QUALITATIVE RESEARCH journal

special issue 2003

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editorial

Teaching qualitative research with QSR Software: a special issue of the *Qualitative Research Journal*

Supriya Singh, guest editor – special issue 2003

In this special issue we bring you reflections from teachers who are trying to incorporate QSR Software in their teaching of qualitative methods. The papers and reports on the working sessions and outcomes are from a conference held in late April 2003 at the University of Wisconsin. We would like to record our appreciation to QSR for their financial contribution to the production of this special issue.

As Chris Thorn says in his introductory remarks, the discussion at the conference was restricted to QSR Software – N6 and NVivo – to avoid focusing on the characteristics of the software. Though many of the participants are knowledgeable about a variety of software, the conference brought together people around one suite of software so that they could concentrate on issues of research and teaching.

A constant theme of the papers is that the software is a tool – a 'mindtool' or background tool – that offers potential for more reflective, detailed and rigorous analysis. The authors reveal how they addressed the challenge of focusing on qualitative research, introducing the mechanics of the software tool, and then having the students use it to enhance the reflexivity and rigour of their research.

These are also the issues at the centre of many discussions at the Association for Qualitative Research (AQR). The use of software now is a standard in qualitative research, yet not everybody is at ease with it. As some of the papers elaborate, there is an unspoken lack of comfort between the hands-on interpretation of data and the machine aspect of software. There is also the feeling, as Lyn says in her piece, that software is an 'add-on' to the hard business of teaching qualitative methods. Yet, those of us who routinely use software – N6 and/or NVivo among others – know that the age of the coloured markers has gone. However, the teaching of qualitative research methods and software within a limited period, continues to be a challenge.

Earl Babbie's opening address made me wish I had been at the Conference. It is a rare person who can talk and write of doing research and make you laugh at the same time. Telling one anecdote after another, mainly about how easy it is to get research wrong, he posed some of the continuing challenges for teachers of research methods. Behind some of the difficulties, Babbie says, are two conflicting

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and unarticulated approaches to the computer. There is a fear of the computer – it has not totally disappeared with the digital generation – a fear that the computer is going to make the researcher look stupid. There is also the fear that the computer will mechanise the analytic process, submerging the reflection and interpretation of qualitative data. At the same time there is a mystical belief that the computer will churn out the analysis. In his address, he introduces the main point behind the papers in this issue – that the computer is a tool to 'think with', that this tool allows for options that were not present before. It is a tool that is open to 'creative misuse'.

The papers in the main section continue with this theme. Gail Fitzgerald and her co-authors lucidly portray the software as a 'mindtool' in graduate students' study of the Digital Divide. Jeff Durrant describes attempts to integrate the use of N6 and Geographic Information System, combining analysis of qualitative and spatial data. Judy Davidson poses the possibility of using NVivo in literacy learning. Central to both qualitative research and literacy learning is the analysis of texts. In a world with the increasing use of electronic texts, it is feasible, she argues, that NVivo could be used in such a manner.

Patsy Clarke in her invited paper offers a perspective from South Africa, where many sections of the population do not have ready access to computers. In the online courses she describes, NVivo becomes an aid to student-centred learning and teaching.

The next section of the issue is a write up of working sessions. Silvana di Gregorio reports on a workshop that aimed at drawing up syllabi for using NVivo in grounded theory analysis. To prepare for the workshop, di Gregorio transferred a project done manually to NVivo. In the process, she noted how the use of this software can focus too much attention on processes, like open coding. At the same time, the software also helps in the examination and reflection of the process of analysis.

Kristi Jackson draws on her experience as a professional trainer in the use of software, pointing to the need to *blend* lessons in technology and methodology. This is an ideal that is often not realised in the classroom. Kristi draws connections from her professional training experience to see how NVivo can be woven into the experience of evaluation research. Her paper goes into the details of demonstrations, discussions and topics that teachers will find useful.

Dan Kaczynski illustrates the main theme of software as a tool, by taking the reader to the classroom and detailing some of the techniques used to integrate teaching of qualitative research methods and software. The students not only learn how to use the software in their research, but also clearly see how they have shaped the analysis of the data.

Pat Bazeley describes the use of N6 and NVivo in the analysis of mixed methods research. Mixed methods research requires students to have a knowledge of both qualitative and quantitative methods and the appropriate software, so that they can integrate their analysis.

It has been important to note the reflections of the participants of the conference in Wisconsin. The issues they discussed relate to using software as a way of making qualitative research more rigorous and transparent. It also means reveling in the possibilities of playing with the data to see how far you can go in your conclusions. At the same time, it means checking what you can say, and what you cannot. And as Babbie said in his opening remarks, it also means you can make mistakes, change directions, knowing that the tools are flexible and subservient to your research.

Associate Professor Supriya Singh heads the user-centred design project in the Smart Internet Technology Cooperative Research Centre in Australia. She is immediate past president of AQR. She has done qualitative research among the Simunul Bajaus of Borneo, Anglo-Celtic middle-income married couples in Melbourne, and computer scientists studying smart personal agents.

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Notes to contributors

The Qualitative Research Journal is devoted to the communication of the theory and practice of qualitative research in the human sciences. The present plan is to bring out two issues a year. Contributions should be no longer than 6000–8000 words, excluding abstract and references. Send all contributions in Microsoft Word format by email (not a disk) to d.caulley@latrobe.edu.au. Double-space all manuscripts, including references, notes, abstracts, quotations, figures and tables.

In order to assist refereeing, which is anonymous, the title, the author's name and affiliation, the corresponding author's address, telephone number, email address and biographical material (which will accompany your article upon publication and should not exceed 50 words for a single author and 25 words in the case of multiple authors) should be typed on a separate sheet. For refereed articles the title page should be followed by an abstract of not more than 250 words. Because of the diversity of material submitted to the Journal, it is suggested that authors may supply the names and addresses of one or more potential referees. Please send a head-and-shoulders photograph(s) (colour or black and white) of the author(s) with the name of the author written on the back of the photograph.

The Journal uses notes rather than footnotes. Australian, UK or USA spelling may be used. Other than spelling, the Journal uses the *Publication Manual of the American Psychological Association*, 5th edition, 2001.

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Book, third edition, Jr. in name
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Why the conference?

Chris Thorn, *Director of the Technical Services Department, Wisconsin Center for Education Research, University of Wisconsin-Madison, USA*

This special issue is an outgrowth of a working conference on *Teaching Qualitative Methods* that was held in late April, 2003 on the campus of the University of Wisconsin-Madison. The Wisconsin Center for Education Research and QSR were co-sponsors of the event. The impetus to develop and host this meeting came out of familiarity with Lyn and QSR tools and a growing frustration with the lack of good materials available for teaching qualitative methods with the modern tools now at our disposal.

I have been using qualitative research software for my own work and instructing others for over a decade. I have been the principal investigator on a research team that develops open-source multimedia analysis tools for the past five years. While the tools have taken advantage of technological advances, teaching in qualitative methods has not kept up. This seems to have a number of causes. First, existing university staff – many of whom are well educated in qualitative methodology – received their training before qualitative software tools became widely available. However, their inability to use the tools has meant that new scholars have either had to learn on their own or take advantage of the relatively limited training opportunities provided by commercial trainers.

What seemed to be missing in my experience of working with faculty and research teams was a critical mass of people focused on teaching the *craft* of qualitative analysis. This focus on the skills and processes that lead to the successful doing of qualitative research clearly betray my roots as a sociologist. In fact, I must confess that my research interests are in the characteristics of successful collaborations in socio-technical systems. This conference was seen as a way to bring together a critical mass of scholars struggling with teaching qualitative methods and looking for a community that could support those efforts.

In that vein, I was very pleased to get Earl Babbie to provide our plenary talk. The challenges of teaching methods and the appropriate use of tools in pursuit of our individual research interests was a central theme of the discussions leading up to this conference. A large part of Earl's scholarly contributions in methods focus on these issues. His comments and insights provide an excellent backdrop for a group struggling to come to grips with using software tools to teach what has traditionally been the domain of a *manual methods* approach to research work.

The conference was set up as a working conference with several goals in mind. First, we heard from scholars using qualitative tools in their research and their teaching. They talked about their experience using the tools and their lessons learned as they became more proficient. Second, we held a forum on the handful of books currently available that directly support students learning qualitative tools in an academic setting. Finally, we spent a day on small groups meeting with a facilitator who led the groups on a structured discussion and exploration of a particular area – teaching and doing mixed-methods work, the importance of narrative in qualitative analysis, etc. These groups were charged with developing a course description, identifying challenges, and addressing possible remedies in these areas. It is this work that provides the core of the current volume.

Perhaps my use of the work *craft* can explain some of the reticence to use qualitative software tools that I have seen and heard about in discussions with colleagues. There does seem to be a tradition of students learning the basic skills and techniques of qualitative analysis at the knee of a mentor. There is also a very clear sentiment that one should *learn by doing* as well. Students are expected to go in to the field with little practical training and *encounter* the interface between epistemology, method, and technique. This approach to training and apprenticeship in qualitative methods produced something akin to the guilds of earlier centuries. We have cadres of scholars trained in particular processes and using hand-crafted tools to replicate their mentors' ways of working.

The appearance of qualitative data analysis software might appear threatening to scholars in the qualitative methods *guild* as the early industrial age machine tools might have appeared to the weapons smith or cabinet maker. While this a bit of a straw man comparison – the divisions are not so stark – it very likely has some grain of truth as well. It has been my experience (and I have discussed this with others who use and develop analytical software) that university-level qualitative methods instructors are often indifferent to (or even hostile towards) qualitative analysis software. It is seen as too complicated and 'getting in the way of the analysis'. I have heard concerns that software packages 'lead to premature closure' or 'distance one too much from one's data' – despite the fact that the speaker is likely to have had little or no experience with the software in question.

This impression of being seen as doing less pure or *mechanical* qualitative work has been a challenge to a number of users of qualitative software. This conference provided an excellent opportunity for users of these tools to come together and discuss ways to address these concerns. Again, the idea of community building was an element is this aspect of the conference.

Another element of community building was to create a web presence for those interested in sharing information on teaching qualitative methods – particularly techniques for incorporating software. One outgrowth of the conference was a commitment by my research group to develop and maintain a website devoted to this community. The initial work came from content submitted by attendees and other teaching-related materials gleaned from the web.

I was somewhat concerned about the appearance that we were restricting the discussion by explicitly referencing QSR and its software in the call for participants. From the outset, however, the goal was to avoid what I had often experienced in other meetings that focused on qualitative software – namely that the software became the focus. By scoping the conference around users of QSR tools, we could then bypass mundane discussions of how to do this or that or explorations of a particular feature and focus on the issues of teaching.

As I had suspected, many of the participants had used other products. I, for example, have a copy of almost every package installed on my computer and I work on developing new tools to do the things that commercial products don't provide. The outcome was exactly what I had hoped for in that regard. While I did speak with several potential participants who were disappointed that we were not including one or two other specific tools, the payoff was evident in the sessions. Participants were able to speak about particular methodological techniques without having to explain what buttons to click to get from here to there.

I'd like to take this opportunity to thank the authors for continuing their contributions to what was a *working* conference. Their continuing commitment to take the work of the conference and produce materials for this special edition is an extremely rewarding response.

Chris Thorn is active in several research efforts. He is engaged in research on software tools for improving decision making in educational systems. He is principal investigator of a team that develops multimedia tools for qualitative analysis of video. His teaching includes coursework in applied qualitative methods and decision making.

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Towards a working conference

Lyn Richards, *Director of Research Services, QSR*

These days, I teach teachers more often than students, and software skills more often than methods. I sorely miss teaching methods to students, and am sharply aware of how the task has changed as software skills became necessary for qualitative researchers. In my role at QSR, I have responsibility for talking with and assisting the teachers with this task, as well as writing materials that will help them. And through these processes, I acquire constant evidence of the varieties of their problems and solutions in different countries and different disciplines – but also of the commonalities.

Qualitative software has been part of some methods courses (including mine) since the early 1990's, and by the decade's end was a quite normal inclusion in courses at least at graduate level. But it is only very recently that all methods teachers have been urged or required to include software, by students and peers and occasionally (as in the UK) by accrediting bodies. There is of course a pleasing fit between this gradual change and the increasing accessibility of programs and the machines they run on. During these years, software has become more user friendly and understandable for students as design has improved. And students (and, of course, teachers) have acquired more computer skills, on better computer platforms. So where's the problem big enough to deserve a working conference and a special journal issue?

Working with students, supervisors and teachers over these years, I learned, sadly, that it was often the most devoted qualitative research teachers who felt the difficulty of teaching with software most seriously. Wherever teachers saw software as posing problems, it was experienced as alien to the soft, intuitive tasks of understanding. There were many reasons for this, ranging from the relative inexperience of qualitative researchers with computers, to the sense that programs distanced the researcher from data (and these reasons in turn were often clearly related). But whatever the reason, when software was seen as not fitting the method, not surprisingly teachers taught it at arm's length. The program was juxtaposed to methods, rather than taught as part of the process of doing justice to data.

Hardly astonishing, then, that software was an unacceptably time consuming add-on. It's hard enough to persuade a student that they can create concepts and theories from data, or to demonstrate how messy data that cannot be pre-emptively reduced can be

persuaded to tell a story. With pressure from your department to shoe-horn this massive task into a semester, you know many students will achieve only descriptive accounts of trivial data, and will go away unconvinced. Now *on top of that*, you also have to teach them a software package and assist them in achieving sufficient competence in it to be able to do something they couldn't do with manual methods. And still fit it into that semester.

Across methods teaching, across the planet, it seemed software was experienced as another barrier to getting on with the real work of qualitative methods, the tasks of understanding and interpretation. The comparison with the rise of statistical software is dramatic – whereas quantitative methods teaching took off with the advent of software, qualitative teaching seemed to hit a crisis. As software was increasingly normalised by researchers, the teaching trailed behind the increasing demand. Responding to appeals from teachers needing resources, I was launched into a series of texts, and became aware of a lot of discussion about the need for resources and communication.

The first signs of crisis appeared to us on the Help Desk as students appealed to us for help supervisors couldn't give. The most common message was, 'My supervisor told me I should use software but they don't know anything about it.' For users at all levels, the critical problem seemed to be that software and methods were discussed in different conversations. (*The NVivo Qualitative Project Book* was one attempt to bring them together for novice researchers.)

As the juxtaposition of software and method became apparent, so too did an opposing problem. With widespread acceptance of the necessity for qualitative software, we heard more often the assumption that software *conveys* or even *forces* method. On the Help Desk at QSR we found increasing numbers of researchers coming to a workshop in a software package to learn why they might be wanting to work qualitatively, or how it would be to do so. (It was for these people, and the very many more who met data without methodological grounding, that *Readme First* was written. Its theme was the fit between question, method, data and mode of data handling and analysis and outcome. Software tools are just part of that fit.)

These were the themes I was taking into conversations with QSR's wonderful world-wide network of researchers, software trainers, IT advisors and teachers. Over those same years, that network had developed into ongoing conversations, sometimes in person, often virtual, at conferences or working seminars, private consultations about the best way to solve a problem for a colleague, or the wide-reaching discussions on the Forum. The first outcomes were in written materials, from workshop handbooks and teaching notes to the texts discussed later in this volume. I became increasingly aware of the difficulty of getting them right for the teachers in the absence of discussion. The direct feedback might be amazingly positive, the reviews affirmative, but we still didn't know how they worked in practice when the teacher wasn't the author. In conversations with my co-authors, I tried to predict the teacher and student needs. Increasingly I realised that the books worked best for the teachers who had by other means overcome the barriers to teaching with software.

A series of these conversations occurred at the fourth London conference on Strategies with QSR Software, and Chris Thorn, from the Wisconsin Center for Educational Research, was part of them. The Wisconsin conference followed in less than a year, and this special issue six months after the conference – an extraordinary outcome. In part this is due to the energy and enthusiasm Chris Thorn evidently applies to any opportunity to assist integration of IT change and teaching – I take this opportunity to thank him and his centre, on behalf of all the participants. Further energy came from the informal committee of advisors who put their interest and ideas behind the initiative; special thanks to Silvana di Gregorio, Kristi Jackson, Donna Richter and Dan Kaczinsky.

But the conference, and this special issue, also happened in a sort of intellectual spontaneous combustion. The committee initiatives were the catalyst for something already happening. As teachers more clearly articulated their problems, the need for focussed communication about methods change and teaching of methods was becoming clearer, and a working conference and an online resource of what are basically working papers were waiting to happen.

The papers in this issue are in-progress contributions, all prepared by teachers grappling with the software-teaching tasks, all revised by feedback in presentations and working sessions and in the anonymous referee reports, all inviting further discussion and development. The Wisconsin website is set up and waiting for the next round of contributions, and the second conference is scheduled – same month (April), same place (Madison), 2005! In the meantime, the UK conference series on research strategies will meet at the University of Durham, September 2004, and a new Australian conference will be launched in October 2004, combining the focus on research strategy with the issues of teaching with software. Whatever happens in these coming meetings, I am convinced that the materials in this special issue, and the discussions from which they emerge, have changed the discourse of qualitative methods teaching and qualitative computing irrevocably, and for the better. Those terms now sit easily in the same sentence.

Lyn Richards is Director of Research Services at QSR. Previously Reader in Sociology at La Trobe University, she taught qualitative methods, wrote four family research books and caused computer scientist Tom Richards to develop the NUD*IST software.QSR, NVivo and four more books followed. Lyn has taught researchers in 14 countries.

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Lessons learned from teaching quantitative methods

Earl Babbie, *Chapman University*

I'm honoured to be asked to help kick off this workshop on qualitative data analysis. I might start by saying a little bit about how I came to be here today. In many ways, I think I've had an accidental life. With virtually no planning at all, I'm finally convinced that there's such a thing as a social research gene that may be in your DNA. They never tell you about it, but after stumbling around awhile you see a pattern there. And I really think that's true for me.

DRIFTING INTO SOCIAL RESEARCH

My earliest experience with research came when I was about six years old and discovered, to my horror, that my cousin, Freddy, did not believe Gene Autry was the greatest cowboy of all time. At that age, it was like somebody who didn't believe in God. I wasn't sure how to handle that and, then, out of nowhere, I decided that I would go around the neighborhood and ask people what they thought.

I started with my Aunt Annie who worshipped me – let's tell the truth! She *really* liked me and I *really* knew that. So I went to her and I asked, 'Who's the greatest cowboy – Gene Autry or Roy Rogers?' And she said, 'Well, which one do you like?' and I said 'Gene Autry.' And she said, 'Okay I pick Gene.' So, I was off to a good start, and I started canvassing the neighbourhood. After a promising beginning, to my dismay, things started slipping away. However, I had a brilliant realisation that you don't see used that often in survey research these days: I went back to Aunt Annie, and I asked her again 'who do you like?' She asked me again whom I liked and she complied. So I stood there and asked her repeatedly whom she liked!

The second project I can recall also involved survey research: as a mid-shipman at summer camp. I had a Navy ROTC scholarship to college and summer training was part of the deal. In the course of being trained as a Naval officer, I had a brilliant idea. Why not do a survey of the midshipmen who were there at camp, learning about their attitudes and backgrounds, and then, thirty years later, we'd check to see who had been successful and who hadn't. Maybe we would be able to figure out what caused success.

And so, I typed up a questionnaire, on ditto master as some of you remember, and went around and gave them to every mid-shipman. And I had the same experience that

I later discovered Karl Marx had in the study of 25,000 French workers: nobody gave the questionnaire back! So that survey didn't do too well.

The next experience I want to mention actually anticipates what we're doing here this weekend. I should start by saying that I'm not here as an expert in qualitative research analysis programs or really even in qualitative research. I wouldn't say that's my expertise. But the project I wanted to mention used qualitative technology that's not widely used today. I was doing library research on the Northern Athabaskan Indians under an anthropologist, Evon Vogt, and he introduced me to something called the 'edge-sort card'.

This technique involved a 5 x 8 card with plenty of room to write notes. Around the edge of each card were some numbered holes, and you could assign a meaning to each: one of the holes might represent a matrilineal society, for example; another might represent endogamous kinship patterns and so forth. Having assigned meanings to those holes, you could use them to code your data. As you studied a particular tribe, you'd write the notes on its card, and if it had that matrilineal society then you rip out the hole representing that characteristic. Actually there was a special punch you could use to notch the holes so they were open to the edge of the card. After you'd amassed a large number of coded cards, you could run a knitting needle through the hole representing matrilineal societies, for example, lift it up, and all the matrilineal societies would fall out. You could then read through your notes on those matrilineal societies and/or you could sort them on another variable: looking only at the matrilineal societies with endogamous kinship patterns, perhaps.

The edge-sort cards I was taught to use forty years ago fascinated me, and I think they anticipated some of the things you'll be doing here at the workshop. But the techniques you'll be learning are blessedly much better than those edge-sort cards.

Earlier, I said I have had an accidental life in research. I've really stumbled through this all my life. When I went off to graduate school at Berkeley and was asked whom I wanted as my advisor I had to say, 'I don't know who's here.' When I was graduating as an undergraduate and decided I wanted to go on in sociology as a career, I screwed up my courage and made an appointment with Talcott Parsons, with whom I'd taken more classes than with anyone else.

For about the first five minutes of our meeting, Parsons thought I was interviewing him for a paper I was writing about sociologists. I finally stammered that I wanted to be one. Parsons said, 'Well, then, you should go to graduate school.' I said, 'Okay, where should I go?' and he said, 'Somewhere else!' He could see I was taken aback by that response, so he clarified, 'Every one should go somewhere else. You shouldn't do everything in the same place.'

Relieved, I said, 'Okay. Where should I go?' and he said, 'Well, I don't know. Go to Berkeley.' And I said, 'Okay.'

So I applied to Berkeley, was accepted, and eventually showed up not knowing who any of the faculty were. The department secretaries asked, 'Well, what are you interested in?' and I said, 'Ahhh, sociology of religion.' They said, 'Oh, we'll give him to Glock.' Charlie Glock was actually a name I recognised, because I'd read an article by him in sociology of religion. And only then did I discover that he was also the director of the Survey Research Center. I didn't know what survey research was, of course, but I was able to find the Center, and I ended up working for him during my graduate school years.

As I was getting ready to finish up at Berkeley, the University of Hawaii decided they wanted a Survey Research Center, and the Sociology chair, Doug Yamamura, came to Berkeley. He met with Glock and asked how to go about creating a survey center. Charlie gave him a variety of ideas and then said, 'Well, you should probably hire someone young and energetic, somebody like Earl, for example.'

And so I went to the University of Hawaii and started teaching survey research. I've always found one of the real ironies in college teaching, more so in the past than now, that teachers are usually not taught how to teach. My first course in survey research was held in a room just about this size actually, with a little desk up front, sitting up on a little platform. And so I sat up there. There were six students and they sat various places in the room.

As I've said, I was pretty much making it up as I went along. There was no textbook that I really liked, and I ended up using a British text by a man named C.A. Mosher. No offense, but he spelled things wrong; he talked about government ministries that my students had no interest in. So one day, I sort of doodled the table of contents for the perfect textbook in survey research, which I titled 'A Survey Research Cookbook and Other Fables.'

The next day I received a letter from Wadsworth Publishing Company asking if I'd be interested in writing a textbook on survey research. I sent them a table of contents by return mail. As I say, I've just sort of stumbled into all of this, and in 1973, I published *Survey Research Methods*. Two years later, I expanded it into *The Practice of Social Research*.

QUALITATIVE AND QUANTITATIVE EXPERIENCES

I've been involved in both qualitative and quantitative methods throughout my career, though tending toward the quantitative. The first study I published was an examination of *Soka Gakkai*, a Japanese religion. I was in Japan with the US Marine Corps between college and graduate school, and I wanted to keep up my sociological involvement. *Soka Gakkai*, a pretty militant Buddhist sect was attracting a lot of attention at the time, with a number of US servicemen joining. I met some people who belonged and it struck me as something worth studying.

I read about the history of *Soka Gakkai*, interviewed people, did participant observation, and did a few little tabulations on a content analysis of the leaders' speeches. On the whole, it was mostly qualitative.

Later in my career, most of my published empirical research has been quantitative, however. My teaching has involved both. Usually now I teach an introductory methods course that covers both quantitative and qualitative. I'd have to say, in honesty, that it probably leans towards the quantitative.

I've taught 'Advanced Quantitative Methods' but not specifically 'advanced' qualitative methods. In the era of my training and early career, quantitative was king. And that really is what I grew up in. When I first started publishing textbooks, they certainly were much more positivistic and much more quantitative than they are now. But even so, I was mainly criticised for not being positivistic enough.

I used to be criticised by reviewers who said things like, 'This seems pretty nominalistic. You speak as though terms like social class and prejudice don't have Real meanings. You talk as though they were just agreed upon meanings.' And I said, 'Yeah. Unless I missed a memo I think that's true.'

The reviewers of the first textbook also complained that I only calculated three statistics in the statistics chapter. (Through an honest misunderstanding, I'd never taken statistics.) I calculated three very simple statistics and got two of them wrong! And, you know, the reviewers objected to that.

The reviewers had one other quantitative complaint. I was teaching myself programming, and I had figured out how to create a table of random numbers. I created a camera-ready table that went into the textbook and out into social research classrooms around the country. Shortly, we started getting puzzled letters from faculty. One I recall said, 'My students have asked me a question I can't answer and that is: 'How come the table of random numbers doesn't have any nines?'' Well, I figured if you create enough tables of random numbers you'd get one that doesn't have any nines. And then I figured out what I'd done wrong in the program. I suggested they send out an errata sheet just filled with nines and a note saying, 'Insert at random.' Instead, we bought a table of random numbers from people who knew what they were doing.

While my textbooks have sought to lay the groundwork for quantitative analyses, you can see that it's not always been easy. And over the course of doing this for thirty years, I've been in a position to watch the shifting popularity of qualitative and quantitative methods. Most recently, of course, we've seen a definite resurgence of interest in and use of qualitative methods.

For my part, I've really tried to avoid the separating of qualitative and quantitative as distinct universes, preferring to attempt a seamless integration of the two. That may be wishful thinking, but I've wanted students to see what the two approaches have in common, all the while not being blind to the differences between these two approaches.

WHAT'S EASY AND WHAT'S HARD?

In thinking about the conference and the topic, I started looking at my own experience in teaching methods of various kinds, and I see a hierarchy from the easiest to the hardest thing to teach. I'll share that with you to see if maybe it lines up with your experience.

I think the easiest thing to teach is what you might call low-grade qualitative research. For example, in my methods class, I have a field research assignment in which I tell students to go out and find a location where people may jaywalk. Then, they are to hang out at that location and observe people jaywalking, taking copious notes and looking for patterns in what happens.

Just about everybody can do that. It's not that hard. The quality is certainly not that great, although I am now convinced that from having so many students do it, I know a lot about jaywalking. But none of it's that exciting. If somebody in a coat and tie jaywalks, then other people are more likely to do it; men are more likely to do it than women, and blah, blah, blah like that. So, it's pretty easy to teach that and it's not really high-octane research.

It's a little bit harder to teach a method that you might call low grade quantitative. For example, I have an assignment in which I ask students to make some observations about different ways of greeting people and how they react. I ask them to make five observations in each of three conditions, code them, and percentage the results.

By and large they can do this, though percentaging on the basis of five is a challenge for some. They tell me ten percent said this, or eighty-five percent said that. I sometimes think they mixed up the part about percentaging and the part about random selection! They're sort of grabbing numbers out of the random number table. Ultimately, this seems to me to be a little more challenging than the simplest of qualitative assignments.

The next more difficult task, in my experience, at least, is teaching higher-grade quantitative analysis. It really is a challenge to get students doing really good quantitative analysis. But the way we've structured quantitative analysis, there are certain steps you can give students to follow. There is no sure path to success, but you at least can give students some pretty clear guidance.

You can teach them how to use MicroCase or SPSS to construct and understand percentage tables, for example. You can catch errors in what they do. You can find that they percentaged the table backwards and point that out to them. You can look at a table they've done and see other patterns in it, or think of other control variables and so you can advise them on that.

I want to make a strong point that complex quantitative methods do not necessarily mean high quality results. It's possible to train students to do very complex statistical analyses in which they have no idea what they're doing. Early in my career, I was in a

sociology department near a political science department that was enamored with factor analysis. All the political science students had to learn factor analysis. And suddenly, I was getting a rush of students from those courses coming to me with – in those days – stacks of computer printout, saying, 'What does this mean?' I'd answer, 'I don't know! It means the death of many trees, I guess! I don't know.' I'm sure you've probably run into a situation where students who get into very complicated analyses by 'following the instructions' but really don't know why they're doing it or why. So it's a genuine challenge to teach students to do really high quality quantitative research.

But I think the hardest, and I say this partly out of not being an expert in it, is to teach students to do high-quality qualitative research. If it's difficult to teach students to understand something like factor analysis, there are at least programs with steps to follow in doing it. It has been harder to find software that would lead students through qualitative analyses step by step.

I think the excitement about programs like NUD*IST, NVivo, N6 and the like is that they make it possible to lead students through a higher quality analysis.

LESSONS FROM TEACHING COMPUTERISED QUANTITATIVE ANALYSIS

Let me turn now to the topic I was specifically asked to talk about: whether I have learned anything in teaching quantitative method using computers that might be useful to you in teaching students to use qualitative data analysis programs.

The first thing I would comment on concerns basic *attitudes towards the computer*. There are many aspects to it. The first is fear. Twenty or twenty-five years ago, I never would have believed that I would be talking today about students being afraid of the computer. And yet, in my experience, that is still there in part.

When I first started using the computer for data analysis in a time-sharing environment, I quickly fell in love with computers. I was very enthusiastic about their potential for many aspect of my life, and I tried to get my colleagues to try out what we had. No way. I could hardly get a single colleague to sit down in front of the computer terminal. And on those rare occasions when I did, I'd say, 'Alright the first thing you have to do is log in. So type 'log in'.' My colleague would say, 'Is it a capital 'L' or a little 'l'?' And I'd say, 'Well, I don't care, I don't think it cares.'

'Okay, on these keys?'

'Yes, type it on those keys.'

They were so nervous that I came to the conclusion they must have thought that while we were sitting at a remote terminal in the sociology department, there was this big

screen in the computer center, where the actual computer was, and it was saying, 'Professor Smith did something stupid.' My colleagues were amazingly timid.

I found graduate students a little more open to learning the computer, partly because I could order them to do it. But they were still not too enthusiastic about it. Undergraduates were better, they were a little looser about it all. But for me, a breakthrough in my thinking came when I was visited by a delegation of fourth graders.

The teacher had asked if they could come and interview a sociologist and presumably other fourth-grade subcommittees were out interviewing other professions. As you can imagine, I'm a little bit of a ham, and so I agreed. While they sat in my office, I explained that sociologists study the way people behave, that we focus particularly on group behaviour – and by about then they were punching each other, and I could see this was not working.

In desperation I said, 'Do you want to see my computer?' 'Hooray!!' They wanted to see my computer. So we went into the little closet where we had the terminal, and the fourth-graders were fighting over who got to sit in front of it. I was saying, 'Wait, I have to tell you how to do this,' and one kid won the struggle for the chair and he announced, 'I'm gonna type my name.'

I said, 'No, don't type your name. It's not going to know what that is ... ' And he typed his name in and hit return and the computer replied, 'System Error' or something like that and the kids all laughed! And the boy at the terminal said, 'I'm gonna do it again.' And he typed in another system error, producing more howls of delight.

I kind of figured that I'd have those students in my classes by now, but I'm not sure what happened to them. When I first started teaching my online methods course, for example, I figured I'd have all these hackers, and we'd teach each other stuff. But no, I'm almost always the most computer savvy person in the class and students are saying, 'Oh, I don't know' and 'I can't do this' so there's still a lot of fear of computers out there I think.

At the same time, ironically, there's often a mystical faith in the computer. I still always love the expression, and you still hear it even today, 'These data were analysed by computer.' Yeah. So is the search for weapons of nuclear destruction. As I know you know, 'the computer' cannot give you the answers. And with all due respect to colleagues who are writing 'intelligent systems' software, but the computer can't think.

