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Review of:

Muhr, T. 1997. *ATLAS.ti 5: The Knowledge Workbench*. Berlin: Scientific Software Development. For PC and Mac. £TBA

Books and software have much in common. Both have authors and are published, both need to be negotiated and understood by a 'reader', both add something – whether positive or negative – to one's world, and finally, both books and software may be appraised and appreciated differently by different people. For these reasons, I would like to take this opportunity to review a piece of software as one might a book.

Software reviews are normally found in publications dedicated to computing such as *Personal Computer World* or *MicroTimes Magazine*. They are rarely, if ever, in the case of archaeology at least, found within the pages of those publications specific to our discipline. I offer a review of *ATLAS.ti 5* here because I am an archaeologist first and a computer user second, and like the vast majority of my contemporaries, I use software of varying designs for diverse aspects of my research. The software package is becoming as indispensable as the book in both research and teaching environments in archaeology, so I offer this review to the archaeological/heritage/museological community in the hope that it may prove informative.

ATLAS.ti 5 is a qualitative data analysis (QDA) package (for an introduction to QDA see Denzin and Lincoln 1998; Miles and Huberman 1994). It is one of several on the market; some of the better known being NUDIST, *hyperRESEARCH*, NSR and The Ethnograph. There are several others that can broadly be categorised as text managers, code-and-retrieve programs and theory builders (see Miles and Weitzman 1994, for a somewhat outdated but nonetheless informative discussion of QDA software). In theory, even Microsoft's ubiquitous Word is a QDA package in that it can be used to manipulate, search and annotate textual documents. Most software packages designed specifically with QDA in mind, however, do a good deal more than this to greater or lesser degrees, and more or less intuitively.

ATLAS.ti 5 is the latest in the developmental history of Scientific Software's flagship QDA package. It should appear on the market at approximately the same time as this review (being in beta-testing at the time of writing), and it is significantly improved over its immediate predecessor, version 4.2. For those familiar with version 4.2, *ATLAS.ti 5* retains much of the basic user interface of that release but with improved functionality in those features retained from the old version, along with several new analytical and data management features unique to version 5.

What Does *ATLAS.ti* Do?

Broadly speaking, *ATLAS.ti 5* assists the qualitative researcher in identifying, recovering, theorising and reporting on the meaningful content of a range of primary research

materials. It is an extremely useful tool for any researcher who needs to make sense of interviews, surveys and other forms of human engagement. This is made possible by an extensive collection of tools: text editing/Primary Document handling, code-and-retrieve functions (including object managers, families, query tool, GREP search and word cruncher), memo writing (including object managers, families, active linking with other programs like Excel and PowerPoint and user-definable memo types), networks (including user-definable relations), and a range of outputs (including print/editor options *e.g.* code-list tables, HTML, XML and reports). All of these tools are designed to facilitate the five main tasks of most QDA projects: Primary Document handling, quotation creation, coding, memo writing and report generation.

In terms of usability, *ATLAS.ti* is rather like a Geographical Information System (GIS) for qualitative data. It allows not only the management of a 'normal' data set such as photographs of objects in a museum's collection, archive data on those objects and label data but also less quantifiable data, such as visitors' responses to those objects. Beyond management, *ATLAS.ti* allows the researcher to analyse one set of data in relation to another such as might be required for a visitor survey to a museum's collection, for example. As in a GIS, all of this information is kept together in one qualitative 'landscape' which can be analysed and displayed either in parts or as a whole.

The Structure and Layout of *ATLAS.ti*

As alluded to above, *ATLAS.ti* is an analysis, management and theory building tool. It is designed to facilitate contextualised understandings of qualitative data sets manifest, for example, as text (perhaps from interviews), audio and visual media such as video or still images. It supports single user/single platform use, multiple user/multiple platform networking and all possible permutations in between.

The main structuring principle of *ATLAS.ti*, both conceptually and in terms of data structure is the 'Hermeneutic Unit' (HU). The HU is the key to the whole package; it acts as a container for all of a project's primary data sources and everything that a researcher might wish to do to or say about that data without actually altering it, thus maintaining its integrity. The term 'Hermeneutic Unit' succinctly describes the way in which *ATLAS.ti* works, and anyone familiar with hermeneutics, either methodologically or philosophically, should find the program very accessible.

