

Computer-Aided Qualitative Data Analysis of Multimedia Data

presentation prepared by
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Technological
Advances, Challenges
and Methodological
Implication



Part I: Basic Considerations

Part II: How can software assist in the analysis of multimedia data?

Part I: Basic Considerations

Underlying assumptions

Reasons for collecting multimedia data

Disadvantages of including visual data

Applications of visual data

Data collection

Data analysis (approaches and techniques)

Data representation /Examples

References

Starting with Epistemology

- Can visual data represent true (i.e., adequate) knowledge?
- Are photographs and videos not mere vacation images that lack objectivity and scientific rigour?

Solutions based on different epistemological point of views

- **From a positivistic perspective:**

- to produce `objective material, controls need to be implemented:

- No camera movements, no close-up, continuous filming without human intervention
- or: Data collection based on a detailed sampling plan
- Or: setting up a quasi experimental design

Solutions based on different epistemological point of views

- **From a constructivist perspective:**
 - Researchers cannot reveal or report on complete or whole accounts of reality, they only tell part of the story.
 - Images have no fixed or single meanings and are not capable of capturing objective reality.
 - Knowledge is produced in conversations and negotiations between informants and researcher, rather than existing as objective reality.

Why to include the visual into research?

- Video allows to capture movement
- It produces a more holistic view of events
- It provides a unique memory enhancement
- It allows for repeated viewing
- It allows a microanalysis of behaviour
- It makes it possible to observe many angles

Downsides of including the visual into research

- Too much data
- Equipment takes attention
- Hostility towards the camera
- Danger to think through the machine
- Important contextual details may be missing as it is mostly not possible to use multiple cameras to film all angles
- Loss of mobility
- Less rigour in analysing the data because of data overload

Applications of visual data

- To create a stimulus participants can respond to
- To document the research process (“I was there.”)
- To produce data for methodological decisions
- To see how body language might influence responses
- To facilitate triangulation
- To be used in member checks
- To support and illustrate concepts
- To use for presentation purposes (ethnographic film and documentaries)

Applications of visual data

- As a separate source of data, independent in its own right
- As a possibility to transform self-understanding / as a agent of change / as a force that shifts the way we “see” and understand

Data Collection

- Deciding on:
 - the **appropriate media** and its implications
 - Still image or video? What is right for setting and culture?
 - Which technical know-how and resources are available?
 - **paradigm issues**
 - Should be film continuously?
 - Should the researcher or a professional photographer take the pictures?
 - the **emic** or **etic** perspective
 - Should participants be involved in the data collection and analysis process?

Data Analysis: Different approaches

- The ‘scientific’ approach:
 - Knowledge is produced through the translation and abstraction of visual data into written text
 - Analysis is a distinct stage of research at which the visual is decoded into the verbal, having no place in the final product of the research except as occasional illustrations
 - Visual evidence must be contextually complete and sequentially organised

Data Analysis: Different approaches

- A constructivist approach:
 - Analysis is an exploration of the relation between the visual and other knowledge that represents the story of the research in different ways; each media evokes different elements of the fieldwork experience.
 - Analysis should focus on the meanings that different individuals give to the images in different contexts. Answer the question: Who should analyse?
 - Sequential and non-sequential analysis, allow for an order to emerge

Data Analysis: Different approaches

- A constructivist approach (cont.):
 - Get participants' viewpoints and suggestions
 - Acknowledge the different viewpoints as complementing each other
 - Use data from different media to contextualise each other, not for the purpose of forming a 'complete' record but to provide different representations and strands

Data Analysis: Techniques

- Sequential viewing
- Shuffling
- Classification into categories / Thematic analysis (possible approaches: inductive or deductive)
- Semiotic analysis
 - Denotation: What or who is being depicted
 - Connotation: What ideas and values are being expressed

Analysis Techniques for Still Images

- What do I learn by ordering them sequentially?
- Does shuffling give me a different perspective?
- How do research participants order the images and what does it mean to them?
- Thematic analysis / categorisation
 - Spaciality
 - Camera shot and angle (How was it made? What might be reasons for particular choices?).
 - Colours
 - Models (human, animals, objects). Who is in the picture?

