

Using specialist software for qualitative data analysis

Oscar Odena, School of Education, University of Hertfordshire

Invited closing seminar at the Educational Studies Association of Ireland (ESAI) Annual Conference, Cavan, Republic of Ireland, March 29-31, 2007
Session sponsored by the Standing Conference on Teacher Education North and South - SCoTENS

(This seminar was delivered while working at Queen's University Belfast, in association with the CPAL Project team Ruth Leitch, John Gardner, Stephanie Mitchell, Laura Lundy, Despina Galanouli and Peter Clough)

Abstract

This paper is divided in four parts. The first part provides some background information on the analysis of non-numerical data, specifically the content analysis of text, including approaches such as 'grounded theory' and 'recursive comparative analysis'. In the second section, the use of computers for qualitative data analysis is discussed, with particular reference to its general advantages and misconceptions. The third section outlines the possibilities of some specialist software programmes for qualitative data analysis (NVivo and MAXqda). Finally, an example of the use of specialist software in a recently completed research project is examinedⁱ.

1. Analysis of non-numerical data: content analysis of text

There are several ways to conduct content analysis of text: from grounded theory, without any preconceived ideas, to identifying only somebody else's categories – for instance, when the researchers have to explore a set of questions, predetermined by an external funding body.

In grounded theory (Glaser & Strauss, 1967) the categories emerge through a process of inductive reasoning, rather than the data being allocated to predetermined categories. Ideally, the researchers start the data gathering and subsequent analyses without any defined ideas on what they will find. The analyses are undertaken following a 'constant comparative method' (Lincoln & Guba, 1985; Seddon, 2005), which includes the following steps:

- Immersion – producing detailed transcriptions
- Categorisation – assigning categories
- Reduction – grouping categories in 'themes'
- Triangulation – checking themes against all transcripts (preferably with other people)
- Interpretation – making sense of data with new model or established theory

As observed earlier, in externally funded projects there are often themes that are required to be explored from the outset, so the researchers look for illustrative examples within the transcripts. Nevertheless, the analysis should always be a more thorough process of reading, categorising, testing and refining, which is repeated by the researcher/s until all categories are compared against all the participants' responses, and the analysis is validated with other individuals (Leitch *et al.*, 2006, 2007; Odena & Welch, 2007). The same process has previously been labelled as 'recursive comparative analysis' (Cooper & McIntyre, 1993) and thematic/content analysis (*e.g.* Kvale, 1996; Odena, 2001, 2002, 2004, 2005a, 2005b, 2006).

2. Using computers for qualitative analysis: advantages and misconceptions

The use of computers for qualitative data analysis, also known as the acronym CAQDAS (Computer Assisted Qualitative Data Analysis), has some clear advantages in comparison to the more traditional qualitative analysis, which uses extensive drawing with coloured pens on printed paper. The most obvious advantage is that the researchers do not need to print the transcripts each time they decide to make a substantial change in the categorisation. The colouring of text by hand might be perfectly viable when the number of pages does not exceed 100-150 sheets. However, with more than 200 pages, the researcher's memory (and patience) needs to be portentous, as the number of subcategories and the relations between them is likely to vary at each additional reading of the transcripts. Computers can ease the time spent managing data and finding extracts, and, ultimately, are a guarantee that no important quotations are overlooked. Other powerful advantages include:

- The possibility of tracing back / revising your thinking after a break, as the researcher/s can save interim categorisations as often as they wish
- Analysis with teams
- Replication of an analysis at a later stage
- Enhancing the credibility and acceptability of qualitative research (for instance when submitting an article for publication to a prestigious journal, or when preparing a research grant proposal for a funding body)

There are a few misconceptions regarding the use of computers for qualitative data analysis, especially surrounding the perceived change of the researchers' role. Some researchers believe that 'the computer will distinguish the important bits and then make the links between these bits' (Gahan & Hannibal, 1998: 1). In fact, the researcher is still in charge of building up the analysis, having the ideas, engaging with the data and making all the decisions about the study.

Another misconception - observed by a specialist software lecturer - is that computers might be used to undertake very quick qualitative analysis under tight deadlines in order to produce final reports, which then lack depth in the analysis and discussion of results. However, the same reasoning appears to apply to the use of software for quantitative data analysis - therefore the potential weakness lies with the researcher, not with the computer program.

3. Possibilities with NVivo and MAXqda

NVivo is the latest version of the software programme for qualitative data analysis NUD*IST (Non-numerical Unstructured Data Indexing Searching and Theorising). Its basic characteristics are as follows:

- It favours the use of rtf files (only in early versions)
- The researchers categorise the transcripts using coloured stripes on the computer screen, which can be easily amended, changed and/or merged
- The word ‘node’ is used instead of category
- It has two types of nodes: ‘free nodes’, that can be organised and grouped freely, and ‘tree nodes’, organised in family trees
- It has the possibility to write attributes for each document, produce node reports, and help the beginner user with hands-on tutorials (see Gibbs, 2002), etc.

