GROUP WORKING

IN THE

DHSS LARGE DEMONSTRATOR PROJECT[1]

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ABSTRACT

Policy making in the UK's Department of Social Security (DSS) provides an interesting example of co-operative working. The manual procedures for policy making in this organisation are effective despite the physically and temporally dispersed nature of the groups involved. However, the size and complexity of the task and the constraints under which policy groups work means that there is considerable scope for improving efficiency in this area. The Policy Application of the Alvey DHSS Large Demonstrator Project, which this paper describes, has sought to provide computer support for DSS policy makers in ways which preserve the effectiveness of their present organisation whilst increasing its efficiency.

Policy makers in the DSS are concerned with the monitoring and continuing development of the policy of the Department. This involves the explanation of existing social security legislation in terms of the policy that it implements, the development of new legislation when it is discovered that the existing legislation does not properly implement it, and the development of new policy when this becomes necessary to reflect the will of the Minister. Policy makers are not decision makers but make recommendations to the Minister. These recommendations are supported by closely-reasoned arguments. The development of legislation and of the policy arguments behind it is a group process which we have sought to support with a computer-based group decision support system which contains knowledge based elements.

The nature of the group processes in the DSS which are involved in policy formulation are discussed and a policy support system which has been designed specifically to suit this style of group working is described. The system provides mechanisms and formalisms for group communication tailored to the dynamics of the policy development process. The system comprises support for the structuring of policy problems, for detailed argumentation around policy issues, for text, argument and legislation retrieval and for the use of a logical model of the social security legislation in order to enquire about the effects of legislation on target groups, to model changes to the legislation so as to assess their efficacy as solutions to policy problems, and to check for unexpected interactions with other parts of the legislation. It also provides facilities for the disstribution, collection, review, evaluation and amalgamation of policy argumentation among the group. Small-scale evaluations—which have led to very positive reactions from DSS policy workers—are described.

INTRODUCTION

The Alvey DHSS Large Demonstrator Project is a £6.8 million, 5 year research project aimed at demonstrating the viability of intelligent decision support for large, legislation-based organisations. It is a collaborative project, partially funded by the UK Government, between Logica Cambridge, ICL, the Universities of Lancaster, Liverpool and Surrey, Imperial College, and the Department of Social Security (DSS—formerley the Department of Health and Social Security; the DHSS).

The project has built three applications as demonstrator systems. These are:

- The Claimant Information System—which provides advice and explanations to potential claimants of social security benefits as to their eligibility to claim and the consequences of claims they might make.

- The Local Office System. This is intended to provide decision support for DSS adjudication officers who are assessing claims for benefits in local offices. These people are legally empowered adjudicators and the decisions they must make are affected by large bodies of complex legislation and case law.

- The Policy System—which provides support for DSS policy makers. The job of a policy maker is to formulate, explain and monitor the policy of the department, to implement it as social security législation, and to modify existing legislation so as to reflect the current policy.

It is with the policy system that we will be particularly concerned in this paper as it is only in this application that a significant amount of group working goes on.

POLICY MAKING WITHIN THE DSS - THE NATURE OF THE PROBLEM

The DSS is a very large organisation with roughly 93,000 staff working on the social security side and administering approximately 5 million claims per year from about 500 offices around the UK. There are a great many people involved in monitoring and

formulating policy on behalf of the Minister in central policy branches and the regional directorate. In the policy branch concerned with formulating the policy for income support, one of the main social security benefits, there are as many as 300 people involved.

Most of the day-to-day work of a policy worker involves the explanation of policy. Queries about the way the legislation is working or the justification for legislation arise as a result of questions being asked in Parliament, from pressure groups, from concerned individuals, or from reviews within the policy branches themselves. Typically, such queries concern perceived anomalies or injustices. However, the social security legislation is, on the whole, the way it is because of the policy of the department. Such queries, therefore tend to elicit explanations rather than to initiate the revisions of the law that the inquirer is often seeking.

