

Visual Conceptualization Opportunities with Qualitative Data Analysis Software

Raewyn Bassett

INTRODUCTION

In the past decade, technology advances – especially the digital camera, and cell phones with photo and video features – together with decreasing costs of ownership have contributed to the renewed interest in visual studies (Sweetman, 2009). Additionally, an increasing number of qualitative software programs, or CAQDAS,¹ with the ability to import and manage visual data have made it easier for qualitative researchers to include images such as maps, photographs, scanned drawings, video and the like in their research projects. While researchers have been slow to engage with CAQDAS (Bassett, 2004) in the past, the availability of software-compatible visual digital technologies now provides new and exciting ways to do things in qualitative research (Dicks et al., 2005).

Visual methods afford ways of looking and seeing that encourage new conceptualizations of data beyond that to be found in

the text of transcribed interviews or policy or other documents (Hockey and Collinson, 2006; Sweetman, 2009). And the sensory experience of viewing an image cannot be replicated in text (Banks, 2007). Almost by accident, Collier (1957) discovered that photographs provided a means for research participants to describe their understandings of space and place, of relationships, and everyday activities that spoken questions in semi-structured interviews did not (see Chapter 11, this volume). Focusing on photographs that are meaningful to them, participants feel less the center of the researcher's attention. Photos, drawings, maps and video can prompt memories, and/or lead participants to see the familiar in a new light (Banks, 2007). However, images are not mere illustrations or addendums to interviews (Stanczak, 2007). Details that may be overlooked, meanings not recognized at the moment of perception, information that cannot be studied closely in the field (Frisinghelli, 2009) or tacit,

embodied knowledge of which participants may be unaware (Dant, 2004; Sweetman, 2009) can be captured in images.²

Just as the form, meaning and effect of an image is influenced by the technologies used in its making (Rose, 2007), so too are these influenced by the technology used to view, see, read and interpret an image. The structure of CAQDAS programs used to analyze images and other documents encourages, but also constrains, different ways of conceptualizing visual and other data (Boden, 1994). Each CAQDAS package provides a conceptual space specific to it, based on the developer's decisions about how research is to be done. It is in this conceptual space (a black box if you will) in which the researcher uses to explore and manipulate data (Richards and Richards, 1994). The conceptual space referred to in this chapter is that area in a computer produced by the software program where data is read or viewed, thought about, coded, notes written, diagrams drawn, questions asked and data retrieved and/or linked in multiple ways. How the conceptual space positions images, text, audio, and codes – i.e. whether and how they are juxtaposed – affects the researcher's thinking and understanding of that data. Although the researcher can access and use only those functions the software program enables within this conceptual space, these constraints can foster creativity (Boden, 1994), as well as complacency (LaFrance, 1996). With reciprocal software–researcher engagement (O'Brien and Bassett, 2009), creative exploration and transformation of data is supported and enhanced (Boden, 1994; Richards and Richards, 1994). In the interaction between the software and the researcher, mediated spaces (Burnett, 2005) are created in which 'what we see is no longer given by our eyes but by our instruments' (Johnston, 1999: 30). Johnston (1999) has referred to this as 'machinic vision'. Perceptions of the data are decoded with the use of the different functions of the software and recoded as meaning when the researcher 'sees' them anew in software–researcher interaction.

Researcher and software program work together, achieving things neither could do alone. A mediated space is created as a hybridization of the conceptual space of the software and the human user. This space exceeds, and may even overturn, the initial design, intention and objectives of the software. It is within the boundaries of this mediated space that interactivity and creativity occur (Burnett, 2005).

Reading text and/or listening to utterances while simultaneously viewing an image in a CAQDAS space is a cognitively different experience than doing these same tasks using basic computer programs such as Microsoft Word and Windows Photo Gallery. When using several computer programs simultaneously to read text, listen to participants' dialogue, and view related images the researcher must tab between programs and screens, thus breaking thought processes as attention is redirected to each screen change. A similar case can be made for viewing photos while listening to audio and reading text on paper, without a computer. When these tasks are available simultaneously within a bounded conceptual space, cognition is not interrupted but can advance significantly without pause.

Creativity requires not merely exploration but rather a transformation of the conceptual space. By using the rules embedded in software, researchers can explore and transform the conceptual space (Boden, 1994), rearranging it by manipulating available software functions for uses other than those for which they were designed, and thereby creating new insights in the process (Richards and Richards, 1994). In this chapter, the advantages of working within the conceptual space of different CAQDAS will be explored, and the differences within the conceptual spaces offered by each of the CAQDAS packages will be noted. Most tasks related to analysis are common to all CAQDAS, but it is in their use within the conceptual space specific to a program in which analytic differences, and, I suggest, advantages, are evident. The conceptual opportunities that NVivo, ATLAS.ti, Transana and HyperRESEARCH softwares

offer to visual methods are explored in this chapter.

QUALITATIVE DATA ANALYSIS SOFTWARE REQUIREMENTS

Of the four softwares discussed in this chapter, HyperRESEARCH and Transana are available for both Macintosh and PC computers, while NVivo and ATLAS.ti are principally PC programs but can be run with PC simulation software on the Macintosh. The requirements for working with visual data using CAQDAS programs are few. Most image formats (e.g. jpeg or tiff) are readily usable by most image-processing software, including CAQDAS. Upon import into NVivo software, images are converted to .jpeg files. HyperRESEARCH supports PICT files on Macintosh operating systems. Images can be imported into Transana, although the software was developed to support video rather than photographs and scanned still images. If an image is too large, image-processing software can be used to reduce its size so that it can be comfortably used within the software screen area. Video is more specific to each software program and may need to be converted to meet their requirements. In either case, the researcher may need to make decisions that consider the equipment to be used for image capture and whether to match the software choice to the equipment to be used, or vice versa.

Any number of images and video can be imported into the software. The larger the project, the more computer memory is required in order to run the software program without mishaps such as slowing of functions and crashes. This is a computer problem, however, not a software problem. In addition, the number of images and video, as well as the image quality (which affects the size of the image file) will determine the amount of data storage needed. With visual data, attention to the storage of files and ensuring sufficient RAM to run the software is necessary.

