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Grounded Theory and NVivo: Wars and Wins

Jacqui Soliman
Melanie Kan
University of Technology Sydney

Interaction Design and Work Practice Laboratory
University of Technology Sydney
Sydney, New South Wales
Email: jsoliman@uts.edu.au

Abstract

The development and use of qualitative software tools have potentially revolutionised the ways in which qualitative researchers design their projects and analyse their data. The degree of this impact and the arguments surrounding the use of qualitative software appear to be polarised: for and against. This paper critically reflects on the process of using one qualitative software tool, NVivo, used to assist in grounded theory analysis. The ways in which NVivo was used throughout the various phases of data collection, analysis and conceptualisation are discussed from the viewpoints of two researchers.

INTRODUCTION

Computer assisted qualitative data analysis software (CAQDAS) is becoming increasingly prevalent in qualitative research. There are now a wide range of CAQDAS packages available (Lee & Esterhuizen, 2000; Weitzman, 2003). However, there are strong arguments over whether or not one should use CAQDAS, and the degree of its impact on the quality of the research (Glaser, 1998). Despite this, there are limited reflections on the actual methodological implications of using such software. This presents a challenge, in particular, for researchers new to qualitative research, who are more susceptible to adopting CAQDAS within their research without serious consideration of its effect (Mangabeira et al., 2004; Fielding & Lee, 1998; Gilbert, 2002; Blismas & Dainty, 2003; L. Richards, 2002).

This paper considers one CAQDAS tool, QSR NUD*IST Vivo (NVivo) (Fraser, 1999) and one methodology, grounded theory as outlined by Glaser (Glaser, 1978, 1992, 1998; Glaser & Strauss, 1967), from the perspectives of two researchers who were new to both grounded theory and NVivo. It is important to emphasise here that we concentrate on the grounded theory methodology as presented by (Glaser & Strauss, 1967; Glaser, 1978, 1992, 1998). Therefore, a discussion of the debate surrounding the method of grounded theory is beyond the scope of this paper.

Adopting this approach immediately thrust us into the midst of the arguments surrounding the use of CAQDAS. Glaser's arguments appeared rather vociferous regarding the use of software for grounded theory studies, arguing that computer use in grounded theory provides a safety net, encouraging the researcher to produce a full descriptive coverage rather than a grounded theory. This, in turn, aborts the intuitive skill development necessary for grounded theory (Glaser, 1998). For researchers such as ourselves, choosing to adopt this approach raised formidable concerns in using CAQDAS. This paper was birthed out of a consideration of these issues.

To further complicate matters, coinciding with Glaser's strong arguments against CAQDAS use are the equally strong arguments for. Some researchers have been strongly encouraged to adopt the use of CAQDAS in their research by their research institution (Bringer et al., 2004; Mangabeira et al., 2004). This, however, was not an issue for the authors, although there was an implicit expectation to utilise the latest available tools to assist with analysis. Anecdotal evidence from more experienced qualitative researchers gave us the impression that qualitative analysis would involve months of manual cutting of transcripts, endless shuffling of paper and the risk of being lost in a sea of index cards and transcript fragments. This, along with the impression that software would make the seemingly daunting task of qualitative analysis more manageable, formed the initial assumption that CAQDAS should be used.

With an awareness of these issues arose the challenge of reconciling the use of NVivo with grounded theory. This challenge was compounded further by the several cautions offered when using software, and the importance of understanding the adopted research methodology (Morse & Richards, 2002). Disappointingly, Glaser's myopic view of CAQDAS use within grounded theory has failed to offer a serious critique of grounded theory's compatibility of CAQDAS use. Even so, Glaser conceded that he was open to the use of computerisation if he could be shown that it was not incompatible with the tenets of grounded theory (Glaser, 1998). The following section examines the relevant literature in order to address the methodological implications of using NVivo for grounded theory analysis. Subsequent sections discuss our perceptions of the conceptual assumptions behind NVivo and some critical reflections on using this software to support data management and analysis.