Thus, on receiving a query, from whatever source, the policy worker's first task is to establish whether a genuine anomaly exists. If it does not, an explanation may be issued. If it does, then action must be taken to establish whether corrective action is necessary and, if it is, to take steps to correct the anomaly. Corrective action may involve a change in or a refinement of existing policy and/or a change to the existing legislation.

POLICY MAKING WITHIN THE DSS - THE NATURE OF THE TASK

Let us assume that a problem requiring corrective action has been identified. The problem will, typically, be "owned" by a single policy maker. This person will commence the work of finding an acceptable solution to the problem by reviewing it. This normally involves the production of a "policy review paper". This outlines the current state of the legislation, of the Department's policy, of the effects of the legislation that are perceived as being problematic, gives any other relevant background information (such as statistical data, statements by Ministers, the findings of other reviews of the area, etc.), and may suggest and partially evaluate some candidate solutions. It is also the rôle of the review to set the scope of the problem (by saying what is and is not included) and by providing criteria for evaluating candidate solutions.

In our analysis of the policy process, we refer to this phase as "problem structuring". Problem structuring may be a solitary task or it may involve others, depending on the size and scope of the review. However, when others are involved it is normally only in the rôle of information provider to the problem owner. Occasionally there will be meetings and less

formal consultations during this phase to clarify the current policy or to seek ideas for solutions.

The original review paper will be circulated to several others. Some of these will be subordinates of the owner and others will be colleagues in other branches or directorates. It is the rôle of the owner's subordinates to elaborate the arguments in the review paper, to suggest other and more detailed solutions and to evaluate all the candidate solutions. They will, however, sometimes have something to say about the overall problem structure and may suggest new structures which imply different solutions and will affect evaluations of already suggested solutions.

The main purposes of circulating the review paper outside the originating branch are: to alert others who may be affected by the problem; to make others aware of the kinds of solutions being offered so that possible interactions with other areas of the social security legislation or its administration may be revealed; and to seek evaluations of the candidate solutions and the arguments behind them from the sometimes very different perspectives that other directorates bring to bear.

Everyone who receives the original policy review paper will comment on it. This may take the form of marginal notes on the original or a short memo but is more likely to be in the form of a complete, new policy review paper. On receiving back these comments, the owner must understand them, digest them, amalgamate them and otherwise use them to inform the writing of a new review paper. If the owner is happy with the statement of the problem, the efficacy of the chosen solutions, and the coherence of the case in favour of those solutions (and for rejection of the rejected solutions), then a document is produced recommending the chosen solutions to the Minister. However, it is more likely that there will still need to be much more work done before a clear and supportable set of solutions is arrived at. This means sending out the second version of the review paper to either the same or a different set of subordinates and colleagues for further work and comment.

Even when a set of recommendations to the Minister have been submitted, the Minister may reject them or ask for various modifications. In fact, this is quite normal for early submissions. When this happens, the owner must begin a new cycle of producing a review paper, sending it for comment and then preparing a new set of recommendations. On a particular policy problem we analysed, which was to do with a very small part of the Income Support legislation and was recommended to us as fairly typical for its type, yet

small, complete and not too complicated, there were a total of twenty people who became involved, more than 40 full review papers were written as well as a host of notes and memos and five sets of recommendations were made before the Minister was happy with the solutions proposed. The whole process took two years from start to finish. Many policy problems take longer times to resolve and some are under continuous review.

ISSUES IN GROUP WORKING

There are many interesting aspects to the way policy is made in the DSS but we will concentrate here on the way that groups work together to solve a policy problem. First, we will look at some of the unusual features of the group itself, then of the problem and finally of the dynamics of the task.

The Group

One striking aspect of group work among policy makers is that they tend not to view their task as group work at all. Indeed, the number of meetings held about a particular policy problem is very small and typically involve only a very few of the people working on the problem, so face-to-face contact with other members of the group is rare. The individual's perception of his or her task is that they are given a problem to work on and then work on it. They are not unaware of the wider organisational setting for their task but tend to consider their input as being an individual effort.