Also, researchers should ensure that the data is both secure, and safe. Attention should be paid to restricting access to data, in a similar manner to participant data collected in paper or audio files. In addition, backups should be planned for and maintained in order to ensure that an unexpected system crash doesn't destroy the data, and therefore the project.

Finally, user training requirements should be considered. Each program, while similar in nature, has specific tools, functions and terminology. The flexibility and robustness of these programs implies a complexity of use that can seem daunting. Practically, these differences may discourage users from considering a change to a different program once the investment has been made in training on the use of a particular program. However, a number of training opportunities exist, as well as user groups and help forums. The software chosen should be the one that is best suited to addressing the research questions. The time spent up-front to learn the nuances of the particular program is returned in the strength of the analysis available.

SOFTWARE SOLUTIONS FOR VISUAL STUDIES

Qualitative data analysis software has been designed to support the researcher in the interpretation and analysis of a variety of data sources, including images, text and audio. With the import of still and moving images into CAQDAS, new options for analysis are available to researchers. The basic functions include: coding of data; searching, retrieving, and defining codes; making connections between codes and/or documents; clustering data or codes; outlining emerging understandings of the data visually; writing memos; and abstracting and exporting tables of numerical and textual data to Excel or SPSS. However, it is the arrangement of these functions in the specific software that affords the researcher distinct and very different

opportunities for exploring data. To illustrate these opportunities I shall draw upon the results of a study of qualitative researchers in Nova Scotia, Canada, in which these four software programs, HyperRESEARCH, Transana, NVivo, and ATLAS.ti were used for the analysis.

Researching Nova Scotia Researcher's use of CAQDAS programs

This pilot project set out to explore how researchers in the province used CAQDAS in their research. After receiving Dalhousie University Ethics Review Board (ERB) approval, 10 researchers were recruited to the study. Conversational interviews of 1–1.5 hours were conducted with each researcher and digitally recorded. Researchers were asked about their qualitative research experience, how they decided upon the CAQDAS program they used, which functions of the program they used and why, and what support they had in its use. At the end of the interview they were given a disposable camera and asked to take photographs that illustrated how they identify themselves as qualitative researchers. They were explicitly told, on the advice of the ERB, that they could not include people in their photographs, and that they must ensure any pictures of family, friends and colleagues, and that any data on computers from their research projects were not visible in the photographs. Of the 10 researchers interviewed, three were research assistants or associates, two were doctoral students, and five were principal investigators. The digital audio interviews and photographs of the participants were then imported into each of the four software programs.

In this chapter, the focus is on the photographs only. The conceptual space of each software program will be described first, followed by some of the findings emerging from the use of that conceptual space to illustrate how, with user interaction, the space

becomes a mediated space. Not all functions of each software program (only those used to obtain the results below) will be discussed.

Transana

Although still images such as photographs can be imported into the software program Transana, in order to utilize the full range of functions such as applying keywords to transcribed text, video and/or audio files are required. A slide show of 36 photographs from the research study, 'Researching Nova Scotia Researchers' was made using Windows Movie Maker and imported into Transana. The juxtaposition of the photographs in the top right corner with the 'transcription space' to the lower left – the space where keywords are logged), searches were converted (to 'Clips and Collections' in the lower right), and visualization of 'keywords' along with the run-time of the slide show or video on the upper left (Figure 27.1) – allowed for simultaneous working back and forth between screens by the user. Time codes in the transcript link text and slide show, and a 'Notes' function enables field notes and memos to be written about the photographs and keyword searches.

Tools of the trade

Within Transana, each of the 36 photographs in the slide show was labeled using the Transcript field, and keywords applied to the text. The photographs taken by participants consisted mainly of objects, such as computers, thumb drives, journals, coffee mugs; and of places, such as offices, country roads, backyards and flower gardens. Watching the photographs replace each other slowly as the slide show played, it was apparent that these qualitative researchers were users of technology and contemplated their data in many different places, not merely the office alone. Technologies such as digital recorders and laptops were portable, allowing the researchers to engage with their data in quiet places such as gardens or while sometimes doing

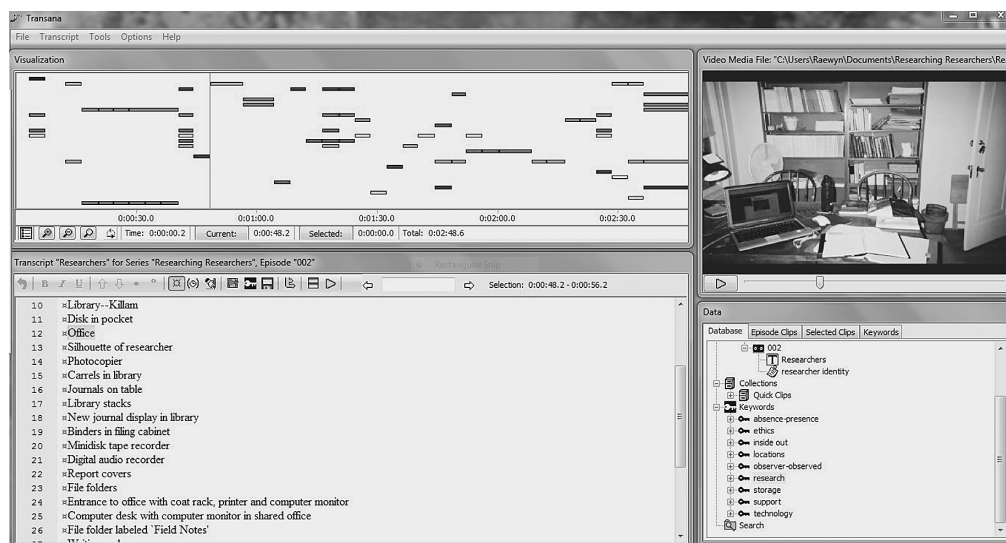


Figure 27.1 The conceptual space of Transana

other things such as driving. Using the 'Notes' function in the software, I documented my observations as I watched the photos play one by one. The Notes screen must be closed in order to use further functions in the software, so the transcription space (lower left screen) can be used to record thoughts and ideas. 'Keywords' (codes) initially assigned to photographs were mere topics without conceptual depth (Sandelowski and Barroso, 2003) e.g. 'shared office' and 'backyard' (lower right screen in Figure 27.1). An option in the visualization screen that allowed keywords to be viewed with the timeline of the slide show was selected (upper left screen in Figure 27.1). Simultaneously with the assignment of keywords to data, clips of the slide show, each constituting a single photo, were created.

