



## Analysing qualitative research data using computer software

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**ABSTRACT** McLafferty, E., Farley, A. (2006) *Analysing qualitative research data using computer software. Nursing Times; 102: 24, 34-36.*

An increasing number of clinical nurses are choosing to undertake qualitative research. A number of computer software packages are available designed for the management and analysis of qualitative data. However, while it is claimed that the use of these programs is also increasing, this claim is not supported by a search of recent publications. This paper discusses the advantages and disadvantages of using computer software packages to manage and analyse qualitative data.

An increasing number of clinical nurses are carrying out qualitative research. It is therefore important that they become aware of the possibilities of using qualitative data analysis software packages.

Analysing data is always time-consuming and any software package that can reduce the amount of time spent in this activity should be welcomed. However, the process of learning to make the best use of such packages is itself time-consuming. It is also best to learn about these packages before actually using one.

### Background

Traditionally, computer software packages designed for the management and analysis of research data have been associated with quantitative methods. However, analytical packages are increasingly being designed for use in qualitative studies. Researchers say that these packages are now being routinely used and are revolutionising the analysis of qualitative data (Fielding, 2002; St John and Johnson, 2000; Fielding and Lee, 1996). However, this view is not supported by the available literature.

A preliminary review of articles published in the *Journal of Advanced Nursing* between January 2005 and December 2005 identified that 76 out of approximately 254 articles described qualitative research (around 33%), though only 12 of these articles (16%) reported the use of computer software packages when analysing the data. The remaining 64 (84%) did not indicate the use of such packages.

Considering that analysis software specifically designed for qualitative research has been available since 1984 it is surprising that so few researchers report using it. This may be due to the difficulties associated with mastering the software, although Tak et al (1999) argue that use of such packages is largely mechanistic and that this can stifle research creativity.

As novice users of qualitative data analysis (QDA) tool NVivo, we are exploring its features and uses in relation to the management and analysis of research data. NVivo is one of many software packages that include ATLAS.ti, Ethnograph, MAXqda and QDA Miner. Information on these packages is available on the internet.

### Handling data

A common approach to the analysis of qualitative data is the use of transcription, where the researcher makes audio recordings of interviews and transcribes all that has been discussed.

Once the data is transcribed, it is organised into manageable chunks or segments of text. These segments are sections of the text that can stand by themselves and be understood (Tesch, 1990) or still make sense if taken out of context. The segments of text are then labelled or coded according to their meaning. This is achieved through continual reading of the data as the researcher proceeds in order to identify any categories and themes that emerge.

During this process it is the researcher's responsibility to organise verbatim quotations gained during the interviews into a framework, in which statements made on the same or similar themes are grouped together. In this way common themes and concepts can be identified (Farley and McLafferty, 2003). This process can be undertaken manually or by using a computer software package that is designed to handle and manage qualitative data.

### Manual analysis

There are a number of manual methods of data analysis. One identified by Russell and Gregory (1993) involves manually assigning quotations to a category, cutting and pasting them onto different coloured paper and reorganising them into sub-themes. The result is a mountain of paper that has to be managed and interpreted.

This method tends to be time-consuming and messy. It is easy to lose or overlook data that may be

### REFERENCES

Burnard, P. (1994) Searching for meaning, a method of analysing interview transcripts with a personal computer. *Nurse Education Today; 14: 2, 111-117.*

Davis, C. et al (1997) Use of the QSR.NUD.IST computer program to identify how clinical midwife mentors view their work. *Journal of Advanced Nursing; 26: 4, 833-839.*

Denardo, A.N., Levers, L.L. (2003) *Using NVivo to Analyze Qualitative Data.* [www.education.duq.edu/institutes/PDF/papers2002/DeNardo&Levers.pdf](http://www.education.duq.edu/institutes/PDF/papers2002/DeNardo&Levers.pdf).

Farley, A., McLafferty, E. (2003) An introduction to qualitative research concepts for nurses. *Professional Nurse; 19: 3, 159-163.*

**BOX 1. ADVANTAGES OF USING DATA ANALYSIS SOFTWARE PROGRAMS**

They can handle large data sets

They are speedy and convenient when coding, searching and retrieving data

They have the facility to attach memos and notes to data

They facilitate detailed analysis and construct-building

They allow for the production of visual indexed trees

The researcher can map the progress of the project through time/date stamps, allowing the dynamic nature of the data analysis process to be audited

The researcher can explore relationships between concepts and reorganise these into coherent explanations of the subject

hidden in a mountain of paper but it does allow researchers to revisit their analysis visually, which enhances their familiarity with the data.

