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Software and Method: Reflections on Teaching and Using QSR NVivo in Doctoral Research

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This reflective paper draws on a range of experiences developed over the last 11 years regarding the way in which qualitative data analysis (QDA) software (QSR NUD*IST and NVivo) is taught and used within doctoral research. The existing separation of qualitative methods training from QDA software training can result in disconnected technical and methodological learning curves. This can cause a number of problems for doctoral students because a 'methods revolution' is being experienced and current students are not necessarily exposed to the support they require via the methods literature, their postgraduate training programme or their supervisor. Three key influences on the use of QDA software are discussed within the context of teaching and learning QSR NVivo: the increased popularity of QDA software amongst those from traditionally positivistic backgrounds; the promise of improved levels of transparency; and the reliance upon the free tutorials, which are distributed with the software, to learn qualitative research methods as well as software processes. Implications for doctoral students, supervisors and examiners are discussed.

My Story

I first became involved in computer-assisted qualitative research in 1994, when I considered doing some interviews to supplement the main quantitative study in my doctoral research. I was located in the Science Faculty of a traditional United Kingdom (UK) university under the supervision of a chartered health psychologist. The only colleagues engaging with qualitative research were some clinical psychologists; none had any experience of using a qualitative software package. I decided from the outset

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that I would use a computer program to facilitate my analysis. I referred to Miles and Huberman (1994) and decided to select QSR NUD*IST (version 3).

I viewed qualitative analysis in much the same way as I did in quantitative study, i.e. as a separate phase to data collection. It never occurred to me that this should be an iterative process (Johnston, Corban, & Clarke, 1999) or that I could use the software to assist with the organization and integration of my literature review (Bringer, Johnston, & Brackenridge, 2004; di Gregorio, 2000). I never considered that my use of software would be questioned in any way (Richards, L., 2002) or that I would need to spend considerable time and valuable word space explaining the background and use of qualitative data analysis (QDA) software in my thesis, viva and resultant articles (Johnston & Carroll, 1998a, 1998b; Johnston *et al.*, 1999). I never imagined that I would invest so much time learning the technical aspects of the software, or that I would squander a considerable amount of this time doing irrelevant things with it. I failed to recognize that I had fallen into a coding trap (di Gregario, 2003a, 2003b; Gilbert, 1999, 2002; Richards, L., 2002) and I never discussed the idea of keeping a research journal to help document the processes involved, or to write and link memos to assist with my audit trail (Bringer *et al.*, 2004; di Gregorio, 2003a, 2003b). It never even occurred to me that keeping archived copies of the project to refer back to might aid the writing-up process (Bringer *et al.*, 2004). Towards the end of my doctoral research, NUD*IST version 4 was launched and I attended a training course with the software developer (Lyn Richards). It was at this point that I discovered my ignorance regarding the skilful use of the software. More importantly, I discovered how much I did not know about qualitative research.

In the last eight years, I have delivered training courses in NUD*IST and NVivo to academics, policy makers and research groups throughout the UK and internationally. I have attended several training sessions with the software developers,[1] and spent time at a specialist research retreat.[2] During this time I have met literally hundreds of qualitative researchers from a range of countries and subject disciplines.

In the majority of my training courses the participants have been studying for a higher degree, usually a doctorate. On a minority of occasions the student's supervisor has also attended. Over the last eight years I have witnessed a growing demand for training in university departments which have traditionally eschewed qualitative research. This pattern of adoption and use has been recognized and discussed elsewhere (Fielding & Lee, 2002). I have also found that my approach to teaching has increasingly moved away from the technical aspects of the software towards an integration of software processes and qualitative methods. I have found that researchers are eager for information on the impact of computing on methods. As a research degree supervisor and examiner I have witnessed examples of successful and unsuccessful QDA software use. Some students have used the software in innovative and creative ways and the thesis has arguably been improved as a result (see e.g. Bringer, 2002); others whom I have examined have not used the software effectively.