USING QUALITATIVE SOFTWARE: ARGUMENTS FOR AND AGAINST

'Threads' in the debate

On exploration of the literature, it soon became apparent that there were many 'threads' involved in this debate, raising several key issues for consideration. These issues included why people choose (or not) to use software, how the software is used, who the users are, and the critiques of use.

To use or not to use?

Weitzman (2003) offered a useful overview of the issues surrounding software use for researchers seeking direction on the use of CAQDAS in their research. In describing some of the ways that software could facilitate analysis, he discussed the view of some researchers that software would do the analysis for them, and how this view tended to either attract or repel researchers to use the software in their research. This is where most of the debate of CAQDAS use in qualitative research is centred. Weitzman contended that software was simply a tool for the researcher to assist in the analysis, but it would not actually do the analysis for the researcher. Ultimately, he argued that the responsibility lies with the researcher to understand the methods of analysis within their chosen approach; a view supported extensively throughout the literature (Morse & Richards, 2002; Fielding & Lee, 1991; Macmillan & Koenig, 2004; Gilbert, 2002; Weitzman, 2003). The use of CAQDAS in qualitative theory building is an extension of this concern and Weitzman argued that software would not do the theory building, but it could support the researcher to do so. He also acknowledged, however, the potential for this to change in the future.

Gilbert (2002) explored the tool metaphor reflectively within the context of a study of CAQDAS use. She considered several aspects of tool use: the goals of the user for using the tool, the implicit goals built into the tool by the developers, the power of the tool, the range of functions, and the skill of the user of the tool. In doing so, she highlighted several interrelationships between these aspects of use and concluded that "researchers at all levels must guard against the assumption that learning qualitative software is equivalent to learning qualitative research" (Gilbert, 2002, p227). Gilbert's arguments echo the threads of our present reflections. However, these threads first need to be unravelled before considering the methodological implications of CAQDAS use. The goals of the user for adopting the tool are closely interwoven with why people choose the software option and who they are.

Why people choose software

There are several reasons cited in the literature for why people choose software, amongst these are to facilitate data management (Lee & Esterhuizen, 2000; Welsh, 2002; Blismas & Dainty, 2003), search facilities (Blismas & Dainty, 2003), greater methodological transparency (Dainty et al., 2000; Bringer et al., 2004), and to alleviate the time consuming aspects of qualitative research (Dainty et al., 2000). These were succinctly summarised by Weitzman (2003) in his discussion of what we can expect to gain from the use of software. *Consolidation* of all data and theory in the one place supports the analysis process. *Consistency* helps the researcher to undertake careful exploration of the data. *Speed* allows the researcher to undertake greater exploration of the data. *Representation* helps the researcher to visualise and extend their thinking of the data and therefore assist in theory building. Weitzman also mentioned that these gains all have a flip side, which has the potential to encourage users to become lazy and take shortcuts in their research. This, in turn, has affected the way in which CAQDAS has been and is used by researchers (L. Richards, 2002).

The ways in which such software is used can range from developing and maintaining a multifunctional database to a theory building tool. Examination of the literature revealed that most people tended to use the software for the gains that consolidation, consistency and speed could offer (Welsh, 2002; Mangabeira et al., 2004; Blismas & Dainty, 2003; Dainty et al., 2000; Fielding & Lee, 1998). Reflection on the gain of representation has been limited. Those who opted out of using NVivo for the gain of representation gave the reasons that it was difficult to show the model on the whole screen at once (Welsh, 2002), and that "the features were inflexible or not functional enough to entice the user into seriously considering using them" (Blismas & Dainty, 2003, p458). Blismas & Dainty (2003) further state that they believe one of the weaknesses of NVivo is its potential to influence researchers' analytical techniques. This is, of course, one of the real fears of software that Weitzman (2003) described as the flip side of representation – that the conceptual assumptions behind the program will shape the analysis. Even for those who chose to use NVivo for the gain of representation neglect to reflect critically on why they have done so. For example, Bringer et al. (2004) state that they chose to do so because it was useful for developing the themes and their relationships. However, they did not reflect at a deeper level: of what the methodological implications of doing so are, on the conceptual assumptions behind the software and if it constrained their research. It is here that we see the goals of the user coming into play. How they have chosen to use CAQDAS is related to why they chose it and the extent to which they employed the various functions needs to be in accordance with their research goals.