Analysis Techniques for Videos not using CAQDAS

- Logging and transcribing to map visual and verbal knowledge, e.g. in form of tables
- Developing different transcripts for different aspects (e.g., one for speech, one for gesture, one for gaze, patterns of movement, etc.)
- Transcripts should be time coded to locate section for reviewing

Analysis Techniques for Videos not using CAQDAS

- Thematic analysis and coding of the transcripts
- Comparison of thematic categories
- Analysis of aspects like spatiality, scope, tonality, colours, music, etc. (as also done for still images)
- Creation of hypermedia

Analysis Techniques for Videos using CAQDAS

- Videos can be assigned as raw data to be analysed without the need for transcription
- Thematic analysis and coding of the video data directly including detailed coding for spatiality, scope, tonality, colours, music, etc.
- Paraphrasing / summarizing of coded segments
- Comparing and contrasting coded segments to develop categories and dimensions
- Linking video data to other data sources
- Creation of hypermedia

Further Analysis Techniques for Videos

- Focus on various units of analysis
 - Frame / Shot / Scene / Sequence / Generic stage / Work as a whole
- Looking at the video / sequences in show motion
- Looking at the video / sequences in high speed
- Focusing on just sound, just image

Data Analysis of Videos according to Collier

- 1. Open viewing:** Watch film repeatedly in its totally
- 2. Inventory the film** by categorising and comparing recurrent and contrasting elements
- 3. Structuring:** Count incidence of particular phenomena, find patterns, build typologies
- 4. Returning to the whole view:** Make conclusions by organising details into context

Data Analysis of Audio Data

- In case of speech, data analysis is similar to that of text, depending on the chosen analytic approach, i.e., conversational analysts approach the data differently than a grounded theory analyst.
- Don't decide for audio data to save transcription time
 - you end up paraphrasing parts of the data anyway and
 - listening to the audio data takes longer than reading through transcripts

Data (Re)presentation

- Choice of grammatical tenses influencing the claims to authority:
 - If reporting in the **past tense**, this means as much as: ‘I was there’, claiming authenticity and **authority** as a person with first-hand experience
 - If reporting in the **present tense** creates a ‘literary illusion’ claiming that the images are permanent and continuous, thus making them **more objective**

Data (Re)presentation

- Choices what to present and how
 - **Positivist/Realist approach:** still images and video are dependent on written text
 - **Constructivist:** still images and video are contributing as independent source of knowledge


Example of an online Hypermedia Presentation



Visuals support written description

Visualising Ethnography

Methods and Media Courses Links Exhibition Interviews Experiences

Experiences :: **Photography by Tribal Peoples of Baluchistan ~ sheila Pinkel ~ 2002**

<p>Introduction</p> <p>Project Overview</p> <p>Women's' Literacy</p> <p>Photography</p> <p>Women's Education</p> <p>Photography(2)</p> <p>Water</p> <p>Women's Realities</p> <p>Brief Conclusion</p> <p>Print This Study</p>	<p>Project Overview</p> <p>In 1995, I went to Pakistan for two months to photograph Pashtun and Baluch tribal communities in the southern desert region of Baluchistan. Initially I was invited to do this project by Menhaz Akbar, a sociologist living in Islamabad, who was concerned that tribal life in the region of Baluchistan was changing and wanted to see that a visual record was made. I was a guest of the Baluchistan Rural Support Project (BRSP), a non-governmental agency (NGO), centered in Quetta, the main city in the region, working in central and southern Pakistan to help tribal peoples live more easily in remote desert environments. Each day we traveled two - three hours into the desert and visited different tribal communities. BRSP workers were well aware of the quality of tribal life and had no intention of disrupting it. Their goal was to provide assistance in order to make life more bearable. While BRSP workers met with members of each community, I roamed the villages and photographed.</p>	
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more..  

