

COMPUTER ANALYSIS OF UNSTRUCTURED INTERVIEW DATA

Geoffrey Shacklock
The Flinders University of South Australia

ABSTRACT

This paper reports on the use of a software package for analysis of data collected from a series of in-depth, unstructured interviews. The software called HYPERQUAL was designed by Raymond V. Padilla and uses the Macintosh HyperCard system as an organising database for handling qualitative data. The cut, paste and sort functions of the computer in finding and moving required information are used together with the 'filing card' organising system of HyperCard to enable the researcher to electronically perform the coding and sorting processes essential to interpretational qualitative analysis. HYPERQUAL is a versatile analysis tool which can be used for: both structured and unstructured interview data, observational data, and document analysis.

Paper presented at the Annual Conference of The Australian Association for Research in Education, Fremantle, 22-25 November 1993.

Introduction

This paper is about HyperQual, a commercially available software package for the analysis of qualitative research data. The software conducts a conventional qualitative analysis procedure

electronically by using the HyperCard system available with Macintosh computers. The cut and paste functions of the computer together with the card organising format of HyperQual allow an efficient means for the storage, comparison and retrieval of data. The paper reports on the use of this software, using illustrative data collected from unstructured interviews with school teachers, where the focus was on teacher development, teacher professionalism, and teachers' work.

About the software

This paper reports on the use of HyperQual version 4.3 operating with an Apple Macintosh System 6.0.7. It should be noted however that another version, HyperQual 4.4, is compatible with System 7; as is a newly available version, HyperQual 2, which does not use the previously known HyperCard and Home stack, but HyperCard Player.

The software described in this paper was developed in the United States by Raymond V. Padilla and was purchased by this researcher to assist in the routine aspects of analysis of data contained in a collection interview transcripts.

Aim of the software

The manual which accompanies the software reports that HyperQual is designed to perform the mechanical part of qualitative analysis, which is to say that it assists in the physical handling of data. This can often be an onerous and time consuming task which can be a something of a burden to the researcher. However, as is pointed out by Tesch (1990:113), this is not to imply that qualitative analysis is "mechanistic or mechanically determined", but that it simply requires a lot "handwork" in the requisite tasks of recording, sorting and organising data.

The software therefore, aims to ease the burdens inherent in the physical handling of large amounts of data whilst at the same time freeing the mind of the researcher from the demand of memorising where and how segments of data have been organised and stored. This, it is hoped, will allow the researcher's attention to be more effectively focussed upon, the conceptual processes involved in qualitative analysis and, the decision making which is integral to interpretation that leads to conclusions, and possibly theory generation, based on the data.

Overview of the analysis process

Once the research is underway and data has been

collected, it can be stored directly into the software or it can be transferred to HyperQual from another application, such as a word processor, by use of the Macintosh clipboard facility.

After data has been appropriately stored the researcher can search, either manually or with the find function from the desktop, the full text for interesting pieces or segments which can then be selected and copied from the main text prior to being pasted elsewhere, with or without an identifying label (or tag). Tesch (1990:115) has borrowed a term used by Seidel (1988) to describe this process, where a segment of text which has value as data representing some useful research category is removed from the larger mass of data it was originally collected in, as "de-contextualisation".

Selected segments of data can be coded and usefully stored with or without an identifying tag and compiled with other selections that have been similarly coded with the same tag for comparison and interpretation. The placing of data segments with others of the same category (having the same tag) is referred to as "re-contextualisation". The coding or tagging referred to here is an important and difficult aspect of the research process, and is one which must be tackled by the researcher as the analysis proceeds. There is often considerable backtracking and consequent refinement of codes as the research proceeds. (A discussion of the importance and difficulty in coding data is given in Strauss (1987).)

As Tesch explains, using the words of Marton, each segment of data has two contexts, "first the interview from which it was taken, and second the 'pool of meanings' to which it belongs" (1990:118). The categories, identified by the associated tags, into which selected data segments are placed upon re-contextualisation, are of specific interest to the researcher and represent the other 'pool of meanings' context.

The de-contextualisation /re-contextualisation process, where the data is dissembled before being reassembled into groupings suitable for the researcher's interpretative agenda, is usually referred to in qualitative analysis literature as the development of an organising system. An organising system evolves as the data is progressively reprocessed and becomes the platform on which interpretational analysis and, eventually if the research has this purpose, theory-building, can be constructed.

Most texts on qualitative analysis devote some space to the discussion of why an organising system is important in analysis and how it can be developed. (Tesch, 1990; Bogdan and Biklen, 1982). However in brief, an organising system is important in qualitative analysis because it provides a methodological vehicle for the

moving about, and multiple copying, pasting and comparison, of data segments which in turn allows the researcher to engage in the necessary processes of induction/deduction/generalisation (Hutchinson, 1988) that are essential in the analysis of data.

