



Cognitive mapping expert views for policy analysis in the public sector

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Abstract

This paper reports the use, in the UK Home Office Prison Department, of cognitive mapping techniques for policy analysis. The methodology used has been developed to facilitate more effective management of messy problems by management teams. Here it is used for the collation, comparison and *analysis* of the views of many experts in relation to a major policy issue. The analysis makes use of the specially designed computer software, Decision Explorer. The paper discusses the impact of the approach and suggests general implications for the way in which policy analysis is conducted.

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1. Introduction

This paper reports on an experiment, using a ‘Soft OR’ modelling technique and software package that were brought to bear on documented expertise in order to identify and explore potential policy options pointed up by experience and expertise outside the Prison Service of England and Wales.

The paper reports the use of policy analysis techniques that form part of a well established strategic problem solving methodology, SODA—Strategic Options Development and Analysis (Eden, 1989; Eden and Ackermann, 2001; Acker-

mann and Eden, 2001). The SODA methodology has recently developed further into ‘JOURNEY Making’ (Jointly Understanding Reflecting and NEgotiating strategyY) (Eden and Ackermann, 1998a). SODA specifically addressed the resolution of complex strategic problems however, as time passed and as SODA was used for problem solving, management teams used the process and substantive outcomes as an influence on their overall strategy. Consequently, the fundamental principles and guiding theories that inform SODA led to a significant extension of the methodology so that it became a process oriented/management science strategy making and delivery methodology. Thus JOURNEY Making continues to address strategic issues resolution, but also allows agreement to a statement of strategic intent through the development of a formal business model. The

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development of the business model is dependent upon a particular approach to the identification of patterns of competencies and distinctive competencies (Eden and Ackermann, 2000) and their ability to support the goal system. In addition, JOURNEY Making includes new approaches to stakeholder analysis and management and alternative futures (related to Scenario Planning as seen by Van der Heijden (1996) and O'Brien and Meadows (1998)).

SODA and JOURNEY Making have been developed through sustained action research (Eden and Huxham, 1996) into the provision of decision support, particularly to teams or decision making groups. Both approaches make use of computer software, Decision Explorer,¹ designed to record, analyze and present qualitative data—argumentation—relating to strategic policy issues and modelled as cognitive maps. These maps are generally records of verbal accounts of issues given in interviews by members of the management team. Suitably analyzed and presented, they form the basis for consideration and debate of the issue by the management team at strategy workshops.

In the case reported here SODA was used primarily for the *collation and analysis* of the views of many experts in relation to a major policy issue faced by a UK Government Department, the Prison Department of England and Wales some 10 years ago. At the time the issues were highly confidential, however, the processes and general aspects of the case can now be reported. Using Decision Explorer, a computer based model or “knowledge base” of experiences and expert opinion relating to a major area of policy was developed alongside a traditional policy review. The “knowledge base” was then compared with the contents of that traditional policy review, extended where the contents differed and finally, used as a Ministerial briefing mechanism.

The next section briefly outlines the techniques that have been developed as a part of SODA and which are relevant to discussing this experiment. A description and discussion of the experiment and

the challenges encountered follows. These point to some ways in which the approach might evolve. Finally the experience of this project suggests some issues in relation to public policy analysis in general and these are briefly considered.

2. The technique and tool in context—“cognitive mapping” and Decision Explorer

SODA and JOURNEY Making traditionally comprise a number of interlinked elements: *facilitator(s)* using cognitive mapping as a technique; *computer software* (Decision Explorer) as a supporting tool to elicit, store and handle the complexity revealed by members of a *client team* through a *designed process* of inquiry exploring strategic issues. The methodology brings these elements together so as to meet the specific needs of those drawing on support from the system. Originating from research into methods of helping the process of problem solving in teams (Eden et al., 1983), it has been increasingly used as a fully-fledged organizational Group Decision Support System (Eden and Ackermann, 1992; Ackermann et al., 1993; Ackermann and Eden, 2001) and for strategy development and implementation within both public and private sectors (Eden and Ackermann, 1998a).

At the core of the method, and of particular relevance to the analysis of expert views, is the technique of “cognitive mapping”. Although ‘cognitive mapping’ has a variety of interpretations in practice (Axelrod, 1976; Huff, 1990), this particular form of cognitive mapping is based on “personal construct theory” (Kelly, 1955) and has been developed, following extensions to the use of “Repertory Grids”, for the purpose of capturing a “personal construct system” (Eden et al., 1979; Eden and Jones, 1984; Eden, 1988). Personal construct theory sees “man as a scientist”, constantly trying to make sense of the world in order to act within and upon that world. The analyst using the technique of cognitive mapping seeks to elicit the beliefs, values and expertise of decision makers relevant to the issue in hand through interview or through the analysis and coding of documents. These are then captured as a model of

¹ Decision Explorer was developed by the University of Strathclyde and is available through www.Banxia.com.