The basic user interface into the HU is its 'Editor'. The HU Editor is comprised of one main window, which displays whatever Primary Document is currently being worked upon – or in the case of audio or video Primary Documents, information on that document. Alternatively, this main window can be displayed as a split screen with the Primary Document on the left, and a visual display of the user's interjections into that document on the right. (Fig. 1). In addition, and in common with most windows-based software, the interface windows are framed by a series of toolbars. The layout of these toolbars in *ATLAS.ti* is similar in feel to many image/photo editing packages such as Adobe Photoshop, which means that first time users, who might find themselves initially threatened by having to work with a 'Hermeneutic Unit', should find the basic layout of the Editor fairly comfortable in practice.

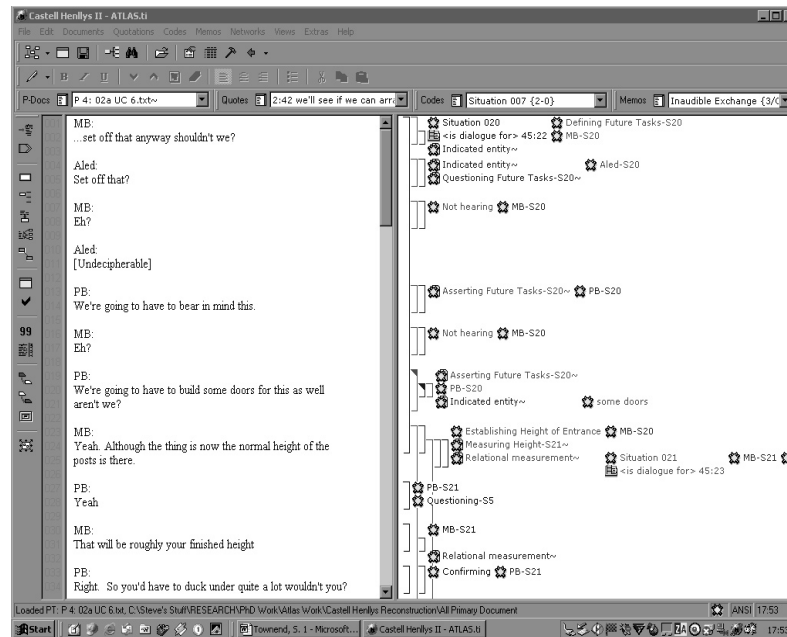


Figure 1. The main window in the 'Hermeneutic Unit' (HU). Primary Document to the left, and coding and annotations to the right of the central margin. Main toolbars both top and left.

The toolbars to both the top and left of the Editor's main window contain most of the commands for the four most common tasks executed when working with a source document: Primary Document handling, quotation creation, coding and memo writing. These basic tasks are further facilitated by four 'child' windows that are embedded within the HU Editor and visible as a toolbar directly above the main window. When activated, these become comprehensive 'object managers' which overlap with the main toolbars in some of their functionality while offering intuitive access to many more commands and tools than it would be possible to squeeze into a single window/toolbar layout. Most of a user's time will be spent within the HU Editor, with some combination of object managers open, performing one or another of the main tasks that they facilitate. With all four object managers open the HU Editor becomes somewhat crowded, and it can be difficult to see one's primary data (Fig. 2), but they can be either minimised or freely moved around in order to prioritise access to different elements of the HU Editor.

Research Materials Supported by *ATLAS.ti 5*

ATLAS.ti 5 supports the full range of research materials that might be anticipated in any given QDA project, such as textual documents (including support for some special scripts such as Hebrew), audio files (.wav and .mp3), video (.mpeg1 and .avi) and still images (.bmp, .tif, .jpg and 20 or so other proprietary formats). Any of these file types