The group that works on any particular problem is liable to be widely separated in space and time. That is, very few members of any particular group will be in the same office, or building or, increasingly, even the same town at the same time during the solving of the problem. This is not helped by the DSS policy of rotating staff, especially the more senior staff such as would typically work on a policy problem, around jobs and around regions on a regular basis (about one move every three years). This means that many of the individuals in a group and even the owner are likely to have changed during the life of a policy problem.

The Problem

A striking characteristic of policy problems is that there is no obvious process for solving them. It is also clear that deciding the criteria for the evaluation of candidate solutions is just as much a part of the problem as the finding of the candidate solutions in the first place. This latter is especially true where the solutions proposed are changes to policy rather than changes to legislation.

Rittel and Webber (1984) have expressed the notion that for a certain class of problems ("wicked problems") to understand what the problem is is, in itself, to identify acceptable solutions to the problem (see also Simon, 1984, for a discussion of this type of problem). The kinds of strategic planning problems they discuss seem very similar to the policy problems the DSS deal with. To quote Rittel and Webber :

> "The formulation of a wicked problem *is* the problem! The process of formulating the problem and of conceiving a solution (or re-solution) are identical, since every specification of the problem is a specification of the direction in which a treatment is considered." (p137).

They also say:

> "The information needed to *understand* the problem depends on one's idea for *solving* it. That is to say: in order to *describe* a wicked problem in sufficient detail, one has to develop an exhaustive inventory of all conceivable *solutions* ahead of time." (p136).

Clearly, this is just not possible as the space of potential solutions is infinitely large. When people solve such problems, Rittel and Webber argue, they identify feasible solutions on the basis of "realistic judgement". What this seems to amount to is a constraining of the solution space by excluding those types of solution which are thought to be "unrealistic". Judgements about what is and what is not a feasible solution must be based on criteria to do with the goals, the power, the resources and the beliefs of the planner. Essentially, these criteria are used to define constraints on the type of characterisation that is acceptable for the problem and hence on the type of solution that may be proposed. Solutions which violate these constraints are not acceptable.

A further difficulty that these problems pose is brought about by the size of the groups working on them, by the mobility of the group members, and by the length of time

problems take to solve. Both of these factors lead to difficultiess with access to, amount of, and retention of information. The DSS has a significant problem with the capture, the organisation, and the retrieval of information during the solution of a policy problem. In essence the only visible information is in the reveiw papers and any external sources that are introduced. The related problems of forgetting, information overload, "tunnel vision" and ignorance of the workings of other group members are all potential dangers in the policy making process.

Problem Solving Dynamics

The organisational structure of the DSS policy function works very well in overcoming most of the difficulties inherent in the policy problem. In particular, the distribution of problem-solving over a large group of individuals with different organisational perspectives and expertise is effective at trapping most of the potentially harmful interactions between different policies and different parts of the legislation. Unfortunately, the cost of this is the extremely slow speed of the process. This in turn raises the problems of information cature, organisation and access mentioned above which, in its turn, requires further care and thus slows down the process even further.

One of the most important organisational devices for ensuring the coherence of the final solution is to give the problem to a single individual to own. The process is essentially one of this individual iterating towards a solution with the assistance of a large group of expert colleagues. The individual ownership of problems ensures that each solution is internally coherent while the distribution of the problem-solving effort helps to ensure consistency across the whole of DSS policy and legislation.

The drawbacks of this type of organisation are largely in the limits of the cognitive capacities of the individuals involved (no single person can foresee the ramifications of a change in legislation across the whole of the social security law - only a rather small part of it), and in the nature of the communications between group members.

