

Chapter 4

Strategic Options Development and Analysis

Fran Ackermann and Colin Eden

Abstract Strategic Options Development and Analysis (SODA) enables a group or individual to construct a graphical representation of a problematic situation, and thus explore options and their ramifications with respect to a complex system of goals or objectives. In addition the method aims to help groups arrive at a negotiated agreement about how to act to resolve the situation. It is based upon the use of causal mapping – a formally constructed means-ends network – as representation form. Because the picture has been constructed using the natural language of the problem owners it becomes a model of the situation that is ‘owned’ by those who define the problem. The use of formalities for the construction of the model makes it amenable to a range of analyses as well as encouraging reflection and a deeper understanding. These analyses can be used in a ‘rough and ready’ manner by visual inspection or through the use of specialist causal mapping software (*Decision Explorer*). Each of the analyses helps a group or individual discover important features of the problem situation, and these features facilitate agreeing a good solution. The SODA process is aimed at helping a group learn about the situation they face before they reach agreements. Most significantly the exploration through the causal map leads to a higher probability of more creative solutions and promotes solutions that are more likely to be implemented because the problem construction process is wider and more likely to include richer social dimensions about the blockages to action and organizational change. The basic theories that inform SODA derive from cognitive psychology and social negotiation, where the model acts as a continuously changing representation of the problematic situation – changing as the views of a person or group shift through learning and exploration. This chapter, jointly written by two leading practitioner academics and the original developers of SODA, Colin Eden and Fran Ackermann, describes the SODA techniques as they are applied in practice.

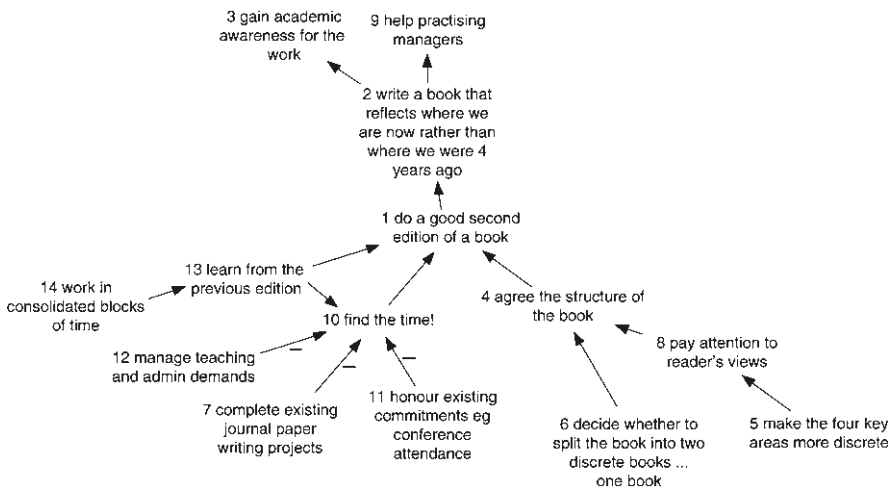
F. Ackermann (✉) and C. Eden

University of Strathclyde Business School, 40 George Street, Glasgow, Scotland G1 1QE

4.1 Summary

The underlying essence of SODA (Strategic Options Development and Analysis) is that it is an approach that enables *problematic situations* to be explored more fully before making a decision. This process is carried out using a technique called cognitive or cause (or causal) mapping which is a fundamental part of the SODA approach. Mapping allows views to be captured and structured in a ‘means-end’ format (for example, this issue might lead to this outcome) thus generating chains of argument. Therefore a map can be seen as a representation of how somebody or a group construes a situation and therefore helps them make sense of it before considering action. Thus it is synthetic. In the figure below some of the considerations surrounding the issue of writing a good second edition of a book can be seen. The central statement is the issue of concern, those statements linking out (consequences) reflect the objectives, and those linking in are options and constraints. Where there are minus signs at the head of the arrow, this represents a negative link namely managing teaching and admin demands may lead to NOT finding the time.

The unfolding map thus enables exploration of the situation. This can be done through a simple visual examination of the map, or when working with a large model, can be assisted through the use of specific analyses designed for mapping. By capturing the full extent (as much as is possible given time and resource constraints) the approach helps enable participants to take a more holistic view allowing the analyses to reveal the ‘nub of the issue’ – the one or more statements that are most central and which have a significant impact upon desired ends (individual values or organizational goals). The exploration will also highlight options, causes and constraints. The analyses can also uncover self-sustaining vicious or virtuous cycles suggesting dynamic behaviour. When working with large maps (comprising



the views of many participants) specially designed mapping software – *Decision Explorer* – can be used.

Although SODA is most commonly used with groups, the approach has also been used at the individual level to explore how best to manage a particular situation (whether it be personal or managerial) (see Bryson et al. 2004b, for examples). However, as noted in Chapter 1, one of the key emphases of SODA is the capture and structuring of multiple perspectives, and to facilitate this emphasis, there are a number of different modes. These modes range from manual interventions to those that are extensively supported through technology.

In most of the modes of working, the capturing, and knitting together, of perspectives is carried out in a publicly viewable manner which ensures that participants feel that the process is procedurally just (Kim and Mauborgne 1995) through all being involved in contributing. Furthermore by opening up the apparent problem situation and exploring all of its facets, participants gain a wider and more sophisticated appreciation and feel that the resultant direction appears more robust and procedurally rational (Simon 1976). As such, participants feel both emotional and cognitive commitment to the outcomes, increasing their likelihood of implementation. Widening the scope and involving participants therefore helps avoid making poor decisions that are either unsustainable or not owned (Nutt 2002). It also helps to protect against the traps of reductionism and dogmatism.

Thus SODA is an approach which aims to encourage the facilitator/consultant to bring together two skills. Firstly, skills relating to the *processes* involved in helping a problem solving team to work together efficiently and effectively in reaching workable – politically feasible – agreements. Secondly, skills pertaining to the adoption of a framework which enables the construction of a model comprising the *content* – the interconnected issues, problems, strategies and options – which members of the team wish to address.

4.1.1 What Does It Look Like (Basic Characteristics/Attributes)?

The SODA framework constitutes four important and interacting theoretical perspectives. These perspectives include: the individual (cognitive psychology); the nature of organizations and groups (as negotiated enterprises); consulting practice (the interaction between a facilitator and client group); and the role of technology and techniques (to allow the construction of a visually interactive model). Each of these perspectives leads to the core notion that drives SODA: the application of a facilitative device – the construction of a publicly viewable model amenable to continuous change and analysis to support group working.

Recognition of the *individual* implies drawing on a theory of cognition particularly in relation to the psychology and social psychology of problem solving. This is evidenced in SODA through one of the main tenets underpinning the approach, that of a Theory of Personal Constructs' (Kelly 1955). Within SODA, construct theory has practical significance through cognitive mapping (Eden 1988).

As noted above, the ‘cognitive map’ is a model of the ‘system of concepts (or statements) used by a person to communicate the nature of the situation – the way they make sense of their world’. The model represents the meaning of a concept by its relationship to other concepts – providing context – and through an action orientation. Thus, any statement about an aspect of the situation is given meaning either by suggesting consequences/purposes – why this ‘fact, assertion, proposal’ is important, or by providing explanations for the statement being made – how this circumstance or proposal has been derived or come about. In other words, statements are made as a way of representing a person’s ‘making sense’ of the situation/problem they believe is faced by the group.

Thus, in an organizational setting the manager is taken to be involved actively in the psychological construction of the world rather than the perception of an objective world (Thomas and Thomas 1928). So it is the interpretation of an event that is reality. Action arises out of the meaning of situations, and the meaning will vary from one person to another even if the summary descriptor of the event is agreed by both individuals to be similar. Thus individuality – expertise, wisdom and experience – is legitimate and allowed to blossom within a SODA intervention.

In *organizations*, teams are created in order that each member of the team may bring a different perspective to an issue. A different construction of a problematic situation comes from having a different role and from a different set of experiences and wisdom. Individuals, within an organizational setting, thus will use all methods of communication in order to negotiate with and persuade others to their viewpoints. However, exploiting individuality implies deliberately encouraging more richness in problem construction by accentuating complexity within problems – complexity of multiple perspectives and complexity from more data. Moreover, a view of organizations which focuses on the individual will inevitably also focus on the organization as a changing set of coalitions in which politics and power are significant explanations of decision making.

Consulting practice centres on the role of negotiation in effective problem solving. The consultant is the instrument for facilitating the negotiation, and for managing consensus and commitment. The consultant is taken to have a central professional role in both *designing and managing* this negotiation. Finally the *tools and techniques* employed by SODA comprise the use of cognitive or causal mapping and associated software – *Decision Explorer*. This software acts as a means of both visual interactive modelling (Ackermann and Eden 1994) and analysis.

4.1.2 What Is Its Significance (Why Use It)?

SODA’s main contribution is that the approach helps groups manage complexity inherent in messy complex problems-balancing the management of content with the management of process. It pays explicit attention to all three of the purposes argued to be behind systems thinking in Chapter 1.

Underlying this notion of success is a view of problem solving that focuses on the point at which people feel confident to take action that they believe to be appropriate. The use of SODA recognizes that there is never a right answer to complex problems but rather a better or worse answer. Complex situations suggest dilemmas and paradoxes for a team, and consequently approaches such as SODA encourage informed judgment as opposed to a search for optimal solutions.

4.2 Strategic Options Development and Analysis (SODA): A Detailed Exploration

SODA has its foundation in working with ‘multiple perspectives’ in order to more fully understand a situation. Each member of a client group is held to have his or her own personal subjective view of what they regard as the ‘real’ problem(s). Thus tapping the wisdom and experience of participants is a key element in developing decisions with which participants feel confident. And, it is because of the complexity and richness that arises from attention to subjectivity that SODA provides a means for managing *process* as well as *content*. Thus SODA through attending to behaviour, judgement, and decision making in organizations sees experience-gathering as an act of ‘scientific’ endeavour, where managers experiment with their organizational world, learn about it, develop theories about how it works, and seek to intervene in it.

To facilitate an appreciation of both the approach and its practice, we begin with a short introduction to the method before examining each of its constituent parts. Commencing with an examination of the cognitive/cause mapping technique (its formalisms and benefits), we will then address the analysis of maps, before concluding with the processes and considerations of working with groups.

4.2.1 Introduction to the SODA Method

4.2.1.1 Where Has SODA Been Used?

The SODA method was initially developed in the 1980s (Eden et al. 1983) and has been used extensively with organizations public and private, large and small, at senior and middle management levels. Example organizations include: Shell International, Reed Elsevier, Grant Thornton (Australia), the Northern Ireland Prison Services, the National Health Service, Scottish Natural Heritage, Quantum Media, Scottish Water, AMEC Process and Engineering, Strathclyde Poverty Alliance, Cardonald College, IKAD (France), SES Global, Bombardier, Strathclyde Police. A SODA intervention may take as little as half a day where there is urgency or significant resource constraints or can encompass a number of days. SODA has also been used for individual problem structuring (see Bryson et al. 2004b).

4.2.1.2 Conceptual Background

Alongside taking cognisance of the four perspectives as noted in the summary, the overall approach is essentially based on the framework shown below (see Fig. 4.1). This draws on the theoretical frameworks mentioned earlier and also illustrates how the tools and techniques support the overall approach.

As can be seen from the framework, the bedrock of the methodology is based on theories relating to psychology (Personal Construct Theory) and organizational behaviour. These theories are augmented by further concepts attending to both the intervention impact (the role of the consultant/facilitator in an organization) and its implementation. In the centre is the method – which not only takes cognisance of the theories but also recognises the need to manage the environmental considerations, the desires of the client, and effective group working. The tools and techniques support the method. Below are further details for each of the five elements.

4.2.1.3 The Theoretical Framework

Personal construct theory: This theory was developed by a psychologist called George Kelly who argued that people continually and actively anticipate events

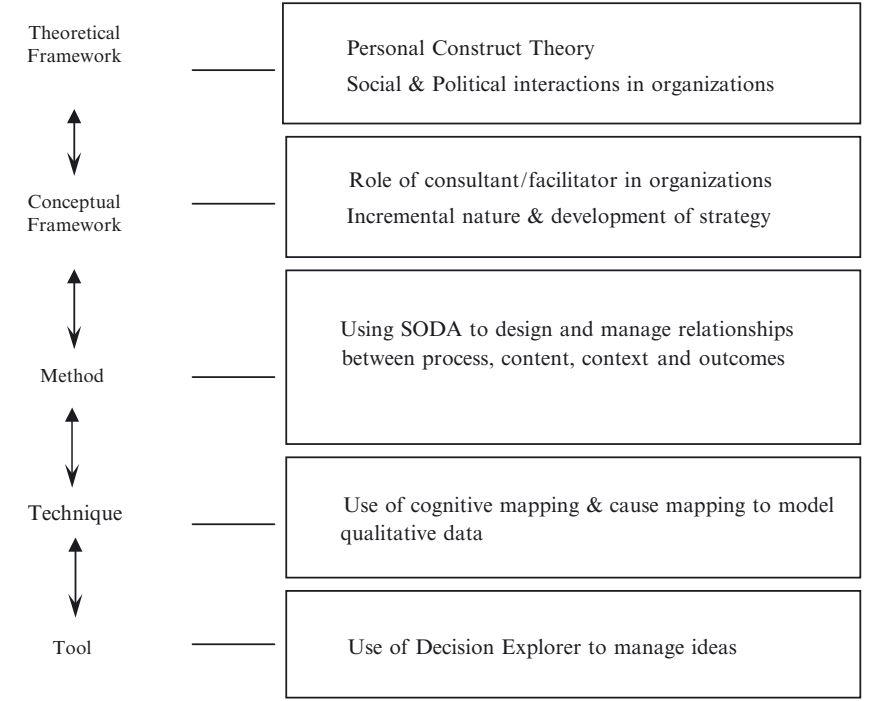


Fig. 4.1 A Framework illustrating the various theories, techniques and processes underpinning SODA

through a process of hypothesising what might occur in the future based on existing experience and subsequently testing out these hypotheses (Kelly 1955). From this experience new constructs are added to the existing set of constructs. Thus people make sense of their world by comparing and contrasting events, observations, facts, etc. to determine their meaning and to help navigate the future. The body of knowledge, what Kelly referred to as a “construct system”, is finite, and is made up of bipolar constructs. A bipolar construct is one which contains the contrasting or opposite pole and can be expressed as “this rather than that”. For example, I wish to study Management Science rather than Financial Accounting.

Kelly proposed 11 corollaries, five of which are particularly pertinent to SODA’s focus on problem solving and therefore through that particular lens can be seen as:

Construction: constructs are used to model an individual’s experiences and build up a worldview. This relates closely to Karl Weick’s notion of sense making (Weick 1979) which was influenced by Kelly.

Organization: individuals organize constructs hierarchically; they have super ordinate, core and peripheral constructs. As such at the top of the SODA hierarchy are values/beliefs – driving forces for us as individuals – with those further down the hierarchy either representing issues (events that affect positively or negatively our values) or options/constraints (explanations and alternative courses of action). This structure helps us organize and make sense of the constructs and experiences.

Individuality: individuals construe events differently through differently perceiving and interpreting things from a situation. An example here might be that it is raining (something it does frequently in Glasgow). One person might construe this as being a good thing (maybe they are from a water board) as it ensures that the reservoirs and dams are filled. Another might perceive it as a bad thing – they have forgotten their umbrella. Finally a third, particularly if it is winter, might perceive it as a good thing – if it is raining in Glasgow then there is a good chance it is snowing in Glen Coe and they can go skiing this weekend. Each has an entirely different interpretation of the same event. Recall a meeting you have recently attended. Was your view of what occurred during the meeting the same as others? Did the minutes of the meeting bear any resemblance to your understanding of what was agreed?

Commonality: the success of a decision making team depends upon the ability of member’s to understand how each interprets the situation as there will be similarities and differences between their experiences. Returning to the exercise suggested above (thinking about a meeting), by surfacing and understanding the different experiences gained, a shared or common language can be developed. A good article to read for further insights on this is Eden et al. (1994).