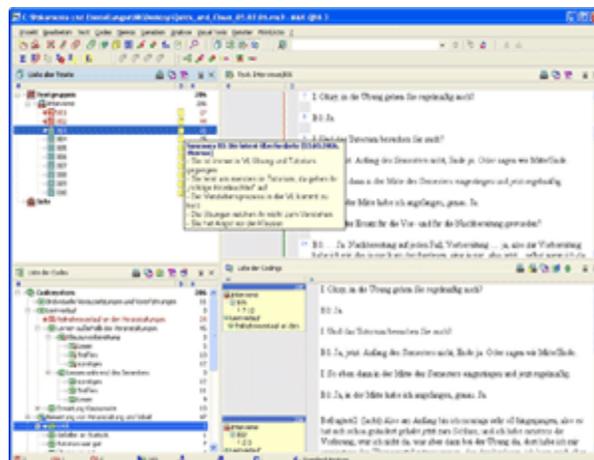
Additional advanced features of NVivo include:

- Boolean searches of words and phrases within a combination of documents
- Reporting the words and phrases found by line number, or visualising a predetermined number of lines, the whole paragraph, or the page where they were found
- Importing (some) results to SPSS - for example, the number of times that a node appears within each transcript in a set of transcripts, which can then be compared with another set of transcripts.

There are other specialist software programmes in the market most of which can be used for similar purposes. An internet search reveals the different names, brands and versions that are regularly updated; and each version of each brand has its strengths and different price. MAXqda is a good alternative to NVivo. It is a fairly priced software programme and a trial version can be downloaded for free from its home website. MAXqda includes the basic characteristics of NVivo, presented clearly on-screen in four separate windows as follows:

(1) The list of documents you have;

(2) the list of categories;



(3) the text you are currently analysing;

(4) and a search window to perform searches.

Most universities and research organisations hold an institutional licence directly with one of the brands (MAXqda, NVivo, ATLAS.ti, etc.), which allows them to have the software installed in a number of computers bringing the price per unit down. Some university departments also offer the possibility to acquire a copy for personal use to postgraduate students at a reduced fee.

4. An example of the use of specialist software from a recently completed research project

In this section, an example of using CAQDAS in the context of an educational research project is presented, i.e. the Consulting Pupils on the Assessment of their Learning (CPAL) Project. This project, funded by the ESRC Teaching and Learning Research Programme, www.tlrp.org, explored primary and post-primary pupils', their parents' and teachers' perceptions of the issues related with the increasing participation of pupils on their own assessment in Northern Ireland (for more information please see the project's website at www.cpal.qub.ac.uk). CPAL included 3 interrelated studies:

- Study 1 *Pupils Profiles* consulted primary pupils (KS2) on their views on the development of Annual Pupil Profiles
- Study 2 *Assessment for Learning* (AfL) consulted post-primary pupils (KS3) on their experiences of learning in classrooms whose teachers were identified as implementing the AfL principles – for a summary of these principles click on www.assessment-reform-group.org/CIE3.PDF
- Study 3 *Teachers Perspectives* explored the teachers perceptions of the increasing participation of pupils in 'AfL classrooms'

In Study 2, Focus Group Interviews were used amongst other techniques, in order to explore the pupils' views about assessment in 'AfL classrooms'. In total, over 70 students aged 11-14 from 11 classrooms covering five curriculum subject areas (Maths, Arts, English, Geography and Science) from six post-primary schools participated in the Focus Groups. At the beginning of the interviews participants were asked to reflect in a drawing '*How I feel about learning in this class*'. Then, they were asked to explain their drawingsⁱⁱ and to co-interpret extracts of their videotaped lessons – for a full description of Study 2 methods, including a discussion of the problems and potentialities of involving students as co-researchers, refer to Leitch *et al*, 2007.

Between October 2006 and February 2007 content analysis was used to analyse the full transcripts of all Focus Group Interviews, which was assisted with the computer programme NVivo (Gibbs, 2002; Kvale, 1996; Odena, Plummeridge and Welch, 2005). As explained before, the analytical process of reading-categorising-testing-and-refining was repeated until all categories were compared against all the pupils' responses and the analysis was validated amongst the researchers of the CPAL team and the Project Director

(see acknowledgments). Up until January 2007 seventeen categories were identified, which were subsequently clustered into eight broader categories in the Final Report and are listed below in Table 1.

The following transcripts, shared with all CPAL team members through the *Virtual Research Environment (VRE)*ⁱⁱⁱ, were uploaded to NVivo:

- School A, Art Focus Group interview	19 pages
- School A, Maths Focus Group interview	30 pages
- School A, English Focus Group interview	22 pages
- School B, English Focus Group interview	24 pages
- School C, English Focus Group interview	25 pages
- School C, Science Focus Group interview	12 pages
- School D, Science Focus Group interview 1	20 pages
- School D, Science Focus Group interview 2	20 pages
- School D, Geography Focus Group interview	30 pages
- School E, Maths Focus Group interview	28 pages
- School F, English Focus Group interview	12 pages
- School F, Geography Focus Group interview	11 pages

Total	253 pages (single line spacing)

The interviews were focussed on issues regarding pupils’ learning and participation, and ‘AfL’ practices. These issues were explored in various degrees by the interviewers through ‘conversations with a purpose’ (Burgess, 1988) loosely structured around the students’ perceptions of the lesson, the explanations of their drawings and their views on the videotaped lesson’s extracts.

