Computer Supported Argument Maps as a Policy Memory[1]

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Abstract

This paper investigates to what extent Computer Supported Argument Visualisation can be designed to encourage debate and deliberation by citizens on public issues. Such argument maps use icons and arrows to represent the structure of a series of related viewpoints, reducing the amount of text necessary to convey the ideas, thereby clarifying the issue under consideration. Argument maps have the potential to provide a readily accessible medium by which citizens can follow and join in public debates on policy issues. In this paper we describe our approach, type of maps we have chosen to use and then demonstrate the potential of a collection of maps to form a 'policy memory' to support policy development. Our case study is the development of the 'Smoking in Public Places' policy in the Scottish Parliament. Our overall aim is to engage citizens in democratic decision-making leading to better policy-making and a more engaged citizenry.

Keywords: eParticipation, digital democracy, eGovernment, argument visualisation

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Introduction

Society suffers in two ways wherever participation is on the decline. Firstly, where many feel disillusioned with government, their silence amplifies the noise made by extreme views, leading to an imbalance in public influence. Secondly, half-hearted participation deprives the government of a greater range of expertise. As a result, policies are developed whose democratic integrity is undermined by a lack of representation and a restricted pool of knowledge. It is argued that for any policy to be understood and accepted, it is crucial that the citizen be engaged in policy development (OECD 2001).

Many governments regard ICTs as presenting an opportunity to provide greater accessibility to political life, and have been exploring ways in which such technologies can re-invigorate citizen participation. These initiatives have been reported on by a number of authors (Coleman and Goetz 2001, Macintosh 2003). Whilst governments have every reason to encourage people to participate, there is an expectation that contributions will be based upon reflection and a familiarity with the issue under consideration. Yet even the most diligent citizen would baulk at the task of uncovering and deliberating upon the wealth of material generally associated with political issues. Not only has the government to convince the population that it is worthwhile taking an active interest in policy creation, but it has also to find innovative ways of presenting the continually accumulating amounts of material, without reference to which any contribution is likely to be of limited use.

Accordingly, unlike earlier papers on e-consultation that scrutinise the tools used to gather the citizens' comments, such as chat-rooms or threaded discussion forums (Macintosh, Coleman and Mansur 2005), this paper seeks to address the question of how can those vast assemblages of information be represented to both enlighten and stimulate participation? It argues that a solution may be found in the technology of Computer Supported Argument Visualisation (CSAV). At present, CSAV is employed in the presentation of large amounts of information as well as addressing complex problems. Herein, it is suggested that it could be used to represent the progress of political ideas from the moment of their introduction to parliament up to the time where they become confirmed policy; in effect, the establishment of a 'policy memory'.

Although the greater part of what follows will be devoted to a description of the 'policy memory', the first two sections provide, in turn, an overview of what is regarded as being the source of problems with participation, followed by a defence of the belief that CSAV is a viable solution. The third section contains a discussion of the 'policy memory', which is rounded off by an attempt to dispel some concerns that might be raised, concluding with a reflection upon research that may be required in the future.

Barriers to Participation

There are several barriers to participation mostly to do with the perceptions of the citizenry. Simply put, they do not trust the government to take any interest in them outside election times (Electoral Commission 2002, p 41; Coleman 2005, pp 3-7), and

they assume that the government will do what it wants once in power (Pattie, Seyd and Whiteley 2003, pp 618-619). In addition, there is a perceived barrier between the government and the people in the form of its procedure and protocol that further inhibits participation (Hansard,2004, passim; Electoral Commission 2002, p.62).

There are two important consequences to this: one, the interests of those whose needs are the most acute in society are not upheld by the minority who participate (Pattie, Seyd and Whiteley, 2003, p.633; Paxton and Dixon, 2004, pp. 42-48); two, that the government loses the benefits of participation – the extension of its sources of 'expert' advice, the feeling of collective responsibility that leads to greater respect for the law, and the belief that the law is drawn up with the fullest possible regard for the health of society (Macintosh, 2003, pp 32-34).