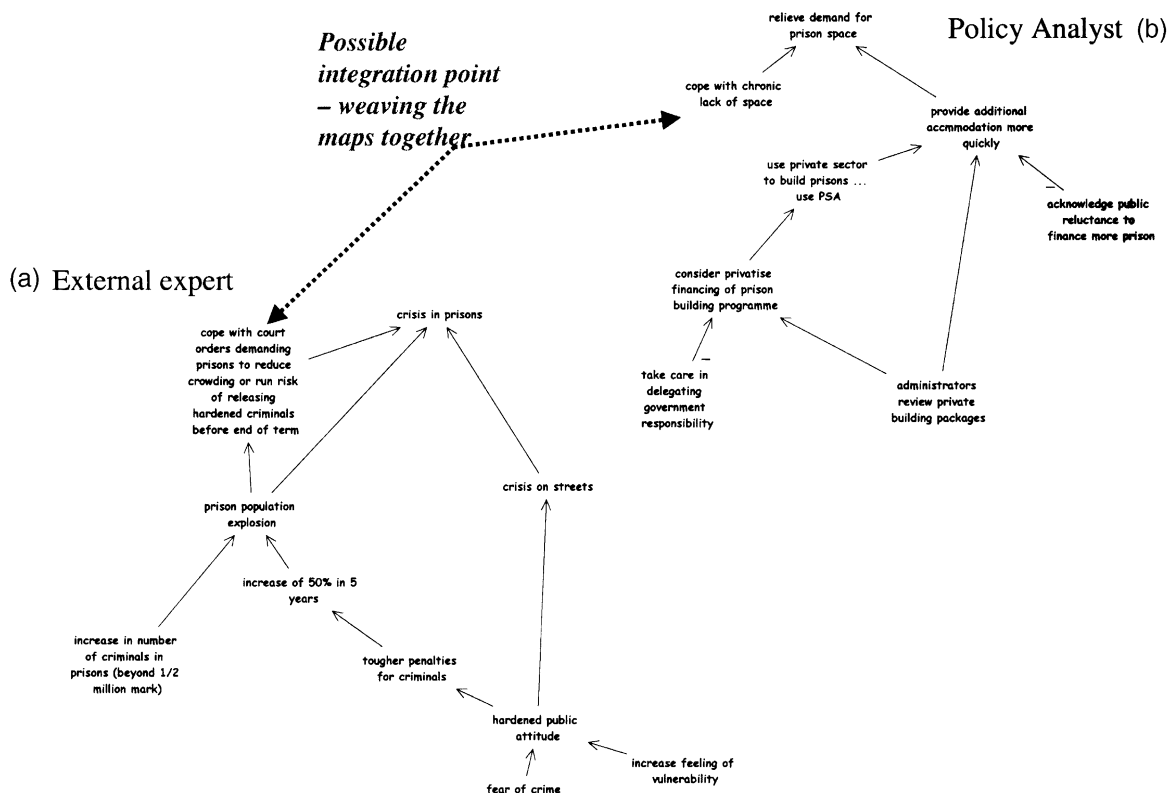


Fig. 1. (a) and (b)—Sections of individual cognitive maps.

the construct system represented as a cognitive map. The cognitive map is made up of concepts linked to form chains of action-oriented argumentation.

In practice, one of the significant distinguishing features of the type of cognitive maps used for problem structuring is that they tend to be larger than those used for research. Because they seek to map the construct system of a person as it relates to a particular issue, the map will need to capture the idiosyncratic ways of seeing the world for the particular person. Following, for example, a one-hour interview about a problem the cognitive map is likely to contain 90–120 nodes. Similarly when an article is decomposed into a map, the substance of the arguments within the paper are likely to require a map of over 100 nodes to fairly represent the point of view of the author. When maps are used for research purposes they have tended to be 12–20 nodes (see, for example, Johnson et al.,

1998; Narayan and Fahey, 1990). It is the richness of a map that provides opportunities for option development and problem solving (Ackermann and Eden, 2001).

These “cognitive maps” would usually provide a medium for problem solving work but here are the basis for modelling and understanding the perspective of each expert, as if the expert were a decision maker. It is important to note that maps are coded so as to be action oriented representations of the world—the analyst codes argumentation about policy issues so as to reveal or *highlight the implications for action* in the way the issue is construed (examples of mapping argumentation are given in Fig. 1a and b). A cognitive map demands that assertions have consequences or implications (which reveal the answer to the “so what?” question)—and so the map is made up of “constructs” (or concepts) and arrows indicating the direction of implication embedded in the belief

or argument. In particular the arrow shows the implied possible action and its possible outcome as suggested by the original argument. Thus meaning is given to a construct not only by its content, but also from the consequences attributed to it and from the explanatory constructs that support it. In gathering data and in building the model, the central questions guiding the consultant are “what are the implications of *using* the ‘theory or belief about the world’ as a basis for intervening in the world?” and “what might explain or support that assertion or belief?”. Thus an assertion is questioned by considering why the expert is making it—“what does the expert expect someone to do as a result of the assertion?”. For example, if the expert asserts that “the number of criminals in prisons passed the half million mark last year”, then it becomes important to review the context of the assertion, within the holistic sense of the expert’s view, to discover, and so state, the way in which this data is regarded as relevant to the policy issue. Clues derive from other statements such as “struggling to keep pace with the prison population, more than 60% of the states currently are under court order to reduce crowding”. This can be captured in the form of a map.

Fig. 1a illustrates a small part of the cognitive map of which the above arguments were a part. Conversely Fig. 1b is the coded version of a policy analyst arguing that in order to provide additional accommodation (and thus develop a coherent policy in relation to prisoner housing), there must be consideration of alternative packages, and appreciation of the public’s reluctance to finance more prisons. Moreover, when considering such public policy, care must be taken when delegating governmental responsibility. Thus both individuals agree with the need to review prison estate but bring different issues to the fore, and have different concerns (depending on their position in the situation—e.g. either directly involved or as a commentator). As can be seen the two perspectives of the world can be linked together around the area of lack of space/crowding.