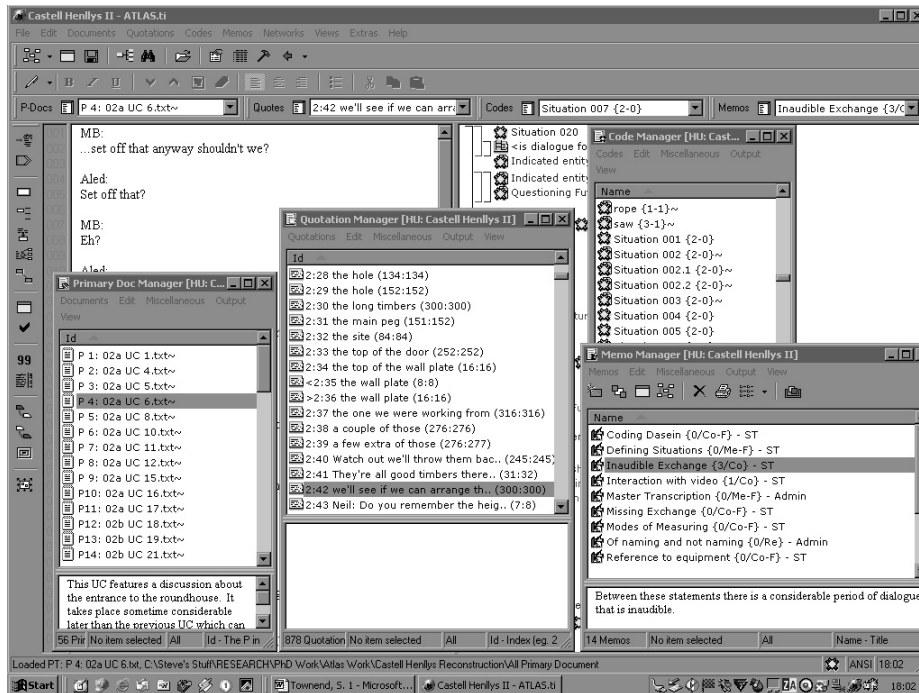


Figure 2. HU Editor with all four object managers open.

may be brought together in a single HU. Happily for *ATLAS.ti 5* users, except for an initial digitisation phase, very little prior preparation is required for those data sources that are either in an analogue format or hand-written.

Primary Document handling in *ATLAS.ti 5* is greatly improved over earlier versions. With the previous release, textual documents written in a proprietary format such as Microsoft Word had to be stripped of their formatting and converted to standard American National Science Institute (ANSI) encoding. This proved to be both time consuming and irritating because all of the line breaks and speech turns marked out in the original document were lost, and one ran the risk of creating a Primary Document that was one very long line of text and completely unusable. Version 5, however, has resolved this problem and it now understands whatever you feed it, from Word documents to e-mails.

In addition to these improvements in the handling of textual Primary Documents, version 5 supports their editing from within the HU Editor. This is a major advance over earlier versions particularly in relation to large projects involving a number of researchers in a network situation. It is now possible, through the 'data source management' tool, to synchronise any changes made to a Primary Document by any number of researchers with the original, meaning that the data source always maintains its integrity.

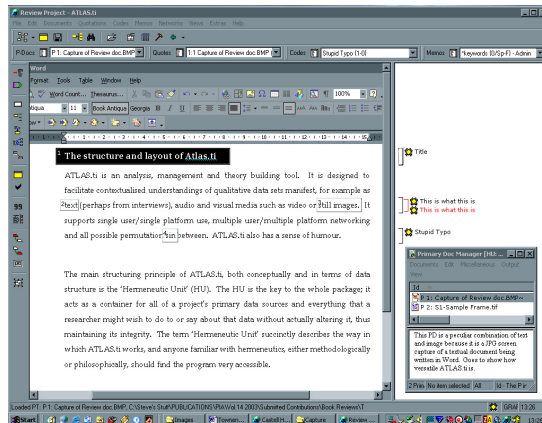


Figure 3. Managing and analysing a graphical Primary Document with a textual content.

analysis methodologically into line with the textual analysis and thus increases overall intuitive connectivity between the different media types within one HU.

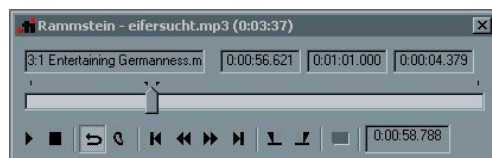


Figure 4. *ATLAS.ti 5*'s audio file interface.

within a file (which can be finely adjusted using the arrow keys on a standard keyboard) and various controls to start, pause, stop, select and quote within that file (Fig. 4). The interface for the handling of video files is similar to that for audio files. The same sets of controls are shared by both interfaces with the addition of a separate re-sizable window for video footage (Fig. 5).

