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Utilizing Qualitative Data Analysis Software

A Review of Atlas.ti

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Atlas.ti is qualitative data analysis (QDA) software, and its recent version 5.2.12 is now more user friendly as a Windows-based application. Atlas.ti provides some very useful tools in academic research, particularly for social science disciplines. This review offers a case study of utilizing a QDA software package, with two examples of research presented to show how to utilize Atlas.ti. This will serve as a practical guide for qualitative researchers who are beginning to use the QDA software Atlas.ti.

Keywords: *qualitative data analysis software; content analysis; text analysis; qualitative research*

This review intends to serve as a practical guide to using qualitative data analysis (QDA) software in academic research, particularly social science disciplines. QDA software is also called computer-assisted qualitative data analysis software (CAQDAS). The choice of software for this article is Atlas.ti (Muhr, 2004). For a discussion evaluating and comparing features and functions of different software packages, pleaser refer to the works of Barry (1998), Brower (2006), Evans (1996), MacMillan and Koenig (2004), and Weinstein (2006).[1]

There are, of course, a helpful user guide and sample data sets for Atlas.ti, like many other software packages today. There is also a rich scholarship of theoretically based qualitative analysis guidance. A few scholarly works discuss the issues of using computers in qualitative research, including the work of Mangaberia, Lee, and Fielding (2004). However, we have not seen many scholarly works to show how to use the software packages with actual research cases embedded, whether it is a software review, guidebook, or research paper. So the motivation for this article is to fill the gap between the two: the theoretical academic papers and the simple software navigation or tutorial-like works. In short, this article intends to be a software review but with cases of actual research examples.

Two examples of research will be presented as an illustration of how to utilize Atlas.ti. This article can serve as a practical guide for beginning qualitative researchers or software users by showing not only which functions of Atlas.ti to use but also how two examples of

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Table 1
Summary of Research Examples Used in This Article

	Research Example 1	Research Example 2
Nature of inquiry	Exploratory	Explanatory
Type of research	Forecasting study with Delphi technique (1st round of Delphi)	Comparative case study
Work process	Solo work	Teamwork
Coding strategy	Open Coding and code in vivo	Hybrid coding
Outcomes from analysis	Coding scheme graph in network view, a table of code counts	Coding scheme for teamwork, kappa score report for interrater reliability
Qualitative research spectrum	Theory building and grounded theory	Theory testing and hypothesis testing

research are approached. As with any case study, this one will not cover every aspect of software utilization, which is not my intention.

Summary of the Research Examples

Table 1 summarizes the two academic research projects that utilized the QDA software package Atlas.ti and are used as examples for this software review article.

The first research example is a study titled "Past, Present, and Future of Network Theory: Network as a Metaphor, Method, Theory, or Paradigm?" which employed a Delphi technique to project the future of the network research and social network analysis. In this example, an online survey with open-ended questions was conducted. With the comments collected from the survey and the comments collected from the online discussion list, open coding was done to explore and capture the theme and future trends projected by the panel. A coding scheme graph was drawn in the network view to visually represent the projected trends, with produced code counts. This was done in a first-round Delphi to formulate a second-round Delphi instrument, which was a more structured questionnaire. The following section describes the steps used in the analysis process.

The second research example is a study titled "Leveraging Partnership Network for IT [information technology] Innovation: How to Build the Effective Neighborhood Information System [NIS]," which employed a comparative case study as a subproject in the study to complement and triangulate the other subproject done by quantitative analysis in order to look at how partnership works to build an NIS. In this example, a hybrid coding strategy was utilized. Hybrid coding was used to rely on existing studies in part. With the coding scheme produced in a previous exploratory study, Coder 1 (main coder) coded the reports of the field expert on that topic and produced a coding scheme. In doing so, the main coder was able to enhance the reliability of the coding scheme with a minimum of data (only a few interviews done by then). This was also suitable as the author (simultaneously the main coder) wanted to bring in an additional coder for the interviews of multiple cases to come. Then, the team—two coders and a project assistant—convened after pretesting

and concluded a coding scheme. This teamwork setting had an advantage of bringing other sets of eyes to the study, and the author benefited from instant feedback through each round of team meetings. The following section describes the steps used in the analysis process.