A computer is a wonderful thing to think *with*. I think the computer is for social scientists what the microscope was for biologists or the telescope for astronomers. It's a neat tool we can use to think with, but it's not going to do the thinking for us.

NVivo, again with all due respect, cannot tell you what the important categories or nodes are, but it's this wonderful device to use in looking for them, discovering them, storing them, and using them for analysis. But it's not going to think for you.

I mentioned factor analysis earlier and there is this naive belief that some techniques like that will do the thinking for you: that you just pour the data in and the results that come out are 'The Truth'. Students sometimes feel that way, and methods instructors have to be forewarned about that.

On the topic of attitudes towards the computer, I have a hunch that if you are already involved in qualitative analysis and you have colleagues who are involved in qualitative analysis, there's a non-zero probability that your adopting computers for that task may be seen as going over to the enemy. It may strike some of your colleagues as kind of an unclean act, that somehow qualitative research is fundamentally unapproachable by machinery.

I'm just always struck by the beliefs we researchers have about these things. I recall one conference where I was spending a lot of time in sessions on qualitative research, and between sessions this pleasant, matronly lady came over to me and she said, 'You know, it's really good to meet you after all these years and discover you're not really Satan.'

I wasn't exactly sure how to respond. 'Thank you?' 'That's going to be a weight off my mom's mind!'

Some people's commitment to qualitative research seems to be based on a deep hostility to quantitative methods and anything associated with it (eg., computers), so you should realise that your use of computers may be seen as a little suspect by some of your colleagues.

Let's look specifically at teaching methods. From my experience with quantitative methods, I would suggest that teaching logic is more important than teaching the mechanics. Or at least certainly start with the logic of what is going on. In my basic methods class I spend the first two weeks just talking about the 'philosophical' stuff: paradigms, concepts, reality, determinism, things like that. Because I really want them to get grounded in the logic of what it is we're doing. Then we start talking about some mechanics for *doing* research.

When you start getting into the mechanics, I would also urge that you get students to master the *basics* before moving on. I mentioned factor go compute well past their understanding. I used to think this would be a smaller problem in qualitative data analysis, but Lyn Richards assures me it's not. So I'd urge that you insure students have mastered the basics before getting them into very complex analyses.

In some ways, the 'simple' stuff can be the most challenging. My orientation as a quantitative analyst seldom gets beyond an elaboration analysis of percentage tables. I like staying really close to the data, since I find it's easier for me to hear what they are

trying to say. I recognise that this kind of analysis is looked down upon by some quantitative analysts – probably the same people who have a low regard for qualitative research.

Every now and then, I'll have someone tell me why they don't like a 'simple' percentage-table elaboration, saying something like, 'You know, the reason I don't use just the elaboration model and percentage tables is I'm really not sure how to do it. I can calculate a correlation, see if it's significant or not, and I know what I've got: case closed.' Certainly, 'simple' qualitative analyses can be a challenge for students to do them right, so make sure they've mastered the basics.

The next issue I want to mention is the strain between learning the computer program vs. learning data. When I teach MicroCase or SPSS in a quantitative analysis class, I spend a lot of the time teaching them how to learn the program, and eventually, presumably, they'll learn how to analyse data. But I think there are both positives and negatives to that approach.

Certainly, on the negative side, students may take so much time learning the program that they don't get to analyse data. But there's a positive side, too: if data analysis is somewhat nebulous for students, then learning the program is concrete. There are specific things to focus on and learn. And to learn the program, they have to be mucking around in data. The challenge for you is to balance these two learning processes.

In another aspect of the learning process, I would urge that you consider having students work in pairs. I initially started doing this, when we didn't have enough computers in the lab. Over time, however, I started recognising a real advantage to this kind of collaborative learning. So now, when we have enough computers in the lab that they can each have their own, I still encourage them to pair up.

It would be nice if you could get them to pair up with unequal abilities. The weaker student in the pair certainly can learn from the coaching and mentoring of the stronger student, but there's an advantage in the other direction, too. Any teacher in the room knows the best way to learn something is to teach it to somebody.

I have not had students do joint projects in this context. I always worry about the free rider problem in respect, so I haven't had students do joint analyses, but I definitely encourage them to coach each other. I do that in all my methods classes, whether they're using the computer or not. I say, 'Look you should coach each other. Do your homework and have somebody else read it and comment on it.' Faculty do it and, presumably, we get value out of it. So students should do it, too. It's the whole peer review business. Get them trained in that.

This is a good time to mention the power of mentoring in the teaching and learning of data analysis. It is unquestionably the most powerful way of learning research methods. That's certainly the way I learned quantitative methods from Charlie Glock, in the day of punched cards and counter sorters.

In part, I would learn from watching him analyse data. But I probably learned more by doing an analysis, giving it to him, and having him critique it. I'd rush in with a stack of tables, saying, 'Look what I've discovered!' He reviewed what I'd done and say, 'You've percentaged the tables backwards. None of this makes any sense.' Eventually I became very good at doing it right. I'm grateful that he never settled for 'pretty good'.

My dissertation involved a national survey of medical school faculty members, and I think I did more than twenty drafts of the questionnaire before Charlie was satisfied with it. Finally, in frustration, I started stapling them to the wall and they went all the way around my office. By the time we were done, however, I knew how to write questionnaires. I've never had that mentoring in qualitative research, by the way, and I really feel the lack of that. So if it's possible to teach this software in a mentoring format, that's great – both for the students and for you.

I want to say something about deductive and inductive models of explanation. In general, I think the deductive model is a lot easier to teach than the inductive model. And I say that fully anticipating that qualitative is generally on the inductive side. The deductive model at least gives some steps to follow: create or select a theory, derive hypotheses from it, and then test them. That's called psychology.

I don't mean to trivialise the deductive model by any means, only that it provides a set of steps that students can understand, can practice, and can get better at. The deductive model is nicely rational, and students seem to like that.

The inductive model is a lot more difficult, I think. I use an example with my students that is based on research I did with Charlie Glock. I talk about looking for the causes of religious involvement and say we started with the notion from Marx that religion is the opiate of the masses. But we also found Christian calls to people who were 'weary and heavy laden.' Both points of view seemed to say that a purpose of religion was to offer solace to those in need.

So if you take that as a starting point then you can sort of derive a general premise that people who are denied gratification in the secular society would be more likely to turn to religion than those who are getting gratification. From that theoretical position you can derive some specific hypotheses. You can look for groups that are more deprived of status than others. Women, for example, are denied secular status in comparison to men in this society; therefore, women should be more religious then men. You do the survey and you find, huzzah, women are more religious than men. The hypothesis is confirmed, thereby lending support to the Gratification Theory of Religious Involvement.

You can look at age, as another example. In a youth-oriented society like ours, old people are deprived of status. Hence you'd expect older people to be more religious than younger people. In the same survey you'd look at the relationship between age and religiosity and, huzzah, older people are more religious than younger people, once

again lending support to the theory. I find this is a useful teaching example as an illustration of the deductive model. I get the sense that student can follow the logic and feel they could apply it to some other topic.

The problem is, as I then tell students, our study didn't go exactly like that. And while I say 'our study' I joined the analysis years after the survey had been conducted. However, Charlie describes that his first analyses of the data uncovered several variables that were correlated strongly with religious involvement, such as gender, age, and some others.

Family status presented a bit of a puzzle. People who had complete families – spouse and children – were less religious than those who lacked one or both of those. This was just opposite of the stereotype of the 'family who prays together stays together'. The survey suggested that those intact families were less likely to be praying together.

Social class related to church involvement, at least within this denomination Charlie was studying, Episcopalians. The lower class church members were more religious than the upper class.

In addition to these individual findings, when you put the several variables together, they had a powerful impact on church involvement. The most deprived – poor, elderly women without families – were extremely religious, while the least deprived – wealthy, young, married men with children – had very low levels of religiosity.

Charlie once told me about the time he was having lunch with a colleague and was excitedly reporting his powerful findings in the religion study. He showed a table indicating how strongly an index combining the several variables predicted levels of religious involvement. His colleague cut him down by asking, 'Yeah, but what's it all mean?'

So he had all of these patterns, all of these findings, but wasn't quite sure what they meant and had to start looking for what did they have in common, trying to find a pattern. At some point he realised that 'all of these people who are more religious are also deprived of status in our secular society. Maybe they turn to religion for ... Oh my God, that would be the same as what Marx said'.

While my students can follow the story about this inductive examination of religiosity, I come away with little confidence (nor, I think, do they) that they could replicate the process with some other set of data. The inductive model is simply more elusive, still more of an art than a science.

To the extent that qualitative analysis is commonly inductive, that offers another challenge to those who would teach qualitative methods. Although NVivo and N6 won't solve the problem for you, they are tools that will make it easier for you to do that.

Hanan Selvin, late sociologist and a friend, used to talk about 'data dredging'. Now Hannon was someone who wrote code and invented statistical analyses and was a

pretty quantitative guy. He certainly knew when a set of data did or did not satisfy the assumptions of a particular statistical technique. Yet, ironically, Hanan was always quick to suggest the use of techniques even when they were not technically appropriate. He was willing to do correlation and regression analyses on nominal data – if those analyses revealed any patterns in the data that deserved further attention. This was what he meant by 'data dredging'. Of course, you were never justified in stopping your analysis at that point, declaring you had discovered something 'significant at the .05 level'.

I think the beauty of programs like NVivo and N6 is that you can assign so many codes to the same thing. You can look at data in many different ways, most of which may prove fruitless. Of course you could always do this by hand but not nearly as easily. Put differently, you don't have to worry about always 'doing it right'. These programs support you in being more open minded and wider ranging in your approach to data analysis and in teaching it to your students.

CONCLUSION

It seems to me that this is a really exciting time. I've already told you, I'm not at all expert in these programs, but I'm starting to learn them and I'm getting more and more excited about them. In particular, I think these programs are open to creative misuse: using them in ways the developers never anticipated.

What you're getting into is really exciting, and I'd like to know how it turns out. I plan to continue my own explorations, but I would enjoy hearing from you as you get into it. I'm a conduit through which you can share things with your colleagues. So, I hope you have a great workshop, and I thank you for letting me help you kick things off.

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NVivo as a cognitive tool for training novice qualitative researchers: a constructivist approach

ABSTRACT

This paper discusses a doctoral-level qualitative methods research course built around a real research project and the use of QSR's NVivo for data coding and analysis. The course was designed as an authentic practice field following constructivist approaches for teaching and learning; the emphasis was on students conducting inquiry in a meaningful context to develop their own knowledge and skills by taking on researcher roles similar to experts. The purpose of the research project was to understand real life experiences of persons in the Digital Divide from a phenomenological perspective. Participants included patrons of a public library whose primary access to computers and the Internet was through the library computers. Instruction in NVivo was integrated throughout the course to assist students in coding, analysing, and interpreting their research findings from demographic information, interviews, and researcher memos. Although the students utilised the same dataset in their analyses, different coding strategies and outcomes emerged. In this learning environment, NVivo served both as a productivity tool in the research process and as a mindtool to support the students' cognitive development of knowledge about qualitative research. The course structure, qualitative methods content, and NVivo instruction are described followed by an analysis of student work that demonstrates how NVivo served as a mindtool for knowledge construction. Finally, recommendations are discussed for designing learning environments as practice fields, integrating qualitative software tools into instruction in, and assessing knowledge construction using NVivo.

INTRODUCTION

Teaching qualitative methodology to future researchers is a challenging art. Faculty who teach research methods courses, continually search for new instructional approaches and materials that enable them to represent the complexities of qualitative research in courses of instruction. Typically, instruction occurs prior to engagement in

actual research. The challenge is to provide effective preparation to researchers-in-training that expands their knowledge of qualitative methods and builds skill repertoires that enable them to actually perform like a qualitative methodologist.

With the recent rise of qualitative software tools, new questions exist for how and when to teach the software tools and how to appropriately integrate software tool instruction into meaningful methodological experiences (Marshall, 2002). Methods instructors are advised that teaching the research methods and the logic for the use of software tools are more important than teaching the software per se, and that the most effective instructional approach is to interweave learning the software tool into learning the methods (Babbie, 2003). The challenge is to teach the software at a sufficient level so that it works in the inquiry process as a 'mindtool' to support the learner in knowledge construction. A mindtool is a cognitive reflection and amplification tool that helps learners construct their own realities by designing their own knowledge bases (Jonassen, 2000; Jonassen, Peck, & Wilson, 1999). Teaching the software should not be the primary purpose of instruction, but rather, the purpose should be the meaningful use of the tool to support research and knowledge about research.

Constructivism – one of the newer learning philosophies – offers valuable pedagogical guidelines for instruction aimed at meaningful learning around real problems of practice. Constructivist learning approaches are based on the belief that learning is a willful, intentional, active, conscious, constructive activity that requires reciprocal intention–action–reflection cognition. The fundamental shift to constructivist-oriented beliefs asserts that learning is a process of meaning making, not of knowledge transmission, and that it is influenced by communities of practice where knowledge and skills are shared and reflected upon (Jonassen & Land, 2000). Practice fields, a term coined by Senge (1994), is one constructivist approach that situates learning in authentic activities. The following eight design principles for creating practice fields by Barab and Duffy (2000) are applicable for designing qualitative methods courses based on authentic inquiry:

1. Students learn by doing domain-related work.
2. Students must own the inquiry and be responsible for the solution.
3. The teacher's job is to coach and model learning and problem solving through participative questions.
4. Students must reflect on what they are doing and why, and whether it is effective.
5. The problem in the practice field must be loosely structured so that students can define their own problems and process.
6. The problem should require complex thinking and problem solving. Teachers should provide the necessary supports rather than simplifying the problem.
7. Students should discuss ideas and engage in critical thinking with others to negotiate meaning within the community of learners.
8. The learning context must be motivating. This is accomplished by focusing on relevant and engaging problems.

This paper describes a doctoral-level qualitative methods research course designed as an authentic practice field where students develop knowledge of qualitative methods, learn to use the qualitative software program NVivo as a research tool and as a mindtool,

and carry out real research in an area relevant to their discipline – the phenomenon of the Digital Divide. The content, organisation, and requirements for this course are described, followed by a discussion of challenges and recommendations.

THE PRACTICE FIELD LEARNING ENVIRONMENT

NVivo was integrated into an advanced research course for students in an Educational Technologies doctoral program. There were six doctoral students in the semester-long course and it was co-taught by the faculty instructor and a doctoral intern. Required learning resources included a combination of a text, research articles, government access and policy reports, NVivo software manual, and listserv discussion groups. An online workspace was used to supplement class sessions by providing a shared depository of individual and class documents, threaded discussion board for student-generated topics, and access to research documents and resource sites. Three areas of instruction were simultaneously addressed throughout the course: 1) learning to do qualitative research from a phenomenological perspective, 2) understanding the Digital Divide and its impact on access and use of technology by the general public, and 3) building qualitative methodology skills (see Figure 1).

Figure 1. Course schedule and requirements for Qualitative Methods Course

<table>
<tr><th>Week</th><th>Topic</th><th>Readings prior to Class</th><th>Assignments</th><th>Research Study</th></tr>
<tr><td>prep</td><td colspan="4">Personal digital divide experiences: Write personal narrative telling your ‘story’– 3–4 pages, double-spaced; bring copies</td></tr>
<tr><td>1</td><td>Qualitative Research & Project Design</td><td colspan="2">Join DD listserv and begin participating</td><td>Visit public library and look at public computing area</td></tr>
<tr><td>2</td><td>NVivo Tutorial 1</td><td>Chapters 1 & 4</td><td rowspan="4">Gather information/ develop understanding of the impact of digital divides on personal experiences to support inquiry</td><td rowspan="2"></td></tr>
<tr><td>3</td><td>Phenomenological Approach</td><td>Chapters 2 & 3</td><td rowspan="3">Gather surveys and review information to identify potential participants for interviewing</td></tr>
<tr><td>4</td><td>Making Data</td><td>Required DD readings</td></tr>
<tr><td>5</td><td>NVivo Tutorial 2</td><td>Chapter 5</td></tr>
<tr><td>6</td><td>Plan Research Study – interviews</td><td>Interview Methods</td><td>Bring questions</td><td>Schedule interviewees</td></tr>
<tr><td>7</td><td>Analyse Survey Data; set up interviews</td><td>Survey Methods</td><td>Practice interview</td><td rowspan="2">Conduct and transcribe interviews; enter files in NVivo</td></tr>
<tr><td>8</td><td>Presentations on Digital Divides</td><td></td><td rowspan="5">Join QSR-Forum and participate in QSR-Forum and the Digital Divide listserv</td></tr>
<tr><td>9</td><td>Coding
Spring Beak</td><td>Coding Methods</td><td rowspan="4">Input attributes; code and analyse interview data</td></tr>
<tr><td>10</td><td>NVivo Tutorial 3</td><td>Chapter 6</td></tr>
<tr><td>11</td><td>Abstracting</td><td>Theme Methods</td></tr>
<tr><td>12</td><td>NVivo Tutorial 4</td><td>Chapter 7</td></tr>
<tr><td>13</td><td>Phenomenological Narratives</td><td>Chapter 8</td><td rowspan="4">Presentation of research report</td><td rowspan="3">Develop themes and interpret data; prepare report</td></tr>
<tr><td>14</td><td>Work Night and NVivo Help</td><td>Chapter 10</td></tr>
<tr><td>15</td><td>Teaching Qualitative Methods/ Wrap-up</td><td></td></tr>
<tr><td>16</td><td>Presentation on Research Findings</td><td></td><td>Prepare presentation</td></tr>
</table>

The research study in the course focused on the Digital Divide. This is the term used to describe the gap in technology access and usage between people of different genders, income levels, educational levels, ethnicities, regions of the country, and other subpopulations. As technology increasingly entwines itself with educational, social, financial, and employment opportunities, those individuals lacking access and/or technology skills will find themselves falling further behind their peers (Compaine, 2001). Some experts who have studied the phenomenon have identified the Digital Divide as one of the most important civil rights issues facing our modern information economy. Students in the course took a broad view of the Digital Divides that exist in society by gathering background information on divide factors.

The purposes of phenomenological research are to describe the phenomenon as lived experience and reveal meanings given to the phenomenon. According to Patton (2002), 'the important reality is what people perceive it to be' (p. 69). With the goal of understanding a phenomenon, researchers utilise interviews focusing on description and sense-making by persons who actually experience the phenomenon. Questions from a phenomenological perspective involve how people 'perceive it, describe it, feel about it, judge it, remember it, make sense of it, and talk about it with others' (Patton, 2003, p. 104). In revealing the essence of a phenomenon, researchers must look across individual experiences and subjective meanings and find the shared structure of the phenomenon. This step requires moving beyond individualistic data into themeing and interpreting the shared experience.

NVivo was selected as the qualitative software tool because of its flexibility in coding, searching by attributes and modeling capabilities, and appropriateness for use with smaller data sets. As described on the QSR website, when using NVivo 'a project starts as soon as ideas start. NVivo enables you to take qualitative inquiry beyond coding and retrieval, supporting fluid interpretation and theory emergence' (http://www.qsrinternational.com). When used in this way, NVivo becomes a mindtool as well as a qualitative methodology tool.

Conducting authentic inquiry

A partnership was formed with a public library in a mid-size town to gain access to library patrons who used the public computers at the library as their primary means of access to computers and the Internet. The purpose of the research was to learn about their life experiences with computers and the meanings and values of access to computers and the Internet in their lives. The library staff was interested in participating in the research project in order to gain information about computer use, concerns, and suggestions for improvement. The course instructors viewed the partnership as the means to gain access to research participants to conduct phenomenological interviews.

A survey instrument was used to gather information about usage of the library computers in regards to computer and Internet access, uses, importance, and suggestions for improvement of library computing services. Based on the survey responses, nine adults were selected for interviewing because they fit the desired

profile and agreed to be interviewed. The nine participants ranged in age from 29 to 61 years. Seven were female and two were male; eight were Caucasian and one was African-American. All participants were employed and all had some college education. Three of the nine had computers at home, and one had Internet access. Their responses indicated they used computers at the library as the primary way to meet their computing needs.

As a part of their learning experiences in phenomenological research, the students worked together as a group to develop the interview instrument. The protocol was developed as a semi-structured interview with a few main questions and follow-up probes to delve more deeply into responses if needed (see Figure 2). From a phenomenological perspective, questions were designed to invite people to tell stories about their experiences with computers and the Internet and then give meaning to their experiences. Probes were included to encourage more in-depth responses from participants to digital divide themes or personal experiences and meanings. Specifically, the goal of the research was to gain an understanding of the presence and impact of digital divides on computer and Internet use by library patrons in this library setting.

Figure 2. Semi-structured interview protocol for Digital Divide Study

1. **Please describe a typical day when you use the computers at the library. What do you usually do from the moment you enter the main door of the library?**
2. **Can you describe the ways you use the computers and the Internet at the library?**
   Probe: What purposes do you have for using these applications?
3. **I'd like you to think back to when you first started using computers. Can you tell me your story about how you got started?**
   Probe: I wonder about the reasons you decided learning to use the computer was important for you.
4. **Can you tell me about a time when you didn't have access to computers and the Internet? What was this like for you?**
   Probe: Did this create any problems for you? How was this a problem?
   Probe: Can you tell me what this was like at that time not to have access?
   Probe: Were there any negative effects on your life because you didn't have access to computers?
5. **Now that you have access through the library, do you experience the same problems?**
   Probe: What are some of the good outcomes for you because you have computer access through the library?
   Probe: Are there some down sides of relying on computer access through the library?
6. **So what do you feel the impact of public access computing is on your life? How important is it?**
   Probe: Can you give me a couple examples?
7. **In a perfect world, what access would you desire and why?**
   Probe: Based on your use of computing, would this make a difference for you?
   Probe: And how important would that be for you?

The interview ended with some demographic questions related to factors in digital divides: age, ethnicity, computer ownership, Internet access, present employment, and a review of demographic information entered on the survey related to access and barriers. Since each student interviewed only one or two library patrons, each wrote memos about their contacts and interview sessions and shared the documents in NVivo. All interview data and researcher memos were coded and analysed individually by each student with the assistance of NVivo.

Teaching qualitative methodology

Prior to this course, students had only a cursory introduction to the phenomenological approach. Thus, information was provided on the phenomenological method and approaches to data collection and interpretation. The text used, *Readme First for a User's Guide to Qualitative Methods* (Morse & Richards, 2002), provided an excellent foundation for differentiating this method from other major qualitative methods and was used to guide learning through the research design and implementation process. At the first class session, students shared their personal narratives describing an experience they had as a member of a digital divide group and the meanings they gave to this experience. The narratives were discussed in class, thereby increasing sensitivity to the multiple digital divides that occur across time and how each person's 'story' is unique. During the first month of the course, students explored the literature in a unique digital divide area and developed a grounded research perspective for their role in the research project. These reflective experiences were important parts of the phenomenological approach of deriving data from conversations and experiential literature (Morse, 2003) and bracketing prior knowledge related to one's perspective.

Gathering phenomenological data through interviews

Prior to conducting interviews with the research participants, students practised the interview skills with another student and were observed and provided feedback. Although the interview protocol was semi-structured with main questions and follow-up probes, the main emphasis was on encouraging the interviewee in telling his or her story and elaborating with personal meanings. Based on this practice activity, some of the interview questions were re-arranged, and places to embed small talk were identified to elicit conversation and keep the flow of the interview.

Learning to code inductively

Students practised inductive coding using a set of transcripts gathered from interviews with children talking about access to technology. This activity followed a lecture on coding methods that covered inductive and deductive coding; use of prior research in topical coding; definitional elements, coding items, patterns and structures; and coding supports available in NVivo. In the exercise, each student coded the transcripts individually and then coding outcomes were compared. A taxonomy was built to explore similarities and differences and the impact of students' differing perspectives towards digital divides was discussed. It was evident that different approaches were

used in the coding process, some demonstrating 'in-vivo' coding with specific words found in the transcript, and others taking a more analytical approach to coding with pre-defined topics (codes). General guidelines for reductive coding and consistency were discussed.

Using NVivo for abstracting and interpreting

After students had started coding with the research transcripts, the instructor provided information on ways of identifying patterns in the data and abstracting process. The demographic data were assayed to look for patterns that might emerge within sub-groups of the data. The survey responses were reviewed to look for consistency of information as a form of triangulation. Data were searched to look for congruence with conclusions in the reviewed literature. NVivo skills were taught to aid in abstracting and interpreting. It was expected that the coding structures, analyses, and interpretations would vary given that each student was working independently from a unique research perspective of the Digital Divide. Findings and interpretations were shared in final research presentations.

INTEGRATING QUALITATIVE SOFTWARE TOOLS

Four class sessions (2.5 hours per session) were set aside for the purpose of building the above mentioned NVivo skills. Specifically, weeks two, five, ten, and twelve of the sixteen-week course were used exclusively for learning the essential skills of NVivo, based on the tutorials in the *Readme* textbook. One of the doctoral students in the course was familiar with NVivo and served as the co-instructor, while the other five students were utilising the tool for the first time. None had utilised NVivo in an authentic research project prior to this course.

Students were given 'out-of-class' assignments after each of the four NVivo sessions that incorporated practice with authentic data. The investment of classtime to learn the basics of NVivo was important in reducing the learning curve for first-time users of the software, bringing all students to a skill level sufficient for carrying out the class research project involving the advanced processes of searching, modeling, and re-coding. By integrating use of the software tool during the instruction in qualitative methods, students were able to apply and practice newly acquired concepts and skills as they analysed the interview data from the research project.

Students were expected to have read assigned chapters in the course text prior to each of the four NVivo tutorial sessions in order to form a conceptual framework for the instruction. The doctoral co-instructor taught the four sessions and designed the NVivo learning materials, in-class activities, and practice exercises. He also evaluated the student's NVivo practice exercises and worked with individual students as needed. In addition to the course text, essential skills and protocols within NVivo were researched using the NVivo software manual, online help files, and the QSR International website http://www.qsrinternational.com.

Authentic skill exercises utilising NVivo were coupled with each of the NVivo class sessions. The tasks included specific NVivo procedures, such as importing and coding, saving and backing up projects, and other tasks to develop understanding of the Digital Divide and qualitative methodology through nodes, assaying, and modeling. Tutorial sessions included on the NVivo CD and QSR website were recommended to the students for additional practice, specifically the *Bush Schooling Tutorial*. The online workspace associated with the course was use to share out-of-class ideas and manage assignments.

Prior to the course, a set of essential skills within NVivo was developed by the co-instructors to guide the instruction of NVivo. Each of the skills was covered in adequate depth to allow the students to utilise NVivo in analysing the interview data and recording their cumulative understandings and thoughts of the Digital Divide for their research project. In doing so, NVivo was not only used as a software tool to aid in the analysis of qualitative research, but also as a cognitive tool to practise and frame concepts learned about qualitative methodology and the Digital Divide. While not a comprehensive list of the tools and capabilities of NVivo, the following essential skills, grouped in three main categories, were identified as necessary for the course research project.

NVivo skills for managing data

Creating, opening and saving projects: Students demonstrated project management skills in NVivo through setting up the save interval feature, saving a project with a new name, password protecting a project, and backing up/restoring a project. The students utilised the back up/restore option throughout the course in order to share their projects with the course co-instructors.

Creating, browsing and formatting documents: Students demonstrated document management skills through creating documents and document sets within NVivo, importing documents, and creating memos. Students utilised the document explorer tool within NVivo; deleted, expanded and duplicated documents; edited document properties; and viewed document outlines.

Annotating documents: Students demonstrated document annotation skills through formatting of documents, including inserting timestamps, using headings, and using colours and fonts for visual prompts. In addition, students created internal annotations, weblinks, links to other files, and databits.

These skills were necessary prerequisites for more advanced use of NVivo to support qualitative research. Because students knew the basic mechanics of NVivo, they were able to utilise the tools with their research data.

NVivo skills to get unstructured data into ideas

NVivo coding: Students demonstrated document coding skills through the creation of various headings (Heading 1, Heading 2, Description, etc.) allowing NVivo to create nodes and node trees using the code by section feature. In addition, students used the coder, the coding bar, and paragraph coding.

Creating and recording attributes: Students demonstrated skill in creating attributes for documents and nodes, as well as importing/exporting attributes from/to a text file. Attributes included information about the people, sites or other items represented by the documents or nodes in the research project. Also, students set up values to record demographic information in an attribute table.

Searching text: Students demonstrated various searching methods, including searching for specific text, searching for phrases, and searching attributes. Each method also included creating nodes from search results.

These methodological skills revealed the potential of NVivo as mindtool for moving from unstructured data to ideas. This is an important stage in qualitative research in general and in phenomenology in particular. Because this set of skills was built using real interview data and coding, the students were prepared for the next stage of research.

NVivo skills to support abstracting and interpreting

Creating, browsing, formatting and organising nodes: Students demonstrated node management skills through creating nodes and node sets within NVivo and importing/exporting nodes. Students utilised the node explorer tool within NVivo; deleted, expanded, merged and duplicated nodes; edited node properties and attributes; and organised nodes into trees.

Assaying data: Students demonstrated skill in using NVivo's assay tool to generate a brief report on the contents of a document, set, or node. Nodes and node attributes were used to create the assay table. Students also exported and printed assay tables.

Show tool and models: Students demonstrated skill in utilising the show tool to give an overview of their projects to classmates. They utilised the modeling tool to create conceptual models and to show relationships among data.

The building of these skills was continuously linked to the goal of the final phase of phenomenological research – 'writing up' from data through abstracting and interpreting. Because the focus for learning NVivo went beyond learning the tool per se to authentic use of the tool in research, NVivo supported students' cognitive efforts in abstracting and interpreting knowledge. The power of NVivo as mindtool is reflected in the variety of the individual outcomes exemplified below.

EVIDENCE OF KNOWLEDGE CONSTRUCTION

As Morse and Richards (2002, p. 46) point out, 'when thinking phenomenologically the researcher attempts to understand, or grasp, the essence of how people attend to the world'. The researcher looks either at how people make meaning of the phenomena they encounter in various situations or what is the essence of their experience. To achieve this goal, researchers of phenomenological topics have to separate their a priori knowledge about the topic and bracket it in a written form as personal assumptions, knowledge, and expectations prior to conducting interviews with their subjects.

In the library study, each student focused on the essence of participants' experience in using public computing from a different Digital Divide perspective. Pete focused on the Digital Divide and socioeconomic conditions; Gina on the generation gap in the digital age; John on the impact of educational differences on the Digital Divide; Sherry on gender difference; Mary on the impact of ethnicity; and Doug on the impact of values on personal perception of the Digital Divide. The personal assumptions and knowledge included in the students' presentations were separated in the writing phase to bracket researcher's perspectives apart from the experiences of the participants.

Coding structures: similarities and differences

Several factors influenced the individual coding structures of the students in this project. In the beginning, students were exposed to the twofold goal of 1) coding activity as a means to get from unstructured data to ideas, and 2) as a tool to assist a qualitative researcher in abstracting or 'thinking up' from the data (Morse & Richards, 2002). During the class, ideas about the role of the researcher in phenomenological research were exchanged. Also, the class discussed inductive, data-driven and deductive, theory-driven coding approaches.