The most commonly executed task in QDA is known as 'code-and-retrieve'. This refers to the process of attaching conceptual labels (codes) to one's data and then being able to find them again along with the data segments with which they are associated. This is well supported in *ATLAS.ti 5*. The first step in any coding exercise is to select those segments in a data source that the researcher finds interesting. In *ATLAS.ti 5* this known as defining 'quotations'. Coding these 'quotations' is the next step. This element of the code-and-retrieve couplet is made very simple by a combination of the standard toolbar and the codes object manager. Between them, there is great deal of redundancy in the basic coding types supported (open, *in-vivo* and by list) which means that there are a number of routes to achieve the same end, making this crucial process comfortable and intuitive. In addition there is an 'auto coding' tool that uses a number of user-definable search strings to locate text that it is desirable to code in a particular way (Fig. 6) *e.g.* all references to place such as up, down *etc.* to be coded as 'spatiality'.

The handling of graphical Primary Documents has also been significantly improved over version 4.2 by the addition of a margin area like that available for textual Primary Documents. This enhancement means that it is now much easier to keep track of the coding and interpretation of graphical Primary Documents. It is particularly useful where one has a Primary Document that is an image of a text (Fig. 3), as might be the case if one were analysing a fragile manuscript, because it brings the image

Audio and video support in version 5 remains much the same as for the later builds of version 4.2. On the whole, this is excellent. In the case of audio files in either .wav or .mp3 formats a 'media player' type interface appears with a progress bar to monitor position

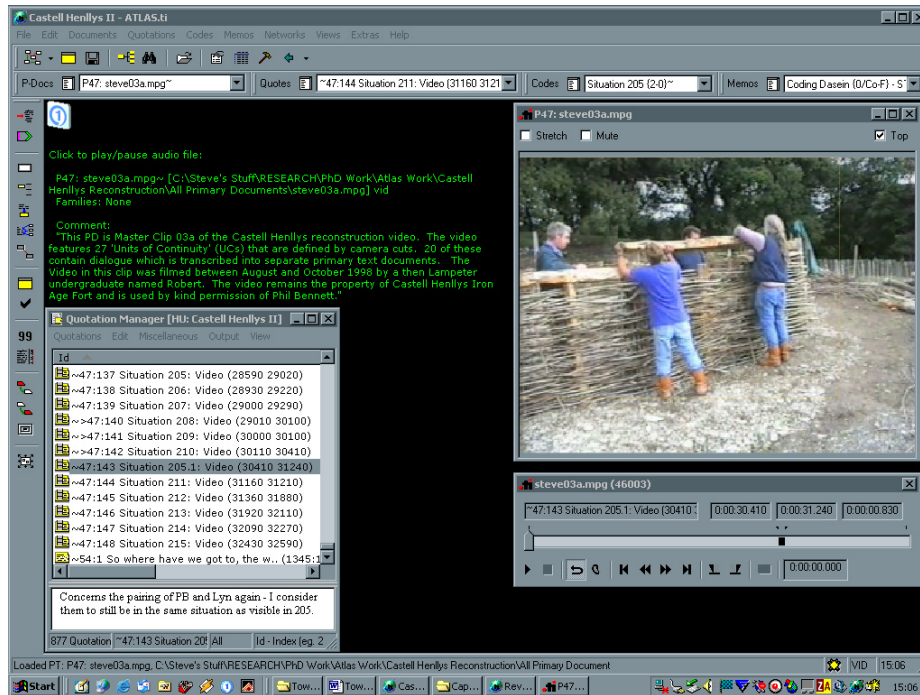


Figure 5. *ATLAS.ti 5's* video handling interface within the HU Editor.

Another useful coding tool is the 'family'; a collection of codes that are conceptually related. This is particularly useful when there is a mass of coding information connected to a Primary Document. Dividing these codes into families is a good way not only of managing them, but also of making connections between them at a conceptual level.