Sociality: which relates to the fact that decision makers need to find a common way of not only construing events (especially future events) but also in designing and working with options in order to be able to reach a consensus.

4.2.1.4 The Conceptual Framework

Social and political interactions in organizations: As noted in Section 4.1.2, rational analysis alone does not achieve change – organizations are made up of people who are persuaded to carry out some activity or change some operation. Thus organizations might be considered as “political cauldrons” where different and shifting coalitions emerge in order to get things done. Understanding who has power (in its different forms) is key to making changes – if any meaningful changes are to occur then there will be winners and losers and thus a change in the balance of power. Some will work to stop the changes going ahead and others will work towards ensuring their implementation. Understanding who these stakeholders are, and what their bases of power are, is an important aspect of change management. (For a good understanding of stakeholders and their management, see Ackermann and Eden 2010.)

Role of consultant/facilitator: There are two important aspects of facilitation worth considering when planning a SODA (or any) intervention. Firstly any intervention made by a consultant/facilitator (regardless of whether they are internal or external to the organization) raises expectations that something might change (for the better or worse). This has a number of consequences. One is that those involved will act to ‘manage’ this intervention in a way that is most beneficial to them. Another is that expectations will be established that need to be dealt with.

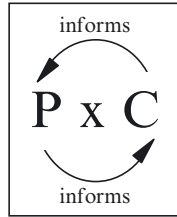
Secondly the act of talking to someone changes people’s minds. As Huw Wheldon of the BBC put it: “How can I know what I think until I hear what I say?” (Huw Wheldon of the BBC quoted in *Life on the Air*, by David Attenborough BBC books, London, 2002, p. 216), and notably paraphrased by Weick as – ‘how do I know what I think until I see how I act’ (Weick 1979). For an example of this at work, think back to when you have had a problem and you have gone to talk it over with a colleague. Half way through your explanation, you see the way forward; thank your colleague and leave. The very act of having to frame/structure the problem in a way your colleague can understand and therefore help you, provides sufficient aid to help you move forward.

Incremental nature and development of strategy: As noted above, change is difficult and the greater the change, the more resistance will be exhibited. Therefore it is important to find ways of gaining the commitment of those involved through involvement and understanding. As Lindblom (1959) wrote “often constant nibbling is a better substitute for a large bite”.

4.2.1.5 The Method

Process, content, context and outcomes: As noted above, SODA comprises paying attention to both Process (namely considering power, politics, personalities, and people – the skills traditionally encompassed by Organizational Development facilitators) and Content (traditionally Operational Research skills of capturing, structuring and analysing problem statements). The significant aspect being that one informs

Fig. 4.2 The relationship between Process Management and Content Management



or influences the other – $P \times C$ (see Fig. 4.2 from Eden (1990)). An example of this might be that as a result of the analysis of the data one particular issue emerges as central and therefore the most appropriate place to start the workshop – content is therefore informing process design. However an alternative might be where one particular issue is contentious and therefore should not be tackled first as the emotional state of the group is not ready – here process is informing content management.

Understanding the context is also important. Attending to context along with reflection on the outcomes agreed during the intervention requires decision makers to consider (a) whether there are sufficient resources available – both in terms of cash and staff time and (b) whether there is sufficient support for it – from both up (senior management) and down (staff) the organization. Most of the contextual implications arise as participants discuss the nature of the problem situation – thus, options are contextualized through beliefs about the possibility of their implementation. In this way problem definition arises from issues of problem solution. The ‘outcomes’ attend to what the ‘client’ (the person initiating the intervention) hopes to achieve. It is important to spend time exploring the aims and objectives of the intervention in order to ensure that SODA is best suited to help resolve the situation. For further information see Eden and Ackermann (2004b).

4.2.1.6 The Technique

Cognitive mapping and cause mapping: This technique, the bedrock of SODA encapsulates the strongest link to Kelly’s work. Building on the Repertory Grid technique developed by Kelly, cognitive mapping was designed to enable a representation of somebody’s construal of an issue to be created. It is important to note that both representation and construal are significant to the process. Returning to the corollary of individuality – construal deals with how the person whose views are being ‘mapped’ sees the world. It is a subjective picture (rather than an objective truth) and one that gives insights into how the particular individual might act in the manner articulated by Thomas and Thomas, namely “if men define events to be real, they are real in their consequences” (Thomas and Thomas 1928).

Maps in essence are networks (directed graphs) comprising nodes (constructs/statements) and links (causal arrows). As such, chains of argumentation are built up revealing both the richness of the area of concern and also particular characteristics

of it – for example, different aspects or themes, dilemmas, significant concerns and contradictions.

Cognitive maps are those maps that attempt to represent cognition – and therefore are focused on a single individual. Causal maps are those that are produced either from the amalgamation of cognitive maps, or from using the Oval Mapping Technique or mapping live using *Decision Explorer* (see later on in the chapter). The notion of group cognition is problematic as even if the constructs being captured appear to say the same thing, the map will not reflect a single cognition but rather fragments of a number of different cognitions.

Cognitive Mapping has been used extensively and not just in problem structuring (Ackermann and Eden 2004; Bryson et al. 2004b). The mapping technique, its use, attributes, and guidelines will be presented in the next section along with some exercises. For further information on the origins and theoretical underpinning of cognitive mapping see Eden (1988).

4.2.1.7 The Tool

Use of decision explorer to manage ideas: *Decision Explorer* (formerly *COPE*) is a software package that replicates the mapping process whilst also enabling rapid search and analysis, and providing the means to view as much or little of the captured material as desired. Working as a form of relational database, the software allows maps to be viewed and amended (either in groups or individually) and helps manage the complexity of the situation at hand (rather than simply reducing the complexity).

4.2.2 SODA and Cognitive/Cause Mapping

4.2.2.1 Mapping: What Is It? Where Can It Be Used?

It is first worth noting that there are many forms of cognitive or cause mapping each corresponding to a different theoretical basis. Whilst all forms of mapping aim to elicit causality they do so using a variety of coding procedures. Some examples include the work undertaken by Laukannen (1998), Langfield-Smith and Wirth (1992), Bougon, Weick and Brinkhorst (1977), Huff (1990), and Huff and Jenkins (2002). Understanding that the nature of cognitive and cause maps can vary will avoid later confusion when reading around the field.

Mapping has been used to great effect for a wide range of different purposes and applications. Below are a few of the main reasons mapping is used in the SODA method:

- *To structure thinking through capturing chains of argumentation, dilemmas, etc.* By being able to capture all of the statements (constructs) along with their relationships (causal relationships) maps present the means of being able to identify the

key issues, consider the breadth of considerations, and identify inconsistencies in our arguments. This relates back to the corollary of construction and organization. Let's look at an example experienced by one of the authors:

A while back a member of our department had a messy problem. She was a lecturer (on probation), who was working on her PhD, whilst looking after her 18 month year old son. In addition, her husband was working in the Middle East and her main home was in Cumbria (around two hours drive away from where she was working). Things were tough. Whenever she thought about her job she remembered that she needed to get the PhD completed in order to get off probation. However that meant working in the evenings and weekends. Having Raymond (her son) however meant that if she was working full time as a lecturer along with completing her PhD she needed to keep on the nanny. In fact a large percentage of the money she earned went to pay for the nanny! Her husband couldn't help – he was too far away. And then there was the issue of the house and all the things to do there. She found herself awake at night constantly worrying about the situation. Knowing I used mapping to help decision makers she asked me to do a map for her. Over the course of an evening we produced a map. There was nothing new on the map – she was aware of all of the statements captured. However the fact that the map did capture all of the concerns, assumptions, aspirations and issues in one place and showed how they impacted one another meant that she could stand back and see the 'wood for the trees'. Her immediate response was a sense of relief, now she could begin to make sense of it all and plan appropriately. She could see the implications of doing option A compared with option B, she could understand exactly what it was that she wanted (her goals) and identify the major issues. After some time deliberating upon the map, and another evening spent adding further material to it, she made her decision. She went and saw the Head of Department and stated that she was resigning. She explained why she was doing this, and showed him the map along with the concerns and options to demonstrate the rationality of the decision.

It is not untypical for the nodes/concepts on the map to be well known and understood – the advantage lies in taking what is often a mess and *reformulating it into a structure* that can then be worked with. Complex problems like these, with lots of interconnected issues or decision areas (Friend and Hickling 1987), are sometimes referred to as 'wicked' (Rittel and Webber 1973) or 'messy' (Ackoff 1981).

The map also provides insights and a sense of control that can sometimes result in there being enough clarity to move forward to action without doing any further analysis (see Eden 1987).

- *To present ideas in a graphical, rather than linear, form.* In many, if not all, situations there are links between the various pieces of information. Think back to when you take notes: often you find yourself drawing a link in from one point to another to show a relationship. The graphical format not only allows some rough analysis to be carried out (see next point) but also enables more material to be captured on a single sheet of paper facilitating further exploration. In this type of use there is some similarity with 'mind mapping' (Buzan and Buzan 1993), although mind maps are not constructed in a formal manner and so are not amenable to analysis.
- *To carry out 'rough' analyses.* For example by looking at a completed map it is possible to determine which are (a) the key issues (those with lots of statements linking to and from them), (b) potential goals/values (those that are at

the top of the map hierarchy with statements only linking in to them), as well as (c) properties such as self-sustaining or controlling feedback loops. This scan of the map to detect its emerging properties often can be a powerful way of summarizing what has been said as it provides added value and highlights areas not yet captured. When doing it for yourself it also provides the opportunity for further reflection.

- *To share more easily, through capturing more statements and links on one single A4 page.* Connecting with the idea of presenting statements in a graphical form, not only does the map help its constructor understand the situation better but also it will help others appreciate the construal. For example, when working with a group from Shell involved in the development of an Expert System, one of the comments from a member of the group involved in the project was that maps were a great way of (a) ensuring that the knowledge captured from the expert was valid and comprehensive as the map reflected what had been said in a natural and transparent manner, and (b) sharing the complexity of this knowledge with colleagues. This was because all the *statements were on one page together with how they related to one another*. Meaning could be deduced from concepts that were linked to, or from, one another.
- *To allow a more 'objective' stance to be taken.* Returning to the earlier example about the benefits of structuring thinking, one of the advantages of mapping is to be able to stand back, to reflect on the various explanations and consequences and therefore take a view that is more 'objective', in the sense of being a *fuller view*. Therefore it is possible to 'play' with the material, exploring how different options might achieve objectives and reflecting on which are the significant or busy statements.
- *To capture wisdom, 'tacit' knowledge and experience.* One of the difficulties experienced when trying to understand a situation is that the material provided, at least in the first instance, can be fairly superficial. People revert to well rehearsed scripts. Think about a particular event currently unfolding – it might be something global, like the credit crisis, or it might be something more local and relevant to your organization. In either case, you have probably had numerous conversations about this to the point that whenever anyone asks you about it, you are easily able to respond, without much cognitive effort. Essentially you have built up a repeatable script. Mapping however enables further exploration of the issue or problem through its focus on *teasing out* explanations (laddering down) for particular assertions/statements along with determining the reasons why (laddering up) particular issues matter. In this way a deeper level of insight is gained.
- *Improve interviewing capability.* It is often very difficult to do a good interview. If the interviewee speaks in a monotone, and it is a warm sunny afternoon, and you are tired, then the propensity to mentally 'drop off' or begin thinking about something else is very high. Moreover, taking linear notes is very passive – you don't have to understand what is being said – just note them down. Mapping however demands that more *active listening* takes place. As

such, there is an overhead in terms of effort because it forces you to not only capture the points but understand what they mean – otherwise it is not possible to be able to capture the relationships. As a result you are likely to understand far better what is being proposed rather than finding yourself in the position of either not understanding your linear notes (or the point being made) or realising that you missed a vital question, such as whether one aspect had an impact on another.

4.2.2.2 Building a Map: How a Map Is Constructed

There are a number of aspects to consider when mapping. If we go back to the point about mapping's origins being based on Kelly's Personal Construct Theory and that each construct can be seen as bipolar then we need to attend to the content of the statement. But we also need to consider its context.

A good way of illustrating this is to start with an *attribute map* (see Fig. 4.3). In the centre is the focus of the map – 'good rather than other teachers'. The three dots (an ellipsis) is used as a short hand for 'rather than'. Having the contrast to 'good' namely 'other' provides some additional meaning by providing *content*. For example, the contrast could have been 'poor', 'excellent', or 'innovative'. In each case the contrast adds depth to our understanding. If we then look at the attributes surrounding this statement (*the context*) we can see that they are also bi-polar giving the reader more of an understanding of what is meant by each of them, and an enhanced understanding of what is meant by a good teacher. Try thinking of a few more attributes that might denote a good teacher along with their opposite poles.

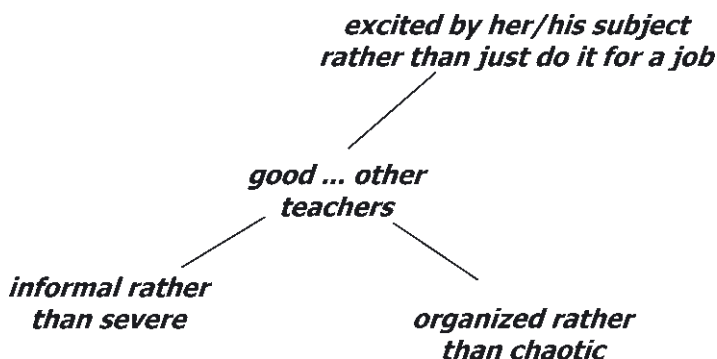


Fig. 4.3 An attribute map (From Eden et al. 1979, p. 45). Reprinted from Eden, C., Jones and Sims, D., 'Messing About in Problems: An Informal Structured Approach to Their Identification and Management', p. 45, Copyright (1983), with permission from Elsevier

If we take seriously the premise that meaning can be derived from context lets look at Fig. 4.4. We can see that in both instances the same central focus (A) has been used. However, the context around it (B, C, & D or Q, R & P) is different suggesting quite different interpretations. Let's consider an example. Imagine we are all together at the end of a class and we agree that it would be nice to have a great evening together – this seems very straightforward until we try to implement it. What does a great evening constitute? Going to the Pub for lots of drinks? Having a meal in an expensive and high-class restaurant? Trying out the latest ethnic food café? Frequently we find ourselves in the situation where language itself is *very imprecise (in terms of meaning)* and can cause complications re action.