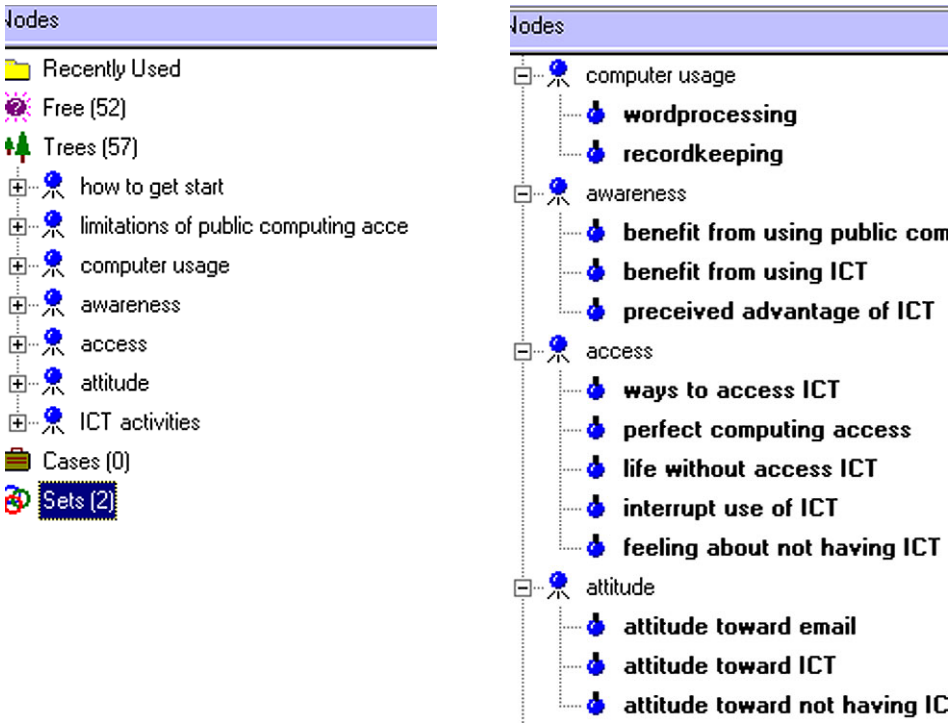
These concepts guided each student in developing his or her own coding strategy. Each student focused on 'thinking up' from data as the main goal of the qualitative research project, combined various coding tactics, and implemented them with the NVivo support tools. Specific constraints such as the structure of the interview and time frame in the course also influenced the coding strategies. The structure of the research project led to an overall common coding process. After getting familiar with the interview transcripts, all students started with a deductive, a priori research data tactic, followed by a more inductive, data-driven approach, and culminating with a more integrative tactic of aggregating nodes into node-trees.

In spite of this apparent common coding strategy, there were significant differences among students' individual node structures. At the aggregate level these differences are reflected by the range of total number of nodes (parents and children) in the trees (55 to 143), the number of hierarchical levels in the trees (2 to 5 levels), and the range of the number of parent nodes used (6 to 14).

At a more descriptive level, three main trends in the coding process were evident among the six students. Doug, John, Pete and Sherry started with the interview questions as main topics and used NVivo's coding by section to guide their development of free codes. This was viewed as a legitimate starting point since the structure of the interview was developed through group negotiation around major Digital Divide concepts as reflected in the literature reviews. Gina took an opposite approach. She developed an outline for the parent nodes outside NVivo and used the software environment to implement the tree using the parent-node structure as her starting point for coding. Between these two extremes was Mary who spent a great deal of time reading each interview in order to 'get closer to the data and to find meanings and find implications of the text' but she used NVivo to code for significant topics or categories in each interview. The second step for all students was to get involved in inductive, data-driven coding followed by the integration of free nodes into trees.

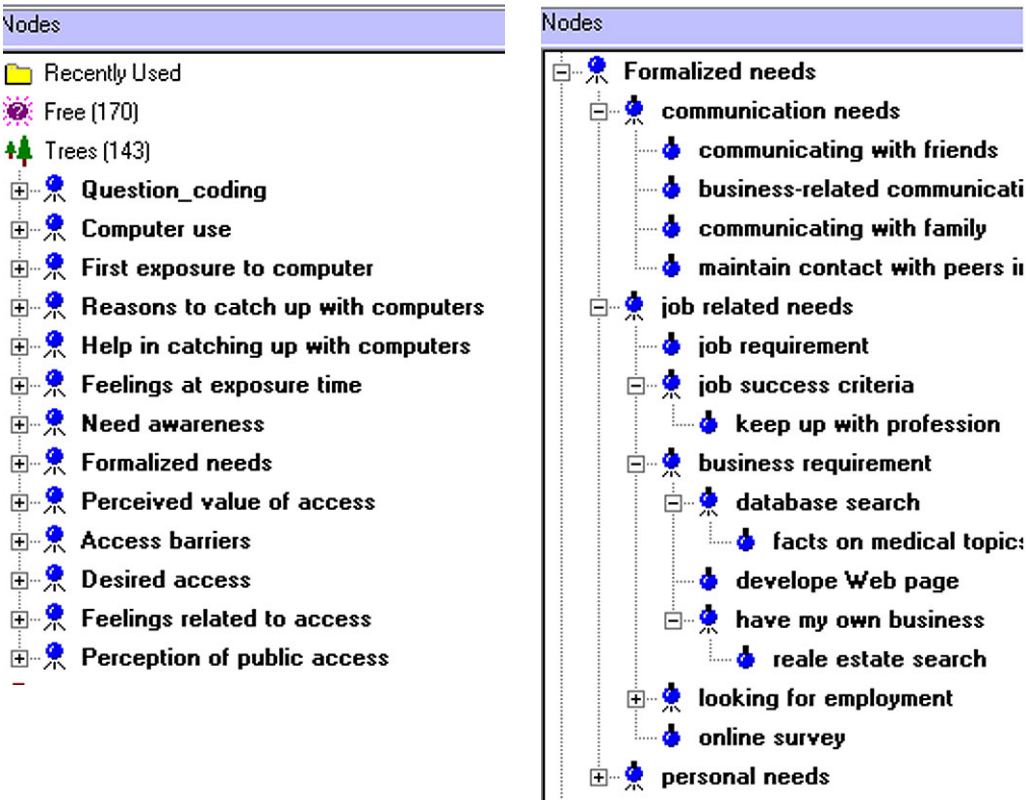
It was evident, however, that each student's cognitive style had influenced the actual development of the coding tactics. At one extreme was Gina who used the analytical approach to develop 52 free nodes around the major topics she outlined from her research outside NVivo. She grouped the free nodes around seven topical codes ending up with 57 nodes structured mostly in two-level trees with few three-level trees (see Figure 3).

Figure 3: Gina's node tree structure developed for Digital Divide Project



Doug, representing the other extreme, engaged in a very detailed inductive, data-driven coding for each question across all interviews. The result was a pool of 170 free codes that were then 'cleaned' due to overlap and lack of significance. However, his coding approach generated a final tree structure with 143 nodes grouped mostly in three and four-levels trees with a lot of categorical nodes that were defined in the grouping process rather than in the coding process (see Figure 4).

Figure 4: Doug's node tree structure developed for Digital Divide Project



The other four students developed coding strategies that generated outcomes falling somewhere in between these two extremes. Each student, however, developed some specific tactics in coding strategy that were reflected in the final output.

For example Pete, the co-instructor who had prior experience with NVivo, developed a node structure similar to Gina's with respect to the tree size (55 nodes), but the tree structure was similar to Doug's having most of the codes grouped in three and four-level trees. Pete started by developing his free codes based on interview questions using NVivo's coding by section feature. However, as he started to build trees, Pete re-coded the free nodes based on major topics identified during his initial coding stage.

Sherry, on the other hand, used the same initial strategy as Doug by creating free nodes for each question across all interviews. In the next phase, Sherry developed more categorical nodes and a tree structure around the initial goals of the study. The outcome of her strategy was a tree structure with 98 nodes grouped around six parent nodes with two and three levels of children nodes.

As mentioned before, Mary spent a great deal of time getting 'close to the data'. This helped her to create a set of nodes around some rough categories based on the topics in the data. As she worked through this first stage, Mary started to engage in more analytical coding by developing nodes covering concepts that helped her both to understand the multi-faced aspects of the Digital Divide and to break down overlapping information in the initial nodes. The initial 180 nodes that resulted from Mary's inductive coding strategy were grouped into a tree structure with 121 nodes, 14 parent nodes and three to four levels of children nodes, an outcome close to Doug's structure.

Finally, John used NVivo to structure the information around some major Digital Divide concepts he recognised in the data. He generated a tree structure with 74 nodes grouped around nine parent nodes followed by one level of children nodes. His approach was close to Gina's but had a lower level of specificity.

Multiple forms of analysis and interpretation

A broad goal of all coding approaches is the development of themes that 'usually mean something more pervasive than a topic or category' (Morse & Richards, 2002, p. 121). Typically, reorganising nodes into trees is the starting point in the search for patterns and themes. NVivo has several features that offer support for this cognitive effort – memos, attributes, and sets – as well as the analytical tools of search, assay, scope, filter, and modeler. All students used memos and attributes primarily to identify main patterns and themes. Memos were used to reflect on the thinking process during various stages in the coding process. Attributes were drawn from the initial survey data and demographic questions. Attributes were used in combination with the search and assay tools to identify patterns within the coded data. Four students (Doug, Gina, Mary and Pete) developed sets to help them group the data as they started to get into the abstracting and interpreting phases of the research.

Some common themes and patterns identified by all students regardless of the coding and synthesising strategy used were *computer use* and *attitudes/feelings* about access to computers and the Internet. However, more specific themes evolved around the individual research perspective for each student such as *formalised needs* and *perceived value of access* (Doug), *information and computer activities* (Gina), *method of computer familiarity* (John), *ethnicity* and *downside of computer access* (Mary), *role of public access* and *global vision of public access* (Pete) and, *motivation for Internet* and *computer usage* (Sherry).

The evidence that the diversity of the outputs resulted from the same data set (interview transcripts and researcher memos), collected around a common topic

(Digital Divide), and interpreted using the same qualitative research software (NVivo) supports the assertion that NVivo is far from being just a productivity tool. In this learning environment, NVivo's main benefit was to serve as a mindtool to scaffold the cognitive development of knowledge about qualitative research for students who were novice qualitative researchers.

CHALLENGES AND RECOMMENDATIONS

Providing a practice field learning environment

The course was successful in providing an authentic research experience as the framework for learning qualitative methods and the use of qualitative software tools. The eight practice field design principles were met in the learning environment, allowing the students to perform real-life research similar to experts while developing specific knowledge and skills. Students were responsible for conducting their own inquiry (principle 2) in a loosely structured problem area (Digital Divide) (principle 5) that was engaging and relevant to their professional interests (principle 8); learned by doing actual research (principle 1) and by reflecting on their process (principle 4). As the research project required complex thinking and problem solving, the instructors taught, coached, and modeled processes used by experts (principle 3). The software tool (NVivo) was used to scaffold learning and enable students to undertake a complex problem rather than simplifying or reducing the learning experience to guided exercises (principle 6). Finally, the participative class environment allowed students to share their expertise in the Digital Divide area and engage in critical thinking as a community of learners (principle 7). The final research presentations demonstrated outcomes similar to those of experts and were documented by personalised analyses of qualitative data.

The greatest challenge to the instructors in delivering this course was the time factor. One semester (16 weeks) is too short a time to allow students to conduct actual research, develop the knowledge and skills necessary, and complete a research manuscript ready for sharing. The necessity of securing protection for human subjects in research (a United States requirement) slows down a research project and makes it difficult to have authentic data available for learning and practising. To meet this challenge, similar courses should be conducted over a longer time frame.

Integrating qualitative software tools

There were two purposes of including NVivo as a component of the course: (1) the software tool allowed learners to actively construct/represent their growing expertise as a qualitative researcher throughout the course; and (2) NVivo supported learners in analysing the data from the embedded research project. Learning and using NVivo throughout the course provided learners a tool to actively construct their growing knowledge of qualitative research by applying methodological concepts to authentic/relevant tasks while conducting the real work of researchers.

The use of NVivo helped students actively process (through memos and coding) what they had learned about the qualitative research approach by providing them a mindtool for constructing their own knowledge of the Digital Divide and the qualitative research process. NVivo was the ideal mindtool as it offered the learners a blank canvas (project) to represent what they learned (documents, memos, and nodes) and allowed them to function as constructors of their knowledge (coding) and represent what they learned to others (show tool and modeler). The use of NVivo throughout the course allowed students to integrate their qualitative research skills with their knowledge of NVivo to construct meaning and explain the phenomenon of public access computing, one aspect of the Digital Divide.

A specific challenge to the approach of embedding NVivo within a beginning level qualitative research course is the potential for overwhelming the novice researcher with a diverse set of newly learned skills. Managing new concepts in qualitative methodology, conducting an actual qualitative research project, and learning a powerful software tool within a sixteen-week course may push some students beyond their comfort level and/or capacity. These activities may not promote qualitative research unless the instructor provides adequate scaffolding. In addition, the timing of the NVivo sessions is critical so that students can begin working (and not simply practising) on the interview data as early in the course as possible.

Assessing knowledge construction

One of the challenges of any constructivist approach applied to teaching and learning is to develop a method for assessing authentic learning that is capable of capturing the complexity of the thinking process of the learners (Tombari & Borich, 1999). The use of a complex qualitative research tool, such as NVivo, provides significant help in assessing students' development of knowledge and cognition in situated projects. The analyses of the free nodes and the tree structures along with the information from coding memos are powerful resources for the instructor in assessing a student's ability to move between analytic and global thinking as he or she moves from inductive, data-driven coding toward abstracting and themeing. These are critical cognitive skills for a qualitative researcher. NVivo's quick access to the actual text related to a given node allows the instructor to assess the consistency of the coding process, an important consideration for accuracy in research and writing up the data. More importantly, through its tools NVivo helps novice researchers to monitor their own cognitive activity, reflect, and make improvements without being forced to start over from scratch.

CONCLUSION

One of the exciting aspects of teaching and learning in this course was observing the power of NVivo to support knowledge construction. Because multiple novice researchers (the students) analysed a common data set, similarities and differences in cognition emerged in their coding process that became visible through the artifacts created in NVivo. Coding, building trees and sets, searching, assaying and modeling in NVivo have multiple functions in a situated learning environment. First, NVivo's

productivity function allows users to concentrate primarily on the cognitive part of research by 'taking on' important organisational issues in a qualitative research project. Second, NVivo serves as a mindtool by helping students build their knowledge base about qualitative research and monitor their own research processes. Finally, NVivo provides rich artifacts that can be used by the instructor to assess knowledge construction, and beyond that, to assess the outcomes of constructivist approaches in teaching and learning. In this situated learning environment, taught from a constructivist philosophical orientation, NVivo served as the bridge between learner and researcher roles and supported the students in being able to think and work like experts.

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ARTICLE NUMBER 2

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Explorations with qualitative inquiry courses and Geographic Information Systems

ABSTRACT

Over the span of three years a graduate course in Geography focused on qualitative inquiry with a specific emphasis on conducting research projects that combined spatial and qualitative data using Geographic Information Systems (GIS) and QSR's N6. This paper describes the experiences of this course with a particularly critical eye towards the manner in which efforts to include and integrate qualitative data software and GIS into future qualitative inquiry courses could be more effectively accomplished.

INTRODUCTION

Geography has long been primarily associated with the collection, analysis, and general fascination with spatially-associated data – maps – but Geography also has a rich tradition in qualitative inquiry (Limb & Dwyer, 2001) and efforts to combine qualitative inquiry and spatial data in fieldwork extend back at least four decades (Brookfield & Brown, 1963). With these antecedents in mind, a research methods course focusing on qualitative inquiry was developed primarily for graduate and advanced undergraduate geography students. While the course had several objectives, one of the primary goals of the course was to explore ways in which students could combine or work with spatial data – to which they were heavily exposed to in their curriculum – and qualitative data. To facilitate these efforts, over the course of three years, students were involved in ongoing research projects that included qualitative and spatial data. These explorations evolved from simply using GIS data during the first year to design the research, to attempts at combining the benefits of both GIS programs and QSR's N5/6 qualitative software packages.

The combination of social and spatial data fits well within the framework of Geography, which is the study of place. By using the advanced technologies of GIS

and N6, more of the facets that make up place can be integrated and clarified as the perceptions and understandings of people about a place are related to the physical attributes and features of that place.

The biggest problems and frustration from trying to teach these concepts arose because the course goals were too broad and thus overrode and frustrated each other. The first priority was to teach the basics of qualitative inquiry, and this often left little time to delve into the more complex task of integrating qualitative and spatial data in a meaningful way. The results were what could be expected with such an ambitious or naive agenda. However some valuable lessons were learned about how to integrate abd teach these two tools.

The approach of combining social and spatial data has the potential for broad application across disciplines. However, its utility is most readily apparent with subjects related to resource use and land management. Before delving into our experiences, an overview of the situation in which the course was taught, a short introduction to the basics of GIS, and an outline of the research project will provide some needed background. The basic concepts and tools we were teaching are also outlined.

Course objectives

The course in question was a graduate course that, over the span of three years, also involved several undergraduate students. This was initially the only qualitative course offered in the department and was therefore the first exposure to qualitative inquiry for most students. Since it was the only qualitative course, much of the content was, by necessity, introductory in nature. But because it was a graduate course, there was also an attempt to advance the students rapidly and give them experience of 'doing' qualitative research. The predictable result was that the course at times tried to do too much. While there were numerous goals for the course, the three overriding objectives were:

1. Cover the basics of Qualitative Inquiry.

2. Gain experience in Qualitative Inquiry by participating in a current research project.

3. Explore possibilities for integrating qualitative data with spatial data.

While this paper focuses on the last of the three objectives, the experiences and successes in meeting the final objective were tied closely to the other two objectives. It is also important to note that the first two objectives dominated the course and due to time constraints often relegated the third objective to the background, particularly during the first year. But it is important to present the course experiences during all three years since the early explorations were critical to the eventual trajectory of the course. While it would be redundant here to cover the basics of qualitative inquiry and N6, an initial background on the nature of GIS and an overview of the research project(s) may be more helpful.

The basics of GIS

GIS is not simply a computer-generated map but rather a computer system that consists of both the graphic data displayed on maps and associated tabular data. Among the many definitions of GIS, a particularly useful one states that GIS is 'an information system that is designed to work with data referenced by spatial or geographic coordinates. In other words, a GIS is both a database system with specific capabilities for spatially-referenced data, as well as a set of operations for working with the data' (Star & Estes 1990, p. 2). The practical difference between simple Computer Assisted Drafting (CAD) and GIS is the GIS's ability to connect with and integrate a database along with mapping graphics, enhancing spatial analysis capabilities. In short, GIS consists of three parts: first, a database; second, spatial or map information; and third, a way to link both (Clarke, 1999).

For example, Figure 1 is a computer-generated map that shows the relative location of Emery County in the State of Utah. Emery County is the location of the research projects carried out by the students and discussed in more detail in the following sections. The map in Figure 1 is helpful in illustrating where Emery County is in relation to the rest of Utah and western Colorado, but beyond this the map is of limited use. On the other hand the map in Figure 2 is a GIS-generated map of land ownership in Emery County. In addition to illustrating the spatial nature of private, federal, and state owned lands, the map is also connected to a simple database that enables the user to query such things as the total surface area of private land versus federal land in the county. In addition a GIS user could also select a portion of the map and query the ratio of private to public land in that area versus another area, or even create various proposals for potential land-swaps by selecting areas where the small State sections could be traded for federal lands in another area on the map. Though the database for this particular map is quite simple, there are numerous additional databases that could be connected, such as a layer showing roads with a database of length, jurisdiction, road surface type, date last maintained, or even the number of vehicles traveling the road during a given period. Any data that can be spatially connected to geographic coordinates on this map could be integrated into the GIS.

A key aspect of GIS is the ability to 'geo-reference' attribute data. Geo-referencing may be defined as attaching location information (latitude/longitude, x–y coordinates) to data to create geographic features and/or surfaces, or linking data to geographic features and/or surfaces. Geographic 'features' are objects with size and shape. All geographic objects can be represented as points, lines, or polygons – collectively known as 'Vector data.' Geographic 'surfaces' are composed of data that has no distinct shape, but instead possesses measurable values for any particular location on the earth's surface (temperature, precipitation, slope, elevation, etc.). This 'raster data' (matrix of identically sized cells) is the most common form of surface data. In GIS databases, attribute data has historically been almost exclusively numerical or quantitative (population density, metric tones of grain per acre, etc.). However there is enormous potential for enriching a GIS through geo-referencing qualitative data. Being able to connect qualitative data to a specific location allows for an analysis that incorporates human perceptions, meanings, and experiences with spatial and bio-physical data. It is here that we attempted to utilise CAQDAS to connect relevant qualitative data to a situation usually only considered from a spatial or bio-physical standpoint.

Figure 1: Computer-generated Map showing location of Emery County and San Rafael Swell

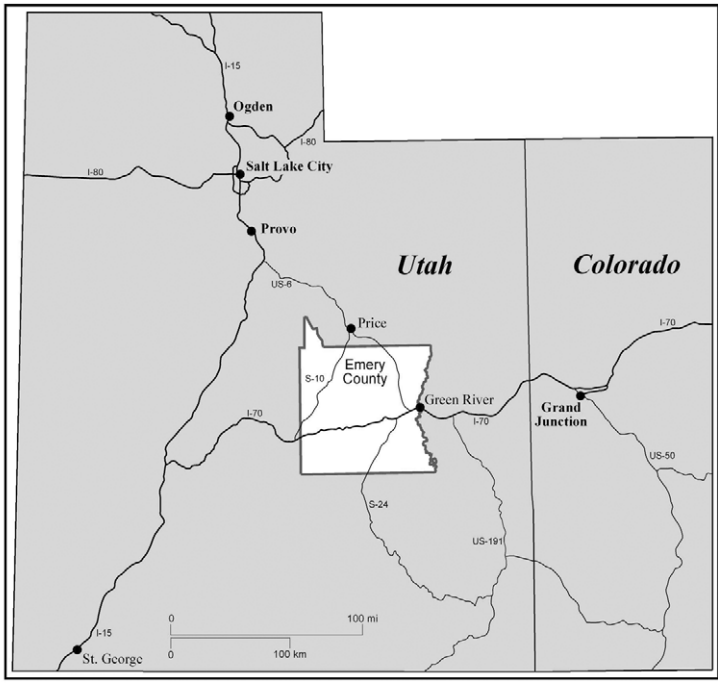
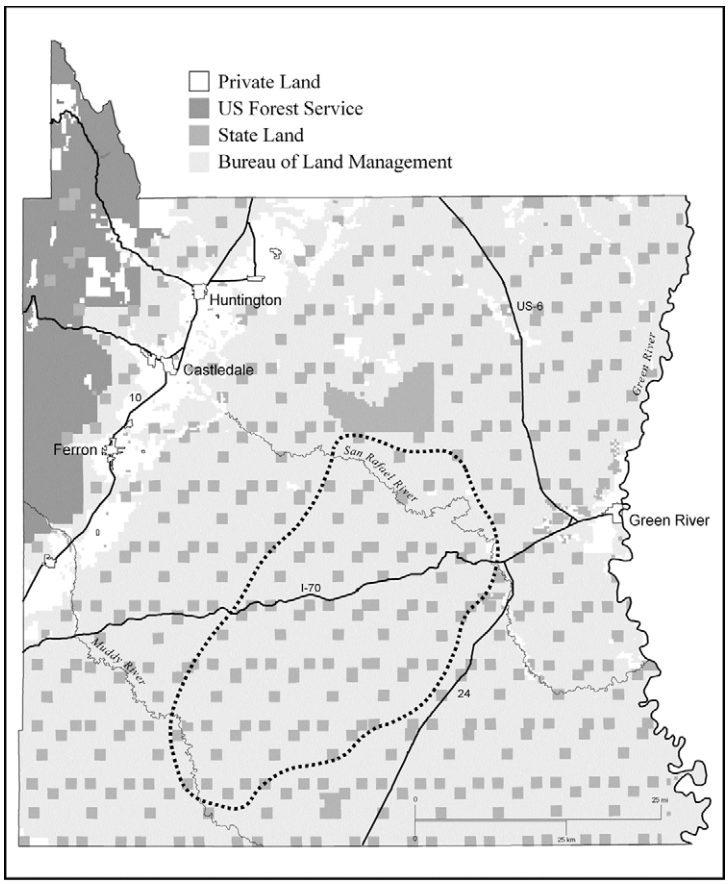


Figure 2: GIS map demonstrating GIS



Overview of the research project(s)

Federal public land dominates much of the western United States (86% of Nevada, 66% of Utah) and is utilised for a variety of activities from ranching and mining, to hiking and camping. Public land is also often at the center of controversy as various groups (politicians, environmental groups, local populations, and other special interest groups) fight over appropriate use, and land managers struggle to develop and implement policies. Perhaps nowhere has the struggle over public land use been more contentious and visible than in Emery County's San Rafael Swell, a massive uplift of the earth's crust measuring approximately thirty miles wide and fifty miles long. The 'Swell' is a popular place for hiking, rock climbing, canyoneering, four-wheeling, backpacking, and camping. In addition ranchers living in nearby communities have grazed cattle in the area since the late 1800s, and during the mid-twentieth century the uranium boom brought hundreds of miners who worked numerous, now abandoned mines.

At the center of the controversy over the Swell has been the concept of formal Wilderness designation. The short version of a lengthy story is that in the 1980's the BLM (the dominant land manager in the Swell) conducted a Wilderness review throughout Utah that resulted in six Wilderness Study Areas (WSAs) being designated in the San Rafael Swell. (WSAs are relatively more restrictive than most public land, with activities such as mining and off-highway vehicles typically eliminated or substantially reduced.) The establishment of the WSAs pleased few people as local political leaders felt that too much land was designated and the emerging Utah Wilderness Coalition (UWC) believed far too little was designated.

While there are numerous issues involved in the Wilderness debate in Utah and the San Rafael Swell (Durrant, 2001; Durrant & Shumway, forthcoming), the students involved in the qualitative research methods course during 2001–2003 focused their research on ranching in WSAs and motorised vehicle access in the San Rafael Swell.

Initial efforts: qualitative research using GIS for sample selection and improving interviews

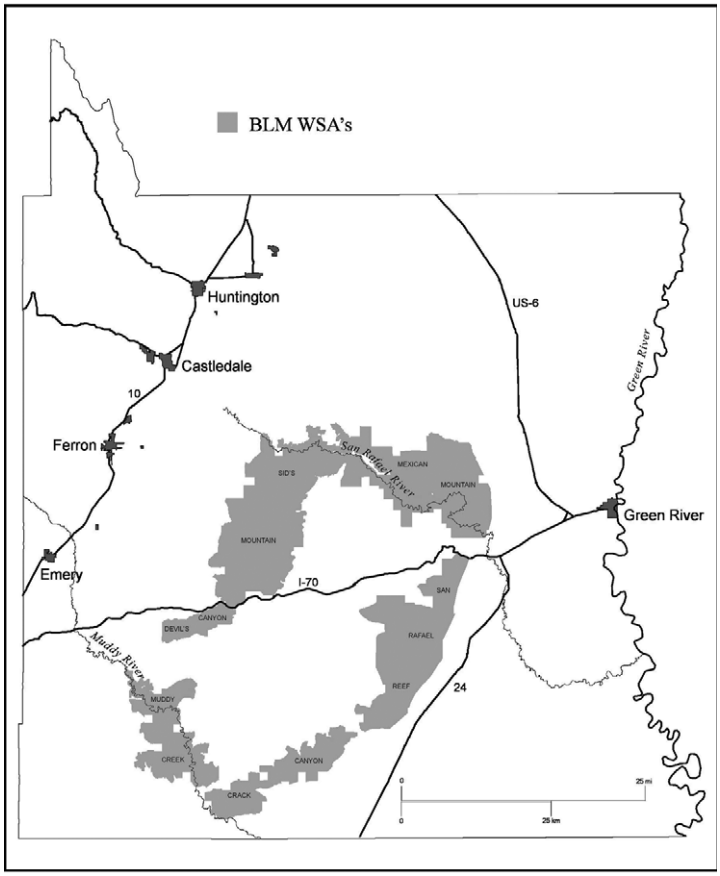
Ranching continues to be one of the hotly contested issues in the ongoing Wilderness debate. Proponents of large-scale Wilderness designation argue that ranching is allowed in Wilderness areas and will therefore be unaffected by the designations. On the other hand Wilderness opponents argue that Wilderness designations will impose such severe restrictions on ranchers that eventually ranching will be eliminated. In the midst of these often boisterous assertions, the initial qualitative inquiry class designed a research project that sought to find out what the ranchers thought about WSA designation, with the research question being: 'From the ranchers point of view, how have WSAs impacted the livelihood and way of life of ranchers who use public land allotments that include WSAs?'

Due to the limitations of space, the entire research process and results of the survey during the first two years of the course will not be presented here but may be found

elsewhere (Dods, 2003). Instead the focus here will be on those aspects in the research design where we utilised N5/6 with a GIS.

Initially the class utilised a GIS to assist with the selection of the study sample. Employing existing databases, a map of the San Rafael Swell was created outlining the boundaries of public land livestock allotments overlaid on existing WSA boundaries (Figure 3). From this map and database the class was able to select only those ranchers who held permits for livestock grazing in allotments that overlapped to some degree with an existing WSA. A total sample of fifty-two ranchers whose allotments fit the criteria was identified. Of the fifty-two, students in the class were able to contact thirty-six by phone for an initial semi-structured interview (fourteen of the remaining ranchers were unavailable during the study time and two declined to participate).

Figure 3: Wilderness Study Areas (WSAs) and cattle allotments



Following the initial interviews the class used notes from the interviews to create a second interview guide designed to probe deeper into the answers given over the phone. Twelve of the ranchers were selected for the in-depth interviews that took place at their residences or businesses in Emery County. These interviews were recorded, transcribed, and entered into QSR N5 for initial analysis. Since the course had already used quite a bit of time covering an introduction to qualitative inquiry, designing the

ranching research, and conducting and transcribing the interviews, only the basic set-up and functions of N5 were covered in the course. With an initial introduction to the software the students read through the transcripts several times. The students then spent time free-coding individually and then met together to discuss experiences and findings. After much comparison and discussion, they developed a common set of codes that were then applied to every interview (see box below). While this initial analysis provided insight into our research question, the course ended before any additional work could be completed.

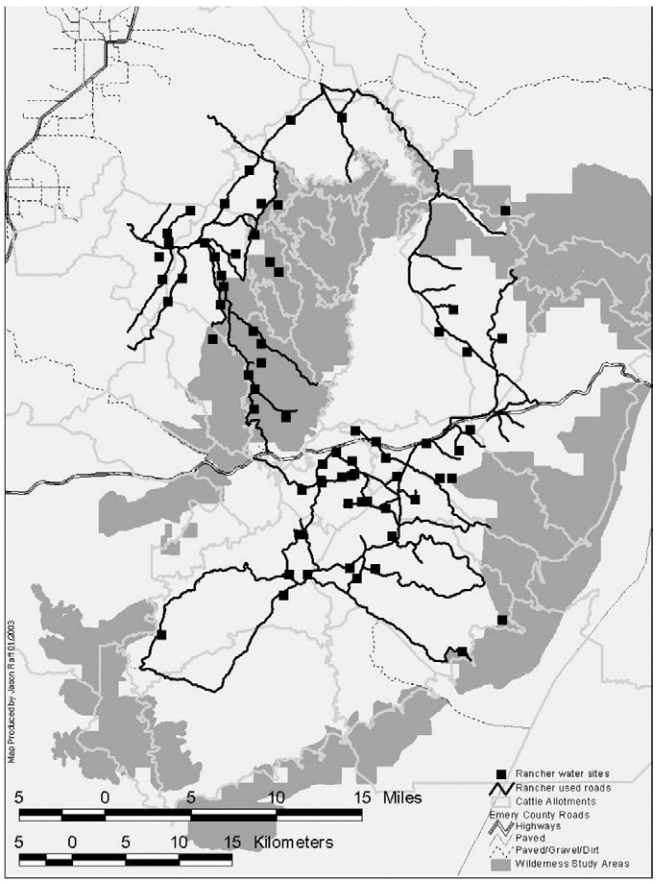
Codes	
Access	Access; concerns that the ranchers have about accessing their grazing allotments in WSAs or Wilderness areas. These issues could be related to access to livestock, water, etc.
Alt	Alternatives; information about alternatives to WSAs or wilderness designation
Att	Attitudes; attitudes that the ranchers have about WSAs or Wilderness designations.
BLM	Bureau of Land Management; specific information about BLM involvement with allotments and management.
DAD	Anecdotal stories about life or experiences as a rancher. Most often some mention of another family member or current situation.
Deg	Land degradation; information about land degradation if it has occurred.
FR	Future of ranching
GtG	Generation to Generation; passed down from grandfather to son to grandson. How they got into ranching, how they hope to continue the tradition.
Hood	Livelihood; information about their current economic condition, what kind of roll ranching plays in their livelihood, can they make a living, how do they make a living, do they need a second job, etc.
LM	Land management; issues about how the land is being managed, how they think it should be managed, how land management has changed. Involves other agencies in addition to the BLM.
Multi	Multiple use; idea that the land should be used for many things, legislation should not limit the use of any specific group.
Alt	Alternatives; information about alternatives to WSAs or wilderness designation
Att	Attitudes; attitudes that the ranchers have about WSAs or Wilderness designations.
BLM	Bureau of Land Management; specific information about BLM involvement with allotments and management.