Who are the users?

This question raises the issue of the skill of the software user. The skill of the researcher determines to a large extent how they will use the software, and also the potentially detrimental effect on their research if they fail to grasp the power of the software and the damage it can cause if used inappropriately. For example, the potential speed of coding could lead to taking shortcuts and the conceptual assumptions behind the software could encourage the researcher to think only about their data in terms of their own assumption (Weitzman, 2003). Herein again lies researcher responsibility to ensure that the software is compatible with their research goals.

A study undertaken by Mangabeira et al. (2004) discusses how the experience of the qualitative researcher and their experience in using computers could affect their approach to research. Experience as a qualitative researcher could either drive them to use the software skilfully or not at all, depending on their naivety of computer use. Inexperience in both qualitative research and in using CAQDAS means that users face the issue of balancing their methodological and software training, and they are in the most danger of adopting the view that software will do the analysis for them, particularly if learning the software is in isolation. This view is also supported by L. Richards (2002) and Gilbert (2002). Again this emphasises the importance of the researcher in stating their goals.

Blismas & Dainty (2003) provide an example of how the inexperience of the researcher can affect the approach to research. They report that many construction management researchers are fast adopting CAQDAS, in order to address the issue of qualitative research being traditionally perceived within their field as lacking rigour, consistency and methodological transparency, and also to manage the volume of data in a sensible time scale. The gains of speed, consistency and consolidation that the software offers creates an illusion of rigour, leading them to also believe that it provides the necessary methodological framework for the research.

Critiques of use

Much of the reflection on CAQDAS use has centred around those who use it for its data management capabilities, rather than its perceived theory building capabilities. Critiques that actually reflect on the methodological implications of CAQDAS and evaluations of the effectiveness of such use are limited. Consequently, there is a need reiterated throughout the literature for continued and critical debate (L. Richards, 2002, 1995; Bringer et al., 2004; Blismas & Dainty, 2003; Weitzman, 2003).

The limited critiques of CAQDAS use for its theory building aspects was explored by L. Richards (2002). She noted that many researchers are not using the theorising tools available in NVivo and NUD*IST, a view also supported by Kelle (1997). She speculated that there were two main reasons for this: the tools were not understood, or they were simply not wanted, but "neither possibility has hitherto been faced in the literature" (L. Richards, 2002, p271). That software is most easily approached through coding, and least through the searching and theorising processes is understandable, but she raised the possibility of some other key factors coming into play.

One factor was a trend of people attracted to using the software who had no qualitative training, and often faith that the software would do the analysis. These people tended towards 'pattern analysis' and not theory building. Studies undertaken by Mangabeira et al., (2004) agreed with this factor. They concluded that inexperienced researchers are at the most risk of CAQDAS taking over their approach to analysis, or as stated by Macmillan & Koenig (2004), being wowed by the software and the potential gains that it offers, so much so that they are blinded by the flip side of these gains. Macmillan & Koenig (2004) term the belief of these people the 'wow factor' (the unexplored assumption that research is enhanced by the use of software, and the tendency toward uncritical appraisal). They argued that this needs to be deconstructed to raise the level of debate from simple descriptions of use and functionality to a serious critique of how software might transform the analytical process.