L. Richards (2002) called for more debate, honest reflection and discussion on the impact of qualitative software packages on the way in which we actually *do* qualitative research. There are lots of different software programs on the market which can assist

with qualitative data analysis. This paper focuses specifically on the use of NVivo[3] within doctoral research. The reader is referred to Delamont, Aitkinson, and Parry (2004) for a discussion of wider issues in the PhD supervision process, and to Bazeley and L. Richards (2000), Morse and L. Richards (2002) and L. Richards (1999b, 2005) for information on the use of NVivo more generally.

Technical and Methodological Learning Curves

It is true to say that there is a 'technical learning curve' with any new software; with QDA software programs is it clearly also true to say that there is a 'methodological learning curve' involved, because technology has revolutionized the way in which researchers now approach qualitative data analysis (L. Richards, 2002). The problem for many current doctoral candidates is that they are finding themselves increasingly ensnared in this 'methods revolution' without access to an informed research methods literature, integrated research training programmes or a well-versed supervisor.

Typically, the students who attend my training sessions are at quite an advanced stage in the doctoral process, because they (and their supervisors) do not consider the issue of software training until too late in the process (as they might do with SPSS). The majority will have completed their initial literature review and will have started and occasionally completed their data collection before they actually engage with the software. In some cases, participants have already conducted a considerable amount of analysis using manual methods or with the aid of Microsoft Word. This is extremely unfortunate because the software can, and arguably should, be used from the beginning of the research process (see L. Richards, 2005, for a discussion).

In my experience in the UK, it is common for students to start a doctoral thesis without having a detailed knowledge of qualitative analysis methods. In many cases students complain that their supervisor(s) also has a lack of knowledge of qualitative research processes or a lack of knowledge of, or a resistance to, the use of a specific software program. Resistance to the use of QDA software is often fuelled by an outdated research methods literature, which is still dominated by discussions about the relative pros and cons of various software programs. Fielding (2002) correctly asserts that this is because QDA software programs are still not viewed as integral to the analysis process; as a result, current methods texts still include separate chapters on software, suggesting a false dichotomy between 'tool' and 'process' (see e.g. Weitzman, 2003; Willig, 2001). For those embracing Glaser's Grounded Theory (GT) perspective this is no doubt aggravated by his scathing and misplaced critique of computer-assisted approaches to GT analysis (Glaser, 2003).

Most of the existing literature examining the impact of software on the way we do qualitative research has been written either by the software developers (see e.g. Bazeley & L. Richards, 2000; Morse & L. Richards, 2002; L. Richards, 1998, 1999a, 1999b, 2000, 2002) or by people involved in software training and consultancy (see e.g. Bazeley, 2002, 2003a; di Gregorio, 2000, 2003a, 2003b; Jackson, 2003). Reflective reports about the way in which computing has influenced the way in which we do qualitative research are still largely confined to specialist conferences on qualitative computing, such as the

QSR Strategies Conference Series.[4] In the UK, funding for attendance at conferences is usually on the condition that research students are presenting their work. Thus, many UK-based research students are not funded to attend such specialist conferences until it is too late in the doctoral process.

The Economic and Social Research Council (ESRC) inadvertently contributed to this false dichotomy between software and methods training when they issued their research training guidelines for postgraduate students (ESRC, 2001). These guidelines fail to emphasize the need for an integration of technology and methodology within postgraduate methods training. As a consequence, it is not unusual for university departments either to send postgraduate students for specialist training (e.g. the ESRC-funded CAQDAS Networking project[5]) or to buy in specialists trainers in qualitative data analysis to teach specific software packages.

I have been bought in to many different universities within the UK over the last few years to provide specific software training. It is impossible to teach students how to use the technical aspects of the software without talking about qualitative methods or to discuss the impact that software has had on the way we do qualitative analysis. Students need to fully understand the 'methods revolution' (L. Richards, 2005) and are eager for information on this. The challenge of combining discussions about methodology and teaching the functional aspects of the software is a difficult one and an initial literature is starting to emerge on this topic. Jackson (2003) reports that in the United States (US) she is also bought in to deliver short-course training sessions to a number of universities. In her article she provides some useful guidance on blending technology and methodology within the context of short-term training courses.

