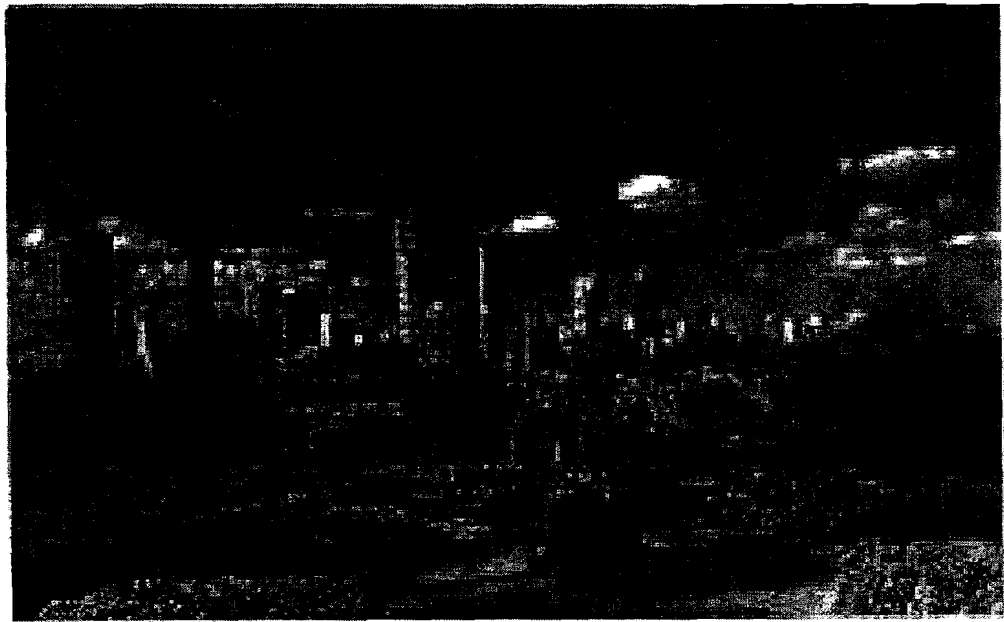


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GDN 2002



Perth

Western Australia

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WELCOME TO GDN 2002

Welcome to Perth. The Graduate School of Business, Curtin University of Technology, is proud to host this year's Group Decision and Negotiation (GDN) Conference. The purpose of GDN 2002 is to bring together researchers and practitioners around the globe in order to promote theory and practice of Group Decision and Negotiation. This year we have papers scheduled for presentations from USA, Australia, The Netherlands, New Zealand, Canada, South Africa, UK and Hong Kong.

28 papers are scheduled for presentations in the next 3 days, which include three key-note presentations by Profs. Fran Ackermann, Doug Vogel and Alma Whiteley. Each submission has been reviewed by at least one member of the Conference committee and feedback has been provided to the authors to improve the submission for presentation. This CD-ROM based conference proceedings include some full-length papers and some abstracts (extended and short).

We are indebted to a number of persons and groups for bringing this conference to you. INFORMS section on GDN, especially Prof Mel Shakun who was generous in giving us suggestions and guidance. We are grateful for that. Mel could not attend the conference this year, but we are sure he is with us in virtual reality. We are also grateful to EuroGDSS for their support. Curtin University lent its support to the conference and we would like to acknowledge the financial contribution provided by Curtin Business School, the School of Information Systems and the Graduate School of Business. Their financial assistance allowed us to better showcase Western Australia to our overseas visitors.

Finally, we would like to thank many of our colleagues in conference committee and many other colleagues who directly or indirectly supported us. Enjoy the next few days in Perth. We wish you all a wonderful and fruitful time.

Des Klass, Overall Chair GDN 2002
Mohammed Quaddus, Program Chair GDN 2002

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**The link between computer modeling, shared understanding and commitment in
Decision Conferencing – an interpretive study.**

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Abstract

Decision Conferencing is a form of Group Decision Support System (GDSS) that utilises computer modeling to support group decision making and rests on the premise that the process provides two crucial benefits to groups trying to solve problems: a) participants develop a shared understanding of the issue and b) the process fosters the generation of a commitment to act on the decision made.

In evaluating the above claims made in the extant Decision Conferencing literature, extensive in-depth interviews were conducted with people from 6 public sector organizations in the UK where Decision Conferencing had been used, primarily to facilitate resource allocation decisions. This paper focuses on one of the organisations from the overall study. The results indicate that rather than there being direct links between computer modeling, shared understanding and the development of commitment as identified in the literature there are a number of mediating factors that need to be taken into account.