Cognitive maps thus take the form of a set of connected options-outcomes chains. Assertions about the world imply possible policy options which (taken in coherent bundles) in turn imply



Fig. 2. Structure of a policy map.

strategies for the organisation. These are often linked to the overarching goals taken to be purposes of the organisation or decision maker (see Fig. 2).

In building a map, then, it is important to ask at each and every stage what the proper place of a concept is within the map. The answer can only come confidently from a clear appreciation of the policy-maker’s *belief/goal system* and its relationship to the issue being addressed. “Coding” argumentation is thus a discipline—it forces the analyst to ask powerful questions of the “data” presented by the experts.

The process comprises three key elements: eliciting the different views and belief sets as individual cognitive maps, drawing together this expert opinion in the form of a composite map which is the aggregation of the cognitive maps representing models of the expertise of each expert, and, as noted below, using the composite map in a workshop setting to explore the policy arena and the possible policy options.

SODA workshops are designed for small groups (ideally of 6–10 key individuals) to work on taking forward the issue(s) as defined by the participants through their maps. The composite model acts as a tool to help *negotiation* towards an agreed policy. Information derived from an analysis of the model structure and its content can be accessed directly from the computer model to

support work on an agenda. Generally, the agenda and the supporting information is relevant and recognisable to participants in the workshop. Each policy-maker can see his or her concepts and arguments in the context of others'; the model as a whole encompasses each individual's viewpoint and thereby challenges the boundaries they have placed on the issue. The inclusiveness of the model, the analytic nature of its contents, and its public nature are means by which a more creative and better developed analysis of the policy issues results. Policy makers are therefore able to change their mind about the issue, in a way which reflects their learning from the synthesis of several views of other members of the policy making team.

The aim is not to develop an all encompassing database of argumentation; rather it is to develop a model that is sufficient to allow the strategy or policy debate to be intelligently resolved (Phillips, 1984). The model is thus issue dependent and indeed, client dependent.

The practice of this *process* means that the task of the SODA analyst has been to design and manage a policy making activity such that policy meetings (or workshops) involving key policy makers are appropriately informed by and are built upon the policy analysis of the map/model through interacting with the software. The aim is to produce clear and agreed statements of goals, major policy areas, policy options available, and explorations to be carried out to buttress the policy. And crucially, the purpose is to ensure that the members of the management team share an understanding of, and commitment to, strategic decisions, their rationale and their implications.

3. The prisons policy experiment

As the basis of the major policy review, which was the subject of this experiment, an aim of the Prison Department was to identify and explore available policy options as they were informed by external experience and expertise. Significantly, then, the experts were not members of the policy making team for which the analysis was carried out. Further, there was only a small team (of two) from the Prison Department involved in the pro-

ject, which meant that the role of the group decision support system in managing the social or organisational complexity inherent in policy development and evaluation the strategy process was given little emphasis. The method was nevertheless seen to contain techniques and tools capable of contributing in their own right to work on the analysis of the complexity of policy issues. In particular, the specific SODA related technique of cognitive mapping in an action oriented manner combined with the Decision Explorer software was seen as providing:

- a *knowledge base* or repository for options based policy argumentation and expertise;
- a way of capturing and *taking into account, through analysis, more of the complexity* of the policy issue; and
- a *way of presenting information/argument* about policy options and their consequences.

In short, the method was seen as a way of handling *analytically* the complex arguments surrounding the policy option and so informing policy choice rather than as a method for group decision support.

Thus, the experimental project was: the use of cognitive mapping and Decision Explorer to represent, store, analyze and make sense of the views of a number of 'experts' on the major, live policy topic (some of which were presented in the form of documentation). Although attempts have been made to map policy documents as apart of understanding policy decision making (for example, Shapiro and Bonham, 1973), these processes have not been a part of the policy making activity, or expected to influence the policy outcome. Similarly analyses of internal policy documents and annual reports have been undertaken in order to compare public and private statements by executives (Fiol, 1995).

This was to be carried out in parallel and deliberately delayed behind the traditional policy review exercise so that comparison could be made. The project developed in three phases: information collection, interpretation and coding; policy appraisal and model extension; and research briefings as detailed below. For reasons of confidentiality,

examples in the text are illustrative rather than drawn directly from the case.

3.1. Phase 1: Information collection, interpretation, and coding

Well documented arguments about, and experiences of, analogous policy initiatives outside the Prison Department and in other countries were used as a basic input to this policy review. One of the authors worked, as an analyst, with 16 documents representing a range of “expert” opinion (people either with practical experience of, or directly affected by, the issues). Some of these documents reported policy analysis conducted in other countries, others were formal academic papers, and some argued responses from key stakeholders in the issue. The analyst sought to extract the network of arguments from each document. This process of “extraction” involved identifying short phrases which stand as a distinguishable element of an argument. The process of entering these into a Decision Explorer computer model considered how each of these concepts formed part of the overall network of argumentation in the manner described above. The set of linked concepts in the Decision Explorer computer model was then taken as representing the perspective of that particular expert on the policy issue. Finally the models of each expert’s cognitive map were aggregated into one model where cross-links between arguments were made and many concepts merged to account for similar wording. As statements in each model were merged then the meaning of the construct was extended and so changed to account for the different options and outcomes each author had identified (the software permits this to be done in a semi-automated fashion).

