



Analysing Textual Data

In: Digital Tools for Qualitative Research

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Pub. Date: 2015

Access Date: May 23, 2020

Publishing Company: SAGE Publications Ltd

City: London

Print ISBN: 9781446256077

Online ISBN: 9781473957671

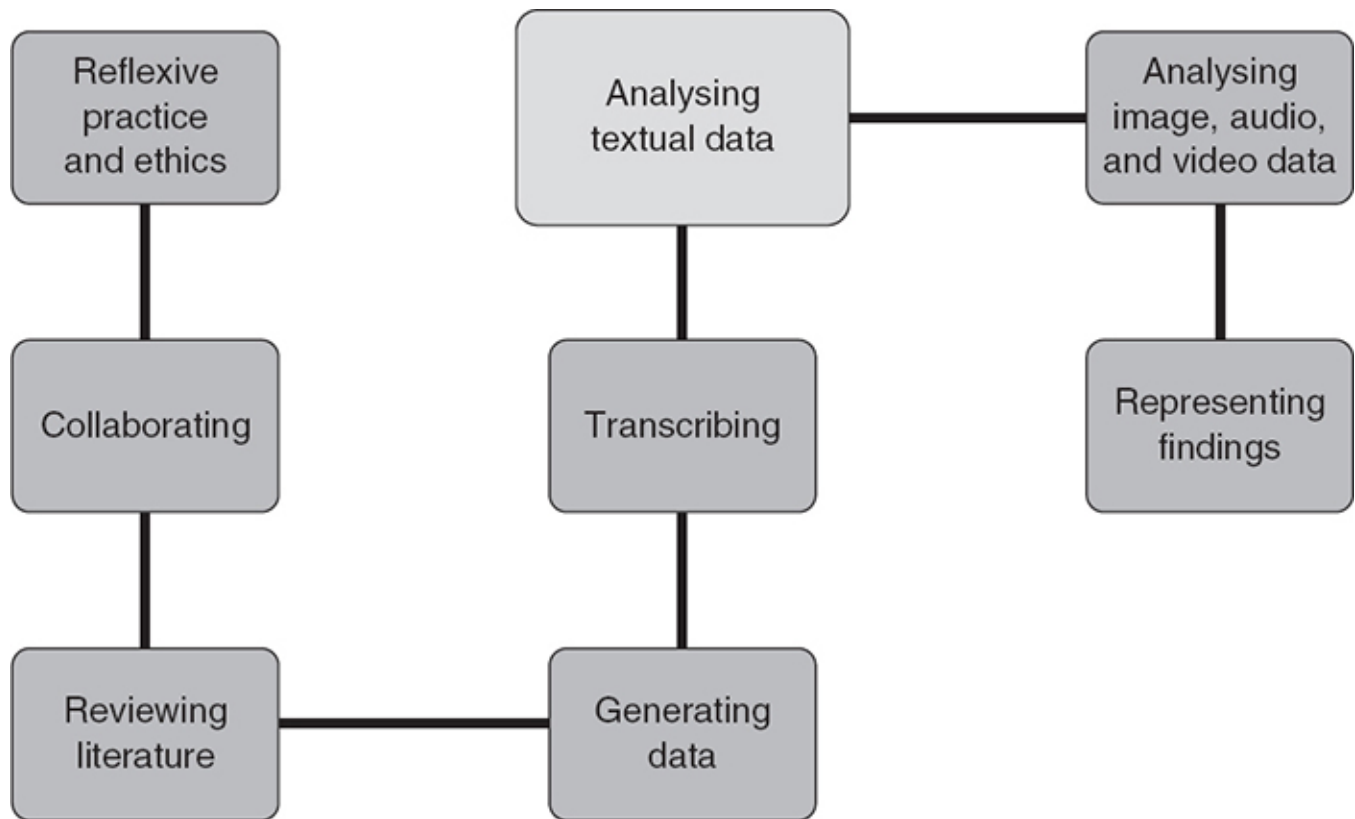
DOI: <https://dx.doi.org/10.4135/9781473957671>

Print pages: 114-140

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Analysing Textual Data



Learning Objectives

- Describe the variety of approaches to data analysis.
- Select and critique appropriate features of the major data analysis software packages for how they support the analysis process.
- Name various criteria with which one could evaluate and choose a software package.
- Have strategies to ensure ethical practices when analysing textual data.

Introduction

In [Chapter 6](#), we discussed transcribing audio and/or video recordings. In this chapter, we turn to how digital tools, in particular features of computer-assisted data analysis software (CAQDAS), can be used to analyse textual data. In [Chapter 8](#), we will deal specifically with issues related to the analysis of audio and video data, including the use of Transana, a software package developed specifically for video analysis.

Approaches to Data Analysis

There are many different approaches to data analysis. Tesch (1990), one of the earliest scholars to discuss data analysis software, identified 26 approaches to qualitative research and illustrated how they could be supported by software programs. Saldana (2013) discussed 25 first-cycle coding methods and six second-cycle coding methods for qualitative analysis. Ideally, data analysis *methods* are to be grounded in particular *methodologies*, such as the five introduced by Creswell (2013): narrative, phenomenology, grounded theory, ethnography and case study. Other qualitative research methodologies include, but are not limited to, life history or biographical research, discourse analysis, conversation analysis and ethnomethodology, action research, critical/feminist approaches, action research and visual or semiotic methodologies. Because the choice of research methodology and specific data analysis methods are beyond the scope of this book, we refer you to Saldana (2013), Grbich (2013), Gibson and Brown (2009) and Gibbs (2007) for helpful overviews of qualitative data analysis methods.

Visit Web Resource 7.1 for a review of different qualitative methodologies.

The use of computers to help analyse data has been a complex journey. In the 1980s, qualitative researchers developed software to assist them with their data analysis (with Ethnograph and NUD*IST being two of the earliest packages). As desktop computing became more prevalent and powerful, so too did the use of these packages – see Davidson and Di Gregorio (2011), Fielding (2008) and Hesse-Biber and Crofts (2008) for more comprehensive discussions of the history of software use for qualitative research.

The CAQDAS Networking Project in the UK, funded from 1994 to 2011 by the Economic and Social Research Council (ESRC), has served as a sort of meeting place for discussions around the use of qualitative data analysis software and remains a useful source of information.

Visit Web Resource 7.2 to explore the University of Surrey's CAQDAS networking project.

Even though CAQDAS packages were initially developed by qualitative researchers and were updated regularly based on user feedback (only later becoming commercial products), there has historically been scepticism and resistance towards the use of computers for data analysis (Davidson and Di Gregorio, 2011). Given the variety of approaches to analysis it is not particularly surprising that the idea of using computers to support analysis would generate debate. Over the years there has been a persistent, but mistaken, perception that CAQDAS most easily, or only, supports one methodology, namely grounded theory (Lonikila, 1995), and one analytic method, namely coding – see Coffey, Holbrook and Atkinson (1996) and the response by Lee and Fielding (1996). This is in part because grounded theory as a methodology was popularized at around the same time as the initial CAQDAS packages were (Davidson and Di Gregorio, 2011).

Visit Web Resource 7.3 to read more about the debates around the use of software for qualitative research.

We agree with the view of Lewins and Silver (2007) that far from *imposing* a particular analytic structure or approach to the data, CAQDAS tools *afford* a variety of functions and features which can be intentionally used (or ignored) by the researcher based on their analytic needs. Whether software is used or not, the researcher remains in charge of decisions around how to handle, analyse and interpret the data. In recent years, researchers have begun to publish more thorough descriptions of how they are using software to support their analysis. These studies have been mainly descriptive or comparative, with sometimes contradictory outcomes. For example, Goble et al. (2012) concluded, after exploring NVivo 8, that CAQDAS in general was not appropriate for phenomenological work, because they believed that coding was the primary analytic feature that the software offered. Nonetheless, numerous phenomenological studies have been published in which data analysis software was used (e.g. Mitchell, Silver and Ross, 2012; Mitchell and Kuczynski, 2010). In [Vignette 7.1](#), Monique Mitchell discusses her use of MAXQDA for phenomenological research.

Vignette 7.1 MAXQDA for Phenomenological Research

Monique B. Mitchell, the Center for Child and Family Studies, University of South Carolina

As a researcher examining the lived experience of various phenomena, I have found MAXQDA to be an invaluable qualitative research tool that has assisted me in exploring youths' lived experiences of transitions within the foster care system.

In addition to its highly intuitive colour-coded categorical system, MAXQDA provides an opportunity for users to view the document system, the code system, the document browser and retrieved segments windows simultaneously. This is particularly helpful when identifying, establishing and positioning parent and child codes within and between documents.

The 'edit' function is another useful feature of MAXQDA. While activated, this feature allows the user to edit the original document as a means to ensure the accuracy of all the data in the system. Users are not able to code while the 'editing' function is active to prevent accidental modification or deletion of the original document during the coding process. Fortunately, the editing function is deactivated in the default mode, prioritizing the coding and categorizing process in data analysis.

One my favourite features of MAXQDA is the logbook. This wonderful feature allows the user to document each step and key turning points during the analytic process. Thoughts associated with the study's design, concepts and categories emerging from the data,

relevant background literature, and/or initial presuppositions can be exhaustively reflected upon in the logbook. The logbook is also a valuable tool for documenting an audit trail that can capture the daily events and decisions related to the research process.