Initiatives are being put in place to provide conduits for public voice in government at local and national level, such as the Local e-Democracy National Project funded by the UK government (see http://www.e-democracy.gov.uk/default.htm, accessed October 18, 2006). One problem with these is that many people question the point of contributing their views if no-one with power is seen to act upon them (Coleman, Geniets, Kaposi, Moss and Nicholls, 2005, p.20; an illuminating contrast is provided in Jankowski, Leeuwis, Martin, Noordhof and van Rossum 1997, where the presence of a governmental representative acts as a focus for many discussion threads). Another problem lies in 'consultation overload', where citizens receive an unending series of questionnaires, but seldom learn how their views have influenced the way in which policies under review were decided. The prevailing cynicism is such that some interpret these exercises as being merely a sop to the electorate (Macintosh, Whyte and Renton, 2005, p.29). Unless some mechanism is available, and utilised, by politicians to respond, any inclination to contribute positively will swiftly fall flat. A third problem lies with the questionable degree of deliberative content in the responses to many online discussions and consultations (Wilhelm, 1998).

Placing a premium on comments that are well-thought out also raises the bar of participation (Fishkin, 2000; Burkhalter, Gastil and Kelshaw, 2002). Not everyone agrees that deliberation *alone* can deliver sound policy (Sanders, 1997; Dryzek 2000; Parkinson 2003). Nonetheless, most admit the need for views that are the product of deliberation rather than statements of opinion, for policy has to be justified upon a stronger basis than its simply being what most people want. Yet the ability to make a reasoned contribution is complicated by the effort required by an individual to find all the relevant material, and become familiar with the points in favour and against any particular stance, prior to formulating a response.

There are many reasons why not all people are equal to this effort, but until a way is found to ease this task the government is in a dilemma of accepting only a partial section of participants, and thereby creating policy formed by a minority of people, or it accepts indiscriminately and thereby creates policy infected by unreasoned judgement.

Computer Supported Argument Visualisation

Argument visualisation has been used for nearly a century as a technique for presenting complex issues in a diagrammatic form, thereby reducing to a minimum

the need to scrutinise text (for a concise history see Buckingham-Shum, 2003.) Diagrammatic arrangements of boxes and connectors are used to replace the prose version of the argument under consideration. The boxes either carry a summary of a section of text, or contain an icon symbolising any part of an argument that occurs frequently, such as 'question', 'premise', 'asserts', 'supports' and 'contests'. Representing prose in this way provides an easier way of comprehending the overall picture as well as enabling the user to appreciate the structure of the arguments involved. This technique is often likened to producing maps of unfamiliar territory, where a pictorial description of a region, containing symbols to represent salient features, has been found to be easier to use than a prose description of the same area.

The possibility of implementing these maps on computers has meant that information can be associated with an argument through the use of hyperlinks, ready to hand without obtruding upon the material already displayed. For instance, for any particular assertion, a user can immediately see whether there is evidence to support it, to browse if they choose, or continue with tracing the overall plan of the debate.

'Computer Supported Argument Visualisation' (hereafter 'argument visualisation') has enjoyed success in the fields of education (van Gelder et al 2004, Twardy 2004) and commerce as a means of presenting large amounts of information in a way that makes it easy to assimilate, and as a way of addressing so-called 'wicked' problems (Rittel and Webber, 1973; Kunz and Rittel, 1979). For an overview of the potential contribution of CSAV to policy creation, see Renton and Macintosh 2005. Lately it has begun to find its way experimentally in social and governmental situations with encouraging results (see the various initiatives – Karacapilidis, Loukis and Dimopoulos 2005, Papadopoulos 2004. Atkinson, et al 2004, and van Gelder 2003).

Maps as Policy Memory

To extend the map analogy, just as a collection of maps covering the same region but representing different aspects of that region, such as population distribution, physical relief, and meteorological conditions, increases a person's appreciation of that region, similarly, a series of maps covering the evolution of a particular policy would flesh-out the viewer's understanding of what is taking place. Such maps need to represent parliamentary committee debates, statements from domain experts, consultations and other material that forms the evidence-base for the policy development.