Keeping this in mind, now consider the alternative (see Fig. 4.5 below). Here we have differently worded central foci, X and Y, but the context surrounding them is identical (J, K & L). This too can cause problems. Reflect back, have you ever been in the middle of a good argument with someone only to find you are both arguing the same point! You are in violent agreement! What has happened is that through the argument,

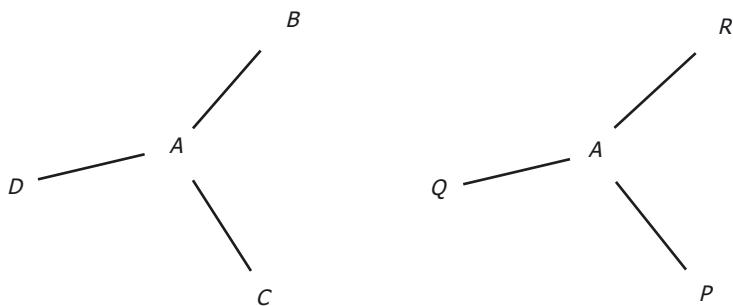


Fig. 4.4 Two attribute maps that appear to have *the same* central focus (A) (see Eden et al. 1979, p. 46). Reprinted from Eden, C., Jones and Sims, D., 'Messing About in Problems: An Informal Structured Approach to Their Identification and Management', p. 45, Copyright (1983), with permission from Elsevier

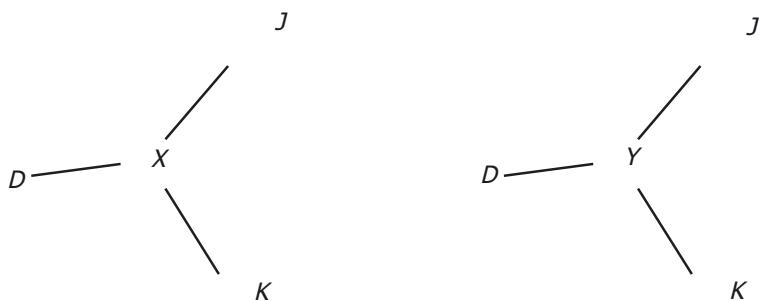


Fig. 4.5 Two attribute maps with what appear to be *different* central foci (see Eden et al. 1979, p. 46). Reprinted from Eden, C., Jones and Sims, D., 'Messing About in Problems: An Informal Structured Approach to Their Identification and Management', Copyright (1983), with permission from Elsevier

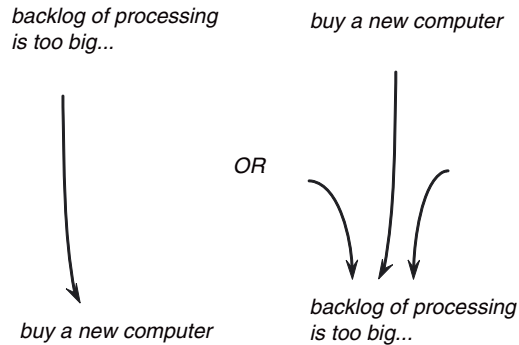


Fig. 4.6 Exploring causality (see Eden et al. 1979, p. 49). Reprinted from Eden, C., Jones and Sims, D., *Messing About in Problems: An Informal Structured Approach to Their Identification and Management*, p 45, Copyright (1983), with permission from Elsevier.

you have provided one another with the context and thus realised that *although the words are different the meaning is the same*. This situation is common particularly as we work with those from different backgrounds (national, industrial, communal, etc.).

Moving on from content and context lets begin to *consider the relationships*. In the previous examples, the links have simply been arbitrary attributes. However when undertaking cognitive and cause mapping the arrows have a particular meaning – that of causality – A may lead to B, or this ‘Option’ may lead to this ‘Outcome’ or this ‘Means’ may lead to this ‘End’. However the direction of the arrow will depend on the value system of the individual (or group) being mapped. Lets consider Fig. 4.6 above.

The two concepts/statements on the left hand side might be from an interview with an IT manager. Here he is arguing that because the *backlog of processing is too big*, they should *buy a new computer* (he is interested in getting one of the latest machines with extremely fast processing time and various other features). However on the right are two statements from the Finance Manager. Her view is that *buying a new computer* is only one option for *reducing the backlog* and that there are others.

Thus we see two things here. The first is a *difference in values/aspirations* and the second is that you can *have negative links*. In reviewing the Finance Manager’s map note that the arrow linking from ‘*buy a new computer*’ to ‘*backlog of processing is too big*’ has a minus sign at its head. This indicates a negative link and can be read as A leads to [not] B (in this case ‘*buy a new computer*’ may lead to *NOT* ‘*backlog of processing is too big*’). As a consequence we can capture statements that have both positive and negative ramifications thus illustrating dilemmas.

4.2.2.3 Guidelines for Mapping

So let’s have a look at a map in a little more detail. What does it look like? Fig. 4.7 below is part of a map produced when working with a group of staff interested in developing a new Information System for monitoring students. The map was created in the

mapping software (Decision Explorer) and has used various styles of statement to denote constituencies. For example those statements which are in shaded rectangles emerged from the IT staff who would be responsible for managing the system and those that are in italics represent the views of academics. In addition there are numbers attached to each of the statements e.g. 10 reduce rates ... drop out rates are too high. These numbers are simply tags or reference numbers to allow effective manipulation of each of the statements. They do not have any weighting except to reflect when in a conversation the statement was made relative to others.

The arrows can be read as “may lead to” therefore the chain of argument shown by statements 62, 63, 68 and 37 reads ‘being able to archive old data’ may lead to ‘avoid clogging up the system’ which in turn may lead to ‘able to get fast and easy access’ and therefore lecturers being ‘able to access student records while counselling’. Finally the dotted arrows with numbers show that there are other statements within the whole map which are linked to the material shown in the map but which are not at this point displayed on this extract of the whole map. Thus it is possible to show as little or as much detail to be revealed as demanded.

The map (Fig. 4.7) shows the hierarchy with goals/values at the top (boxed statements) and assertions at the bottom (dotted boxes).

Some of the mapping guidelines to watch for therefore are:

1. *Separate sentences into distinct phrases.* Frequently when we speak we encapsulate three or four causally linked phrases into a single utterance. For example “we need to *expand our business into new areas*, and therefore must focus on



Fig. 4.7 An example of a cause map

building strategic alliances, and tapping and developing our skills base". Here there are four potential linked statements: expand our business into new areas, build strategic alliances, tap our skills base and develop our skills base. Note that the last part has been separated into two – tapping the skills base and developing it – this is because different activities are needed in order to do either of these and also they are likely to have different ramifications. A common pair that benefits from separation is "improve and increase" – what you do to increase something doesn't necessarily lead to improvement. An example from the above map might be "if we can stop inaccurate entries through having a data checking facility then we will be able to increase staff productivity".

2. *Build up the hierarchy.* As noted above (section 4.2.1.3) when discussing the second of Kelly's corollaries, laddering up and down the chains of argument enables a more complete representation to be captured. Questions such as "how might that be done" or "what are some of the constraints preventing that from happening" help ladder down to options; whereas "why is that important" helps tease out ramifications. Therefore, returning to the above map, one question that might be asked is "why do you want to increase staff productivity"? (laddering up) and another might be "how could you have a data checking facility?" (laddering down).
3. *Identify the option and outcome (means and ends) within each pair of ideas.* Checking the direction of the link is important. For example, consider the two statements 'buy Microsoft Office' and 'standardise our software'. For most people 'buy Microsoft Office' is one option/route to 'standardise our software' – but there may be others. However it is unlikely that you would 'standardise our software' in order to (may lead to) 'buy Microsoft Office' (unless of course you were Bill Gates!). Another example from the above map – 49 and 51 – might be do you 'improve the visibility of cross organizational activities' to 'increase coordination between admissions staff' or the reverse.
4. *Watch out for values/beliefs/goals and strategic/key issues and mark them.* Values and goals are statements that can be seen as 'good in their own right'. An obvious private sector candidate might be 'build shareholder value' and a personal goal might be 'feel fulfilled at work'. Strategic or key issues are those that either have a lot of links around them or a lot of emotion behind them. In an interview setting watch out for the non verbals, namely the gestures made and tone of voice as they provide a lot of useful information. There is no prescribed way of marking them. One method might be to use an asterisk for key issues and circle goals but it is up to personal preference. In the above map, the software allows us to identify these using particular styles e.g. goals are black text in a rectangular box.
5. *Add meaning by wording the statements in an imperative form.* By making the statement action oriented, that is an imperative, it is usually much easier to correctly link the statement. Thus the verb is quite significant. Whereas a statement that simply contains the word 'marketing' could probably be linked throughout the map as it has multiple interpretations, identifying the action e.g. "improve marketing's resources" or "outsource the marketing department" or "develop a

marketing campaign” helps make sure that the appropriate links are captured. Look at the map in Fig. 4.7 to see how many of the statements commence with verbs. Where they don’t e.g. ‘*too many ad hoc systems*’ then these might be assertions or facts. Typically these appear at the bottom of the chain of argument as they are usually uttered as being an explanation for a particular action.

6. *Use the person’s own language.* There is always the temptation to paraphrase, particularly if you know the issue/subject well. However it is important to capture exactly what is said (as much as possible given the above guideline) so as to ensure that the map is recognisable to the interviewee. Furthermore, paraphrasing might result in a different meaning being derived from that which the person being mapped had in mind.
7. *Capture contrasting poles.* Obviously not every single statement will have one, but where they are provided make sure you capture and reflect these on the map. Sometimes they are immediately obvious. For example ‘we need to do this rather than that’. At other times however the first pole is noted and subsequently elaborated before the ‘rather than’ is mentioned. It is worth being alert to this possibility. Finally using this device as a means for better understanding what is being said can be helpful. Where a statement is not immediately clear, try asking the question “rather than...?” This can often provide the clue.
8. *Tidy up your map by looking for isolated statements and examining heads and tails.* Look for statements that have no arrows linking them to other statements. Where these do occur it is worth asking the person being mapped more about them. For example, “I notice that you mentioned ‘X’, I wonder if you could explain to me how it relates to the other material we have already discussed”. This usually leads to more information being surfaced along with gaining an understanding of the particular statement’s position in the map. Checking whether the end points – the heads (those with no links leaving from them) – are goals/values will enable these to be determined, or further questioning to take place. Likewise exploring tails (those statements with no links going into them) and checking to see if they can be further developed in terms of options will help build the map.
9. *Consider the following tips* including: (a) use blank paper, (b) start two-thirds up the page, (c) write in rectangular blocks of text and (d) use a self propelling pencil. Blank paper is useful because it allows statements to be positioned in a more appropriate place rather than feeling constrained to writing on the line! We are so well trained from childhood that we can find it hard to stop writing on lines so as to allow a more graphical representation to unfold. Starting two-thirds up the page (and usually in a portrait orientation) works well as most interviewees’ start with the main issues bothering them and thus there is more detail supporting them (explanations, options, constraints) than ramifications and consequences. Working in rectangular blocks of text enables links to be drawn in so that the flow is retained – it is easy to see the chain of argument – whereas if the statements are one long sentence then arrows will have to ‘wiggle’ around them giving no visible assistance. Finally a propelling or mechanical pencil is best as mistakes can be rubbed out whilst always being sharp enough to write clearly.

4.2.2.4 Have a Go!

Below is a piece of text. Have a go at mapping it. It is probably best to first read it through once to understand what is being said. Then underline what you see as the phrases. Finally write these on a blank piece of paper and capture the links that are contained in the text – map *just what is in the text*. Once you have done this, return to the above coding guidelines, and check whether you have taken them all into account.

The text is based on some work that the authors did with Scottish Natural Heritage.

To influence the attitude and policy of others to care for the natural heritage, SNH could well be advised to use those protected areas owned by SNH as demonstrators for good care of the natural heritage. To meet this need and to secure practical management of the natural heritage (another of SNH's goals) SNH must develop and deliver a strategy for protected areas. Various ideas such as gaining a general awareness of global resource depletion, SNH addressing sustainability (they are currently the only organization doing so) and using their knowledge of how the natural heritage is changing with time may go some way towards achieving a strategy for protected areas. Management of the marine environment, and of those species which cause conflict, for example deer and seals may go some way towards balance maintaining natural heritage features with addressing increasing complex environmental problems which adds to the knowledge of the natural environment (Fig. 4.8).

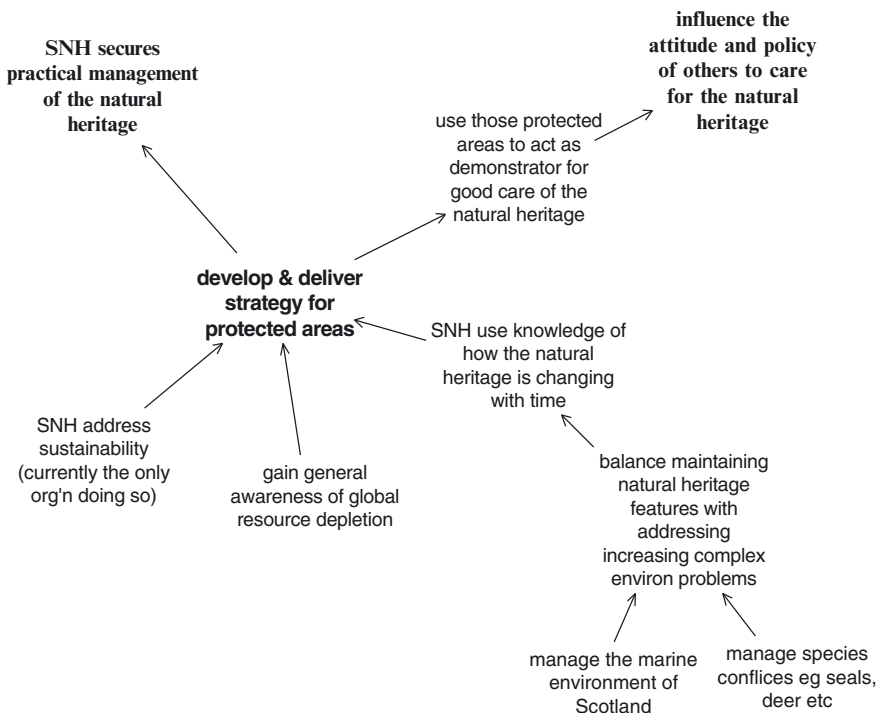


Fig. 4.8 A possible map from the SNH text

4.2.2.5 Comments on the Map

How did your map look? Did you get the values/goals (there were some hints). Did you manage to break down the text into statements? Did you find it easy? If you answer ‘no’ then that is pretty typical. Most of us actually find mapping text harder than mapping discussion. This is because we can ask questions in a discussion to ascertain the links. Furthermore, the temptation to add our own links (which appear to be obvious and natural) is considerable – particularly as we want to make sense of the argument. See Eden and Ackermann (2004) for further discussion on mapping text.

Hopefully the above map should also have prompted you to ask

- “Shouldn’t ‘*developing*’ and ‘*delivering strategy for protected areas*’ be separated?”
- “Shouldn’t ‘*influence the attitude and policy of others ...*’ be split?”

In the first case you would be absolutely right – they should. The actions that might be necessary to achieve ‘developing a strategy’ are quite different from those of ‘delivering it’. However, in the second case, interestingly enough the answer is no. The person whose views/perceptions it represents felt that they were not separable. In his mind they were two sides of the same coin and separating them would add complexity and be a false image. This highlights an important point that the interviewee (whose map it is) is the only one who can say what is right and what isn’t.

Probably the hardest of the concepts to capture correctly is the one reflecting the ‘balance’. Don’t worry, this is usually the case.

4.2.2.6 Additional Coding Guidelines

The coding guidelines below extend those noted above. They are taken from a book on mapping called *Visible Thinking* by Bryson et al. (2004).

4.2.2.7 Getting the Wording Right

- Try to use around six to eight words for each statement – by including more words you will have a better sense of what was meant, BUT including too many words may mean that there are multiple statements.
- As part of the above guideline, think about incorporating who/what/when into the statement.
- As much as possible avoid words such as ‘should’, ‘ought’, ‘must’, etc. as these are both prescriptive and unnecessary. Instead of capturing ‘*we must invest in a new information system*’, simply note down ‘*invest in a new information system*’ – it saves time!
- Check your statements to see if they include phrases such as “in order to”, “due to”, “through”. These all imply a link and therefore comprise two statements rather than one.

Don't forget the earlier guidelines, that of using their language, and adopting an action orientation.

4.2.2.8 Direction of the Arrow

- Make sure links are causal, showing means to ends or options to outcomes. Frequently novice 'mappers' end up producing a more chronological or flow diagram type of representation.
- Check that you really have options leading to outcomes – when getting started it is not unusual to produce 'upside down' maps where the links flow from outcomes to options (as often this is the way people speak).
- As a rule of thumb, link specific instances into generic statements. For example you might have '*privatise prison services*' as the generic with '*privatise cleaning*', '*privatise catering*' and '*privatise maintenance*' as specific options.
- Seek to have those statements that appear to be assertions or facts at the bottom of the map. These often are not action oriented but they matter to someone because they imply action is necessary, and so the action is higher up the map.
- Avoid double-headed arrows and check feedback loops. Double headed arrows imply feedback (i.e. dynamic behaviour). However as only two statements are involved it is difficult to (a) determine whether they are 'true' feedback loops and (b) if they are loops, how best to manage them. Try to explore how A might lead to B by adding an intervening statement and do the same for elaborating the link between B to A. This loop, now containing four statements, is more amenable to review. Once this is done, or where you have a feedback loop – check whether it makes sense. For example are you *developing a marketing plan* in order to *create more awareness* in the market so as to *get more products sold*, and thus *have more revenues*, which in turn can be spent on *developing a marketing plan*. At first glance this might look like a feedback loop. However the second mention of marketing plan is a redevelopment of the first and therefore chronologically inconsistent.