Communications are particularly interesting as a source of difficulties. The flow of information during policy work is illustrated in figure 1 below. The diagram is somewhat simplified because it is possible for an owner's subordinate to delegate the work to or ask for comment from his or her own subordinates, as, indeed, may the owner's colleagues in other branches or directorates. Apart from telephone calls and the rare face-to-face meeting,

the major medium for information transfer is the policy review paper. These papers are typically documents of perhaps 15 or 20 A4 pages of single-spaced text (including tables) and usually have one or more annex which may well be much larger than the main document.

The review papers and annexes are usually very well written, with good, clear English style and well-formed arguments. However, they are, inevitably, rather dense in their information and argument content. Furthermore, policy makers, in writing their policy documents, rely heavily on tacit knowledge of and shared assumptions about the political culture in which they operate - so there is often as much to be read between the lines as there is on them!

What this implies for the policy worker is that each paper is a very complex communication that must be unravelled and analysed and understood before it can be responded to. Naturally, this task is many times duplicated for the owner of the problem. Each paper that is produced is the end-product of a great deal of work. This work is kept, if it is kept at all, in the individual policy worker's personal files. These are eventually archived but are not easily available to the group during the problem solving period (nor afterwards, since the archives are very difficult to search). This means that many arguments that appear in review papers are incomplete in that assumptions, data and so on on which they were based do not make it into the paper but stay in the personal file. This places an additional burden on the reader of a review paper to judge the validity of his colleagues conclusions without the benefit of full visibility of their reasoning. An even more extreme manifestation of this problem is that the repeated iteration involving new issues of the owner's review paper means that most of the group is working always with the digested and summarised comments of their colleagues rather than the original material so that duplication is always a danger, and the opportunity to spot another's mistakes is not available.

Indeed, the problems of retrieval of past policy decisions and, especially, of the reasons behind them, very often means that the justification for the legislation and the policy behind it is reconstructed anew each time it is required by a policy branch. This situation is clearly unsatisfactory as it is another source of delay and of possible inconsistency or incoherence.
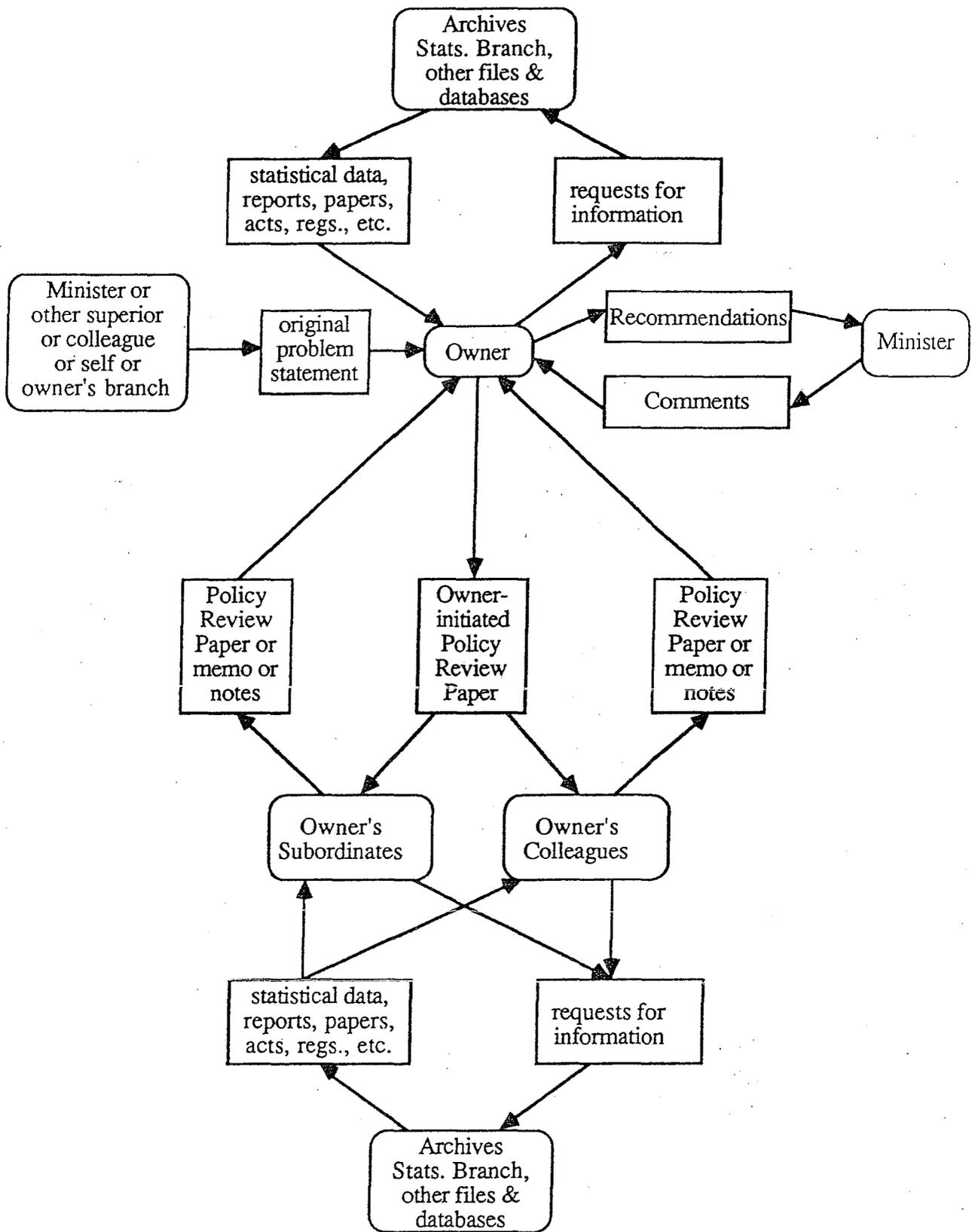
Figure 1:   The flow of information during policy problem solving