Describing this collection as a 'memory' serves to suggest that involving the citizen in policy creation can be achieved by providing them with a policy record to which they can refer in checking for consistency of stance as well as for comprehensiveness of coverage. It should also provide a means by which the citizen can trace the impact of their contribution, and encourage the government to publicise the input received along with their response to it. Doing so will overcome one of the barriers mentioned earlier, that citizens believe politicians are indifferent to their contributions.

As such, the 'memory' is designed with the general public in mind, who may lack a specialist's knowledge of policy development, but who may have an interest in following a particular bill through its various stages, and who may want to lobby their representative should the bill appear to be deficient in some respect. The 'memory' is also intended to be of use to more sophisticated users, such as NGOs, who may also want to monitor the direction policy takes in its progress through parliament.

The concept of a 'policy memory' is seen as comprising all the relevant data, information and knowledge, including expert-statements, consultation contributions and parliamentary debates for example, all presented as a number of visualisation maps. These maps are directly supported by links with the source documents upon which they are based. The visualisations fall into three types according to the role they play in supporting participation:

- Overview maps – As their name implies these simply give the user a visualisation of the important stages in the development of the bill placed in chronological order.
- Dialogue maps – these record in chronological order the contributions made by the representatives, indicating who the contributor is, the constituency they represent and so far as possible their statement expressed in a concise form and in a logical sequence, including interventions and their response to those interventions. Such maps provide a clear overview of the debate, showing whether any particular party dominated or shied away from contributing.
- Argument maps - the content of the debate is re-organised so that opinions concerning particular topics are presented together, rather than having them dispersed throughout the report. These opinions are depicted as an arrangement of nodes conforming as closely as possible to the structure presented in the debate, along with associated comments demonstrating support or opposition.

Taken as a whole, this set of maps should provide all the information a person needs to be informed about their representative, the views canvassed in the debate, the strength of the arguments and where opportunities lie to contribute to the policy creation. These need to be more than a simple 'I agree/disagree' affair, but to fulfil the expectation that the citizen has something to contribute to the policy. Ideally, the 'memory' would run parallel with the legislation's development; clearly, it is far more useful to have the record whilst there is an opportunity to affect the policy. However, for the purposes of this research, the memory is based upon a policy that has now become law. The following section uses a case study to discuss how the policy memory, comprising these maps, could be created and used. The policy on banning smoking in public places pursued by the Scottish Parliament was the basis for this case study. (The maps were created using the software tool 'Compendium', see: http://www.compendiuminstitute.org/Default.htm, accessed October 18, 2006).

Case study: Smoking in Public Places

Consider the problems of an owner of an hotel and restaurant in Edinburgh wishing to understand the implications of the emerging government policy on banning smoking in public places. The policy is likely to impact heavily on his business therefore he wishes to alert the Scottish Parliament to the financial and business implications of such a policy on himself and the rest of the hotel trade. Traditionally, this would have involved a complex push process of requesting information, navigating websites to learn about possible consultations, providing an individual response to the consultation document and then a wait and see what happens period whilst others respond and Parliament consider responses.

This actual policy was first introduced on the 7th September 2004 when the First Minister outlined his plans for the forthcoming parliamentary session, and aimed at improving the health record of the Scottish population. As a policy, it had an impact not only upon people's health, but also upon the economy and personal liberties. Not surprisingly, there was plenty of scope for individuals to see something in the proposals that they found unfavourable. The bill was debated and finally passed on 30th June 2005 having received 97 votes in favour, 17 against and with one abstention. During this ten month period, our hotel owner, NGOs and members of the public would have had formidable difficulties in locating all relevant documents, following the policy development and providing input. Although verbatim versions exist of each Parliamentary debate and committee meeting, and are accessible online via the Parliament website, they are not collected together in a manner that eases studying. Nor do they contain links to other useful information, such as consultation results held by the Scottish government, or the findings of representatives from health institutions, the hospitality sector, the tobacco industry, licensed trade associations and charitable organisations, for instance.

