Mapping methods for qualitative data structuring (QDS)

By Jenny Brightman, Banxia® Software Ltd.


Introduction

The purpose of this paper is to outline and discuss the characteristics and use of four different methods for “mapping” qualitative data. The methods discussed are mind mapping (developed primarily by Tony Buzan. Buzan with Buzan 1993)), concept mapping (developed primarily by Joseph Novak. Novak & Gowan 1984), cognitive mapping (developed primarily by Colin Eden - with David Sims and Sue Jones and later with Fran Ackermann. Eden, Jones, & Sims 1979, Ackermann et al 1992, Eden & Ackermann 1998) and dialog mapping (developed by Jeff Conklin. Conklin 2003). Each of these methods provides a framework for structuring qualitative data (ideas). While there are some similarities between the four methods each has its own distinctive characteristics. These characteristics are described in detail, with a short illustration and sample map. The characteristics are then summarized and contrasted at the end of the paper. Any one of these methods might be of interest and of use to individuals and groups of researchers who either need to structure their own thinking about a project or who wish to use one of the methods to gain new insights into their research data. Which method you use to map your data depends on what you are trying to achieve.

Qualitative data analysis (QDA) context

Qualitative data analysis texts and journals (see note 1) show a focus on the “code and retrieve” approach for structuring and analyzing qualitative data. These methods tend to form the main body of work in studies using qualitative data. A “typical” QDA project might involve a series of interviews or focus groups from which information is recorded and transcribed and then "coded" into various categories. The researcher’s own notes, recorded as linear text, may also be added to the repository of data and coded using a particular coding approach (such as open coding, axial coding or selective coding). Conclusions are then drawn from and theories built around the coded data. Mapping the structure of ideas, be they the researcher’s ideas about a project or the research subjects’ ideas is generally a small part of such QDA studies. In talking about causal mapping Miles and Hubermann observe that: “the conventional view is that qualitative studies are only good for exploratory forays, for developing hypotheses - and that strong explanations, including causal attribution, can be derived only through quantitative studies” (Miles & Hubermann. 1994). The result of this view is that researchers do not appear to explore the use of mapping methods (particularly causal ones), either for their own use or as part of their study. There are, however, several well-established ideas mapping methods for qualitative data structuring (QDS) - not all of which are causal methods. These methods offer different frameworks for organizing ideas and providing insight into qualitative data. As well as being of use to the researcher in organizing his/ her own thinking, ideas mapping can be used to express and explore the relationship between the different variables in the data, to explore the causal and other relationships expressed in the data, and highlight actions and their consequences.

The four QDS methods discussed here developed in different fields of study. The mind mapping technique was developed and popularized primarily by Tony Buzan, in the UK, who started his career at the Daily Telegraph Newspaper, in London. As an undergraduate at the University of British Columbia, studying psychology, English, mathematics and general science he became absorbed by questions which related to how we learn, the nature of thinking and the best techniques for creative thinking. This led to further studying of “psychology, the neuro-pathology of the brain, semantics, neuro-linguistics, information theory, memory and mnemonic techniques, perception, creative thinking and the general sciences”. (Buzan with Buzan 1993). In 1971 he started to write about his ideas on mind mapping and radiant thinking, “Use your head” was published in 1974.

The development of concept mapping was driven by Joseph Novak (in the field of education), inspired by the work of educational psychologist David Ausubel and his “Assimilation Learning Theory”. In essence this theory contends that some prior knowledge is the key to additional learning and that new

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material is related to relevant ideas in the individual’s existing cognitive structures. (Ausubel 1968, Ausubel 1978, Novak 1998). Novak developed the concept mapping technique while employed as a Professor of Education and Biological sciences at Cornell University. His research there focused on educational studies, knowledge creation and knowledge representation. In 1977 he published his ideas in the book “A theory of education” (Novak 1977).