Remember you are working to build an understanding of the particular issue facing the person being mapped (or yourself if the map is about your issue). By knowing what facts mean and why they fit together as they do – the mechanism and the structure – we are able to determine the basis for pulling a mess into a system of interacting issues.

4.2.2.9 Developing Practice

There are a number of ways you can gain more practice in mapping. Three are listed below – each providing different benefits.

The first method is to try to map another piece of text and see how you get on, and whether it gets any easier. A good source of text might be to use an article in a

well written newspaper which is discussing a particular current concern with its attendant issues, values and options. However, don't worry if you find that many of your statements are unlinked – this is likely to say as much about the structure of the writing as the quality of your mapping!

The second method is to try the technique out on an issue that you are currently grappling with. Start by capturing the main issues (using an action orientation as this will stimulate a better understanding of the issue) and how they relate to one another. If, in linking them together, further concepts are needed to explain the relationship note these too. Next consider why they are issues – are the issues either attacking or supporting some desired outcomes – thus eliciting some of your personal values (laddering up). Finally think about what might be some of the options and constraints and capture these (laddering down). This material will give you some idea of the consequences of each option, helping arrive at one that is potentially more sustainable as it addresses more of the goals. Throughout the process use the guidelines to help you sharpen your thinking.

A third method is to try creating a map through an interview. Here the aim is to find a colleague, friend, or family member who currently is wrestling with a difficult issue and try interviewing him or her whilst building a map to record and guide the interview. Try to make sure that the issue is something that is 'live' rather than past as this will provide a more realistic event (post rationalising an issue can result in the interviewee talking very fast but also in a structured manner). Review your map together and find out if it helped their thinking about the issue. Alternatively, try mapping a television presentation or a work presentation. However, as with the text option, this option does not provide the benefits of being able to ask questions to elicit relationships and enhance understanding.

4.2.3 Reflections on Mapping: Some Hints and Tips

Don't worry about appearance. One of the most common concerns particularly regarding sharing the map is "but it looks so messy". It is worth bearing two things in mind here. The first is if the interviewee is struggling with the issue because it is difficult and messy, the chances of you being able to produce a perfect map are extremely small (and if you did manage it, would be very humbling! Why couldn't they unravel the problem themselves?). Secondly, as long as it captures their language (rather than yours!) then in our experience interviewees are happy to work with the messy handwritten image. Allowing them to see the map is also a great way to validate what you have captured and demonstrate that you have been actively listening. Often interviewees are curious about the different form of note taking being used, which gives you a perfect opportunity to start explaining the process – and get some confirmation of the captured material. A tip here is, where you can, sit at right angles to the person you are mapping – this way you can both read the map, but you don't encroach onto the interviewee's personal space.

Capture the constructs/statements first. By doing this, you can begin to gain an understanding of what is being said and as you begin to get an overall understanding

of the material, you can begin the process of linking one statement to another. It is far easier to add links once the statements are captured than the other way around. Imagine the concepts/statements as landmarks. However, if statements are very obviously linked then by all means put in the arrows immediately.

Use natural breaks productively. When the interviewee pauses, having contributed a number of ideas, use these breaks to feedback material to him/her. This will provide a number of benefits. The first is that it will demonstrate you really have been listening and capturing their views thus gaining you more credibility and building the consultant client relationship. This is important if you want to come back and interview them a second time. Secondly it enables you to test your understanding of the material and get feedback if it isn't correct or there is more to add. You are therefore more likely to get a better understanding of how the issue is understood.

Finally, and sometimes the most important reason, as you are feeding back the material make sure you write down what you are saying which is in your brain but hasn't yet been translated onto paper – before you forget it! Often, particularly at the beginning of an interview, there isn't time to write down all the material and so the statements are 'half formed'. Use these opportunities to flesh them out more fully ensuring that they adhere to the guidelines.

Build in time for review. Before ending the interview try to ensure you have at least five minutes to review the map with the interviewee. Start by recounting what appear to be the key issues (those with lots of links in and out) to ensure that all have been captured. Next check whether there are any 'orphans' – statements that have no other statements linking to them – and enquire how they might be woven into the map. Finally review the apparent goals (statements that are "good in their own right" and typically have no statements linking out from them) and whether they are legitimate or need further laddering up. By taking the interviewee through the map you are not only able to further validate the representation, but also to provide him/her with an intuitive understanding of how mapping works. This can be useful if a workshop is to follow. It also provides value for the interviewee as they are able to see the particular situation structured and thus more amenable to management.

Consider the shape of the map. Is your map very broad but somewhat shallow (not having lengthy chains of argument)? This usually suggests that the perspective being mapped is one that encompasses a very wide range of the issues and concerns (perhaps a senior managerial perspective). This is in contrast to a map that is narrow and deep suggesting in-depth knowledge of a relatively small part of the business.

Make sure you capture the interviewee's (not your) key issues. Sometimes when you are doing a series of interviews and someone else has already mentioned a particular option or issue, it is tempting to skip capturing it again. However, the interviewee does not know this, so the omission may raise anxieties. Rather than follow *your* agenda, always ask the interviewee what he/she sees as the key issues – this way you will develop a far better understanding of what they see as important.

Consider how you manage the interview. Starting with a very broad question (one that does not result in a 'yes/no' answer) is best. For example, "how can the organization grow its business over the next 3 years" allows interviewees to surface

all of their concerns and opportunities and therefore provides the agenda for subsequent questions (e.g. how might an issue be resolved, what are some of the constraints, what are the consequences, etc.). Don't feel the need to prepare lots of questions, questions emerge as the map does as there are always uncertainties about meaning and structure.

Carefully introduce the process. Don't spend time at the beginning explaining that you are using cognitive mapping. This is partly because in saying you are going to do "*cognitive mapping*" individuals might feel concerned about what this actually involves, and partly because you will end up spending time explaining the technique which reduces the amount of time you have building the map. Wait until they comment on your unusual note-taking format and then explain the process – but don't necessarily say it is cognitive mapping, but rather a two-dimensional way of taking notes. The more you can jointly develop the map, the better the representation will be and the more shared.

Manage multiple 'opposite poles'. If you find yourself with a statement that seems to have more than one 'opposite pole' then this might mean you have a series of options. For example, you might start off with '*centralise marketing rather than have a profit centre*'. However, later on in the interview the interviewee notes that it might be beneficial to have marketing as a cost centre rather than a profit centre. There are now three different options – have a centralised marketing department, or set up marketing as a cost centre or as a profit centre.

A few final pointers: Try not to learn all of the guidelines at once. Start by just noting down statements and drawing in some rough links. Then move to thinking about causality i.e. which way the link should be positioned. Finally consider the action orientation. Always try to avoid writing down statements that simply comprise one or two words as the more complete the statement the better the understanding. As a final tip, try to write in lower case rather than capitals – not only is it quicker but some handwriting experts believe it to be more readable.

Sometimes an interviewee will take no interest in the map you produced; very often this is because you have produced a map that belongs to you rather than to the interviewee. There is always a great danger in translating the words used by the interviewee into something that is more meaningful to you. Often the maps that are of no interest to interviewees turn out to be summary maps. For example, we have often found that we might produce a map comprising 60 statements from a 45 min interview where a novice interviewer, in the same interview, might produce a map with only 15 statements. This is because many of the statements are summarised rather than captured with their richness and subtlety.

4.2.3.1 How Does Mapping Compare with Other Graphical Processes?

There are a number of different graphical representation modes ranging from the well known Mind Maps (Buzan and Buzan 1993) to influence diagrams (Richardson and Pugh 1981). Table 4.1 compares three common diagrammatic forms (word and arrow diagrams) against a few characteristics.

Table 4.1 Comparison of three diagramming forms

–	Cause mapping	Mind maps	Influence diagrams
Nodes	Formal guidelines for capturing material i.e. action orientation and six to eight words	No formality – anything goes	Formal guidelines for capturing material i.e. variables
Links	Formal guidelines for linking material i.e. hierarchical causality	No formality – anything goes	Formal guidelines for linking material – flows of a single unit of analysis
Size	Aims to build up rich and detailed pictures – individual maps may comprise 100 statements, group maps 1,000	Usually fairly small – around 30 or 40 statements	Focuses on only capturing the stocks, flows and intervening variables
Analysis	Open to analysis – including detecting feedback, identifying central statements	No analysis usually carried out	Analysis crucial
Format	Graphical format – so easier to remember and understand underlying structure	Graphical format – so easier to remember and understand underlying structure	Graphical format – so easier to remember and understand underlying structure

4.2.4 *Where Has Causal Mapping Been Used?*

4.2.4.1 To Elicit Representations of Individual Thinking

As noted above, mapping can provide a very powerful means of understanding your own thinking or helping someone else develop theirs. Remember the example earlier of the lecturer trying to manage the job, her PhD and her personal life. Being clear about your (or others) goals – and the various options and dilemmas that exist – can help provide a sense of relief as the map's structure helps make sense of the complexity. Some consultants use mapping as a way demonstrating their skills to clients. Through building a model of the client's thinking of the issue the consultant is seen to be able to provide added value. Another example is when commencing a project – spending time mapping out the objectives of the particular project, the issues and options can help clarify the situation. For further examples see Ackermann and Eden (2004) which provides examples of three different individual uses of mapping.

4.2.4.2 To Support Group Working

When working on developing strategy or resolving messy complex problems typically groups – rather than an individual – are involved. This is for two reasons.

The first relates to the fact that organizations are political and social constructions (as noted above when discussing the framework). Many researchers argue that in order to get things done in organizations, participants have to ‘own’ or ‘buy into’ the change – and therefore it is important to attend to ensuring the outcomes are ‘politically feasible’ (see Eden and Ackermann 1998). The importance of ensuring commitment was well expressed by Machiavelli who noted that *“It must be remembered that there is nothing more difficult to plan, more doubtful of success, nor more dangerous to manage than the creation of a new system. For the initiator has the enmity of all who would profit by the preservation of the old institutions and merely lukewarm defenders of those who would gain by the new ones”*. Paying attention to gaining emotional commitment through building in the means to allow participants to ‘have their say’ and be listened to (procedural justice (Kim and Mauborgne 1995)) is thus important. The mapping process – using the group methods discussed below – provides this.

The second reason focuses on the added value gained from eliciting and structuring the contributions from a range of different perspectives and enabling the model to facilitate an action plan that is more robust. In the decision making literature this could be seen as ensuring that the process used is procedurally rational (Simon 1976). Moreover, and returning to earlier comments, surfacing and structuring the issues, goals, options and assertions of different participants can help the group as a whole begin to develop a shared sense of understanding and a common language. This facilitates negotiation and therefore increases the likelihood of a successful outcome.

4.2.4.3 To Analyse Models

Models can often become very large – group models in particular reaching up to 1,000 nodes. As such it becomes difficult, if not impossible to be able to effectively examine manually the structures to determine emergent properties and gain insights into ways forward. However, computer-based analyses can yield important insights into significant emergent properties that can either reveal counter intuitive and damaging outcomes or offer up new and creative opportunities. A sample of the analyses techniques available has therefore been provided below (in the next section).

4.2.4.4 To Support Other Forms of Modelling

Whilst SODA (and any form of modelling) can be used on their own and provide significant value, combining SODA with either more quantitative models or other qualitative processes can extend the use and power of the method. SODA – particularly causal mapping – has been used as a starting point for modelling complex projects that have experienced considerable disruption and delay (Ackermann et al. 1997), and multi-criteria decision making (Belton et al. 1997) amongst a range of other applications.

4.2.5 *Analysis for Strategic Options Development and Analysis (SODA)*

Regardless of the particular method for generating the initial map (see the next section on different options of using mapping/SODA with groups) the following analytical routines provide a powerful means of exploring a causal model's structure and properties and gaining insight into possible avenues of action. These analyses are typically carried out using the *Decision Explorer* software but could be undertaken manually – although for some analyses it would be a time consuming and potentially laborious job. The analyses range from simple routines for tidying and structuring the map to more complex ones assisting in examining the underlying structure.

The analyses are dependent on the coding formalisms being adhered to. One particular characteristic that often occurs when mapping is when duplication of links occurs through redundancy. For example, the chain of argument might be $A \rightarrow B \rightarrow C \rightarrow D$ however there might also be links from $A \rightarrow C$ and $B \rightarrow D$. In this case it is worth checking whether these two further links are unique in their own right, rather than duplications – a summary link where $A \rightarrow C$ summarizes $A \rightarrow B \rightarrow C$. If they are unique, could further material be added showing the variation? This process avoids the model having extraneous links and thus ensures clarity of thinking.

As the maps may represent a single interview or a series of interviews or workshops they may contain anywhere from a few dozen to several thousands concepts. As the number of concepts increases, the 'map' usually starts being referred to as a 'model' because it can no longer be represented as one single easy-to-read document. Rather than attempting to depict all of the concepts at once – an impossible task when using the software and working with over 60 concepts – *Decision Explorer* has the facility to create a number of 'views' – windows which can reveal a section of the overall model. These views allow aspects/themes/areas to be explored and amended as required. Changes made to the concepts and links are reflected throughout the model, though changes to the content of the views are local. Thus views can have material either made visible or hidden without copying or deleting concepts from the model.

Although the analyses have been used for a range of different purposes, the analytical processes covered in this section particularly relate to the resolution of messy complex and often strategic problems. Thus Fig. 4.9 depicts a three stage process. The first stage centres on the analysis of the model (although obviously some capture of the information, knowledge, wisdom and experience needs to have been already completed – maybe through individual interviews or a group modelling process). This stage is typically carried out in the 'back room' enabling the analyst/facilitator to both tidy the model and review its structure in preparation for a workshop. The analysis process is iterative (although below it is presented in a linear form) and often helps the facilitator/analyst to gain a good understanding of the whole in preparation for facilitating a group workshop.

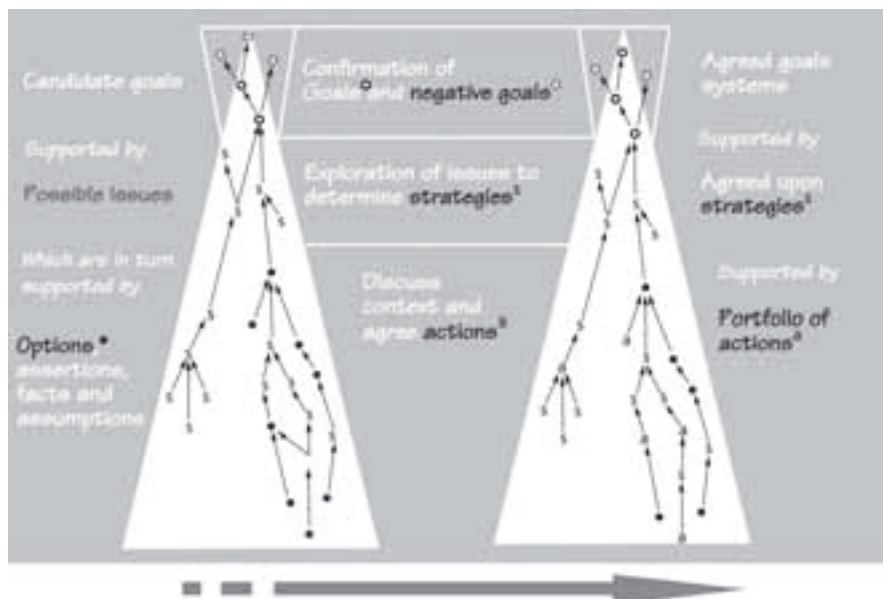


Fig. 4.9 Developing agreement for the direction

4.2.5.1 Identifying Goals

Identifying candidate goals is usually a good place to begin – remembering that a goal, according to SODA principles, is something that is “good in its own right”. An example of a goal in a University setting might be *‘be research excellent’*; for a private sector organization it might be *‘become No 1 in the market’*. Each of these goals may also support other goals and/or be supported by other goals. Understanding the goals (or values) can provide assistance in understanding the objectives of the individual(s) and thus allow for exploration of their variety and coherence. To find the goals, an obvious starting point, therefore, is to examine the ‘top’ of the model (using the *List Heads* or *LH* command in the software – a ‘head’ is a statement that has no other statement linking from it). Reviewing the resultant list usually provides a mix of statements, some of which are candidate goals whilst others are issues, options, and assertions, etc. that have not yet been ladder up to goals. Those that are candidate goals (‘candidate’ until confirmed by the group) can be given a particular style (a typical goal style might be bold, black, Times Roman, 14 point) to easily distinguish them. Those that are ‘heads’ but not goals can then be examined to see where are missing links and dealt with accordingly. This is particularly the case when weaving together material from different individual interviews as it is possible to miss capturing some of the links.