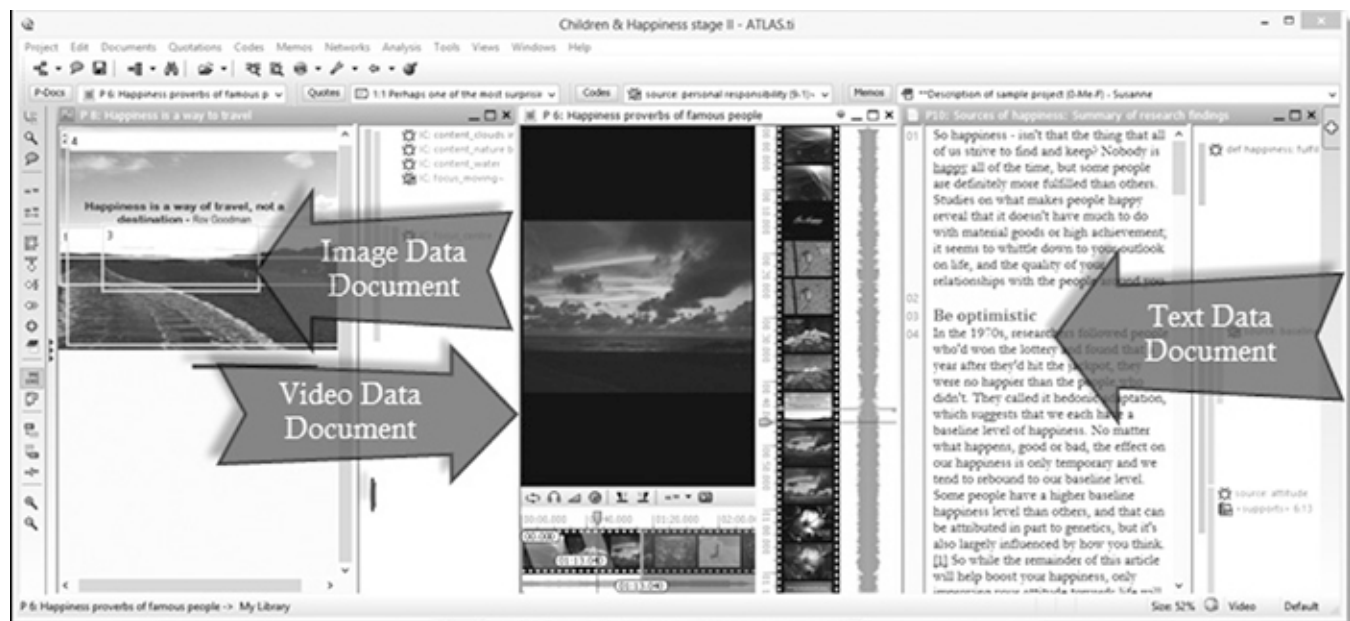
We tend to agree with Schoenfelder's (2011) observation that perceived limitations of CAQDAS packages are 'based on the individual analytic approach rather than on principal methodological incompatibilities' (Section 1). Most users are not fully aware of the capabilities of the software and may therefore be disappointed with their experience.

Digital Tools That Support Qualitative Data Analysis

While some have advocated the use of non-specialized tools for analysis (Hahn, 2008), such as word processors (LaPelle, 2004) and spreadsheets (Meyer and Avery, 2009), mastering one of the major commercial software packages may be well worth your time. These packages are updated regularly, provide user support and are likely to be used by your collaborators. The initial investment of time and effort required to learn the tools will pay off handsomely over the course of your research career.

Weitzman and Miles (1995), and later Weitzman (2000), categorized software packages according to their functionality as text retrievers (able to retrieve all examples of particular word(s) across the data), text base managers (able to store and organize data sets), code and retrieve programs (able to apply codes to data and retrieve and display coded text), code-based theory builders (able to represent or create links and relationships between codes, create categories and write memos to annotate data) and conceptual network builders (able to create and analyse graphic representations of relationships between concepts). However, over the years the boundaries between these categories have blurred, with the major packages now supporting all of these functions.

ATLAS.ti 7, MAXQDA 11 and NVivo 10 are three popular qualitative data analysis software packages. ATLAS.ti was developed as a research project at the Technical University of Berlin in 1989, with the first commercial version released in 1993. Version 7 was released in 2012, with a mobile application released in 2013. The Apple version is scheduled for release in 2014. ATLAS.ti supports analysis of not only text but also images, audio and video data, allowing you to either directly code the media files and/or transcribe the files. You can also synchronize your transcript with the media file (the benefits of which were described in [Chapter 6](#)). ATLAS.ti can link to Google Earth coordinates for geodata analysis. It also supports importing survey data for mixed methods studies and provides bundling and merging features for teams to share analysis, although not in real time. [Figure 7.1](#) shows a new feature in ATLAS.ti 7 – multiple data document windows. You can see, from left to right, an image data document, video data document and text document all open simultaneously in their own workspace for analysis.

Figure 7.1 Multiple documents open in ATLAS.ti 7 (screenshot adapted courtesy of Susanne Frieze)

Visit **Web Resource 7.4** for a link to the companion website for *Qualitative Data Analysis with ATLAS.ti* by Frieze (2012), which includes sample data and analysis activities.

MAXQDA released Version 11 in late 2012, with the Apple version scheduled for release in 2013. The first version was released in 1989 by creator Udo Kuckartz. The company, based in Berlin, offers a free MAXReader program with limited functionality that allows you to view and handle the data (but not code it). This can be useful for sharing analysed data with non-MAXQDA users. MAXQDA offers a free mobile device application, MAXApp, which supports data collecting, tagging and some coding. It is also the only one of the three to offer an 'emoticode' feature, as illustrated in [Figure 7.2](#). Instead of choosing words, symbols can be selected to describe the data.

Figure 7.2 MAXQDA emoticones



Like ATLAS.ti, MAXQDA supports direct audio and video file coding, transcription and media file synchronization, Google Earth integration and importing of survey data. MAXQDA is able to import bibliographic data from citation management software (such as Zotero) to support writing literature reviews from within the software.

Visit Web Resource 7.5 for a link to the companion website for *Basics of Qualitative Research* by Corbin and Strauss (2008), which includes a set of exercises to be conducted in conjunction with MAXQDA.

QSR International, the Melbourne-based company that distributes NVivo, was established in 1995. The earlier version of the software, NUD*IST, developed by Tom and Lyn Richards, was released in 1981. NVivo 10 was released in 2012, with the first version for Apple operating systems scheduled for release in 2013. Like the other two packages, NVivo supports multimedia file coding, transcribing and media file synchronization, Google Earth integration and importing of survey data. Like MAXQDA, NVivo will import bibliographic data from citation management software, such as Zotero, to support literature reviews. Unlike the other two packages (but similar to Transana), the NVivo for Teams server version allows collaboration in real time. The

OneNote add-in imports content from Microsoft OneNote.

A unique feature of NVivo is its NCapture add-on – a web browser extension specifically designed to capture web and social media data, as described by Marcus Ogden, a product manager for QSR International, in [Vignette 7.2](#).

Vignette 7.2 Analysing Web Data with NVivo's NCapture Tool

Marcus Ogden, Product Manager, QSR International

The wealth of qualitative information available on the web has become an increasing focus in recent years for researchers and for QSR International, the developers of NVivo. As well as research papers and journal articles (in PDF format) and web pages (such as blogs), social media sites such as Twitter and Facebook have become important to qualitative researchers as sources of data for analysis. For example, social media data can be analysed to examine how online communities interact (see [Chapter 5](#)), how public opinion changes during election campaigns or how people respond to public events or crises such as the 2011 UK riots.

Social media data often contains tags identifying topics or individuals, and structures representing the flow of information between people (replies, retweets). QSR's NCapture tool for NVivo 10 allows researchers to capture online content directly from their web browser, for import into NVivo. All web pages can be imported as PDFs, but, additionally, data of interest from Twitter, Facebook and LinkedIn can be imported as structured data sets. These data sets can then be 'autocoded' to create NVivo node structures representing (for example) tags, users or conversations. Videos from YouTube can also be imported for analysis, along with their comments.

To help researchers understand what's going on in their social media data, NVivo offers a range of visualization features. For example, researchers can view charts for their Twitter data, showing how the incidence of particular hashtags – or of particular nodes arising from the researcher's own coding – vary with time. Or researchers can view cluster analysis diagrams for their Facebook data, showing which people are talking about similar topics. These visualizations can help researchers come up with new questions about the data for further investigation, and from the visualizations researchers can easily access the underlying qualitative data to help them investigate these questions.

Visit Web Resource 7.6 for a link to Bazeley and Jackson (2013) *Qualitative Data Analysis with NVivo*.

As you can see from these brief overviews, the three packages offer similar features with some unique differences. As competitors, new versions of one software package can often be found to have incorporated features of the other two packages; so it will be important for you to explore the most recent version of the software (or the version you have access to). Lewins and Silver (2007) have provided a comprehensive and comparative overview of these three packages, as well as descriptions of four additional packages (HyperRESEARCH 2.6, QDA Miner 2.0, Qualrus and Transana 2).

Visit Web Resource 7.7 for a more comprehensive list of data analysis software tools.

In [Reflexive Practice 7.1](#), you will begin the process of exploring one of the CAQDAS packages. Your access to a software program, available training and support, and personal preferences around interface design are likely to be the factors that impact which package you ultimately choose.

Visit Web Resource 7.8 to read a vignette by Dr. Jonathan Pettigrew reflecting on the use of both NVivo and MAXQDA in his qualitative work.

Reflexive Practice 7.1

Which of these three packages, if any, are you familiar with? Have you already selected a package to use in your work? If so, what factored into that decision? If not, take some time to explore each product website, watching the introductory video tutorials and even downloading the trial versions of the software to see how well they run with your system. Make an entry in your reflexivity journal about your decision-making process and select one of the packages in which to try out the features that will be explored in this chapter. You should also by now have some text and audio/visual data that you collected in [Chapter 5](#) and transcribed in [Chapter 6](#). Use this data as you learn one of the data analysis software packages in this chapter.

Organizational Features

One of the most obvious benefits of using software is that it can serve as the ‘textual laboratory’ (Konopasek, 2008) for all of your data and the documents related to your study (e.g. literature review sources, institutional review board/ethics committee forms and analytic notes). Di Gregorio and Davidson (2008) provide a fuller description of how to begin building your entire project within a software package, including detailed examples from all three major packages. Being able to read, annotate, code, visualize and interpret in one space, within reach of your theoretical literature, research proposals and ethics guides, drastically improves your ability to systematically document all the decisions that you make throughout the research process and allows others to view those processes. In this way your thinking is made visible in ways that it could not have been prior to

the use of software (Konopasek, 2008). Consider now [Reflexive Practice 7.2](#).

Reflexive Practice 7.2

CAQDAS tools make it easier to share your analysis process in an ongoing manner. However, there are certainly ethical dilemmas inherent in sharing unfolding interpretations with others. What are some of the ethical concerns and challenges with using CAQDAS tools in this manner?