Presence-absence

As the photos turned from one to another on screen, in some office scenes the researcher's presence could be felt, while in others not. A search using the Boolean OR to retrieve all photographs assigned the keyword 'office' enabled a closer investigation of only those photographs. They could be explored in

sequence rather than separated by other photos as they were in the slide show. A keyword for 'presence-absence' was created. One photo in particular gave a strong sense of the presence of the researcher even though she was absent from the photograph (upper right in Figure 27.1). In the Notes function in the software I wrote:

In this clip of the office, you can imagine entering through the open door and finding the researcher there but out of sight, looking up files in a filing cabinet, or sitting in a chair for example. The photograph gives a sense for the viewer of immediately conversing with the person in the room upon entry through the open door. The researcher has a presence although absent from the photograph.

Books and a day planner open on the desk, an active computer screen in addition to the door ajar contribute to this impression. Rather than looking in on the photograph, the viewer has a sense of being able to walk into the photograph through the partly open door, thus also placing the viewer there with the researcher. Exploration of the three further photographs of offices did not provide the same strong sense of presence-absence even though in one photograph an anonymous researcher is shown at the computer

keyboard, and in another, coats hanging on a coat rack imply the presence of an unseen researcher.

Temporal aspects of presence-absence

Returning to the slide show of photographs, the conceptualization of presence-absence now provided a new lens with which to 'see'. In the photograph of the office (Figure 27.1), past, present and future are captured: in the present the viewer looks at a past scene captured by the camera and anticipates a future interaction with the out-of-sight researcher. In two other photos there was also a strong presence of the absent researcher-photographer. A temporal aspect emerged: the fusing of past (there-then) and present (here-now) (Barthes, 1977: 44), and in the photo of the office discussed above, the projection of past and present into the future.

A photo of a highway, taken by a study participant through her car windshield, implied her contemplation of research data (perhaps listening to the interviews) while she was driving. In reviewing the photograph, the viewer becomes the driver: the eyes of each combine as each looks through the car windshield down the road, the road markings giving a sense of movement. The photograph is framed in such a way that we are led out of the frame in the far distance. This scene of a 'there-then' moment captured in the photograph is also the 'here-now' as the viewer becomes the driver.

In another photograph, the fusion of past and present has an additional element: the viewer both watches the photo being taken while at the same time seeing through the eyes of the photographer. In this photo, the researcher's silhouette is caught in the flash of the camera against the glass of the window as she photographs her backyard from inside the house. The viewer sees the scene captured from the photographer's eyes while also looking in at the photographer, watching her snap the shot. The viewer is taken from her present viewing position to the past where she is also simultaneously the photographer and the viewer of the photograph as it was taken.

Moving between the various screens and functions in Transana, writing Notes, viewing the photos and visualizing keywords applied to the photographs, the researcher uses the conceptual space established by the developer. The screen where the photo is viewed can be enlarged but at the expense of the diminishing size of the windows juxtaposed with it. Data must be managed in specific ways, for example, and while photographs can be imported into Transana as single still images, they cannot be coded with keywords and the keywords then used to retrieve specific chunks of coded data. However, by manipulating the data requirements of the software and creating a slide show of the photographs, the software functions can be used to their full extent and ideas tested using Boolean searches in ways they cannot when attempted by hand. Furthermore, the positioning of photos provides ways of seeing that differ in comparison with other software, as is explained below.

NVivo

The photographs were imported into NVivo software, each as a single data source rather than as a slide show, although the latter is possible. In NVivo a photograph is displayed to the left center of the screen and adjacent to the right is an area in which notes about the content of the photographs can be written, and the pixel region assigned, linking the text to a specific area of the photograph (Figure 27.2). The photo is coded by pulling the cursor across and down, over the area of interest and assigning one or more labels (codes), called Free Nodes or Tree Nodes in NVivo (Figure 27.2). The content column can also be coded by highlighting a string of text and assigning a code. Coding 'stripes', which visually display the codes assigned to any one photo and/or the content column, can be turned on. In Figure 27.2, diagonally shaded stripes indicate coding to the content column while solid shaded stripes apply to the photograph. Other software functions include 'search and retrieval' tools, relationship-naming between

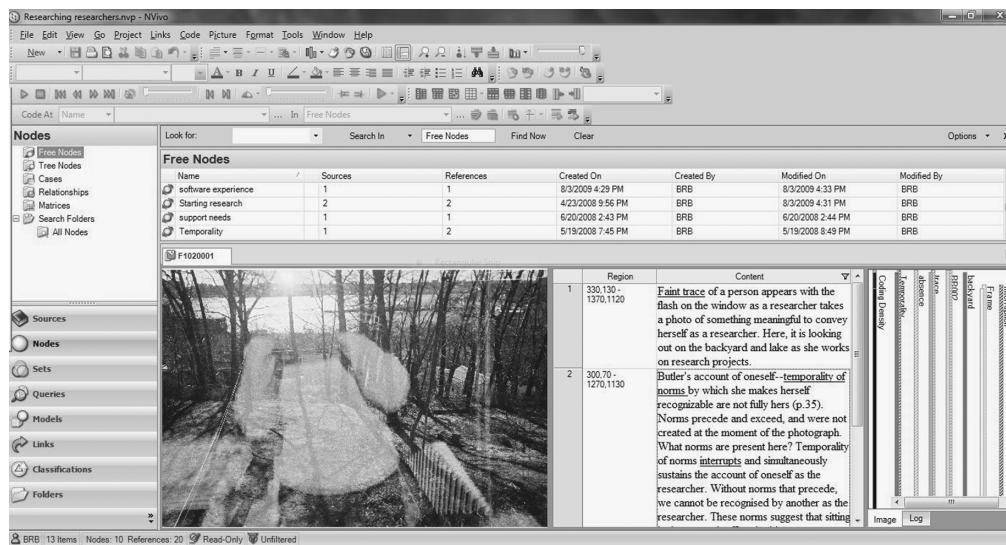


Figure 27.2 The conceptual space of NVivo 8

codes, and a tool for visually modeling ideas.