Sheila Pinkel

Photographs taken as part of this project

http://www.lboro.ac.uk/departments/ss/visualising_ethnography/index.html

Example of an online Hypermedia Ethnography



The Centre for
Social Anthropology
and Computing

UNIVERSITY OF KENT
AT CANTERBURY ■■■■

45 years in the Turkish Village 1949-1994

Paul Stirling's Ethnographic Data Archives

Paul Stirling did ethnographic research in two Turkish villages between 1949 and 1994. He collected formal household data in 1950, 1971 and 1985. Since 1990 we have been preparing an archives of this data for eventual public access for teaching and research, as well as the passerby who has a more than casual interest in Turkey and its past half-century of change.

Writing

Prof. Stirling's book: [Turkish Village](#)

Prof. Stirling's [Thesis](#)

Prof. Stirling's [Articles](#)

[Background](#) for the project.

Data

Search his [1949-1986 Fieldnotes](#)

Search his [Turkish villagers Database](#)
(1949-1985)

[Notes and advice for database](#)

[Photographs](#)

[Interviews](#)

[Video / Film](#)



[Credits](#)

(all people who have helped along the way)

Projects arising from this Archives by [others](#)

A look to the future: [The APFT Content Code System](#)

Example of an online Hypermedia Ethnography

- Accessible are already published books and articles, and the field notes.
- The photographs are currently not accessible (June 2004)
- The ethnographic films made by the BBC (thus, no raw data footage) are awaiting copyright clearance.
- All in all, it seems to me a authoritative presentation, not one created with the purpose of encouraging the viewer/reader to actively engage with the data.

Example of an online Hypermedia Ethnography: Conclusion

- There might be more engaging publications of hypermedia ethnographies on CDs or DVDs
- As of today, it is difficult to find online hypermedia publications at all, and if so visuals tend to be used as support for textual descriptions and not as an independent data source.
- There seems to be little evidence that hypermedia techniques are exploited for the purpose of result representations as was already suggested in 1996 by **Amanda Coffey, Beverley Holbrook and Paul Atkinson** (<http://www.socresonline.org.uk/1/1/4.html>)

Example of an online Hypermedia Ethnography: Footnote

- A likely reason for the lack of hypermedia publications including visuals are ethical reasons, because it is difficult to protect the anonymity of respondents and to get permission for publication.

Further reasons for lack of inclusion of multimedia data more generally

- Poor field readiness: Visual records have been difficult to acquire.
- Visual records have tended to be static in form, i.e., not easy to index, segment and compare.
- Visual records were difficult to document in a manner sufficient to draw full benefit from them.
- It was difficult to integrate visual records with other field materials
- It has been very expensive to incorporate large amounts of visual data into publications.

Useful references

- Van Leeuwen, T. and Jewitt, C. (Eds.) (2001). Handbook of Visual Analysis. London: Sage.
- Pink, S. Doing Visual Ethnography. (2001). London: Sage.
- Ratcliff, D. Video and Audio Media in Qualitative Research. <http://don.ratcliff.net/video> (last accessed 28th June, 2004).
- Nielsen, J. and Christiansen, N. Video as Tool for Data Capturing and for Analysis. <http://hermesdoc.lib.cbs.dk/staff/nina/Papers/Video%20as%20a%20tool.htm> (last accessed 28th June 2004)

Part II: How can Software assist in the analysis of multimedia data?

Means by which computer assisted QDA addresses aforementioned problems

Disclaimer

A general model to analyse qualitative (multimedia) data

Comparison of three packages: QSR NVivo, Hyper Research, ATLAS.ti

Conclusion

Means by which computer supported QDA addresses aforementioned problems

- Ease of access
- Integration with other information becomes much easier
- Indexing/coding of information is as easy as coding text
- Comparison of data within one media type and across media types becomes possible
- Some applications allow to create hyperlinks between (and within) different media types
- Some applications offer tools to output the entire analysis into a format that facilitates hypermedia publications