As your data and documentation increases, letting computers do what they do best can free up your time to focus on the interpretations and analysis, rather than the management of your data. See [Vignette 7.3](#) for a description of how Carlos Galan-Diaz and his colleagues used NVivo for a large data set.

Vignette 7.3 Using Nvivo for Handling Large Data Sets

Carlos Galan-Diaz, Anna Conniff and Tony Craig, the James Hutton Institute, Aberdeen, Scotland

As part of an ESRC funded project [RES-000-22-1397] (Conniff et al., 2010), we collected the verbal commentary of 81 participants while they either watched a seven-minute walkthrough of a virtual environment model (passive condition) or navigated themselves through the same virtual environment (active condition). After viewing two different versions of the same virtual environment, participants were asked to choose which one they preferred, with a particular onus on describing how the environment looked and felt using a 'think aloud' protocol. One of the main research questions was whether the navigation mode (active versus passive) would cause a qualitative difference in people's perceptions of the virtual environment.

Given the volume of material generated, the use of NVivo was necessary to analyse the data. As each of the two versions of the virtual environment model had three distinct areas where participants had to focus, we used NVivo (Version 9) in two ways. First, all transcripts were autocoded according to the distinct moments at which participants talked about the different areas, thus creating a self-organizing structure at import. Second, word frequency queries were run against each of the desired output areas so as to identify (and corroborate) that participants were indeed describing the physicalities of the virtual world (i.e. that what they were reporting was commensurate with what they were doing). This

was paramount as each of the three main areas had overall outputs in excess of 10,000 words. Once the data was structured, the actual qualitative analysis started.

Our research study would have been much more laborious to structure had we only used word processors, spreadsheets or pen and paper. With NVivo, we were able to store, archive and manage a large amount of text data. Searching and coding for particular sections of interest in the transcripts across 81 participants allowed for easy identification of emerging data trends, as well as testing for a priori research questions.

All three programs support organizing the data by 'known characteristics' (Lewins and Silver, 2007), that is, attributes of the data that are important to the study (e.g. demographic data). NVivo may have the best functionality in this area through its 'cases' for organizing the data, in combination with the attributes and queries features for searching. ATLAS.ti offers 'families' as an organizing tool, with query and explorer tools for searching. MAXQDA uses 'document variables' and 'sets' to group data, and the matrix coding query and code relations browsers for searching. These search tools are explored later in the chapter.

ATLAS.ti allows you to segment the data prior to coding by creating 'quotations' which can be manipulated separately from codes. This provides greater flexibility than the other two packages for creating a priori units of analysis as well as for the micro-analysis of data. Turn now to [Reflexive Practice 7.3](#).

Reflexive Practice 7.3

Import some data into the trial software package you have chosen. If necessary, read or view the online tutorial information about setting up a project. Try importing several types of data (.doc, PDF, etc.), and organize the data by any known characteristics that may be important for your analysis. Reflect on your experience in your reflexivity journal. What concerns do you have and what are you looking forward to as you explore the software package?

Analysis Features

We next describe in more detail a few of what Lewins and Silver (2007) called the 'main tasks of analysis', and illustrate how the packages support them. While not every approach to data analysis incorporates all of these tasks, and no two researchers are likely to perform these tasks in exactly same way, we consider these to be common analytic tasks. These tasks include annotating, linking, searching, coding, querying and visualizing.

Visit Web Resource 7.9 for tutorials and resources for exploring the relationship between analysis

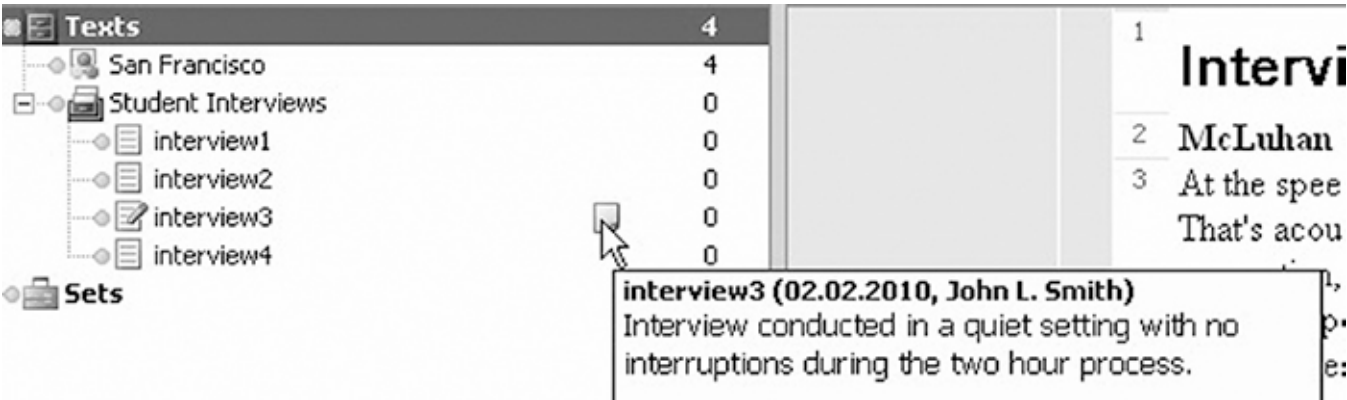
and software use.

Annotating

‘Before computers, many researchers did not code segments of text’, but rather ‘felt through, explored, read and re-read ... compared and systematically built upon data records, keeping growing memo records about the accruing evidence and their exploration of its narrative’ (Richards and Richards, 1998, p. 214). Reading through the data repeatedly, while noting its interesting aspects, is a common first step across data analysis approaches. While researchers used to do this with a highlighter and/or writing in the margins of printed documents, software tools now connect your annotations directly to the data.

In NVivo, an annotation can be displayed as a footnote within a document, with the relevant text highlighted. ATLAS.ti allows you to attach explanatory ‘comments’ to any segment of your data, to codes or to entire data documents. This can be useful but can also make it difficult to remember where you may have written a particular annotation. In both MAXQDA and ATLAS.ti, hovering the mouse over the comments allows you to see what is written. [Figure 7.3](#) shows how the memo tool in MAXQDA is being used to more fully describe Student Interview #3.

Figure 7.3 Memo tool in MAXQDA



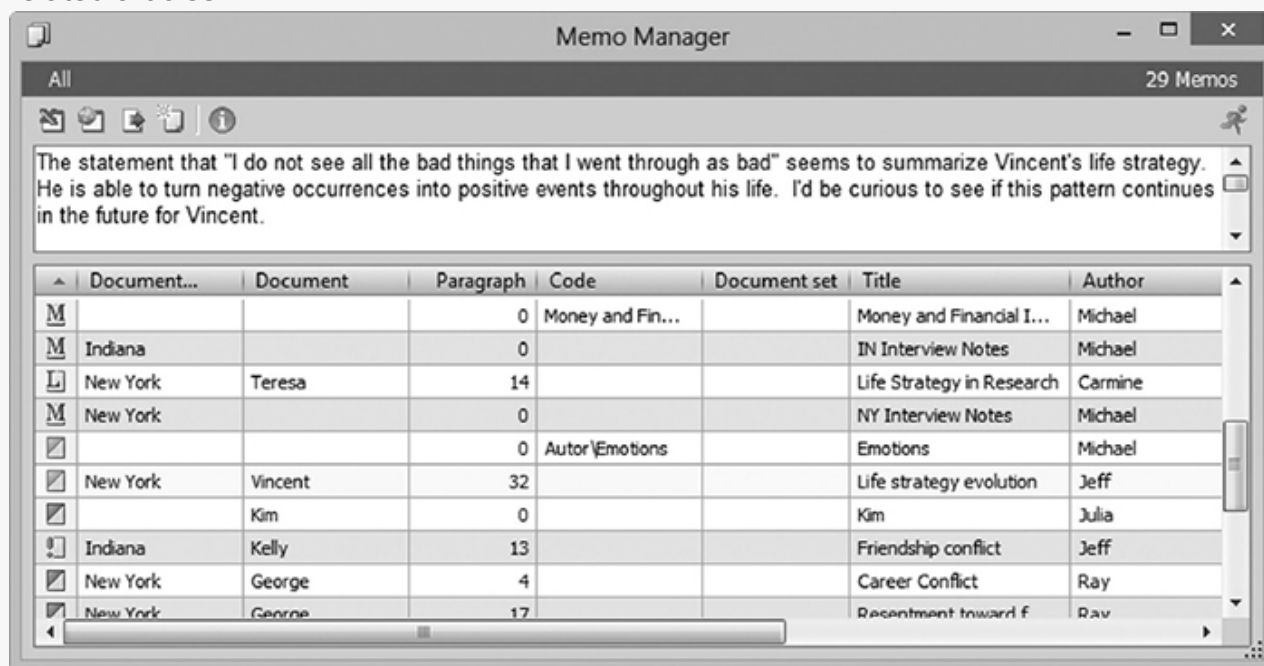
Memos are a type of annotation tool that serve a more analytical function and are often more complex in structure and length than comments. In NVivo, each document and code can only have one memo linked to it, and memos can only be linked to one other item. Individual parts of a memo can be multiply linked to other project items. In contrast, MAXQDA and ATLAS.ti have more flexible memo functions, with the ability to link to multiple documents. In [Vignette 7.4](#), Julia Schehl, Senior Manager at MAXQDS, describes the use of its memo tool.

Vignette 7.4 Using the Memo Feature in MAXQDA

By Julia Schehl, Senior Manager, MAXQDA (VERBI Software)

In MAXQDA, the user can create 'Post-it'-like notes of insights and attach them immediately to segments of the data, codes or entire data documents. These notes are called memos. Memoing is extremely helpful for immediately recording your ideas, as well as communicating with team members. Memos can be tagged with different icon types, so that without having to open and read a memo the user immediately knows if it contains, for example, an open question, the beginning of a theory or a case summary.

In the figure below, memos were used to keep track of early thoughts and theories that came up during the beginning of the analysis which still needed to be proven by further information. Here, the researcher identified what might be the life strategy of the interviewee, but by using a symbol he notes that this is not yet a final conclusion. The memo tagged with 'L' is a literature memo and contains some important quotes from related articles.