Carvajal (2002) is critical of the short-course approach to training and argues that traditional research methods courses need to be changed to ensure software use is fully integrated into the programme. In his analysis of a number of training workshops advertised via the QUAL-Software e-mail discussion group he noticed that most were one-day sessions, prerequisite knowledge of qualitative methodology or methods was typically not required, all workshops were advertised as hands-on yet participants were typically working on someone else's data, and the majority focused on the technological rather than the methodological aspects. University departments need to consider whether or not a short-course training workshop is sufficient or whether qualitative methods and software training should be fully integrated as part of a doctoral student's research training programme.

Differences between the doctoral system in the UK and the US would suggest that integration may be easier to achieve within the US system because of the increased emphasis on research training within the US system. This is reflected in the level of interest shown in the US in the international conference dedicated to Teaching Qualitative Methods Using Qualitative Software.[6] Davidson (2004) recently presented three case examples to demonstrate how she integrated NVivo into her semester-long research methods programme for doctoral students in the US. She highlighted a number of tensions associated with grading a student's performance and pointed out that 'understanding how qualitative research software works and understanding how

to teach it are relatively but distinctly different forms of knowledge' (Davidson, personal communication, 2004).

A doctoral student's lack of understanding regarding the integration of technology and methodology may be hindered further if their research degree supervisor is unfamiliar with both QDA software and the emerging literature regarding the 'methods revolution' (see e.g. di Gregorio, 2003a; Gilbert, 1999; Jackson, 2003; Marshall, 2002; L. Richards, 2002). Qualitative software has been publicly available for 21 years (L. Richards, 2004), yet there are no current requirements in the UK for doctoral supervisors or examiners to be trained in the use of QDA software. Is it acceptable for doctoral supervisors and examiners to know less about computer-assisted approaches to analysis and the current methods revolution than their students?

One way that the novice NVivo user can speed up the technical learning, associated with the familiarization of the software functionality, is to use it as a management tool for the *whole* doctoral process, not simply the aspects that they initially view as data (e.g. transcribed interviews and focus groups, field notes). The most obvious things to include would be the student's research diary, different types of memos and their literature review (see e.g. Bringer *et al.*, 2004; di Gregorio, 2000). In her practical text entitled *Handling Qualitative Data*, L. Richards (2005) stresses the importance of using software from the earliest point in a project. If a student can see multiple uses in the program, they are arguably more likely to invest the necessary time required to learn its functionality. It is essential that doctoral supervisors recognize that this can be a time-consuming process and one that must begin early in the doctoral programme.

A Consequence of Lack of Integration: The Code and Retrieve Cycle

Qualitative researchers have in the past expressed concern about losing closeness to data (see e.g. Fielding & Lee, 1998; Weitzman & Miles, 1995). Yet, somewhat ironically, in examining the concept of closeness to data and software use, researchers have discovered that software can allow some users to get *too* close and this can lead to a code and retrieve cycle. NVivo trainers around the world (e.g. in the US: Gilbert, 1999; Jackson, 2003; in the UK: di Gregorio, 2003a; and in Australia: Marshall, 2002; L. Richards, 2002, 2005) have identified this. Researchers, particularly (but not exclusively) novice qualitative researchers, have found themselves coding in a somewhat mechanistic manner, often for excessively long periods of time, without using some of the in-built tools to help them to see the proverbial wood from the trees. This incessant desire to code every part of a document without taking time to think and reflect upon data can lead to an overly descriptive prosaic project.

Gilbert (1999) conducted in-depth interviews with qualitative researchers who had experience of manual and computer-assisted methods of analysis and describes three levels of closeness to the data: the *tactile–digital divide* (working on screen verses paper), the *coding trap* (getting too close), and the *metacognitive shift* (reflection on processes). Gilbert explained that movement from each level was driven by a gradual adaptation towards confident software use. When users were able to reflect appropriately upon their software use (metacognitive shift), they were able to correct errors

which had thwarted their progress at earlier stages (e.g. when they encountered the coding trap). Given the timing of Gilbert's study, it is likely that the problem of the tactile digital divide has reduced with the normalization of software in our everyday lives.

It is certainly true to say that computer software can facilitate and/or highlight the coding trap and the code and retrieve cycle, but I would suggest that there are three key influences here, as follows.