The development of cognitive mapping was driven by Colin Eden (in the operational research field), working initially at the University of Bath and latterly at the University of Strathclyde. Based in the School of Management, the team were using operational research techniques and mathematical modeling to address their clients’ problems. For those seeking help with strategy development, the problems were founded in dealing with complex and messy data. The team realized that the key to helping these clients was not in the (mathematical) modeling of the problems themselves but in the structuring of the problems. Problem definition and problem structuring were seen as the keys to success rather than the use of a particular mathematical modeling technique. The focus turned to methods of providing decision support and QDS for the strategy formulation process. The ideas of the psychologist George Kelly (Kelly 1955) relating to how we construe information were used to inform the development of the cognitive mapping technique, these ideas being particularly important when thinking about working in teams - in attempting to create a sense of commitment and agreement to action, a common way of construing the future was needed. Kelly’s theory is organized into a fundamental postulate and 11 corollaries, certain elements of that theory were adopted, namely the individuality, the sociality, the commonality and (for problem solving) construction corollaries, that of bipolar constructs and the idea that beliefs are structured hierarchically into a system of super-ordinate and subordinate constructs.

Dialog mapping was developed by Jeff Conklin, based on the work of Horst Rittel in the field of urban planning. The theme of Horst Rittel’s work was “the reasoning of designers: the nature of their problems, the kinds and structures of the knowledge they use, the formation of judgment, their logics of procedure” (Churchman et al 1992). Rittel’s work led to the development of the Issue-Based Information Structuring (IBIS) approach to ideas structuring (known as “the IBIS grammar”) from which dialog mapping was developed. Dialog mapping is a “question based” form of ideas mapping. The map starts with a question, ideas (which are possible answers to the question) are then added as the next level “out” from the question and then pros and cons are added which qualify the possible answers.

Despite their different origins these four approaches to ideas mapping (QDS) are generic methods and can be used in any field of study. Also, a common theme across the application of all of the methods is their utility in building understanding and consensus within groups, as well as their utility as tools for individual thinking and learning. They can be used as “learning tools”: helping researchers to explore and define what it is that they are trying to do - structuring their own thinking at various stages during the project (from outlining the project plan, to structuring the final report) or as “exploratory tools”: helping researchers to build a visual representation of an interviewees’ or group’s perceptions of an issue.

Mind mapping
A mind map consists of a central idea (expressed in the form of a picture or words and a picture) from which radiate ideas that relate to the central idea. The structure is dendritic (tree-like), usually with branches of diminishing size - “thick” towards the center and finer towards the periphery. The map is a radially organized structure of key words and images emanating from a central image (idea or topic). The small number of inner “branches” radiate out to a much larger number of outer branches. Buzan talks about “radiant thinking”. The images are an aid to memory and, as illustrated in Buzan’s books these hand-drawn images can be quite spectacular. “The full power of the Mind Map is realized by having a central image instead of a central word, and by using images where ever appropriate” (Buzan 1993). The emphasis is on using artistic and textual prompts to help with the organization of data.
The guiding principles for the creation of mind maps (Buzan 1993) are:
1. Use emphasis - images, color, font and style variations throughout your map
2. Use association - make links between associated ideas, use color coding (specific colors) for specific types of information
3. Be clear - make your images as clear as possible and try to use one key word per line (branch). Make the length of the line match the length of the word. Lines (branches) closer to the central idea should be thicker than those further out (emphasizing the hierarchy).
4. Develop your own mapping style - including other forms of coding (such as symbols) which can be used to cross-reference on maps.

The illustration used throughout this paper is that of a school pupil thinking about the forthcoming school science fair. The maps that have been produced are “personal”, that is, if you (the reader) or any of your colleagues were asked to carry out this exercise you would be unlikely to produce the same maps. There would be common elements but your knowledge of and attitude towards the subject will influence the content of the map. The purpose here is to illustrate the structure of the mapping approach.