Code memos can be used to document code definitions like 'use this code if interviewee describes health issues that affect his or her day-to-day routine'. They may also contain actual quotes which can help clarify the coding category. In this way the memos can enhance the reliability of the coding process.

Thanks to the Memo Manager, all of these thoughts and questions are stored in a sortable table, which makes it possible to quickly call up memos with a specific icon or title at any time. Clicking on a memo in the Memo Manager opens up the original document, image

or media file to which the memo is attached.

MAXQDA also allows free memos, which are not attached to a specific element (document, code or segment) but rather to the whole project. They can be used to store information or instructions for the whole team, such as interview guidelines.

Beyond annotating the data, there is a good bit of writing involved in qualitative research, including keeping a research journal (see [Chapter 2](#)), documenting decisions made around coding, making connections with the theoretical literature and writing up your interpretations after coding (see [Chapter 9](#)). All of this can be done using the memo tools in ATLAS.ti, MAXQDA or NVivo, with each memo incorporating a computer-generated date stamp. Eventually, you can export the memos into a word processing program as you finalize your reports. Turn now to [Reflexive Practice 7.4](#).

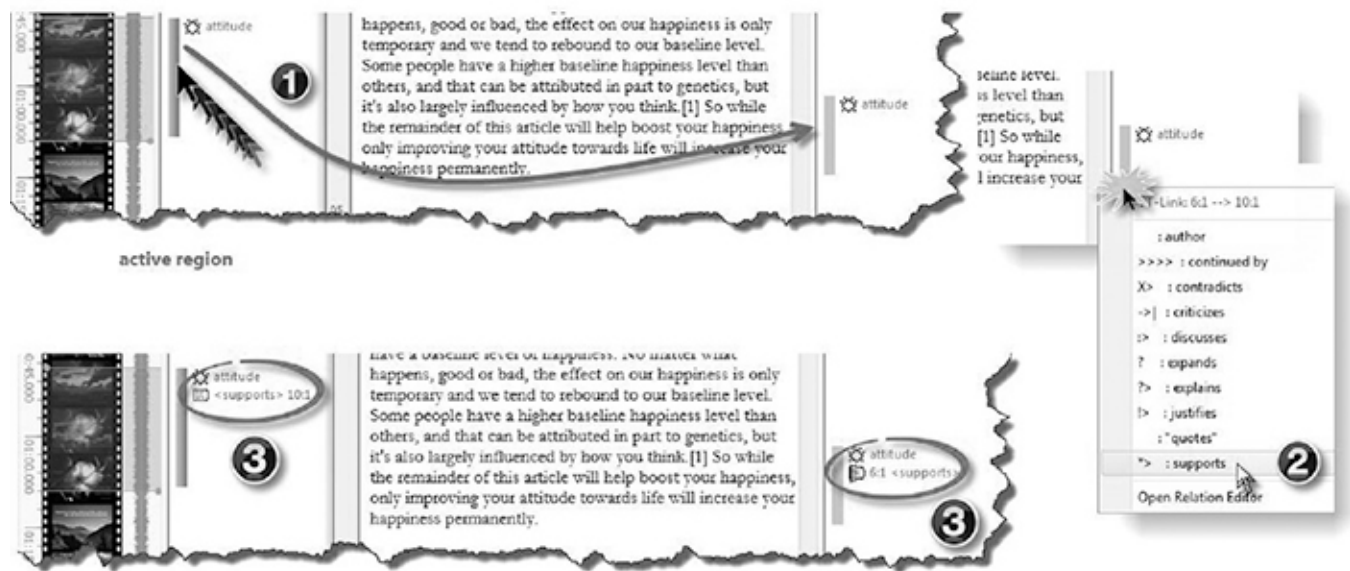
Reflexive Practice 7.4

Create a memo that describes your research questions and the focus of your study. If necessary, read or view the online tutorial information about creating a memo in the software program you are using.

Then, read through your data and capture your initial thoughts using the comment, memo and other annotation tools available in the package you are using. Reflect in your journal on what this experience was like.

Linking

As part of your initial data exploration, and throughout the analysis process, it may be useful to make note of relationships you are seeing between your data sources, the ideas you have captured in memos, the theoretical literature and/or the codes you create. Prior to the advent of the computer, qualitative researchers could be found cutting their data into strips of paper or creating handwritten indexing systems to reflect relationships they were noting in the data. Now this can be done with linking tools in the software packages. For example, [Figure 7.4](#) is a screenshot of the hyperlink tool from ATLAS.ti 7 in which two quotations that support each other are linked to reflect this relationship. Here we see a relationship link between a segment of a video clip coded as 'attitude' (#1) and a section of a newspaper article coded in the same way. The researcher used a hyperlink to show the 'supports' relationship (#2) in the data. This hyperlink then showed up in the margin (#3) of both primary documents (the video and the newspaper).

Figure 7.4 Hyperlink tool in ATLAS.ti

(from http://www.atlasti.com/uploads/media/WhatsNew_a7.pdf, last accessed 18 July 2013)

The linking features of the software packages allow you to represent processes (e.g. storylines, sequences of events, causes and effects, steps in a procedure) and make connections between various aspects of the data or your study as a whole. These can be particularly important in research traditions such as narrative analysis, conversation analysis and discourse analysis.

Each package supports creating links in different ways. ATLAS.ti has a very flexible linking tool that allows multiple links to be established and quickly navigated, especially with the use of the multiple document windows, whereas MAXQDA allows only pairs of linked segments. Navigation between linked segments in NVivo is a bit more cumbersome than in the other two programs, requiring multiple mouse clicks. Turn now to [Reflexive Practice 7.5](#).

Reflexive Practice 7.5

Within your sample project, practise creating links within or between your data sources. If necessary, read or view the online tutorial information about creating links between data. Then reflect on this experience in your journal.

Searching

Search tools can be used to find particular words or phrases (much like the 'find' tool in Microsoft Word), as well as provide word frequency counts. Searching can be a useful starting point for thinking about coding. For example, doing a word frequency search can easily show the most commonly occurring phrases across

transcripts, but on closer examination you may see that it was the interviewer bringing up a particular phrase repeatedly in interviews rather than the interviewee. We would counsel researchers against putting too much stock in the numbers on their own, but they can serve as a useful starting point for further analysis; see, for example, Dempster, Woods and Wright (2013).

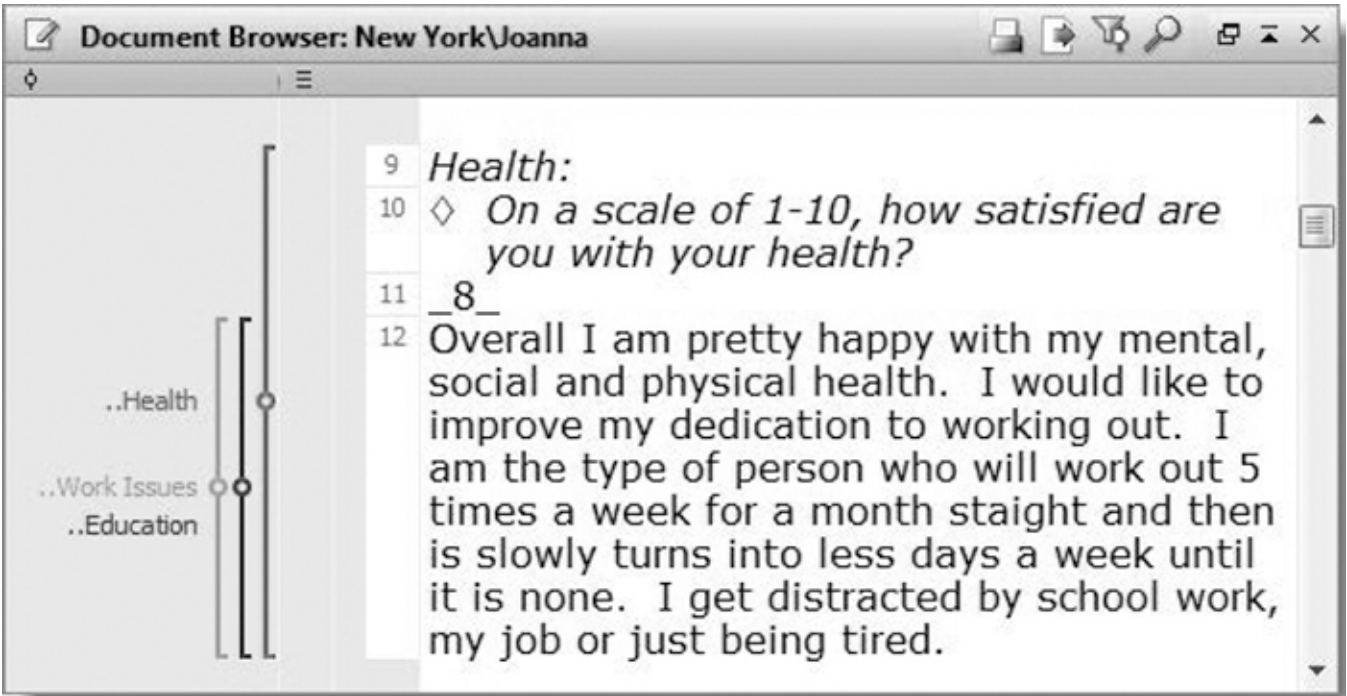
Coding

For many, but not all, researchers who work with textual data, coding is at the heart of the analytic process. Coding refers to the process of attaching a meaningful label to a specific portion of the data. In more deductive approaches to analysis, coding may come quite early in the process, with some or all codes established in advance. For more inductive approaches, codes may emerge only after initial exploration has been done through memos and linking. Codes can be created at any point during the process – prior to or during analysis – again depending on your methodological approach.

Prior to the use of software, coding was done by hand, for example through writing in the margins, colour-coding with highlighters and/or using index cards. The ‘hands-on’ nature of this very laborious process gave some researchers the sense of being ‘immersed in’ or ‘close to’ their data. There may still be value in engaging in the tactile experience of sorting the data by hand, both conceptually and as a learning experience. At the same time, it is very easy to get lost in piles of data and lists of codes with no way to ‘see’ patterns emerging across the data in a systematic way. In contrast, software packages can easily support your ability to 1) create and assign codes to data; 2) retrieve all data which has been assigned a particular code; 3) review the coded data in its original context; and 4) make decisions about renaming codes, deleting codes, recoding data, merging codes, creating hierarchies and groups of codes, and so on.