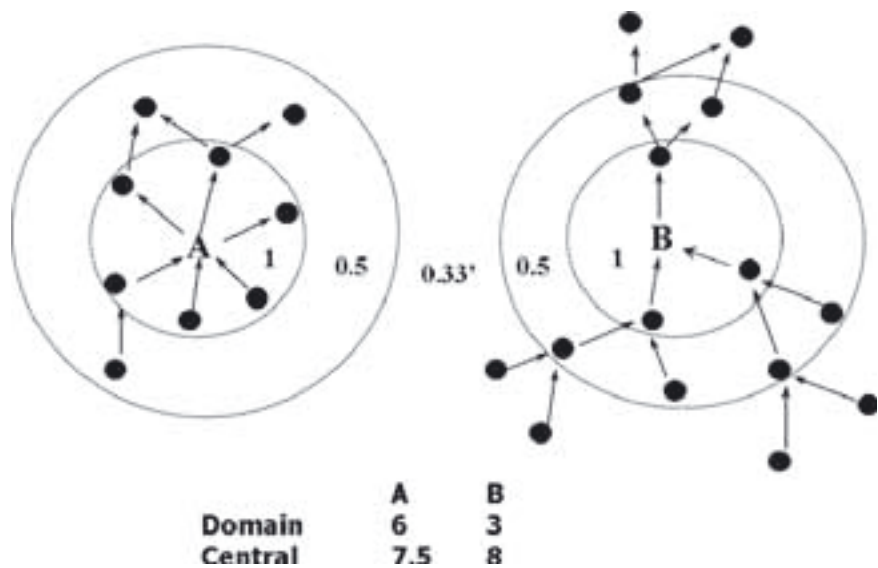


Fig. 4.10 A comparison between the central and domain analysis results

4.2.5.2 Identifying Issues

The next stage is to determine which of the statements are key issues. An issue can be seen as something that is broad, requires resources (time and money) and may take a while to put in place. An example might be *‘keep good people’* or *‘avoid being taken over by a competitor’*. Issues can be positive or negative but either way should be of some concern to those involved. There are two analyses that help here (see Fig. 4.10).

4.2.5.3 Carrying Out a Domain Analysis

The first analysis – *Domain* – examines each statement and calculates the number of links in and out (essentially determining how busy it is). Those that have a high score are considered as potential key issues. If the model is around 200 statements and the analysis depicts that there are three statements that have eight links around them, five that have seven links around them and then 19 that have five links around them, then a natural breakpoint is evident and the top eight are selected as being candidate key issues. This is obviously dependent on the size of the model and will also reflect the adherence to the coding rules. Those identified as issues can be attributed with a specific style (a typical issue style might be italic, purple, 12pt). Often this analysis can be conducted visually rather than having to use the software.

4.2.5.4 Carrying Out a Central analysis

A second way of considering issues (and one that both reinforces the domain analysis as well as suggesting new issues) is to review the overall model's structure to see which statements are '*central*'. To understand this analysis, consider the structure of a molecule (see Fig. 4.10). Here elements are connected to one another with bonds – with some of the elements being relatively peripheral with few bonds connecting them whilst others are more central. By identifying those statements that are both busy and central a greater sense of confidence in revealing the key issues is acquired. This analysis is usually impossible to do without the software.

It should be noted that the results of the central analysis provide a more 'accurate' view of potential key issues than domain analysis. This is because the domain analysis results can be influenced through a participant spending a considerable amount of time on a single topic that is currently of concern to them – a hot button – but which is peripheral to the whole, and which later on becomes less significant.

To confirm the emergent set of key issues two further analyses are useful. The first 'slices' the model into *clusters* (possible themes) through comparing how similar each pair of statements are. The second analysis uses a different approach to 'slice' the model – that of producing sets comprising all of the supporting material for each of the potential key issues, or goals, and thus provides *hierarchical sets or clusters*. Both provide useful ways of feeding back information to participants.

4.2.5.5 Carrying Out a Cluster Analysis

The clustering analysis works using an algorithm to check link similarity. Two statements are 'similar' if they have many linked statements in common. It is rather like having shared friends. If I am friendly with A, B, C, and D, and you are friendly with B, C, D, and E, then we both 'share' friendships with B, C, and D. The higher the proportions of our friends we share, the more 'similar' we would be on this measure. Figure 4.11 shows that when you have a number of statements with many links amongst them, but rather few links with other statements, you can think of it as a cluster. In Fig. 4.11 the dotted and lined selected pairs have little similarity and therefore are components of two separate clusters. Thus the material within the clusters is closely related (due to the linking) enabling the clusters to reveal the emergent themes in the model. Each theme potentially contains at least one key issue. If there isn't a key issue within the cluster then examination might suggest further candidate key issues.

This analysis, more than any other, relies on good mapping coding – particularly avoiding redundant links. It is also affected by any feedback loops (see below) as these tend to result in large clusters as everything that is captured in the loop is placed into a single cluster. It is difficult to undertake this analysis without the software. However, the principle of causally related clusters (as opposed to topic based clusters) is an important one, and it is possible to undertake rough cluster analyses based on structure. Note that although the analysis is based on structure, the structure was based on content, and so clusters are content analyses.

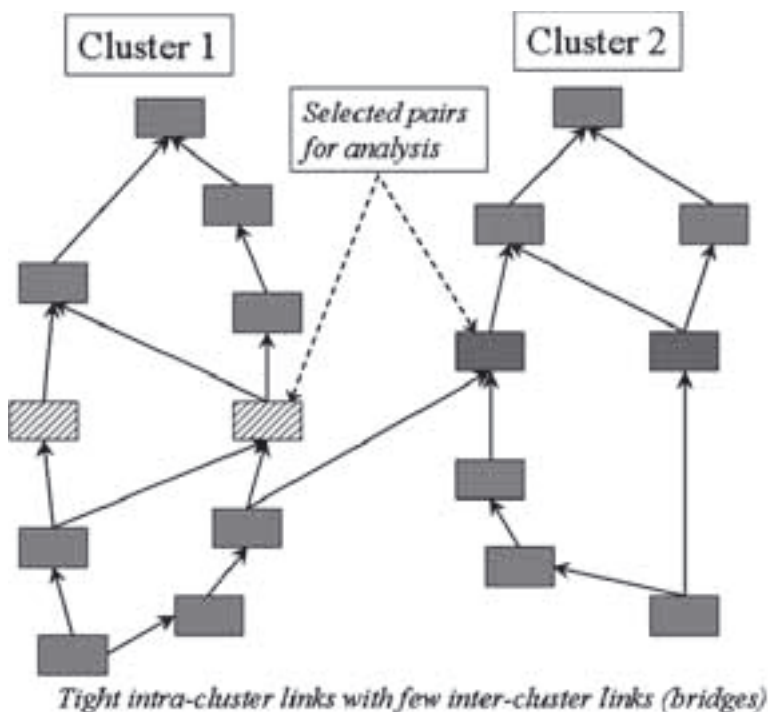


Fig. 4.11 Cluster analysis: Tight intra-cluster links with few inter-cluster links (bridges)

4.2.5.6 Carrying Out a Hierarchical Set Analysis

Hierarchical sets – as their name suggests – take each member of the seed set (in this case the key issues) and drills down the chains of argument. Each of the statements linking into the seed (see Fig. 4.12), along with all of the material that links into them is captured, essentially producing a tear-drop shaped set.

As with clustering, where the resultant hierarchical set (called hieset in the software) is very large (over 40 statements) consideration should be given to whether a further key issue exists within the set. In both cases – ‘cluster’ or ‘hieset’ – it is possible to just examine the contents of one cluster or hieset at a time. For further help, reviewing the results of the central and domain analyses alongside the large set can give insights into which might be candidate key issues (i.e. those that are relatively busy or central). Likewise if the set is very small (less than 10) then examining whether the issue is a key issue – for example does it directly relate to another similar concept that is key – can be helpful.

As with the cluster analysis, these sets are also useful for providing feedback to those involved in the intervention as they reveal each key issue with all its attendant supporting material (they are therefore NOT mutually exclusive as are cluster sets).

Undertaking this analysis with the software is quick and easy. However, as with cluster analysis, the principle of hierarchical clusters/sets is an important one because it seeks to show all of the options that can influence a chosen outcome (key issue or goal).

4.2.5.7 Finding Options

Identifying Potent Concepts

Once a hierarchical set analysis has been carried out, it is possible to determine which options are '*potent*' (i.e. those that have consequences for a number of key issues or goals are more potent than those that support only one or two). This is a means of prioritising options. Figure 4.12 shows those statements in the light shaded area having an impact on three of the key issues.

Identifying Composite Tails

Another analysis that helps both with determining options and giving some insights into the key issues is the composite tail analysis. A composite tail ('cotail' in the software) is where a concept has multiple out-bound arrows – hence being labelled composite.

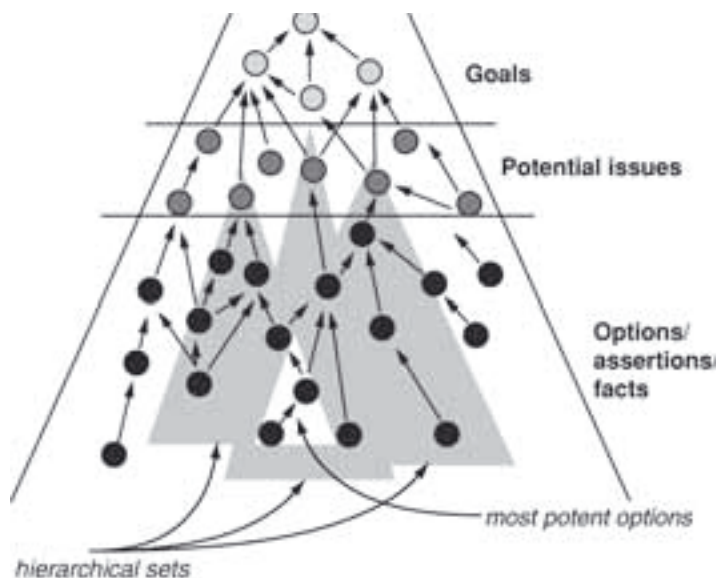


Fig. 4.12 Hierarchical sets drilling down from the potential issues and producing tear drops of supporting material

The analysis thus starts at the ‘bottom’ of the model examining tails and laddering up until a branch point is reached. This is then listed and the analysis starts with the next tail. The results provide a source of useful information as they refine the results of the potent analysis. This is achieved by detecting which of the potent concepts are also composite tails and therefore pinpointing those that have the greatest effect. Any options beneath them only hit the potent option identified and so can be chosen as implementation strategies for the cotail. For example, in Fig. 4.12 there are two concepts that are potent, however, it is the top one of the pair that is of significance as it represents the branching point – the lower is simply elaboration.

Detecting Feedback Loops

Identifying whether there are any feedback loops in the model can not only give valuable insights into the structure but can also help tidy up the structure of the model. As with both cluster and hieset, the software places the components of each loop into a set which is then amenable to listing or mapping (the latter tends to provide more useful insights). Once detected it is worth checking that the loops are legitimate – sometimes when weaving the different maps together errors can occur through incorrect causal links. Where they are valid, then the loops can be examined further to determine whether they are controlling loops or comprising a vicious or virtuous cycle. Loops can give those involved in the intervention some powerful insights as they depict a dynamically changing situation. Moreover, identifying loops and the events that are triggering them can provide a powerful way of providing the structure for a System Dynamics model (see Ackermann et al. 1997; Howick et al. 2008). Finding feedback loops visually is notoriously difficult – loops are often missed. However, their identification and exploration is usually very important.

Producing an Overview of the Model’s Content

As noted above, developing the model and then working on the model with the group tends to take the form of a three stage process with the analysis aiming to ready the model for a group workshop. (Although it is important to note that all the analyses are fast enough to be undertaken by the software with the group.) As a last step before bringing the model to the group to review the material and negotiate a set of outcomes some further means of helping those participating navigate maps is helpful. Therefore constructing an overview ‘road map’ of the model is carried out. This is similar in concept to a road atlas, which on the front cover depicts the country along with the major cities/towns and their apparent associated road connections. However this picture typically suggests direct routes between the major cities (for example a direct route between Glasgow and Edinburgh) which when examined in further depth prove not to be the case (e.g. the Glasgow to Edinburgh route actually travels through Linlithgow, Falkirk,

etc.). The same process is possible with the model, resulting in a ‘collapsed’ picture of the goals and key issues (Cities and towns) with the various chains of argument (routes) between them (both those that are direct as well as those that traverse additional argumentation).

4.2.5.8 Summary

To summarise, the software analyses provide a means of making sense of a large amount of qualitative data through being able to tidy the model along with gaining new insights from the emergent properties that unfold. As a result they might give clues regarding how best to act in the situation. Moreover, the analyses make it possible to test thinking and reveal uncertainties. However two things should be noted; firstly that all the analyses are based on the structure of the model and therefore vulnerable to the quality of the mapping coding, and secondly that analysis of models isn’t easy – the first few times it is often overwhelming to keep in mind the mapping guidelines, software commands and underlying purposes of the analysis.

For additional reading on analysis see Bryson et al. (2004), Eden (2004), or Ackermann et al. (2005).

4.2.6 *SODA for Group Problem Structuring and Resolution*

4.2.6.1 Introduction

Although SODA has been used to support individual working, its predominant use is with groups. As such, consideration has to be given to assessing which of the different possible modes of working is best suited to the group in question. Issues worth reflecting upon include:

- The degree of *openness* within the participant group. In some organizations (or countries – see Hofstede (1980) for further insights) participants are more constrained by social conformity pressures. As such they are hesitant to raise contradictory views and the material generated therefore does not reflect the situation accurately.
- Related to the above concern, participants may believe that their *view is ‘out on a limb’* from the rest of the group, and so feel they may be subject to ridicule for expressing an alternative view (it is possible that everyone in the group feels this way also) (Harvey 1988).
- Existing social and political relations. Participants may have ‘*trading agreements*’ with others in the group which would be broken if they expressed a view which opposes that of their trading partners – to do so would have consequences for support on other issues.

- To dissent from the view of the group may risk damaging *team cohesiveness* ... the camaraderie of being a team (Janis 1972).
- *Time available*. In some circumstances the situation demands a fast response. Sometimes the complexity of getting the appropriate people together results in a constrained duration for working.
- *Resources available*. There may also be limitations in other resources, such as consultant time, or facilities and equipment.
- *Objectives of the client*. Whilst there is usually a prime objective which centres around the situation of concern, there may be other objectives such as building teams, etc.
- *The skills and abilities of the facilitator*. Where the facilitator is a novice, starting with a mode of working that reduces the amount of load is likely to be helpful.
- *The context*. This goes beyond basic issues of time and resources, to consider the culture of the organization, the views of other stakeholders (particularly those more senior in an organization), other organisational concerns, etc.
- *The participants*. Paying attention to the personalities of those involved along with their ability to work together will also shape the intervention.