Disclaimer

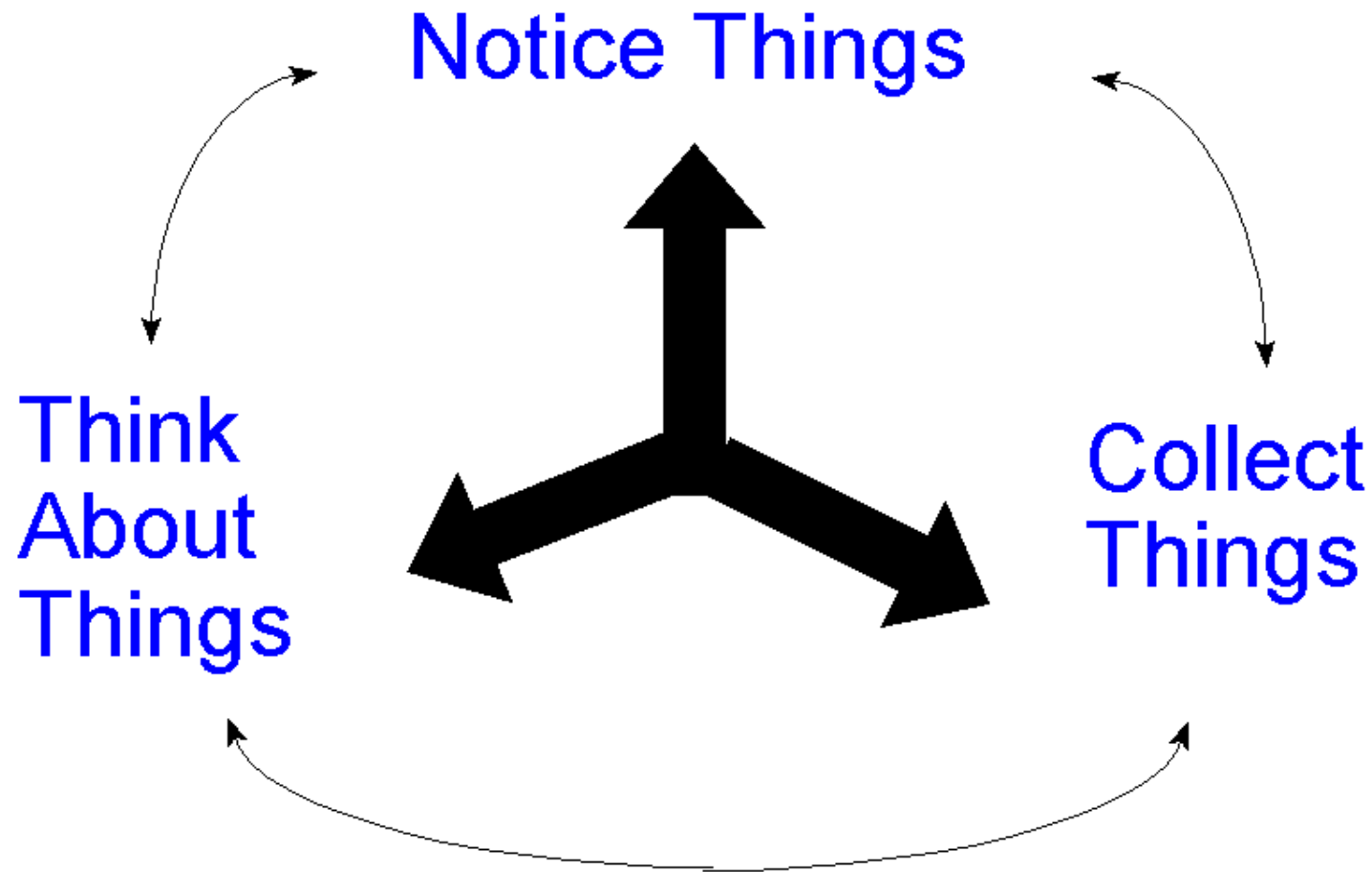
- Not discussed are packages that
 - only support the analysis of audio/video data like: Transana;
<http://www.transana.org/>
 - Mac only versions like Qualifier:
<http://hisii.hawaii.edu/qualifiers/qualifiers.html>
 - Programmes developed for particular research areas like psychotherapy, e.g. C-I-SAID <http://www.code-a-text.co.uk/>, behavioural research: The Observer
<http://www.noldus.com/products/observer/observer.html>

Analysis of qualitative (multimedia) data

A general model

<http://www.qualisresearch.com/>
(QDA paper)