Beyond the development of the organising system itself, the other important and essential requirement for the efficient movement and location of data is the construction of a referencing system that allows each segment of data, wherever it is located and at whatever stage of the analysis, to be traced to its primary and secondary sources. This can be a demanding task which is time consuming and complex to do manually, yet the computer with its power to reference and cross-link items of information is invaluable in allowing the researcher to perform this task in a relatively small time frame and crucially, with the minimalisation of opportunity for loss of data or ambiguous referencing.

HyperCard

The HyperCard program is a software package that provides a unique information environment and software development tool for use with Macintosh computers and there are a range of applications which have been designed to use the HyperCard system to advantage.

HyperCard software and application documents are called stacks and the central stack is the known as the Home stack. The Home stack is the nucleus of the program and provides essential information for the operation of HyperCard; such as where to find, and how to interact with, applications. HyperCard will not work without the Home stack .

Each HyperCard document or stack has a series of data screens, called cards, which are arranged in a circular fashion in much the same way as a circular card file. These cards can be written on, labelled, sorted, added and deleted. How this is done varies according to the purpose of the application because the cards in a stack are designed (or formatted) to suit the information they are to hold. The author of HyperQual has formatted cards to hold text data and diagrams and contain

reference information for the efficient storage and referencing of qualitative research data, as well as tools for moving about within the data environment.

HyperQual

HyperQual is an application which uses the HyperCard software and has six different stacks which have been formatted to handle a range of types of qualitative research data. There are six HyperQual stacks and each is suitable for a specific data type as shown in the table below.

Data Type

HyperQual Stack

Structured Interviews	Xview
Unstructured Interviews	Site
Observations	
Site	
Text Documents	Doc
Research Memos	Memos
Illustrations	
Schemas	
Data Chunks	T&S

The Xview Stack

This stack has four different cards formatted to comprehensively handle structured interview data. They are: the project face card, the interview schedule card, the specific interview card, and the data card.

Fig.1

The project face card (Fig.1) is the first card in each stack and has fields which allow entry of the project name and general notes (text) about the project, which in some ways means it could be likened to an abstract. The interview schedule card allows the researcher to sequentially list the questions which are used in the interviews. The next card is an interview face card which has fields for entry of information about a specific interview such as: its number and location, the date and time of the interview, the name of the

interviewer, and a large body of text which can be used to record general notes about the interview and its conduct. The next card is the data card and it is here where the text of the interview transcript is recorded along with any necessary identifying information. It would be normal to use a new data card for answers to successive questions.

Fig.2

Each stack would hold the cards for a full round of interviews for the set questions and would contain: one project card, one interview schedule card, as many

interview face cards as required (equal to the number of interviewees), each of which would be followed by as many data cards as required (equal to the number of separate questions appearing on the interview schedule). Data collected from subsequent rounds of interviews conducted in the same project would be held in a separate stack.

The Site Stack

Equivalent to the Xview stack in function but designed for handling data from unstructured interviews, or from observations made in the course of fieldwork.

In this stack there are three cards: the general project face card (Fig.1), the site face card (Fig.2), and the data entry card (Fig.3). The project face and data cards are identical to those found in the Xview stack, whilst the site face card performs a similar function to that of the interview face card as described above. Successive interviews or observations, from the same round or site visit, may be held in the same stack, with the associated data cards separated by appropriate site face cards.

It is the use of this stack in a research project which will be described in more detail throughout this presentation.

Fig.3

The Doc Stack

There are no face cards, nor any interview cards, in this stack. The data card found in this stack is specifically useful for the storage of bibliographic data and selected text (Fig.4). It may be useful in this regard as a means of recording bibliographic notes from reading and research whilst fieldwork is being undertaken, but probably has limitations as an expanded reference database compared with a specialist reference database and bibliography maker such as EndNoter.

Fig.4

The Memos Stack

The memos stack contains only one type of card with four fields (Fig.5). It allows the researcher to record

notes about ideas or observations that have been made about specific bits of data held in a data stack and to store these notes in a stack separate from the working (data) stack. Furthermore these memos can be linked to the specific card they refer to by a programming device called a button. The button is installed on the relevant card (Fig.2) by the researcher and can be used to move from that card to the memo card and back.

Fig.5

Research memos are an important part of the qualitative research process because they give " a running record of insights, hunches, hypotheses, discussions about the

implications of codes, additional thoughts, whatnot [and] cumulatively, the memos add up to and feed into the final integrative statements and the writing for publications" (Strauss, 1987:110). As such, the memos stack is a powerful built-in research tool for the HyperQual user.

The Schemas Stack

This stack uses Hypercard's built-in paint program which enables the researcher to make diagrams which may be useful as a note or tool in the analysis process (Fig.6). There is only one type of schema card which contains a blank field for painting and drawing.