Prior to presentation of the model to the policy makers, the analyst used the software to conduct a sequence of analyses of the data. The analyses are designed to reveal dominant clusters within the data, so demonstrating emerging issues and their interconnections (see Cropper et al., 1990; Eden et al., 1992; Eden and Ackermann, 1998b). Similarly the analyses permitted the identification of

possible “key options” implicitly or explicitly suggested by the experts and that could have a potent effect on the goals of the Prison Service. Each of these analyses depends upon the embedded structure of the model as a *network* of interconnected constructs.

This first phase culminated with a presentation of the model to the Director General (equivalent to the CEO) and the Finance Officer of the Prison Service. The feedback consisted of providing an overview of the model by displaying (on a large projected computer screen) the system of goals of the Prison Department as they had been alluded to, or assumed, by the experts; the key issues as they had emerged from the cluster analysis; and the linkage of key options to these issues and goals. The experience was akin to being “walked through” the model.

Reactions during this feedback session indicated a number of problems. The graphical presentation of a Decision Explorer model that is designed to help manage complexity through a colour signified classification of goals, issues, and key options sometimes takes some assimilation and the Prison Department members were coming to the data in this form for the first time. However, more importantly, there was particular discomfort about the breadth of the computer model. In following the arguments contained within the documentation, material about other integrally related policy areas had been necessarily included in the model (as seen by the expert and included by the analyst). There clearly had been an expectation that the material mapped and analysed would follow boundaries *each of them had drawn in their minds* around the policy topic. Finally, despite the analyst’s efforts, the content of this initial model was not taken to be sufficiently closely related to the Prison Department goals and institutional perspective. That is, the relevance of some material to the policy debate was questioned and was felt to introduce *more complexity than necessary*. The *ownership* of the data present in traditional policy workshops was missing—an inevitable consequence of expert views that had not been given personal meaning through being read through the perceptual framework of the policy makers.

3.2. Phase II: Model extension and appraisal

Alongside this work, the Prison Department had prepared, by traditional methods, an analysis of the same “expert” papers and their relevance to the policy issue (here personal interpretation was able to give ownership). The second phase of the project was to introduce the contents of this report into the computer model and so *compare and contrast the conclusions in order that the additional material would represent the differences*. The resulting, ‘merged’ model was again presented to the Director General and the Finance Officer with additions to the model highlighted. It was perhaps significant that the process of coding the traditional report revealed a model that was less than half the size of the model developed by the analyst and added less than five percent new concepts, but rather rephrased into ‘local jargon’ a number of existing concepts.

This time, the Decision Explorer modelling format was more readily accepted, as much as anything because enough of the content was now more familiar (mostly because of rephrasing) although some degree of acceptance arose due to increased familiarity with the mapping technique. However discussion of the model again demonstrated the difficulty of working with aggregated “expert” data where each line of argument could not be directly evaluated against author, but rather was given equal status. When models are used to facilitate negotiation in groups, concepts and arguments within a Decision Explorer model are deliberately given equal status—each member of a project team, for example, is deemed to have a legitimate viewpoint which should be fully modelled. The reliability of these points of view will be tested in discussion by the proponents at the workshops and through attention to the synthesis of a number of arguments concerning the same topic.

When policy makers consider material from experts they are not prepared to consider each set of views equally. With multiple experts who are given equal weight there are particular problems that arise from the differing perceived validity of, for example, trade union expertise compared to that of research academics. In addition, in considering the written evidence used in this experiment, it

became frustrating, both for the analyst and policy makers, to be unable *socially* to challenge any contentious or contradictory arguments and conclusions included in the model.

These sources of distress, on the part of the policy makers, led to re-coding of the material so that each assertion could be attributed to a particular expert.

3.3. Phase III: Using the model as briefing mechanism

The third phase of the project resulted from the policy makers’ having developed confidence in the model and coming to the view that the software provided a fast way of briefing others about the complexity of the issue. This phase sought, therefore, to test the potential of the information base as a briefing mechanism.

As part of the policy development process, the Prison Department had scheduled two visits to outside agencies with practical experience in related areas. The analyst undertook to brief the individuals involved in the visits (one of whom was the Minister concerned with Prison Service policy), and to point up questions revealed by analysis of the model, which might be resolved during the visits. On their return, the analyst would debrief them and build their first hand experiences into the model. For the first visit, relevant “slices” of argumentation were extracted from the model using analytical techniques within the software, printed out and sent to the individuals involved. For the second visit, the personnel were given a brief presented in a form more akin to a written document, but they were also “walked through” the computer model directly.

Both groups found that the briefing was a useful starting point, but that it was rapidly superseded by learning “on the ground”. The visitors, who were acting in the role of researcher guided by the significant assertions as revealed by the model, were of the view that a lap top computer combined with the ability to continually modify and analyze the model in “real time” would have made the system particularly useful.