Retrieval of coded sections of data is also well supported in *ATLAS.ti 5*. At the most basic level, codes and their related data segments can be retrieved through the code and quotation object managers with the click of a mouse. Beyond this, there is a 'word cruncher' tool that analyses the number of instances of all the words that appear in all (or a selection) of the Primary Documents contained in an HU and exports them to an Excel spreadsheet for analysis. At another level of sophistication is the 'search' tool which will search for specific words or strings. The most powerful of the retrieve functions is the 'query tool' (Fig. 7), which uses a standard set

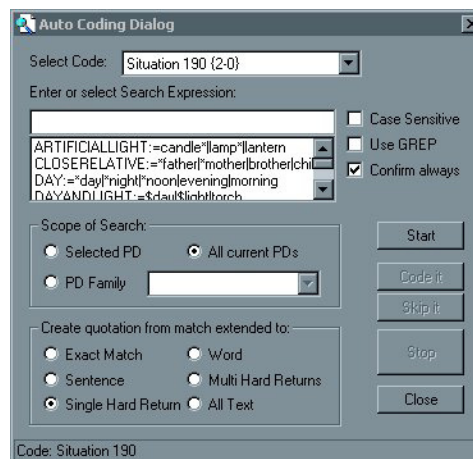


Figure 6. *ATLAS.ti 5's* auto coding tool.

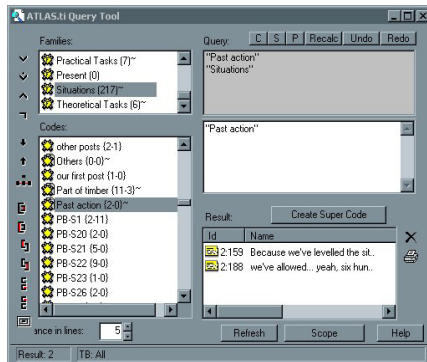


Figure 7. *ATLAS.ti 5*'s query tool.

of Boolean operators to retrieve instances of code combinations and their associated quotations within the HU. Where the tool looks for this information can be determined by defining the 'scope' of the search.

Another aspect of QDA that is effectively supported by *ATLAS.ti 5* is comment and memo writing. These are extremely useful for keeping track of one's thinking during a project, making preliminary conclusions, simply noting details or a myriad of other uses. All objects (quotations, codes, Primary Documents, networks and even memos themselves) have a comment facility attached to them. This encourages the researcher to note everything they do and why in a way that maintains a close relationship to the inspiration for that note. This is particularly useful in a multi-user environment where it means that everybody involved in a project can keep track of the reasoning behind, for example, the use of a particular code, thus encouraging consistency.

Memos are rather more complex than comments. They are not connected to any particular object but can be linked to objects or left 'floating' as required. In addition they can be assigned a 'type', either one of the default types or one defined by the researcher *e.g.* 'theory', 'method' or any other category that may be meaningful to the researcher. Like codes, memos can also be assigned to families to assist later analysis or conclusions. The most impressive thing about the memo function in *ATLAS.ti 5* over its predecessor is the fact that other types of object *e.g.* image files, Word documents, Excel spreadsheets, PowerPoint presentations, in fact almost any program supported on a local machine can be imported and edited or otherwise manipulated within the memo as if in the originating program (Fig. 8); it is very nearly possible to create a complete multi-media project without ever leaving the HU Editor for *ATLAS.ti*. In theory a researcher could write and assemble a complete thesis through *ATLAS.ti 5* alone. This makes the memo a very powerful tool indeed, because it enables every computer-based element of a project to be kept within the HU to which it relates.

One final tool that should be mentioned is the 'Network

| CODES | CJ | GH | MB | PB | TOTALS |
|--------------------|-----|-----|-----|-----|--------|
| Attention to Task | 0% | 50% | 0% | 50% | 100% |
| Interp. Past Prac. | 14% | 25% | 36% | 24% | 100% |
| Interp. Self | 25% | 15% | 56% | 4% | 100% |
| Outstanding Event | 25% | 50% | 0% | 25% | 100% |
| Planning/Practice | 68% | 2% | 26% | 4% | 100% |
| Practice/Planning | 68% | 0% | 29% | 4% | 100% |
| Role of Experience | 42% | 6% | 36% | 15% | 100% |
| Appearance | 36% | 5% | 50% | 9% | 100% |
| Constraints | 39% | 4% | 32% | 25% | 100% |
| Environment | 17% | 27% | 41% | 15% | 100% |
| Involvement | 22% | 12% | 53% | 13% | 100% |
| Materials | 30% | 6% | 47% | 14% | 100% |
| Others | 20% | 3% | 62% | 14% | 100% |
| Resources | 40% | 0% | 20% | 40% | 100% |
| Risk | 13% | 25% | 63% | 0% | 100% |
| Role of Others | 42% | 6% | 41% | 11% | 100% |
| Space/Place | 26% | 12% | 50% | 12% | 100% |
| Tasks | 26% | 3% | 66% | 3% | 100% |
| Technologies | 26% | 9% | 53% | 11% | 100% |
| Time | 26% | 7% | 52% | 3% | 100% |
| Tools | 9% | 11% | 77% | 3% | 100% |

