

How has Computer-Assisted Qualitative Data Analysis Software affected qualitative research?

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Context and rationale for the research

Computer-Assisted Qualitative Data Analysis software (CAQDAS) packages

- Specialised programs for analysing qualitative data
 - Eg NUD*IST, N Vivo, Atlas ti, HyperResearch, QUALRUS, MaxQDA, QDA Miner, the Ethnograph, Leximancer, Transana
- Now an established tool for qualitative research
 - In use since early 1980s
 - Widespread usage
 - Sometimes divisive
 - Software users and non-users
 - Allegiances to specific programs
 - Advocates and critics

Questions and controversies about CAQDAS

- What can (or can't) be done with programs?
(c.f. Seidel and Clark 1984; Muhr 1991; Di Gregorio 2000; Bazeley 2002; Hutchinson, Johnston and Breckon 2010)?
- Are computer-assisted analyses more rigorous, transparent, credible or trustworthy?
(cf Tallerico 1991; Dainty et al 1998; Bong 2002; Smyth 2006)
- How does using software change the process and experience of analysis?
(c.f. Richards and Richards 1987; Kelle 1995; Weitzman 1999; Gilbert 2002; Davidson and Skinner 2010)
- Do programs 'impose' methodologies or 'drive' the analysis?
(c.f. Bryman and Burgess 1994; Lee 2002; Seror 2005)

Questions and controversies about CAQDAS

- How do we choose between programs?
 - Which programs ‘best’ suit specific analytical approaches? (cf MacMillan 2005)
 - Are programs comparable in their features and functions? (cf The KWALON 2010 experiment)
 - Does using (any or all) CAQDAS programs compromise creative freedom? (cf DeNardo & Levers 2002)
- How do we guide new researchers through these choices? (cf Kaczynski 2003)

Our research interest and focus

Our focus in this study:

- How *has* the technology evolved?
- What implications has this had for qualitative research practices for
 - Creating and collecting data?
 - Analysing data?
 - Presenting data?

Our research interest:

- Computer-assisted qualitative data analysis as a form of 'professional practice' utilising
 - Technical reasoning and wisdom (techne)
 - Practical reasoning and wisdom (phronesis)
- Experiential learning and collective wisdom

Research method

Analysis of methodological literature from 1980 to 2012

Dataset generated by purposive sampling:

- Initial search for literature for
 - the terms CAQDA, CAQDAS, “qualitative data analysis software”, “qualitative data analysis program” and “computer-aided qualitative data analysis”.
 - names of specific programs eg NUD*IST, Ethnograph etc.
- Subsequently supplemented by program descriptions from manufacturers

Final data set: 163 items

Research method

Analytical strategy:

- Reviewed literature in chronological order to identify debates and trace discussions over time
- Read and wrote memo for each article detailing key points and arguments relevant to research question
- Intended to use N Vivo (version 10) to
 - Record notes about each publication
 - Develop data categorisation system reflecting discussions of
 - Program features
 - techniques supported by programs
 - Develop conceptual model illustrating relationships
- Subsequently used Word to chart the data, N Vivo to develop conceptual model

Chart: exemplar entry

Program feature	Program	Source detailing	Applications	Source
Handles coding directly from audio files	Atlas ti	Evers 2011	Working directly with digital forms/ audio recording enables retention of tone etc	Lee 2002
	N Vivo 8	Evers 2011		
	HyperRESEARCH	Man. Website 2009	Reduces, eliminates need for transcription	Evers 2011
	Qualrus	Man. Website 2013		
	Transana	Man. Website 2013		

Historical development

- 1970s-early 1980s: introduction of computers to support qualitative analysis of data
- Mid 1980s to mid 1990s: introduction of dedicated CAQDAS programs
- Development of original CAQDAS programs
 - Refinement of original features and functionality
 - Introduction of additional features and functionality
- Development of additional programs

Features for data collection and creation

- Files types/ data sources that can be accommodated by programs
 - Text files eg transcripts of interviews
 - Initial formats – plain text; later formats - Rich text, HTML and PDF
 - Audio and video files
 - Pre-coded survey data
 - Data from online technologies such as web-based communication forums eg Twitter, Facebook
 - Geo data
- Creating data files
 - Text files: Initially created in WP then imported, Later created in programs with text editing functionality and transcription functionality
 - Other files types: create in other programs then import