The mechanics of assigning codes to your data involves highlighting a portion of your data and clicking to attach a code. All of the software packages allow you to ‘see’ how the data has been coded through a margin view, often incorporating colour coding, as well as quick retrieval of all data segments that have been coded in a certain way. In [Figure 7.5](#) you can see how the coded data appears in MAXQDA with coding stripes in the left-hand margin. Three codes (health, work issues and education) have been attached to this section of the data.

Figure 7.5 Coded data with margin view in MAXQDA



(from MAXQDA 11 manual)

One of the main differences between the software packages in regards to coding has to do with the presence or absence of a hierarchical structure for the codes. ATLAS.ti is unable to provide code hierarchies by default in the way that MAXQDA and NVivo do. [Figure 7.6](#) illustrates how coding hierarchies appear in NVivo.

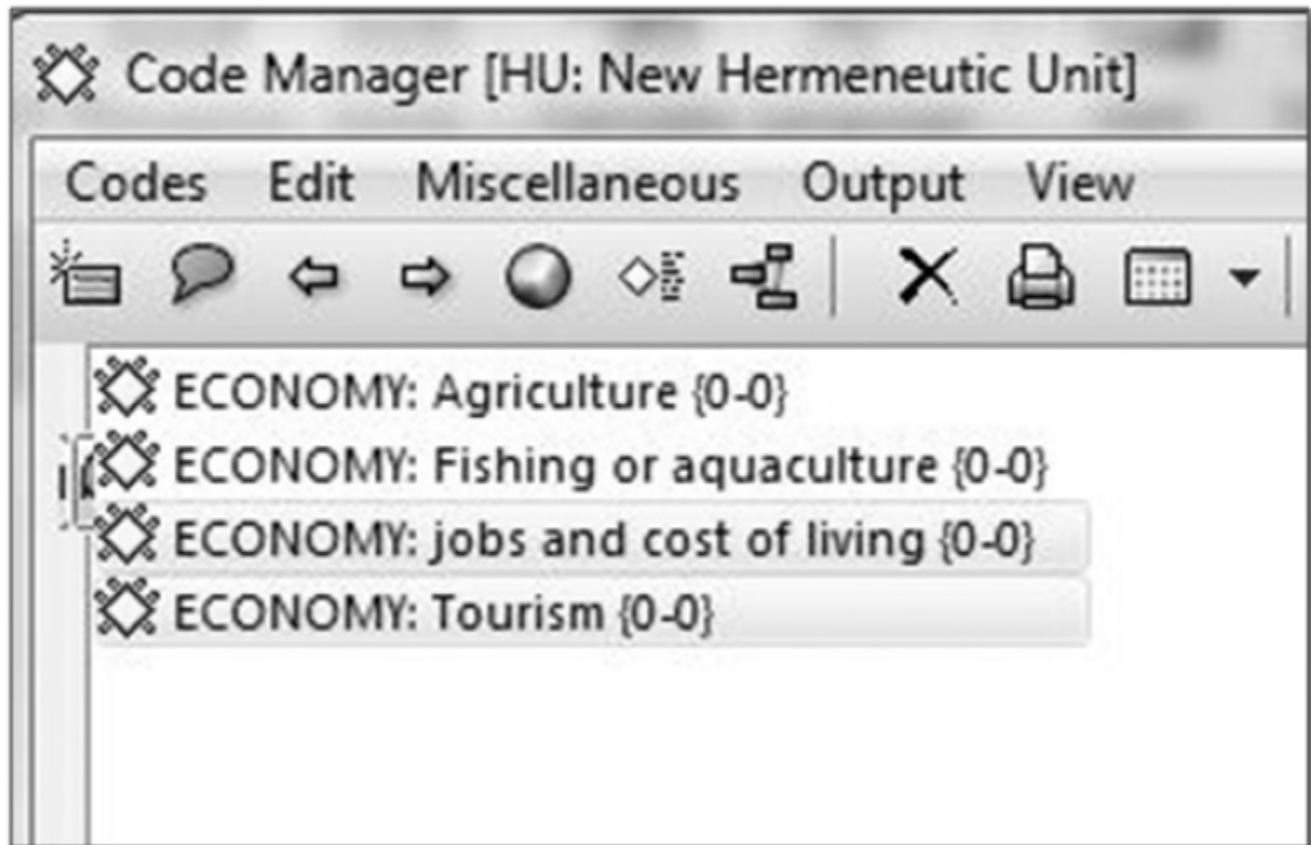
Figure 7.6 Nodes in NVivo

Nodes			
	Name	Sources	References
[-]	Economy	24	277
	Agriculture	8	20
[+]	Fishing or aquaculture	18	168
	Jobs and cost of living	15	76
	Tourism	7	12

We see a coding ‘node’ (‘Economy’) with several subcodes (agriculture, fishing or aquaculture, jobs and cost of living, tourism). The ‘sources’ column indicates how many of the data sources contain the code (e.g. 18 sources have the code ‘fishing or aquaculture’). The references column indicates how many times the code appeared in the data (e.g. ‘fishing or aquaculture’ has been applied across the data 168 times).

In contrast, ATLAS.ti hierarchies must be created by the researcher through code labelling devices, such as adding prefixes. The researcher would start with a flat coding structure first (e.g. 'agriculture', 'fishing or aquaculture', etc.), after which they would group the codes into the larger category of 'economy' (see [Figure 7.7](#)). The numbers after the code ({0,0}) will increase as codes are applied to the data to show their frequency of use. While this coding hierarchy can be created at the start of the study, its default 'flat' coding structure affords a more inductive approach to coding. The extra step needed to create hierarchical coding, or to change it later, can be frustrating for some.

Figure 7.7 Prefix hierarchies added in ATLAS.ti

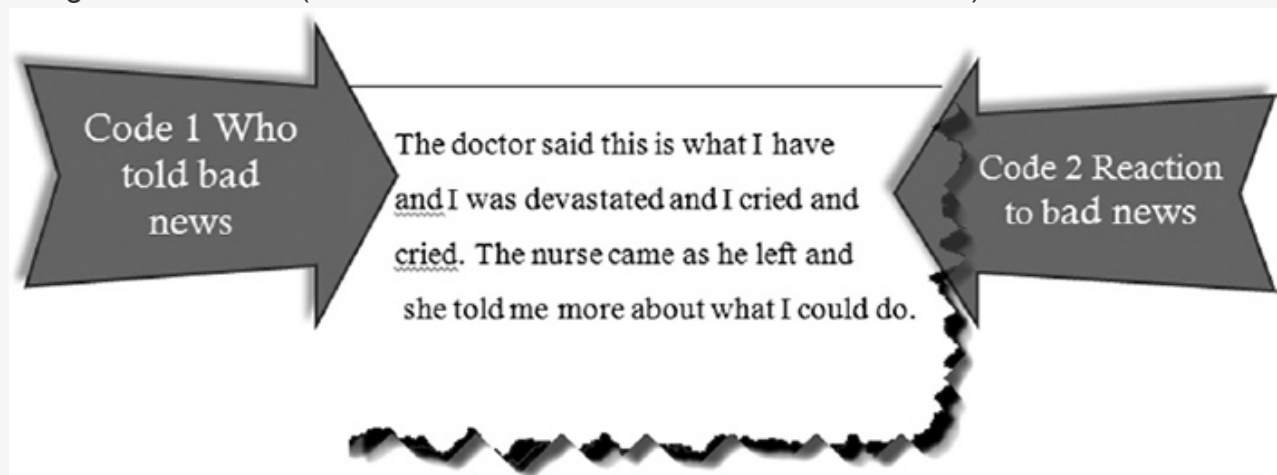


One way that NVivo (Versions 9.2 onwards) supports the coding process is through its framework analysis tool. Framework analysis was developed in the 1980s by Ritchie and Spencer (1994) for policy research and involves five stages: 1) familiarization with the texts; 2) identifying a thematic framework; 3) coding the data; 4) charting the data; and 5) mapping and interpreting the data. See [Vignette 7.5](#).

Vignette 7.5 Using NVivo to Conduct Framework Analysis of Interview Data

Paul G. Dempster, University of York

Framework analysis follows a process of data reduction where coding is represented across different cases and themes in a table format. The goal is to reduce data to manageable amounts. Having worked out the codes you wish to pursue, you assign codes to your data. By providing a summary of your coded data in cells on a chart, you can quickly see patterns and explore and map themes across the data. NVivo supports the ability to link individual cells back to their original data source. The following excerpt from an interview shows the affordances of using software to help manage the process of developing a framework analysis. In this study the researchers were exploring how bad news is shared and received with patients in hospital. This segment of the data had been assigned two codes ('who told bad news' and 'reaction to bad news').



Instead of retrieving all of the data which had been coded with these two codes into one document, which may run to a number of pages, framework analysis puts the result of the analysis into a chart organized by case.

Case number	Code 1: Who told you the bad news?	Code 2: What was your reaction?
Case 1	Told news by doctor (diagnosis), follow up by nurse.	Cried for long period. Devastation.
Case 2	Doctor gave diagnosis, left, then nurse explained.	Cried, then angry. Disbelief.

Simply clicking on the cell will bring up all the coded material relevant to that case, making the process more accurate and efficient. The methodology allows you to explore large amounts of data across a large number of cases with relative ease.

The summary grid and grid table features in MAXQDA 11 work in a very similar way to the framework analysis tool in NVivo and can be used to summarize and reduce data across multiple cases.