THE POTENTIAL FOR COMPUTER SUPPORT FOR GROUP WORKING

Within the scope of the policy application of the DHSS Large Demonstrator Project, we have identified a number of ways in which we can support the work of policy makers. The main thrust has been to extend each individual's access to information, to extend each individual's access to expertise about the legislation, and to improve the sharing of ideas between group members. It is on this last area that we will concentrate in the remainder of this paper.

From our extensive analysis of the policy process over almost four years, we have developed a model of how policy formulation works which involves the following four phases; problem structuring, detailed argumentation, evaluation and rationalisation. These are discussed below. We have taken the view that the system that the DSS already uses for policy formulation has a number of advantages that it would be good to retain. We have therefore designed the support we wish to offer to mesh closely with current practices. Inevitably, the introduction of computer support will change the way that people work but we expect that the changes will all be in the direction of closer group co-operation and greater group cohesion.

The general view is that the policy group will each have a networked workstation. They will all work on the production of a policy review "document" which is actually a complex problem structure that defines a number of sub-problems, each with its own internal structure. The development of policy arguments takes place within sub-problems. The policy workers individually modify a structure and detailed argumentation produced by the owner who then has the task of consolidating their working into a revision of the original "document". This process iterates as in the manual system until the owner believes that it is ready to become the basis of a set of recommendations to the Minister.

Problem Structuring

This has already been discussed above. In terms of support, we can offer access to an executable logic model of the legislation, to stored legilslation text and to stored policy arguments. However, problem structuring is an essentially individual activity under the present organisation.

Detailed Argumentation

In this activity, the owner or, more likely, another policy worker in the group, is developing a detailed policy argument within an element of the problem structure. It is in this area that the greatest amount of support can be given.

As well as access to an executable logic model of the legislation, to stored legilslation text and to stored policy arguments, we provide a standard form for expressing arguments. The rationale behind the use of a standard argument form was that for the group to co-operate more effectively on the development of policy, they needed to have a common language and a common set of objects that they were manipulating.