Qualitative Data Analysis



The 3 Notes

- **Noticing** = Creating a project and reading your data files
- **Collecting** = Coding data files
- **Thinking** = Searching data files

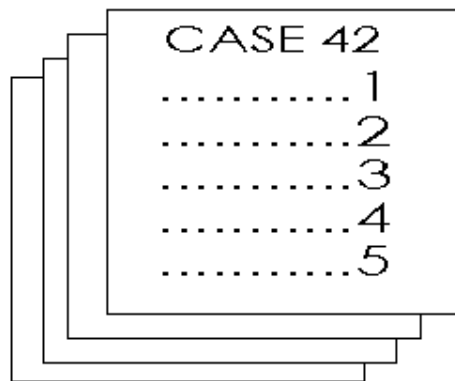
⇒ *the Puzzle Analogy*

Analyzing Qualitative Data

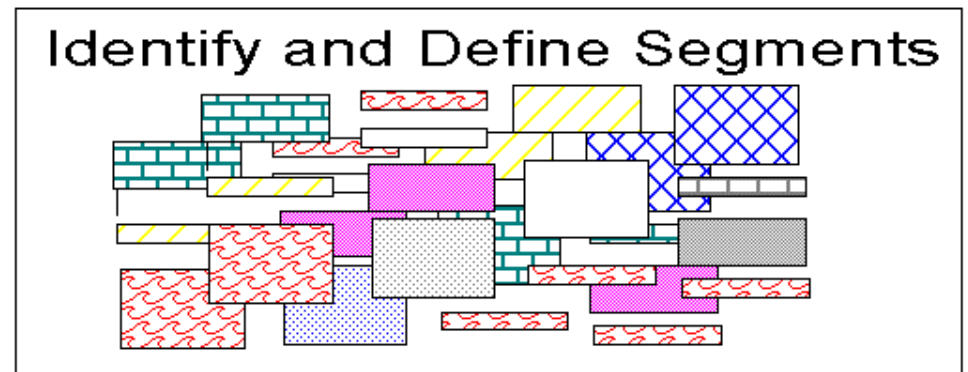
January, 1994

John Seidel and Susanne Friese
Copyright © 1994, Qualis Research Associates

Create Data Files

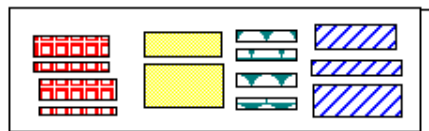


code data files



search data files

Sort and Sift



Analyzing Qualitative Data

January, 1994

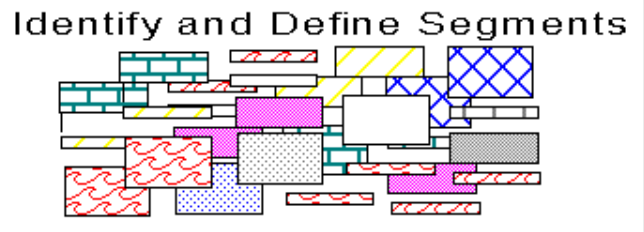
John Seidel and Susanne Friese
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Create Data Files

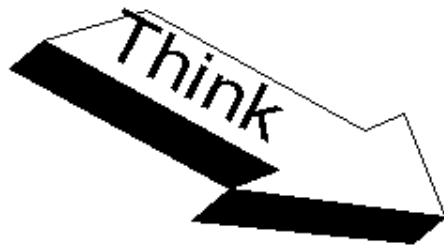
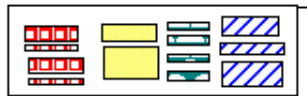