Figure 1: An example of a mind map.

Concept mapping

Concept maps are made up of “concepts” and expressions of the relationships between concepts (these relationships are known as “propositions”). A concept is the label given to “an idea of a class of things” or “a perceived regularity in phenomena” (often but not necessarily expressed as a single word). A “proposition” is a statement or assertion, made up of two or more concepts with linking words, presenting the proposition as a meaningful statement. For example:

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concept maps

help to

organize data
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“Concept maps help to organize data” is the proposition. When drawing a concept map, concepts are usually framed, most commonly by rectangles. The links are labeled to express the relationship
between the concepts in the map. Cross-links provide links between the different “domains” of the map (a domain is a “branch” of the map which deals with one particular aspect of the issue being considered). Cross-links often provide new insights into the information being mapped. The structure of the concept map is hierarchical, with the broadest, most inclusive statements at the top of the map and the more detailed, specific statements lower down. The statement at the top of the hierarchy is usually the subject of the map. There can be multiple links from a concept to a number of other concepts.

The guiding principles for the creation of concept maps, having defined the subject of the map, are:

1. Identify and list the key concepts which apply to the subject of the map
2. Establish (or think about) an approximate rank order for the concepts in the list - from the broadest, most general concepts to the most specific. (The rank order need only be approximate, but going through this stage helps with the construction of the map and the identification of the different domains/branches of the map. You do not have to do this step.)
3. Construct a “preliminary” concept map
4. Having created a preliminary map, review the map and look for cross-links - links between the different domains of the map. (It is often the cross-linking which gives new insights into the data).

Using the school science fair example, the following concept map was produced.

Figure 2: An example of a concept map

Cognitive mapping
There are a number of different techniques which use the label “cognitive mapping” (Huff, A.S. (ed) 1990 gives a good overview of various forms of cognitive mapping). Here we are discussing cognitive mapping based on the work of Eden et al. A cognitive map is made up of “concepts” - short phrases that express an idea (fact or assertion) about an issue - and links - connections between the concepts which are read as “may lead to”. [The use of the label “concept” to describe the basic unit of data in a cognitive map can be confusing to those already familiar with concept mapping.] Concepts may be mono- or bi-polar. Bi-polar concepts express ideas in the form of: “carry out a good project rather than try for a spectacular one”. In this case “carry out a good project” is the emergent pole and “try for a spectacular one” is the contrasting pole. Bi-polar concepts give us more information about what a person really thinks about a subject. This concept could have been expressed as: “carry out a good project rather than a mediocre one” or “carry out a good project rather than study a different subject”. The bi-polar concepts which are of most interest are those which bring out “the shades of grey”, the
subtleties in peoples’ thinking. Links in a cognitive map can be “positive” (which is the default - “may lead to”) or “negative”. Negative links lead the first part of the concept at the tail of the link to the contrasting pole of a concept at the head of the link, i.e.

end up with nothing rather than have results to show on the day

carry out a good project rather than go for a spectacular one

This would be read as “carry out a good project may lead to have results to show on the day” and “go for a spectacular one may lead to end up with nothing” - “one” in this case referring to “project”. The “rather than” phrase appears often in cognitive mapping and so there is a short-hand way of representing this, which is as an ellipsis, that is three dots - “…”, so bi-polar concepts would be written as:

carry out a good project … go for a spectacular one

The guiding principles for the creation of cognitive maps, having defined the subject of the map, are:
1. Break ideas down into short phrases (6 to 10 words if possible), one idea per concept
2. Express ideas in an imperative form (that is as a command) if possible e.g. “carry out a good project”
3. Try to capture any “opposite poles” (that is “rather thans”) which are expressed.
4. Build ideas into a hierarchy - think in terms of outcomes (desirable or undesirable), “what may lead to what” - means/ ends, cause/ effect , how?/ why? - this is surfacing the goal structure.

Using the school science fair example, the following cognitive map was produced.