During the consultancy period of this policy, some polls showed both that people were in support of a ban on smoking in public places, as well as people being in support of having pubs decide whether or not to make pubs smoke-free – with the proviso that they did not serve food or allow children. Polls conducted by the Scottish goverment at the time tell a slightly different story, but no less a complex one; eighty percent of the 53,474 respondents claimed that they would support a bill that made enclosed public spaces smoke free; yet only fifty-six percent felt that there should be no exemptions (Scottish Executive 2004, p.19 and p.25 respectively) These confusing statistics warrant the belief that the public's ability to discriminate between the various aspects of this policy requires all the help it can get.

The Overview Map

The first stage in developing a policy memory for smoking in public places was to create an 'overview' map, an arrangement of nodes providing links to each of the above sources of information. The intention is to, not only provide the user with a much simpler task of finding data, but as the nodes are arranged in a chronological ordering the user would have the opportunity to assess the extent to which one meeting might have had an impact upon subsequent ones. This will be accompanied by maps of political activity, falling into: the dialogue map; and the argument map. Each type will be discussed in more detail below, but the aim is to present one of each type to cover significant debates, committee meetings and so forth, thereby providing an overview of the issues from three distinct perspectives.

Figure 1 shows a section of the overview map containing links to important stages in the development of the bill placed in chronological order. Each box provides access to the Parliament's Official Report (Scottish Parliament 2003) via hyperlink, along with links to the types of argument maps alluded to above.

The 'Dialogue' map

Dialogue maps present a chronologically ordered visualisation based upon an official report of important deliberations during the policy life-cycle, such as debates or

committee meetings. Their intended purpose is to eliminate superfluous speech, such as rhetoric and heckling, so that the dynamics of the meeting are easier to appreciate, allowing the same content to be displayed in a more economic manner. These maps use icons to represent the following: the speaker's political party or their organisation, such as when organisations are giving evidence to a committee; points of intervention along with responses to that intervention; the structure of their point of view, defined in terms of facts, beliefs, conclusions, as well as whether these are being used to support or contest an assertion, or whether they are requesting or proffering information; the results of any votes that are taken, with a breakdown of voters 'For', 'Against' or 'Abstain' by party presented in the form of a pie chart.

They have links to the following: any documents cited by participants, especially the appropriate official record, but including research et cetera; tables of voters' names, constituencies and parties; parliamentarians' web pages with biographical details. Figure 2 shows a section of the parliamentary debate rendered as a dialogue map.

The 'Argument' map:

Argument maps present the issues covered during a political session. Participants' remarks are rearranged in order of topic so that the user can see what issues are covered and what stances are taken upon them. The issues are arranged in the form of a simple decision-tree, whereby the user has the opportunity to peruse the members' opinions before taking their own decision upon a particular question: for instance, 'Is there a real danger from ETS?'. According to whether they agree, disagree or are uncertain, they continue down the structure until they reach an end point. The purpose of this exercise is to demonstrate the complexity of the relationship between the issues, encouraging deliberation and suppressing the instinct to take a superficial view of such matters. At each decision point, the user is presented with an argument map covering that particular issue.

These maps use the same icons as for dialogue maps, with information about the members subscribing to any particular view provided by roll-overs. Their purpose is to provide a summary of the justifications for any particular position, thereby affording a reference point for users to cite when drawing attention to perceived omissions and other defects, which might assist in prompting the user to engage with the policy-making process. Figure 3 shows a section of such a decision-tree with a section from the argument map 'Arguments concerning impact upon Personal Liberty' given in Figure 4.

Discussion and Conclusions

Evidence-based policy-making raises a number of challenges for information management. This information intensive process is incremental and dynamic and requires meaningful messages to be extracted over time from large assemblages of data and information produced by multiple stakeholders. Our research is exploring the concept of 'political memory', a dynamic computer supported archive that both records and supports the policy-making process. This research is still very much in its infancy, the results are being used to identify larger research questions on which to build future research proposals.