Utilizing the QDA Software

This section is to simply illustrate how one could go about doing coding and qualitative analysis, but there can and should be other ways of doing this. These two approaches are not comprehensive in utilizing QDA software and should only serve as a case study.

Briefly, I would like to talk about some of the benefits of using QDA software. First, the processes (How did I get there?) can be more transparent and replicable, which is meaningful in social science disciplines, particularly public administration research, where I have witnessed an increasing number of case studies. In doing so, qualitative research can be more credible. Second, it can be time saving and more effective in terms of project management, especially in a teamwork setting. Learning from Herbert Simon "human (expertise) + computer (data processing)" can yield a better performance (Klahr & Kotovsky, 1989).

I will now go step by step to show how I used Atlas.ti for the research examples. I start with the first example, a Delphi study.

Step 1: Created many codes using open coding, and code in vivo. See Figure 1.
Step 2: Narrowed down by merging codes ("paradigm" merged with "widespread," and it is automatically documented in the definition window of code manager), used comments or memo in addition to codes for future write-ups ("grounded" in the code manager window tells you the frequency of code as you code). See Figure 2.
Step 3: Produced a coding scheme graph in a network view (you can label your codes and links). See Figure 3.

Network view is a great visual tool, derived from graph theory tradition. This graph was used in a first iteration of the Delphi method and was provided to the panel to answer a second round of the Delphi survey.

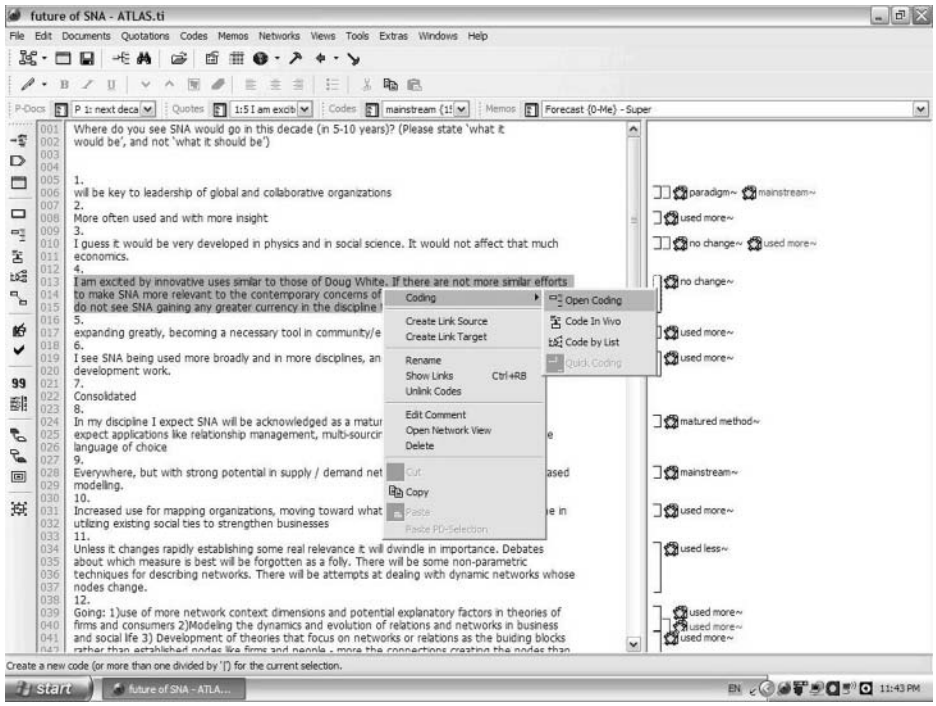
Step 4: Produced a table of code counts (a quick "quotation count report" from the code manager window can be saved as a document file or Excel file).

In sum, a table and a coding scheme were provided as feedback for the iteration process of the Delphi study.

Now, I will move to the second example, particularly to show processes for a teamwork setting. Again, data consisted of transcribed interviews. There were about 30 interview transcriptions from four cases in a comparative case study.

Step 1: Coded with a previously developed a coding scheme.