The argument form we use is a modification of one developed by Steven Toulmin (1958). This is based on the assumption that the forms of arguments can be expressed using a simple syntax. Toulmin distinguished macro-arguments (which are of some indeterminate size at least as big as a paragraph of text) from micro-arguments (which are at least as small as a paragraph of text). The form he devised is for describing micro-arguments and it is the micro-arguments developed by policy makers during the Detailed Argumentation phase of their work that we offer support in the creation, manipulation, storage and retrieval of. It will be useful to briefly review the reasons for the particular form that Toulmin devised.

If we make an assertion, Toulmin argued, we commit ourselves to the claim that it involves. If that claim is challenged, we will, normally, produce some facts to support it. The facts themselves may be challenged and, if so, will require their own support so that they may be agreed and the argument may progress. This gives us a basic and simple distinction between a Claim and the Data which supports it. Of course, the Claim may still be challenged, not now on the basis of its factual support but on the question of why we believe those Data support that Claim. What the challenge demands are the "rules, principles, inference licences or what you will" that justify the step from Data to Claim. Such justifications Toulmin calls Warrants; "general, hypothetical statements which can act as bridges and authorise the particular step to which our argument commits us". The basic form of an argument is therefore;

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Data  ━━━━━━━━━━━━━┯━━━━━━━━━━━━━▶  Claim
                    │
                    │
                    │
                    │

                 Warrant
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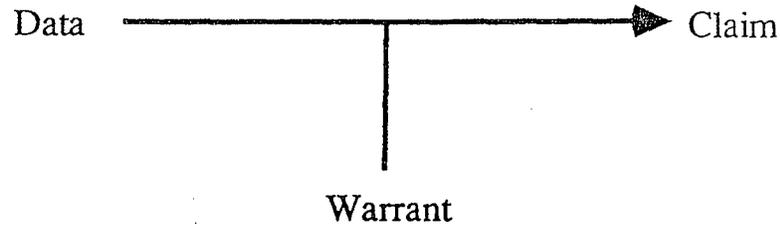
Figure 2:   Toulmin's basic micro-argument form

The nature of our Warrant will affect the amount of force that the argument gives to the Claim. That is, we will need to qualify the Claim on the basis of the Warrant we have used. There are also conditions of exception or Rebuttal which indicate circumstances in which the general authority of the Warrant would not hold. What is more, the authority of the Warrant itself may be challenged in which case we need to provide explicit support for it in the form of a Backing. A Backing is a statement of facts which, in the particular field of argument we are in, can safely be taken as certain or self evident. Toulmin's complete argument form now looks like this;

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Data  ━━━━━━━━━━━━┯━━━━━━━━━━━━▶  Qualifier, Claim
                   │                       │
                   │                       │
                   │                       │
                Warrant                 Rebuttal
                   │
                   │
                   │
                Backing
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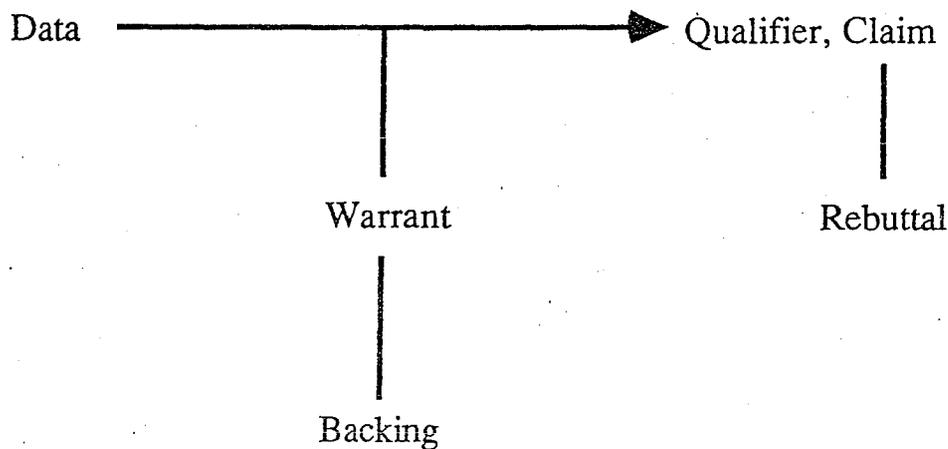
Figure 3:   Toulmin's complete micro-argument form