Currently the creation of maps is largely performed manually via the CSAV software and thereby is quite time consuming. The corollary of this is that the maps will be expensive to produce as well as there being a lag period between the end of the debate and the appearance of the map. Whilst experiments are underway in using semantic searching to extract text for the maps (For example, see the material prepared for the GlobalArgument.net experiment, especially Okada and Buckingham Shum 2005.) the results are unclear and further research involving semantic search and text mining is required.

In connection with the human element of cartography, lies the problem of objectivity. The analytical maps are a production based upon the source documents but nonetheless are the interpretation of an individual. There might be an issue with the integrity of this procedure, especially if the maps turn out to be a powerful influence. However, maps are not the only medium of representation that is required to be objective, and the original documents are always closely connected to the map via hyperlinks. Where a user doubts the validity of the map they are at liberty to check against the original document to establish the accuracy.

There is also the problem that however useful such resources are, there is no guarantee that anyone will use them. A salutary tale comes from an experiment in participation held in Sweden. A 'Decision Support System' was used to help resolve a planning issue. The process arrived at a reasoned conclusion but failed to gain the support of the participants (Grönlund 2005; and also along similar lines, Karpowitz and Mansbridge 2005). These maps may help clarify issues but there is no answer to someone who votes in a particular way simply because they want to and in the face of all reasons that point to their acting against their interests in doing so. Yet, this is to loose sight of the contribution to transparency these maps make, regardless of whether or not anyone cares to take advantage of them.

There is already an appreciation that learning the techniques of map reading is a skill that has to be acquired; do the maps represent a further barrier to participation? To address this issue the techniques will need to be trialled to see whether or not the public is disinclined to use them, though the following should be borne in mind; that such techniques are used successfully in the teaching of critical thinking skills; that gaining familiarity with argument visualisation does not appear to be an insurmountable obstacle in its other uses (Buckingham Shum 2003, p 19).

The use of argument visualisation in a political context is in its infancy. It has a proven track-record in simplifying complex arguments, of addressing 'wicked' problems and structuring large amounts of information to reveal informative patterns of behaviour. There is sufficient semblance between politics and these areas to warrant attempting to extend the advantages into the political domain. It has shown itself capable of contributing to conflict resolution and drawing together groups constructively to produce solutions to problems.

Funded digital government research to date has focused mainly on innovations in service delivery, and the important aspects of policy-making have been neglected. As we have demonstrated, the domain involves a large amount of knowledge that must be made explicit in different formats at each stage of the policy-making life cycle. This includes knowledge from many different sources and channels. Policy-making thus

articulates one of the fundamental problems of information and knowledge management, that of abstraction of meaningful messages from large volumes of heterogeneous data. Our future research will seek to build on our work with argument maps by considering the associated research questions:

- To what extent is a novel combination of ontologies, text mining and argument visualisation and display techniques technically feasible and manageable?
- To what extent can the above combination of tools be used as a platform for a 'Political Memory' for evidence-based policy formulation, i.e. a memory that is capable of supporting a cascade model of incremental evidence where the emerging archive allows re-use of the policy evidence at successive points in a series of consultation exercises during policy formulation?
- To what extent can such a memory be acceptable to the various stakeholders concerned with the emerging policy and facilitate their meaningful engagement?

By addressing these research questions we will be in a position to progress the use of technology to support evidence-based policy development.

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Figure 1: a section from the overview map