1. QDA software programs have arguably increased the popularity of qualitative research amongst those from traditionally positivistic backgrounds and they have brought with them different ways of approaching qualitative data analysis.
2. The transparency that comes with QDA software may have merely highlighted a problem that has always existed.
3. The free tutorials, which are distributed with the software, have systematically influenced the way in which people have used the software.

Heightened Popularity of Qualitative Research

QDA software has undoubtedly legitimized qualitative research in disciplines that have traditionally adopted quantitative approaches (see Fielding & Lee, 2002). This has been accompanied by a growing interest in mixed-methods approaches more generally in the social and behavioural sciences (see e.g. Tashakkori & Teddlie, 2003). One of the reasons for this may be the increased ability to link qualitative and quantitative data in a way that was extremely difficult to do without software.

For example, importing tabular data from a statistical software package on things that you know you know about participants (*document attributes*) or cases (*node attributes*) can be incredibly useful when using NVivo's powerful search tool to compare and contrast themes (Welsh, 2002). Using node and document attributes in this way can allow researchers to automatically filter out (via the creation of sets) certain people or themes on the basis of known characteristics. L. Richards (2000) has named this type of analysis 'pattern analysis', and suggested that many people who claim to be using versions of GT are in fact performing a form of pattern analysis. Seale (2002) conducted a review of published articles that mentioned the use of QDA software and found that in most cases the analysis was indeed a type of pattern analysis. This resulted in a lack of analytic depth and was criticized on the grounds of questionable credibility and trustworthiness.

The developers of NVivo have also given significant attention to the ability to export detailed coding information. This offers the potential to create data sets from the qualitative data which may then be exported to a statistical program, the advantage being that the researcher can then go back to the original text to seek further interpretation (Bazeley, 2004). A recent review of over 200 published mixed-methods studies by Bryman (2004) revealed just seven which involved transformation of qualitative data to a quantitative form. In a recent presentation to the ESRC Research Methods Festival in the UK (a festival which is heavily subsidized and targeted towards doctoral

students), Bell (2004) provided a technical overview of how qualitative data can be linked to quantitative data. Regrettably, he failed to enter into any discussion about what these numbers actually meant or to adequately direct researchers to the existing literature (see e.g. Bazeley, 1999, 2002, 2003a, 2003b, 2004). Not only is there enormous scope for development in this area; there is also a need for sound theoretical consideration of the issues raised (Bazeley, 2004).

Some aspects of QDA software programs, such as the ability to generate coding automatically or to search text for keywords, phrases or patterns of words, can save a considerable amount of time. However, the fact that software can assist researchers in searching text in this way does not justify the *sole use* of these tools within a qualitative study. Inductive techniques coupled with the strategic use of the search tool, document links, node links, the show tool and the modeller are required to gain a rich understanding of the data (see L. Richards, 2005, for a practical discussion).

It is not unusual for qualitative researchers to talk about rigour within qualitative research via discussions of inter-coder reliability (see e.g. Kaczynski, 2003). For some, rigour may be conceptualized as consistency and completeness in coding. If this type of consistency is strived for, then it is certainly true that a range of tools within NVivo can facilitate the process (e.g. generating profile reports on nodes and documents, skilful use of the assay and show tools, matrix searching to generate coding tables, viewing nodes and documents with coding stripes etc.). However, a discussion of the impact of QDA software programs on the increased level of rigour within different methodological approaches has still to be had (L. Richards, 2004). If a mixed-methods approach to analysis is being pursued, it is particularly important for researchers to discuss how this fits with the methodological perspective they are adopting and to debate where, why and in what way rigour fits with their underpinning epistemological position.

Unprecedented Levels of Transparency: Has the Code and Retrieve Cycle Always Existed?

It may be the case that the 'code and retrieve' cycle has always existed and has simply been exposed as a 'dirty secret' via the use of QDA software (L. Richards, 2004). With manual methods there has traditionally been much more scrutiny of the final *product* (e.g. doctoral thesis) rather than the research *processes* involved in creating the final product. QDA programs such as NVivo provide a considerable potential to give unprecedented levels of transparency within qualitative research. For example, it is now possible for supervisors and examiners to view not only the data, but also what a student has done with that data and to track the processes involved in the whole research journey (e.g. browsing data, reading memos, viewing coding structures, reviewing links and annotations, exploring models, examining the research journal etc).