It is on this point especially that Glaser vociferously argued against the use of software, stating that doing so tends towards pattern analysis. He argued that computer use tends toward "description, counting and logical interpretation" (Glaser, 1998, p146) and uses the following example to make this point:

> "In coding for foundated relationships in global security transactions the researcher runs into the patterns of making many calls and making infrequent calls between buyer and broker. It became easy to start saying that making many calls (without analysing meaning) is an effort to develop and continue a relationship of trust, a relationship with a foundation. Infrequent calls are made in relationships of little trust with little foundation. The constant comparative method focusing on the meanings involved showed different properties of this pattern. Infrequent calls meant a relationship of total trust, so it was used with total confidence in transactions only when necessary and judicially" (Glaser, 1998, p146).

Essentially he is correct, but only partially so. He neglected to mention that the researcher is the one responsible to make this comparison, not the computer, consequently it is the researcher who may tend towards pattern analysis, not the computer.

The other factor is the lack of contribution to the debate from experienced qualitative researchers, from both those using and not using the software. L. Richards (2002) suggested that for those using the software, a likely reason is "that they were not encouraged by their senior colleagues to offer debate" (p273). As for those not using the software, her reflections were more critical. Those who found software to be incompatible with their research goals were described broadly as 'losers', with an unclear differentiation between those users who outrightly reject the use of software in qualitative research, and those who reject the software for theory building but still utilise it for data management.

It is here that the debate becomes noticeably polarised, around the issue of the extent to which the software can actually aid in theorising. Kelle (1997) argued that it is at this point that researchers need to be most concerned about the danger of methodological biases that may arise from CAQDAS use. If CAQDAS is regarded as a tool for data analysis and not simply data management, then there must be a methodological underpinning. Likewise, Weitzman (2003) discussed how conceptual approaches imposed by the software could impact research and encouraged researchers to realise that these could prove beneficial or impose constraints, and it was important not to be trapped by them.

We suggest that a lack of in-depth reflection on the conceptual assumptions behind the software is a further explanation for the limited critiques of use. The depth of reflection on this issue will determine to what extent the methodological implications are evaluated. We argue that the onus remains on the researcher to ensure that the program serves their analytic needs, not the other way round.

Reconciling the use of NVivo with grounded theory - the original quest

The recurring theme that ties the above threads together is the agency of the researcher – the importance of the researcher guiding the use of the software and the direction of their research design. With Glaser's arguments against the use of software coupled with limited reflections in the literature from grounded theory researchers, the question remains: How is someone using grounded theory as their research methodology guided to use software throughout the research process? To answer this question, the following sections consider the conceptual assumptions behind the software and how two researchers applied their understandings of these assumptions within the grounded theory approach.

CONCEPTUAL ASSUMPTIONS BEHIND NVIVO

A potentially confusing issue is the debate as to what extent NVivo has been influenced by grounded theory (Lonkila, 1995; Coffey et al., 1996; Kelle, 1997; Fielding & Lee, 1998). NUD*IST (the predecessor to NVivo) was described by Lonkila as a "grounded-theory based program" (Lonkila, 1995, p49). Recent instructional texts on CAQDAS use to implement qualitative data analysis have also suggested the usefulness of NVivo in grounded theory. For example, Gibbs (2002) stated that "the design of NVivo was strongly influenced by grounded theory and therefore the program gives good support for the method" (p. 165). A belief that NVivo has been strongly influenced by grounded theory potentially traps the researcher into thinking that the software is capable of providing instantaneous support.

Contrary to this belief, the NVivo developers have constantly reiterated that the software was intended to be a general qualitative data analysis tool (L. Richards, 1999; T. Richards, 2002; T. Richards & Richards, 1995; Crowley et al., 2002). In fact, one of the original developers used grounded theory as an example of a method that "has always lived a somewhat contorted life in a computer" (T. Richards, 2002, p211). He argued that it is only the introduction of NVivo that has enabled the grounded theory researcher to more easily do grounded theory with the computer. In fact, he continued on to state that "NVivo, as was intended, is being preferred by researchers wishing to do a very detailed and finely articulated study, perhaps using linguistic techniques" (T. Richards, 2002, p211). Therefore, from the developer's viewpoint, NVivo was not intended to be specifically used for grounded theory.