These issues influence which of the possible modes for working with groups should be adopted. However, combinations of the modes are possible. Also pertinent is recognising that whilst the above considerations might suggest a particular design for the intervention, this design might change sometime during the intervention as the process of working together suggests different options. Therefore paying attention to the pre-workshop phase is very important and is part of the facilitation process (Ackermann 1996).

The modes of working centre on the level of ‘technology’ used in each. One mode of group working is essentially manual. This might involve interviewing each of the participants (using cognitive mapping) before weaving together the views or it might involve manual group mapping using the Oval Mapping technique (see below). Another mode is where the facilitator, using *Decision Explorer* and a public screen (through a projector) works with the software and allows the group to interact with the model. Each has its own benefits and disadvantages and therefore careful consideration regarding their fit with the particular group and issue being considered is important (see Ackermann and Eden 2001).

Figure 4.13 provides one possible design; though it must be noted that there are many others (another is provided in Pidd (2003)). This figure shows a combination of manual and computer supported working taking place. Starting initially with interviews a *Decision Explorer* model is built combining all of the views. This is followed by an oval mapping workshop – maybe with the more junior members – to elicit further views. These views are added to the *Decision Explorer* model. Finally, a workshop with the decision making team is undertaken. Here the facilitator operates the software on behalf of the group allowing for changes as the group negotiates a way forward. The resultant model then allows easy assessment of progress.

One possible route...

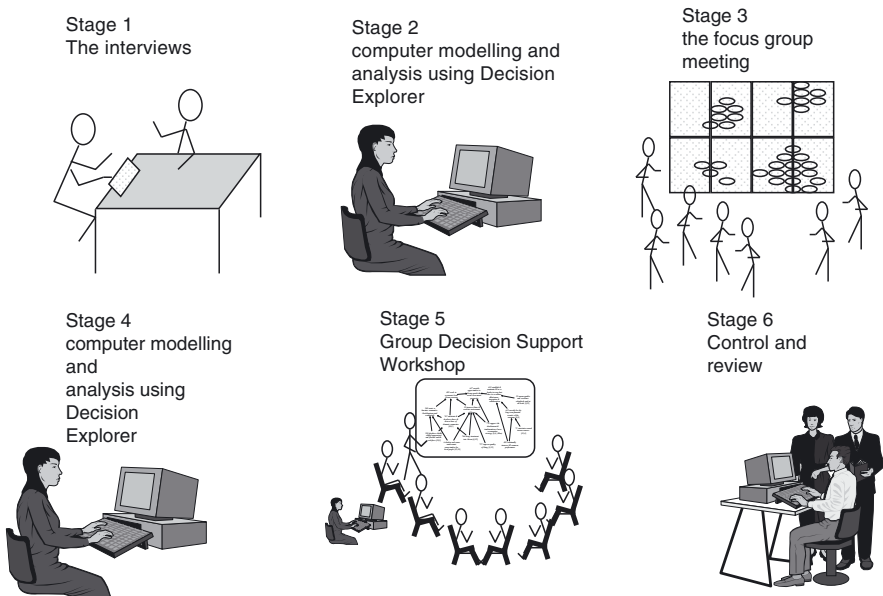


Fig. 4.13 One possible route (Microsoft Clipart)

Particularly powerful is the ability to determine whether the actions agreed are done in relation to the objectives they have been set up to achieve – the relationship – the arrow – being significant.

4.2.6.2 Working Manually: Using the Oval Mapping Technique (OMT)

The Benefits of Oval Mapping

Oval mapping is initially much like brainstorming, except that very significantly it is not about lateral thinking but about surfacing current aspects of the problem. It depends on participants contributing their views directly through writing them on to an oval shaped adhesive, or sticky putty based, card and posting them publicly (see Fig. 4.14). There are a number of benefits including:

- Building teams – as the process is manual, interactive, and participatory participants begin to learn more about one another's roles and responsibilities and gain a wider appreciation of the organisation as a whole. From this they can develop a sense of being part of a team. This ties into the above comment about client's having more than one objective – sometimes more covert in nature.



Fig. 4.14 Getting started – writing, reading and placing ovals

- Providing a social context – which not only helps build teams but also provides participants with a means of learning more about the organisation, contributing to the outcomes as well as having fun.
- Relatively little role ambiguity – most groups have experienced some forms of brainstorming and so are less concerned about their relative performance.
- Flexibility in location and relatively easy to set up – particularly important in organizations where there are few resources (it is also a good way to limit the number of demands on the facilitator – as there is no need for the software).
- It provides the group with the ability to see the whole picture. Through being able to capture all of the concerns, issues, objectives, assertions and facts with their relationships in one single large map, participants can develop a better understanding and begin to work towards a sustainable and negotiated set of outcomes.
- It allows participants to contribute simultaneously and therefore avoids contributions being lost and increases productivity. It also engenders a sense of procedural justice (Kim and Mauborgne 1995) as everyone is able to contribute and listen.
- It is transparent – which enables participants to easily see where the process is going. As such this procedural rationality (Simon 1976) increases its credibility with participants. They are more likely to contribute and engage with the process.

Starting an Oval Mapping Session

As noted above, when starting any form of group workshop there are a number of important aspects to consider. With Oval Mapping, there are a couple of tasks that need to be covered before the workshop (falling into the ‘pre-meeting’ stage). The first is determining who is going to attend – both to ensure that a range of views and perspectives are covered and secondly to get buy in from those that have the power to make it happen (or not happen). OMT workshops work best when there are around seven to nine people (more than this is hard to manage) and therefore there is always the trade-off between getting buy-in and emotional commitment from participants versus ensuring all have airtime.

It is also worth considering where the workshop is to be held, when, what is to be told to the participants, etc. Whilst location might not sound significant, it can have a fundamental effect on the outcomes. Choose a room that has plenty of wall space which is amenable to flip chart sheets being posted onto the walls (Blu-tack or sticky putty is best for this). Typically OMT works best when there are at least 14–16 sheets of flip chart paper set up – see Fig. 4.14) and the surface is conducive to being able to write on the sheets easily (wood panelling or textured wall paper are to be avoided). OMT workshops are usually effective over about 3 h and running the workshop in the morning can ensure participants are mentally fresh. Whilst getting these details right won’t guarantee success they will help to reduce problems that could derail a successful intervention (McFadzean and Nelson 1998).

For the workshop itself, it is important to provide clear directions to the group covering issues such as agenda, objectives and ground rules. The first 10 min of a meeting can be critical towards the overall meeting’s success (Phillips and Phillips 1993). Below are a set of steps which have been found to be useful.

1. Encourage participation by going through guidelines for writing up statements (see 3 and 4 below) – helping participants in this way can settle their concerns.
2. Explain that this process is aimed to get at their expertise – note that they are the experts and therefore it is important for them to surface all of the considerations around the particular topic being discussed. This is their opportunity and anything not raised in this forum can’t be considered.
3. Stress one statement per oval – this ensures that the writing on the ovals is sufficiently large to be able to be read by all and will also facilitate linking. When there is more than one statement on the oval they will need to be disaggregated.
4. Recommend six to ten words each contribution – that they follow the mapping formalisms in that they avoid single words and questions and so work to write up action oriented statements.
5. Warn that there is no removing of other’s ovals! This is one that always gets a laugh when it is mentioned but nevertheless is important. Encourage participants to write up on a new oval why they agree/ disagree with a statement so that the rationale is captured.
6. Piggyback off one another’s statements – encourage them to use the unfolding material as a set of prompts – tapping new thoughts and considerations. This is often worth doing towards the end of the generation stage when contributions are

drying up. Try asking “what might be some of the possible alternatives for achieving X” or “what other consequences might occur”, etc.

7. Explain the role of the facilitator(s) – noting that the facilitator is not there to provide substance but rather work to cluster the material to help them make sense of it. If there are two facilitators (one capturing the material into *Decision Explorer* and the other moving the material around and encouraging contributions) then explain this process and purpose.
8. Issue pens, and ovals – it is important to provide all participants with the same pens; partly to make sure that the nibs are large enough to ensure that the writing can be read by all, and partly to provide some anonymity. Most people can’t recognize one another’s handwriting but if someone is working with a distinctive pen then this will highlight ownership.
9. Ask participants, once they have written down a few statements on to the ovals, to put them on the wall. This way other participants can piggyback off the contributions.

Running an OMT Workshop

When running the session be prepared for the first few moments to be a little ‘quiet’ as participants begin to think about what is important, and write down their contributions. There is often a slight hesitation to be the first to put up a contribution but once the group gets started then there is often a rush of contributions being placed on the wall. This initial generation stage may last for up to 30 min but typically the group starts to slow down before that. A good way of prompting for more material is to ask participants to review the material already posted and consider possible consequences, explanations and constraints. This not only increases the breadth of material but also increases the chance that participants read the contributions of others.

During this period of generation try to cluster the material into groups of similar material e.g. a cluster on staff, competition, funding, etc. Don’t get too concerned about getting ovals into the ‘right’ cluster – the group can review and confirm (or change) the clusters and it is important that they feel they are able to do this. The objective here is to help the group manage the extensiveness of the material and thus reduce the cognitive load. The more the material is broken down into clear clusters the more they feel they can contribute. One tip to identifying clusters is to try moving contributions around to see where they fit. Also be prepared to change clusters if new material emerges suggesting different groupings. Where clusters become very large (30+ statements) see if you can break them down into sub-clusters. Encourage the participants to put their ovals into the clusters – it makes your job easier and gets them further involved in the emerging picture. Remember that these clusters will get modified as they become causal clusters rather than topic clusters (see the analysis section above).

Once the group has exhausted all the contributions they can make – at least initially – try to position the ovals so that in each cluster the most hierarchically super-ordinate is at the top and those that are more detailed are at the bottom. A tea or coffee break is a good time to do this.

The next stage moves away from apparent brainstorming to the structuring process and it is here that the most value emerges. With the group's help begin to confirm that the statements in the cluster belong there by reviewing the material in each cluster. The next stage which further helps sharpen the meaning of the clusters is to begin to start linking the ovals – building up the chains of argument. At this point further material will be generated as participants, when explaining how one oval links to another, provide detailed explanation. This in turn prompts another participant to realise that their perception is quite different – they saw a completely different chain of argument. When different arguments are identified it is important to avoid arguing about which is correct and capture both views.

The linking process therefore helps move the group from what is essentially a divergent picture to one that is a shared picture of the situation which can reveal quite important insights. For example, the cluster might expose a totally different understanding of a term or process. When eliciting these additional views, it is important to get the participants to write up the new material on new ovals – partly as it reduces the load from the facilitator but more significantly because it ensures that the contributions are in their handwriting gaining further ownership. Additionally it is worth using this period of the workshop to convert any statements that are not currently action oriented into a more action oriented phraseology and elaborate any single or two worded statements. Figure 4.15 shows the process of working through the clusters and Fig. 4.16 shows a cluster of material.

One tip that facilitates the linking process is to number all of the ovals as the links are made. This allows links from an oval in one cluster to be easily linked to an oval in another cluster some distance away. Rather than drawing in a long link, a small arrow with the oval's number can be written onto the flip chart. This process helps the group begin to see how the initial topic clusters they have identified inter-relate whilst keeping the picture relatively tidy and amenable to effective working. The numbering also helps let the group know how many contributions they have made and if entering the map into *Decision Explorer* facilitates that process too – particularly if it is being done during the OMT workshop (as the ovals move around and are therefore difficult to capture).

Don't worry if it takes quite a bit of time to review, extend and link the first cluster – the first few always take the longest. As the group becomes more familiar with the process, and more of the material is worked through, then the process becomes quicker. Encourage discussion and make sure that all participants are able to feel part of the process.

Finishing an OMT Workshop

Reaching agreements follows from the continued exploration of the material generated. Each of the clusters is continuously reviewed to confirm that the material is captured accurately and linked appropriately. Check whether anything is missing. During this stage (or earlier when working through the clusters) it is a good idea to identify the 'head' (top point) of each cluster and with the group determining whether it forms a good title for the cluster.



Fig. 4.15 Working through the clusters



Fig. 4.16 A set of clusters being worked up

The forms of analysis discussed earlier (for using the software) are an appropriate way to begin identifying key issues and potent options. Although the analyses cannot be undertaken thoroughly it is possible to get the group to work together with the principles of analysis introduced to them by the facilitator. The process will usually seek to have the group (a) identify busy ovals (with lots of ins and outs), (b) look for options that hit many clusters (and the ‘heads’ of clusters), (c) gather together all of the heads of clusters and check them as a possible goal system (set of multiple criteria), and d) look for any feedback loops. Each of these provides a deeper understanding of the nature of the problem being addressed. In addition the analyses give some clues about where priority actions might lie. As with mapping in individual interviews using asterisks when using *Decision Explorer*, different colours can be used to distinguish statements that have different kinds of status.

Needless to say none of these analyses replaces the judgment of the group, but each does lead the group towards discussing possible agreements about a way forward to resolve the problem.

Concluding the workshop with some form of prioritisation of the options can be helpful. Within each of the clusters, identify those statements that potentially are options (or can be rewritten as options). Then provide each participant with a number of self-adhesive dots (see Fig. 4.16) and ask them to attach them to the options they think are the most important. If they believe that a particular option is very important then they can allocate more of the dots (resources) to this option. In addition, two colours can be used – one to determine short term and the other long term. This provides an indication of consensus and resource allocation by forcing a choice about what to focus on as solutions. Other criteria include having one colour of dot to indicate degree of leverage and another to show degree of practicality. Finally, when there are likely to be considerable disagreements it also can help to use one colour of dots as a veto. Although social pressures may reduce its effectiveness providing the opportunity to veto is an important aspect to procedural justice.

The conclusion of the workshop relies upon reaching reasonable consensus about priorities for action – full consensus is an ideal but is difficult to detect and usually impossible to attain.

Photographs of the final stages of the workshop provide un-manipulated ‘minutes’ for agreements and context.

For more details and case examples on the practice of Oval mapping see Ackermann and Eden (2001a, b) and Bryson et al. (2004a, b).

4.2.7 Working in a Facilitator Supported (Single User) Visual Interactive Model

4.2.7.1 Introduction to Facilitator Supported Modelling

The facilitator supported mode of working with *Decision Explorer* can run in four different ways. It can follow on from a series of interviews involving cognitive mapping (where the resultant maps have been entered into *Decision Explorer* and

woven together as a group causal map using the analysis procedures mentioned above). It can also follow on from using the oval mapping technique (either during the same workshop or after and, potentially, with another group). A third possibility is where a model has been build from an analysis of documents (see Eden and Ackermann 2004a, b). Finally it can also be used as a starting point for the modelling exercise. This form, however, makes heavy demands on the facilitator to ensure that all the contributions are captured and linked appropriately. This is particularly the case at the start as contributions can be surfaced very quickly and discussion and debate generates considerable material.

Whereas the OMT or individual interviews act as powerful capturing and structuring opportunities, these facilitator driven workshops not only allow for development of the model in terms of content capture but also facilitate the development of common understandings and a shared language. As with OMT, participants are able to see their ideas within the context of those of others, thus extending an individual's understanding of different perspectives. In both cases having the material projected on to a public screen or wall helps separate the proponent from the contribution and thus helps the contribution to be judged on its merit. Capturing ideas into a publicly viewable map also allows participants to be able to move from a physiological 'knee-jerk' stance to one that is more thoughtful as participants do not have to immediately respond to the material. Thus the model becomes a 'negotiative' device allowing participants to listen to one another, to have time to mentally digest different views and therefore work more gently towards an agreement. Techniques of successful negotiation – both social and psychological – therefore play a prominent role in this form of SODA workshop.

4.2.7.2 Why Use the Software Supported Mode?

There are a number of reasons for choosing to use the single user mode of working. These include:

- The ability for participants to focus on the issue at hand rather than being distracted by ovals. When facilitated effectively it also reduces the risk of contributions being lost – the facilitator works to capture them rather than requiring participants to write them on ovals.
- Tighter adherence to the mapping guidelines – the facilitator is able to ensure compliance and take the cognitive load. In OMT mode, participants generate material that requires considerable tidying up to extract its full impact – this is particularly the case when entering links. Because of the ability to edit and re-edit on a continuous basis, flexibility in presentation is easy.
- Increased productivity through being able to exert greater concentration on the issue/situation. Being able to watch the map develop helps to avoid distractions such as trying to “get a word in edgeways”, or to think through the implications of what is being said. It also helps to avoid the frustrations of long debates around a single non-contextualized point of view. Most participants at the end of a workshop report that although they feel exhausted they genuinely believe that they have made progress despite previous struggles (Eden and Galer 1990).