There have been some slight modifications so as to produce a computer-manipulable form of micro-argument structure and, especially, to ensure that micro-arguments may, where possible, be integrated with the logic model of the legislation. However, what we are offering policy workers is essentially the same as Toulmin's form.

The main benefits that a standard form for micro-arguments give to policy workers are:

- The components of an argument (e.g. assumed data, inference warrants) are either explicitly stated or are explicitly omitted. In the jargon of rhetoric or argumentation (see Dixon, 1971; Perelman and Olbrechts-Tytecha, 1969) this will affect the force of the argument. In particular it will make obvious how an argument may be challenged or rebutted.

- Arguments become easily manipulated by policy workers who can use graphical editors to create and amend complex argument structures compounded from many micro-arguments. In particular, the particular policy arguments that one worker has created become the actual objects for manipulation of subsequent workers.

- Arguments are easily manipulated by the computer. They can be stored, indexed, searched, retrieved, checked, linked to the legislation text and the logic model as appropriate, displayed and combined and recombined as necessary.

- Just as there is a single body of legislation that all policy workers refer to and work on, so there is (in theory at least) a single, coherent body of arguments which developed the policy behind and derived the particular form of that legislation. A computer-manipulable argument form allows the possibility of making this set of arguments available to all policy workers as a baseline from which to develop new policy and legislation.

Evaluation and Rationalisation

These two phases involve the owner gathering in, at the end of each iteration, the detailed argumentation of the others, extracting the suggested options, the arguments for them and any evaluative arguments for or against them and applying a range of evaluation "perspectives" (based on the department's policy goals and the arguments for them). This will yield a set of potential solutions for each of which a coherent argument should be available. By manipulating these and the overall problem structure, the owner will be seeking to develop a set of arguments for these options which are mutually consistent and satisfy the evaluation criteria. This we have called rationalisation.

The rationalisation of the chosen solutions then becomes either the new probelm structure to be passed out to the rest of the group, or the basis for the preparation of a set of recommendations to the Minister.

Knowledge Based Support

It is fundamental to a policy maker's job that he or she should understand the social security legislation. The quality and quantity of this knowledge varies according to the exact rôle of the policy maker however. Senior policy makers are aware of the general form of the legislation within their areas of specialisation but not of the detail. They also require an acquaintance with the legislation in related areas. More junior members of the team have a more detailed knowledge of the legislation which is more narrow in its scope. In this way, the knowledge required for policy formulation is itself widely distributed within and between policy groups.

It is certainly the case that the most major concern of a policy maker is that all of the possible options for change are discovered and evaluated. However, close behind this, is the concern that changes to the legislation which are proposed in one area should not have unforseen and undesirable ramifications in other areas. Indeed, a great deal of the interaction between policy groups and with other interested parties (e.g. external pressure groups) is largely for the purpose of exposing proposals for legislative change to expert critiquing so as to avoid such problems.

As an aid to detecting such unwanted interactions between different parts of the legislation, the policy system provides a representation, in first-order logic, of the legislation. In our prototypes, we have modelled only small parts of the legislation but a fully operational system would be expected to model the whole of the social security legislation and parts of related legislation. There is also a need to add a little "real-world" knowledge (such as that men cannot become pregnant) where such knowledge is assumed and used but not made explicit in the acts, regulations or case law.