Our first impressions of NVivo were that it was user friendly and potentially well suited the grounded theory approach, for example, ease and flexibility of coding and memoing. As codes began to emerge however, a concomitant emergence of discrepancies within the various instructive texts required a closer investigation of both grounded theory and NVivo assumptions. For example, consider the following extract from a primary instructional text on NVivo: "Nodes need not have coding. You might want nodes to store ideas, with Memos about them, or to record the category you are curious about but yet have no data to code at. You might also create nodes to represent cases you are yet to study. You will probably have some idea of the categories you want your data sorted into before you begin work on your project. Create a tree node structure to hold these categories: you can change or expand it later, as your data evolves" (L. Richards, 1999, p59). This conflicts with Glaser's instructions regarding coding. He states that codes are assigned through constant comparison of the data. As such, to predetermine the categories and possible relationships between them goes against the very idea of emergence (Glaser, 1992). The very generality that the developers claim NVivo is capable of can be the grounded theory researcher's downfall, if they do not continually consider how the methodology is guiding the use of the software.

In particular, it was in the later stages of the grounded theory approach, particularly raising the level of abstraction and the conceptualisation required to develop the core category, that it became necessary to uncover these assumptions and to reconsider the effectiveness of NVivo to assist with later analysis.

USING NVIVO FOR GROUNDED THEORY ANALYSIS: TWO RESEARCHERS PERSPECTIVES

Data Collection

Alongside Glaser's arguments against using software, are his arguments about taping interviews. He argued that taping produces unnecessary volumes of data and that field notes are sufficient for grounded theory. Consequently, computers only become necessary to manage the overwhelming quantity of unnecessary data. However, both of us transcribed interviews primarily because not doing so could leave us vulnerable to criticisms of rigour, especially as the research was for the purpose of completing our theses. Whether one should transcribe interviews or not is beyond the scope of this paper; the intention here is to comment on how we managed to do so in NVivo while remaining within the bounds of the grounded theory methodology. As coding begins with fracturing the data in order to raise the conceptual level, codes are "of central importance in the generating of theory" (Glaser, 1978, p55).

Progress was initially stunted at this stage, not due to any restrictions that NVivo placed on the data collection, but because of the challenge of merging the writings by Glaser and the various instructional texts on NVivo regarding the

nature of the data. As Glaser prescribed that interviews should not be transcribed, the data to be coded are field notes, whereas the various instructional texts on NVivo, in particular the tutorials that are provided with the software, use full transcripts as the data to be coded. Either full transcripts or field notes can be entered as data in NVivo. As stated earlier, in order to maintain rigour we decided to use full transcripts. To remain in the bounds of the grounded theory methodology we treated the data as a series of incidents, which meant that we initially tended to code at a paragraph level, rather than sentence by sentence as prescribed by Glaser (1978, p57). We considered that coding the transcripts in this manner was akin to making field notes after the interview and then coding those. Coding at the sentence level was also relevant depending on the emerging categories. Essentially, "the goal of the analyst is to generate an emergent set of categories and their properties which fit, work and are relevant for integrating into a theory" (Glaser, 1978, p56). Therefore, we did not feel the approach adopted compromised the methodology.

Generating categories

Coding is the process by which categories are generated, through the use of constant comparison. As coding is central to both grounded theory and NVivo, at first glance it can seem that the two are favourably compatible. However, there are distinct, but subtle differences of the notion of coding by each (Lonkila, 1995). There are several essential properties of coding that the researcher must do for moving to the next conceptual level: constant comparison, tolerate conceptual confusion, and memoing (Glaser, 1998).