Fig. 4.17 A group focusing on the main screen working on a model produced from the morning's OMT session, which can be seen on the wall

- Like OMT it is relatively easy to set up and run. All that is required is a laptop computer, data projector with good resolution (preferably better than XGA), and a large screen (see Fig. 4.17). The better the resolution of the projector the more 'readable' are the statements – as well as allowing more to be brought on to the screen (this can be up to 50+ statements as the group slowly increases the material represented on a single view).

4.2.7.3 Running a Single User Workshop

As noted above, the set up demands for single user working are relatively straightforward.

In terms of layout of the workshop location, seating participants in a semi circle around a central screen/projected image is a good starting point as it enables all to easily read what is on the screen and see one another (keeping the social context). It is also important to have comfortable seats and appropriate refreshments (see Hickling 1990, for more details on good room design). Avoiding interruptions from the 'day to day' work can further help concentration and so running the session off site or in another office building may be considered. Getting the 'trivialities' of

workshop design right will increase the probability of other, more important, activities working as planned.

When starting with a new map, it is worth being clear what the focal point of the intervention is and displaying it in the centre of the public screen. Where the model is already in existence, it is important firstly to review the existing material so that participants have an overview of what is in the model (see section 4.2.5.7 on producing an overview). The first part of an overview typically comprises a map of key/central issues and goals. This helps the group make sense of the complex material without feeling too overwhelmed. Having pre-worked up views that depict the material supporting each key issue (the equivalent of a 'hieset' – see section 4.2.5.6) also helps when working through the model's existing content. Finally having a set of text styles that not only comprise goals, key issues, and potent options but also a style that depicts agreed strategies (differentiated from key issues, but often the consequence of rewording key issues into strategy statements) and agreed actions (green for go) facilitates seamless working.

In both cases the participants will cycle between generation of new material, tentative agreements, digestion, and back to generation. Therefore designing the workshop to work on a cycle of around 20–30 min for each area of consideration (possibly clusters or hiesets) allows participants to explore, reflect, and move on with a sense of progression.

A few hints and tips for working in the software supported mode.

- Set up styles in advance (without borders – borders make it more difficult to see the box appearing around 'selected concepts') – use clear, easy to read fonts (Times Roman and Arial work best – try them out with the projector being used).
- Start with a few concepts on the screen (~15). This helps avoid participants being overwhelmed and not knowing where to start reading. Bring more material on as the group 'digests' the initial material. Try to avoid moving concepts around too frequently – whilst there is always the temptation to 'tidy' up the view, it can be distracting and frustrating to participants who have just worked out where statements are, to discover that they are no longer there!
- Turn off menus (where possible) as they can be very distracting! When first working with *Decision Explorer* having menus available is probably necessary. However, once more familiarity with 'hot-keys' has been gained, removing the menus provides: a) more screen room to view statements, and b) less distraction as the group doesn't usually need to see the menus.
- Work in 'fit to view' mode – as it will allow participants to see the whole of a map and it is possible to dynamically capture and review all of the material. When the statements become unreadable then it is likely to be an indication that a new view is needed.
- Capture as much of the dialogue as possible – as with doing interviews it is worth capturing the statements and then reviewing the links with the group.
- Review progress approximately every 20 min – this allows the group to go through a process of generation/creation/development/agreement and then digestion. It also helps the facilitator ensure that all the relevant material has

been captured along with any links to statements in the current view or to other parts of the model.

- Use views to ‘drill down’ and look at areas in more depth. As noted above, a view for each key issue can be helpful, as can views for loops.
- Analysis – should be used sparingly during the workshop. However, gaps such as coffee and lunch breaks can provide opportunities to see what emerges from the use of analysis tools.
- Have printed copies of ‘starter’ maps to hand so that you can easily refer to them – copies might also be useful for group members. Save regularly – it is software!

4.2.7.4 Summary

At the end of a workshop, it is helpful to reflect with the group on the progress to date and to clarify next steps. Building in sufficient time for the group to review agreements is important as it provides not only a sense of closure but also ensures that the messages taken back to others are consistent. Providing a set of print outs of all the material provides a very tangible deliverable – even if a more refined and ‘tidied up’ set is provided later.

For more information on the use of software supported workshops see Ackermann and Eden (1997)

4.2.8 Reflections on the Method

SODA therefore expects to provide the following benefits

- *Problem structuring* (through the capture and structuring process) and analysis of aggregated maps.
- Ability to help members of the group *change their minds* about the nature of the situation through seeing what others perceive and not having to respond immediately – time to think and act more cognitively than physiologically.
- The ability to *negotiate* a group view of the problem through appreciating the different perspectives, considering all options and their associated ramifications, and developing a sense of shared ownership and commitment.
- More *creativity* in option generation – through the ability to continue to build on one another’s contributions rather than be reduced to just working with those that can be held on to mentally.
- *Real-time interaction* with the model. The ability to play with contributions, explore them, and dynamically amend and extend the model ensures greater understanding and ownership.
- *On-line minutes* and post workshop *review* – an organizational memory that can easily be referred to – particularly in the case of exploring why a particular option has been chosen (through looking at the consequences and explanations).
- Reduce the impact of dysfunctional *interpersonal dynamics*. By allowing all views to be heard, and appreciating the different rationales, etc.

- Gain enough commitment to *devote time and energy* to getting it right. The sense of being able to manage the complexity, and the feeling that progress is being made energizes the group to continue the work.

4.3 Developments in the Uses of SODA

The foundations of SODA lie in the use of cognitive mapping as an important early stage in capturing subjectivism. Section 4.2 explored the skills needed for creating cognitive maps. In this section we explore the development of SODA over the last 15 years. As we will see, most of these developments are related to using the principles of SODA within the context of a group setting only. This orientation has been driven significantly by seeking to meet the challenge of undertaking effective problem-solving directly with a group and within the context of achieving significant outcomes in half a day or less.

The structure of this last section starts with a focus on the more effective management of social processes and negotiation within organisations, within the context of higher group productivity with respect to problem-solving. This focus introduces the potential of SODA in the broader-based application of strategy making. In particular, we discuss two applications of a developed SODA methodology with respect to exploring future scenarios and stakeholder management. We also consider some of the ways in which SODA has been integrated with other operational research techniques, specifically system dynamics modelling. Finally we consider some of the ways in which SODA can be implemented in low risk problem-solving projects.

4.3.1 *Managing Social Processes*

4.3.1.1 Increasing Social and Psychological Negotiation

A significant foundation for the development of SODA was the view of organisations as negotiated enterprises where each participant in an organisation subjectively defines problems. That is to say, each member of a management team has a different perspective on any problem as a result of their particular role, experience, education, and setting within the organisation. Members of the team are conscious that they need to continue to coexist at the level of social relationships as well as with respect to solving problems together. We have called these two aspects negotiated social order and socially negotiated order (Eden and Ackermann 1998). Negotiated social order suggests that problem solving depends upon negotiating new social relationships in order for implementation to occur. Socially negotiated order implies that problem solving is a social process where solutions are the result of social negotiation.

However, alongside a recognition of the significance of social negotiation was also the recognition that problem solving is about members of the team changing their mind -- psychological negotiation. Thus, one emphasis in the development of SODA must always be on facilitating more effective social and psychological negotiation.

The construction of a causal map, as a model amenable to analysis, is an important part of negotiation. Negotiation depends upon people gradually shifting their positions and so the model, and the results of analysis, should be continuously in transition. For many, the use of SODA is focused upon the construction of static cognitive maps which are then merged into a static group map. The static nature of these maps, as models, is largely the result of the technology available for constructing maps – typically, a pencil and large piece of paper for constructing cognitive maps in an interview situation, the use of post-its or Ovals displayed on flipchart sheets on the wall for group work. In both of these cases it is possible to envisage changing both the wording of nodes and the placement of causal links. However, time pressures tend to discourage keeping the model in continuous transition, even though the productive outcomes of doing so usually make it worthwhile. In a group situation it is even more important to allow for changing wording to reflect increased ownership and changing causal links to reflect discussion and elaboration. Rewriting of a post-it or oval takes time which interrupts the flow of a meeting and so is not done often enough.

An additional, and important, aspect of good negotiation is the need to pay attention to anonymity when appropriate. The merging of maps into one group map retains some important aspects of anonymity, however, working with a group directly using post-it or ovals cannot ensure absolute anonymity. Nevertheless, anonymity plays an important role in successful negotiation.

4.3.1.2 Group Productivity Issues

Techniques such as SODA are of most use in the context of complex and messy problems. Dealing with these sorts of problems typically involves managers and experts who are short of time. Over the past 15 years the need to find ways of increasing the productivity of group problem-solving episodes has become increasingly important (Eden and Ackermann 2004). There have been two distinct approaches to addressing this problem: (a) working to a cycle of providing a deliverable – a ‘take-away’ approximately every hour, and (b) developing and using a computer based Group Decision Support System (GDSS) specifically designed to support SODA. The first of these approaches seeks to ensure that it is possible to design a problem-solving workshop that can be completed in one hour, where the deliverable at the end of the hour can inform the next stage of problem-solving. Each stage allows for a more thorough development. The second approach allows

for parallel processing, computer supported analysis, and organisational memory in the form of a computer file.

4.3.1.3 Negotiation and Productivity: Using a Group Decision Support System (GDSS)

In the early 1990s the first version of a SODA based group decision support system was developed. Given the nature of technology at that time the system was based upon a hardwired network of laptop computers each running specially designed software. The laptop computers acted as consoles – one for each participant – and permitted direct communication with causal mapping software (*Decision Explorer*). The communication was controlled through the use of specially designed computer software that acted as a chauffeur. The chauffeur controlled the network and retained statistics about progress. In addition the chauffeur controlled electronic preferencing and rating, where participants were able to express their preferences with respect to options (the equivalent of using sticky dots in the low-tech version), and rate options with respect to, for example, the degree of leverage in relation to goals. The system was tested over a period of 5 years before being redeveloped at a professional level.

The group decision support system – called *Group Explorer* – permitted the achievement of a number of important objectives: (a) a causal map that could be in continuous transition where statements could be quickly and easily edited and causal links modified, (b) anonymity of contribution of statements or arrows, (c) the use of all the facilities available in *Decision Explorer*, particularly the use of styles to indicate different types of statement (goals, options, strategies, agreed actions, etc.). Significantly, the parallel processing possibilities increased the productivity of the group.

The system has now been used extensively with a wide range of different groups: top management teams in multinationals, small and medium-size enterprises, and public and not-for-profit organisations. Participants are consistently amazed at the progress that can be made in short periods of time using a combination of the SODA methodology alongside the group decision support system (see, for example, Andersen et al. 2010).

The use of a group decision support system replicates the use of oval mapping with a group without the requirement for initial one-to-one cognitive mapping interviews. Using SODA directly with the group is less expensive on participant and facilitator time, but does reduce the degree of richness that can be obtained through one-to-one interviews. It is also more demanding on the facilitator.

4.3.1.4 New and Better Researched Applications

Since the introduction of SODA as a soft-Operational Research methodology in the 1980s many of the principles have been extended and developed in other applications.

4.3.1.5 Strategy Making

The acronym, SODA, implies that the methodology is likely to be most applicable in exploring strategic options. Since strategic options are usually explored in relation to messy and complex problems, it is not surprising that situation exploration was likely to be relevant to strategy development. Indeed, many management teams who had been exposed to the use of SODA for exploring strategic problems wanted to continue using the techniques and processes as a part of strategic thinking and the development of strategy.

The structure of strategy (Eden and Ackermann 2001) – a network of goals, supported by a network of strategies, supported by a hierarchy of tangible actions – was similar to the hierarchy used in strategic problem-solving (see Fig. 4.9).

A significant area of concern in strategic planning had been the likelihood of a well-developed rationalistic strategic plan being ignored by those with power. The lack of ownership of a strategy by members of the top management team was a matter of great concern. The interactive way of working that is a strong feature of SODA was an attractive way of engaging a management team directly in the development of their own strategies.

Thus, during the mid to late 1990s the SODA method began to morph into a method for developing strategy. 1998 saw the publication of *Making Strategy: the Journey of Strategic Management* (Eden and Ackermann 1998) which discussed developments of SODA that addressed important concepts from strategic management. In particular, it became clear that the early stages of strategy making should include paying attention to the organisation's existing *emergent* strategy as well as to the development of any new strategic plans. The way in which members of the strategy making team defined important issues that needed to be addressed in order to create a successful strategic future was taken to be an indicator of emergent strategy. The issues and their relationships were easily depicted through a map. Exploring networks of issues was a straightforward development of the early stages of a SODA intervention.

Similarly, developments in addressing competitive advantage through the exploration of patterns of distinctive competences were articulated through the exploration and analysis of causal maps. The causal maps allowed for the identification of patterns of competences where it was the pattern that was distinctive (Bryson et al. 2007; Eden and Ackermann 2000, 2010b). The process was designed to pay particular attention to self-sustaining distinctiveness through the identification of feedback loops. In considering strategic management, the journey additionally encompassed consideration of the strategic management of stakeholders (Ackermann and Eden 2010). In particular the exploration of stakeholders involved participants surfacing various formal and informal relationships which once captured were amendable to analysis. Similarly the exploration of alternative futures – scenario building – became an exploration of the links between possible future events. The particular characteristics that followed from SODA as a methodology being adapted for the development of strategy was a focus upon the *systemicity* of issues, competences, goals, and stakeholders.

The notion of strategy making being a journey reflects the two significant concepts of negotiated social order and socially negotiated order that were central to SODA as a methodology. In other words, the process followed – the journey – is as important as the outcome. In addition, ‘Journey’ represented an important acronym to describe jointly understanding, reflecting upon, and negotiating strategy: JoURNeY. By expressing strategy development as a social process, the SODA methodology moved forward by paying respect to the importance of procedural justice (Kim and Mauborgne 1995) in encouraging consensus building and ownership.

The journey making process was further elaborated through the publication of *The Practice of Making Strategy* (Ackermann et al. 2005). Here was a focus on the incremental development of a strategy through a series of manageable tasks. The final outcome of the tasks was to be a “statement of strategic intent” for an organization, but each of the tasks led to a continuing refinement of the strategy. In this way the intention was to break up the process of strategy making into ‘bite-size’ chunks.

4.3.1.6 Informing Strategy Through the Development of Scenarios: One Specific Strategy Example

A key aspect of developing robust and practical strategies lies in understanding some of the significant changes that could happen to the environment during the period of time in which a strategy is being implemented. It is typical for us to think about the future as the trend development of the present. In other words, the future is projected from the present. Clearly a trend projected future is both possible and highly probable. However, such a future depends upon the structural characteristics of the past and present remaining in place. It is also possible the future may be determined by a number of critical events that break the trend. Of course, the critical event can arise when a trend variable reaches a critical point. For example, the demand in taking journeys by train may be forecast to continue growing but nevertheless reach a point of overcrowding where ‘riots’ are likely. The event of a ‘riot’ may lead to the destruction of train rolling stock, which may in turn lead to further overcrowding. Extensive overcrowding, and the disruption caused to passengers, may lead to government renationalising the railway network. A sequence of causally related events can gradually develop into a story about the future.

The process of envisaging possible alternative futures is encompassed within the well-established technique of scenario planning (van der Heijden 1996). However, most of the published techniques are resource intensive. Often it is simply impossible to devote high levels of resource to considering what are often seen as highly improbable scenarios, when set against simple trend forecasting. The use of causal mapping and the simple group process exemplified by SODA can provide a basis for undertaking some limited scenario development as a two hour workshop (see Eden and Ackermann 1998, Chapter C8 for an example).