Figure 8. Fully functional Excel spreadsheet in an *ATLAS.ti 5* memo.

Editor' (Fig. 9). This allows researchers to make and to visualise links and relations between the elements that they have drawn out of their data. By default, the types of relations used in this process are based on Grounded Theory (Strauss and Corbin 1990), but these need not be used, nor should one feel bound to Grounded Theory as there is a 'Relations Editor' that allows the user to define their own sets of relations between entities. The networks, once created, are a very intuitive way for the researcher and others to understand the data represented, and so are particularly useful for reports.

Because of the comprehensive extent to which *ATLAS.ti 5* is capable of managing a

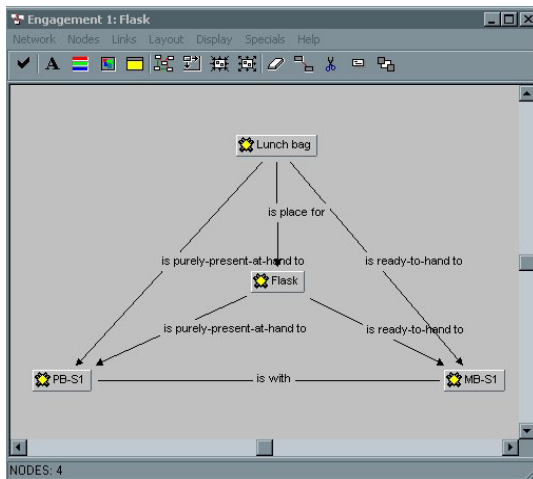


Figure 9. The Network Editor displaying a network with user-defined relations.

large, complex project, it is important that it is also capable of supporting the researcher's need to report on that project. To that end, one of the most exciting additions to version 5 is that it fully supports XML. XML is a universal 'mark-up language', similar to, but much more accessible and versatile than HTML. *ATLAS.ti 5* will 'write' a project into XML code which can then be displayed in a normal internet browser in any number of ways limited only by the 'style sheet' that is applied to it. What this means in practice is that an entire project can be digitally archived or displayed and accessed

in as many forms as a researcher may wish. As XML is a truly universal mark-up language it will not become obsolete because it relies only on style sheets to read it and not the form of the code itself. This is particularly valuable for digital archiving in the current climate of concern over the longevity of such archives.

Conclusion

The reader may question the absence of critique in this review. There are certainly problems with the software but they are mostly minor annoyances, such as not being able to create networks in which the nodes have more than one relation. On the whole, however, given that there is a vast amount more that could be said about this software than there is space for in a short review; *ATLAS.ti 5* achieves almost everything that a qualitative researcher might want from a QDA package effectively and intuitively. The other reason that there is not as much critique as one might expect is that, at the time of writing, version 5 is in beta-testing. It is therefore difficult to write with any certainty on those problems currently identifiable in the beta version as they may or may not make it to the full release which is due in December 2003.

With archaeology increasingly turning to qualitative data, *ATLAS.ti* has potentially

widespread applicability in ethnoarchaeology, public archaeology, museum studies, heritage management and any other field where human engagement is at the core of interpreting the past or attitudes about the past. In these areas of the discipline the need to conduct effective and coherent qualitative research is fundamental, yet most archaeologists are not familiar with, or in many cases even aware, that there is software available to support such research. With more widespread use, *ATLAS.ti* could become as indispensable to the qualitative researcher as the Statistical Package for the Social Sciences (SPSS) – to which, incidentally *ATLAS.ti* exports – is to the quantitative researcher. The archaeological community would do well to explore its potentialities further.

Acknowledgements

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