Positioning photographs

In NVivo a content analysis of each of the photographs was conducted. Denotations of the objects in the photographs were listed in the Tree Nodes window and the photographs coded accordingly. In Transana's conceptual space this same listing was done in the transcript, which was coded to keywords or codes. In NVivo, the photographs and/or portions of them could be assigned to codes without transcription. Lost, however, was the immediate overall conceptualization of researchers as users of technology and as doers of research of various locations, as had been available in Transana. Tabbing from one photo to the next in NVivo left each photograph somewhat disconnected from the previous. Now positioned in the center of the conceptual space rather than in the upper right corner as they had been in Transana, the sense of walking into the office or of driving along the highway, as was the case previously was absent in these same photos. In this way, however, the photos were entities in themselves; this encouraged studying each

in more depth. Interestingly, a photograph that had not had the same sense of inviting the viewer in when viewed in Transana did so in NVivo. Pursuing these conceptual differences back and forth between Transana and NVivo, it seems that where the photo is positioned in the conceptual space influences how both photo and viewer's eye meet.

The content column to the right of each photograph encouraged writing about the photos. Although much of the same work could be done in memos elsewhere in NVivo's conceptual space, the content column was in close proximity to the photograph. The content column could be used for a variety of purposes, and was not restricted to merely noting a photograph's content. It encouraged longer memos and was used to bring theoretical ideas to the photographs, and to develop those ideas next to the photograph. Thoughts about associated theories were notated (Figure 27.2), which, in turn, in an iterative back and forth movement, informed codes and memos. Memos were used to document the conceptual ideas developing as data was assigned to codes.

Cases were constructed in NVivo to cluster the photographs taken by each individual

research participant. A 'case' is a data management tool, and in this study each case was an individual research participant. Attributes (variables) and the values of attributes can be assigned to cases. In this research, socio-demographic attributes and values were assigned to each case: for example, the researcher's role was assigned as an attribute, and a research associate or doctoral student was a value of that attribute. Other attributes included type of qualitative research in which the individual participant engaged, their workplaces, years of experience in research, and so on. One of the advantages of this tool is that searches of codes can be refined using cases and attributes. For instance, to answer the question, 'Does role in research influence the content of photographs taken by researchers?', the Boolean AND was used to intersect the codes which denoted the contents of the photographs (e.g. printers, laptops, thumb drives, staplers, three-hole punches) with the values of the attribute 'Research role' (e.g. principal investigator, research associate, doctoral student). Data to answer this question was retrieved in numerical tabular format. Clicking on any cell in the table produced the coded images and text from the associated content column. The retrieved data in answer to the above question indicated that research associates photographed the objects used in research more so than principal investigators and doctoral students. This finding made sense since research associates are more likely to use these tools than principal investigators and faculty, whose roles are more focused on coordinating and managing than doing the 'hands-on' research. Furthermore, principal investigators took more photographs of gardens and backyards where they might sit to ponder the results of the analysis than did research associates who, with doctoral students, took more photographs of offices.

Inside–outside

A zoom tool available in most CAQDAS programs enlarges details in the photograph or image. Aspects that might have been

missed in normal view were made obvious. On the initial viewing in Transana of the photograph in Figure 27.2, it was the photographer's silhouette that captured the eye. Resizing the photo using the zoom tool in NVivo provided further insights. Other objects initially perceived to be outside in the yard were seen to be reflections from inside the house and vice versa. What appeared to be a slab of concrete outside was actually a table in the house, covered with an embroidered cloth trimmed with lace; a doily (a small lace mat) in the lower right-hand corner of the image had been invisible in normal view; a radiator was mistaken for a fence; what looked like the lawn outside was green carpet covering the floor of the house; and the fabric and creases of the photographer's pants were twigs, soil, and the shadows of tree branches. Such clarifications can lead to new insights in directions not previously considered, such as the social and cultural framing work of photographs (van Eck and Winters, 2005; Rose, 2007).

Social/cultural framing

The researcher's silhouette represents her absence from the photo in accordance with the Dalhousie University ERB's instructions to exclude people in a photograph. Despite the ERB's instructions and the researcher's attempts to comply, her silhouette is captured in the flash of the camera. The researcher remains anonymous, but her presence is fully visible. The composition of any photograph organizes several aspects: (1) where the viewer looks in the image; (2) how the viewer looks at the image; and (3) the scopic regime of ocular centrism (Haraway, 1991; Jenks, 1995). The framing of the researcher's silhouette is so unexpected that it captures the viewer's attention. The photograph not only frames the present-but-absent researcher but also frames cultural thoughts and practices. Thus, the ERB's current requirements regarding photographs in social science research are framed in the photograph. The ethical concern to ensure not only the anonymity and confidentiality of the study

participants but also anyone associated with them whose picture might hang on a wall or sit on a desk was included in the instructions to absent people from the photographs taken.

The specter

Moving from one photograph to another by tabbing from photo to photo after opening each in NVivo (horizontal center of Figure 27.2), the silhouette of the researcher can be traced in every other photograph. The researcher is a trace or specter (Derrida, 1994) present yet unseen, haunting the photos. Now viewers of the photographs, instead of seeing only coffee mugs and printers and office scenes can imagine the researcher in each context, tracing her through each of the photos. These insights were documented in memos in NVivo and used to construct further understandings of the code 'presence-absence'. Advantage was taken of the flexibility of NVivo's code system, where codes as 'Free Nodes' can remain standalone, unlinked to other codes as they are developed; these can later be hierarchically related to other codes and sub-codes or 'Tree Nodes'. A Tree Node of presence-absence was created with the sub-codes 'absence', 'trace' and 'double haunting'.