Following the visits, the analyst carried out debriefing through interviews. The practical

experience that had been gained was built into the model. The resulting, final model was presented, again to the Director General and the Finance Officer. This session was much more effective than the preceding two, partly because the participants were attuned to the style of presentation, and partly because there was new, directly relevant data, some of which neither policy-maker had seen through the standard briefing, to be assessed in the context of the old. It was possible, again using the analytic routines in the software to see how the new information affected the shape of the model and in particular how it affected the analyses of the most significant policy options and goals. This was to some extent analogous to the experience of seeing one's own arguments placed in the context of others' in a normal SODA exercise.

This presentation ended the formal experiment. The conclusions drawn from the work, both from the viewpoint of the Prison Department and from the research side are set out below. We review these questions under three headings developing the knowledge base; retaining and managing the complexity of policy argumentation; and presenting to the policy-maker group.

The final section then considers what lessons have been learned about the process of public sector policy analysis in general.

4. Using cognitive mapping and Decision Explorer for policy analysis

4.1. Developing the knowledge base

4.1.1. Using "remote" experts

The experiment deliberately set out to access the expertise of many people outside the policy-making organisation and to combine them into a single set of interrelated arguments. This is at variance to the traditional SODA project which draws on the expertise of members within an organisation. The information offered and collected in a model can be assumed, at the outset, to be a relevant contribution to the debate. The process of face to face interviewing allows the analyst to clarify the nature of the relevance of information offered and the process continues throughout the work-

shops. Here, with remote experts neither attuned to the specific concerns of the Prison Department, nor available for interview, the assumption of relevance was always questionable.

4.1.2. Coding argumentation

The formality of this particular form of cognitive mapping experiment highlighted the extent to which any knowledge base based on expert views is vulnerable to the different purposes of the "expert" authors their analysis and conclusions were at times deliberately tangential to the policy issues facing the Prison Department. Further, the value systems of the expert authors were usually implicit within the written material particularly where taken from "learned journals", where the demand is for "value free" argument. It was difficult, then, to be clear about the status to accord some concepts within the model for example, at times, what an expert presented as a policy option would be seen by our policy makers as a valued goal and vice-versa (see Fig. 3). Fig. 3 shows two ways of coding the same set of concepts depending upon the views held about valued outcomes, the first coding shows a map from the perspective of an expert in the public sector whereas the second shows the same concepts from the stance of expertise developed within the private sector. As a result whilst effort was made in trying to represent the material as

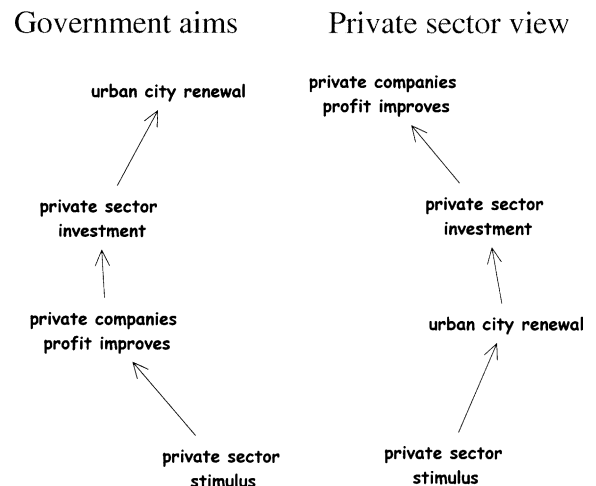


Fig. 3. Different coding of the same concepts.

close as possible to the thinking, the resultant maps did not truly represent cognition but rather a deliberately contrived argument.

It was crucial, then, to follow a disciplined approach to information. This involved coding the experts' arguments so as to consistently highlight (a) the policy options implied given our understanding of the goals of the Prison Service and (b) the additional potential consequences of policy options. This latter set either took on the status of goals which had been taken by our policy makers as lying outside the scope of this policy area, or, alternatively, were seen as outcomes which were to be positively avoided—outcomes which in a cognitive map are coded as “negative-goals” and have the same status as goals or values but which are only notable because of their likelihood of occurrence as undesirable outcomes (Eden and Ackermann, 1998a). The inclusion of both associated issues and of negatively valued outcomes provoked further discussion about the relevance of the model. Early sessions were dominated by discussions about whether the content of the model was reasonable, rather than whether it was a proper reflection of the data sources. It was difficult as a consequence to focus work on the extent to which the data could inform the current policy debate.

To sum up, this sustained translation of comment into its constituent *interrelated* elements, in itself, distinguished the model from the traditional policy review. Further and crucially, the *collation and interconnectedness* of information from disparate sources contrasted strongly with the *distillation* of material in the written report.

While, in the policy makers' eyes, this meant a less sharply focussed review, it did mean that options (and portfolios of options) not previously considered were now raised as possibilities simply because of their inclusion and retention through the modelling process and also because of the wider context within which they were now seen. Potential “own goals” (those formally coded as ‘negative-goals’) were suggested and the assumptions on which policy options and arguments were founded were now opened up for more critical scrutiny. This systematic, analytic approach was eventually taken to be one of the main sources of benefit the policy makers identified.

4.2. Retaining and managing the complexity of policy argumentation

4.2.1. Unravelling complexity

Policy analysis in general seeks to reduce complexity. The coding methods outlined, above, enable the analyst to expand complexity in a managed way. The Decision Explorer software holds this complexity and allows relevant extractions to be made. “Relevance” is defined through use of analyses that allow the analyst:

- to establish the goals, options, assumptions etc. within the map hierarchy and the rough “shape” of the model;
- to establish where closely connected clusters of argument indicate key elements in the policy debate;
- to show how “robust” conclusions were: whether they were weakly or strongly supported by argumentation; and finally,
- to identify those potential options that have consequences in many areas within the policy debate.