Figure 1
Coding: Open Coding, Code in Vivo, and Code by List



Coding was done through hybrid coding strategy, fusing codes from earlier open coding into codes from documents of expert reports. With the codes produced from the preliminary round of open coding, I coded documents of an expert who is widely accepted as one of the important field experts in NIS endeavor, and his reports have credentials to serve as guidance for this study. This was done because first, the reports were dependable sources so that I could refine my codes. Second, it was to code the following three other cases in more of a theory-testing manner as a complementary triangulation study to the quantitative analysis. The coding scheme was discussed with an additional coder to refine definitions, and it has been revisited with multiple rounds of feedback from two coders progressed respectively. Each coder conducted coding separately with the developed coding scheme and then convened to discuss the results after each round.

Step 2: Merged and discussed works of two coders (you can rest your mouse to see the coder number. Double click the code in the code manager window and it will give you a quotation summary window sorted by code so that you can go back to the coded section easily). See Figure 4.

Figure 2
Merged Codes in the Definition of Code Manager Window

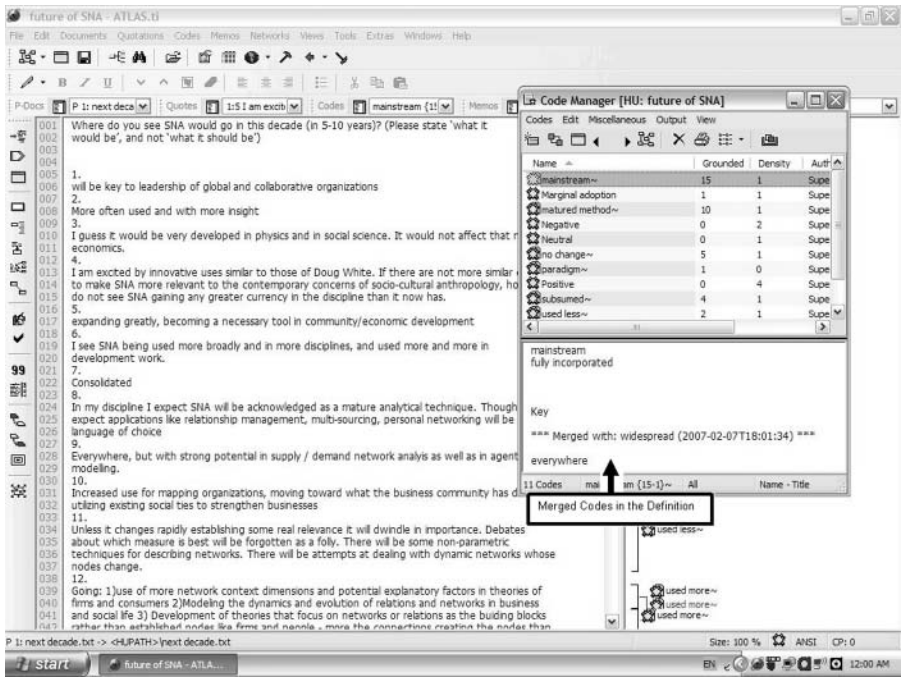


Table 2
Kappa Score Report

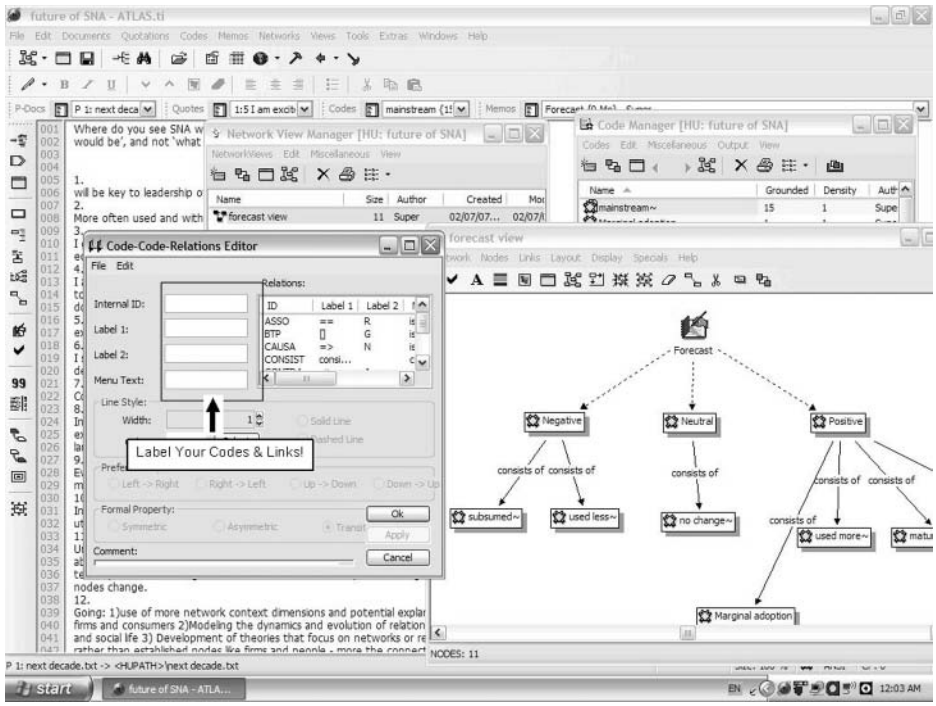
Code	Coder 1	Coder 2	Exact Match	Overlap	Kappa (including overlap)	*F* Measure (including overlap)
Awareness of NIS	8	8	0	4	0.42	0.47
Executive level connection	4	6	0	3	0.49	0.55
Funding	8	19	0	8	0.46	0.55
Management leadership	8	9	1	3	0.46	0.47
Relationship building	17	17	0	8	0.44	0.47
Resource interdependency	6	6	0	4	0.66	0.67
Shared goal	3	4	0	2	0.57	0.57
Total	178	246	3	105	0.43	0.49

Note: NIS = neighborhood information system.

Step 3: Produced a Kappa score[2] report to see a pattern of agreement between coders (see Table 2).

Step 4: Use "memo," "search," and "code family or super-code" functions for write-ups. In families, two families of codes were created to answer two research questions of the study. Each family contains a number of codes that applied to a research question. Super code is

Figure 3
Labeling Codes and Links in the Network View Manager Window



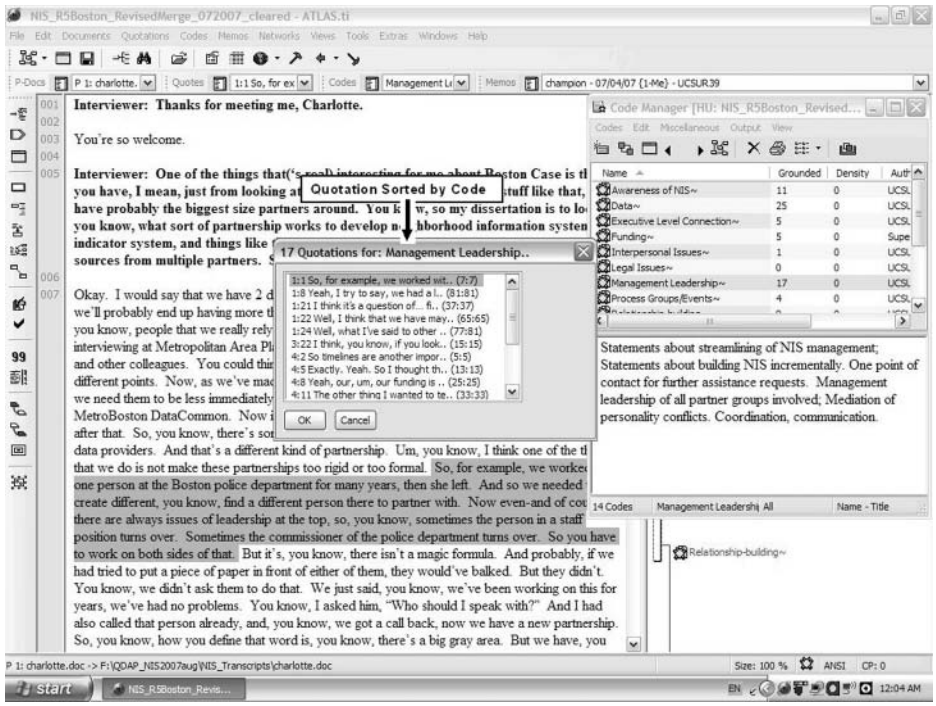
useful as it can serve as a query tool (see Figure 5). Refer to Maietta (2006) for more on this query tool discussion.