Student papers from this class focused, understandably, on the ranchers' experiences. Compared with papers from later classes, the papers lacked an understanding of how the experiences were grounded in place. Topographical features such as water sources, roads, or steep climbs played little or no part in the students' analysis of the rancher interviews.

The following year a different set of students took up the research along with a graduate assistant who had been involved in the initial interviews. The goal for the research was to continue to pursue the same question by conducting a second round of in-person interviews, centering on the issue of motorised access to allotments for

cattle operations, including water source maintenance – one of the biggest issues concerning the impact of WSAs on ranching that came out of the initial interviews. One change made to the interview strategy was that in order to increase comparability of the interviews (which occasionally suffered during the first year), the graduate assistant would take part in every interview with a different student each time. Additionally, interviews were designed to further incorporate the possibilities of GIS by utilising maps during the interviews, where the ranchers could draw routes of motorised access and key water sources (Figure 4). The reason behind this strategy was that during the initial interviews ranchers exhibited a wide range of opinions that clearly illustrated there was no united rancher 'voice' on many topics. It was hypothesised that since opinions come from experience, the experiences of individual ranchers must vary in some degree according to the place they happened, or, more directly, that opinions may differ in large measure according to the characteristics of their allotments.

Figure 4: Rancher interview maps



In pursuing this avenue, we found one rancher, for example, who had a very relaxed attitude about the WSA that covered his entire allotment and didn't care or worry if the entire thing was eventually designated as a formal Wilderness area. In having him describe in detail his allotment on a topographic map, it became clear that the WSA portion of his allotment was limited to a steep canyon region and that the water sources in this area consisted of natural springs. To him there was no reason to take

motorised equipment into the area. When it was mentioned that the relatively flat and open part of his allotment was part of the UWC expanded proposal, his demeanor changed somewhat, and he insisted that maintaining motorised access to human built stockponds in that area was vital. This was just one case where utilising various geographic features in a GIS helped us to see connections and probe deeper, and more effectively, in interviews.

The students in the second year course took the information from the interviews, and since we had moved more quickly in our research, were able to extend their individual analysis in N6 to include diagramming and matrix building. They created final papers that were more insightful than those from the previous year. In addition, the graduate student was able to extend the analysis into a Master's Thesis (Dodd, 2003). However, the GIS capabilities were still relatively untapped.

Stage 2: Connecting location and opinions using QSR's N6 and GIS

Following our moderate success in utilising N5/N6 and GIS in our research projects, we decided to attempt not only to utilise both but to try and find a way in which the two computer systems could be more closely aligned than had been the case with the interviews of ranchers in the San Rafael Swell. An ideal situation presented itself when the BLM conducted a public comment process as part of their efforts to create a motorised recreation management plan. This plan would designate which existing routes would stay open to motorised vehicles, such as motorcycles, all-terrain vehicles (ATVs) and full-sized, four-wheel drives. As route designation is one of the major issues and sticking points between Wilderness advocates and opponents, the public comment period generated a vast number of written comments for the BLM to consider.

In total, the BLM received over 7,500 comments, though only 1,283 were 'unique' comments. Most of the others were identical copies signed by various individuals, including over 4,000 identical faxes sent by the members of an environmental organisation.

Despite many of the comments being identical copies, the unique comments totaled several thousand pages. The BLM struggled to handle the thousands of pages that made references to hundreds of vehicle routes and other geographic features. The voluminous written comments along with the obvious content connections to geographic features in GIS databases (also heavily utilised by the BLM) presented an opportunity to utilise N6 to manage and assist with the comment analysis while also forming an ideal situation to more closely connect N6 and GIS (Durrant, 2003).

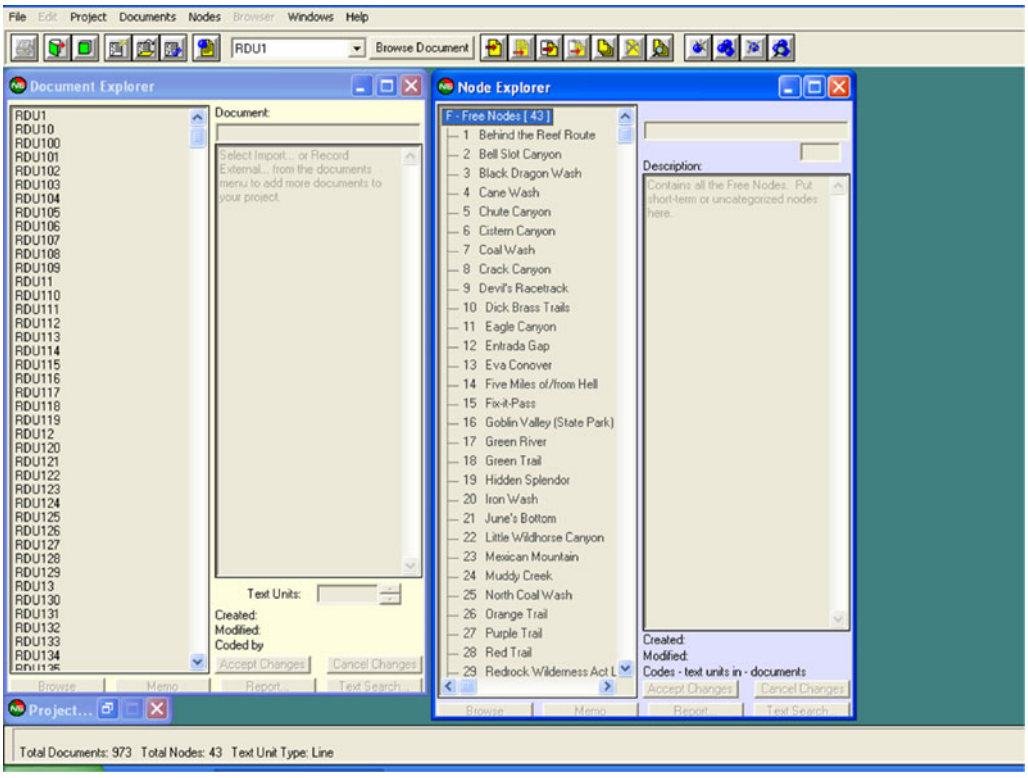
The first challenge to utilising N6 was to digitise the many comments that were submitted only in paper form. In order to avoid spending a large portion of the course typing the comments, several students were hired to complete the task before the course began. After each individual comment was typed, it was saved as a separate plain text file.

The course started with a several week introduction to qualitative inquiry and an overview of the ongoing struggle in the San Rafael Swell, including the research of

the previous two years. In addition the high profile nature of the OHV debate over route designations was covered. As part of their introduction to the topic, each student read a portion of the paper copies of the comments (they had not yet been introduced to N6) and helped create two lists: 1) the major themes expressed in the written comments, 2) the geographic features referenced in the written comments (this list totaled over 450 geographic features). From this point the students worked on two N6 projects: the first was to analyse the themes found in the comments, and the second was to work with references to geographic features. The purpose of the first project was to help the students see how N6 could speed and enhance the process of considering and analysing the disparate comments received by the BLM, who had previously struggled to handle the vast data primarily by hand. The purpose of the second project was to explore avenues for more closely connecting spatial data with the comments by using the abilities of both N6 and GIS.

For the second project the list of geographic features was culled down to include only 43 features that had been mentioned in a minimum of ten comments (with many of the others only being mentioned in one comment and close to 100 features being found outside the boundaries of the OHV planning unit, including some in neighbouring states). 43 nodes were created to correspond to the geographic features, and the students spent considerable time connecting the geographic text references from the comments to these nodes (Figure 5). To connect the geographic features to the GIS, each feature was given a number in the GIS that corresponded with the node number in N6.

Figure 5: N6 nodes used for geographic comments



In addition to working with the qualitative data from the comments, the class also focused on the GIS data that was available. Figures 6 and 7 show the interface of ArcView, a GIS program utilised in the project. The map on the right hand side of Figure 6 consists of three 'layers' of data: the boundary of the planning unit, all the routes in alternative one, and the routes in alternative four – each of the layers can be turned on or off by checking the boxes in the left hand margin. In Figure 7 the map is zoomed in, and the database or 'attribute table' for the most comprehensive road layer is also shown.

Figure 6: Arcview map

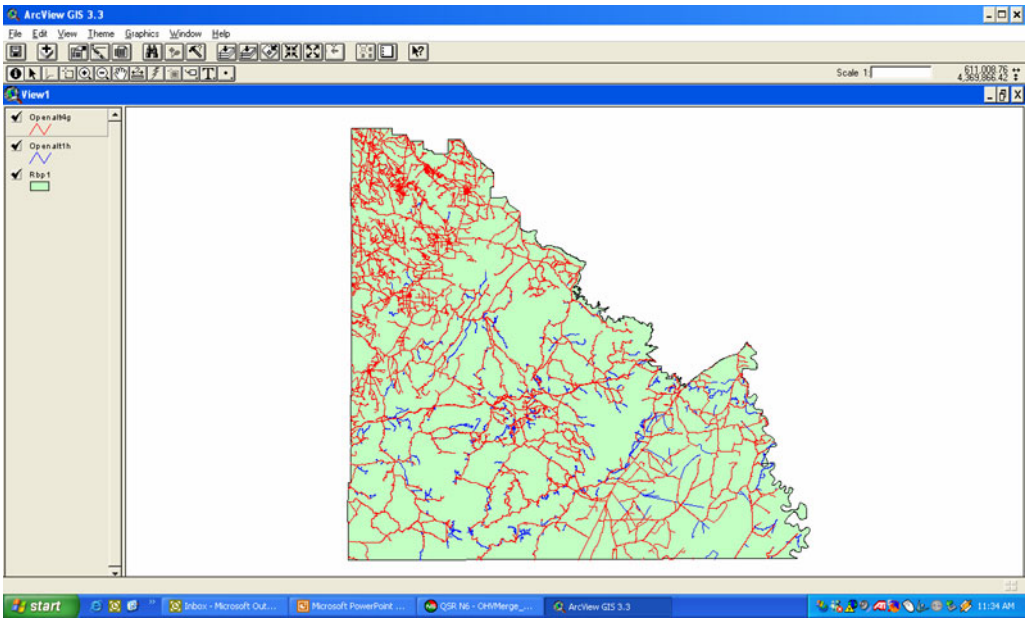
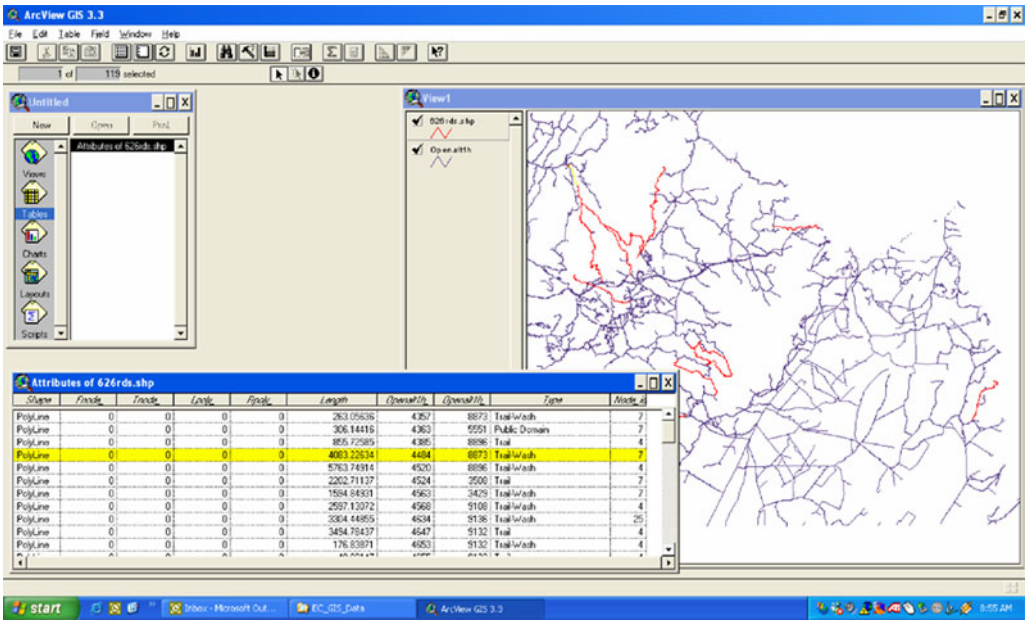


Figure 7: Arcview map with attribute table shown



The first problem we had with the GIS data was that though there was a relatively comprehensive road layer, the database was not organised around the names mentioned in the comments. Furthermore each individual line segment on the map was a different entry in the database table when, in fact, each road was a combination of up to several dozen line segments. Thus instead of perhaps a hundred individual routes in the Swell, the database showed over one thousand. So the first step to make the GIS data usable and more comparable with the N6 nodes was go into the GIS project database and combine those line segments together and create a table with the 43 routes rather than hundreds of individual segments. The details of this process have been presented elsewhere (Durrant, 2003) but in Figure 7 (above) it is possible to see the first step where a new column was added to the GIS attribute table, and all the individual segments that were part of one of the 43 routes was given an identification number corresponding with the Node number (far right hand column). Individual rows with similar ID numbers were then combined to create another attribute table of only 43 entries.

From this point there were many possibilities for further analysis and integration of GIS and N6. For example it would be possible to take the analysis of various themes from the first N6 project and combine them with the second project and then create a map that highlighted those areas of greatest conflict in opinion by creating another column in the new attribute table and assigning whatever values were appropriate. Since, once again, the plans outpaced reality for the class, the students were not able to pursue these possibilities but instead worked on individual final papers where they utilised the two N6 projects (some combined them for analysis) and had access to the GIS project in order to see spatial relationships. The students who were able to connect their N6 data to geographic features in the GIS produced some very insightful papers. The class emphasised the importance of using description of the research situation to build a foundation for analysis. The use of GIS data helped them develop much better descriptions which led to better understanding and analysis of the overall research problem.

Obviously with more time the analysis could have been much more sophisticated, and the students would have most likely found even more ways to integrate GIS and N6. To gain additional class time, in the coming years a preparatory course will be required that will allow the class to commence from a much more advanced position and spend more time and effort on advanced analysis.

Redesigning the course(s) to provide further opportunities to combine qualitative and spatial analysis

It is painfully evident when reading the previous experiences that the greatest handicap and perhaps mistake was trying to combine such an ambitious agenda into a single semester course. The recent addition of a separate undergraduate course will greatly alleviate this problem and will perhaps do more to allow students to understand and explore connections between N6 and GIS than any other action. The

undergraduate course will take over the introduction into qualitative inquiry and will also provide hands-on experience with the basics of N6. In short this will have the effect of adding over a month to future classes. Previously it was difficult to complain too loudly about the paucity of qualitative courses as there had been no course in the department dedicated to qualitative inquiry. Table 1 below shows how the course objectives have been spread over two courses to allow more time as well as the chance for more depth in the graduate class.

Table 1: Course Objectives Spread Over Two Courses

NEW UNDERGRADUATE COURSE	REVAMPED GRADUATE COURSE
Introduction to Qualitative Inquiry (What is it? When/Why use it? Etc.)	Discussion of Spatial Data and Qualitative Inquiry (exercises include geo-referencing observation notes utilising hand-held GPS receiver)
Introduction of the basic features of CAQDAS (primarily an introduction to the material in the N6 tutorial)	Advanced discussion of Qualitative Design and Theory
Focus on Qualitative Analysis Methods (particular focus on N6 capabilities)	Explorations of connections in data handling and analysis of GIS and N6
	'Hands-on' research experience

Lessons learned and potential paths to follow

Our research project on the San Rafael Swell gives a brief glimpse into the exciting potential of combining the advantages of N6 and GIS to manage and analyse data. Being able to combine aspects from physical landscapes and human understanding to analyse situations involving humans and land allows for a more thorough and in-depth understanding. Despite the shortcomings and frustrations, even the often bumbling attempts to integrate N6 and GIS into the curriculum of a qualitative class, proved that this line of exploration offers many promising avenues. It is with this in mind that these experiences have been shared. In addition to the absolute necessity of having at least two courses for such an agenda, the following are some additional lessons that were learned from the efforts.

- Various student backgrounds. While none of the students participating in the course had taken a previous course on qualitative research, they varied greatly in their knowledge of, interest in, and capability to understand qualitative inquiry. By creating an advanced class, students should be at a higher and less varied level of understanding.

- Data fit and preparation. While it was immensely useful to bring real research data into the course, this required much time up front. It was important to assure that the data had a good fit for the issues we were studying in class, and this required quite a bit of preparation before the course. While we solved this problem with student workers before class began, if student wages aren't available other avenues will have to be pursued.

- Dynamic relationship between N6 and GIS. To take full advantage of both N6 and GIS, the data needs to be dynamic. Taking the data from N6 and connecting it to the GIS will provide insights that may not have been coded and analysed. The data should be kept active in N6 for further analysis after gaining understanding from the GIS. This may require several updates throughout the project to both systems.

- Need for a strong focus by the instructor on the research project even at the peril of other important research tasks. Teaching students to use and integrate both N6 and GIS along with actual data on a research project takes much more time than the average course on the part of the instructor. While some benefits may be gained through the work that students do with the data, instructors should know in advance that time needed to work with students on this project may take away from other important and related tasks.

- Consistency of multiple researchers. Related to the variability of students in the class, it is hard to assure consistency with multiple researchers working on a project. We improved this during the second round of rancher interviews by sending a graduate student to every interview and the third round by assigning one student to oversee and double check student efforts. This provides some valuable research experience for a higher-level student, but the potential for problems with the data is high.

- Lots of work: Because you are working with two computer programs that require many hours at the controls and which students most likely will not have access to away from a centralised lab, this form of course requires lots of work from the students that they can't do at home. The amount of time that will be required in the lab should be emphasised from the beginning so that students know what they are committing to upfront.

- The Fallibility of Maps: Maps are very useful but they can lie, cheat, and deceive (Monmonier, 1996). This is an interesting and critical topic for discussion though it adds to an already crowded agenda; but it is necessary due to the authoritative status often bequeathed on the maps utilised in combining qualitative and spatial data.

The integration of N6 and GIS is difficult, especially when there is no manual to follow. This is the excitement and lure, but also the hassle and time consumer. But despite the heavy time commitment, the potential for linking physical and social data

is a compelling reason to pursue it. Geography is built on the notion that place matters. Understanding the different forces that operate in a given place – be they bio-physical, social, or cultural (Sack, 1997) – can help us understand specific situations in a more comprehensive and lasting way. By combining N6 and GIS, these different forces can be better identified, integrated, and thus better understood.

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ARTICLE NUMBER 3

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NVivo as a tool for reading instruction: speculating on the possibilities – a research note

Over the last decade, the world has seen the rise of software tools for non-numerical (textual) data analysis. These tools allow one to sort and organise text, using varied approaches within the qualitative research paradigm, and working with diverse forms of texts and/or other research circumstances. Features common to many of these tools include: storage for documents, ability to code or 'mark' text for later retrieval, and the ability to search and sort documents and codes.

Qualitative research is one of the primary fields in which these uses of technology can be seen.[1] Within the arena of qualitative research, educational researchers are coming to make increasing use of these tools for qualitative research studies.[2]

Although the software tools for non-numerical data analysis used by educational researchers were designed to be employed for qualitative research studies, they are fundamentally tools for analysing texts, and the analysis of texts are what the work of education is all about. As one progresses through school, reading to learn from texts is critical to gaining knowledge and coming to understand ideas across all disciplines (Vacca & Vacca, 1999). Recognising that this software had the potential for addressing key educational goals in regard to literacy learning, I conducted an extensive search of electronic databases, including the ERIC database, but found no evidence of the application of qualitative research software to the issues of reading comprehension.

In lieu of such information, the purpose of this piece is to consider the possibilities of repurposing qualitative research analysis software as tools for reading instruction. For simplicity's sake, my speculation will focus on one software tool – NVivo.[3] My purpose is not to prove NVivo's effectiveness as a tool to aid reading comprehension instruction, but to make the case for considering the possibility of testing its use for these purposes (as well as testing other members of the same class of software).

I come to this research exercise with several qualifications. I am a qualitative researcher who has used NUD*IST and NVivo and test-run other tools. I am a teacher of qualitative research who has experimented with the integration of NVivo in several qualitative research courses for doctoral students. I am a qualitative research consultant who has helped others design or review research work using NVivo. I am a reading specialist who has developed reading programs and worked with readers of many ages.

My paper experiment into the application of NVivo as a tool for reading instruction will address three main considerations:

1. What is it that good reading instruction must do to support readers to be successful making sense of text?

2. How might NVivo's features be reapplied to support the key tasks of reading instruction?

3. What are the questions a good skeptic would raise about the adoption of tools like NVivo for reading instruction?

What is it that good reading instruction must do to support readers to be successful making sense of text?

Skilled reading, particularly of dense content-area texts, requires that readers:

- activate prior knowledge
- secipher text (decoding)
- elaborate and extend textual knowledge
- evaluate understanding.[4]

In engaging with text in this way, we hope students will learn to construct meaning through interaction with text, coming to use text as part of active inquiry (Rosenblatt, 1978; Tompkins, 1980).

How might NVivo's features be applied to support the key tasks of reading instruction?

Imagine, for the sake of argument, that high schools have switched over to electronic textbooks. Also imagine that all students have a computer available to them onto which is loaded NVivo and the electronic textbooks that they will be using for their courses. Moreover, student papers, projects, lab notes, and other textual documentation would also be organised within NVivo – making it like vast inter-connected textual reservoir.

Given this scenario, how would an instructor apply NVivo to support students' reading needs across diverse subject areas? The following table presents some thoughts about the ways NVivo's features might be used to address the four areas critical to reading

instruction identified above. For the purposes of efficient use of space I will assume that the reader has basic familiarity with NVivo and/or tools with similar characteristics.

READING TASK	NVIVO FUNCTION
Activate prior knowledge	• Create a memo through brainstorming what one knows about a topic or develop a Concept map using the Modeler Function. • Review this document as the study proceeds and code or link documents to ideas embedded in it.
Decipher text	• Code textbook and other documents related to a topic. • Review Coding using Coding Stripes to see how ideas intersect within and across texts. • Use Nodes (Codes) as a study guide • Have students present and defend their coding systems for particular projects, comparing the ways they have approached knowledge in an area.
Elaborate and extend text	• Use Data Bites and Memos to annotate and write in-depth about a text. • Use DocLinks and NodeLinks to bring selected texts together in ways that demonstrate new understandings of a topic (linking at top level: documents and mid-level: nodes). • Use the Search Tool to find specific information that the student has identified as relevant within and across texts; to explore possible relationships of significance within documents and related to the node structures developed.
Evaluate understanding	• Have students write their papers as compound documents with Doc Links and Node Links that allow the teacher to follow the students' line of thinking back into the reading. • Use NVivo projects as student products to be evaluated at the end of a unit. Develop evaluation criteria for projects that would force students to defend their choices, such as the development of their tree nodes.

What are the questions a good skeptic would raise about the adoption of such a course of action within schools?

1. Is there a reasonable fit between the supports readers need and the features of this tool? Will it add value to reading instruction? Textual analysis is at the heart of what NVivo does ... and textual analysis is also at the heart of what school demands that students do. The core features of NVivo are complementary to reading instructional tasks that are critical to successful mastery of text. Studies would be needed, however, to demonstrate that, indeed, readers using this tool can make sense of it to meet these goals and to better understand how working in this medium supports textual analysis and transactions with text.

2. Why do we need software to do this? Isn't pen, paper, and textbook easier and cheaper? As we increase the number of textual tasks that we do with digital media, it makes sense to have digital tools available in computer and non-computer formats. While there are overlapping and convergent functions between a tool like NVivo and paper and pen activities, there are also divergences, that is, there are things you can do with the technology that you can't do without it. An example of this would be the efficiency of searching for relationships among diverse self-established codes on a topic. It may be that the combination of redundancy (what we already know and do) and new functionality (doing things that we can't do without the technology) is the greatest strength for adopting these tools.

3. Why not make a tool just for reading instruction? This tool was made for qualitative researchers, so isn't it going to have whistles and bells that would distract from using it for other purposes? Reading researchers have experimented with using hypermedia to create reading instructional tools. Hypermedia tools have proven beneficial to developing the readings skills of at-risk students (Anderson-Inman & Horney, 1998) and for the development of deeper, more critical readings of texts (Myers, Hammett, McKillop, 1998). Although the benefits and potential of such tools have been identified by reading researchers, there is no one generic software tool that has come to the fore as a tool to support reading instruction.

What is powerful about NVivo, and other tools of its class, is the generic quality of their features and their adaptability to a variety of texts and disciplines. In addition, these tools are fairly robust and commercially available. Given that such tools do not exist in the reading world on a viable commercial level, if the fit is good it might be cheaper and faster to adapt tools from the qualitative research world.

In thinking about the repurposing of non-numerical data analysis software to new audiences we might look at the example of the Microsoft Office package (Word, Excel, and Powerpoint). These software tools are found now on almost every school computer, and, yet, these programs were designed, not for children and educators, but for businesses and offices. Educators imported them and worked around their business related features to get the functionality they desired for their environments.

4. For teachers: Will the benefits of using the tool outweigh the costs of professional development and the time required to get up to speed using it? For students: Will the cost and time required to learn the tool be justified by improved reading ability and higher achievement? In order to argue for adoption, there will need to be two tiers of studies: 1) to examine how individuals actually read with NVivo (or other tools of this class); and 2) to understand the issues related to integrating these tools into classroom use. The first tier must prove benefit to move onto the second tier of studies.

5. Does this mean every student has to have a computer on their desk at school? Adding software tools for textual analysis into the mix doesn't create a new problem. It is another variation of an old problem. Teachers, daily, have to manage a single class computer or clusters of computers when they would like to have a lab available or better yet, a computer on every desk. With this software, as with word processing or

other software that are used across domains, they will still be struggling with the same issue of adequate access to the technologies of schooling.

6. How will students get access to the electronic texts they will need to use with these tools? Access to electronic texts will not be a technical barrier, but one of copyright, fair use, and cost. Increasingly, textbooks and other reading materials are being made available in digitalised formats. This makes for ease of transporting, decreases costs, and makes it easier to update sections as information changes. If the use of this software is proven to be of benefit, I think we can assume that software developers, publishers, and schools will be able to craft agreements that bridge their various positions.

7. How do we know NVivo is the best tool of its kind for these purposes? If there is merit to the argument that NVivo might have value as a tool to support reading comprehension, then it opens the possibility that other tools in the same class might also be valuable. It would make sense in that case to compare tools and their functionality for the purpose of reading instruction.

Moreover, it will be important to think about these tools, not only as a collection of diverse examples of one sort of tool, but as tools that are integrated with other tools – web-work, electronic texts, Palm-held pilots, and other forms of software.

CONCLUSION

Repurposing software for non-numerical data analysis designed for qualitative researchers into tools for reading instruction in school settings, raises tantalising possibilities and opportunities. Mapping out the issues on paper is a beginning point, but there are important questions that must be answered before this could be more than an interesting detour. The most important question that would have to be answered with compelling data would be – does it work? If students were instructed in reading, using software for non-numerical data analysis, would they learn to make better sense of text? If this can be answered positively, then it opens up new worlds of work for software developers who have developed such tools for qualitative researchers.

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Endnotes

1 A comprehensive list of software for non-numerical data analysis favoured by qualitative researchers can be found at http://caqdas.soc.surrey.ac.uk/website.htm

2 Proof of this assertion is found in the number of qualitative research dissertations that make use of software tools created by the company QSR: http://www.qsrinternational.com/userprojects/projects/Theses.pdf

3 NVivo is produced by QSR (www.qsrinternational.com) and distributed by Scolari, a subsidiary of Sage publications (www.scolari.com). For more information on these tools, please refer to Richards (1999) or Morse and Richards (2002).

4 For this framework of assumptions, I draw upon a cluster of reading instruction textbooks: Manzo, Manco, & Estes (2001); Singer & Donlan (1980); Sprio, Bruce & Brewer (1980); Topping & McManus (2002); and,Vacca & Vacca (1999), as well as my own work in this area: Davidson & Koppenhaver (1993) and Davidson & Pulver (1991).

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innovating courses

ARTICLE NUMBER 4

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A visit to 'Qualitania': teaching and learning computer-based qualitative data analysis in an online research methods course

ABSTRACT

This paper draws on the teaching, research and support work of the writer in the KwaZulu–Natal region, South Africa in the context of online courses developed to harness the transformational potential of technology, based on current educational theory and integrating technology in a way that avoids the practice of merely 'bolting on' technology to existing course. The 'Qualitania' of the title is the online learning space of one of these courses that focuses on qualitative research methods and data analysis. In this course the use of QSR NVivo is integrated into the learning process together with strategies to encourage reflective practice in learners including their own narratives and 'right brain' courses.

CONTEXT – A SOUTH AFRICAN UNIVERSITY IN TRANSITION

> *I come from the dirty dusty roads of township crime and poverty – How do I bail myself out of this prison of misery? Education!* (Extract from a learner's narrative)

In post-Apartheid South Africa, the legislation, a human rights constitution and related policies aim to redress inequities and bridge many divisive dichotomies including that of black–white, rich–poor, advantaged–disadvantaged. Cultural diversity is everywhere evident including in Durban, a main port on the east coast, now transformed from a former colonial seaside town into a vibrant African city. Visually evident from the Durban campus of the University of Natal are the extremes of residential environments of the upper and lower socio-economic groups. Luxury houses are found one block to the east of campus; to the west a sprawling informal settlement of mud, cardboard and packing cases. (see Figures 1 and 2). Gradual formalisation of the latter is replacing the temporary structures and providing basic services including a school, library and newly tarred roads.

Figures 1, 2: Views of the informal settlement located one kilometer east of NU campus.

Overlooking all this from the Berea Hill that skirts the city, the Durban campus of the University of Natal (NU) is itself in an ongoing state of transformation as it attempts to more closely reflect the changing social and cultural environment.
In the past, South African universities catered for specific ethnic groups as classified by apartheid legislation eg., either White or Black, Coloured or Indian. The Durban campus of the University of Natal (NU) catered mainly for the white population while another hill-top university a few miles to the west of the Berea, the University of Durban–Westville (UDW) was established to cater for Durban's large Indian population. The student intake of both these universities has changed in recent years. In 2000, UDW's student population comprised more than 60% Black students while NU's percentage of Indian students (34%) was higher than that of UDW (31%). Further transformation is anticipated. In January 2004, NU will merge with UDW. This is part of the government's current policy of rationalisation of higher education through mergers. The new merged university will be the largest 'contact' university in South Africa.

TECHNOLOGY FOR TRANSFORMATION

> *My life has changed because I can now do things that I never thought I would ever be able to do.* (Extract from a learner's course evaluation)

The South African constitution identifies designated groups who were particularly disadvantaged under the former apartheid government. These groups are Black people, women, children and people with disabilities. Legislation to redress past inequities for adult members of the designated groups includes the *Employment Equity Act* (1998). In addition in terms of the *Skills Development Act* (1998), companies pay levies to fund skills development. Rebates are provided to companies who fulfill employee skills development goals.

With due regard to the need to provide opportunities and skills development to members of the formerly disadvantaged groups designated in the South African constitution, the University of Natal has recognised the potential of technology. It has set itself the goal to transform into a digital university and develop academic policy related to online learning. To this end, the university's Centre for IT in Higher

Education (ITEd) designed a modularised academic programme in *Digital Media and Online Learning* for staff and postgraduate students. The programme supports staff and academic development and views technology as a change agent. To this end it provides opportunities for skills development and knowledge acquisition in the field of Information Technology (IT). The programme includes students from communities who previously had limited exposure to IT or opportunities in this field.