Constant comparison

Constant comparison is comparing data to data, and then data to theory as the theory emerges (Dick, 2002). For a category to earn its way into the theory it must be verified through constant comparisons and saturation. Glaser stated that the "basic, defining rule" of constant comparison is "while coding an incident for a category, compare it with the previous incidents coded in the same category" (Glaser, 1965, p439). This is where Glaser (1998) argued that computer use encourages users to create long lists of categories with no constant comparisons; thus constant comparison is at the heart of the difference between a grounded theory and conceptual description. In practice we found that NVivo was compatible and also useful for constant comparative analysis on several levels.

NVivo's code and retrieval functions were excellent tools for comparing the emerging codes. We found that we could see at a glance our coding within and across documents. In comparison, coding by hand would have involved cutting and pasting with scissors and glue. Each piece of paper would have been categorised and tagged with its origins and the potential themes it carried. As the data collection and analysis progressed, this would have created an enormous amount of paper carefully laid out according to the emerging themes. NVivo, on the other hand, circumvented this rather arduous process by conveniently locating the data in 'soft' form with easily created and accessed links between documents and codes.

At a deeper level, we discovered the live Node browser was incredibly empowering for developing concepts and making comparisons while obeying the "basic, defining rule" of constant comparison. This will be demonstrated through the use of the following illustrative example. The browser was easily accessible, so it did not interrupt the flow of trying to make the comparison. It enabled us to re-examine incidents coded at any node, where the meaning of a code needed to be clarified (see Figure 1). The context of the incidents was retained, which further helped to clarify meanings. As demonstrated in Figure 2, as much or as little of the desired context could be shown, for example the first and last lines, enclosing paragraph, or even the document that contains the coded incident. Additionally, all the DocLinks to memos were visible, and also accessible from this browser, as shown in Figure 2 by the document icon at the end of the sentence. As the development of the concept had been captured in the memos, the ability to not only see these links, but also have the ability to go back to the memo and re-read the ideas, was in particular incredibly empowering. To analyse the data manually would have necessitated shuffling through piles of data, with no guarantee that we would manage to locate all the coded incidents.

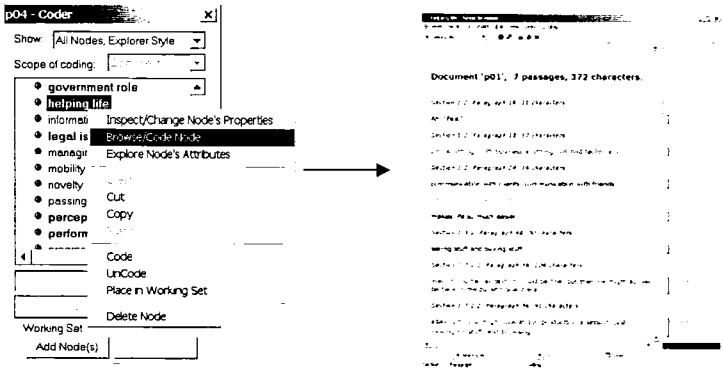

Figure 1 – Illustration of how incidents can be re-examined whilst coding. A list of incidents coded for any node can be displayed via the Browse/Code Node function.