The analytical procedures for unravelling complexity are contained within the computer software. The analyses use some of the analytical techniques used in graph theory (Harary et al., 1965) as well as others that are particularly relevant for the analysis of cognitive maps (Eden et al., 1992). The analyses attend to both content and structure through an analysis of the structure of the map, where the structure has been informed by the content of all experts. The software permits a formal process of ‘collapsing upon’ the most significant aspects of the map, so that paths of argumentation are retained but the detail removed.

4.2.2. Interrelatedness

Whilst it is conventional to label issues as distinct areas of the policy world, such distinctions will always be artificial—a convention used to hold all things equal, to set aside complexity. Indeed, it has been argued that “wicked problems” cannot be clearly bounded—the implications of proposals in one issue area will spread into other arenas of policy. The systematic translation of the experts'

opinions into a model highlighted the relatedness of policy areas. Using the techniques in the software as a way of interrogating the model, the analyst was able to identify the system of interacting policy issues that made up the policy exploration. The analyst was also able to assess the coverage or thoroughness of the exploration and to reveal gaps in the argumentation as well as to focus on particular policy options for presentation to the policy makers.

4.3. *Presenting to the policy making group*

Unlike the more traditional forms of documents and written reports, this presentation took the form of a visually interactive exploration of the material. Also the presentation of information to the British Civil Service follows well prescribed formats; a ‘map’ is not one of these. The mapping format and the system by which concepts are coded and placed in the map were not immediately obvious to the policy makers. This will have been bound up with the lack of “rapport” the policy makers had, at least initially, with the data as it was structured within the model.

Being able to interact and visually explore the content invited reviewing the implications of deleting/ignoring particular assertions on the overall conclusions that could be drawn out of the composite material. The policy makers saw this as an intriguing “what if” type analysis that they had never before entertained as compared with mental simulation where there was the danger of missing some ramifications.

The analyst was fascinated by the extent to which the policy makers were concerned to understand, what was *not* significant in terms of policy implications as well as what was.

5. Implications for policy analysis

5.1. *Analyst as “intelligent bystander”*

A key issue that has arisen from this work relates to the potential benefits set against the losses of using ‘outsider’ policy analysts. Whether to include an internal expert in the model building team remains a moot point.

With the Prison Department charged with the responsibility for taking account of and responding to the views of many organisations, “remote expertise” may be a common rather than rare component of policy analysis and review. An internal policy analyst would help in translating experience into a locally relevant format, in identifying where the boundaries to the issue were likely to be, in assessing the reliability of evidence and conclusions and hence the weight to be attached to the various arguments, and in assessing the level of detail to which the model should go so as to meet the intended audience’s needs. The aim would be to sharpen the model from the start.

There must, nevertheless, be a strong argument for allowing “naive” observers initially to code up expert argumentation without such guidance in order to test the possible benefits of a challenge to the established boundaries of the issue and so forth. Therefore, whilst the involvement of internal policy makers in the development of the model could ensure greater ‘ownership’ of the model and so make the model more ‘readable’, it may, more seriously, mobilize biases and ensure “problem setting” (Rein, 1976, 1983) too early in the policy analysis process—as was evidenced by the initial ownership problems. However once the initial lack of ownership was overcome, the model provoked curiosity and finally a greater breadth of exploration within this experiment.

5.2. *‘Ownership’ of policy analysis*

There is no doubt that the extent to which policy makers have some ownership of policy analysis ultimately influences the impact the analysis will have on their thinking about the issue (Rein, 1983). It is generally assumed that policy making should be informed by a wide range of expert views, if for no other reason than some of the views will express the likely response of different stakeholders to chosen policies. However, views expressed by individuals who have an alternative value system to that prevailing within the policy making organization are likely to be of less interest and potentially ignored or ‘rubbished’ in favour of those that support the value system (Janis and Mann, 1977; Benveniste, 1989). It is

therefore always possible that a form of policy analysis which, by virtue of its tight methodology, forces policy exploration along the alternative perspectives offered by a range of ‘experts’ and will thereby generate problems of ownership. There is always a tension between an intellectual commitment to “broad-mindedness” and emotional commitment to prevailing values.

In the experiment reported here, this tension was highlighted and resolved by involving internal views as a second stage of model building. On reflection this approach seems to be a satisfactory balance between the need for ownership and the need for encompassing the implicit interests and biases of all the experts.

5.3. *Policy analysis as information provision or as decision support*

It is necessary to have a clear understanding of the role of the policy analysis (in our case the model) in order to conduct it appropriately. A crucial distinction is between the use of the policy exploration for information giving/briefing and its use for policy decision support. This was not fully appreciated during the project reported here.

As an information giving tool, the exploration acts as a repository for argumentation about an issue—clear procedures for presentation of the material and for updating the analysis are needed. We would argue that the best information giving model derives from a *consideration of action* and therefore of decision support. Information giving models would, nevertheless be used:

- to pull expert opinion together in a rounded view,
- to identify inconsistencies,
- to point up the reliability of arguments and conclusions,
- to show the “shape” of the issue and the complex interrelatedness of policy areas, and
- to identify desirable and undesirable consequences of a full repertoire of possible policy options.