A potential consequence of increased levels of transparency is that the expectations placed upon a current doctoral student may be greater than in the past. This means that the level of assessment in a thesis employing NVivo can be more rigorous. This level of transparency has historically been much easier to assess with quantitative research. In

my own mixed-methods doctoral research, I was instructed to keep all my quantitative data and SPSS output files in case these were required by the examiners. However, the need to keep all my qualitative data only ever referred to my interview transcripts, not what I did with the data. Unfortunately, the use of QDA software has not brought with it the promised levels of transparency in practice. There is still therefore a void between the promised role of computer-assisted methods of analysis in improving the quality of qualitative research and current practices (Gibbs, Friese & Mangabeira, 2002).

Spencer, Ritchie, Lewis, and Dillon (2004) were recently commissioned by the UK government to develop a framework to guide the assessment of the quality of qualitative research. This involved a review of the existing literature relating to standards in qualitative research, and interviews with government-based commissioners of research, representatives from funding councils and academics. The report highlighted four guiding principles: that research should be *contributory*, *defensible in design*, *rigorous in conduct* and *credible in claim*. Transparency was considered to be an essential feature of good research and was seen to involve an honest account of the way in which the research was conducted, a full description of sampling, data collection and analysis processes, and a candid discussion about the relative strengths and weaknesses of the study. Incongruously, this report makes no reference to QDA software programs, despite the obvious role that software can play in maximizing transparency (Bringer et al., 2004; Thompson, 2002).

My own attempt to address the transparency issue has been to encourage doctoral students to write and present reflective accounts of their use of NVivo (see e.g. Bringer, Johnston, & Brackenridge, 2004, 2006; Coupland & Johnston, 2004; Jevon & Johnston 2001, 2003). In the UK, the doctoral viva offers the potential for a detailed discussion of the assessment of research processes as well as the research product (the thesis itself). It is arguably the research processes which are most transferable; paradoxically, they often remain invisible (Thompson, 2002).

The Impact of Demonstration Software on the Use of NVivo

The demonstration tutorials which are distributed with QDA software are incredibly useful aids to teaching and learning. However, they can also encourage novice researchers to use the software inappropriately. This is especially true when users attempt to use the demonstration tutorials as their *sole* method of support. New users tend to be highly motivated to learn the functionality of the software, yet do not necessarily acknowledge that each tutorial is specifically designed to teach *software processes*, not qualitative research methods per se. However, for some new users this may be their first real practical exposure to qualitative research. Thus, in teaching themselves how to use the software they are usually doing so with primarily the technical learning curve in mind.

In my experience, most users report that they get to a certain point in a tutorial and then stop because they feel they know enough, or because they are bored, or because they are under an extreme time pressure to complete their analysis. For some this will involve stopping after they have learned how to code and retrieve. For students who are supervised and examined by those with experience of manual methods and no

exposure to software, this may be perceived as acceptable because it mirrors what the supervisor and examiner expect the software to do. In essence, new users may not know what they need to know because they are misinformed by their supervisors and/or not exposed to the appropriate methods literature via their research methods training programmes.

The problem with the demonstration tutorials which accompany NVivo is that it is only when you move on to the later stages of the tutorials that you can see the full power and functionality of the software. As many of the tutorials are sequenced into different stages, new users often view the later stages as an 'advanced' stage of analysis. Conceptualizing the search functions in NVivo as advanced stages of analysis is simply not true or helpful (Gilbert, 2002). In Gilbert's study of software use, she noted that is only when users become relatively expert with the program that they are able to gain distance on a metacognitive level (Gilbert, 2002). In essence, they cannot see what they are trying to do or how to break down a search into a series of logical steps, which build the results of preliminary searches onto the next search. This is analogous to the novice chess player who fails to think two or three moves ahead in a game. Or, if compared to quantitative analysis, it may be conceptualized as only doing descriptive statistics when multivariate analysis is required.