Figure 3: An example of a cognitive map:
**Dialog mapping**

The IBIS grammar consists of questions, ideas, and arguments. Ideas link in to questions, arguments link in to ideas. Arguments may be either pros (plusses) or cons (minuses). The link type, rather than the node type, specifies whether ideas are classified as pros or cons. The node type is simply “argument”, because arguments may be either pros or cons depending on the context. With a change of context a node (argument) which previously supported an idea (a pro) may change to oppose it (become a con).

The form of a dialog map would be as shown in figure 4:

Figure 4: the structure of a dialog map.

The guiding principles for the creation of dialog maps are:
1. All maps (discussions) start with a question
2. Answers (ideas) are stated in response to the question (the “responds to” link) - ideas are always defined relative to some question
3. Justifications (arguments) are added to the ideas - these justifications may be pros (supporting/advantages/plusses) or cons (objecting to/inhibiting/disadvantages/minuses)
4. Arguments can give rise to new questions which expand on an idea

Dialog mapping extends the IBIS grammar to include additional link and node types. In dialog mapping the node types and links are:

<table>
<thead>
<tr>
<th>Node</th>
<th>Link</th>
<th>Node</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q</td>
<td>responds to</td>
<td>I:</td>
<td>the idea node links to question node with a “responds to” link</td>
</tr>
<tr>
<td>I</td>
<td>supports or objects to</td>
<td>A:</td>
<td>the argument node links to the idea node with a “supports (+) or objects to (-)” link</td>
</tr>
<tr>
<td>I</td>
<td>expands on</td>
<td>Q:</td>
<td>the (new) question node links to the idea node with an “expands on” link.</td>
</tr>
<tr>
<td>I</td>
<td>specializes</td>
<td>A:</td>
<td>the argument node links to the idea node with a “specialize” link where the argument is an example of the idea</td>
</tr>
<tr>
<td>Q, I or A</td>
<td>challenges</td>
<td>Q:</td>
<td>the (new) question “challenges” the content of an existing node (allowing explanation of why the question, idea or argument might be wrong).</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td>“decision node” - a decision in IBIS is simply a “selected” node. That is having constructed the map, nodes are identified which represent the chosen course of action.</td>
</tr>
</tbody>
</table>

Using the school science fair example, the following dialog map was produced.
Summary of the characteristics of the four ideas mapping methods.

The following table gives a summary of the main features of the four ideas mapping methods, based on their:

- structure (1) physical layout and (2) how content is structured
- link type(s)
- orientation (1) goal-orientation - aimed at surfacing an individual’s or a group’s goal structure (2) action orientation - intended to act as a spur to action
- basis of construction (e.g. question based).

This is a comparison across the four methods. This is an important distinction because while it might be argued that there are aspects of questioning involved in constructing a mind map, it is not question based when compared to methods such as cognitive mapping (where “why” and “how” type questions are used to build up the hierarchy in the map) or dialog mapping, which is expressly question based.

<table>
<thead>
<tr>
<th>Mind mapping</th>
<th>Concept mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>- One central idea surrounded by a radiant network of associated ideas</td>
<td></td>
</tr>
<tr>
<td>- Hierarchical - from the generic towards the center to the specific at the outer extremes</td>
<td></td>
</tr>
<tr>
<td>- Associative - links are associative i.e. this idea is associated with or part of the super-ordinate idea, but the nature of the relationship is not expressed.</td>
<td></td>
</tr>
<tr>
<td>- Not inherently goal structured - aimed at helping you to identify all of the factors associated with an issue but not (necessarily) focusing on outcomes</td>
<td></td>
</tr>
<tr>
<td>- Not inherently action orientated</td>
<td></td>
</tr>
<tr>
<td>- Not question based</td>
<td></td>
</tr>
<tr>
<td>- Multi-directional network of ideas (usually presented as a structures with one “upper most” idea but can be represented as a “wheel” with a central concept with a radiating network of concepts)</td>
<td></td>
</tr>
<tr>
<td>- Hierarchical - from the generic (at the top) to the specific (at the bottom) of</td>
<td></td>
</tr>
</tbody>
</table>
the hierarchy
• Relational - links can be used to express any form of relationship between concepts, identified by the map builder
• Not inherently goal structured - helping you to identify all of the factors associated with an issue but not focusing on outcomes
• Can be action orientated, but not inherently so
• Not explicitly question based - implicitly question based in so far as the map builder must answer the question: “what is the relationship between this concept and that concept?”