Table 1. CPAL Study 2 Focus Group Interview Categories

1 Assessment
2 Classroom climate
3 Learning goals
4 Participation and practical learning
5 Students’ motivation
6 Students’ influence
7 Teachers style
8 Teacher-students relationships

Some of the quotations within these categories overlapped with quotations from other categories. For example, some words coded as (1) ‘Assessment’ (see Appendix) were also

part of quotations categorised as (7) ‘Teacher style’. This happened because often the students’ views were not presented as separate from one another in their responses, as they talked freely to the interviewer, voicing their thoughts as in any other loosely structured conversation.

Conclusion

The capability of the specialist software program helped manage the 253 pages of Focus Group transcripts – equivalent to 506 double spaced pages. Moreover, the flexibility of the software allowed for the re-organisation of categories and subcategories throughout the research process. It also facilitated the process of sharing and shaping the interim analyses with all team members. As shown earlier, interim analyses contained up to 17 categories that were subsequently refined down to 8 categories, which referred only to one dataset from Study 2. Having a clear analysis of this dataset allowed the researchers to go back and forwards between this and the other two studies and, ultimately, to make sense of the whole project when writing the Final Report (see www.tlrp.org/proj/leitch.html).

Acknowledgements

The above example is taken from the CPAL Project, directed by Ruth Leitch at Queen’s University Belfast. The research team is grateful to the students and teachers participating for their willingness to share their experiences and to all the CPAL Advisory Group members for their valuable input throughout the research process. CPAL was supported by the UK Economic and Social Research Council (ref: RES-139-25-0163) as part of the Teaching and Learning Research Programme. Mary James, Institute of Education (University of London), acted as CPAL’s critical friend and Richard Daugherty, University of Wales at Aberystwyth, and Jannette Elwood, Queen’s, acted as consultants to CPAL.

APPENDIX

Edited extracts from a Focus Group Interview

CATEGORY ONE – ASSESSMENT: comments within this category include the students’ comments on the assessment of their work and their description of peer-assessment activities.

QUOTATIONS ON ‘ASSESSMENT OF PUPILS’ WORK’: several tools such as ‘traffic lights’ and assessment practices were reported in a way that emphasised the students’ preference for getting positive feedback on their individual progress, rather than grades only (the question number ‘Q/’ at the start of each of the interviewer’s questions helped to locate the text in the original transcript; all students used invented names):

Document 'School A, Art Focus Group'

[student]...I like that way of using the card because instead of just getting a mark, it doesn't really mean anything, like, it's just, cause sometimes you could do good and sometimes you could do bad, but it doesn't really explain, but then you don't really know what you could improve on or what you

could, like, what your, what's your good points...

Q/ Yeah.

Lucy/ ...and you could be, for your next piece of work you could just be working on something that you think is, you did badly on, but you did really, like, good on...

Q/ Yeah.

Lucy/ ...but the card explains, like, what you did bad on, or what you could improve on and what you did good at.

Q118/ So you appreciate all the detail actually, don't you, rather than just getting a mark?

Lucy/ Yeah.

Q119/ Right. That's an interesting opinion. OK, let's move on round here to Rose, don't worry, we'll get to hear everyone.

Rose/ I don't mind if you get a mark or you use the card, but I like using the card cause it tells you what you could improve on and it tells you what you can just keep the same...

Q/ Yeah.

Rose/ ...or work harder on, and then the mark, it tells you how well you've done...

Q/ Right.

Rose/ ...and everything overall, like.

Q120/ So you sort of like both then really, do you?

Rose/ Yeah.

Document 'School A, English Focus Group', 3 passages, 2652 characters.

[student talk]...it puts you under pressure to do really well, you know what I mean?

Q/ Right.

?/ And we have a lot of other subjects homeworks to work a bit as well, but we have to worry about English cause we're getting assessed and...

Q/ Right.

?/ ...we have to, like, do well in it so we get a good mark in our tests and stuff.

Q112/ So every single class you're, you feel, you have a feeling that every single class you get assessed?

?/ Well, not every single class, but [indistinct]...

?/ But, like, every bit of homework...

?/ ...I'd say at least twice a week, once or twice a week maybe.

?/ You have to worry and all. [The rest of quotations have been edited out]

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ⁱ A shorter version of this paper was given at the [ESAI-BERA Educational Research Seminar](#) on December 6th, 2006, at Queen's University Belfast, and at the [4th Travelling Research Seminar for Music Education](#) on June 14th-16th, 2007, at Escola Superior de Música de Catalunya, Barcelona.

ⁱⁱ For more examples of arts-based research methods see Leitch (2006) and Leitch & Mitchell (2007).

ⁱⁱⁱ The VRE is coordinated from CARET, the Centre for Applied Research in Educational Technologies, at the University of Cambridge.