The images constructed and held on cards in this stack can be linked to data or memo cards by buttons. In addition, images can be exported to, and imported from, other paint and draw applications.

Fig.6

The T&S Stacks

The Tagging and Stacking (or T&S) data stack is the key to using HyperQual for identifying, moving, collating and connecting chunks of data in a process of qualitative analysis. During a searching process, selected text from a data card can be "dumped" to a new (T&S) stack, without affecting the original data card, by use of a T&S button installed on the data card. The new stack is given an

appropriate name identifying it with the category of data held in it and further chunks of data (belonging to the same category) collected from other source data cards can also be dumped into that nominated T&S stack.

There is a different type of T&S stack for each data stack contained in HyperQual, that is; the Xview, Site, and Doc stacks. Each is created by using the T&S (or Q&D) buttons installed on the source data card and in each case they are used to copy and store chunks of data from other data stacks. The T&S button is used whenever the researcher wishes to be in control of the searching process and selection of each chunk to be dumped; but when it is preferable for this twin process to be done

automatically, the Q&D (Query & Dump) button must be selected.

Importantly, when chunks of data are dumped to a T&S stack they can be tagged by the researcher with appropriate identifying labels. These labels are listed on the card in a tags field and correspond to the labelling codes referred to in qualitative analysis literature. They are particularly useful in any refinement of the analysis because of the collating and sorting that can be conducted across stacks, using these tags as identifying labels for data "connected" in some way, through a special menu available on all T&S cards which allows various operations to be performed with the listed tags .

T&S stacks have only one type of card which has two fields in which the researcher can enter information (Fig.7). The first contains a list of tags and the second contains the selected chunks of data which are, in HyperQual terminology, exemplars.

Fig.7

Using HyperQual to Conduct Analysis

This researcher's experience with HyperQual is limited to one unfinished research project which collected unstructured interview data from several rounds of interviews. The interview transcripts were entered onto the data cards of a separate Site stack for each round. Individual interview transcripts were broken into logically "topical" sections for which there was a separate and appropriately labelled data card. The set of data cards for each interview were separated from successive sets interview data cards by a new, appropriately labelled, interview face card.

In the research project used for illustration here, important aspects of the first round interviews were concerned with teacher development where the interviewees were asked to reflect upon their experiences with, and expectations of, teacher development practices. In proceeding with analysis of transcript data, segments of

text were selected and dumped into a newly created T&S stack, the "Teacher Development TS" stack, with suitable tags for exemplars including; role of i/s, evaluating i/s, and expectations of i/s. Further, new T&S stacks such as the "role of i/s TS" stack were created using the filter option which appears on the T&S data cards.

It is possible for the HyperQual user to move about within the data in a given stack by various means using set information (assigned by the software) on individual cards together with menu functions such as: Go Last, Go First, Go Previous, Go Recent, and Go Next. Movement from one card to another within and between stacks can be achieved through use of the Card number, Card I.D., Source Card, and Memo or Flag & Zip buttons (Fig.7).

Printing and Output

HyperCard allows information contained in stacks to be printed through an in-built printing capability that can be used with any stack. There are four print options available in the File menu of the desktop. They are: print a field, print a card, print a stack, and print a report.

1. Printing a field - allows a nominated field from a card to be printed.
2. Print a card - allows a card as seen on the screen to be printed.
3. Print a Stack - allows a stack to be printed.
4. Print a report - allows a formatted report of card information to be printed.

Whilst print options 1 & 2 maybe variously useful, it is the last of these which is most useful since the researcher can obtain a hard-copy of designated information from any stack and at any stage of the analysis process. There are however nine built-in templates, one of which must be used to print a report. These templates are for the following reports: XviewData, XviewFace, XviewTS, SiteData, SiteFace, SiteTS, DocData, DocTS, Memos. A template is selected by clicking the Reports menu and making the appropriate selections.

When printing formatted reports, it is possible to print all the cards in a stack or only some marked cards. Cards can be marked by selecting the Marked button which appears on the bottom of cards and the researcher can choose which, and how many, cards are marked.

SiteData report gives the following information:

1. A report title on each page that includes the stack

name, date and page number

2. The interview number
3. The card I.D. number
4. The data field
5. The notes field

Information from all data cards in the stack is printed in sequence, first to last. However, selected cards can be printed by using the 'marked card' function from the menu.

SiteFace reports give the following information:

1. A report title on each page that includes the stack name, date and page number
2. The interview number
3. The name of the researcher
4. The interview date
5. The card I.D. number
6. The interview notes

Information from all face cards in the stack is printed in sequence, first to last. However, selected cards can be printed by using the 'marked card' function from the menu.