The alignment of photographs and content areas for writing in NVivo provided different ways of seeing and thinking than Transana's conceptual space. Especially potent was the positioning of images in each software program, which led to different analyses. In NVivo, the ability to write while observing the photograph and not have to open and close the writing space allowed a more continuous and immediate flow of thoughts. Coding of images in addition to coding of text provided additional advantages in the conceptual process. Constructing cases (i.e. individual researchers) and grouping the photographs for each case together, as well as assigning attributes and values to each case, facilitated a more detailed retrieval of coded data to answer questions in relation to the researchers and their photographs.

This led to topical codes becoming more conceptual.

ATLAS.ti

In ATLAS.ti, the Hermeneutic Unit (HU) is the term used to refer to the research project-space. On opening the program, the default HU loads immediately and a spiraling cloud of codes, showing the most frequently used codes in correspondingly larger fonts, indicates visually which ideas in the analysis are the most prominent. Toolbars sit to the left and at the top of the screen (Figure 27.3). A large area is available for viewing data, and coding is immediately visible to the right of the document. After assigning the photographs to the HU, each photograph is opened from the Primary Document (PD) drop-down menu for exploration. Each photograph closes out when the next is opened. A photograph is viewed unencumbered by an associated writing space; however, in order to note thoughts and ideas, a memo must be opened, which is easily accessed from a drop-down menu at the top of the screen (Figure 27.3) or inserted in the right margin.

Upon import, the photographs were not grouped together in any specific order in the PD manager, although a useful numbering system there can be used for this purpose, such as keeping the documents for each participant together so they can be viewed at the same time. In this study, however, the photographs were grouped as 'Families', a function in ATLAS.ti that allowed the photos of all participants who were research associates, for example, to be grouped in a Family of that name. This helps the researcher to avoid being distracted by photographs of other kinds of researchers.

Coding of photographs is undertaken in similar fashion to that in NVivo by pulling the cursor through the area of interest in the document and assigning a code. A square or rectangle is drawn around the area of interest (Figure 27.3). Coding stripes are immediately visible to the right of the photograph as

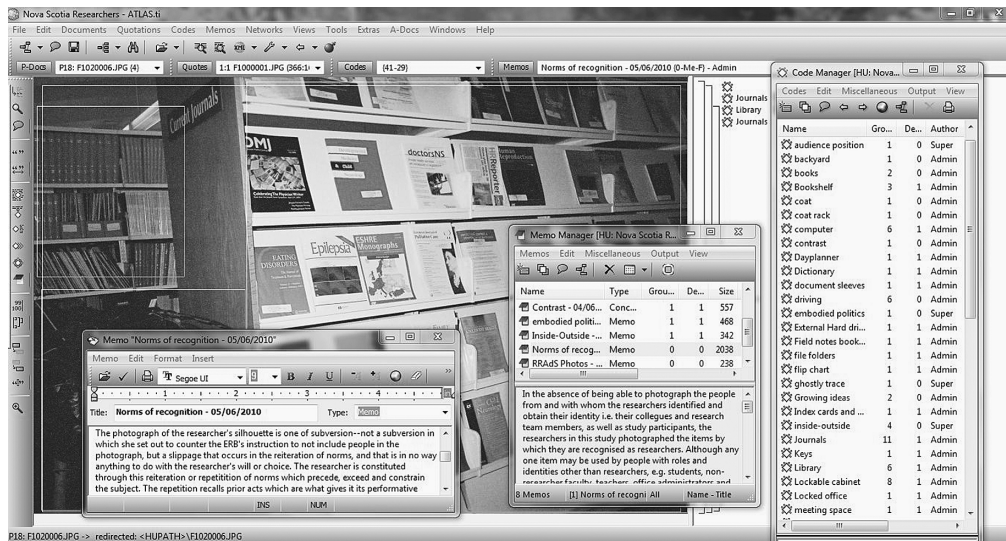


Figure 27.3 The conceptual space of ATLAS.ti

data are coded. Coding stripes are colored square brackets (I) that line up with the area of a document assigned to a code (Figure 27.3). As long as the right-hand margin is turned on, each code and bracket appears in the margin as the researcher codes. There is no limitation to the number of codes that can be displayed. In the Code Manager, codes stand alone until connected in a network. The more links between codes, the more dense the connection.

Recognizing researchers

As had been done with the two previous software programs, codes as topics, rather than concepts, were assigned to the items in each photograph. Building upon the exploration and investigation of photographs in NVivo and Transana, ways that the study participants recognize themselves as researchers took more of a focus in ATLAS.ti. A search and retrieval using the Boolean 'OR' gathered those photos assigned to 'item' codes. In ATLAS.ti, retrieved data are displayed in context, highlighted within the document of origin and in the order in which data were coded. If an image in a document was coded first, text in another document coded second,

another image third, and sound in an audio file fourth, then they are retrieved and displayed by the software in that order. If viewing and coding an image led the researcher to another document, which then led her to another image, then viewing and reading the retrieved data for a specific code in ATLAS.ti can remind the researcher of those implicit connections in the data.

After exploring the retrieval of coding for objects used in research, it became apparent that in the absence of ERB permission to include photographs of the people with and by whom they recognize themselves as researchers (i.e. their research teams and the participants of research), the objects photographed by the researchers – the coffee mugs, the laptops, thumb drives, photocopiers, printers, books and journals – took on significance as the objects by which they and others recognized a researcher. The instructions to researchers in the study from the ERB to not include people in their photographs, anchored in a history of increasing the protection of research subjects while simultaneously protecting the university from liability, excluded the very aspects by which qualitative researchers recognized themselves

as researchers who interact face to face and spend time with their participants in collecting or generating data. The photographs did not differentiate qualitative researchers from those who do numerical analysis. It would be an easy conclusion to make from the results of a retrieval query using the Boolean OR to gather photos assigned to codes that suggested qualitative research might be conducted more easily in outdoor areas such as gardens or while driving. But, what could not be overlooked was that quantitative researchers, too, might contemplate their research results while in cars or gardens. The effect and power of the ERB instruction was to constitute the qualitative researcher as a researcher who is indistinguishable from any other type of researcher.