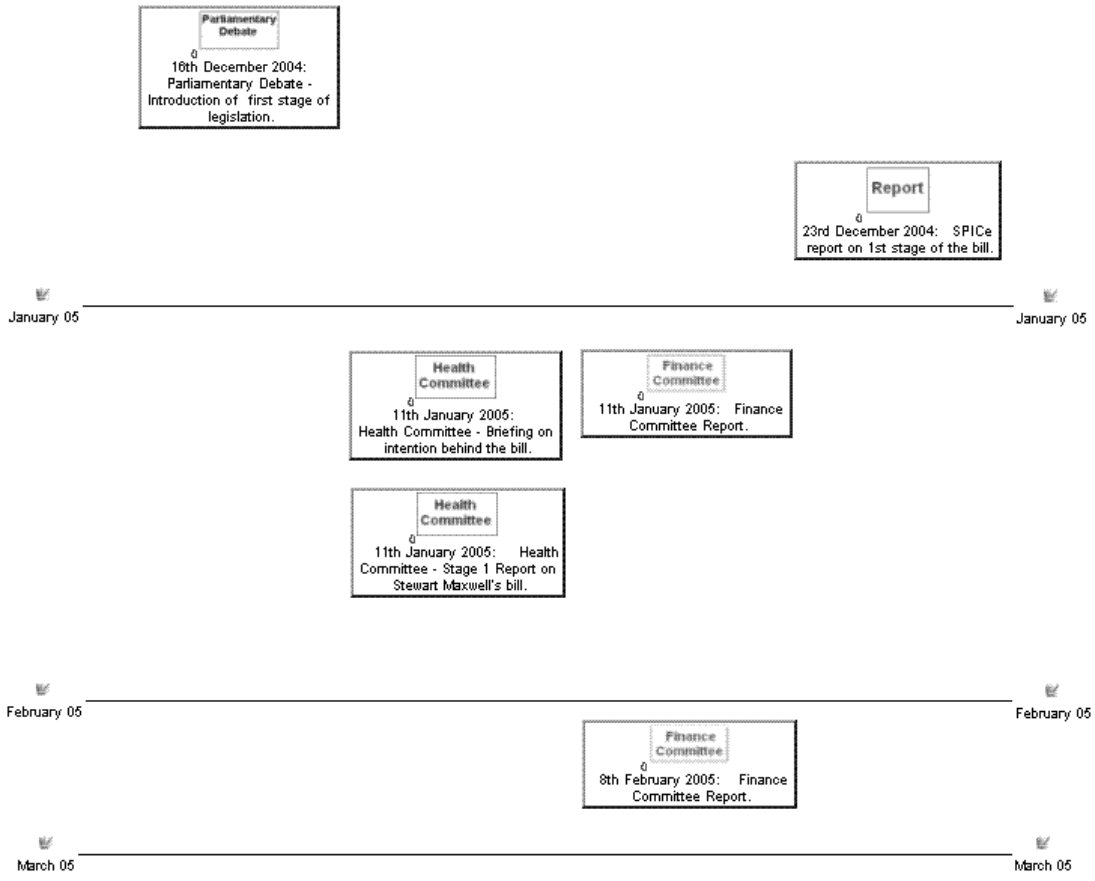

Figure 2: a section of the parliamentary debate as a dialogue map.