In reviewing the model in this project, it was notable that the policy makers found it difficult to

separate the receipt of information from an evaluation of its worth and reliability. In the context of decision support to a team, the process of information receipt/assimilation would be followed by a process of judgement/evaluation of its worth, local relevance and reliability.

There is then a further burden on the policy-maker team; that is to go on to elaborate, for inclusion in the model and in negotiation with other stakeholders, the local features of the policy issue—the real options, the assumptions that the team agree it is fair to work under, the goals that the policy, as it results, should be supporting. In this role, the analysis becomes a highly dynamic representation of the policy issue, one which changes as a view as a result of what form the nub of the policy issue takes. This view then can be taken to the next stage in the policy process. The analysis is not merely a repository for relevant information on a policy topic, but also a tool capable of supporting negotiation and decision if necessary.

5.4. *The richness and complexity of policy analysis*

As noted above, there will always be immense difficulties for policy analysts and policy makers in choosing between increased richness and the consequential problems of finding ways of *managing* complexity by a combination of holism and reductionism, and *reducing* complexity by bounding the data and so the analysis. Given the experiment reported here, there seems to be a strong case for further exploring the role that computers can play in both managing richness and facilitating the dynamic nature of the process of policy evaluation (echoed by the work of Vennix, 1996; Richardson and Andersen, 1995). The experience gained from the attempts at briefing ‘investigators’ suggested that the use of a computer based policy model for unearthing crucial assumptions needs to be further explored, and that the subsequent potential for “real-time” data management is, in itself, worth further investigation.

Despite the difficulties relating to ownership, the ability of the techniques reported here to capture, develop and manage a complex network of

arguments and information bearing on a policy issue was demonstrated. The inclusion of wider policy considerations in the analysis provided a useful challenge to the boundaries within which the policy review was being pursued. Within those boundaries, the interrelatedness of issues exposed by mapping raised questions, not previously asked or even recognised, about the assumptions lying behind the policy options presented.

Further benefits of holding on to richness also became apparent—the “traditional” review paper covered less than half of the first model. It was clear that much richness could be retained and used in the computer model. Indeed, it was agreed that the depth and breadth of experience relating to the policy topic stored in the computer would be used as an introduction for newcomers to the topic, particularly a new civil servant or possibly a Minister.

5.5. *Exploration of values/goals guiding policy formulation*

Throughout this report there has been a concern with understanding the goals of the policy making organization and the implicit values embedded within the views of ‘experts’. The concern has arisen largely because the coding system used to generate cognitive maps demands that the direction of the implication between any two concepts needs to be consistent with the intent for change in the policy situation.

It is worth noting that problems identified by Holsti (1976, p. 43) pertain to the interpretation of these documents: “analysts will be forced to rely on documents that are in the first instance intended to convey information to the public, to legislatures... as likely as not they are also intended to persuade, justify, cajole, manipulate, evoke sympathy and support, or otherwise influence the intended audience... words may convey explicit or implicit clues about the author’s “real” beliefs, attitudes, and opinions”.

The demands of technique and “politics” of policy analysis are in this sense aligned and mutually supportive. This highlighting of the role of values and goals has indicated that there may be significant benefit to be gained from conducting

policy analysis in such a way that policy makers become party to the debate rather than recipients of a report that drives through to conclusions (see also Rein, 1976).

The outcome of addressing these issues within the project reported here was that:

- The policy makers were able to reflect upon the interaction between goals for the organization that were sometimes conflicting; and they were also able to consider the relative salience of particular goals in relation to the policy evaluation.
- The need to explore carefully the implicit values of different experts sharply revealed the basis of alternative ‘facts’ and also suggested the potential coalitions of stakeholders to particular policy options.

6. Conclusion

SODA is designed to offer support to a group of decision makers, or a management team by providing them with an efficient and structured way of identifying and evaluating options. With no clear rationale or opportunity for the use of the group decision support process, the Prisons experiment reported here took SODA into new territory. The aim of the experiment was to test some aspects of the methodology in the public policy field and to identify any changes required to the approach to improve its applicability. It was intended that its analytical software, Decision Explorer, should provide a way of combining the views of policy experts, mostly outside the organisation, into a single set of interacting statements for evaluation in a policy review.

On one level the experiment gave positive benefit in that the policy makers found the exposure to cognitive mapping techniques an intellectually demanding experience. As the Director General said at the final session:

“The project has been both challenging and stimulating. Each time we reviewed the computer model, its potential capacity to throw up new ideas and its ability to challenge basic assumptions were apparent.”

The software was seen to have demonstrated its ability to handle complexity, to force questions to be asked, to challenge boundaries and to reveal assumptions in tackling a difficult and important policy topic. Some changes to the use of the software tool, Decision Explorer, have been suggested by this application and at a more fundamental level, the work has also raised questions about the continuing relevance of the theories underlying the SODA methodology in what, it has been argued (Gunn, 1988; Stewart and Ranson, 1988) are rather different organisations to those which have been the testbed for the SODA methodology.

In addition, this experiment enabled comparison with a traditional report, aiming to summarise all expert views. The SODA model was more comprehensive and yet could be summarized through many different ways of ‘slicing’ the material. Through being able to carry out “what if” questioning policy makers were able to explore how robust particular conclusions were in relation to certain assumptions made by an expert.

However there are a number of issues that require consideration when working in this new format.