The topic codes that represented the objects in which researchers placed their recognition were brought together in a network view (Figure 27.4) for further exploration. The network view tool provides a visual space for thinking about concepts. As codes are linked to one another, the density of links between codes is recorded in ATLAS.ti (right screen in Figure 27.4). How 'grounded' a code is in data is also recorded. The 'groundedness' of

a code refers to the number of times a section of a document or the full document has been assigned to a code by the researcher; hence, codes with a higher numerical value for groundedness have had data assigned to them more times than other codes. This can lead to further questions and searches of the data, such as: Do principal investigators recognize themselves through photographs that include journals more than do research associates? Codes in ATLAS.ti stand alone until linked 'symmetrically' or 'asymmetrically' in one or more network views. With linking, a hierarchical view of codes is created (center screen, Figure 27.4); however, the hierarchy is not contained within the coding structure used to code documents. In a conceptual space in which codes are not visibly accessible as hierarchies, codes can be developed more fully and are more robust; links between codes can be made later.

Tracing the specter

The specter of the researcher which emerged in NVivo could be visually traced in ATLAS.ti using hyperlinking and viewing the hyperlinks in a network view. Hyperlinking, a series of links or markers between sections of

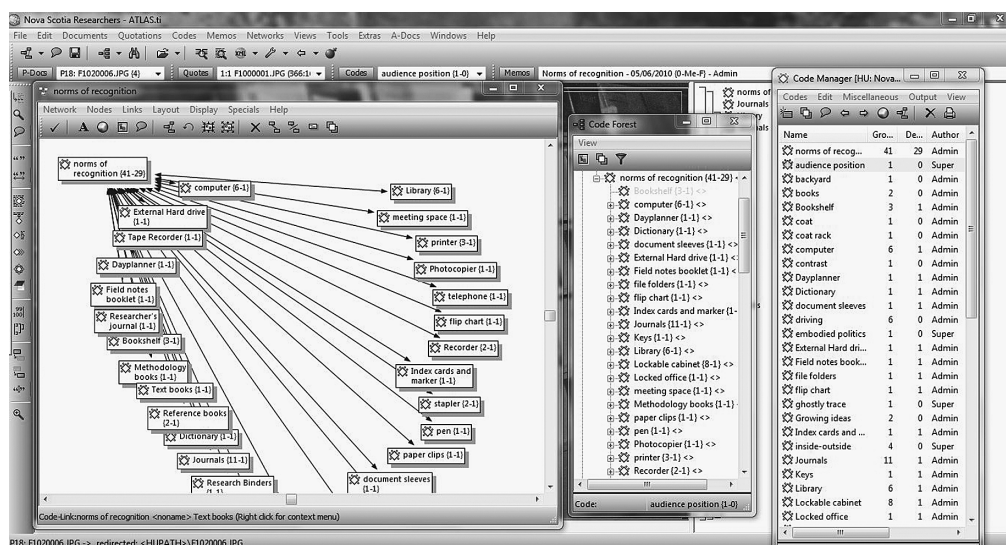


Figure 27.4 A network view in ATLAS.ti

documents (Snyder, 1996), connects one document with another in ATLAS.ti software. It is possible to retrieve the linked documents in a network view. In NVivo, the links are limited to codes, usually between two codes at a time, although workarounds are possible. Hyperlinking provides multiple rhizomatic pathways through data (Deleuze and Guattari, 1987; Mason and Dicks, 1999); pathways can be entered at any point. Two types of pathways can be constructed in ATLAS.ti: a set of linear links called a *chain*, in which sections of documents or whole documents link to each other in a straight line (Figure 27.5); and multiple pathways projecting out from a central point, called a *star*, resembling a hub (the central point e.g. a document or a code) and spokes (the links that move out from the central point to other linked items). Each provides different readings depending upon where the researcher enters the pathway. Hyperlinking, then, provides the researcher with a process other than coding to think about and helps to conceptualize the emerging analysis. Hyperlinking addresses some of the theoretical and methodological concerns expressed about fragmenting data (Coffey et al., 1996), authorship

(Barthes, 1977), representation (Denzin, 1997) and post-paradigm ethnography (Marcus and Fischer, 1986). Tracing the specter of the researcher through the hyperlinked photographs (Figure 27.5) provides an understanding in which any one image in the chain is now informed by each of the other images. In observing the hyperlinked images, for instance, the silhouette of the researcher can be traced to each photograph: about to select a book off the shelf, reading a journal in the library, present in the office or driving down the highway. In each photograph she stands before the viewer, clicking the shutter.

HyperRESEARCH

In the conceptual space of HyperRESEARCH, images and documents are positioned to the right of the screen with 'Case' and 'Code' lists juxtaposed to the left. There are three options provided by the software for positioning these three screens, based on researcher preference. In this study, I employed the option that allowed the image to be displayed as fully as possible when the cases and codes screens were selected (Figure 27.6).

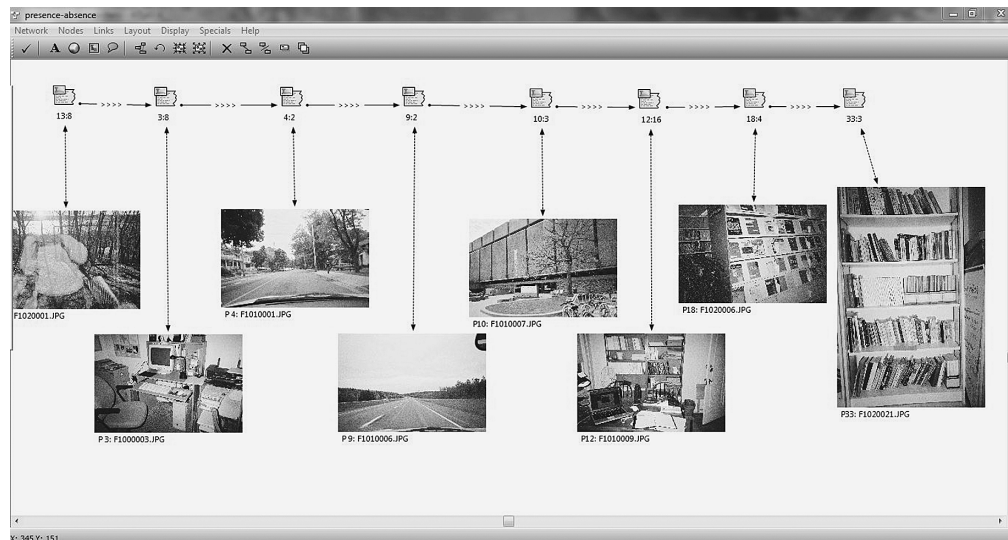


Figure 27.5 Horizontal *chain* hyperlinking in ATLAS.ti



Figure 27.6 The conceptual space of HyperRESEARCH

Boolean search and retrieval of codes, a ‘Hypothesis Tester’ (a concept map in which codes can be diagrammed) is included in the conceptual space of HyperRESEARCH. A frequency report of codes provides a numerical overview of how many times data has been assigned to a code, similar to the groundedness of codes in ATLAS.ti (NVivo includes a ‘percentage of document coded’) and a bar chart to provide the same information visually (also included in NVivo and Transana).