**Software packages**

Producers of qualitative data analysis software packages identify what they see as their main functions, and promote the benefits and uses of their packages. However, the growing number of packages available means it is unlikely that a single researcher will know enough about each one to make an informed choice about which will be the most appropriate package for their research approach. There is also a tendency for researchers to rely on recommendations from more experienced colleagues or to choose what is immediately available (Russell and Gregory, 1993). These researchers go on to state that cost also makes it unlikely that an individual will own more than one software analysis package.

Miles and Huberman (1994) state that researchers do not always choose the most appropriate software package for analysing their data but instead tend to opt for the program that they believe they already know and understand.

They also state that many researchers use a package they already own and make it 'fit' the research they are currently undertaking instead of using a package specifically designed to suit their current research approach. Woods and Roberts (2000) dispute this assertion, stating that most software packages do not necessarily have to be used for only one research design.

It would be useful if more people who are already using computer software analysis packages were to discuss and disseminate information on how effective the package actually was in relation to managing their data. This would enable novice researchers to benefit from the increased amount of

information available to them, which in turn would allow them to make a more informed choice of software package to suit their research. Despite the difficulties associated with choosing the most appropriate software package, there are real benefits to their use, some of which are considered here.

**Advantages of software analysis**

Contrary to the expectations of many novice users, software packages do not take over the role of the researcher in data analysis, rather they facilitate systematic management and analysis (Burnard, 1994). Kelle (1997) calls the titles of these packages misnomers as they imply they actually analyse the data. This may deter some researchers from using the packages because they think they will lose control over their data. In fact the packages do not analyse data but they do help to manage it, enabling the researcher to remain in control and to continue to conceptualise and interpret the data.

Jemmott (2002) claims that data preparation and management are much easier when using computer software packages rather than manual techniques.

Davis et al (1997) claim the most significant advantage to using these software packages is the way in which they enable researchers to be creative in their analysis. Instead of spending time copying and manually cutting and pasting data, they can now do the equivalent of these processes 'on screen', freeing time for the analysis of data. Morison and Moir (1998) concur that the use of software speeds up clerical tasks associated with data handling, which in turn frees the researcher to think and to 'discover theory creatively and intuitively'.

When analysing qualitative data (manually or with computer software) codes are assigned to transcripts according to their meaning. Data is divided into sentences and paragraphs (segments) that make sense when taken out of context. These segments are identified by attributing codes to them, which are merely words that allow data to be organised into common elements from which to identify concepts or themes.

Software packages allow for effective and efficient coding of themes and categories, and for easy retrieval and movement of data between documents when compared with manual handling. This allows for the straightforward attachment of codes to segments of text that can even be colour coded for ease of identification and retrieval.

The segments, which are copies of the text material, can then be printed under relevant themes without altering the original text. The process of coding makes it easier to handle and manage data without resorting to the manual cut and paste method. This coding process therefore greatly reduces the need for multiple copying and paper handling (Tak et al, 1999).

**REFERENCES**

- Fielding, N.G. (2002) Automating the ineffable. Qualitative software and the meaning of qualitative research. In: May, T. (2002) *Qualitative Research in Action*. London: Sage Publications.
- Fielding, N.G., Lee, R.M. (1996) Diffusion of a methodological innovation: CAQDAS in the UK. *Current Sociology*; 44: 3, 242-248.
- Jemmott, H. (2002) *Using NVivo in Qualitative Data Analysis*. [www.bath.ac.uk/education/dialogue/dialogue2.7.pdf](http://www.bath.ac.uk/education/dialogue/dialogue2.7.pdf).
- Kelle, U. (1997) Theory building in qualitative research and computer programs for the management of textual data. *Sociological Research Online*; 2: 2. [www.socresonline.org.uk](http://www.socresonline.org.uk).
- Miles, M.B., Huberman, A.M. (1994) *Qualitative Data Analysis*. Thousand Oaks, CA: Sage Publications.
- Morison, M., Moir, J. (1998) The role of computer software in the analysis of qualitative data: efficient clerk, research assistant or Trojan horse? *Journal of Advanced Nursing*; 28: 1, 106-116.
- Pateman, B. (1998) Computer-aided qualitative data analysis: the value of NUD.IST and other programs. *Nurse Researcher*; 5: 3, 77-89.