SiteTs reports give the following information:

1. A report title on each page that includes the stack name, date and page number
2. The interview number
3. The name of the researcher
4. The source card I.D. number
5. The name of the source stack
6. The text of the exemplar
7. All tags applied to the exemplar
8. The card I.D. number
9. Filter tag, if any was used

Information from all T&S cards in the stack is printed in sequence, first to last. However, selected cards can be printed by using the 'marked card' function from the menu.

Memo reports give the following information:

1. A report title on each page that includes the stack name, date and page number
2. The project name
3. The author of the memo
4. The topic
5. The date of the memo
6. The card I.D. number
7. The memo number
8. The text of the memo

Information from all memo cards in the stack is

printed in sequence, first to last. However, selected cards can be printed by using the 'marked card' function from the menu.

Information contained in stacks can be moved from

HyperQual to other applications via the clipboard, however if the movement of a large or a cumulative selection of text is required then an output file should be created. Output files are created by clicking the Dump File button which appears on the bottom of some cards.

Summary

The experience of using HyperQual with unstructured interview data would point to many advantages for the use of HyperQual in qualitative analysis, including:

- (i) ease of storing and retrieving data;
- (ii) rapid movement between sets of data;
- (iii) tidiness of analysis through absence of multiple sheets of paper;
- (iv) quick linkages between pieces of data and with other information such as memos;
- (v) capability for merging data from different sources;
- (vi) cross referencing of data and sources;
- (vii) ease of access to neat hard copies of collated data; and
- (viii) the inclusion of diagrams in the analysis; whilst the possible disadvantages to using HyperQual in analysis would appear to be:
 - (i) some degree of invisibility with the extent of the data and analysis;
 - (ii) the possible loss of intuitive engagement with analysis pathways; and
 - (iii) that some computing knowledge is required.

Concluding remarks

I have found HyperQual to be an interesting and challenging means for dealing with analysis tasks associated with my unstructured research data. As well as being a sophisticated, electronic methodological aid that has allowed relatively quick storage and sorting of data, HyperQual has also been a better than useful tutor in the processes integral to qualitative analysis.

Appendix

HyperCard, HyperTalk, and Macintosh are registered trademarks for the Apple Computer Company.

Card images shown Figures 1,2,3,4,5,&7 in this paper were produced from HyperQual. The text in card fields has been added by the author of this paper.

Availability

HyperQual is available from: Qualitative Research Management, 73425 Hilltop Road, Desert Hot Springs, CA 92240, USA.

New Version

A new version became available in August 1993. It is called Hyperqual2 and is a stand alone application that does not require the use of HyperCard or the Home stack. Instead it uses a new Apple program called HyperPlayer, which is incorporated with the purchased software package.

Technical Information

HyperQual version 4.3 requires HyperCard 2.0 or higher with the user level set to scripting. Earlier versions of HyperCard will not run HyperQual.

HyperCard requires 1Mb of RAM to work properly, however additional RAM will speed up the operation of HyperQual; but if Multifinder or System 7 are being used, more memory is required. The likely ROM requirement for stacks mean that a hard disk is desirable for the efficient operation of HyperQual.

Important HyperCard limits are:

1. Stack size is 512 Mb
2. Maximum number of bitmaps, cards and backgrounds per stack is 16,777,216
3. Maximum number of characters per field is 30,000

Macintosh text files can be imported using the clipboard. Lengthy files may require a script to be written to import the data directly into the data stacks. Text files in IBM DOS format must first be translated into Macintosh format.

Bibliography

- Apple Computer (1990). HyperCard Reference. Cupertino, CA: Apple Computer Inc.
- Apple Computer (1990). HyperTalk: Beginner's Guide for the Macintosh. Cupertino, CA: Apple Computer Inc.
- Bogdan, R. C., & Biklen, S. K. (1982). Qualitative Research for Education: An Introduction to Theory and Methods. Boston: Allyn and Bacon Inc.
- Lofland, J. (1971). Analysing Social Settings. Belmont, CA: Wadsworth Publishing Company.
- Hutchinson, S. A. (1988). Education and Grounded Theory. In R. R. Sherman & R. B. Webb (Eds.), Qualitative Research in Education: Focus and Methods. London: Falmer

Press.

Niles & Associates, (1991). EndNote Plus [Computer Program]. Berkeley, CA: Niles and Associates Inc.

Padilla, R. V. (1991). HyperQual [Computer Program]. Chandler, AZ: Author.

Padilla, R. V. (1991). Qualitative Analysis with HyperQual. Chandler, AZ: Author.

Seidel, J. (1988). The Ethnograph: A User's Guide. Littleton, CO: Qualis Research Associates.

Strauss, A. L. (1987). Qualitative Analysis for Social Scientists. Cambridge: Cambridge University Press.

Tesch, R. (1990). Qualitative Research: Analysis Types and Software Tools. New York: Falmer Press.