Figure 3: ITEd's logo and slogan

The programme is structured around four core modules that incorporate both theoretical and practical components as follows:

1. *Education Theory and Information Technology*
2. *Digital Media Development*, includes:
   - web authoring and graphics; and
   - database technologies.
3. *Human Computer Interface*
4. *Research Data Analysis Theory and Tools, including:*
   - computer-based qualitative data analysis with QSR NVivo;
   - computer-based quantitative data analysis with SPSS; and
   - reference management and digital data collection with Endnote, MS-Access, GPS (geographic positioning systems) and Palm Pilot (hand-held) organisers.

In addition, there is an IT internship as well as elective modules in partnership with other departments. After coursework completion, a research project enables learners to apply acquired research knowledge, skills and technology expertise. These courses are available to participants with any basic degree. They can be pursued at Certificate, Postgraduate Diploma, Honours and Masters levels.

ONLINE COURSE DELIVERY

The modularised courses are presented predominantly online via a web-based online classroom interface. The course design avoids the proliferation of courses that focus on merely providing large amounts of content via computer and/or online technologies – whether lecture notes or summaries, text with or without graphic or audio – that expect learners to study on their own (Noble, 1998a, 1998b, 1998c; Reeves et al, 2002). Rather than using technology as a content delivery tool or as an add-on, technology is used to facilitate active and collaborative learning. The online medium

applies to all students registered for ITEd courses whether they are located on campus and making use of the computer laboratory within the department or located in another part of the campus, city, province, country or Southern African region.

The main reason for the online course design is to facilitate interaction with online computer technologies through direct personal experience of learning about them and with them. In addition, research, including locally conducted research, confirms that carefully designed online Internet-mediated learning events can effectively mimic face-to-face classroom interactions (Clarke, 1998; Cronje and Clarke, 1999). The following related factors add value to online learning:

- distribution of resources across a distance and beyond the local resources of library, instructor and textbook (Harasim, 1996);
- the facilitation of regular and ongoing communication and interaction; including
  - rapid delivery of detailed support, feedback and information;
  - facilitation of collaborative work over a distance;
  - the ease of online submission of work;
- the convenience of asynchronous communication for those in fulltime employment and /or living far from access to a campus; and
- learning opportunities for those normally denied these in traditional time frames and venues.

As 'distance is dark' in online courses (Cronjé and Clarke, 1999), individuals may easily feel isolated and remote in an online classroom. The courses thus use a range of strategies, activities and design features to engage students.

A reward system that motivates students to get online, pose questions and provide peer support on a regular basis is that online behaviour and interaction account for almost a third of the course assessment marks. A class list with picture portraits helps the class put faces to messages. Personalisation of the first activity in which all participants answer specific and detailed questions about themselves also helps everyone get to know one another and their current and prior knowledge of course related issues. The course facilitator consciously promotes an ethos of encouragement and mutual trust. This ethos is intended to provide a model for the way participants deal with disagreements and confrontations during online interaction.

The course facilitator monitors all messages, questions and responses on a regular daily basis and replies promptly where required. It assures distant – and local – students that their asynchronous messages are being received by more than the server computer. A further strategy to reduce any sense of isolation and increase the perception of social presence is that during the courses, a web cam (camera) on the course facilitator's desk captures images of her working at her desk every 20 seconds. The captured image can be viewed on learners' screen with a single click on the online classroom menu. Feedback on the web cam image indicates that it is a simple and successful device to encourage participants and reduce their sense of isolation. Students often capture images of the course facilitator in some amusing poses (see Figure 4).

Figure 4: Captured images from the web-cam on the course facilitator's desk

LEARNER PROFILES

While ITEd has been mindful to ensure that designated groups are represented among course participants, the diversity of class groups requires that cohesion, co-operation and collaboration are encouraged without diminishing the value of unique perspectives and contributions from individuals. The level of class group diversity is illustrated in the following listing of the range of course participants who have completed the courses to date:

- Students and university staff–members;
- students registered for Honours, Masters, Certificates or Diplomas;
- variable educational and academic backgrounds;
- located on-campus or off-campus or at a distance from campus;
- in full-time employment or full-time students;
- varied nationalities, home-languages, world views – and learning styles;
- computer exposure: between 1–20+ years;
- variable computer literacy;
- age range 20+ to 50+;
- predominantly online learning: 'newbies';
- from none to some research experience;
- limited knowledge of qualitative research;
- little or no experience of constructivist theories or practice of learning; and
- little or limited experience of collaborative group work.

Despite the courses originally being targeted at the academic development of university staff, the courses have attracted a greater proportion of non-staff learners through word of mouth via course participants. Those university staff members who have enrolled for the courses have been more often from the support/service sector of the organisation, keen to improve their qualifications and develop a better understanding of the role that technology might play in their current or future work life. At present, the planned incentives for academic/teaching staff to take courses have not been implemented at the university, though this may change with the forthcoming merger.

The variable computer literacy among learners is now managed by providing a clear pre-requisite criterion – a skills test equivalent to that of Module 2 ('Using computers and file management') from the International Computer Driving license (ICDL) – with supportive interventions for those who need to close the gap.

Figure 5: Scenes from the face-to-face contact time during the course

The confidence that comes with improved familiarity with basic computer use has made it less daunting to learn advanced computer use. A further challenge has been accommodating the different approaches of students with no or little formal employment experience compared with those who are employed staff, or those from more educationally advantaged backgrounds. The more experienced are often tempted to take control of the collaborative group projects. There are also the differences between those who are more product-oriented and those who are process-oriented. Particularly noticeable have been situations when groups include students whose interest in group membership extends only to what skills can be used in the group to get the goal achieved as quickly as possible, while others want to spend more time developing intra-group relationships and negotiating the processes.

DESIGN OF THE QUALITATIVE RESEARCH COURSE

The course on qualitative methods is similarly designed to the course on quantitative methods. The differences are mainly in the material and software used. In the quantitative methods course, all materials, readings, articles, questions, and group work focus on the area of research projects, issues and practices related to the quantitative research paradigm. In the other, the focus in on the qualitative research paradigm and mixed methods models.

The theoretical underpinnings of the qualitative research course is congruent with the other ITEd online courses. The course may be described broadly as *constructivist* and based on the following principles and practices:

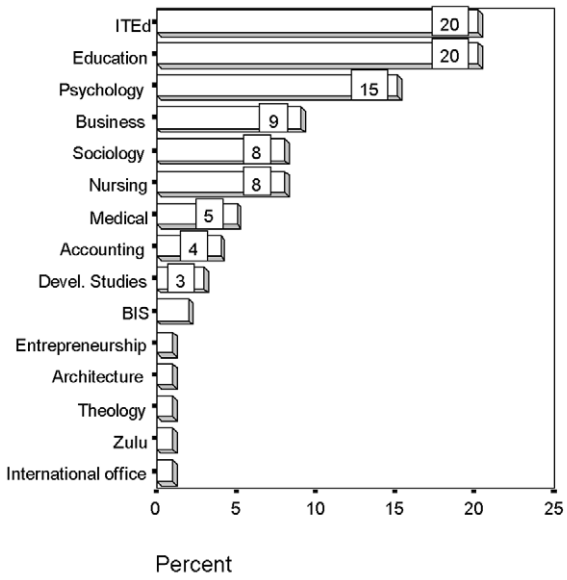
- learners build new knowledge based on *prior* knowledge;
- learning environments need to provide *authentic* activities and situations;
- learning is a *collaborative* activity;
- learning requires opportunities for exposure to *multiple* perspectives;
- learning requires generation of *meta*cognitive activities that include reflection and learning about learning; and
- the facilitator and learners take multiple *roles.*

In selecting technology tools for the qualitative course, the criteria were the same as those used in selecting standardised or 'common' software tools for use by university

staff for teaching, research and administrative purposes. We selected software that is considered an 'industry standard' in its particular field of application, support availability, user friendliness, flexibility of use, uncomplicated distribution/ maintenance and affordable educational licensing costs. Based on these criteria, the QSR suite of packages (currently NVivo and N6) is the software supported and distributed at the university for qualitative data analysis.

The range of departments currently making use of the QSR software is illustrated in Figure 6.

Figure 6: University of Natal departments that use QSR software for projects



LEARNING ACTIVITIES IN THE QUALITATIVE COURSE

> *The journal provided me with an effective way of gathering data about myself, whose analysis makes me better equipped for the road ahead.* (Extract from a learner's course evaluation)

The activities in the qualitative course take place over an intensive three-week timeframe. Participants are required to devote between four and six hours a day to the course tasks. Except for the three days of face-to-face contact time that take place in the second week, learners may arrange their schedules to fit in with other work, personal/family demands as long as they meet the step-wise completion dates for individual and group work.

Participants complete the following activities that are central to the course design:

1. keep a reflective learning journal of the experience;
2. submit structured online personal introductions, present and discuss personal learning metaphors;

3. participate in daily (asynchronous) online interaction and discussion;
4. read online material and submit a (personalised) article review/report;
5. peer review and assess the article reviews/reports of the other participants;
6. attend three days face-to-face contact time for advanced software training, collaboration and 'right-brain' and reflective activities that generate personal data;
7. plan, (design) and implement group projects, design group project assessment criteria and report on the group process;
8. peer review and assess group projects;
9. submit individual data analysis project; and
10. submit a portfolio – including a learning journal and course evaluation – to reflect personal learning and development.

Details of these activities have changed over time in terms of refining instructions or making them more reflective of participants' personalised experiences. A current focus of the course is to refine activity outlines so that they fulfill more closely the criteria of *authentic learning tasks* as outlined by Reeves, Herrington and Oliver (2002). In addition to preparing and peer reviewing their writing for a course newsletter, future group projects will include groups preparing tenders for research projects.

In line with the constructivist underpinnings of the programme, course assessment is ongoing and based on the full range of activities listed above. It combines assessment by the course facilitator, self assessment, peer assessment and work portfolios. Details of assessment criteria for each activity are made explicit from the first day of the course, as part of the information resources and other scaffolding material linked to the online classroom learning space.

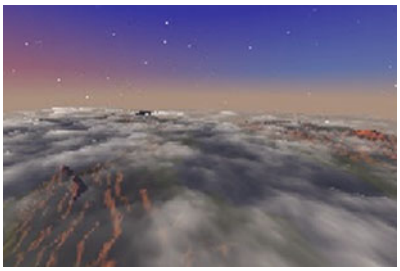
CLASSROOM METAPHORS

> *I was impressed with the idea of challenges and metaphors. I doubt whether many people approach their teaching in this fun way.* (Extract from a learner's course evaluation)

Each of the qualitative (and quantitative) courses is designed around a specific metaphor that is sustained throughout the course classroom and activities. The metaphor for the qualitative course is a journey through the unknown region of 'Qualitania' with the course facilitator as *Tour Guide*. Other participants are *Tourists* and assessment marks are *Reward Miles.* A virtual ticket is provided and an 'aerial view' of the so-called region. Participants write about what they see in their personal introductions for this course.

The current metaphor for the quantitative course is that of the 'Quanti.com Big Brother Survival Challenge' with the course facilitator as *Big Sister* (a label that some students use beyond the classroom). Activities are *Challenges*, assessment marks are *Challenge Rewards*. Unlike the TV versions of *Big Brother* and *Survivor* the emphasis is on collaboration, mutual help, support and survival for all participants.

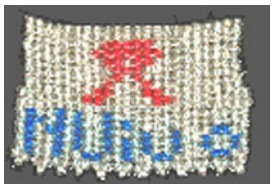
Figures 7 & 8: The view of 'Qualitania' from the air and the logo of the quantitative course



Other reasons for using course/classroom metaphors include:

- to provoke a sense of *ownership* of the online learning space
- the motivating potential of fantasy/*play* (Malone, 1981);
- to promote a spirit of *adventure* (Hill and Raven, 2000);
- to confirm a sense of *connectedness* among participants who share the same scenario;
- to focus on the *process* of learning, not merely the *products;*
- to provide *models* for participants' own personal metaphors for learning;
- to stimulate student *reflection* and creative thinking;
- to provide a novel, *unexpected* approach to break through student preconceptions; including fears and uncertainty eg., *quantophobia* or gaps in confidence.

INTEGRATION OF QSR NVIVO SOFTWARE INTO COURSE WORK



As the ITEd courses aim to provide practical skills with technology within the context of a theoretical framework, an important aspect of the qualitative course is to ensure that learners acquire the software skills in conjunction with exposure to the theoretical background and underpinning necessary for their introduction to qualitative research. Exposure to the basics of theory is facilitated through their reading and writing based on prescribed research reports, texts and journal articles. This is supplemented by online discussions, including those arising from questions, opinions and answers from learners and facilitator.

In learning to use QSR software, once they are up-to-speed with the basic computer skills, course participants soon manage the more specialist software. A greater challenge in the course presentation has been to find ways to integrate the software at a level beyond merely presenting training and practice. The aim is to go beyond a limited 'cookbook' use and understanding. It also became clear in the early presentations of the course that learners had difficulty with the practice of reflection and reflective immersion in data. This was also evident in the 'operational' nature of their learning journal entries.

Meeting this challenge is also part of this writer's own journey with the course participants and the course material. With each presentation of the course, tasks and group projects are increasingly focused on finding ways for learners to generate

meaningful data and also to enhance reflective practice. To this end, from the earliest presentation of the task, the online introduction of participants to the class group was structured so that learners include personal metaphors of their anticipated learning and research process. The inclusion of a learning journal was intended to encourage reflection on the part of learners.

In the initial course QSR N6 was used for storage and analysis of the generated data. However, almost immediately, learners expressed a preference for QSR NVivo software for the following reasons: rich text provides more flexibility than pure text in terms of familiar word processing and text formatting; learners who choose to present illustrative graphics with their metaphors are able to link these to the project documents in NVivo; it facilitates the keeping of a flexible project journal which can be linked to reference lists, other documents and nodes of ideas or other elements in the project. In addition NVivo's modeling tool is a supplement to experiment with visualisation of data and ideas.

LEARNER REFLECTIONS AND NARRATIVES

> *I was amazed at the range of backgrounds and experiences of the class – I saw everyone in a new way.* (Learning journal entry)

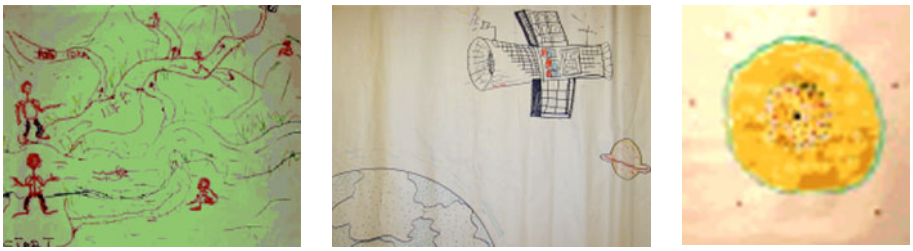
> *How much more I am discovering and remembering by being more reflective. It casts light everywhere.* (From a student narrative)

Since presentation of the first course, the face-to-face contact time has been used for learning and practice with the software and for learners to organise themselves into groups and plan and initiate the group projects. To provide a stimulus for more reflective practice, additional activities were subsequently introduced during this contact time to facilitate more reflective 'me-search' experiences. Exercises include writing up the experience of a five-minute silence 'grounding' period taken during the qualitative course. These writings are made available as data for analysis with QSR NVivo as well as to generate discussion on different forms of attention, reflection and learning about one's learning process. The narratives from this exercise are structured around answering questions concerning what they heard, thought, smelled, and where any daydreams took them. In addition to sharing any personal flights of fancy that arise in the accounts of the silence experience, the learners' writings present further references to their hopes and challenges that pre-occupy them about their studies.

The most recent activity included during the contact time is a session that begins with a session of story telling by the facilitator.[1] Three or four engaging, mythical stories are narrated and each learner has the opportunity to say which resonated most for them and why. Immediately after this there is a session to draw one's personal map but drawn with their non-dominant hand. Various selections of 'ambient' music background this activity, as learners have expressed that they find this helpful.

Figure 9 shows extracts from a selection of drawn learning maps. This is followed by an uninterrupted 'rapid write' exercise about whatever comes to their pens. Each learner then presents these maps and the accompanying narratives or extracts to the class group.

Figure 9: Extracts from the learner 'maps' drawn with their non-dominant hands



The narratives include a range of styles of presentation. Some are reflective streams of consciousness arising from the drawing and writing experience, often with descriptive textual accounts of the images in their drawings. A few have revisited remembered stories from childhood within the context of their process of learning about research. A learner prefaced his contribution, saying 'I relate this old story to my world view in general and to research in particular'.

Below is an unedited 'rapid write' of a learner responding to the images in his personal learning journey map in which he incorporated his passion for mountain rescue and his victory over visual difficulties.

Mutli-bifurcationism *by JF (class of 2003)*

Of choices I speak
The lion's roar
The mouse's squeak

At crossroads we stand
All day
All hour
All week

.Being 'I did', we ask?
Venture 'I may' or 'I will'?
Dare we say 'I can'?
Journeys to the yellow mountain
Roads with bends and kinks
Confusion and excitement
At achieving many links

Caves and time passages
In the alleys of the mind

Hidden doors
Unexpected exits
From the valleys of the blind

Ideas, decisions
Concepts – AHAH!
The fairy-flits of thought
Intrigue and entrance
Deep tunnels in the mind.

These sessions have proved enriching and surprising to all participants. In addition to enabling individuals to tap a more reflective and creative mode of being, they have provided a safe space where learners can present their reflective voices to one another. This open, flexible and non-judgemental process seems to result in more in-depth understandings of the diverse backgrounds and world views of class peers and contributes further to promoting an ethos of support, trust and encouragement that helps set the tone for the collaborative group tasks.

Only the narratives on silence and learner metaphors – available in digital format from the online class discussion forum – are made available for selection as data for analysis with NVivo. The rapid write writings that accompany the drawings are handwritten. Spontaneous narratives after right-brain activities often surprise the learners with the unexpectedly personal and private nature of their content. For this reason, while learners can choose to select from them in their oral presentations and have chosen at times to share contents with the course presenter and class peers, they are not made available to the class for direct scrutiny.

DATA ANALYSIS OUTCOMES

From the learner-generated data in the form of the experience of silence and/or the learning metaphors, learners use QSR NVivo for data management, linking, reflection and analysis to compile an account of the material. Individuals are free to decide the approach they wish to take within the given parameters and decide, based on what interests or 'speaks' to them in the data.

Most of the accounts report descriptively on the topics covered in the material. Some have included a more quantitatively structured account in terms of the prevalence of the most popular themes and topics eg., food metaphors and journeys. An account that broke with this trend explored the different understandings of the concept of *metaphor* and contrasted how this was used by first, second and third English language speakers from the class group.

After coursework completion, participants in the program undertake longer research projects. These are usually focused on needs analyses, development, implementation, evaluation and support of IT products and processes. In the predominantly mixed mode projects, all students make use of the specialist software skills, including NVivo,

that they have acquired in their coursework. The projects include a variety of data sources generated from observation, face-to-face and online interviews, focus groups and surveys as well as documentation sources.

Current student projects include:

- investigation into the transmission of ideology and marginalisation of designated groups by university websites;
- development of a campus online qualitative research and QSR NVivo self-help resource;
- usability evaluation of the Virtual Learning Spaces game technology for adult learning;
- evaluation and support of ITEd's newly developed online learning management system;
- XML technology and the archiving of qualitative data for reuse;
- redesign of a database-driven university Intranet;
- evaluation of an online survey support system;
- evaluation of online documentation and publishing systems; and
- development and evaluation of online course components for various subject fields.

PROGRAM OUTCOMES

The ITEd programme attracts applicants mainly through word of mouth. The popularity of the programme already attracts more full-time applicants than places available. The short timeframe and the interactive nature of the ITEd courses make them more effective with smaller groups, which are usually now limited to twelve to fifteen for each class. University staff members are able to study for individual components and therefore can take an extended period of time to complete a full qualification. Many of the learners who registered at Honours level continued at Masters level after graduation, with the first of these already graduated. At a recent national conference where a number of the ITEd students presented papers or posters on their projects, their development during the program was evident in their presentations and also in their responses to the work of other conferees.

The IT internship included in the program, in addition to providing extended opportunities for obtaining IT work experience, provides students without previous employment experience, with a mentored workplace experience intended to enhance their worth in the job market.

Although no formal follow up has yet been conducted to measure the marketability of graduates, among the students still completing their studies some have found opportunities to work part-time in various IT aspects of research project support roles including data management and analysis. A student who applied for an internship place with a national organisation that develops IT expertise for government departments impressed the selectors with her knowledge and experience with the range of advanced software included in her study courses and has gone from strength to strength in her work with them. Another working student was afforded the

opportunity to move into an IT position and take up a promotion position within his organisation.

This paper began with a description of a university in transition. The goals of the 2004 merger of the universities of Natal and Durban-Westville include:

- creation of the first truly African university in South Africa with an identity that resonates with all the people of the region;
- meeting the challenges of the society and environment in which it is located; and
- preparing learners for the future and global competition (Makgoba, 2003).

The approach of locating technology as a change agent for transformation is well placed to coincide with these goals.

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Endnote

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Alongside (life-long) study in humanities, sciences, and education, **Patsy Clarke** taught high school before switching to research support and computer software support. She teaches postgraduate research methods courses in Digital Media and Online Learning, supervises student research. Her PhD study is on the empowerment of 'elderly' women through online technology.

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working sessions and outcomes

ARTICLE NUMBER 1

Silvana di Gregorio, *SdG Associates, London and Boston*

Teaching grounded theory with QSR NVivo

INTRODUCTION

This is a report of a day-long workshop on using NVivo to teach grounded theory analysis. The objective of the workshop was for each participant to design a syllabus relevant for their needs to teach grounded theory analysis using the software. The emphasis was on using NVivo as a teaching tool. In order to do this, we needed to identify a) which tools could be used for the different grounded theory analysis processes and b) how these tools could be used to illustrate in a classroom setting the grounded theory analysis process.

I was the facilitator of this workshop and used a worked example of a grounded theory project in NVivo to illustrate points. The project I used was one which I had done manually over ten years ago. But I had all the original transcripts with coding, my journal and many pages of notes, so I was able to transfer this project into NVivo. My purpose for doing this was to be able to identify differences in a manual approach to grounded theory analysis with what was possible using NVivo. This enabled me to explore what tools in NVivo could duplicate a manual analysis but also what new ways NVivo allowed me to engage in handling grounded theory analysis. This worked example was the catalyst around which I led the discussion for how to use the software to teach grounded theory analysis.

NVIVO TOOLS FOR GROUNDED THEORY ANALYSIS

The first step was to relate different elements of the grounded theory process to the tools in NVivo which can facilitate that process. I used my own grounded theory study to illustrate how NVivo can support this form of analysis. Table 1 pairs each grounded theory process with tools which support that process in NVivo. Below the table, I have given explanations and examples for each tool.

Figure 1: NVivo tools for grounded theory analysis

GROUNDED THEORY PROCESS	NVIVO TOOLS
Open Coding	Free Nodes
Properties, Dimensionalising, Concept management	Tree Nodes
Axial coding	Modeler and Show Tool
Paradigm model	Node Sets
Journal, concept memos, theory dev't	Memos
Quoting	Node Extract Links
Citing	DocLinks
Linking to axial coding or models	DataBites
Aids to theoretical sampling	Assay tool, attribute table
Checking out hunches	Filter tool, Search tool

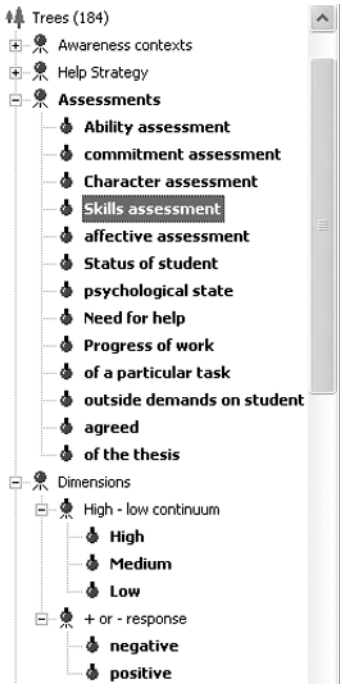
Open coding

This is the initial stage of coding in grounded theory analysis when you are experimenting with codes. During this early stage many codes can be generated. The Free node area is used as an area within which to put these codes. They are organised, by default, as an alphabetical list. At this stage all codes are theoretically, therefore, of equal importance. Later, some will be discarded, others refined and some will be grouped together and moved into the Tree Node area. This happens when the analyst moves out of the open coding phase. However, reflection on codes should start early. A common mistake among grounded theory beginners is to get stuck in the open coding phase – generating hundreds and hundreds of codes and ending up with an unmanageable project. This may be an easier mistake to make in a software package such as NVivo where it is so easy to create codes and to code text.

Properties, dimensionalising and concept management

Some of the codes generated during open coding will be refined into their properties. Properties can be further refined into their dimensions. In the project on the PhD student–supervisor relationship, which is used here as an example, one category that I looked at was the assessments that supervisor's made of their students. There were many kinds of assessments that supervisors made of students – so that the code assessment was broken down into the sub-categories of commitment assessment, ability assessment, character assessment, skills assessment etc. The code 'assessment' was originally a Free Node but once I saw that it could be broken down into these different types, it was moved into the Tree Node area of NVivo and the types of assessment were moved under it. As further types of assessments were made, these were added under the node for Assessments (see Figure 2).

Figure 2: NVivo tool – Tree Nodes



As can be seen by Figure 2, the Tree Nodes act as a very effective tool for concept management. It is easy to see at a glance, the types of assessments that supervisors make of students. In addition, each of these sub-categories of assessment can be further refined into dimensions. For example, ability assessments, commitment assessments and skills assessments can all be dimensionalised along a continuum from high to low. These nodes are also represented as Tree Nodes as can be seen in Figure 2. The dimension nodes are in their own branch of the tree as they can refer to more than one node. The search tool can be used to pull out specific examples of a particular assessment, at a particular level, for example, low skills assessment.

Axial coding and the Paradigm Model

Open coding fractures data as a way of managing and understanding unstructured data. Axial coding puts the coding back together in new ways. It is a way of synthesising the data to support the conceptual developments we are making. Strauss and Corbin (1990) discuss the Paradigm Model as a focused set of procedures used in axial coding in order to relate categories to their sub-categories.

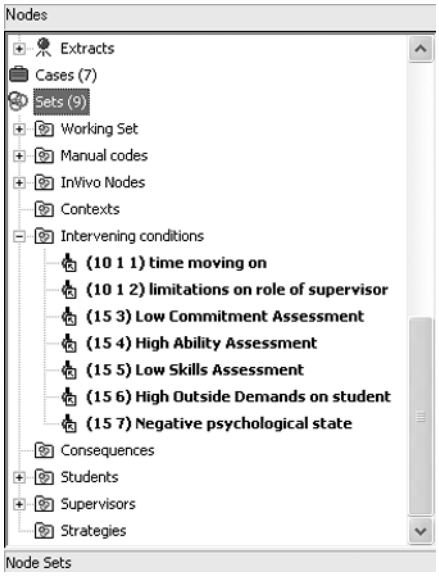
In axial coding our focus is on specifying a category (phenomenon) in terms of the conditions that give rise to it; the context (its specific set of properties) in which it is embedded; the action/interactional strategies by which it is handled, managed, carried out; and the consequences of those strategies. (Strauss and Corbin, 1990:97)

Note that the italics indicate the elements of the paradigm model.

So the Paradigm Model is as follows:
Causal Conditions ➞ Phenomenon ➞ Context ➞ Intervening Conditions ➞ Action/Interaction Strategies ➞ Consequences

The elements of the Paradigm Model can be represented in NVivo by Node Sets as illustrated in Figure 3 below.

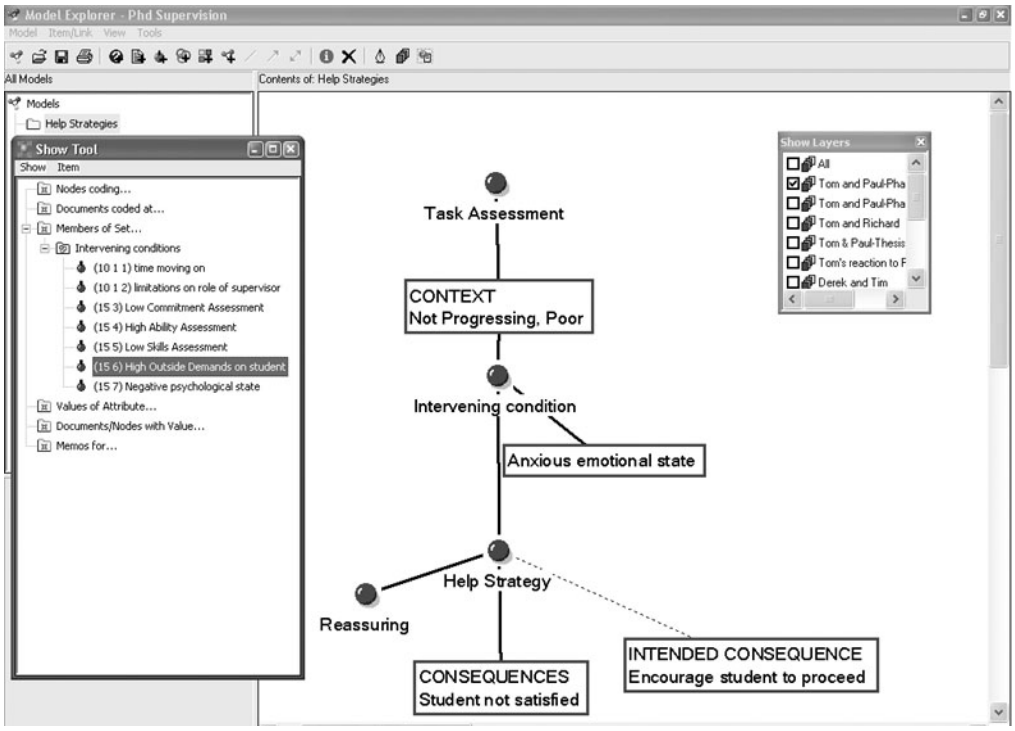
Figure 3: NVivo tool – Node Sets



As can be seen in Figure 3, there is a Node Set for each element of the Paradigm Model. Nodes are dragged into the appropriate set. In many cases, new nodes have to be combined first via the Search Tool. For example, under Intervening Conditions in Figure 3, new nodes are made by intersecting the relevant dimension for a particular category. So a new node is created by intersecting (the Boolean 'AND') 'Outside Demands on Student' and the dimension 'High'. This new node is put in the set Intervening Conditions. Likewise, the category 'Skills Assessment' is intersected with the dimension 'Low' to create the new node 'Low Skills Assessment'. So Node Sets are used to develop and manage the elements of the Paradigm Model.