Contrasting structures

In HyperRESEARCH, the photographs were displayed in much larger size and detail than in the previous software programs. Additional items were uncovered that had remained invisible until now, such as a clothesline in the upper right corner of the photo in Figure 27.2. As before, codes were applied to the photographs as they were imported into HyperRESEARCH (bottom left screen, Figure 27.6). In this software, the detail in the photographs now brought contrasts to the forefront. The most notable was the contrast in the photograph in Figure 27.6 between the hard concrete structure of the university library and the more ethereal picture of the

lone tree coming into leaf. The bent, forked branches contrasted with the straight lines of the rectangular blocks of the library, solid concrete with leaves that seem to float in space, the strength of the latter and the fragility of the former also symbolizing different versions of how knowledge is constructed.

Researchers as growers of ideas

Taking this observation back to the photographs, in one, the office in Figure 27.1, clay plant pots were visible. The pots represented growth and its absence. Two clay pots sat on the floor near the door, stacked inside each other, still with soil, perhaps awaiting a new season and new plants, or perhaps neglected, the plants now dead. On the bookshelf behind these two pots, and to the left, sits a blue plant pot out of which notepaper is bursting, symbolizing the growth of ideas (Figure 27.7). In other photographs, too, researchers had snapped green gardens and backyards upon which they looked as they pondered and reflected upon their research data and findings.

The code map in HyperRESEARCH was used to link the related codes that had been applied to these three photographs

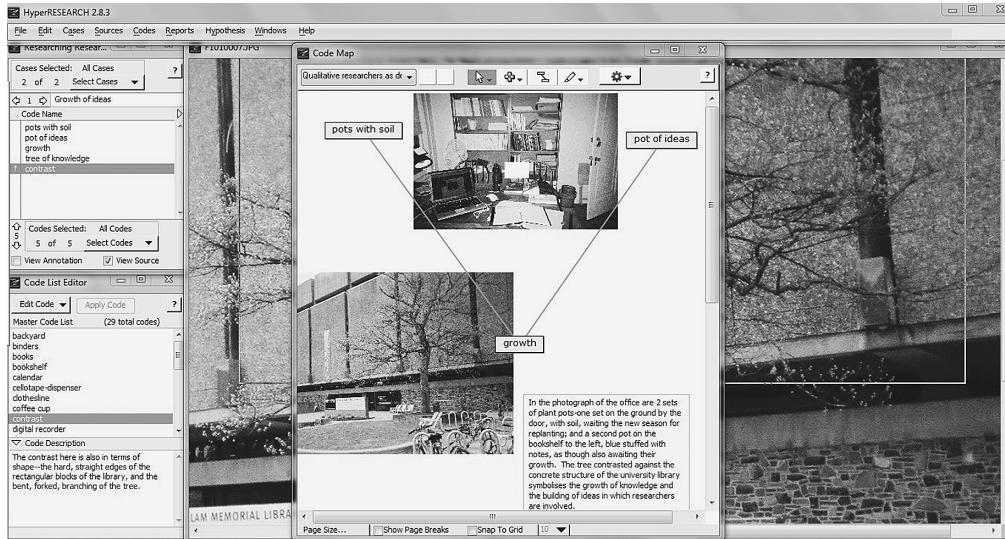


Figure 27.7 Code map linking codes, photographs and memo in HyperRESEARCH

(growth, pots with soil, and pot of ideas). The photographs were brought into the code map and scaled to an appropriate size, and a memo written (Figure 27.7), thus visualizing hunches and ideas and encouraging their further development. The Hypothesis Tester, based on production rules (If this....Then that), was then used to think further about these ideas. In HyperRESEARCH the Hypothesis Tester is intended to test working ideas and hunches. To do so requires coding to be done directionally, unlike coding in the three previous programs. Whereas codes in the three previous software programs can include all dimensions of the code, e.g. positive and negative aspects, in HyperRESEARCH codes must be more carefully defined with the different dimensions of a code as separate codes (Hesse-Biber and Dupuis, 2000). Using the Hypothesis Tester, the idea of researchers 'growing ideas' could be extended to their full development as knowledge in publications including journals, books, and articles on the bookcases in the many offices photographed. The use of the Hypothesis Tester was not so much out of a desire to test a hunch or hypothesis as a desire to use this tool for analysis, trying out

and making explicit different combinations of codes in the 'If this...then that' format. The Hypothesis Tester provided a very different conceptual space than ATLAS.ti, Transana or NVivo. As with the 'Query' and 'Search' tools in the other three software programs, the results from the Hypothesis Tester are dependent upon the quality and completeness of the coding of the researcher.

As with each of the other software programs, the availability of screens for viewing and coding images in close proximity contributed to an uninterrupted conceptualization of ideas with previous ideas (i.e. codes) in view. In HyperRESEARCH, the quality of the photographs in the conceptual space and the detail that was available to the eye provided new views and new insights. The positioning of images, the uncluttered screens and the ease of use of the Hypothesis Tester provided a very different conceptual space than NVivo, ATLAS.ti and Transana.