Impact on data collection and creation

- Formatting of data files
 - Initially:
 - Structure of source documents
 - Formats of text files
 - Size of text unit
 - Number lines of text to create 'addresses' for coded sections
 - Subsequently
 - Conversions of formats for use in software programs
- Volume of data collected
- Types of data being used
- Integration and compatibility of programs

Features for data analysis

Marking up data with codes, tags or symbols

- By researcher assigning tags
 - Select text, assign tag
- By program assigning tags (Autocoding)
 - Specified by researcher
 - Specified by program

Indexing, categorising data

- Initially used separate database management programs as file directory
- Subsequently, indexing systems in programs to categorise data
- Editing coding/ indexing systems after applied
- Cross indexing of data

Impact on data analysis

- Retrieval of coded material
 - According to code assigned (by researcher or program)
 - For review in original context
- Identification of 'key' concepts
- Boolean searching and linking codes to:
 - Retrieve text fitting set parameters
 - Develop propositional relationships regarding concepts and participant characteristics
 - Investigate extent of data support for hypotheses
- Conversion of data for subsequent analysis
 - Eg converting codes into variables

Features for data analysis

Memoing

- Initially: noted in memos
- Subsequently: hyperlinking of memos to data and other elements (annotating original data source)

Integration of analyses by team members

- Initially: by merging projects
- Subsequently:
 - By supporting multiple users in project
 - By enabling simultaneous working
 - Restricting levels of access

Calculation of coding consistency scores

Eg percentage agreement between coders, Krippendorff's alpha

Impact on data analysis

- Logging of project decisions, actions, outcomes
- Documenting chain of evidence between data and conclusions
- Establishment of 'team rules' for analysis
- Determining consistency of coding approaches
- Objective determination of coding similarity

Presentation of data

- Data display / visualisations
 - In imported format eg original transcript)
 - Data to which code is attached (eg text units)
 - Reviewing content of data categories
 - Coding reports
 - Coding stripes
 - Coding matrices
 - Counts of text
 - displaying text in cells
 - Hierarchical systems of major and subsidiary data categories
 - Illustrating data topics eg responses given to question