In brief, the process involves group participants in suggesting possible future events that could have a serious impact on the success of any proposed strategy. Participants write out each event on a separate ‘oval’ as with oval mapping.

Only after participants have contributed all the events they can think of are the ovals linked together through causality. The causal map produced in this manner now encompasses a variety of future stories. Some of these stories cluster together as a relatively isolated scenario, others are highly interwoven. Some stories are triggered by, and totally dependent upon, a single starting event. Others encompass a portfolio of events. Thus, the peace scenario for Northern Ireland that is presented in *Making Strategy* (1998, p. 153) shows a series of linked stories all of which follow from the trigger event of an amnesty agreed for large numbers of paramilitary prisoners coupled with the government agreeing a ceasefire with republican paramilitaries. Three significant, but at the time surprising, event outcomes arise from these triggers: worsening industrial relations within the Northern Ireland prison service, a rising population of ordinary criminal (as opposed to political) prisoners, and prison staff fears of contamination from AIDS. The development of the stories depended upon linking together a set of suggested future events that had been treated as if they were independent during the first stage of the scenario development process.

In developing possible scenarios it is not necessary to make judgements about the probabilities of their occurrence. However, probabilistic forecasting could follow from the development of such maps through the use of Bayesian statistics and Monte Carlo simulation. However, the main purpose of developing scenarios is to explore the robustness of strategy with respect to unexpected futures. In doing so strategies can be refined and sensitivities developed. The process of exploring alternative futures means that managers are more likely to see futures unfolding earlier than would otherwise be the case, and this provides competitive advantage.

4.3.1.7 Multimethod Models: SD and Project Management

An essential aspect of SODA is that part which is about problem structuring. Delivering the structure of a problem through cognitive or causal mapping invites the identification of possible feedback loops. Earlier in this chapter we have discussed the potential for identifying false feedback loops, where the feedback depends upon a causal link which is incorrect. However, as we have also suggested, legitimate feedback suggests dynamic behaviour in the system. Feedback may suggest self-sustaining behaviour or controlling behaviour. If feedback is self-sustaining the behaviour may be vicious or virtuous. Alternatively, controlling feedback (a negative feedback loop) means that any shift in the state of a variable in the feedback loop results in the system returning to its original state.

The qualitative feedback structures that can be identified through the application of SODA will suggest obvious interventions that might reinforce a virtuous cycle, ensure that controlling feedback continues to work as long as it is desired, or look for ways of destroying a vicious cycle. However, as we mentioned earlier, it is sometimes appropriate to develop a simulation model of such dynamic behaviour to deepen understanding. Because the process of identifying feedback in the system is the process of identifying system dynamics, then system dynamics simulation methods are the appropriate way of exploring policy options through computer simulation.

The translation of cognitive maps, to causal maps, to influence diagrams, to the formal structure and system dynamics models and stocks, flows, and auxiliary variables requires considerable effort. Indeed the process of estimating the quantitative parameters of a system dynamics model is a skilled process. Nevertheless, it can be seen as a designed process (Howick et al. 2008) where each step introduces important analytical questions that will help resolve policy questions (see Eden et al. 2009).

4.3.1.8 Cognitive Change/Negotiation

Causal mapping has been consistently used to facilitate negotiation both within and across organisations. In recent years there have been careful studies of the implications for negotiation of understanding the processes by which participants contribute their views and causally link them together (Shaw 2003; Ackermann and Eden 2007). In the field of social psychology there have been a number of studies that suggest that participants in group decision making largely ignore the views of others unless those views match their own. Stasser and Titus (2003) provide a good summary of this stream of research. The use of causal mapping, and the process of mapping based upon the principles of SODA, appears to address some of the issues raised in this psychology based research.

In particular, the *gradual* shift in meaning of any statement on a causal map as causally related statements are added and as changes to the context and content occurs, enables cognitive change to occur. Rather than information being seen as isolated chunks, the mapping process facilitates a degree of equivocality that 'oils the wheels' of negotiation.

There appears to be considerable promise in the use of mapping as a way of facilitating negotiation in situations of overt conflict (Ackermann and Eden, 2010c).

4.3.1.9 Small Steps in Application: Low Risk Projects

One of the difficulties for potential users of methodologies such as SODA relates to the level of risk associated with trying to use a reasonably complex methodology with a real group for the first time. In the main part of this chapter (section 4.2.2.9) we have suggested a number of approaches to gaining experience in mapping. Undoubtedly, this must be a first step in developing the appropriate skills in the application of SODA. However, assuming a reasonable level of mapping skills, where formalities are adhered to, then the next step is to undertake some problem solving with a real group. Keeping risks down by advertising a reduced level of expectation of the group is an obvious first step (see also Eden and Ackermann 2004; Ackermann and Eden 2004).

Establishing frequent milestones, where each milestone produces a group deliverable, can be helpful. This means that the SODA episode can be designed in a manner that does not indicate premature closure as far as the group is concerned. An initial first milestone can be related to the surfacing of statements and agreeing their linkage. The first deliverable becomes the outcome of crude clustering and the

identification of central nodes. The clusters provide for an overview of the problem, and the identification of central nodes provides an indication of where the 'nub of the issue' lies. The basis for establishing priorities will have been established. This milestone can be reached through the use of oval mapping or the use of *Decision Explorer* linked to a data projector. If this first milestone is reached in a satisfactory manner it is likely that the group would want to pursue matters further.

Earlier in this chapter we discussed the process of mapping the contents of a document. In particular, we discussed this activity in the context of learning how to do mapping. However, exploring the published goals system of an organisation by reverse engineering it into a causal map can often be extremely revealing and helpful. Goals statements often do not present the ways in which one goal supports another and in turn is supported by others. Thus, readers get no sense of the means/end structure and so see each goal as relatively independent and do not appreciate its overall purpose. Reverse engineering a goals statement into a map typically identifies strange means/end links and isolated statements. This process can work as the basis of the guiding group discussion about the redevelopment of the more carefully worded goals system. It is relatively low risk because it can be exploratory rather than being set up as an attack on the current goals statement.

References

- Ackermann, F. 1996. Participants Perceptions on the Role of Facilitators using Group Decision Support Systems. *Group Decision and Negotiation*, 5: 93–112.
- Ackermann, F. and Eden, C. 1994. Issues in Computer and Non-Computer Supported GDSSs. *International Journal of Decision Support Systems*, 12: 381–390.
- Ackermann, F. and Eden, C. 1997. Contrasting GDSSs and GSSs in the Context of Strategic Change: Implications for Facilitation. *Journal of Decision Systems*, 6: 221–250.
- Ackermann, F. and Eden, C. 2001a. Contrasting Single User and Networked Group Decision Support Systems for Strategy Making. *Group Decision and Negotiation*, 10: 47–66.
- Ackermann, F. and Eden, C. 2001b. SODA – Journey Making and Mapping in Practice. In Rosenhead, J. and Mingers, J. (Eds.), *Rational Analysis in a Problematic World Revisited*: 43–60. London: Wiley.
- Ackermann, F. and Eden, C. 2004. Using Causal mapping: individual and group; traditional and new. In Pidd, M. (Eds.), *Systems Modelling: Theory and Practice*: 127–145. Chichester: Wiley.
- Ackermann, F. and Eden, C. 2010a. Strategic Management of Stakeholders: theory and practice. *Long Range Planning*, forthcoming.
- Ackermann, F. and Eden, C. 2010b. Negotiation in Strategy Making Teams: Group Support Systems and the Process of Cognitive Change. *Group Decision and Negotiation*, forthcoming.
- Ackermann, F. and Eden, C. 2010c. The Role of Group Decision Support Systems: negotiating safe energy. In Kilgour, M. and Eden, C. (Eds.), *Handbook for Group Decision and Negotiation*: Dordrecht: Springer.
- Ackermann, F., Eden, C., and Williams, T. 1997. Modeling for Litigation: Mixing Qualitative and Quantitative Approaches. *Interfaces*, 27: 48–65.
- Ackermann, F., Eden, C., with Brown, I. 2005. *The Practice of Making Strategy: A Step by Step Guide*. London: Sage.
- Ackoff, R. L. 1981. *Creating the Corporate Future*. New York: Wiley.

- Andersen, D., Richardson, G. P., Ackermann, F., and Eden, C. Using the *Group Explorer* Group Support System to Add Value to Group Model Building. *System Dynamics Review*, Forthcoming.
- Belton, V., Ackermann, F., and Shepherd, I. 1997. Integrated Support from Problem Structuring through to Alternative Evaluation Using COPE and V.I.S.A. *Journal of Multi-Criteria Decision Analysis*, 6: 115–130.
- Bougon, M., Weick, K., and Binkhorst, D. 1977. Cognition in organizations: analysis of the Utrecht Jazz Orchestra. *Administrative Science Quarterly*, 22: 609–632.
- Bryson, J. B., Ackermann, F., Eden, C., and Finn, C. 2004a. The Oval Mapping Process: Identifying Strategic Issues and Formulating Effective Strategies. In *Strategic Planning for Public and Non-Profit Organisations*: 355–376. San Francisco: Jossey Bass.
- Bryson, J., Ackermann, F., Eden, C., and Finn, C. 2004b. *Visible Thinking: Unlocking Causal Mapping for Practical Business Results*. Chichester: Wiley.
- Bryson, J. M., Ackermann, F., and Eden, C. 2007. Putting the Resource-Based View of Strategy and Distinctive Competencies To Work in Public Organizations. *Public Administration Review*, July.
- Buzan, T. and Buzan, B. 1993. *The mind map book*. London: BBC Books.
- Eden, C. 1987. Problem Solving or Problem Finishing? In Jackson, M. C. Keys P. (Eds.), *New Directions in Management Science*: 97–107. Hants: Gower.
- Eden, C. 1988. Cognitive Mapping: a review. *European Journal of Operational Research*, 36: 1–13.
- Eden, C. 1990. The Unfolding Nature of Group Decision Support. In Eden, C. and Radford, J. (Eds.), *Tackling Strategic Problems: the role of group decision support*: 48–52. London: Sage.
- Eden, C. 2004. Analyzing Cognitive Maps to Help Structure Issues or Problems. *European Journal of Operational Research*, 159: 673–686.
- Eden, C. and Ackermann, F. 1998. *Making Strategy: The Journey of Strategic Management*. London: Sage.
- Eden, C. and Ackermann, F. 2000. Mapping distinctive competencies: a systemic approach. *Journal of the Operational Research Society*, 51: 12–20.
- Eden, C. and Ackermann, F. 2001. A Mapping Framework for Strategy Making. In Huff, A. and Jenkins, M. (Eds.), *Mapping Strategy*: 173–195. London: Wiley.
- Eden, C. and Ackermann, F. 2004a. Cognitive Mapping Expert Views for Policy Analysis in the Public Sector. *European Journal of Operational Research*, 152: 615–630.
- Eden, C. and Ackermann, F. 2004b. Use of ‘soft-OR’ models by clients – what do they want from them? In Pidd, M. (Eds.), *Systems Modelling: Theory and Practice*: 146–163. Chichester: Wiley.
- Eden, C. and Ackermann, F. 2007. The Resource Based View: theory and practice. *Presented to Academy of Management Conference Philadelphia*.
- Eden, C. and Ackermann, F. 2010. Competences, Distinctive Competences, and Core Competences. In Sanchez, R. and Heene, A. (Eds.), *Contemporary Perspectives on Competence-Based Management, Advances in Applied Business Strategy*, Volume 12: Bingley: Emerald Group.
- Eden, C. and Galer, G. 1990. A Client’s perspective. *Long Range Planning*, 23: 42–43.
- Eden, C., Jones, S., and Sims, D. 1979. *Thinking in Organisations*. London: Macmillan.
- Eden, C., Jones, S., and Sims, D. 1983. *Messing about in problems; an informal structured approach to their identification and management*, Oxford: Pergamon.
- Eden, C., Jones, S., and Sims, D. 1994. Misunderstandings: understanding problems and the problems of misunderstanding. In Armson, R. and Paton, R. (Eds.), *Organizations: cases, issues, concepts*: London: Paul Chapman Publishing.
- Eden, C., Ackermann, F., Bryson, J., Richardson, G., Andersen, D., and Finn, C. 2009. Integrating Modes of Policy Analysis and Strategic Management Practice: Requisite Elements and Dilemmas. *Journal of the Operational Research Society*, 60: 2–13.
- Friend, J. and Hickling, A. 1987. *Planning Under Pressure: The Strategic Choice Approach*. Oxford: Pergamon.
- Harvey, J. 1988. The Abilene Paradox: the management of agreement. *Organizational Dynamics*, Summer: 17–34.
- Hickling, A. 1990. ‘Decision Spaces’: A Scenario about Designing Appropriate Rooms for Group Decision Management. *Tackling Strategic Problems: the role of group decision support*, 169–177.

- Hofstede, G. 1980. *Cultures Consequences*. London: Sage.
- Howick, S., Eden, C., Ackermann, F., and Williams, T. 2008. Building Confidence in Models for Multiple Audiences: the Modelling Cascade. *European Journal of Operational Research*, 186: 1068–1083.
- Huff A. (Editor) 1990. *Mapping Strategic Thought*. New York: Wiley.
- Huff, A. and Jenkins, M. 2002. *Mapping Strategic Knowledge*. London: Sage.
- Janis, I. L. 1972. *Victims of Group Think*. Boston: Houghton Mifflin.
- Kelly, G. A. 1955. *The Psychology of Personal Constructs*. New York: Norton.
- Kim, W. C. and Mauborgne, R. A. 1995. A Procedural Justice Model of Strategic Decision Making. *Organization Science*, 6: 44–61.
- Langfield-Smith, K. and Wirth, A. 1992. Measuring Differences between Cognitive Maps. *Journal of the Operational Research Society*, 43: 1135–1150.
- Laukannen, M. 1998. Conducting Causal Mapping Research: Opportunities and Challenges. In Eden, C. Spender J. C. (Eds.), *Managerial and Organizational Cognition*: London: Sage.
- Lindblom, C. E. 1959. The Science of Muddling Through. *Public Administration Review*, 19: 79–88.
- McFadzean, E. S. and Nelson, T. 1998. Facilitating Problem Solving Groups: A Conceptual Model. *Leadership and Organization Development Journal*, 19: 6–13.
- Nutt, P. C. 2002. *Why Decisions Fail: Avoiding the Blunders and Traps that lead to debacles*. San Francisco: Berrett-Koehler Publishers Inc.
- Phillips, L. and Phillips, M. C. 1993. Facilitated Work Groups: Theory and Practice. *Journal of the Operational Research Society*, 44.
- Pidd, M. 2003. *Tools for Thinking: Modelling in Management Science*. Chicester: Wiley.
- Richardson, G. and Pugh, A. L. III 1981. *Introduction to System Dynamics Modeling*. Boston, MA: Productivity Press.
- Rittel, H. W. J. and Webber, M. M. 1973. Dilemmas in a general theory of planning. *Policy Sciences*, 4: 155–169.
- Shaw, D. 2003. Evaluating electronic workshops through analysing the ‘brainstormed’ ideas. *Journal of the Operational Research Society*, 54: 692–705.
- Simon, H. A. 1976. From substantive to procedural rationality. In Latsis, S. J. (Eds.), *Method and Appraisal in Economics*: Cambridge: Cambridge University Press.
- Stasser, G. and Titus, W. 2003. Hidden Profiles: A Brief History. *Psychological Inquiry*, 14: 304–313.
- Thomas, W. I. and Thomas, D. S. 1928. *The Child in America: Behavior Problems and Programs*. NewYork: Knopf.
- van der Heijden, K. 1996. *Scenarios: the art of strategic conversation*. Chichester: Wiley.
- Weick, K. E. 1979. *The Social Psychology of Organizing*. Reading, MA: Addison-Wesley.

Note

Decision Explorer can be obtained from www.banxia.com. It runs in Windows. Group Explorer can be obtained from the authors at Strathclyde Business School, Glasgow, UK. It requires Windows Server and a local area network of laptop computers able to run Internet Explorer.