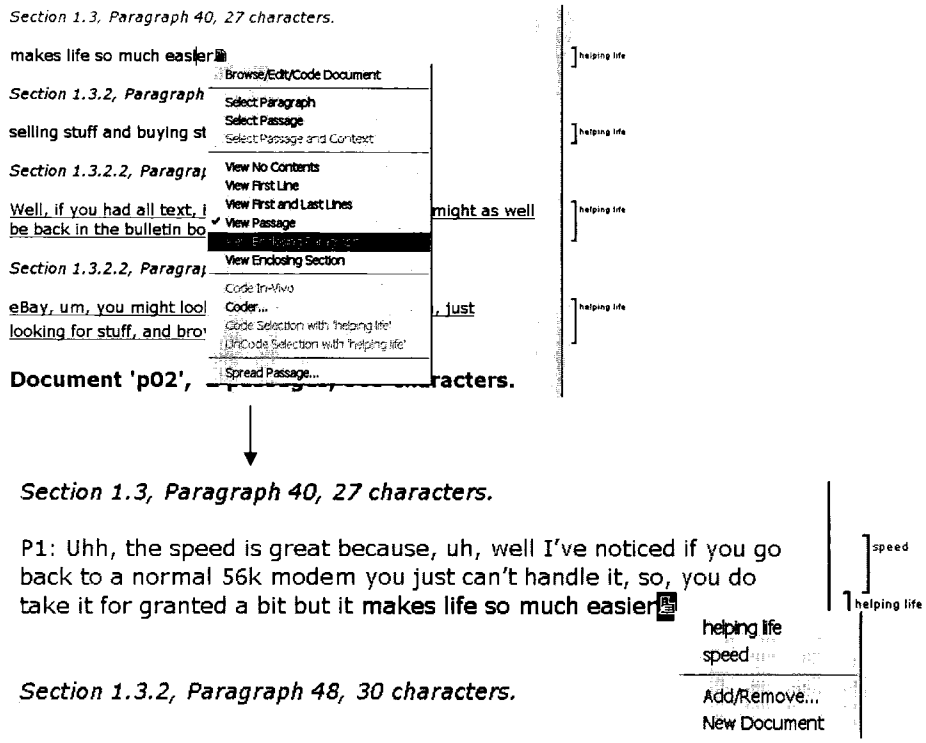

Figure 2 – Illustration of how the context of the incidents was retained. In this example, the context of the coded text is shown in the lighter font, and memos linking to this code are shown in the pop up menu.

One challenge, in particular, that we faced was managing the initial emerging concepts. As the meaning of the concepts are developed constantly through the comparisons, it is important that the researcher is not forced into a hard and fast naming of the concepts. One way this goal was realised in NVivo was through the use of sets. Sets do not move the nodes, they only create an alias to them. For example, two codes that seem to be related conceptually but still require further development of the meaning can be grouped together in a set. So nodes can be placed in as many or as few sets as is desired. This was found to be a flexible way of managing emerging concepts whilst preserving the development of the codes and without prematurely forcing a name on it. Memos were also used to think through the meaning of the emerging concepts.

Tolerating conceptual confusion

Glaser has reiterated that the researcher must be able to tolerate the confusion that arises from the initial fracturing of data and having no immediate structure (Glaser, 1998). He contended that when researchers fail to do careful constant comparison and constant theoretical sampling, they fail to move beyond conceptual description to developing a grounded theory (Glaser, 2002). This is his primary argument against the use of computers – that they force the researcher into conceptual description by stifling the creativity required to conceptualise and develop the theory.

We found that we were able to keep our data unstructured in NVivo through the use of Free Nodes, which helped us to tolerate this conceptual confusion because we did not have to prescribe a structure on our conceptualising. As we were coding our data, we were able to assign categories without prematurely forcing them. NVivo was found to be an excellent tool for quickly generating codes as they emerged specifically because it was designed to code the researcher's ideas *in vivo.* Codes could be easily added to, moved, renamed and deleted.

A more advanced level of coding, tree nodes, structured nodes hierarchically. Depending on the nature of the analysis, this could be a useful function. It is even reminiscent of the increasing levels of abstraction that occur as grounded theory analysis progressed. In practice, we did not necessarily want to impose such a structure on the codes but felt moderately railroaded into doing so. Glaser did not discuss structuring the codes hierarchically. He emphasised the need for researcher tolerance of having no immediate structure. We found that we resorted to paper and whiteboards when analysing codes and their potential relationships. Manual analysis of the codes provided us with greater flexibility and the ability to view 'the bigger picture' in one big diagram, rather than switching between screens.

Memoing

One of Glaser's biggest fears was that software would inhibit the total freedom of memoing (Glaser, 1998). We found that the memoing function of NVivo provided a great degree of freedom. A key element supporting this was the

flexibility in formatting memos. They could take any form chosen by the researcher. Additionally, NVivo allowed the researcher to easily interrupt their coding to memo, through the use of *DocLinks*. Anytime we wanted to capture an idea we could insert a DocLink and immediately capture our idea as a memo. Of course, this did not help with ideas that occurred while we were away from our computers so notebooks and scrap paper were still used to record spontaneous ideas. These ideas were later entered into NVivo.