code data files



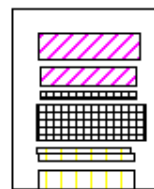
search data files

Sort and Sift

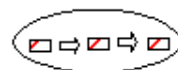


Discover

Pattern



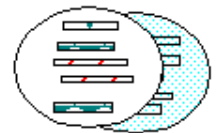
Sequences



Processes



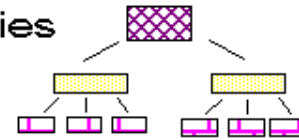
Wholes



Categories

Types

Classes



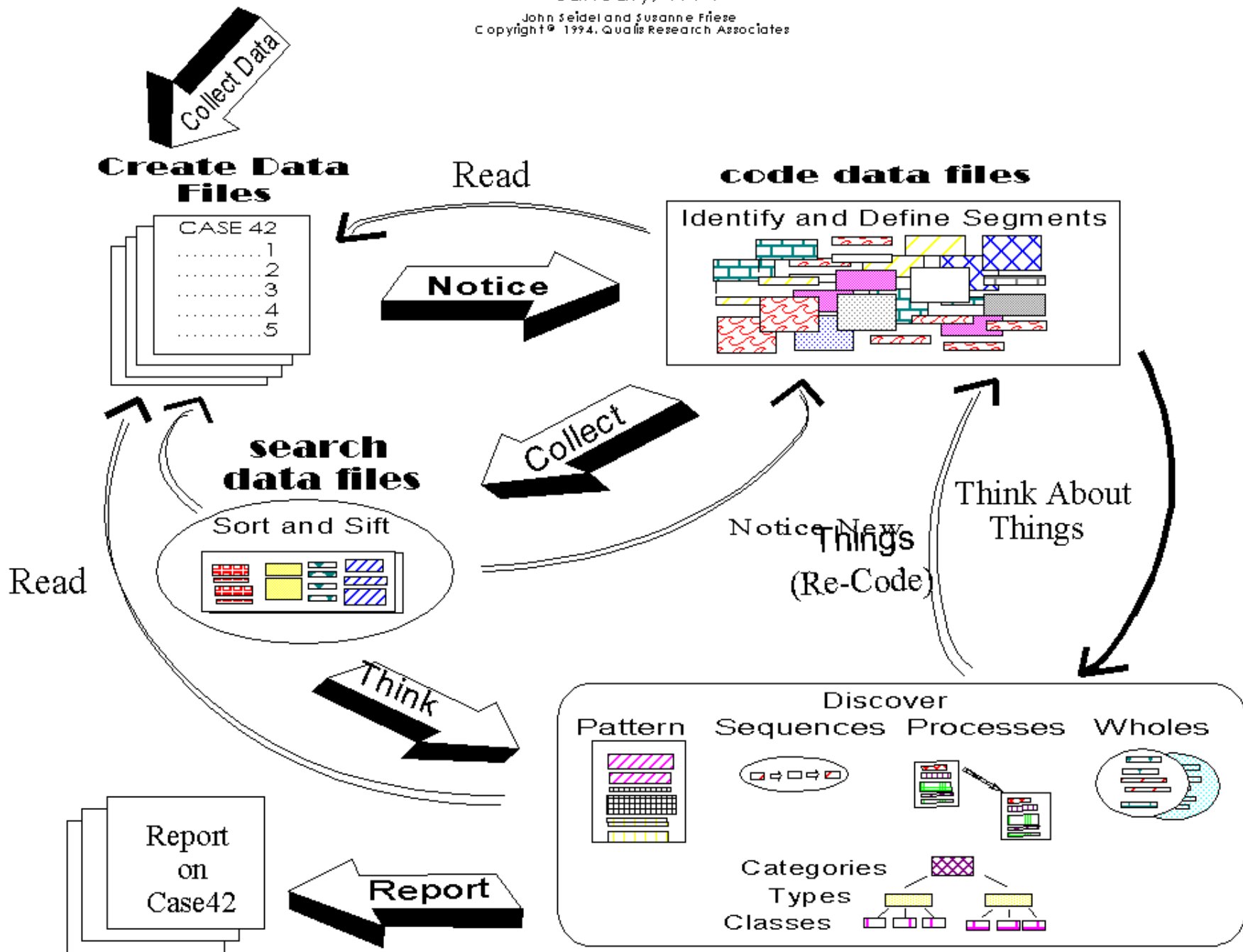
Variations of the Theme

- iterative and progressive
- recursive
- holistic

Analyzing Qualitative Data

January, 1994

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Defining the analysis process