Visit Web Resource 7.10 Results of NVivo matrix coding query

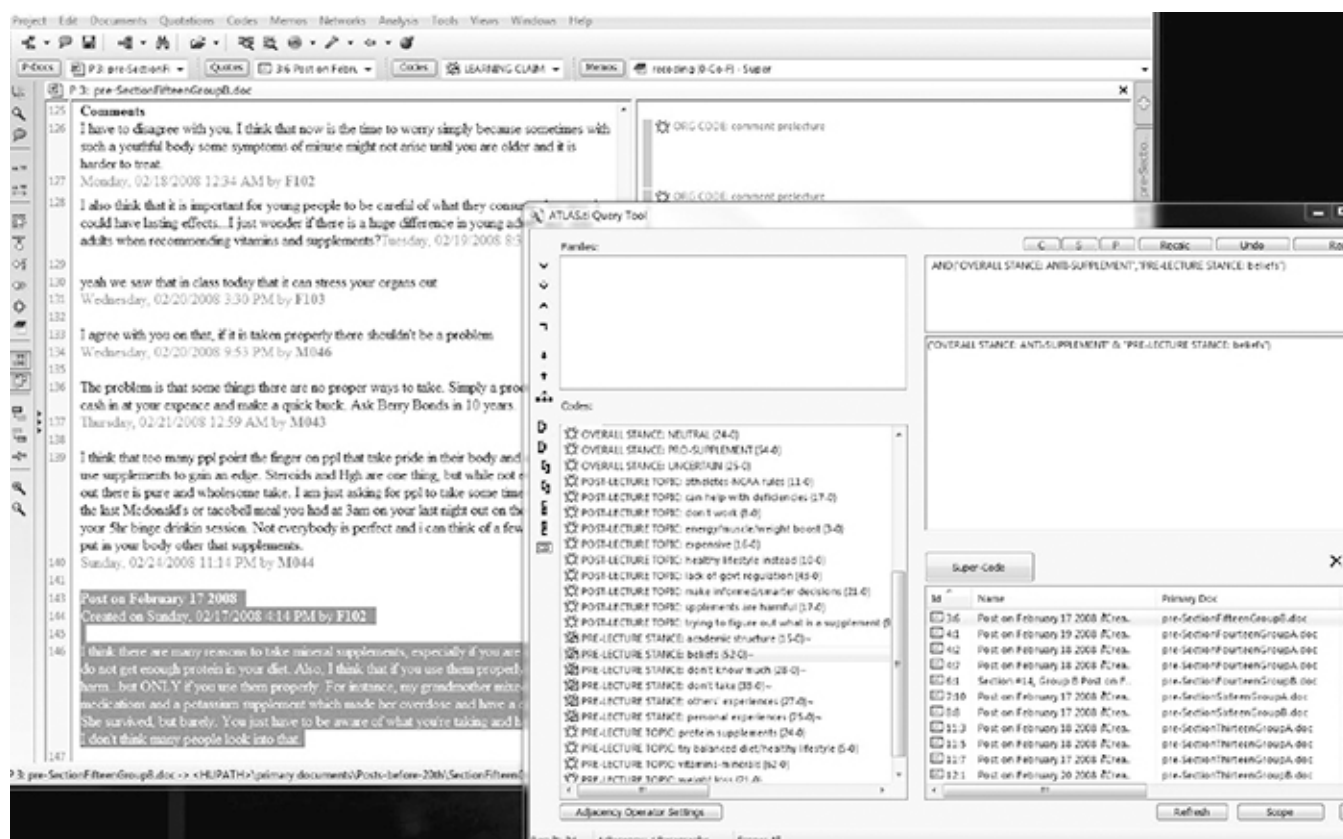
Querying

Coding is a time-consuming process and requires extended engagement with the data, even with the assistance of software. Once the codes are entered, however, the hard work pays off. Querying tools provide powerful ways of systematically exploring relationships between the codes. Lewins and Silver (2007) refer to this as 'interrogating the dataset'. Queries can be used to find relationships and patterns between key attributes of the data.

Visit Web Resource 7.11 for guidance on moving beyond initial coding using CAQDAS packages.

For example, in ATLAS.ti, data that has been coded in a particular way can be retrieved by running queries with Boolean, semantic and proximity operators. The lower right window in [Figure 7.8](#) shows the 24 results of a query that used the Boolean operator 'and' to identify all data coded with two codes (the 'overall stance: anti-supplement' code and the 'pre-lecture stance: beliefs' code). This data is from a study in which undergraduate nutrition students made blog posts related to their previous experiences and/or beliefs with dietary supplements.

Figure 7.8 Results of query in ATLAS.ti



Clicking on each of the results would then take you to where that quotation appears in the data set.

The co-occurrence explorer in ATLAS.ti, and similar tools in NVivo and MAXQDA, show which codes co-occur together in the data, as illustrated in [Figure 7.9](#).

Figure 7.9 Results of co-occurrence inquiry in ATLAS.ti



Here we see that when students used personal experience to back up their claims about dietary supplements, nearly twice as many (29) took a pro-supplement stance than an anti-supplement stance (15). However, when students used beliefs to back up their claims, they were more or less equally divided between taking a pro- (20) or anti-supplement stance (24). While these numbers do not carry much meaning on their own, they are a way to explore hunches about relationships in the data. NVivo's matrix coding query functions in a similar way to the co-occurrence tool in ATLAS.ti, and is described by Chad Lochmiller in [Vignette 7.6](#).

Vignette 7.6 Using NVivo 9 for Matrix Coding Queries

Chad Lochmiller, Indiana University

I am currently using NVivo to compare written reflections submitted by leadership coaches

for school administrators. I import the Word or PDF data documents into NVivo, and apply codes through a hierarchical structure that maximizes the power of the matrix analysis. For example, I use codes that are related to the time, place, participant characteristics and other descriptive factors that could influence how coaches provide support to the principals. Matrix queries allow comparison of coded text to identify differences, similarities or contrasts in the participants’ thoughts, statements or experiences.

In a recent analysis, I used the matrix query to compare the type of issues that coaches were discussing with the administrators in the fall with the issues they discussed in the spring. I was able to select an ‘issue’ code as one of the rows and then compare what the coaches were writing based on a ‘time’ code that related to the calendar year (i.e. Fall, Winter, Spring, Summer) as the columns.

In this way I can make empirically supported statements about the magnitude of any differences found through the analysis. For example, I discovered that coaches working with experienced (EXP) school leaders more often reported ‘resistance’ (RES) to coaching (232) than coaches working with less experienced (NOV = novice) school leaders (132), as illustrated in [Figure 7.10](#). Clicking on the numbers reported in the matrix analysis brings up the coded text for each of the categories.

Figure 7.10 Result of NVivo coding query

Matrix Coding Query - Results Prev			
		A : ACCEPT ... ▾	B : RES TO C... ▾
1 : NOV_PRI ▾	▾	7	132
2 : EXP_PRI ▾	▾	38	232

Now turn to [Reflexive Practice 7.6](#).

Reflexive Practice 7.6

Within your sample project, practise searching the data and assigning some codes to the data. Practise renaming the codes, combining/merging codes and working with or creating

hierarchies as necessary. If necessary, read or view the online tutorial information on searching, coding and querying. Use the query and/or co-occurrence tools once you have applied some codes. Be sure to reflect on your experience in your journal.

Visualizing

Qualitative researchers have long considered data displays and other visualization devices to be useful tools for analysis (Miles and Huberman, 1994). Being able to graphically represent the relationship between your data documents, quotations, memos, links and codes provides an opportunity for greater analytic insight. Tag clouds, for example, show the frequency with which a word appears in the data and can be a useful starting point for understanding your data. All three software packages allow you to easily create a tag cloud with your data (see [Figure 7.11](#)).

Figure 7.11 Tag cloud in MAXQDA



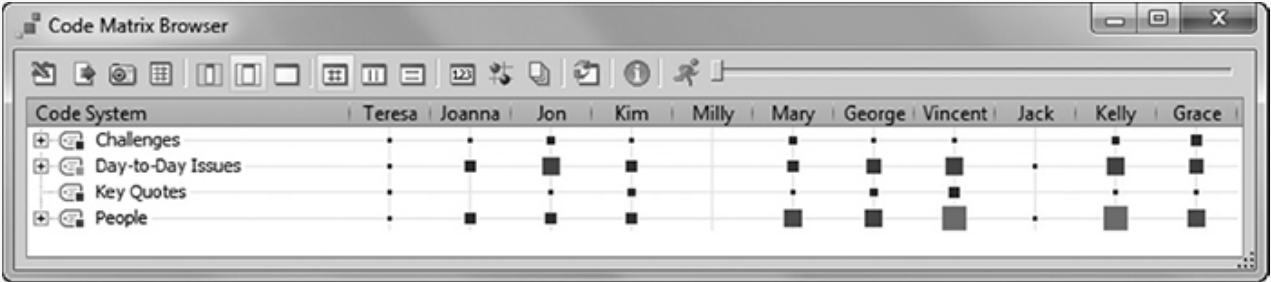
(from MAXQDA 11 manual)

[Vignette 7.7](#) illustrates several visualization tools offered by MAXQDA.

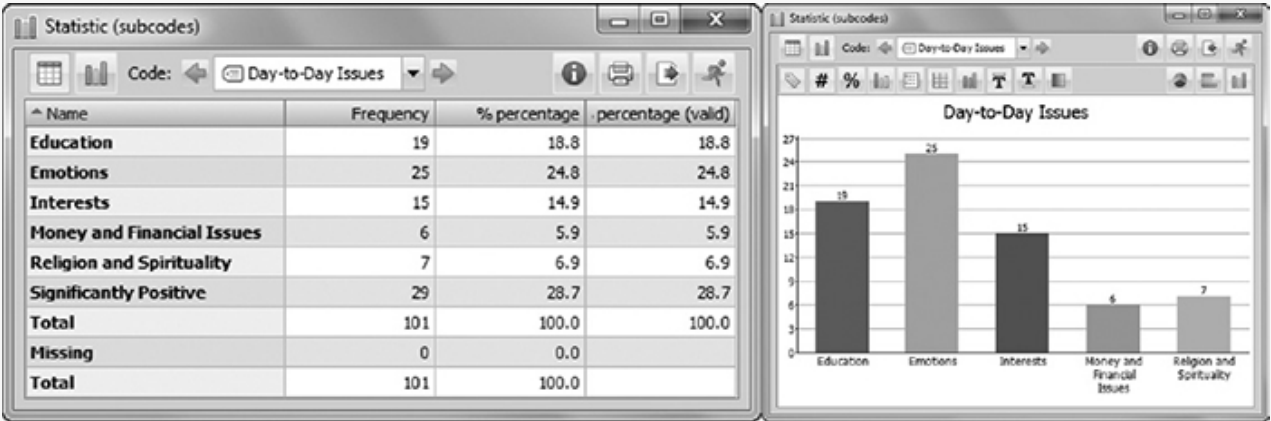
Vignette 7.7 Visualizing with MAXQDA

Julia Schehl, Senior Manager, MAXQDA (VERBI Software)

Visualizing data can be a vital part of research projects, during both the analysis and representation of findings. MAXQDA's code matrix browser provides a visualization of how often codes have been assigned to documents. The squares that visualize code occurrences are bigger, or smaller, depending on how often a code was used in a document, making it immediately clear which topics played a bigger or smaller role across the data. Looking at the figure below, it is easy to see that the interviews with Teresa, Milly and Jack have not been analysed yet. This is also a great way to check the progress of the research and stay on top of things.