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## REFERENCES

Richards, L. (1997) User's mistake as developer's challenge: designing the new NUD.IST. *Qualitative Health Research*; 7: 3, 425-433.

Russell, C.K., Gregory, D.M. (1993) Issues for consideration when choosing a qualitative data management system. *Journal of Advanced Nursing*; 18: 11, 1806-1816.

St John, W., Johnson, P. (2000) The pros and cons of data analysis software for qualitative research. *Journal of Nursing Scholarship*; 32: 4, 393-397.

Tak, S.H. et al (1999) Nursing informatics. Use of a computer software program for qualitative analyses. Part 2: advantages and disadvantages. *Western Journal of Nursing Research*; 21: 3, 436-439.

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

Woods, L., Roberts, P. (2000) Generating theory and evidence from qualitative computerised software. *Nurse Researcher*; 8: 2, 28-41.

Woods and Roberts (2000) identify a number of benefits in using computerised software packages to handle qualitative data (Box 1, p35). DeNardo and Levers (2003) also claim that computerised software packages can cope with overlapping codes and multiple codes. They also enable researchers to conduct multiple searches and to search for more than one code at a time.

St John and Johnson (2000) state that there are few limitations to the number of codes that can be generated by software packages and few limits to the number and size of transcripts. They also claim that computer packages have a greater ability to change their coding systems than manual systems. Furthermore they maintain that the use of computer packages helps to make the analytical process more explicit, although they do not explain how this can be achieved.

### Disadvantages of software analysis

While software can be extremely helpful to researchers, it does have a number of disadvantages. Learning how to use a software package is a steep learning curve and can be time-consuming. Time must therefore be set aside in order to become familiar with the software (St John and Johnson, 2000; Woods and Roberts, 2000). The language and jargon used within these packages will become more familiar with time and use.

Some software packages include an interactive tutorial that users are encouraged to complete. However, from a novice's perspective this is not a straightforward process. There is an assumption that users are already familiar with other packages and this may not necessarily be the case.

Pateman (1998) reported finding it difficult and time-consuming to learn to use the software, arguing that it failed his original intention of making qualitative analysis easier. Despite the difficulties of language and time, many tutorials do take a step-by-step approach to working with data – researchers simply need the time to engage with them.

Transcripts may need to be formatted so that the software package can recognise and handle them. For example, NVivo will not recognise or process Microsoft Word, therefore rich text format must be used.

Woods and Roberts (2000) suggest that program designers determine rules for specific procedures, protocols and structures, which users must follow. It is also important to prepare data prior to analysis by organising it into text units.

A number of authors have identified the issue of overcoding when beginning to use these software packages (Pateman, 1998; Russell and Gregory, 1993). If researchers are not selective when coding they can make the process of categorising unmanageable, for example by ending up with too

### BOX 2. DISADVANTAGES OF USING DATA ANALYSIS SOFTWARE PROGRAMS

Becoming familiar with a package is likely to be time-consuming

Transcripts need to be formatted in a way that the package can recognise and handle

If users are not selective when coding, the process of categorising can become unmanageable and 'overcoding' can become a problem

If codes and categories become fixed by the software, the data analysis process may be inhibited

Conceptualising data on the computer screen can be difficult, inhibiting visualisation and contextualisation

many themes and categories. Richards (1997) describes this as a 'coding fetish'. There is also a belief that somehow codes and categories become fixed by the software with the result that the data analysis is inhibited (Woods and Roberts, 2000).

Russell and Gregory (1993) also state that the constraints of what can be seen on a computer screen can make it difficult, for some, to see the bigger picture, which they claim can be intellectually stifling. This limitation of seeing only sections of material on screen can make it difficult to visualise and contextualise all of the data.

Some researchers may have difficulty in conceptualising the data when only seeing it on screen. It can take time and effort to become confident and practised at relying solely on using information in this way – scrolling back and forth, coding categories and themes. There may be a temptation to print the transcript and revert to manually coding text using different coloured highlighter pens. However, with time users will settle into this new way of handling data.

### Conclusion

This paper has identified a number of difficulties that can be encountered while getting to know and becoming confident and competent in using computer software packages specifically designed for the management and analysis of qualitative data. We believe it is worth the time and effort of doing so since the benefits also discussed easily outweigh the disadvantages.

Although hours can be spent becoming familiar with a specific software package, the effort involved and time spent will reap benefits and will greatly outweigh the disadvantages. The time spent initially developing familiarity with such packages should therefore be considered as an investment for the future. ■