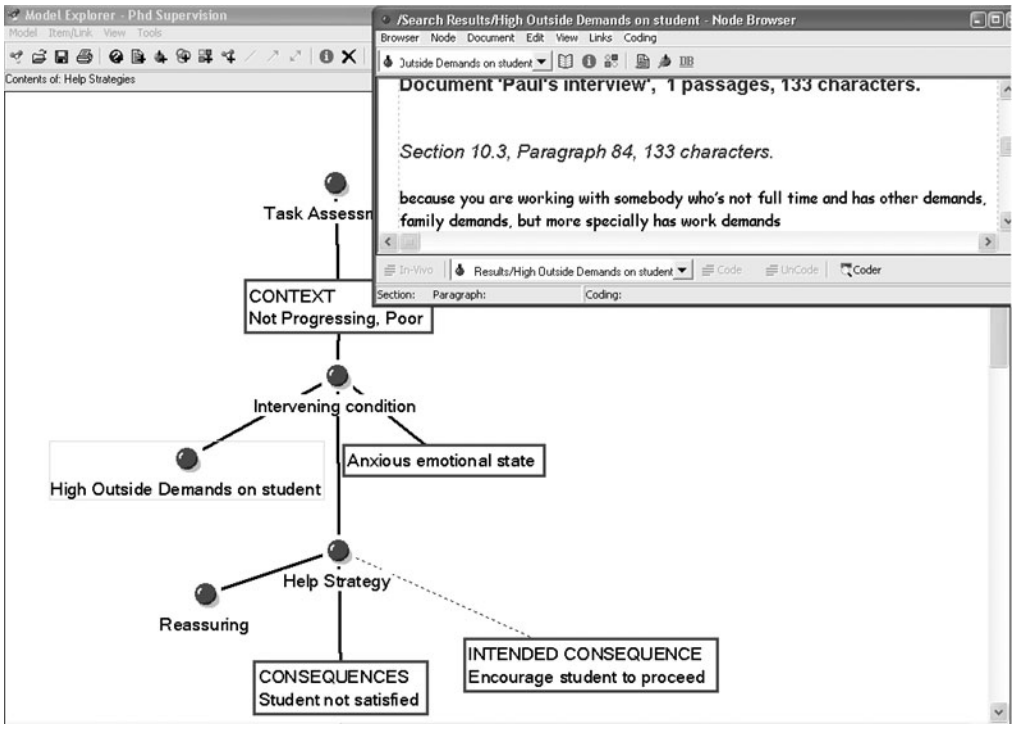
In NVivo, axial coding can be done in the Modeler in combination with the Show Tool. In Figure 4, the Show Tool is identifying all the Intervening Conditions. In this particular example, where the axial coding is looking at the relationship between the 'Phenomenon of Poor Task Assessment' and the help strategy the supervisor offers, the Intervening Condition of 'High Level of Outside Demands on Student' is relevant. This sub-category can be dragged from the Show Tool into the model in order to complete the axial coding.

Figure 4: NVivo tools – Show Tool and the Modeler



The advantage of having the node there is that it is hyperlinked back to the text coded – so it is easy to check the evidence from the data. This can be seen in Figure 5.

Figure 5: NVivo tool – the Modeler with hyperlink to data



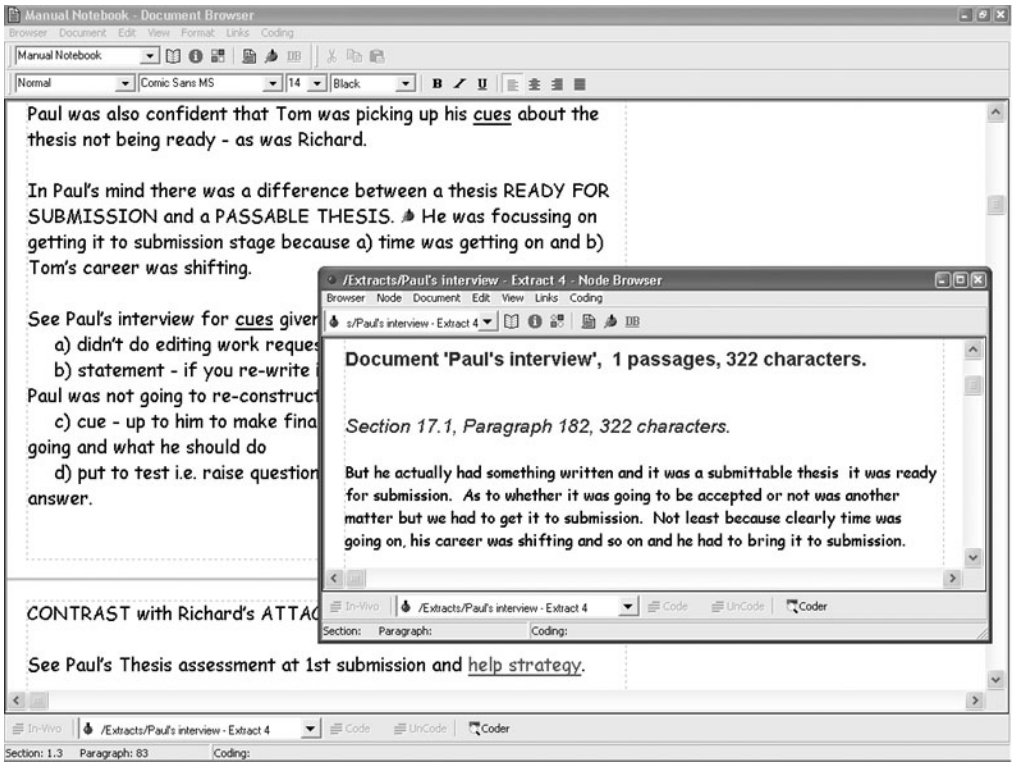
In Figure 5, the node 'High Outside Demands on Student' was clicked so that you could browse the text. The text it refers to appears over the model.

So while it is possible to just draw the relations in axial coding in the Modeler, by working in combination with Node Sets, the Show Tool and the Modeler, you are able to a) easily see the range of elements in the Paradigm Model and b) easily link the argument back to the data from the Modeler.

Theory development

The real development of theory occurs in your Journal, concept memos and diagramming. Your Journal keeps a chronological account of both the housekeeping decisions you make in organising your data and the insights you get day by day while reading, reflecting, observing, coding etc. As you develop your thinking, you may start to write small concept memos or you may develop more abstract diagrams around core categories in your data (di Gregorio, 2003). In NVivo it is possible to create memos as documents directly in the software. In addition, there are tools to help you support the arguments you are developing in your memos. It is possible, for example, to link directly to a quote or quotes that support an argument in your memo. This NVivo tool is called a Node Extract Link. An icon is placed at the point in the memo that you want a quote to support the argument. This icon is hyperlinked to the point or points in the data that support your argument. Click on the icon and you get your supporting quotes. This is illustrated in Figure 6.

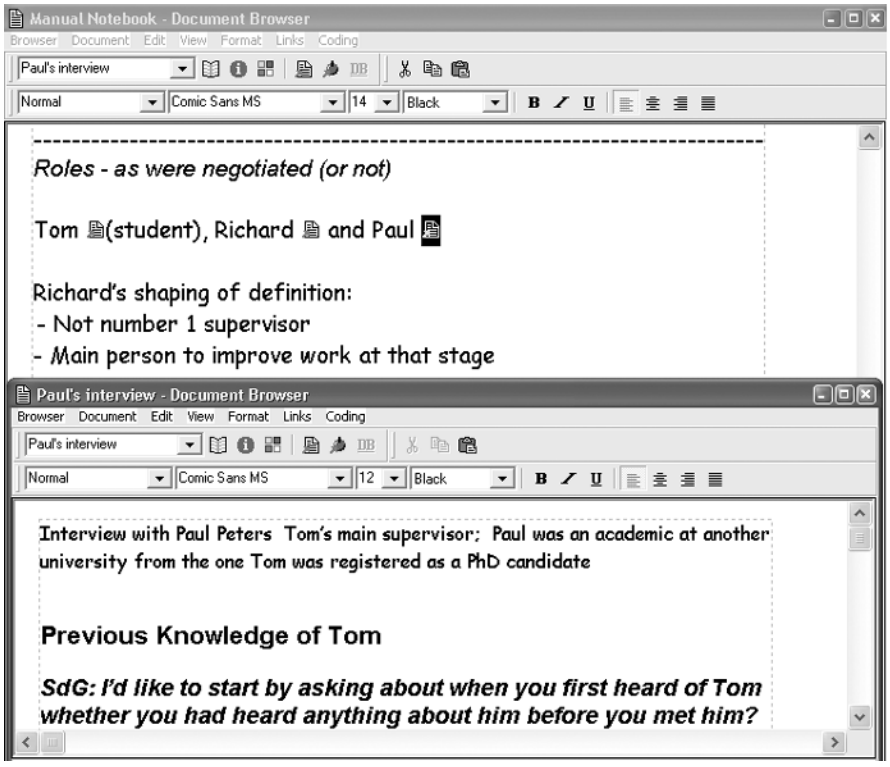
Figure 6: NVivo tools – Memo with Node Extract Link



In Figure 6, a Node Extract icon is placed after the sentence in the Journal that states that Paul (a PhD supervisor) distinguished between a thesis 'ready for submission' and one that was 'passable'. By clicking on the node extract link, the point in his interview which supports this statement pops up – so it is easy to check the researcher's interpretation.

Within your Journal or memo, it is also possible to refer to or cite another memo or document that elaborates your case. This NVivo tool is called an In-text DocLink. In Figure 7, you can see how a DocLink is used. In my Journal, I start to talk about the roles that were negotiated between Tom (a PhD candidate) and his two supervisors – Paul and Richard. There are DocLink icons next to each name. These are hyperlinks to the interviews with these people, in case I (or another researcher) wish to review the original interview. Unlike a Node Extract Link, it does not link to a specific point in an interview. As you can see in Figure 7, when that DocLink icon is clicked, the entire document it refers to opens. So it is easy for anyone to refresh their memory about an interview. It also supports the iterative nature of grounded theory analysis moving from reading transcripts, reflecting about them in memos, then re-reading again etc.

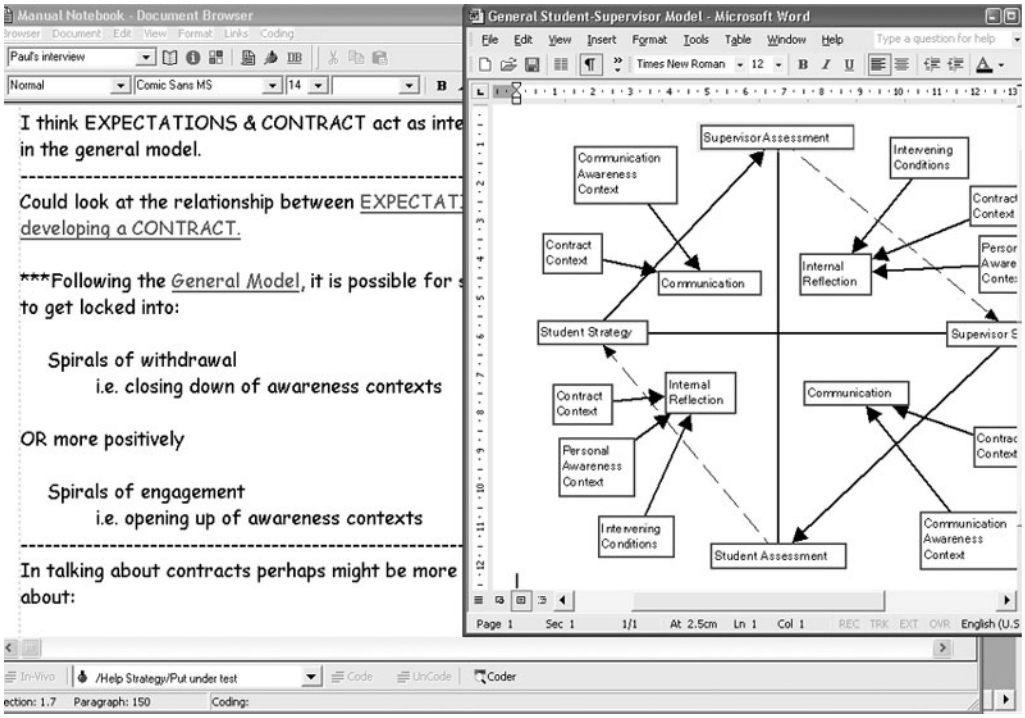
Figure 7: NVivo tools – Memo with In-text DocLinks



Within any document it is also possible to link to files external to the NVivo software. This is useful to link to supplementary material related to the data eg., photographs, or video and audio clips. In this project it was used to refer to axial coding and models developed in the Modeler. It is not possible to directly link to items in the Modeler. You need to export the model to your computer's clipboard and then paste it into a

Microsoft Word document. You can then link to this Microsoft Word document through the NVivo tool called a DataBite. In my Journal, there are several DataBites linking to examples of axial coding and to more general abstract models which were developed in the Modeler. In NVivo, you can spot the texts which have DataBites linked to them as they appear in green and are underlined in green. In Figure 8 you can see some examples.

Figure 8: NVivo Tools – Memo with DataBite link



In Figure 8, you can see the section of my Journal where I am discussing the General Model of student–supervisor interaction which I developed. The words 'General Model' are in green and underlined because I have attached a DataBite to it. I have clicked on this DataBite so you can see the General Model I developed. As you can see it has opened up in WORD and can be place on the screen so you can refer to it as you read my discussion about it in the Journal.

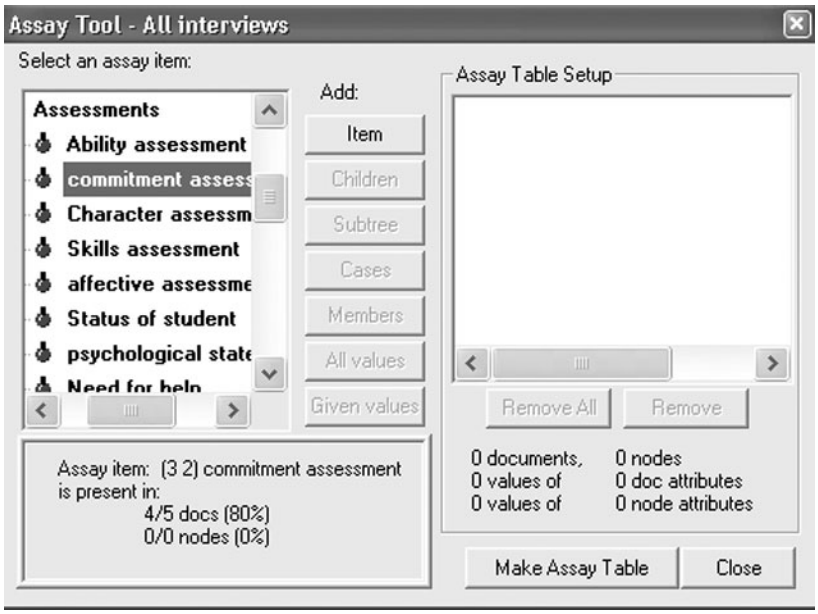
To summarise, theory development is supported in NVivo by the ability to create and write memos directly in the programme. In addition, it supports the iterative nature of the process with the Node Extract Links which links to specific points in the data; with in-text DocLinks which link to entire documents; and with DataBites which allow links to external files, in this case to models developed in the Modeler.

Checking out hunches and aids to theoretical sampling

NVivo has a number of tools to help you check out hunches that you may have about what is in the data. During this workshop, Lyn Richards pointed out that the Assay

Tool is useful to use for checking out categories; to see if a category is indeed core or whether you need to do more theoretical sampling. In Figure 9, you can see how the Assay Tool was used to check out the relevance of the different assessments that students and supervisor make of each other. 'Commitment Assessment' is highlighted in Figure 9 and in the bottom left hand side of the Assay Tool you can see that 'Commitment Assessment' has been coded in 4 out of the 5 interviews in the project so far. That would make me believe that it is an important assessment being made. I could check out which document did not mention 'Commitment Assessment' by making an Assay Table. Your discovery could send you off to do some more theoretical sampling to see if indeed it is a core category.

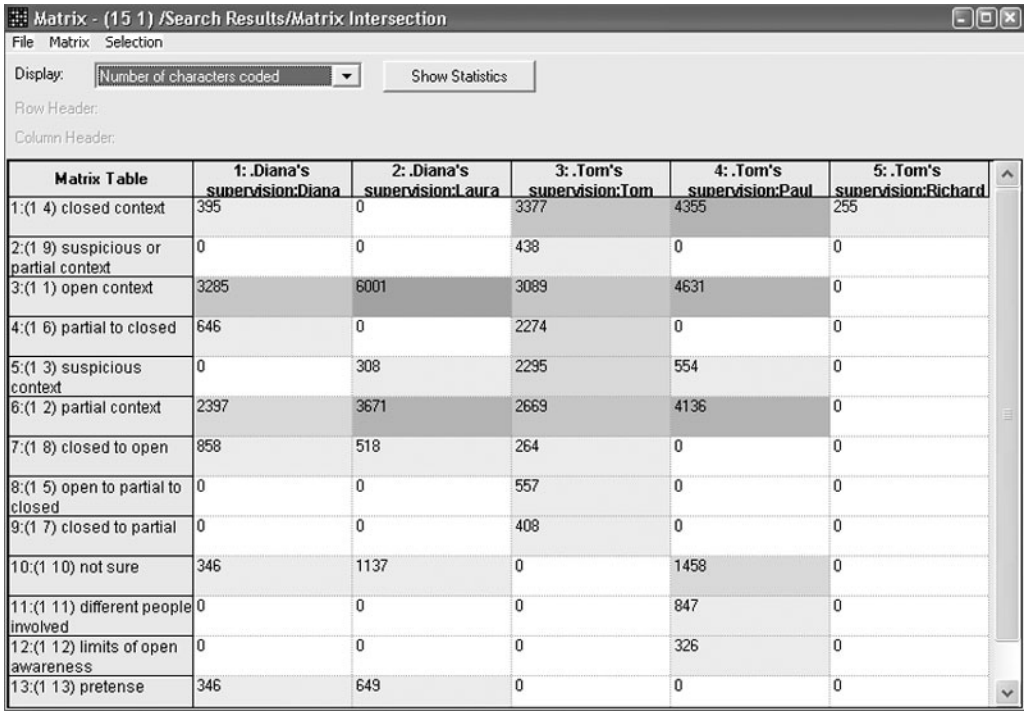
Figure 9: NVivo Tool – Assay Tool



The Search Tool is a very powerful tool for checking out hunches. In this study, I looked at the range of awareness contexts between PhD student and supervisor in their interactions. Awareness contexts refer to how open or closed they were with each other during the supervision process. I had a hunch that Diana's supervision was highly open and Tom's was highly closed. The Search Tool produced a Matrix Table to confirm this but it also revealed some subtleties – that Diana was rather closed in a particular area with her supervisor and that one of Tom's supervisors was at times very closed but at other times he was very open. This Matrix Table is reproduced in Figure 10.

The numbers in the table refer to the number of characters coded, ie. the number of letters and spaces – so it gives a sense of how much was said. To explore the subtleties further, I can click on any cell to get the words behind the numbers. Again this demonstrates NVivo's capacity for supporting an iterative approach to analysis. In this case, the matrix table indicates a pattern in the data but the ability to get the words behind the apparent pattern allows for further reflection and interpretation.

Figure 10: NVivo Tool – Search Tool using Matrix Table Results



Matrix Table	1: .Diana's supervision:Diana	2: .Diana's supervision:Laura	3: .Tom's supervision:Tom	4: .Tom's supervision:Paul	5: .Tom's supervision:Richard
1:(1 4) closed context	395	0	3377	4355	255
2:(1 9) suspicious or partial context	0	0	438	0	0
3:(1 1) open context	3285	6001	3089	4631	0
4:(1 6) partial to closed	646	0	2274	0	0
5:(1 3) suspicious context	0	308	2295	554	0
6:(1 2) partial context	2397	3671	2669	4136	0
7:(1 8) closed to open	858	518	264	0	0
8:(1 5) open to partial to closed	0	0	557	0	0
9:(1 7) closed to partial	0	0	408	0	0
10:(1 10) not sure	346	1137	0	1458	0
11:(1 11) different people involved	0	0	0	847	0
12:(1 12) limits of open awareness	0	0	0	326	0
13:(1 13) pretense	346	649	0	0	0

USING NVIVO TO TEACH GROUNDED THEORY ANALYSIS

The preceding discussion was necessary in both the workshop and in this paper in order to relate the different elements of the grounded theory process to the NVivo tools which could support these processes. This had never been done explicitly before. Workshop participants encouraged me to finish the table in which I had started to make these links explicit. That completed table is Figure 1 in this paper. My purpose was that the tools could be used to illustrate the different aspects of the grounded theory process to students. Having identified the tools it would enable the workshop participants to start to construct their own syllabi for teaching grounded theory analysis.

However, first of all, participants had to clarify the parameters of their syllabus. The parameters broke down into three dimensions:

The target student population

Undergraduate
Masters Level
Doctoral Level

The length of the course

1–2 days
Week
Semester

Objectives

Awareness training
Skills training
Support

All six participants were teaching at Doctoral level – some were also teaching at the Masters level. All were designing semester length courses – except for one who because of the geographical dispersal of her students was planning a 2–3 day course followed by a semester length distance learning module. Most were focusing on skills training, having students work through their own projects – learning by doing. The bare bones of the syllabus which each developed reflect these parameters.

I had introduced Hersey & Blanchard's concept of situational maturity in designing courses. Adapted from their model of situational leadership (Hersey & Blanchard, 1982), it argues that the amount of directive behaviour by the instructor compared to the amount of supportive behaviour varies according to the students' 'maturity' or competence in their knowledge, skill level, etc. A student could have a high situational maturity regarding grounded theory analysis but low situational maturity in terms of computer skills. In which case, the computer training would have to be very directive whereas the grounded theory component would be more collegial.

Participants agreed that this was an important consideration in designing courses. However, I pointed out that it was not necessary to teach NVivo to students. NVivo could be used simply as a tool to illustrate certain processes in the grounded theory method. Alternatively, teaching how to use the tool could be introduced gradually. First, it would be used by the instructor to illustrate processes. This would familiarise students not only with the grounded theory processes but with the tool. Then over the semester, students would be doing more and more with NVivo. It depended on the purpose of the course.

Before participants started to construct their own syllabi, I described some exercises I have developed in using NVivo as a tool to teach qualitative analysis. I described an open coding exercise, where students are given a transcript to read and then start to open code. Some students will read the same transcript – the number of different transcripts covered depends on the size of the class. The students read and start to open code on hard copy – not on the computer. Initially each student works individually on a transcript. Besides coding, they are encouraged to also write their reflections in a Coding Journal. After about 45–60 minutes, they then pair up with another student who has read and started to open code the same document. They discuss the transcript and the codes they have started to develop. If the group is large enough, each pair joins up with another pair who has started to analyse the same transcript. They compare notes and decide who will feed back their codes and insights to the main group. Each group of four will have read a different transcript relating to the same study. As each group feeds back to the class their codes, the instructor creates the codes in the Free Node area of the Node Explorer in NVivo – so the whole class can see the codes. If codes have been refined, they are moved into the Tree Node area.

The instructor can lead a discussion on definition of codes, similar codes, and the need for refining and dimensionalising codes. This can be done on the spot using NVivo.

Lyn Richards introduced another exercise to expand students' theoretical sensitivity. The instructor or students could identify interesting phrases used by respondents. These can be created as in-vivo codes in NVivo. The instructor can encourage students to play with their meaning as an exercise to expand the analyst's thinking about meaning. In my example study on the PhD student–supervisor relationship, the phrase – a sea of faces – was used by a supervisor to describe the first time she noticed her future PhD student apart from the 'sea of faces' of the MBA class she was originally a part of. Another supervisor felt that one of his students treated him as a 'thesis structure doctor'. Students would be encouraged to play with the phrase – to try to find what its opposite would be etc. The instructor could be writing up their comments in NVivo either using the Modeler or Memo writing or both.

Participants were encouraged to develop exercises in a similar vein for the different elements of the grounded theory tool, combining paper and small group work, with illustrations using NVivo as a demonstration tool. There was some discussion about whether constructing courses around a worked grounded theory project in NVivo or have the class develop a grounded theory project during a semester long course. Most participants preferred the latter. I have compiled the results of their curriculum which they developed during the workshop. As time was limited, I think they would all claim that this was just the beginning of their thinking about how to construct a course in grounded theory analysis.

THE 'BARE BONES' CURRICULA DEVELOPED DURING THE WORKSHOP

I have summarised in a table (Figure 11) the common elements in the bare bones curricula the participants developed during the workshop. I have broken down the common elements into four general areas – Theory, Coding/Categorising data, Relating Categories/ Developing Conceptual Frameworks, and Reflecting on Research. Please note that participants did not have time to elaborate on their ideas, so the following discussion is not as full as it could be.

Theory

All participants included theory as an important element in their courses and most started with a session or sessions on theory. One person explicitly included putting grounded theory in the context of symbolic interactionism – where it has its origins. Others discussed the notion of constructing theory and allowing theory to emerge. The importance of developing research questions and matching purpose with theory was also stressed. Before 'doing' grounded theory, students need to have a clear sense of the role of theory in the process. Perhaps the proliferation of 'bad' grounded theory has made these participants aware of the need to start with a solid understanding of what theory is and its relation to research questions and research design.

Figure 11: Summary of common elements in the 'bare bones' syllabi

Theory	Coding/categorising	Relating categories/ Conceptual frameworks	Reflecting on research
Context of Symbolic Interactionism	Open coding/ axial coding/ selective coding	Modeling – seeing it as a story	Ethical dilemmas
Constructing theory/ emerging theory	In vivo coding/ Free Nodes and open coding	Memoing – seeing it as a theory • Use of DataBites • DocLinks and Attributes	Issues of quality and trustworthiness
Combining theory and doing	Discovering categories • As a whole – Doc browser • Seeing into it – Annotation • Seeing elsewhere – open coding (Free Nodes) • Getting up off the data – memoing	Journal keeping	Social empowerment
Matching purpose to theory	Working with categories • Managing nodes in a catalogue – Tree Nodes • Gathering nodes for purposes – Sets • Dimensionalising – live Node Browser (coding on)	Theorising meanings	Bringing one's voice to the research process
Examining theoretical basis		Checking out/ grounding your theory • Using search and matrix for patterns • Using assay and filter for theoretical sampling	
Developing research questions			

Coding/categorising data

There was an interesting distinction between some people using the term 'coding' and others 'categorising data'. We did not have time to discuss this but it may be worth reflecting on what we mean by coding in qualitative research. NVivo's tools are well developed for coding/categorisation. It is possible to see the document as a whole in the Document Browser, annotate your reflections directly in the Document Browser while reading, create in-vivo codes directly and use Free Nodes for open coding. As

organised in the Tree Node area. Codes/categories can be dimensionalised directly in the Node Browser and organised as Tree Nodes. Nodes can be gathered together for specific purposes in sets. Axial coding can be done in the Modeler. Perhaps this was the most developed area where participants could see how they could incorporate NVivo in their teaching. They could use these tools to illustrate these processes to students. As most of these courses were designed around students doing a small piece of research, the students themselves would be able to use these tools during the course. Participants did not have the time in the workshop to develop how they would introduce these tools to students, but they saw the scope for doing so.

Relating categories/developing conceptual frameworks

I had stressed the importance of memoing in my presentation and participants agreed with me, as memoing and journal keeping were mentioned by all. Two main tools exist for this in NVivo – the Modeler, where you can, as one participant put it, see the theory as a story. And the ability to create Memos as documents directly in the software, where you can use hyperlinks (DataBites, DocLinks and Node Extract links) to data to support the arguments you are constructing. While memo writing, you would be checking out the insights you had about the data during reading and coding. The Search Tool, particularly the Matrix Tool, can be used to check out patterns and the Assay Tool can be used to check whether a category is truly saturated and if not, can indicate where to theoretically sample next. The Modeler can be seen as a visual memo. It is sometimes quicker and easier to demonstrate the developing theory as a model which can be drawn in the Modeler. I feel that the memoing, reflecting and developing frameworks process needs to be demonstrated to students with worked examples. My own experience with students is they often are not sure what goes into memos or journals. I have found worked examples help them understand the journal and memoing process. It is also important to stress that in memo writing you are experimenting with ideas, many of which you will ultimately drop.

Reflecting on research

Finally, most of the courses included reflections that are relevant to all research projects – not just grounded theory projects using NVivo. These included ethical dilemmas, issues of quality and trustworthiness, the importance of bringing one's voice to the research process through journal keeping, and the possibilities for social empowerment in research. We did not have time to reflect on whether using a software package such as NVivo added another dimension to these issues. However, there are ethical issues to be addressed specific to using software. Data is very transparent and accessible in a software package that even anonymised participants may be more vulnerable to being identified. On the other hand, the very transparency of the data makes it accessible to groups. Findings can be presented via the Modeler, for example, and participants may be invited to comment, add to or shape tentative results – empowering the participants in the process. These are just two issues which course designers may wish to reflect upon and develop further in their own courses.

REFLECTIONS ON THE WORKSHOP

My reflection about the day was that we covered a lot of ground and packed a lot into the workshop. My goal was that everyone would start to develop the bare bones of a syllabus that was relevant to their needs in their institution. I feel we achieved that. However, it is important to recognise it was a mixed group – some people had more experience than others in grounded theory analysis. Some were relatively new to NVivo, others were very experienced (Lyn Richards – co-developer of NVivo was in the group!). Also, there had been no documentation of what a grounded theory project would look like in NVivo. I was very pleased that for the preparation for the workshop, I was able to start the discussion about how NVivo can support and perhaps further develop grounded theory analysis. A large part of the workshop was spent identifying how NVivo would be used in grounded theory analysis. This was a necessary first step before identifying how it could be used in teaching this kind of analysis.

To summarise, the coding/ categorising tools in NVivo are well developed. In fact, coding may be too easy. In the grounded theory project which I did manually, coding was kept to a minimum. However, when I put that project into NVivo, I could see how I could code more and more thoroughly. The advantage of the software is that you can view your codes much easier and see what you have more quickly. I noticed that as I was transferring my manual codes into the software. The disadvantage is that you can easily get stuck in open coding mode and generate too many codes without reflection. This is something that teachers need to be aware of. But for teaching purposes, the Node Explorer makes it very easy to generate discussion in a group about codes that have been generated so far, about how to group existing codes, whether to merge codes and how to dimensionalise them. These processes are easier to demonstrate using the software. I would say that the memoing possibilities in NVivo are superior to keeping a written Journal. That is because the opportunities for hyperlinking to different parts of the data are so rich. I had transposed my handwritten journal into NVivo and it was much improved through putting my diagrams into the Modeler and hyperlinking to them as well as hyperlinks to specific quotations in the interviews. The Journal in NVivo was much more accessible than in notebook form. However, students need to be taught how to memo in NVivo because beginners tend to get caught up in coding and forget to memo. Furthermore, while the memoing possibilities are rich in NVivo, the memoing feature is somehow ‘hidden’ compared to the coding features. Teachers need to introduce the memoing features early on in the course. Keeping a Journal in NVivo is a good way to do this.

I feel now that NVivo tools have been related to the different processes in grounded theory analysis, it will be easier for instructors to develop courses using the software. It is my hope that this report of the workshop will give ideas to others about the use of NVivo as a teaching tool.

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Websites

www.qsrinternational.com

for more information on the NVivo software; also includes articles on the use of the software, some of which can be downloaded.

www.sdgassociates.com

for more information on training in NVivo and other qualitative analysis software packages; also includes section on recommended literature and articles which can be downloaded. There are further links to other relevant listservs from this site.

Endnote

1 The form of grounded theory discussed in this article is based on Strauss and Corbin's model of grounded theory analysis. In the workshop we discussed that there are different models of grounded theory analysis – notably those developed by Barney Glaser (1967) and Kathy Charmaz (1983). Workshop participants agreed that an acknowledgement of the different varieties of grounded theory analysis should be included in any course on using NVivo to teach grounded theory. I used the Strauss and Corbin model as I had worked through how to use this model with NVivo. My objective was to go through a worked example in depth. However, in developing courses, lecturers will have to decide how to deal with the various varieties. There is obviously scope to develop worked examples in NVivo of other models of grounded theory analysis.

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Blending technology and methodology: a shift toward creative instruction of qualitative methods with NVivo

ABSTRACT

Incorporation of a qualitative software package into the course syllabus seems to interest many qualitative methods instructors. However, their ability to include this aspect of qualitative research in their courses has been hindered by the paralysing debate in the qualitative research community regarding the ideal software package given a particular methodology. While such a debate is of some use to researchers who are embedded in their particular approach to research, it is of little use to instructors who want to present a survey of qualitative methods. These instructors are often hindered by the misunderstanding that instead of adding one software package, they must learn several in order to demonstrate the 'best' package for each qualitative methodology. The author encourages instructors to select one of the more common packages and then use the package to investigate methodological differences in the field. The instructor's need to understand a multitude of software packages is therefore minimised, while their ability to creatively explore debates in the qualitative research world are maximised. The goal of the instruction is to *blend* the instruction of methodology with the technology, rather than treat the software as a separate component of the course. While the current article selects NVivo as the software package and evaluation research as the course in which the package can be included, the ideas presented in the article may be applied to other software packages and other qualitative research courses.