„Analysis is a breaking up, separating, or disassembling of research materials into pieces, parts, elements, or units. (noticing & collecting). With facts broken down into manageable pieces, the researcher sorts and sifts them, searching for types, classes, sequences, processes, patterns, or wholes (thinking). The aim of this process is to assemble or reconstruct the data in a meaningful or comprehensible fashion.“

Jorgenson, 1989, p. 107 (<http://www.quarlisresearch.com> (QDA paper))

QSR Nvivo

http://www.qsr.com.au/products/productoverview/product_overview.htm

- Thematic analysis & categorisation of text documents (supported formats: Text (txt, rtf))
- Linking to external multimedia files and websites. However, such files/documents cannot be coded within the application.
 - Workaround: the creation of documents that contain written references and links to multimedia data sources. Link comment/memo can be used to write comments and interpretations.
- Supports an approach where visuals illustrate the analysis of textual data, but not an analysis of visuals as an independent data source.

HyperResearch <http://www.researchware.com/hr/>

- Thematic coding of text, image, audio and video files
- Supported formats:
 - Text (txt),
 - Graphic (jpeg, bmp, gif, png, pict)
 - Audio (wav, aif, mov, mp3)
 - Video (avi, mpeg, mov, swf, gif)
- Coded segments in images are framed.
- All coded segments can be commented, e.g. can be used to describe non-text segments. This is especially important when working with audio and video data, as none of the CAQDAS packages 'slices' the data physically.

HyperResearch

- Output of coded data segments can be created to include hyperlinks to the underlying multimedia data source.
- Can be used to explore the technique of shuffling photographs or other images to look at them from different perspectives by creating groups.
- Facilitates comparing and contrasting by querying the data based on codes and code combinations

HyperResearch

- Drawbacks:

- It is not possible to modify coded segments. Segments have to be deleted and created anew.
- Images cannot be resized
- Creating hyper-links other than between code and data segment is not possible.
- Videos should be cut into 5 to 10 minutes sections as the coding bar cannot be extended.

ATLAS.ti <http://www.atlasti.com>

- Thematic coding of text, image, audio and video files
- Supported formats:
 - Text (txt, rtf, doc)
 - Graphic (over 20 common formats)
 - Audio (mp3, au, wav, snd)
 - Video (avi, mpeg, mov, qt)
- Modifications of coded segments much more flexible than in HyperResearch.

ATLAS.ti

- Names of coded data segments can be used as a first layer of paraphrasing/summarizing by allowing access to the original data source at the same time. The comment field can then be used as a second layer of interpretation; memos on a more aggregate level.
- Images can be resized, coded segments are shown next to the image and within the image as frame.
- Data segments can be freely linked to other data segments of any media type to create a hypertext structure within the application.
- Network Views allow a visual presentation of a user-created hypermedia structure (not only between selected codes)

ATLAS.ti

- As in HyperResearch: comparing and contrasting, shuffling, grouping, etc. possible
- Entire project can be created as HTML or XML file for further processing and viewing independent of the application. This facilitates not only an analysis supported by hyperlink features but also the presentation of results in form of hypermedia publications.

ATLAS.ti

- Drawbacks:

- Videos should be cut into 5 to 10 minutes sections as the coding bar is not scrollable and thus limited to the size of the screen.
- HTML and XML outputs do not include full length quotations. Workaround: to increase the length of the quotation name right at the beginning of a project., to use memos to summarise quotation contents related to selected themes.

Conclusion

- All in all, ATLAS.ti is the most sophisticated package supporting the analysis of multimedia data. More sophistication, however, implies steeper learning curves. You need to ask yourself whether your project requires highly sophisticated multimedia functionality, or whether you do not want to go beyond using pictures and short videos for illustration purposes. In the latter case, QSR NVivo might be an acceptable choice for you. NVivo is however also a sophisticated package, even though less developed for the direct analysis of multimedia data. Thus, NVivo and ATLAS.ti take similar length in terms of learning time. HyperResearch is the simplest of the three presented programmes, but at times less convenient to work with.

Footnote

For a more detailed comparison of
software features see:

http://www.quarc.de/software_overview_table.pdf