(i) As we have suggested above, the SODA/ ‘JOURNEY Making’ method traditionally offers both a *process* for policy making and a *tool* for the analysis of policy issues. A first, crucial issue concerns the use of this policy *decision support system* in the organisational setting of the public sector. There, policy-making processes tend to be formal, having a clear protocol with “set piece” reviews and conclusions. Further, the formulation of policy is often extended in time and policy may involve the endorsement of many offices rather than being the prerogative of a single decision making team. The patterns of accountability and of discretion are correspondingly complex. This differs from the settings in which SODA has been used extensively—private sector senior executive *teams*.

(ii) Moreover, when working in a more typical group decision support mode, the authors have found that individuals immediately look for their contributions within the overall structure (as noted above in this paper). However in this experiment in the first viewing of the knowledge base there was no material captured in the model that belonged to

the two policy members—instead the material emanated entirely from the experts. Thus, it was not familiar in tone or always congruent with the values of the organization/policy team. Incorporating local jargon into the report (the second phase) resolved this concern considerably and increased ownership consequently. The issue here is to balance widening the search space to avoid mobilizing biases and ensure “problem setting” with providing enough familiarity and ownership.

(iii) Working with expert reports also drives out much of the social negotiation on which SODA and JM are based. The process becomes more analytical (although as noted above that can have benefits in helping take the thinking of the policy team further). This shift of emphasis thus needs to be taken into account when using the methodology in this type of arena. Returning to the issue of social negotiation, it is worth considering the issue of authorship of statements further. When working with material generated from participants in the room, members take the material at face value, however, when using documentary evidence this anonymity becomes problematic and having the means for identifying proponents becomes a necessary part of the method—again a change from the more standard form of SODA. Finally, this apparent ‘dislocation’ from the material appears to render policy makers less able to challenge ideas from the document in the manner that is typically experienced when working with the more conventional form of SODA thus reducing the ability policy makers have to elaborate the model and begin to use it for decision making. Finding ways of overcoming this hurdle also is thus an issue.

(iv) Focusing on the mapping technique itself, when using the cognitive mapping technique to structure the expert material captured in documents one of the issues encountered was the difficulty experienced when determining the implications of concepts. When carrying out interviews with individuals, it is possible to both tease out and validate the inherent causality through reviewing the map with the individual and asking questions of the data. However this was not possible with text based material and so care had to be

taken not to assume links (fitting in with the analyst's belief system) resulting in a fairly sparse structure (compared with that typically experienced in building a map). This difficulty was exacerbated through the difficult experience at times of determining the action orientation of the concept—in order to follow the coding method. In a number of places, cryptic statements were made rendering it difficult to determine the policy option.

(v) In addition to this difficulty, there is also the relative lean'ness of the report format (Daft and Lengel, 1986), as written text does not provide the same clues as to meaning and therefore implications as speech does—through the loss of intonation (along with gesture). Consequently it was much more difficult to understand goals of each expert. Typically these can be at least initially determined through a combination of the structure of the map—there are chains of argumentation supporting them and the passion/emotion evidenced as they are expressed. Using the reports however meant that the combination of a paucity of information regarding implications and the lack of confirmatory evidence through emotion sometimes made it very difficult if not impossible to detect goals.

(vi) Finally, as has been highlighted in the text above, one of the biggest issues for using such decision support techniques with policy makers is the management of complexity. At first the policy team found the model too broad—increasing rather than decreasing/managing the level of complexity faced. This is compounded by the difficulty experienced in being faced with a “new” form of structure (a map as opposed to a report). When following the more typical form of SODA intervention and carrying out interviews (or group workshops) using mapping, interviewees become familiar with the mapping process through a process of assimilation. They see their contributions structured in the means ends hierarchy and consequently see the format in a more natural manner. It is possible that as part of the process, along with mapping the expert material, time is given to also interviewing the policy team members themselves ensuring (a) familiarity with the technique and (b) material that is ‘owned’ by them.

Within this organisational setting, public policy development is a matter of assessing and balancing policy options and making considered and tight packages of recommendations to Ministers. With a refinement of initial policy reviews and proposals at each stage, and with political criteria tending to enter the process at an early stage, the boundaries around issues tend to be well established by convention. These conditions of policy making thereby militate against normal SODA practice of continual reshaping of problems and responses and of holding open possible futures throughout the processes of policy exploration and policy-making. However recent action research projects relating to strategy development in the Prison Service (Eden and Cropper, 1992), in the NHS (Telford et al., 1992), and with the Northern Ireland Office suggest that the use of cognitive mapping and SODA within the public sector are regarded as highly successful by both managers and other stakeholders. Nevertheless there are many issues that remain in the process of validating such approaches as theoretically and practically successful in managing organizational change and policy making in large organizations (Eden, 1995; Finlay, 1998).

7. Future research

To support policy makers working with expert material, there therefore seem to be a number of adaptations necessary to the SODA methodology. These include:

- Being able to clearly note authorship of contributions.
- Developing analyses appropriate to policy makers working with expert material through, for example, (i) helping them explore the ramifications of options, (ii) highlighting the particular implications of specific experts and (iii) examining the different value sets and therefore stakeholder positions.
- Helping policy makers engage effectively with the material. This, it appears, will require methods to both manage the complexity of the mate-

rial (which might include specific forms of analysis see above) and the ownership of the material.

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