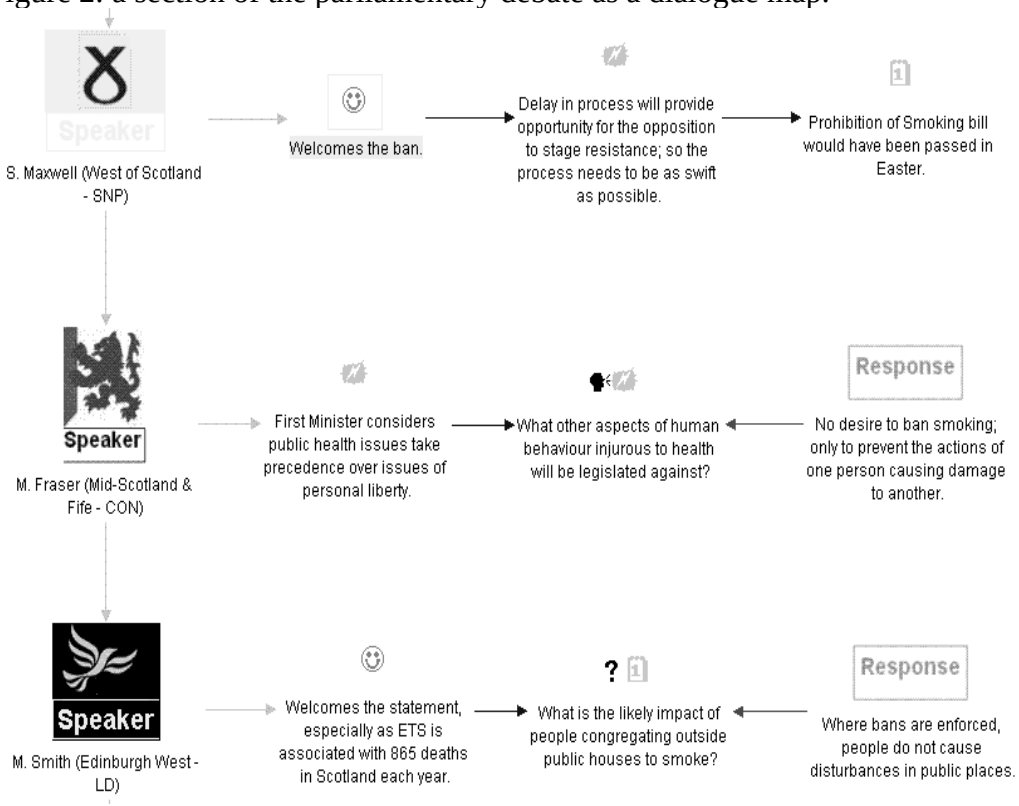

Figure 3: a section of the decision tree showing the arrangement of argument maps to the main trunk.

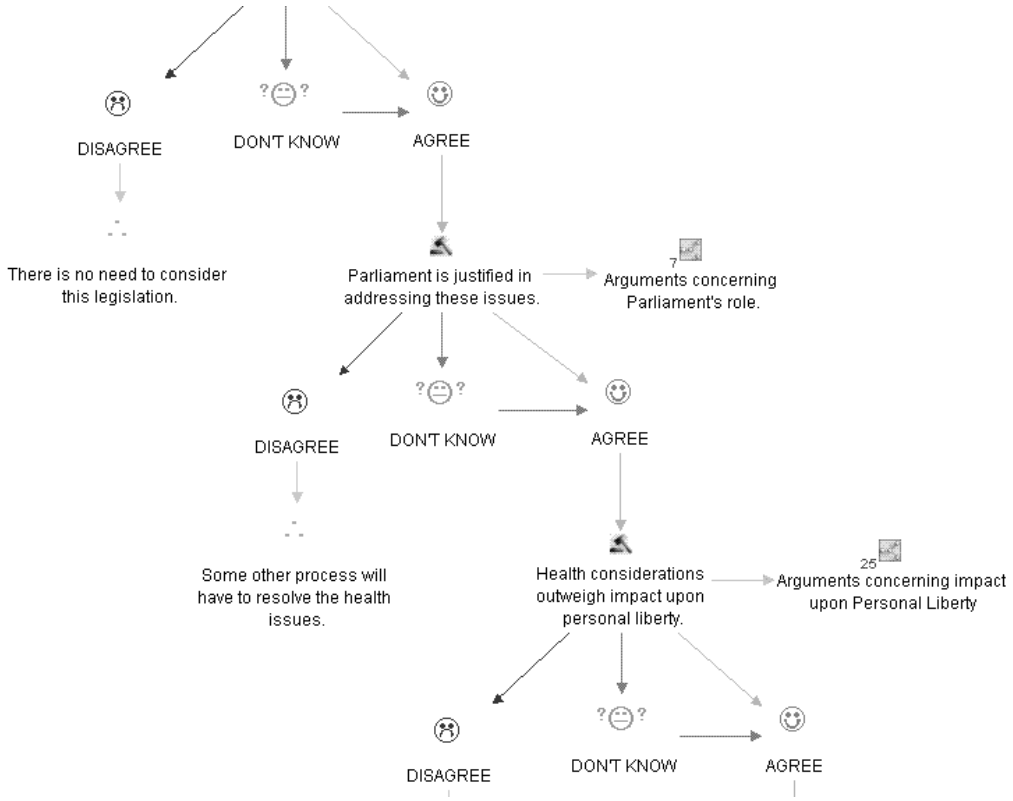

Figure 4: part of an Argument map showing views on the impact of the policy upon personal liberties.