Cognitive mapping
• Multi-directional network of ideas - (usually small number of “upper most” ideas - goals - with a larger supporting body of ideas “beneath”).
• Hierarchical - from the generic (at the “top” of the map) to the specific (at the “bottom”) of the hierarchy
• Causal - all links are in the form of “may lead to”
• Goal structured - specifically aimed at surfacing a goal structure of desirable/undesirable outcomes
• Specifically aimed at being “action oriented” - concepts with a verb in the imperative form
• Not explicitly question based - question based in so far as “laddering” up and down the chains of argument in the map is achieved by asking “why?” type questions to elicit outcomes and “how?” type questions to elicit enabling events

Dialog mapping
• Dendritic (tree-like) network with “seed questions” - built from left to right
• Not hierarchical - questions, ideas and arguments are neutral
• Relational - with five categories of relationship defined - “responds to”, “supports/ objects”, “expands on”, “specializes” and “challenges”.
• Not inherently goal structured - not aimed at surfacing a goal structure but aimed a problem solving
• Not action orientated
• Question based

Comparing and contrasting the four methods for ideas mapping
All four methods help you to organize existing knowledge. To a greater or lesser degree each of them helps you to express associations, find hidden links between ideas, trigger new ideas and/ or questions and in so doing to create new knowledge and understanding. Also, all four methods encourage a high level of critical thinking. The discipline of building a map helps to clarify thinking and helps to develop different interpretations and new views about the subject in question.

When used with groups mapping methods (where the developing map is projected on to a screen) help to avoid “truth through repetition” or “the magic of reiteration”, which is that “if you say something often enough it must be true”. The argument is presented and captured in the map, it does not have to be repeated again and again. This may be a disadvantage, depending on the type of study, in that a respondent repeating the same idea many times, may be seen as significant in itself, indicative of that person being “obsessed” with a particular idea or event.

Mind mapping truly encourages artistic talents, the other methods do not. Mind mapping developed as an aide-memoir - the aim of mind mapping is to accelerate learning, the ability to remember and recall information, by presenting ideas in note form around a central theme, with visual stimuli, thus stimulating different parts of the brain and helping to trigger learning and understanding. In concept mapping, cognitive mapping and dialog mapping the emphasis is on clarity of display and making explicit the relationship between ideas. Artistic layouts are not encouraged. Concept mapping offers
the greatest flexibility in terms of expressing relationships between ideas. In cognitive mapping the traditional view of the conditions for causality (precedence in time, necessity - the event/phenomenon would not exist without the pre-existing event/phenomenon - and sufficiency) is not rigorously applied. You are mapping an individual’s or a group’s understanding of a situation not testing for scientific accuracy. (Miles & Hubermann (1994) suggests a broader view of causality and Pearl (2000) while a largely mathematical text has a nice presentation of some of the philosophical arguments relating to causality). Knowing what causes something or believing that we know what the cause is makes a difference in how we act.

A common mistake across all methods is to put more than one idea into a node or on a branch. It usually become obvious when this has been done because it becomes very difficult to link into the node or build on the branch. This is something that is learnt with practice but some people never feel comfortable with any ideas mapping method, they are not “graphical thinkers”.