Sometimes it can be of great interest to know how often subcodes have been used in a project. If, for example, researchers in an evaluation study collected data on the software features users hope to see implemented in the future, it is important to know which features were mentioned most often. MAXQDA offers a tool that quickly pulls up the frequencies of subcode use, and can also create charts that could be used to present these results in a report or presentation.



NVivo 'models', MAXQDA 'maps' and ATLAS.ti 'networks' all provide ways to visually explore data through creation of graphical representations and maps. In [Vignette 7.8](#) Susanne Friese of ATLAS.ti explores the use of networks.

Vignette 7.8 Using Network Tools for Visual Analysis in ATLAS.ti

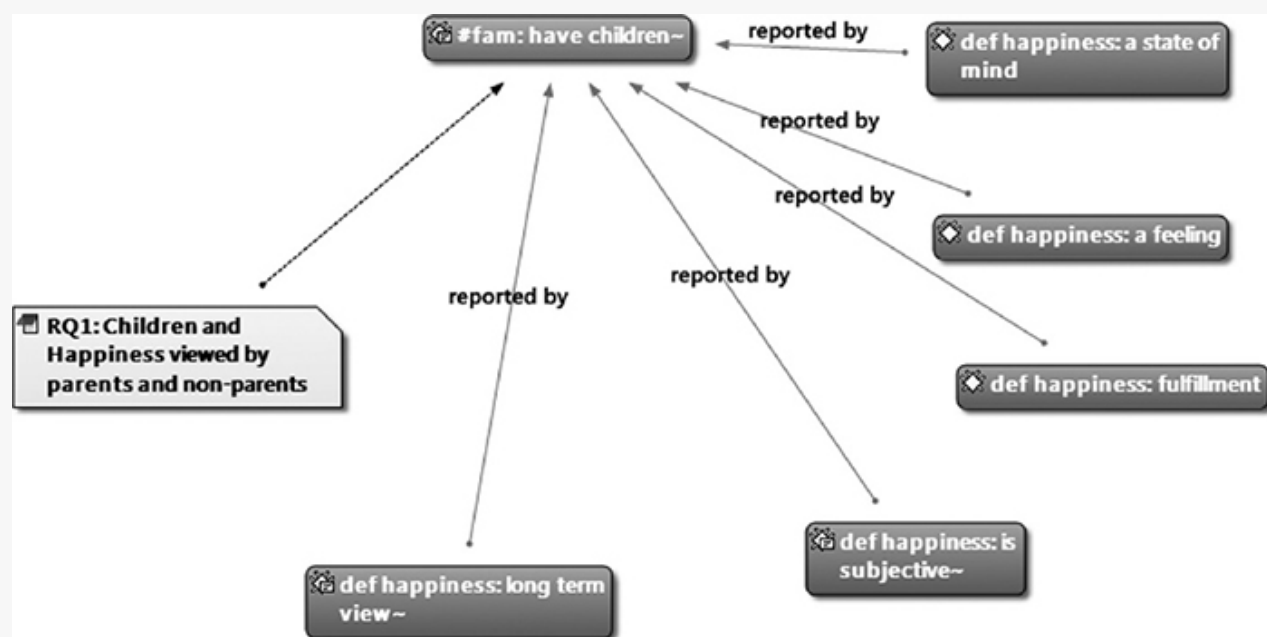
Susanne Frieze, Support Specialist, ATLAS.ti

Network views in ATLAS.ti can be used for analytic purposes as well as for representing findings. A network view can display primary documents, codes, quotations and memos. In my study of the relationship between having children and happiness, I used the network view as a visual analysis tool to examine whether happiness is defined differently by parents and non-parents. The data includes blog posts made on this topic by adults with children and adults without children.

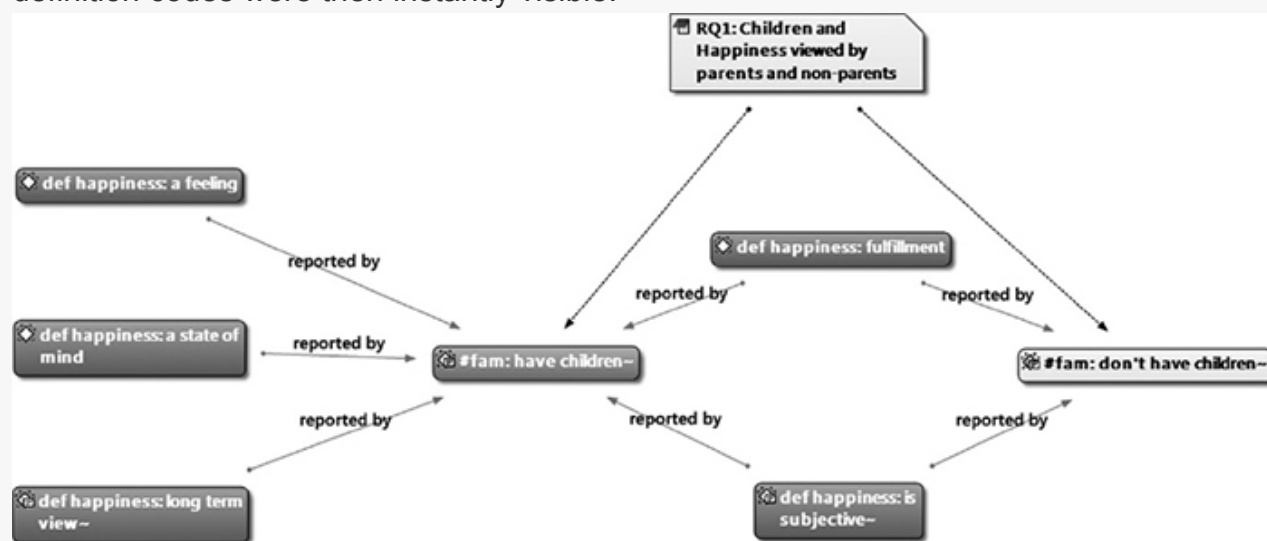
The analysis began by importing one of the codes ('don't have children') into an empty network view. The 'import co-occurring' codes option was used to see which of the happiness definition codes were provided by non-parents. As a result, two codes were imported. These two codes were linked using the 'is reported by' link.



The process was repeated for the 'have children' code. The two network views were then brought together. The existing links between the codes were instantly visible.



The next step was to bring the two network views together. The existing linkages with the definition codes were then instantly visible.



The network nodes were then arranged in a way that best reflected the answer to the research question. The actual data behind the nodes can be viewed by right-clicking on it.

Now turn to [Reflexive Practice 7.7](#).

Reflexive Practice 7.7

Within your sample project, practise using the mapping/networking tool to display your initial memoing and coding. If necessary, read or view the online tutorial information about creating network views or maps. Reflect on this experience in your journal.

Visit **Web Resource 7.12** for more resources on visualization tools.

Evaluating and Selecting a Package

There are several important questions to consider when deciding which package to adopt. First and foremost, it is probably a good idea to consider using the package that is supported at your institution and/or that is used by your research collaborators. For example, if everyone at your institution is using NVivo, then it will be an uphill battle for you to adopt MAXQDA. Of course, it is ideal whenever possible to choose the best tool for the job rather than according to availability. Other factors you will want to consider include operating system requirements, pricing options, availability of trial versions and available training and support. Turn now to [Reflexive Practice 7.8](#).

Reflexive Practice 7.8

Reflect on your experience trying out one of the data analysis software packages as part of this chapter. Visit the websites for each of the software programs and fill out the information in order to make an informed comparison

Program:	ATLAS.ti	MAXQDA	NVivo
Most recent version			
Operating system and mobile apps			
Pricing/licensing			
Trial version			
Training/support			
Recommended system requirements			
Other features			

Visit **Web Resource 7.13** for links to the CAQDAS guides for engaging in teamwork and choosing the appropriate software.

Visit **Web Resource 7.14** for an excellent list of questions to ask yourself when comparing software programs.

Final Thoughts

Choosing and learning a software package is a wise investment of time, as their features can be used to support other aspects of the research process beyond data analysis. The question of whether it is better to analyse data by hand or with software is reminiscent of the instructional technology ‘media debates’ of the 1990s. Kozma's (1994) view was that new technologies (media) undoubtedly would impact learning. Clark (1994) countered that it was always the *method underlying* the new media that impacted learning. Media comparison studies have consistently found no difference in learning outcomes when all variables are held constant except for the use of a particular technology. There have been similar studies comparing ‘by-hand’ qualitative data analysis techniques with ‘software-supported’ analysis techniques in an effort to decide which is better (Basil, 2003; Davis and Meyer, 2009; Welsh, 2002). These studies have concluded, as did the earlier media comparison studies, that what matters are the circumstances under which one is working. Digital tools are neither completely neutral, nor are they overly deterministic. While they may have a certain ‘software architecture’ (Salliard, 2011), with affordances and constraints that need to be understood, the features can be appropriated to support the kinds of analysis needed.

Visit Web Resource 7.15 for some words of advice on using data analysis software by Dr Ray Maietta, President of ResearchTalk.