CONCLUSION

CAQDAS programs such as ATLAS.ti, Transana, HyperRESEARCH and NVivo

provided creative approaches to analyzing visual data. The requirements of the four software programs for the use of visual data are few: consideration should be given to the type of data produced, to equipment choices for image capture, data storage and manipulation, and user training needs, for example. Each program provides a conceptual space based on the developer's ideas about qualitative research; thus each conceptual space poses constraints as well as opportunities for analysis. Software functions can be combined in a myriad of ways not imagined by the developer. In software–user interaction, the conceptual space is transformed into a mediated space, often overturning the initial design, intention and objectives the developer had for the use of the software in research (Burnett, 2005). For example, Transana was developed for the analysis of video. Creating a slide show of photographs manipulated the research design created by the developers, putting it to uses other than that anticipated. CAQDAS programs available for visual methods research provide opportunities not previously available to visual researchers, and push the boundaries in terms of what can be accomplished in visual analysis.

NOTES

1 Computer Assisted Qualitative Data Analysis Software is commonly referred to in its abbreviated form as CAQDAS. Specific seminar sessions devoted to the use of CAQDAS in research are often offered at conferences throughout the social sciences.

2 A number of authors in this volume have addressed ways of using photographs, maps or video in their research, including methods such as photo-elicitation (Chapters 11 and 12), video ethnography (Chapters 5 and 31), participatory mapping (Chapter 25), rephotography (Chapters 6 and 7) and the arts (Chapter 33).

REFERENCES

- Banks, M. (2007) *Using Visual Data in Qualitative Research*. London: Sage.
- Barthes, R. (1977) 'The death of the author', in *Image Music Text*, translated by S. Heath. New York: Hill and Wang. pp. 142–148.
- Bassett, R. (2004) 'Qualitative data analysis software: Analyzing the debates', *Journal of Management Systems*, 16(4): 33–39.
- Boden, M. (1994) 'Creativity and computers', in T. Dartnell (ed.), *Artificial Intelligence and Creativity*. Netherlands: Kluwer Academic Publishers. pp. 3–26.
- Burnett, R. (2005) *How Images Think*. Cambridge, MA: MIT Press.
- Coffey, A., Holbrook, B. and Atkinson, P. (1996) 'Qualitative data analysis: Technologies and representations. *Sociological Research Online*, 1(1) <http://socresonline.org.uk/1/1/4.html>
- Collier, J. (1957) 'Photography in anthropology: A report on two experiments', *American Anthropologist*, 59: 843–859.
- Dant, T. (2004) 'Recording the "Habitus"', in C. Pole (ed.), *Seeing is Believing? Approaches to Visual Research*. Oxford: Elsevier.
- Deleuze, G. and Guattari, F. (1987) 'Introduction: Rhizome', in *A Thousand Plateaus: Capitalism and Schizophrenia*, translated by Brian Massumi. Minneapolis, MN: University of Minnesota Press. pp. 3–26.
- Denzin, N. K. (1997) 'Lessons James Joyce teaches us', in *Interpretive Ethnography: Ethnographic practices for the 21st century*. Thousand Oaks, CA: Sage.
- Derrida, J. (1994) *Specters of Marx: The State of the Debt, the Work of Mourning and the New International*. New York: Routledge.
- Dicks, B., Mason, B., Coffey, A. and Atkinson, P. (2005) *Qualitative Research and Hypermedia: Ethnography in the Digital Age*. London: Sage.
- Frisinghelli, C. (2009) 'Photographs in context: Notes on handling an archive and looking at the exhibition Pierre Bourdieu's photographic documentary Accounts in Algeria, 1957–1961', translated by M. O'Neill, *The Sociological Review*, 57(3): 512–521.
- Haraway, D. (1991) 'Situated knowledges: The science question in Feminism and the privilege of partial perspective', in *Simians, Cyborgs, and Women: The Reinvention of Nature*. New York: Routledge. pp. 183–201.
- Hesse-Biber, S. and Dupuis, P. (2000) 'Testing hypotheses on qualitative data: The use of HyperRESEARCH computer-assisted software', *Social Science Computer Review*, 18: 320–328.
- Hockey, J. and Collinson, J. (2006) 'Seeing the way: Visual sociology and the distance runner's perspective', *Visual Studies*, 21(1): 70–81.

- Jenks, C. (1995) 'The centrality of the eye in Western culture: An introduction', in C. Jenks (ed.), *Visual Culture*. London: Routledge. pp. 1–25.
- Johnston, J. (1999) 'Machinic vision', *Critical Inquiry*, 26(1): 27–48.
- LaFrance, M. (1996) 'Why we trust computers too much', *Technology Studies*, 3(2): 163–178.
- Marcus, G. E. and Fischer, M. (1986) *Anthropology as Cultural Critique: An Experimental Moment in the Human Sciences*. Chicago, IL: University of Chicago Press.
- Mason, B. and Dicks, B. (1999) 'The digital ethnographer', *Cybersociology: Research Methodology Online*, 6(1). [Online] Available from www.cybersociology.com [Accessed 25 July 2005].
- O'Brien, H. and Bassett, R. (2009) 'Exploring engagement in the qualitative research process'. Poster presented at American Society for Information Science & Technology (ASIS&T) Conference, Vancouver, BC.
- Richards, T. and Richards, L. (1994) 'Creativity in social sciences', in T. Dartnell (ed.), *Artificial Intelligence and Creativity*. Netherlands: Kluwer Academic Publishers. pp. 365–383.
- Rose, G. (2007) *Visual Methodologies: An Introduction to the Interpretation of Visual Materials*, 2nd edn. London: Sage.
- Sandelowski, M. and Barroso, J. (2003) 'Classifying the findings in qualitative studies', *Qualitative Health Research*, 13 (7): 905–923.
- Snyder, I. (1996) *Hypertext: The Electronic Labyrinth*. New York: New York University Press.
- Stanczak, G.C. (2007) *Visual Research Methods: Image, Society and Representation*. Los Angeles, CA: Sage.
- Sweetman, P. (2009) 'Revealing habitus, illuminating practice: Bourdieu, photography and visual methods', *The Sociological Review*, 57(3): 491–511.
- Van Eck, C. and Winters, E. (2005) 'Introduction', in C. Van Eck and E. Winters (eds), *Dealing with the Visual: Art History, Aesthetics, and Visual Culture*. Aldershot: Ashgate. pp. 1–13.