Conclusions
Having been through the process of developing four different types of idea maps for the same subject, as illustrations for this paper, it certainly felt like the different methods encouraged the development of different ideas and different perspectives. You might want to try that exercise for yourself. In a research project using qualitative methods, the decision whether or not to use one of these QDS methods depends on what you are trying to achieve and what you think it is that you are looking for. From a project perspective, does the method help you to address your research question and give you new insights into your data? If so, what have you learnt? I would argue that mind mapping is of most use as a tool for personal reflection, knowledge exploration and learning. Mind maps tend to be highly personal, especially hand-drawn ones containing few words and a lot of images. It would be difficult to fit such a method into the body of qualitative research study and use it as the main form of QDS. Similarly, I would argue that dialog mapping is of most use as a tool for personal knowledge exploration and learning but it can also be used for group exploration of issues around a project.

Concept and cognitive mapping have more to offer in terms of how they can be used in the body of a qualitative research study. Concept maps can be used to express complex forms of relationships between categories of data, cognitive maps to express causal or loosely causal relationships. If you are using a causal model for the main part of your study then you need a definition of what you are considering as “causal” - how do you define or identify a cause in a highly complex situation? (The causal conditions of: precedence in time, necessity (phenomenon A must be present for phenomenon B to happen) and sufficiency (phenomenon A must be sufficient cause in itself to cause phenomenon B) are difficult to satisfy and correlation does not imply causation). If you are only mapping your own thoughts on a subject, you may not have to deal with what definition of “causal” you are using other than to accept the “may lead to” notation offered in cognitive mapping. The alternative is that you use a broader definition of “causal”. You might argue that “more often than not factor A leads to factor B” (possibly evidenced by more than 50% of recorded incidents having a particular outcome) or are you mapping (and accepting) the interviewee’s perception of causation? With both cognitive mapping and concept mapping depth of understanding tends to come from cross-linking - new links between different branches of data.

It is possible to develop your own mapping style and to developing your own coding system - for example using a different link style to signify weakly causal links, associative links, temporal links or connotative links and so on. The language of cognitive mapping comes from the management field where talking about “goals” and “key issues” sits well with an audience of managers trying to solve a particular problem. Outside this field the labels for the different types of information in the model should be changed - goals may simply be labeled “outcomes” or “hopes/fears” or “aspirations” - depending on the context - the structuring remains “may lead to”.

In what circumstances might you choose to use a mapping method for the main body study? Perhaps where you are interested in following the interviewee’s agenda, rather than the interviewer’s, where
you are involved in a dynamic and changing dialog with the research subject(s) rather than just having an interest in taking a “snap shot” at the particular time or of a particular event.

The table in appendix 1 draws some comparisons between the ideas and tools which support ideas mapping methods and those which support “traditional” QDA. These have implications for research design - data gathering and data management

What is a legitimate or valid QDS method for use in a study dealing with qualitative data? One which you can defend in the context of your research project, one which helps you to understand your data, to see it in a different way, to discover new questions and to address your research question

Notes:

(1) Review the contents of journals such as: Qualitative Health Research, Qualitative Inquiry, Qualitative Social Work: Research and Practice, Qualitative Sociology and other Social, Behavioral Sciences and Human Science journals (there is a long list of journals which publish qualitative research studies). And texts such as Handbook of Qualitative Research (Denzin & Lincoln), Qualitative data analysis (Miles & Hubermann), Handbook of Applied Social Research Methods (Bickman, Rog, (eds.)) Qualitative Research for Education: An Introduction to Theory and Methods (Bogdan and Biklen), Qualitative Inquiry and Research Design : Choosing Among Five Traditions (Creswell), Research design: Qualitative and quantitative approaches (Creswell), Educational research: quantitative and qualitative approaches (Johnson & Christensen) and there are many other books to choose from which give guidance on qualitative research methods. You can also search on the Internet for information on qualitative research studies. The overall impression is that qualitative methods include some form of interviewing, focus groups, participant observation, shadowing, diary keeping, note taking/ recording (sound, video, photographic) - from which data is transcribed or “filed” (in the case of video clips and photos) in a system for coding and later retrieval for theory building. Ideas mapping is a small part of this field. Concept building at a higher level (which ideas mapping helps with) is rarely mentioned either as a tool for personal reflection or as a tool for use in the main study.