Summary

As with any software, this QDA software does not do the work for you automatically. You still do the work, because it is an intellectual task. But you get the computer to work as your research assistant, which can save time and make your work better, especially for large data sets. There can be a higher initial learning curve issue for QDA software compared to other software packages.

I argue that QDA software can be used at any point along the qualitative research spectrum, whether it is close to the theory-building or grounded-theory end or close to the theory-testing or hypothesis-testing end. For practical benefit, using QDA software will save time and make your work easier to manage, especially for large sets of data and teamwork

Figure 4
Find Quotation by Code in Team Meetings



settings. For empirical benefit, I believe it will enhance credibility building by making the research processes more transparent and replicable.

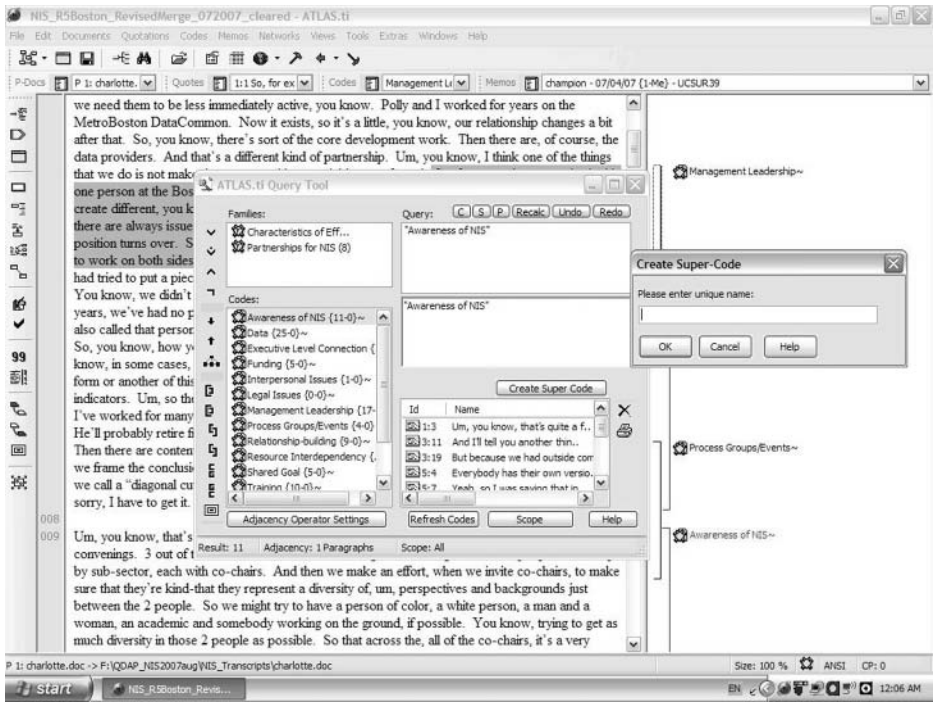
Atlas.ti can handle not only text data but also video and other digital media formats. The two examples illustrated in this article are all text data and thus did not address how to handle other data formats. This should be addressed in a future review.

Notes

1. There are more works, including the works in this online bibliography: http://caqdas.soc.surrey.ac.uk/bibliography.htm (accessed September 2007) and a Special Issue on Content Analysis and Qualitative Software, *Social Science Computer Review*, *18* Fall 2000.

2. Shulman (2006) stated that "Cohen's kappa coefficient is widely considered a better standard measure of the degree of agreement existing beyond chance alone across a wide range of annotation efforts" (p. 52). Kappa score and *F* measure showed moderate agreement scores in this example. Please refer to Shulman for a detailed discussion of kappa score.

Figure 5
Code Family and Super Code



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