To use this logical model of the legislation, the Policy system provides the users with the ability to describe classes of people in which they are interested and then to query the model about how these people interact with the benefit system. There is a range of queries

constructed for this purpose. The policy maker may also use rule editors to modify the knowledge base—effectively modelling proposed changes to the legislation. The system supports a notion of public and private versions of the legislation. The public version is the model of the actual legislation. Any work that a policy maker does on possible changes to the legislation is done within a private version. These private versions exist as versions of a sub-problem within the overall problem structure and can be associated closely with the detailed argumentation so that particular chains of argument and even particular micro-arguments can be associated with a particular set of knowledge base changes.

EVALUATING THE POLICY SYSTEM

It is extremely difficult to discover whether systems with the objectives of the Policy Demonstrators fulfilled their purposes. It is not only that the objectives for these systems were vague (which they inevitably were) but also that there are no adequate metrics of suitability for purpose that could be applied. We are left, ultimately with having to ask potential users of the system for their personal opinions (more or less well-informed by some degree of experience with the prototypes) on the matter. Within this framework, we can vary some of the parameters. We can ask users during development and use their responses to guide further development (formative evaluation) or we can ask them after we have finished and use their responses as a rating or judgement of the system (summative evaluation). We can also be more or less realistic in the kind of experiences they have with the system, varying their exposure between a short presentation and an extended trial in their normal working milieu. We can also ask about different aspects of the system to be evaluated. We could ask, for instance, about the validity of the task model it embodies, or about its usability, or its suitability as a support tool. We can vary the number of potential users we asked—asking more would increase our confidence in any responses. Finally, we could vary the degree of structure, formality and detail of the experiences we provide, the questions we ask, and the answers we expect.

There have always been two members of the Policy Application Team who came from a policy background. Their input to the design and to the knowledge-base building and their ongoing critiquing of the prototypes has provided continuous formative evaluation which has been very healthy for the application.

All the early Policy prototypes were evaluated only by demonstrations. However, in the last three months of the project, a system was installed in a policy maker's office. The

policy maker, with the assistance of Policy Application Team members when necessary, "shadowed" work he was doing on a current policy problem using the prototype in order to get a feel for the adequacy of the system. He was judging it against a set of criteria to do with the accuracy of the policy formulation model it embodied, the quality of its support for the policy formulation tasks, and its usability as a piece of software. The results are reported elsewhere (an internal, DSS report) but they were, generally, very positive on all three sets of criteria.

Nevertheless, despite this favourable evaluation, it must be borne in mind that the evaluator was chosen for his friendly attitude to the project and its aims and his computer literacy. The evaluation is simply the opinions of this one man whose exposure to the system was rather limited. However, coupled with the very positive responses that we have had to demonstrations of the system to many other policy workers, we are probably justified in thinking that the system would be well liked as a support tool.

We also sought some views on the cultural acceptability of such computerised support for DSS policy makers. This too has been encouraging.

The evaluation we have done and the demonstrations we have given have been enough to convince the DSS of the potential of the Policy system. We have now embarked upon a longer (nine months) evaluation study which will again involve placing systems in policy makers' offices and using them to shadow real policy formulation work. This study, which will largely be complete by September 1989, will look in particular at the communication of arguments among the policy group and the sharing of argument development among the group. If the evaluation is successful, it is expected that the DSS will commission further development of the system.

CONCLUDING REMARKS

In the DSS policy function we have encountered a rather unusual instance of group working. The particularly odd thing about it is that the "group" is widely dispersed in space and time. Yet it is a problem which calls for the bringing together of a great many people with a wide range of expertise and with widely differing perspectives. The particular methods that the DSS have employed to use such groups is itself interesting and effective.

Our proposed computer support for this function has, as far as possible, preserved the advantages of the current practice. The main technical difficulties we have had to overcome were in the development of a suitable model of the policy process and in finding a computer-manipulable and yet usable, standard language for the core of the policy worker's task—the creation and manipulation of arguments. We currently have a prototype system encompassing all of the types of support discussed above which was demonstrated at the end of the project in April, 1989, which had been evaluated by the DSS in the three months prior to that and which is presently undergoing a further nine month evaluation in the DSS.

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