(2) Cognitive maps are multi-directional networks of ideas - but they are shown two-dimensionally. The “small number of “upper most” ideas - goals” are colored up so that they are “raised above” the general level of the map. The problem is that you are unlikely to end up with a neat little model (or a big model come to that) where the outcomes sit at the top of the page. There will be, or are likely to be, multiple goals with varying degrees of elaboration beneath them. Imagine a mountain range with a number of peaks and passes that link between the peaks. That is what you are building - but in two dimensions with the color (display styles) giving the height to the peaks.
### Appendix 1:

**Ideas mapping methods and “traditional” QDA**

<table>
<thead>
<tr>
<th>Ideas mapping methods</th>
<th>“Traditional” QDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviewer as facilitator and data gatherer (facilitating interviewee understanding as well as researchers understanding) – dual understanding</td>
<td>Interviewer as data gatherer – single understanding</td>
</tr>
<tr>
<td>Concept building at the time of data gathering</td>
<td>Literal transcription and then concept building</td>
</tr>
<tr>
<td>Closeness to data through understanding the research subject’s perspective and the research subject exploring their understanding</td>
<td>Closeness to data through having access to all data collected for the interviewer to interpret</td>
</tr>
<tr>
<td>Interviewee agenda</td>
<td>Interviewer agenda</td>
</tr>
<tr>
<td>Interviewee interpretation (of the situation)</td>
<td>Interviewer interpretation of what the interviewee has said about the situation</td>
</tr>
<tr>
<td>Dynamic and changing dialogue</td>
<td>Static snapshot</td>
</tr>
<tr>
<td>Prioritization of ideas</td>
<td>Recording of ideas</td>
</tr>
<tr>
<td>Process is important for researcher and client (interviewee)</td>
<td>Process important for researcher (closeness)</td>
</tr>
<tr>
<td>Mind mapping and concept mapping: “learning based” development</td>
<td>Research driven – internally focused (helping researcher)</td>
</tr>
<tr>
<td>Cognitive mapping and dialog mapping: “consultancy based” development – a practical means to an end – externally focussed (helping both interviewer and interviewee). Crossing the boundary between researcher and researched (mediating artifact).</td>
<td>Would you give your QDA software to your interviewee? Would you expect them to work with it? Would you explain your deduction process to you interviewees? – invisible research process</td>
</tr>
<tr>
<td>Coding as learning – building understanding and conveying meaning</td>
<td>Ditto – coding is for theory building</td>
</tr>
<tr>
<td>Iterative research process</td>
<td>Linear research process</td>
</tr>
<tr>
<td>Feedback to verify meaning (all the way through) – “validation meetings”</td>
<td>Feedback of conclusions rather than feedback of meaning</td>
</tr>
<tr>
<td>Rich context (lots of links around, lots of “ins”)</td>
<td>Incidence – lots of mentions</td>
</tr>
<tr>
<td>Mapping follows links for context does it link in, idea could be mentioned at any stage in the interview</td>
<td>“Code and retrieve” methods follow order for context (i.e. lines before and after)</td>
</tr>
<tr>
<td>Inter-relationship of ideas – multiple perspectives, alternate realities - Non-linear recording</td>
<td>One reality – the interviewer's interpretation</td>
</tr>
<tr>
<td>Problem structuring</td>
<td>?Simplification of complexity</td>
</tr>
<tr>
<td>Understand/ represent cause and time (flows of events)</td>
<td>Not generally a focus</td>
</tr>
</tbody>
</table>
References and bibliography


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