Discovering the core category

The early stages of data analysis were punctuated by the occasional use of whiteboards and paper as the interrelationships between codes were teased out. As analysis progressed to work with more abstract codes, conceptual analysis moved further towards manual tools. The above arguments surrounding the type and degree of use of CAQDAS were reflected in the practical limitations using NVivo with regard to spontaneity and creativity.

The nature of grounded theory analysis appears, in both literature and personal experience, to rely on the researcher's intuitive ability to discover a theory which embodies the data from which it emerges. Glaser and Strauss (1967) contended that the researcher's personal and temperamental inclinations would influence her or his ability to be theoretically sensitive enough to conceptualise and generate a theory as it emerges from the data.

As data analysis and conceptualisation progressed to higher levels of abstraction, NVivo became less able to visually reflect the developing concepts, as well as a somewhat slower and immobile tool for recording spontaneously emerging ideas. As aforementioned, such ideas could occur while away from the desktop computer and were therefore recorded in a notebook. Sometimes, during an intense analysis session of higher-order categories (more abstract themes), the speed at which ideas flowed were too fast to be recorded in the simple modelling tool provided by NVivo. The other reasons for adopting pen and paper, however, were more compelling.

One reason was the use of metaphor within the models. In the grounded theory study "Identifying Paradox" (Kan, 2002), conceptualising and modelling the resulting theory involved grounding the visual representations of the theory as well as the text. The resulting models were based on the culture and situation from which the grounded theory emerged. Traditional box and arrow diagrams or similar models using ovals and more curved arrows were replaced by a multidimensional five pointed star, the metaphor of scales representing balance, and a stylised double helical spiral. The actual physical experience/action of sitting with a large piece of paper helped to form a larger more holistic understanding of the phenomenon. This tactile process assisted with the kind of total immersion in the data, physically and mentally, needed to conduct qualitative analysis. The holistic nature of these models was unable to be represented by NVivo's modelling tools. To even begin with basic models in NVivo was felt to inhibit creativity at this stage of analysis. This is somewhat reminiscent of Glaser's argument that without a good dose of creativity the researcher will be unable to generate a grounded theory (Glaser, 1978).

The necessity for conceptual freedom during later stages of grounded theory of analysis were reflected by Piantanida (1982) cited in (Piantanida et al., 2004) who described the conceptualisation process as a mosaic. She described her codes as intriguing pebbles that she collected and then used to create a mosaic – a conceptual picture – that conveyed to others what she had come to understand about the phenomenon she investigated. This analogy succinctly summarised the blending of artistic creativity and social intuition with academic rigour essential for high quality qualitative research.

Finally, it is important to mention that NVivo was certainly not cast aside during this stage of analysis. Grounded theory requires the theory to be grounded in the data and therefore was continually used to compare data, codes and the emerging theory, particularly through the powerful search tool and the well structured library of codes. NVivo was and is an invaluable tool for fast and flexible iterations that ensure a continued adherence to the rigour involved that ensured the grounding of the emerging theory.

CONCLUSIONS

The debates surrounding the use of CAQDAS for qualitative research has generated some heated debates amongst software developers and qualitative researchers. While the debate continues, so does the use, abuse and rejection of such tools. The summary of debates followed by the discussion of the wars and the wins for two researchers who used NVivo for a grounded theory study gives some support to both sides of the debate using examples based on practice. The convenience of NVivo to flexibly store, structure and access raw data was one of the key components we felt enhanced grounded theory analysis. During the later stages of conceptualisation, NVivo was used as a constant reference to the raw data to ensure rigour in the resulting conceptualisations. These later stages of analysis moved towards manual analysis as NVivo was felt to be limited in its modelling and graphics tools.

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