INTRODUCTION

As the analysis of qualitative data has become increasingly computer assisted, educators at the graduate and undergraduate level have followed suit in their attempts to prepare new qualitative researchers for future roles in a variety of fields. These pursuits among educators have resulted in an array of conversations that range from validity and reliability in qualitative research to voice-activated translation of audio

taped data. The strands of conversations therefore cut across methodologies, disciplines, professions and research institutions around the world.

One cross section of these conversations has occurred between collegiate educators and software trainers, as both groups of professionals examine the best strategies for combining the instruction of qualitative methods with the instruction of software packages such as NVivo. As faculty increasingly realised the importance of including a software package in the instruction of qualitative methods, software consultants/ trainers increasingly realised the importance of including discussions of methodology with the more technical training of qualitative software packages.

The present paper draws from the author's ten years of experience training researchers on the use of software packages developed by QSR International (QSR). Participants in these training sessions represent a wide range of disciplines/professions (public health, human services, market research, criminal justice, education, etc.) and an equally broad range of expertise in analysing qualitative data. The perspectives of these individuals have informed the instruction of the software and influenced the focus on the flexibility of the software, which is now a core component of all training provided by the author. The goal of the present paper is to take the lessons learned from a diverse range of users and to present these lessons to teachers as they grapple with the task of including a software package into their qualitative methods courses.

INIITAL LESSONS LEARNED FROM TRAINEES

Diversity among trainees

Although the diversity among those seeking assistance with the software almost defies description, there are two noticeable clusters: those new to qualitative research and those with more experience. The first group of participants is occasionally mandated by their employers to use the software, and many of these participants arrive with little or no prior training in qualitative methods. Individuals often represent organisations that traditionally handle quantitative data but are beginning to acknowledge the value of including qualitative data in their pursuit of knowledge. They tend to be computer savvy, value efficiency, and are interested in the pragmatics of how to get the software to produce output.

Other participants hold prestigious, long standing academic positions in qualitative research and want to learn about the new methods for storing, managing and analysing qualitative data with the assistance of a software package. These participants often represent educational institutions and their goal is to assess how well a software package can meet the methodological rigour of a particular research tradition. They tend to be grounded in one approach to qualitative research (phenomenology, ethnography, discourse analysis, etc.), value epistemological debates, and are interested in the capacity of the software to parallel the unique processes they developed over the years to code and analyse data without a software package.

Training occurs with an interesting combination of these individuals, and the dialogue among these diverse participants continues to reveal the importance of linking, at every possible juncture, the 'how to,' technical aspects of the software with the 'why would I?' methodological implications of the capabilities of the software. A synergistic relationship exists between these two and therefore, the technical 'training' becomes a rich, educational exploration. The remainder of this paper discusses ways the NVivo software can be incorporated into the classroom by strategically *blending* lessons in the technology with lessons in methodology. The discussion draws on years of experience in combing these methodological and technical elements in short-term training, although much is yet to be discovered about applying these ideas to the classroom setting over a longer period of time.

Taking the software into the classroom

The framework for this paper also emerged from the author's experience as a guest lecturer in eight different qualitative methods classes in the United States (the University of Denver, the University of Colorado and Regis University). This experience in the graduate and undergraduate classroom initiated the experiment of integrating the software into a credit bearing course on qualitative methods. Most university instructors invited the software trainer for a solid period of classroom instruction, often in the final weeks of the class after covering qualitative methodology. Others alternated instruction of methodology with software training, in the hope that students would make some links between methodology and software.

Unfortunately, with both strategies the attempt to thoughtfully *blend* technology with methodology in the context of the classroom proved only moderately successful, because the software was relegated to a particular portion of the syllabus, which necessarily segregated it from the larger focus on methods. With limited time, the use of NVivo was presented in strictly 'technical' terms by an outside software trainer, rather than the primary course instructor. The implicit message to students was that methodological training occurred with one source, while technical training ensued from another. This in turn led to the dangerous inference that methodology and software were distinct pieces in a larger whole, rather than integrated elements in a rich, qualitative process.

REFINING THE APPROACH TO TEACHING

The Wisconsin Teacher's Conference

The Wisconsin Teacher's Conference in March of 2003 provided the opportunity to identify strategies that would move faculty toward a genuine integration of lessons in technology and methodology. Because this conference provided a space for teachers to think about strategic integration of the software into the classroom, it also provided new opportunities for thinking about a course syllabus and the activities that would be part of this syllabus, without the insertion of an outside software consultant/trainer. By providing examples of strategies used to link technology and methodology in the intensive, short-term training context, the author hoped to incubate new approaches in the classroom that could be nurtured by instructors and subsequently shaped into their

own comprehensive course on qualitative methods. The intersection of the world of the trainer and the world of the teacher generated new, interesting possibilities of classroom instruction.

The place of software in qualitative methods texts

While the instructors who attended the Wisconsin teacher's conference were enthusiastic about the possibility of adding the software to their courses, the *blending* of technology and methodology was no small task. To understand the difficulty of moving toward this integration, one need simply examine the available texts for qualitative methods courses. None of the most popular texts in qualitative methods adequately weave the use of a software package into a larger discussion of methodology. Instead, these texts relegate the software to its own section, if such a discussion is included at all, or they divorce software from methodology by focusing intensively on the components of one or more software packages, while carefully avoiding the methodological implications of implementing these software components.

As an example, one mode of presenting the diversity of qualitative methods is through anthologies such as *The Qualitative Researcher's Companion* (Huberman & Miles, 2002). These collections from multiple authors present different approaches to qualitative research such as organisational ethnography, naturalistic inquiry, case studies, phenomenology, etc. Such anthologies are often the least likely to include any discussion of software packages in the process of analysing qualitative data.

Other texts on qualitative research do include discussions of computer-assisted qualitative data analysis software (CAQDAS), but these texts segregate discussions of the software to a special section or an extremely brief subsection of a larger chapter. Examples of such texts include *Qualitative Research and Evaluation Methods* (Patton, 2002), *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (Creswell, 2003), *Collecting and Interpreting Qualitative Materials* (Denzin & Lincoln, 1998), and *Interpreting Qualitative Data*, (Silverman, 1993). While these texts provide excellent explorations in methodology, they do not meaningfully integrate CAQDAS into any discussions of methodology.

Publications attempting to more thoroughly address the use of the software typically turn to the matter of comparing different software packages. The most comprehensive such comparison of its time was *Computer Programs for Qualitative Data Analysis: A Software Sourcebook* (Weitzman & Miles, 1995). This sourcebook described software capabilities in a fairly comprehensive manner and the detail therefore helped readers infer how to apply a software package to their methodology. However, the rapid advances in software packages quickly made portions of this publication obsolete, and the publication could not handle all software packages and all methodologies in one volume. In more recent publications, such as *The Handbook of Research Design and Social Measurement* (Miller & Salkind, 2002), efforts were again made to compare software packages. However, these comparisons continue to remain distinct from the rich discussions of methodology that run throughout the rest of the book.

The Dictionary of Qualitative Inquiry (Schwandt, 2001) does identify potential problems of the illusionary divorce between software and ideology/methodology. As he defines 'computer-assisted data analysis', Schwandt states, 'although developers and frequent users of qualitative data analysis tools may customarily reflect on these embedded predispositions, it is not entirely clear that the casual user does so' (2001, p. 28). Schwandt sees a link between methodology and technology, and he asserts that every software possesses assumptions and tendencies toward particular ways of organising and analysing information.

Reframing the debate about the 'best' software

The training experiences of the present author suggest that a productive approach to examining the relationship between software and methodology is to acknowledge that software tools cannot be entirely methodologically neutral, just as survey instruments or other tools cannot be entirely neutral. However, it is unhelpful and inaccurate to assume that every software has the same degree of methodological bias. Furthermore, the most successful qualitative software packages are likely to be constructed in ways that meet a range of methodological approaches. While the range of methodological approaches will not be perfectly or comprehensively met in every case or by every software, the same is true of the various paper and pencil methods that researchers have used since qualitative inquiry began.

While acknowledging some level of methodological bias, the assumption of the present discussion is that some software packages, such as NVivo, are designed and regularly improved in order to meet the needs of a *diverse* range of researchers and methodologies. The tools in NVivo, for example, can be used by grounded theory researchers as well as evaluation researchers. The former may want to develop codes only after significant emersion in the field, while the latter may have a predefined set of codes before they begin collecting data. Some researchers may only use some of the tools in the software, and different researchers may make different use of the same tools.

Debates that seek to prove which package can best meet the needs of a particular methodology might be valuable for researchers who are exclusively embedded in their approach to research. However, they do little to further the attempts to include a software package in the instruction of a course that presents an overview of various qualitative methods. Such debates, in fact, may have prevented classroom instruction of a software package because qualitative methods instructors become paralysed by the fear that they will select the 'wrong' package. This presentation at the Wisconsin teacher's conference was designed to move away from debates about which software is best for which methodology.

Rather than debating the merit of the individual software packages, the author suggests that an instructor select a package, and develop activities and lessons with the package to explore differences in the qualitative research world. Most of the top software packages, for instance, can be used to demonstrate the difference between grounded theory and hypothesis testing, or can be used to examine the debate over whether qualitative data can and/or should be counted into numeric summaries. Rather

than debate over the software packages, this session was designed to use a software package, NVivo, to better understand the debates and differences in the qualitative research world. Instructors in qualitative methods are undoubtedly more interested in the latter series of investigations than the former when it comes to preparing students to conduct qualitative research.

Evaluation research with NVivo as an example

While evaluation research differs from other approaches to research, it is also perhaps in a unique position because evaluation researchers often borrow strategies from a range of research methods and methodologies. Evaluation researchers apply techniques such as participant observation, case studies, surveys, interviews, focus groups, etc. They also draw on phenomenology, ethnography, discourse analysis, etc.

While evaluation research borrows from many theoretical and methodological approaches, the goal unique to evaluation research is the assessment of 'programs'. Because the programs can range from prenatal care to literacy to workplace safety, the theories and methods of collecting data vary considerably. Therefore, evaluation research is in a uniquely flexible position regarding the approach to collecting and analysing data.

While other types of courses may borrow much of what is discussed below, the presentation uses evaluation research as an example in order to make the process of blending the software into the coursework more concrete. The examples below are also geared toward the use of the NVivo software package, although many of the exercises and examples can be adapted to other software packages. As with evaluation research, the NVivo software was selected to make the process of blending the software into the coursework more concrete.

When developing a syllabus, instructors must take many factors in consideration. The present paper is not designed to assess all of these factors. An instructor obviously needs to consider contextual issues such as the level of the course (beginning to advanced), the timeframe available (an intensive block, semester, or year), the focus of the course (general methods, specific methods), the goal of the learning (skills to be developed and/or products to be developed), the individual or collaborative activities of students (individuals, pairs, small groups or large groups), required reading materials, and the availability of mentors in addition to the primary instructor. These factors and others will have an impact on the development of specific course exercises, and many of these factors need to be framed prior to the development of course exercises.

Placing the software in the larger research realm

Prior to embarking on the weaving of methodology and technology, it is recommended that instructors place the chosen software in the larger realm of research. After presenting this framework, the instructor has many possible places from which to begin, depending on the desired emphasis of the course. One way of exploring the

research realm is to generate a heuristic model. The model provided below includes five main areas.

Figure 1: Five areas of the research realm

Examples of each of these areas are provided below and can be used to explore the research realm and the relationship between/among these heuristic categories.

Tools (Objects)

- Pen
- Paper
- Video
- Recorder
- Transcribing machine
- Eyes
- Ears

Methods (Activities)

- Interviews
- Focus groups
- Observations
- Document analysis
- Differential statistics
- Hypothetico deductive
- Hypothesis testing

Methodologies (Strategy Sets)

- Ethnomethodology
- Experimental
- Participant observation
- Action research
- Survey research
- Case study
- Quasi-experimental

Theories (Frameworks)

- Functionalism
- Behaviourism
- Feminism
- Exchange
- Conflict
- Critical

Philosophical Issues (Underpinnings)

- Deduction/induction
- Subject/object relation
- Value neutrality
- Epistemology
- Empiricism
- Rationalism
- Pragmatism

The list of examples helps to clarify the five areas and demonstrates the range from concrete objects (tools) to ethereal, contestable debates (philosophical underpinnings). Advanced courses in philosophy may focus an entire semester on only one of the philosophical issues listed, and therefore the instructor must determine how much emphasis to place on any example. The goal is to provide a framework for understanding evaluation research and role of software in conducting research and analysing data. It is not designed to generate an exhaustive discussion of every detail. A graduate level course might spend two weeks on this model to explore the main components. Several possible questions or exercises may also be posed of students to further explore the model. The sample questions below pertain to three main avenues for exploring the model:

Understanding the categories

1. How would you define the five main categories above, based on the list of examples that follow?
2. Add an example to each category and briefly explain.
3. Is there a category missing, or could you collapse any of the categories above? If so, how?
4. Do you think any of the examples above belong in a different category? Why?

Exploring relationships among categories

1. Take an item from the examples above (from any category except Tools). Research this item thoroughly and develop a detailed description. Complete your description with an analysis of any overlap that may emerge with other categories. Where do you see threads of connections? Where do they seem to be lacking? Provide some explanations of the presence or absence of overlap/ connections.

Applying the categories to debates in research

1. Select a debate in the research world and briefly describe the main arguments. Where does the argument reside, based on the categories defined above (an argument or part of argument may reside in more than one category). Explain.

Finally, as a way of introducing the use of NVivo, an instructor might ask where students would place a software package within the model? While the initial responses tend to place the software in the category of tools, the remainder of the course will demonstrate ways in which the use of NVivo is influenced by the other four categories as well. In other words, the software is not simply a static tool. The philosophical and theoretical inclinations of the researcher will influence which methodologies and methods are chosen to answer various research questions, and these in turn will influence the way/s in which the software becomes engaged in the analysis. The web of connections running through these five areas of research will form the backdrop of the course, with the software serving as a tool for understanding the connections.

Demonstrating NVivo and simultaneously discussing research issues

To play with and build on the notion of using NVivo to examine connections among five nominated areas of research, participants in the Wisconsin Teacher's Conference watched a presentation of several aspects of the software and then engaged in lively debate. The following six demonstrations serve as examples in which a capability of the software may be presented, each followed by several discussion questions that pertain to the larger realm of research. The demonstration activities should be familiar to individuals who use NVivo, although they can be easily explored/practiced with any of the online NVivo tutorials.

Demonstration 1

A. Preparing and naming documents.
B. Exploring the different types of documents that may be included in a study.

Discussion

- What is a Data Set?
- What are the dimensions of a large Data Set, or of a small Data Set?
- What advantages/disadvantages are there to varying sizes of Data Sets?
- Are these associated with particular methods?

Demonstration 2

A. Creating Free Nodes and Tree Nodes.
B. Adding definitions to nodes.
C. Coding and uncoding text.

Discussion

- Why use Free and/or Tree Nodes?
- How do grounded theory approaches differ from hypothesis testing approaches to creating and organising codes?
- How much context should be coded and why?
- Why might data be coded in more than one node and how do we know when to do so?
- How should the interviewer's text and notes be handled while coding?

Demonstration 3

A. Importing quantitative data in the form of an Attribute Table.
B. Running a simple intersection search between a Code and an Attribute.

Discussion

- What is the difference between qualitative and quantitative data? Where and how do they overlap?
- What does it mean to triangulate data and how might we achieve that using NVivo?
- How has mixed-methods research evolved and where is it today?
- What are some criticisms of strictly qualitative and/or strictly quantitative research and responses to these criticisms? What arguments might be proposed to counter these criticisms?
- What are some criticisms of mixed-methods research and responses to these criticisms?

Demonstration 4

A. Profiling coding for all nodes.
B. Generating a matrix intersection and exporting the table.

Discussion

- What are the advantages/disadvantages of counting qualitative data?
- What is the unit to be counted? How do you justify selection of that unit?
- How would individuals from different methodological backgrounds argue for or against the use of these 'counts', or what standards would be established as 'appropriate' use?

Demonstration 5

A. Annotations, Memos, and Models.
B. Recoding data and the leap from coding to searching.

Discussion

- What are some of the criticisms of using software that pertain to 'deconstructing' qualitative data or 'distance from the data'? What are some defenses of data deconstruction and distancing?
- How can the software address these concerns? And are such strategies sufficient?
- What else can be done to avoid these pitfalls?

Demonstration 6

A. Brainstorm a research context (eg., a hospital emergency room, a football team, a yoga class).

Discussion

- What are the different questions a researcher might ask depending on the methodology they favor?
- What strategies might he/she use to collect data? Why?
- Is the software methodologically neutral? How do you know if it is or is not?

As mentioned earlier in this report, the goal of this type of instruction is to *blend* the technology of NVivo with the methodology of evaluation research (especially qualitative evaluation research). By presenting this approach, the paralysing debate regarding which software is 'best' may be bypassed. Instructors may instead move toward the more productive exploration of the research realm with students by using a software package to examine issues and debates within qualitative research. This shift makes the learning of the software more meaningful and the debates in the research realm more understandable. This shift also helps to erode the all too frequent pattern among instructors to relegate the software to a tiny nook in the syllabus where it is only taken out and dusted off once a year as though it was a nonfunctional artifact.

The above exercises were explored at the Wisconsin Teacher's Conference because participants selected these ideas from a list provided by the author. A full list of the original exercises and questions is provided below. These items might serve as potential paper topics, group activities, or exam questions. Most (but not all) of the questions begin with a topic in qualitative research and expand the question to an exploration of NVivo. They are presented here in order to help instructors develop

their own, creative approaches to a course, and it is not expected that all of the ideas will be equally useful to all instructors.

1. During data collection, what information should be logged in addition to the 'raw' data? How should these data be standardised or formatted (think of a standardised guide or template)? What are the implications for using the software?
2. What's in a name? How should you name your documents and why? What are the implications in NVivo?
3. Describe the different types of qualitative data that might be collected in a qualitative study. How does NVivo manage these different types of data?
4. What is a Code? What are the different ways to code in NVivo?
5. What are 'validity' and 'reliability' in qualitative research? Are there any aspects of the software that ensure or threaten validity and reliability in qualitative research?
6. Describe the difference between grounded theory and hypothesis testing. Describe the difference between Free Nodes and Tree Nodes.
7. What are the advantages/disadvantages of a literature review, and when should it be conducted? In what ways can NVivo help manage your literature review?
8. Pick a research area. In a few paragraphs, describe your study and approach to it if you were going to begin with Free Nodes. Describe the different approach you would be taking with Tree Nodes. Comment on how you might use either approach.
9. What is a Case Study? In NVivo, what is a Case? When would you use Cases in NVivo, given the research area you selected in the previous question?
10. What are the differences and similarities between Sets, Cases and Attributes in NVivo? Describe the technical differences in the software capabilities, and the implication(s) of these differences in the research world.
11. What are some threats to confidentiality in a qualitative research project? What are the implications for managing these threats in NVivo? How can the software help? Are there ways in which the software becomes problematic?
12. What issues must be considered/managed in team research? How can the software assist in the management of these issues?
13. Select a methodological debate. How does this debate 'play out' in the software? Does one position on the debate present a better 'fit' with the software – and if so, why? Or does the use of the software simply play out differently depending on where one stands in the debate – and if so, how?
14. What are attributes and values in qualitative research? Technically, what are attributes and values in NVivo? What are the three 'missing values' in NVivo? In what ways are these relevant to a study that includes the use of attributes?
15. Describe different ways in which findings might be delivered (for the same or different audiences). What elements of the software can facilitate the delivery of findings in these various formats?
16. What is 'distance from the data?' Describe key issues you can think of that contribute to distance from the data. How can these issues be amplified and/or effectively managed in the way the software is used?
17. Explain 'mixed-methods' research. When might you apply a mixed-methods design and why? What are some difficulties in conducting mixed-methods

research? In what ways does NVivo help manage these difficulties or aggravate them?

18. What are the research terms most commonly used in the instructor's area of expertise? How do these terms relate to some of the terms in NVivo? What is the key that translates the language of the software to the language of a particular methodology?
19. What is 'rigorous' qualitative research? How can NVivo contribute to or threaten such rigor?
20. Research the debate around the advantages and disadvantages of using a software package to analyse qualitative data. What arguments do you find most persuasive? Which position would you most likely defend, with respect to a research project you are considering?

Possible NVivo modules

Based on discussion and recommendations from the presenter, the following is a recommended approach to classroom modules for the NVivo software.

Module 1
Introduction to the system
- Issues in computer-assisted qualitative data analysis (advantages/disadvantages)
- Project Pad
- Document System
- Node System (has a parallel structure)

Documents
- Rich Text
- Heading levels
- Text units
- Annotations and Memos
- Coding Stripes and other visual aids (online and in reports)

Module 2
Creating the conceptual categories that will determine a coding structure (Nodes)
- Free Nodes (grounded theory)
- Tree Nodes
- Coding structure tips
- Cases
- Sets

Assigning particular pieces of text with codes (Coding)
- Section coding
- Speed coding – drag and drop
- Creating nodes as you code
- Review of visuals that provide coding feedback

Module 3
Creating a web of connections inside and outside of your data (Links)
- Annotations
- Links within the system (nodes or documents)
- Links to external files (audio, video)
- Introduction to simple reports

Module 4
Assigning values to documents, such as age and aptitude test scores (Attributes)
- Examples
- Importing from an Excel file

Relationships among nodes, documents, sets, and attributes (Searches)
- Three components of every search
- Assay after a search

Module 5
Creating reports to take a look at the progress you have made (Reports)
- Document reports
- Node reports
- Search reports

Module 6
Developing visual models to represent parts of a project (Show Tool and Models)
- Reveal patterns
- Explore hypotheses
- Track the timing of events
- Depict timelines for phases of data collection and analysis

Online resource hubs for teachers

The final set of materials presented at the teacher's conference included a list of online resource hubs for teachers. These 'hubs' provide helpful information and in most cases also provide links to additional web resources. The hubs pertain to evaluation research, qualitative research, and the use of NVivo.

Qualitative research syllabi (from around the world)
http://www.nova.edu/ssss/QR/syllabi.html
The Qualitative Report, Nova Southeastern University, Fort Lauderdale, Florida, USA

Research methods resources on the web
http://www.slais.ubc.ca/resources/research_methods/index.htm
University of British Columbia: School of Library, Archival and Information Studies, Vancouver, British Columbia, Canada

Qualitative research resources on the web
http://www.ualberta.ca/~iiqm/iiqmHomePages/resources.html
International Institute of Qualitative Methodology, Edmonton, Alberta, Canada

Books, discussion forums, conferences, etc.
http://www.qualitativeresearch.uga.edu/QualPage/
QualPage: Developed by Judy Norris, University of Alberta
Maintained by the University of Georgia

Evaluation books
http://www.sagepub.com/subject.aspx?scode1=L00&sc=2&sname1=Research+Methods+%26+Evaluation

Evaluation journals
http://www.sagepub.com/searchresults.aspx?search_text=Evaluation&sa=false&sc=3
Sage Publications, Thousand Oaks, California, USA

Computer-assisted qualitative analysis software bibliography
http://caqdas.soc.surrey.ac.uk/biblio.htm
CAQDAS Networking Project, University of Surrey, United Kingdom

Bibliography on qualitative computing with QSR software
http://www.qsr.com.au/resources/literature/reading.htm
Qualitative Solutions in Research, International (QSR), Melbourne, Victoria, Australia

CONCLUSION

While the above recommendations for incorporating a software package into a qualitative methods course are not exhaustive, they do suggest a shift away from the debate regarding the 'best' software package for a particular methodology. Such a debate tends to hinder instructors from including a software package in their courses for fear it will be the wrong software. Furthermore, when a software package is chosen, it is often relegated to an isolated portion of the syllabus, where it will not interfere with the larger and more important lessons on qualitative methods. By inserting the software into a portion of a research methods course, rather than *blending* it into the entire syllabus, a great deal of potential learning is lost. For the purpose of teaching graduate and undergraduate students in a range of qualitative methods, the anxiety over which package to select is, frankly, unnecessary. Teaching energy is better spent on creative explorations with the software and methodology. For instance, excitement among students can be fostered by asking small groups to prepare a defense around a particular methodology and to show the complementary use of a software. As more instructors choose to *blend* NVivo or other packages into their instruction, additional lessons will be learned that encourage a creative, interactive use of the software in the classroom. In this regard, classroom instruction, qualitative research and software applications will all benefit.

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ARTICLE NUMBER 3

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Curriculum development strategies using qualitative data analysis software

ABSTRACT

The dramatic growth in the use of qualitative data analysis software (QDAS) in the qualitative methodological design process is stimulating demand for curriculum development. For this to proceed, a shift in instructional perspective and pedagogy is needed that changes the design question from 'How to fit your research to the software' to 'How to put the software into what you are trying to do'? Educators must explore new ways to effectively bring the software into the courses. Three classroom instructional activities are provided as lesson plans that encourage seamless integration of the software tool. Recognising that QDAS is a tool, in the background, is essential to successful curriculum development adoption. How we as teachers respond to this challenge will significantly influence our conceptualisation of the future of qualitative research.

INTRODUCTION

The dramatic growth in the use of qualitative data analysis software (QDAS) in the qualitative methodological design process is stimulating demand for curriculum development. Research faculty are increasingly recognising that a shift in instructional perspective is needed that changes the design question from 'How to fit your research to the software' to 'How to put the software into what you are trying to do'? Response to this question directly engages research faculty into the curriculum development process of searching for effective ways to bring the software into qualitative research courses. An example of early attempts to integrate research software into the instructional process was the inclusion of a computer disc with a textbook. The software, however, remained a research tool seen as distinct and apart from the topic of inquiry. Babbie suggests that educational researchers, today, have an exciting opportunity to explore the links between the instructors' own research and their teaching role (as cited in Kaczynski, 2003). A new perspective in curriculum development must be inculcated that encourages the instructor to see the software as an instructional tool, rather than a research tool.

External influences have historically played a significant role in shaping curriculum development, especially ' ... when change is occurring at a faster pace than usual' (Stark & Lattuca, 1997, p. 18). This is particularly evident to qualitative research teachers who are witnessing a growing student comfort with technology. Past research practices relying on paper and colour markers are no longer the standard, yet instructional practices are failing to recognise this major methodological change. The field of qualitative research is moving inevitably towards digital analysis. Qualitative researchers have joked that research methodology took a huge jump in technology when colour markers came out in mixed colour packets of thirty-six. The resulting increase in colour choices encouraged more codes. Today, the impact of QDAS upon methodology is dramatically greater than coloured markers. Instructors are now teaching students, who tend to relate well with rich text and proficiently function in a digital world. As a result, curriculum development initiatives must adjust to students who are able to quickly adopt and apply advanced qualitative research concepts such as data triangulation, inter-coder reliability and theory construction in a digital analytic environment.

The qualitative research instructor needs to integrate QDAS into lessons, much as word processing or presentation software programs currently support instructional delivery. Many software programs that once were perceived as an impediment to instructional delivery have now melted into the background and seamlessly support student learning outcomes. For example, the early use of the Internet, prior to the advent of graphical user interface (GUI) browsers like Netscape and Explorer, made integration cumbersome. Recognising and accepting this goal of seamless integration is a first step for the instructor engaged in curriculum development that is aided by QDAS. From here, the instructor must re-examine the overall course design, looking carefully for ways to enhance topics and lessons. Integration of QDAS, as an instructional enhancement, can thus allow the instructor to deliver lessons in a manner much different from a traditional software training format that focuses on the technical features of the software.

To further clarify this approach, three classroom instructional activities are provided as examples. In this first activity (Table 1), the student learning objectives encompass both methodological and theoretical considerations. Bringing a theoretical perspective into the design process enhances refinement of the strategic framework. However, both Patton (2002) and Wolcott (2001) caution that nagging theoretical design issues should not be allowed to immobilise applied research. The essential thing is to ensure that theory is woven into the design discussion so as to help guide and clarify the purpose and focus of qualitative inquiry. Classroom Activity #1 is intended to demonstrate to students how theory can support the methodological design process by enhancing student sensitivity to the concept that meanings of words become culturally imprinted upon us through common usage. Our awareness of such meanings becomes slowly dulled until we take for granted that what is familiar is also correct and proper. Qualitative methods provide the means to engage in research that exposes routines by 'making the familiar strange' (Erickson, 1973, p. 10). An example of this process can be seen by reflecting upon our routine use of word processing. Times New Roman is

the default font, but do we really choose this font? At what point do we acquiesce and accept the default? We must consciously facilitate a change to a different font, and in so doing, create a separate meaning. This acceptance slowly moves from the typing process to the reading. We have come to expect a Times New Roman world.

Classroom Activity #1 challenges students to consciously practice narrative analysis where the text has no obvious straightforward meaning. Thus, the researcher deliberately builds up meaning from the text rather than sensing that the textual data somehow have intrinsic meaning.

Table 1: Classroom Activity #1 – Narrative Analysis Simulation

Activity:

1. Select a narrative with data which students will emotionally react to.
2. Introduce the theme of the narrative and ask students to write down a statement of bias. What do you expect to find and what evidence do you expect to find that supports your expectations?
3. Next, have all students read and open code the narrative data.
4. Form students into small groups to discuss the narrative frameworks from a culturally embedded perspective.
5. Have groups report their coding to the class. Reports are captured and entered into a QDAS program by the instructor, live, using large screen projection.
6. Class discussion should focus on linguistic interpretation, coding techniques, researcher bias and the importance of researcher critical reflexivity. Attention should be minimised regarding the functional features of the QDAS.

Variations:
The narrative selected for analysis may be integrated with lessons from other courses or areas of academic interest. The following are a few examples of creative narrative selection: court transcripts for legal studies; political speeches by current or former political enemies for international studies or military; literary works for health professionals or social services.

This next example (Table 2) demonstrates how QDAS can support development of key concepts throughout a curriculum unit. Instructing students in coding involves a delicate shift in student perspective between data generating and analysis. The concept of researcher as instrument forces the student into a demanding position of self examination, critically reflecting upon their perspective and interpretation of data. Throughout this activity, the emphasis remains on methodological design, not the use of software. Student readiness for this activity involves a basic understanding of grounded theory involving the constant comparative method of data analysis which is facilitated by open, axial and selective coding (Merriam & Associates, 2002). Four variations of this activity are provided that may be modified and adopted to other classroom lessons, prior to or following Classroom Activity #2.

Table 2: Classroom Activity #2 – Inter-Coder Reliability

Activity:

1. Select a qualitative research study from a professional journal. The article should include data samples. You may want to select a professional publication that the majority of the students will find relevant to their field of study. (An alternative is to download public domain raw data from the web)
2. As homework, assign students to read and open code the article using coloured markers and a code key or by any other manual coding approach that appeals to them.
3. At the next class meeting, form students into groups of 2 or 3 and have each group identify similarities and differences of their homework.
4. Next, have the small groups merge with one or two other groups and axial code the article. Each of the larger groups should strive toward consensus on the codes. You may want to briefly explain inter-coder reliability to the class prior to this step.
5. Have each of the larger groups report to the class. Reports are captured and entered into a QDAS program by the instructor, live, using large screen projection. The instructor may choose to demonstrate open, axial and selective coding during this step.

Variations:
If the instructor is using NVivo 2.0 (2002) this activity could be expanded into several related lessons. Each of these variations should emphasise the methodological concept so that the software remains as a tool in the background.

1. Capture each group's report separately. All groups could then be displayed concurrently, using the layered modeling feature.
2. An activity dedicated to the search and show tool features could be provided that would demonstrate one method of further refining the coding process.
3. The attribute explorer feature could be used during a lecture to enhance class discussion on purposeful sampling.
4. Theory building can be discussed by looking for core categories using the assay tool feature. For example, ask the students to identify what is missing and/or what is not being looked at.