Some Things to Emphasis When Teaching QSR Vivo

In my experience, there are three key things that need to be emphasized when teaching NVivo (especially if teaching is heavily reliant on the demonstration tutorials): the importance and function of the research journal; the role of the *free* and *tree node system* and why certain trees structures will aid searching and why others will inhibit searches; and the need to gain analytical distance from data to avoid coding traps such as the code and retrieve cycle.

The Importance of the Research Journal

Encouraging a doctoral student to record key decisions, reflections, emergent ideas and hunches within a research journal can help them to gain the necessary analytical distance which is so often lacking in qualitative projects (Gilbert, 2002; Seale, 2002). The main benefit of keeping a research journal *inside* a program such as NVivo is that it encourages the researcher to rapidly and openly record their thoughts, questions, reflections and emergent theoretical ideas to a central executive point in the program. In essence it can act as a conceptual launch pad from which the researcher can then jump to specific points in their literature, data or memos to explain, conceptualize and theorize. In NVivo, the journal can be coded and searched, and linked to other documents via *internal annotations*, *in-text doclinks* and *node links*, and with *node extracts*.

An electronic research journal can aid further interpretation and creativity, because it gives the person time to reflect, think, ask further questions, and try to explain or theorize about the data in a flexible way, without the fear of losing where they are in their project. I encourage doctoral students to use their research journal as a planning

tool for supervisory meetings and to help them to write their reflections on the whole doctoral process. The feedback that I have received is that students find this enjoyable and relatively easy to write because their journey is already mapped out and contained in a central place. Ironically, the flexibility and creativity that this facility provides is the very thing Glaser (2003) appears to be so concerned about losing when he critiques the use of QDA software.

The Problem of Multiplicative Tree Structures

One of the most common errors that new users tend to make is that they view the index (tree) system as a way of modelling their theory, or expected thesis chapters, rather than viewing it as a functional infrastructure that can maximize the way the data are searched. Poorly organized tree structures include different types of concepts in the same tree and typically contain multiple repetitions of the same node in various places throughout the tree structure (T. Richards, 2004). When developing a child node it is helpful to ask: 'Is this node a conceptually related and mutually exclusive sub-category of the node that I am planning to attach it to (the parent node)?'. A further question to consider might be: 'Can I create a new node using the search tool functions by combing existing nodes or do I need to code up from the data interactively?' (for a further discussion, see Bazeley & L. Richards, 2000; Morse & L. Richards, 2002; or L. Richards, 2005). Unfortunately, several of the demonstration tutorials which accompany the NVivo software actually violate some of these good-practice guidelines and show examples of inflexible and multiplicative coding systems. Thus is it no accidence that problematic index systems are so common in practice.

Gaining Analytical Distance to Maximize Searching

Demonstration tutorials do not sufficiently emphasize the inbuilt tools which can help a researcher to gain analytic distance from their data, or tools associated with an iterative approach to analysis. Under-utilized aspects include assay, the show tool, doc links and node links, because users often fail to see their purpose. One of the most under-used aspects of the search tool is the use of the 'scope' facility. Users fail to appreciate the importance of sets and how the scoping aspect of the search tool can help them to create sets. They also tend to rely heavily on intersect and matrix searching because they find it easier to conceptualize what this type of search is doing. Stepping back from the data and thinking logically about how to build and develop the results of searches into an iterative series of steps is at the heart of expert use of NVivo. It may be that those who have been traditionally attracted to qualitative research have a predisposition toward creativity rather than logic!

Conclusion

I have raised several pedagogic issues regarding the integration of software and method in the training of doctoral researchers. I have discussed some common problems and

influences associated with the use of NVivo software and offered some practical suggestions which may be incorporated into training. These issues could be usefully discussed and debated within postgraduate methods training programmes. Research degree supervisors need to engage with this debate.

Acknowledgements

Notes

[1]   See http://www.qsrinternational.com. Retrieved 14 October, 2004.
[2]   See http://www.researchsupport.com.au. Retrieved 14 October, 2004.
[3]   See endnote 1.
[4]   See http://www.dur.ac.uk/strategies.conference. Retrieved 14 October, 2004.
[5]   See http://caqdas.soc.surrey.ac.uk. Retrieved 14 October, 2004.
[6]   See http://www.wcer.wisc.edu/tqm. Retrieved 14 October, 2004.

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