Chapter Discussion Questions

1. What methodology are you using for the study you are designing? What approaches to data analysis are generally used in that methodology?
 2. Which analysis features supported by the major software packages may be most useful in understanding your data?
 3. Describe your experience creating a sample project and using the software features to explore the data. What additional training or resources will you explore to improve skills?
 4. How might the use of a software package to share your analysis more easily with others add trustworthiness and transparency to your work? How might it create some ethical dilemmas?
 5. How can you ensure ethical practices as you analyse the data for your study?
-

Suggestions for Further Reading

Recent chapters by Davidson and Di Gregorio (2011), Fielding (2008) and Hesse-Biber and Crofts (2008) are helpful in understanding the broader context of data analysis software in qualitative research. Konopasek (2008) provides an insightful description of how software helps us make our thinking visible as we engage in research. Lewins and Silver (2007) and Di Gregorio and Davidson (2008) provide a more thorough discussion of what we have only been able to touch upon in this chapter. For those who have selected ATLAS.ti, Friese

(2012) is an indispensable resource; likewise, for those who have selected NVivo, Bazeley and Jackson (2013) will be your guide. MAXQDA users may be interested in Corbin and Strauss (2008), which integrates the software throughout the text. To learn more about data analysis and approaches to coding in general, see Saldana (2013), Richards (2009) (with its outstanding companion website), Richards and Morse (2013), Grbich (2013), Gibson and Brown (2009) and Gibbs (2007).

Visit Web Resource 7.16 for a link to Richards (2009) companion website.

References

- Basit, T.N. (2003)** 'Manual or electronic? The role of coding in qualitative data analysis'. *Educational Research*, 45(2), 143–54. <http://dx.doi.org/10.1080/0013188032000133548>
- Bazeley, P. and Jackson, K. (2013)** *Qualitative Data Analysis with NVivo* (2nd edition). London, UK: SAGE.
- Clark, R.E. (1994)** 'Media will never influence learning'. *Educational Technology Research and Development*, 42(2), 21–9. <http://dx.doi.org/10.1007/BF02299088>
- Coffey, A., Holbrook, B. and Atkinson, P. (1996)** 'Qualitative data analysis: Technologies and representations'. *Sociological Research Online*, 1(1). Available at <http://www.socresonline.org.uk/1/1/4.html> (last accessed 18 July 2013). <http://dx.doi.org/10.5153/sro.1>
- Conniff, A., Craig, T., Laing, R. and Galan-Diaz, C. (2010)** 'A comparison of active navigation and passive observation of desktop models of future built environments'. *Design Studies*, 31, 419–38. <http://dx.doi.org/10.1016/j.destud.2010.04.003>
- Corbin, J. and Strauss, A. (2008)** *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. London, UK: SAGE.
- Creswell, J.W. (2013)** *Qualitative Inquiry and Research Design: Choosing Among Five Approaches* (3rd edition). London, UK: SAGE.
- Davidson, J. and Di Gregorio, S. (2011)** 'Qualitative Research and Technology: In the Midst of a Revolution', in Edited by: **N.K.Denzin** and **Y.S.Lincoln** (eds) *The SAGE Handbook of Qualitative Research* (4th edition). Thousand Oaks, CA: SAGE, pp. 627–43.
- Davis, N.W. and Meyer, B.B. (2009)** 'Qualitative data analysis: A procedural comparison'. *Journal of Applied Sport Psychology*, 21(1), 116–24. <http://dx.doi.org/10.1080/10413200802575700>
- Dempster, P., Woods, D. and Wright, J.S.F. (2013)** 'Using CAQDAS in the analysis of Foundation Trust hospitals in the National Health Service: Mustard seed searches as an aid to analytic efficiency'. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 14(2), Article 1.

Di Gregorio, S. and Davidson, J. (2008) *Qualitative Research Design for Software Users*. Berkshire, UK: Open University Press/McGraw Hill.

Fielding, N. (2008) 'The Role of Computer-Assisted Qualitative Data Analysis: Impact on Emergent Methods in Qualitative Research', in Edited by: **S.Hesse-Biber** and **P.Leavy** (eds) *Handbook of Emergent Methods*. New York, NY: The Guilford Press, pp. 655–73.

Friese, S. (2012) *Qualitative Data Analysis with ATLAS.ti*. London, UK: SAGE.

Gibbs, G. (2007) 'Analysing Qualitative Data', in Edited by: **U.Flick** (ed.) *The Sage Qualitative Research Kit*, London, UK: SAGE.

Gibson, W.J. and Brown, A. (2009) *Working with Qualitative Data*. London, UK: SAGE.

Goble, E., Austin, W., Larsen, D., Kreitzer, L. and Brintnell, S. (2012) 'Habits of mind and the split-mind effect: When computer-assisted qualitative data analysis software is used in phenomenological research'. *FORUM: Qualitative Social Research*, 13(2), Article 2. Available at <http://www.qualitative-research.net/index.php/fqs/article/view/1709/3340> (last accessed 18 July 2013).

Grbich, C. (2013) *Qualitative Data Analysis: An Introduction*. London, UK: SAGE.

Hahn, C. (2008) *Doing Qualitative Research Using your Computer: A Practical Guide*. London, UK: SAGE.

Hesse-Biber, S. and Crofts, C. (2008) 'User-Centered Perspectives on Qualitative Data Analysis Software: Emergent Technologies and Future Trends', in Edited by: **S.Hesse-Biber** and **P.Leavy** (eds) *Handbook of Emergent Methods*. New York, NY: The Guilford Press, pp. 655–74.

Konopasek, Z. (2008) 'Making thinking visible with ATLAS.ti: Computer-assisted qualitative analysis as textual practices'. *FORUM: Qualitative Social Research*, 9(2), Article 12. Available at <http://www.qualitative-research.net/index.php/fqs/article/view/420/910> (last accessed 18 July 2013).

Kozma, R.B. (1994) 'The influence of media on learning: The debate continues'. *School Library Media Research*, 22(4), 233–9.

LaPelle, N.R. (2004) 'Simplifying qualitative data analysis using general purpose software tools'. *Field Methods*, 16(1), 85–108. <http://dx.doi.org/10.1177/1525822X03259227>

Lee, R. and Fielding, N. (1996) 'Qualitative data analysis: Representations of technology. A comment on Coffey, Holbrook and Atkinson'. *Sociological Research Online*, 1(4). Available at <http://www.socresonline.org.uk/1/4/lf.html> (last accessed 18 July 2013). <http://dx.doi.org/10.5153/sro.68>

Lewins, A. and Silver, C. (2007) *Using Software in Qualitative Research: A Step by Step Guide* (2nd edition). London, UK: SAGE.

Lonikila, M. (1995) 'Grounded Theory as an Emerging Paradigm for Computer-Assisted Qualitative Data Analysis', in Edited by: **U.Kelle** (ed.) *Computer-Aided Qualitative Data Analysis*. London, UK: SAGE, pp. 41–51.

Meyer, D.Z. and Avery, L.M. (2009) 'Excel as a qualitative data analysis tool'. *Field Methods*, 21(1), 91–112. <http://dx.doi.org/10.1177/1525822X08323985>

Miles, M.B. and Huberman, A.M. (1994) *Qualitative Data Analysis: An Expanded Sourcebook* (2nd edition). London, UK: SAGE.

Mitchell, M.B. and Kuczynski, L. (2010) 'Does anyone know what is going on? Examining children's lived experience of the transition into foster care'. *Children and Youth Services Review*, 32(3), 437–44. <http://dx.doi.org/10.1016/j.childyouth.2009.10.023>

Mitchell, M.B., Silber, C.F. and Ross, C.F.J. (2012) 'My hero, my friend: Exploring Honduran youths' lived experience of the God-individual relationship'. *International Journal of Children's Spirituality*, 17(2), 137–51. <http://dx.doi.org/10.1080/1364436X.2012.721752>

Richards, L. (2009) *Handling Qualitative Data: A Practical Guide* (2nd edition). London, UK: SAGE.

Richards, L. and Morse, J.M. (2013) *README FIRST for a User's Guide to Qualitative Methods* (3rd edition). London, UK: SAGE.

Richards, T.J. and Richards, L. (1998) 'Using Computers in Qualitative Research', in Edited by: **N.Denzin** and **Y.Lincoln** (eds) *Collecting and Interpreting Qualitative Materials*. Thousand Oaks, CA: SAGE, pp. 211–45.

Ritchie, J. and Spencer, L. (1994) 'Qualitative Data Analysis for Applied Policy Research', in Edited by: **A.Bryman** and **R.G.Burgess** (eds) *Analyzing Qualitative Data*. London, UK: Routledge, pp. 173–94. http://dx.doi.org/10.4324/9780203413081_chapter_9

Saldana, J. (2013) *The Coding Manual for Qualitative Researchers*, 2nd edn. London: SAGE Ltd.

Salliard, E.K. (2011) 'Systematic versus interpretive analysis with two CAQDAS packages: NVivo and MAXQDA'. *FORUM: Qualitative Social Research*, 12(1), Article 34. Available at <http://www.qualitative-research.net/index.php/fqs/article/view/1518/3133> (last accessed 18 July 2013).

Schoenfelder, W. (2011) 'CAQDAS and qualitative syllogism logic: NVivo 8 and MAXQDA 10 compared'. *FORUM: Qualitative Social Research*, 12(1), Article 21. Available at <http://www.qualitative-research.net/index.php/fqs/article/view/1514/3134> (last accessed 18 July 2013).

Tesch, R. (1990) *Qualitative Research: Analysis Types and Software Tools*. London, UK: Routledge.

Weitzman, E.A. (2000) 'Software and Qualitative Research', in Edited by: **N.Denzin** and **Y.Lincoln** (eds) *The*

SAGE Handbook of Qualitative Research (2nd edition). Thousand Oaks, CA: SAGE, pp. 803–20.

Weitzman, E.A. and Miles, M.B. (1995) *Computer Programs for Qualitative Data Analysis: A Software Sourcebook*. Thousand Oaks, CA: SAGE.

Welsh, E. (2002) 'Dealing with data: Using NVivo in the qualitative data analysis process'. *FORUM: Qualitative Social Research*, 3(2), Article 26. Available at <http://www.qualitative-research.net/index.php/fqs/article/view/865/1880> (last accessed 18 July 2013).

<http://dx.doi.org/10.4135/9781473957671.n7>