The third instructional classroom activity (Table 3) provides an opportunity for students to practise fieldwork interviewing skills outside of the classroom setting. In addition, this activity offers students the opportunity to explore the impact of technology upon methodological design. As students come to accept computers in everyday life, they often give little consideration during the design stage how this perception may impact upon the naturalistic setting. This activity should be scheduled over a minimum one-week period of time to facilitate the sharing of coded transcripts. Students are formed into two-person teams to conduct a single subject interview. One member of the team will use an audio recorder and may supplement note taking with a hand notepad. The other member of the team will use a laptop computer to touchtype interview field notes.

Table 3: Classroom Activity #3 – The Impact of Interviewing Tools

Activity:

1. The interview protocol will be for each member of the team to alternate asking questions. Probe and follow-up questions should be completed by the same team member prior to switching back to the other team member.
2. Upon completion of the interview, each team member will independently prepare a typed transcription and open code the document using QDAS.
3. Within 2–3 days, team members will exchange their completed work with each other.
4. Each member may independently prepare a brief summary report on the similarities and differences found along with an assessment of the different tools used.

Coursework in qualitative methodology assists students in recognising that qualitative knowledge is everyday knowledge. As we go about exploring our daily lives we are engaged in trying to make sense of it. Unfortunately, this process requires that students contend with an overwhelming amount of complex qualitative data. QDAS provides a means to deal with such complexity, as well as a mechanism for generating and exploring the insights and ideas that are constructed from the data. The NVivo learning curve, however, requires researchers to have a firm grasp of qualitative methods, such as critical reflexivity, use of memos, interpretation and emerging themes, as well as, the application of theoretical perspectives in the design process. Given these concerns, it is imperative that a sophisticated program such as NVivo be viewed as a toolkit to help the student develop a methodology for making sense of everyday knowledge.

A related concern in curriculum development is that as QDAS development advances with the ongoing release of new versions, the potential array of tools increases, and as a result, a capacity to confuse the research focus increases. In response, the curriculum development process should acknowledge that the researcher does not need to learn every facet of the program. As teachers, we must remind ourselves that the vast majority of Microsoft Word (2002) users successfully use the software, yet remain unfamiliar with many of the features. This same insight should be applied to NVivo users. Recognising that QDAS is a tool, in the background, is essential to successful integration with curriculum development. With this in place, the instructor can address student learning outcomes which become more readily attainable by a qualitative research student with a clear focus, a comfort with digital tools and competency in fundamental methodological skills.

With growing research interest in qualitative data analysis software, curriculum development efforts must demonstrate how the QDAS tool fits into what the researcher is trying to do. The key question of how educational practice can engage in a shift in

instructional perspective and effectively bring the software into the qualitative research classroom is before us. How we as teachers respond to this challenge will significantly influence our conceptualisation of the future of qualitative research.

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Teaching mixed methods

ABSTRACT

The combination of qualitative and quantitative approaches to research within a single study has become an accepted technique for exploratory and evaluative research. Mixing methods, however, places significant demands on the researcher or research team, and opportunities for training in the issues and techniques involved are rare. Because of the pre-requisite knowledge required, courses of training to gain competency in mixed methods research will necessarily be pitched to senior graduate students, particularly where full integration of methods is to be included within the course experience. The key foci for a practitioner-oriented mixed methods course will be design, analysis techniques and report writing. Competency in use of software is essential for integration of data. Although techniques can be taught, the essential element for successful application of mixed methods is to have sufficient understanding of methodology that one can be flexible, adaptable and often innovative in the application of methods. This requires 'deep learning' built on breadth as well as depth of knowledge, practical experience, and a personality that can tolerate ambiguity and 'messiness'.

INTRODUCTION

The term mixed methods is most commonly applied to research involving a combination, within a single project, of quantitative and qualitative approaches to data gathering and/or analysis. Most researchers 'know' mixed methods when they meet them, but attempts to precisely define the term have been largely unsuccessful. Tashakkori and Teddlie (1998, 2003) created a typology in which they attempted to distinguish mixed models, mixed methods and multimethod research, yet within the same edited volume, Morse (2003), for example, applies these terms in an opposing way. These difficulties are perhaps not surprising, given that methodologists are still arguing over how to define qualitative and quantitative (Bazeley, 2003a).

Although social researchers have been combining approaches for a very long time (eg., the sociological studies of community life in the 1920s), there was a period,

peaking in the 1980s, when it was considered unacceptable to do so, based on the assumption that using different data types or different methods necessarily implied creating a conflict in ontology and epistemology. The 'paradigm wars', as they became known, were largely put to rest in the more pragmatic approach of the 1990s, and mixed methods research has been burgeoning in popularity as an approach to research over the past decade, evidenced, for example, by the publication of the Sage Handbook of *Mixed Methods in the Social and Behavioral Sciences* (ed. Tashakkori & Teddlie, 2003) and the inclusion of mixed methods as a third major approach (adding to quantitative and qualitative approaches) in the second edition of Creswell's *Research Design* text (2003a). Acceptance of mixed methods has occurred particularly in the areas of applied social research and evaluation: 'Evaluators have learned that combining quantitative and qualitative information is not only advisable but inevitable' (Riggin, 1997, p.87).

Despite their popularity and utility, however, few graduate students are prepared for the specific demands of this genre of research methods. Combination or integration of diverse methods demands of the researcher knowledge of multiple methodological traditions, a capacity to understand, employ and adapt diverse (statistical and text-interpretive) methods of data analysis, prescience to envision what might be possible (and useful) and an ability to resolve the technical and interpretive complications which arise.

THE AGENDA FOR THE TEACHERS CONFERENCE' MIXED METHODS STREAM

The mixed methods workshop stream at the Wisconsin Teachers' Conference (University of Wisconsin Madison, April 2003) considered the possibilities for and issues involved in training students to be competent as mixed methods researchers and/or to work within mixed methods teams. Some of these issues included:

- what is being defined as mixed methods research;
- the learning objectives of a mixed methods course;
- the level at which training should/might occur;
- prerequisites for mixed methods training;
- the content to be covered in a training program;
- learning activities at various levels;
- writing skills for mixed methods;
- resources available – print resources and computer software.

THE DOMAIN OF MIXED METHODS RESEARCH

For the purposes of the workshop, mixed methods research was simply defined as any research in which both qualitative and quantitative approaches to research are employed in either the data collection and/or the data analysis and interpretation phases within a single study, ie. to answer a single question (or integrated set of questions). Mixed methods are typically employed for purposes of corroboration (do

the results of different methods support each other?), expansion (use of a different method to add to the understanding being gained) or initiation (use of contrasting methods to spark new ideas and understandings) (Rossman & Wilson, 1985, 1994). Typically discussions of mixed methods research design have been limited to those in which each of the component (quantitative and qualitative) parts is separately conducted, either in sequence or in parallel and with one being more dominant than the other (Morgan, 1998; Morse, 2003). Caracelli and Greene (1997) move beyond such limitations and provide a particularly clear outline of different designs for mixing methods which includes a number of integrated as well as component designs (Table 1).

Table 1: Designs for mixed methods research (Caracelli & Greene, 1997)

Component designs: methodologically discrete, combination at level of interpretation only	
triangulation	seeking convergence on one aspect
complementarity	seeking enhancement or clarification of an aspect
expansion	considering different aspects (side-by-side)
Integrated designs: integrate methods and elements of different paradigms	
iterative	interplay of different methodologies over time (multiple stages)
embedded/nested	one methodology set in "creative tension" within another contrasting method of inquiry
holistic	interdependent methodologies working simultaneously with complex data
transformative	valuing the dialogue across different traditions; value-based and action-oriented.

LEARNING OBJECTIVES, AND SKILLS REQUIRED OF THE PRACTITIONER

A mixed methods course can be distinguished from a multiple methods course in that the former will directly address issues arising from the combination of methods in a single study, rather than simply cover a number of separate methods. Whether it is carried out with the objective of simply alerting students to the issues and possibilities inherent in mixed methods, or with the objective of developing proficiency in carrying out a mixed methods study will, of course, be the decision of the course committee. These different objectives, however, carry implications for very different course design and expectations of outcomes for the students, and have very different requirements with regard to the skills the students must bring with them to the course.

Assuming a goal of developing proficiency in carrying out a mixed methods study, students should have background knowledge of, and ideally experience in, gathering both text and numeric data, and in working analytically with both text and numeric data (ie. both statistical methods and interpretive analysis of unstructured data). While

it is necessary for those coming into mixed methods to have a background in both qualitative and quantitative approaches, it is important that they gain that background in a non-prejudicial way, ie. that they do not see each of these approaches as exclusive and opposed. Where knowledge of particular methods is lacking, the student should first complete courses in the areas with which they are not familiar. A mixed methods course of this type would be most appropriately pitched, therefore, to a senior graduate student audience, rather than to undergraduates.

Students who complete a practitioner-oriented mixed methods course should, by the end of that course:

- be familiar with key literature and debates in mixed methods, and with exemplars of a variety of mixed methods approaches to research;
- have sufficient understanding of the philosophical bases of research to determine if and how apparent paradigmatic differences in approach might influence their work and be resolved;
- be able to determine the appropriateness of a selected method or methods, based on the question(s) being asked (be question-driven in their choice of methods), and be able to determine whether mixing methods provides a cost-effective advantage over use of a single method;
- have knowledge of the variety, rules and implications of different sampling methods, and of alternative approaches to dealing with 'error' or deviance from the norm;
- have well developed skills in carrying out research using at least one major methodological approach, but also a comprehensive understanding of a range of approaches and methods (if they didn't already), particularly to understand the principles underlying those methods;
- have an ability to interpret data meaningfully, and to ask questions of the data, rather than to simply follow a formula;
- know and understand how software can be used to assist analysis tasks;
- be prepared to recognise and admit what is not known, and seek advice;
- learn to take risks, but also to justify choices made;
- develop new ways of thinking about the presentation of research results, especially where the methods used and information gained does not neatly fit a conventional format;
- develop skills in working collaboratively with researchers using different approaches or methods.

Those who use mixed methods need to be flexible, adaptable and prepared to innovate. There is rarely a prescribed approach to be taken when employing mixing methods, and the researcher has to not only determine what might be best in the situation, but also be able to cope when unexpected divergences and contradictions arise in their data. A high level of understanding of principles is required because methods are frequently modified and methodological assumptions may be challenged. It is important, therefore, to understand the implications of such modifications and challenges for interpretation of results.

COURSE DESIGN

As with all methods courses, the teacher is faced with issues of whether, in the time available, potentially invaluable practical experience can be obtained through working through a real exercise in designing, conducting, analysing and writing up a study. This problem is compounded where mixed methods are concerned because the use of multiple approaches, by definition, requires more time than a single approach. Thus, what can be achieved will depend on whether the course runs for one or two semesters, and the unit loading (hours/week) allocated. It is important, however, to place learning within an experiential context as much as possible, while still attending to the need for theoretical development and familiarity with the mixed methods literature. For such a complex topic, a full year program during which some practical experience could be incorporated would be very much preferable to a single semester.

The distinctive and, therefore, essential components that need to be covered by a mixed methods course are twofold, assuming background knowledge has already been acquired through general methods courses or courses based on a variety of specific methods or approaches. These distinctive elements are: 1) mixed methods study design, and 2) analysis and interpretation of mixed data sources. A third element, ideally, would cover methods of writing up results derived from mixed approaches to data analysis. Focusing on these two (or possibly three) elements assumes that data collection procedures and related issues (eg., questionnaire design, interviewing skills) should not need to be specifically addressed.

The methodological design component of the course would focus around how one or more studies might be framed and constructed, each to answer a specific question. These questions would probably be of an evaluative or exploratory type, and selected to be of relevance to the class group. Questions would be selected to elicit a variety of approaches to design. In this context the philosophical and methodological issues raised by mixing methods can be canvassed, ensuring lively debate in class sessions. Examples of reported studies would also be reviewed. Potential designs would be evaluated to determine their fit (or lack of) with current models for mixing methods (eg., as described by Creswell, 2003b; Maxwell & Loomis, 2003; Morse, 2003; Tashakkori & Teddlie, 1988; 2003), with choices of design, sample and data collection strategies needing to be justified in terms of the questions asked in the study and in light of available data sources. If possible (given time and ethical issues) some pilot data could be gathered as this will have ramifications for refining the design of the study and of the data collection sources and instruments.

As noted above, it is most unlikely that a full study could be carried out, so the analysis element of the course would need to be constructed using alternative (ie. existing) data sources, such as might be available in national data archives, supplemented by news reports, web based material, or novels, for example. From these materials a series of sample projects could be developed to ensure that students have experience with a range of both commonly used and less common analysis techniques, including:

- separately analysing numeric and text sources, comparing conclusions which might be drawn from those different sources, and figuring ways of resolving apparent conflicts – which may involve returning to the data, or possibly designing the collection of further data (Erzberger & Kelle, 2003; Jick, 1979);
- using the analysis of statistical (e.g. survey) data sources as the basis for designing a sampling strategy for unstructured interviews (Nickel, berger, Schmidt & Plies, 2001; West & Tulloch, 2001);
- using qualitative material to design appropriate questions for a quantitative survey;
- importing statistical data into a qualitative data base to use in combination with the textual data, for example, to make comparisons between people with different demographics, different responses to closed questions, or with different scores on a scaled item (Bazeley, 1999);
- exporting numeric coding information (binary and/or continuous) from a qualitative data base and merging it with existing demographic and other statistical data to use, for example, for building predictive models, or for dimensionalising a concept (Bazeley, 2002);
- merging statistical and qualitative coding information to generate new variables for use in further analyses (Kemp, 2001).

In order to carry out these kinds of analyses, students would need to already have some familiarity with procedures for the analysis of numeric data (ie. statistical techniques) and also with procedures for the analysis of unstructured, textual data (ie. using one or more of a variety of interpretive analysis techniques). While it is likely that they will have been introduced to statistical software of one kind or another already (though they may not be especially proficient in it), it is less likely that they will be familiar with a qualitative data analysis program such as N6 or NVivo (which are the programs most suited to this type of analysis). It is also quite likely that they will not have had prior experience in dealing with multi-response data (which is what is typically generated from qualitative coding) or the kinds of multivariate exploratory statistical techniques (such as cluster and correspondence analysis) which are often most appropriate for mixed methods analyses. Where these deficiencies exist, they will need to be specifically addressed in terms of principles of application, 'how to' mechanics, and interpretation of results.

A briefer version!

Where it is not possible (or not wished) to develop skills to the level suggested above, for example, where the time available for a course is more restricted or the students are at a less senior level, the coverage of the course might be reduced to cover just the most commonly occurring mixed methods situations. These are the conduct of interviews or focus groups in order to design appropriate questions for a quantitative study, and the inclusion of open-ended questions within a questionnaire in order to elaborate fixed choice responses. In the former situation, students should be encouraged to see their qualitative material as potentially theory generating (to be tested for generality through the quantitative approach) rather than simply a source of 'themes'. Students should also be encouraged not to 'throw away' the qualitative

material once they have developed their questions, but to see that it will have a continuing role in assisting interpretation of later data. In the latter situation, the student needs to learn, in the first instance, how to make a judgement about the level of analysis needed for the open ended texts, for example, whether the information they contain can simply be categorised and dealt with statistically, or whether they warrant detailed interpretive analysis requiring use of QDA (Qualitative Data Analysis) software. Then, if using QDA software, developing understanding of how to use the categorical data from the survey to provide a basis for comparisons of qualitative responses would be a minimum technical skill required of students.

Where does software fit into the picture?

Only in the last six years has software with the capacity to combine data types or to generate data of one form from another (most notably, statistical data out of qualitative coding) become readily available, making integration of approaches more feasible (Bazeley, 2003b). The field is still open for development, with few guidelines on what might be achieved, and thus methods instructors need flexibility and imagination, both for themselves and for their students, to be able to break through traditions, see new possibilities and then help to create the means of achieving those.

Researchers universally use software to assist in statistical analyses, and increasingly also use software to assist in interpretive analyses of text. In a component type of mixed methods study (i.e. for the first three of the analysis exercises outlined above), the researcher would use software separately for each component, as they usually do Students should be alerted, however, to the additional benefits which arise when different data types for the same respondents can be matched and then combined or compared, rather than keeping the comparisons at a more general (whole group) level only. With just the simple matching of separate data sources, for example, specific anomalies can be analysed, scale scores can be compared in relation to associated non-numeric data (enhancing validation of the scale), or statistical results elaborated with explanation or examples.

The employment of software for analysis becomes most significant with respect to integrated analysis methods which involve not just the addition of matched data of another format, but the conversion of data from one form to another, for example, of qualitative coding to a case based numeric format suitable for statistical analysis, or the generation of matrix data based on the co-occurrence of coding in a qualitative data set. The employment of software for analysis becomes most significant with respect to integrated analysis methods which involve not just the addition of matched data of another format, but the conversion of data from one form to another. For example, qualitative coding might be converted to a case based numeric format suitable for statistical analysis, or cross-tabulated data based on the co-occurrence of coding in a qualitative dataset might be generated (seen as a matrix). As well as an understanding of how software programs are used for their primary purposes, then, the mixed methods researcher needs to become proficient in generating non-traditional output from an analysis. They will also become proficient in transferring data in categorical or numeric form between programs, to be matched and added to an

existing database. These proficiencies require technical competencies in manipulating a variety of programs (often innovatively, often requiring considerable problem solving ability). A combination of a 'can do' attitude and practical experience is often needed to achieve the desired end.

Finally, a course in mixed methods research will provide some training in and experience of writing up results based on complex and varied data sources and analyses. It will do so, ideally, because writing up occurs concurrently with analysis and serves to prompt a more complete analysis. The student will learn that conventional forms of presentation are based on clearly structured experimental methods and are therefore not particularly appropriate to the 'messy' material generated in a mixed methods study. In mixed methods approaches (as is often the case with qualitative approaches more generally), published literature may become relevant at any stage through the process (not just at the beginning). Partial analysis may occur before a new data collection method is introduced. Results and interpretation cannot (and should not) be readily separated. The conclusions offered are arrived at through an inductive process where the evidence is derived from multiple data sources supported by reporting the 'audit trail' by which those conclusions were reached, based on those data sources. Students, therefore, will learn to 'tell the story' of moving from question to conclusions, structuring their presentation to include various components as and when they are relevant and most helpful to the reader.

WORKING ALONE OR WORKING COLLABORATIVELY?

Clearly, a comprehensive practitioner-oriented course in mixed methods is a 'big ask' of both the instructor and the students, and is not for the beginning researcher. Integration of methods, as described above, demands a knowledge base. It also demands intellectual, personal and experiential skills of the practitioner which are not often available in a single individual. It is common, therefore, for large scale mixed methods projects to involve a multi-disciplinary and multi-skilled team. Working in such a team relieves the individual researcher of having to have such broad knowledge. The team work however, requires a tolerance for and ability to work collaboratively with those who have different approaches – different perspectives and different methodological traditions. If the goal is to train students to work in such a team, then projects undertaken in class would logically draw on the specific skills of class members, and would be undertaken in mixed approach groups.

RESPONDING TO THE CHALLENGE

Teaching mixed methods offers a high level of challenge, but also a great opportunity for innovation and development. Techniques will change, and while background methodological knowledge and technical competencies each provide important bases, the key to unlocking the successful application of mixed methods is most likely to be found in attitudes taken, such that both teacher's and students' imaginations are set free to explore new approaches to investigating their research questions.

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comparative REVIEW

Reviewer: Helen Marshal, *Senior Lecturer, School of Social Science and Planning, RMIT University Melbourne.*

TITLE 1: QUALITATIVE DATA ANALYSIS: EXPLORATIONS WITH NVIVO

Graham R. Gibbs

Open University Press 2002

TITLE 2: THE NVIVO QUALITATIVE PROJECT BOOK

Pat Bazeley and Lyn Richards

Sage 2000

Here we have two 'how to' books about NVivo with apparently different audiences. Graham Gibbs says his book focuses on 'core' techniques in qualitative research, especially those that are well supported by NVivo. His intended audience is researchers with some background in social research, though not necessarily in qualitative techniques, who have a project in hand and are considering learning NVivo. Bazeley and Richards on the other hand say their book is not a text on qualitative research. It is a book for those who wish to learn NVivo hands-on rather than through a manual. They go on to say it would be used 'at some risk' by those who have no background knowledge of the varied approaches to qualitative data.

This difference in approach shapes the contents of each book. Gibbs starts with the question 'what is qualitative analysis' and decides that it is the interpretation of meaningful data both inductively and deductively (p. 14). He then describes entering documents, basic coding, and data preparation. The next three chapters focus very much on activities within NVivo (coding, memoing, use of attributes, searching text). Two chapters then pull back from NVivo, to look at developing an analytic scheme (using nodes), then three styles of analysis ('structured' analysis, grounded theory, narrative/life history). There is a return to NVivo with a discussion of matrices and models and finally some useful advice on writing up. There is a handy alphabetical list of step-by-step guides for people whose main concern is using NVivo.

Bazeley and Richards begin with installing NVivo, move on to basic coding and document handling, then to more detail on working with data. 'Shaping your project' deals with nodes while the next chapter looks at ways of getting to theory (centred around advanced use and ordering of nodes). Another chapter covers short cuts, and a long final chapter on 'getting there' looks at research goals, concepts and patterns and reporting. As we are increasingly coming to expect with books that promise instruction in the use of a program, there is an accompanying CD with a no-save copy of NVivo (version1.2, not the current version) and some illustrative data. Students can thus play with the data provided, or import their own data without being able to use the CD to 'do' their own project.

In spite of the expressed difference in aims, the books are similar in content and structure. Gibbs uses more general headings, and typically commences with reflections on methodological issues before moving into detail on using NVivo. Bazeley and Richards typically introduce their theme in one brisk paragraph before moving into detail on procedures, but do not completely ignore methodology. Instead, they sneakily insert around their do-it-yourself descriptions, short methodological reflections that will certainly make sense to students with a background in qualitative methods. These little snippets could provide helpful clues to exceptionally bright postgraduate students who do not have such a background, or could be used as a resource by methodology teachers.

Gibbs' preferred way of showing what to do is headings in bold, screenshots and a detailed list of steps. There are useful tables illustrating points made by other authors, and diagrams to illustrate the principles behind processes. Bazeley and Richards use symbols for D.I.Y exercises, outline the steps only in dot points and illustrate with fewer screens. There is the occasional cartoon.

So Gibbs has written a methods book with wordy instructions on NVivo, while Bazeley and Richards have written a short NVivo instructor with methodological tips. The two books differ rather in the ways that the older generation of computer manuals differs from some of the newer less technical computer books – one carefully describing the way to go, the other breezily suggesting possibilities.

Where might each book be used? I decided to explore the differences and similarities between the two books by looking in detail at how they walked me through two aspects of NVivo. Since I will be teaching undergraduates the basics of qualitative methods using Nvivo in 2004, and since having them practice coding will be a central activity, I first compared what each book had to say about coding.

The contents tables gave the following information:

Gibbs	Bazeley and Richards
Chapter 2: Getting started with NVivo	**Part 2: First Coding**
• Documents and nodes • New project • Backing up • Job Search project* • Document explorer • Document browser • The parts of the document • Browse the document, edit and change style • Document properties • Make a report on a document • Nodes • Node Explorer • Other ways of creating nodes • Node report • Searching • Refining coding at a node • Conclusion • Further reading	• Nodes out of data • Working “up” from your project journal • Working with retrievals • More Free Nodes • Viewing coding • Exploring nodes • Nodes in models • Saving your project • Taking Stock
Chapter 4: Coding	**Part 4: Working with data**
• Nodes and coding • Data driven or concept driven? • The node definition • What can nodes be about? • Thinking about the text • Selecting the text • Coding at already created nodes • Seeing what is coded at a node • Hierarchy of nodes • Functions of the node tree • Types of nodes in NVivo • Organizing tree nodes • Coding away from the computer • Refining the coding • Conclusion • Further reading	• Reflecting and recording ideas • Annotating the text • Memoing detail • Coding and what it does • Thinking about coding • Approaches to coding • Coding in NVivo • Coding at new nodes • Coding at existing nodes • Checking coding • Coding-on from a node • Coding a proxy document • Avoiding pitfalls in coding • Reflections on a document • Making a text report of your document • Reflecting in a model • Taking stock

This shows that although Gibbs is writing a text in a series on 'understanding social research' he spends a lot of time on the steps required to make NVivo do particular operations, and although Bazeley and Richards are writing a project book to help people teach themselves NVivo, they are also interested in helping people understand the steps in qualitative research. The differences I described at the start of the review are smaller than reading the introductions and outlines might suggest.

As a way of comparing the usefulness of each text, I tried to imagine myself to be one the students I'll be working with next year. I supposed myself to be a few weeks into the qualitative methods course, probably fairly sure about data gathering issues, like the difference between a focus group and an individual interview, but less certain about epistemology and analysis, so still easily intimidated by words like 'ethnography' and 'grounded theory' As one of Helen Marshall's students for 2004, I would be likely to have a small batch of personally collected data and be using NVivo for some part of the analysis.

(This imaginary student is a bit unusal, of course, because she's reading Gibbs and Bazeley and Richards rather than just one of them, and she's doing her reading ahead of the hands-on NVivo classes instead of alongside or after. I hope I get students like her in my tute next year!)

What would my imagined student find out about coding with NVivo from these texts? Gibbs begins with a brief description of what the term 'in vivo' means, and then goes straight into instructions. Aside from the problem (shared with Bazeley and Richards) that a student using NVivo 2, would be looking at a slightly different screen, I am sure that anyone who could open a project and introduce a document (both covered in detail in an earlier chapter) would be able to do some basic in vivo coding quite easily following Gibbs. This is in part because it is, as Gibbs says, in vivo coding is the simplest form of coding in NVivo. But the instructions are also systematic and clear.

If my student then forged on to the coding chapter she would find that Gibbs says some useful things about how qualitative coding is more than giving a name to a bit of data. I t includes naming a bit of data, but also connecting the bit of text to other data and to other concepts, and refining one's thoughts about the concept and data. Coding can be theory-derived, or built from the data, or both. The node (name box into which the bits of data go) reflects the data, but does not merely categorise them. Instead nodes are part of the process of theorising.

This kind of description would be useful to my imagined student and is easy to follow. Then Gibbs moves onto a detailed description of the properties of nodes in NVivo. For my imagined student, I can't actually see how it is useful to think about properties at this stage. The ensuing good description of what nodes can be about and the useful material on what to put into a node seem much more relevant and link nicely to material on using the coder. I can visualise my student happily playing with an online demo version, or using a demo CD and following Gibbs' instructions on how to see

what is coded at a node or viewing coding stripes. But the discussion of hierarchies of nodes or trees, which comes next, seems a bit too detailed for someone exploring a program. On the other hand, the discussion of what trees can do for research is useful. At this stage my imagined student might well decide to create some trees, and while I suppose the detail on types of nodes and manipulating trees will be necessary at some point, I suspect she wouldn't bother reading it before playing! The same applies to the material on refining and changing coding.

The conclusion to this chapter is that coding is an iterative process, that nodes should not be treated as static, and that coding requires some decisions to be made beforehand. For a novice researcher, the first point could have been stated up front and emphasised throughout the text. It would also be very useful if Gibbs had offered advice on how to avoid coding traps (like endless messing about with trees).
For example, the simple advice that one should never try to code for more than about an hour without stopping to think about what the coding means, reduces the exhaustion and bewilderment that a researcher on an email list has called the 'zombie in front of a confuser' syndrome.

If I were a student, I think I'd appreciate the general advice very much, and would use the detailed instructions over time, but would certainly skip the more detailed instructions until I needed them. I might in fact prefer the book to be in two parts with the general advice and short notes on NVivo separate from the detailed NVivo-manual style walk through.

This may simply mean that I'm one of the students who'd prefer the project book approach used by Bazeley and Richards. Like Gibbs, they offer two chapters on coding. 'First coding' includes instructions for In-Vivo codes. If my student used the disk accompanying the book, it would be easy to create a free node, and the window would exactly match the descriptions. If she used her own data and version 2, there would be slight differences, but again it would be easy to find out how basic coding is done.

If my student were a mature-ager, she might be aware of the older methods for coding using coloured pencils or folders full of chopped up transcripts. If not, she might find the introductory comments on coding a bit mystifying. . But if she is imaginative, and especially if she has a visual imagination, I think she would very much like the way in which the basic coding chapter includes help with using the modeller at the early stages.

If the student then went on to read 'coding and what it does', she would get some examples of the way coding can be done from theory down or can be a way to grow theory up from data, and reach instructions for coding. In contrast to Gibbs' often very detailed instructions, these are brief. So a student who does not feel confident about computers might feel a bit lost, but those who work on the principle of 'have a go and read the manual as a last resort' will probably be quite at home.

Despite their expressed intention of offering only an introduction to NVivo, Bazeley and Richards sneak in advice on qualitative analysis in general – for example the folksy instruction to 'think carefully about what the passage is saying .. why it may be important?' While only a very clever student without a formal background in methodology could really learn much about methodology in general, students like my imaginary undergraduate can still pick up some good general principles. But, as with Gibbs, a bit more very discussion of the practice of coding might be helpful.

(This is probably the place where I must declare an interest. Lyn Richards taught me most of what I know about qualitative research, and this has undoubtedly influenced my reading of both texts.)

For my second attempt to get a sense of how the books differ and may be useful, I abandoned the attempt to recapture lost innocence and turned to a practical problem of my own. I'm in the middle of my first sustained encounter with NVivo v2 (having previously used N4). I wanted to create an attribute table, could not make sense of the instructions in the brief manual. No of course I didn't go to the detailed help screens! I'm very much a 'have a go and if absolutely all else fails, then find someone who has read the manual' sort of user. Instead I followed faithfully the steps in each book to create an attribute table within NVivo. The two accounts were close to identical, and I had no difficulty with either, though I found an irritating stray capital letter in Bazeley and Richards' instructions. At this level, either book will work well.

What I really wanted to do, however, was create and import a table, and Gibbs gave no detail on this. Bazeley and Richards' appendix provided the clue missing from the short version of the manual. My first attempt failed because I managed to turn over two pages at once, and inadvertently set up the table I wanted to apply to documents as though it applied to nodes. Once that was fixed, all was well.

So, for a non-novice but still fairly muddleheaded user, both books contain clear instructions, but in at least one respect Bazeley and Richards offer a little more detail.

Which book will suit which kind of user? I would recommend Gibbs to students wanting help with methods as well with NVivo, but would not use it as a sole text on methods, because the detail on NVivo would get in the way. I would recommend Bazeley and Richards as a brief guide to NVivo for those who were already familiar with qualitative research, but would not use it as a sole text in teaching methods.

Students who are not confident about qualitative methods and computers, or who like to read manuals will probably find Gibbs reassuringly thorough. Those who are impatient and manual-shy will prefer the terser instruction given by Bazeley and Richards. If you are looking for a teach-yourself book, the choice is 'horses for courses' depending on your style. If you are teaching methods, your library certainly needs multiple copies of both books.

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upcoming conferences

2nd biennial working conference on 'Teaching Qualitative Analysis with QSR Software Tools'

The Wisconsin Center for Education Research will host the 2nd biennial working conference on 'Teaching Qualitative Analysis with QSR Software Tools' at the University of Wisconsin–Madison, 5–8 April 2005.

For more information on this conference, details of the last, and for teacher resources, visit the Teaching Qualitative Methods website at http://www.wcer.wisc.edu/tqm.

5th international conference in the series on 'Strategies in Qualitative Research with QSR Software'

The 5th international conference in the series on 'Strategies in Qualitative Research with QSR Software' will be held at the University of Durham, UK, 1–3 September 2004.

The Institute of Education at the University of London hosted the series 1999–2003, and details of past conferences and links to the next are at http://www.ioe.ac.uk/conferences/nvivo/.

The 2004 conference is hosted by Department of Sociology and Social Policy at Durham http://www.dur.ac.uk/Sociology/index_a.html. Pre-conference workshops (1 September) will offer introductions to the software, and post-conference working sessions (4–5 September) assistance for researchers with projects in process.

For updated details of these and other events, go to http://www.qsrinternational.com/.

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