Presentation of data

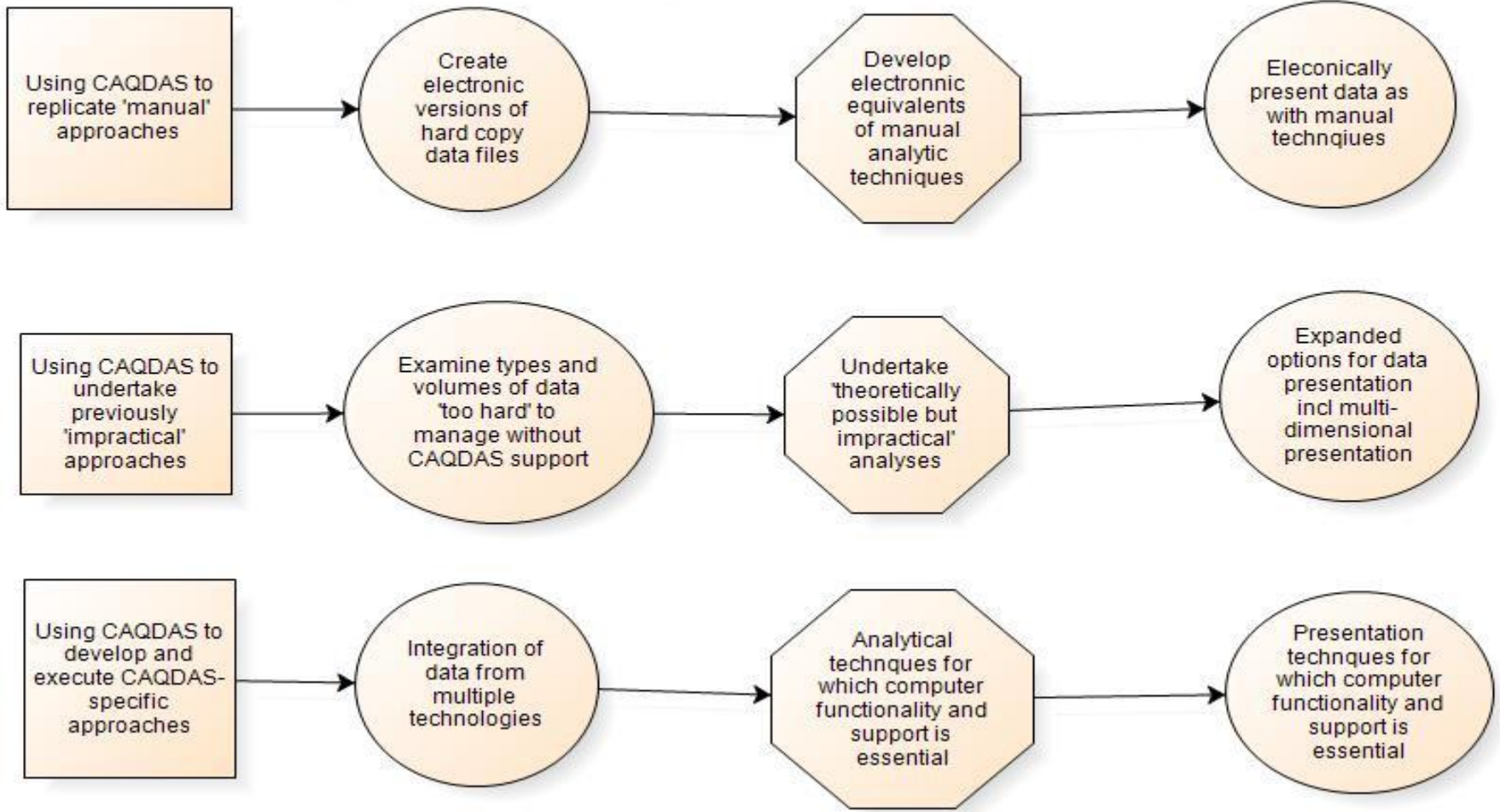
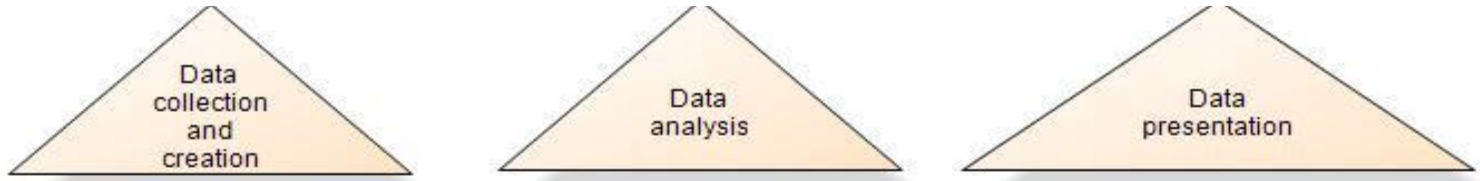
- Data display / visualisations
 - Illustrations of networks
 - Linkages between concepts
 - Linkages between sources, project items
 - Graphs and charts
 - Tag clouds
 - Key words in context
 - Word trees
 - Clustering
 - Proximity and sequence with other terms



Impact on data presentation

- Presentation in original context
- Illustration of co-occurrences of codes
- Demonstration of data support for propositions
 - Similarity and difference across groups
 - Co-occurrence of concepts
- Demonstration of face validity
 - of coding
 - of conclusions
- Illustration of dynamic analytic processes for handling data

Models of CAQDAS-supported research approaches



Next questions....

- How do the current technologies influence creative freedom?
 - What techniques do they support (or not)?
 - What technical wisdom is required?
 - What practical wisdom is developed?
- At what point do technical requirements dominate?
 - In research planning?
 - In research practice?
- What implications does this have for notions of ‘professional practice’?

Next questions...

- Which features, techniques and forms of wisdom are
 - Program-specific?
 - Common across programs ?
 - Common across research approaches?
 - Common across user groups?
- How can we best learn from user experiences?
 - What do we want researchers to explain, and how?
 - How do we want people to validate their methodologies?
- How do we best teach new users to develop their wisdom?

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