Keywords: group decision support systems; Decision Conference; strategic planning; cognitive mapping; group support systems; commitment

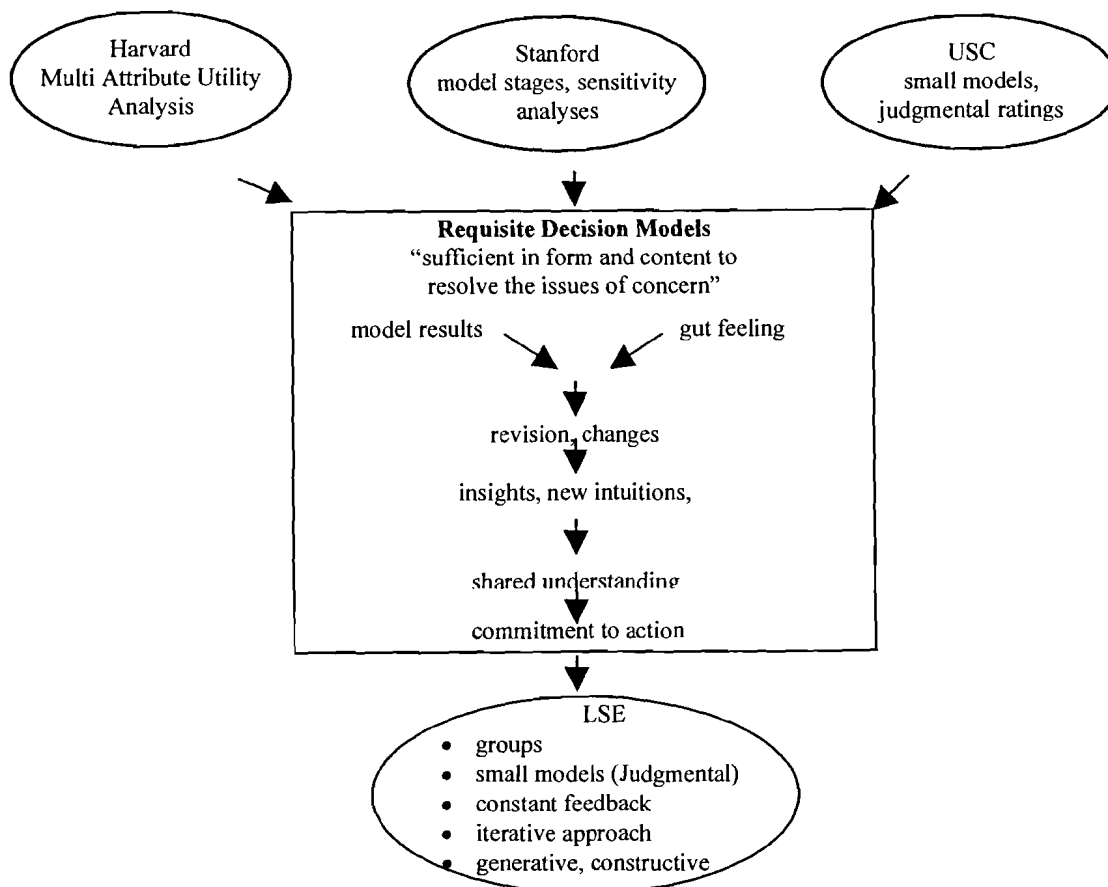
1 Introduction

Decision Conferencing utilizes computer modeling to support group decision-making. The process rests on the premise that modeling provides two crucial benefits to groups trying to solve problems (Phillips,1988;1989c;1990; 1993; Galliers, Klass, Levi and Pattison: 1992; Quaddus, Atkinson, and Levy: 1992a), i.e.:

- a) participants develop a shared understanding of the issue they are facing and
- b) the Decision Conferencing process fosters the generation of a commitment to act on the decision made.

Figure 1 shows the linear relationship hypothesized to exist between modeling, shared understanding and commitment to action.

Figure 1 Decision Conferencing: A View from the Literature



There is consensus in the Decision Conferencing literature that “shared understanding” does not mean “shared agreement”. However, consistent definitions of the terms “shared understanding” and “commitment to action” are lacking. Shared understanding has been variously described as a shared perspective of key issues (Phillips, 1989); a common understanding or perception of the problem (Phillips, 1990; Thierauf, 1989; Schuman and Rohrbaugh, 1991) and the development of an understanding by participants of other group members’ positions regarding the issue(s) being addressed (Klass & Schmidenberg 1992; Dobson, 1991; de Reuck, Schmidenberg & Klass, 2000). An explicit discussion of what is meant by commitment - and particularly commitment *to action* - is largely absent from the Decision Conferencing literature.

Whilst the hypothesized relationships between modeling, shared understanding and commitment form the basic justification for Decision Conferencing, only anecdotal evidence supports these claims. This paper draws on data from a larger, mixed method research investigation comprising 6 case studies of Decision Conferences in 6 UK local government organizations to examine the link between modeling and commitment, and modeling and shared understanding. This paper focuses on the qualitative aspects of one of these case studies and addresses the following research questions:

- I. The Modeling Process and Shared Understanding from a participant’s perspective
 - A. Is the Modeling process perceived by participants as generating a Shared Understanding of the issue(s) to be addressed?
 - B. What is the perceived relationship between the key aspects of the modeling process and the development of a Shared Understanding?

- II. The Modeling Process and Commitment to Action from a participant perspective
 - A. Is the Modeling process perceived by participants as generating a Commitment to Action?
 - B. What is the perceived relationship between the key aspects of the modeling process and the development of Commitment to Action?
 - C. What is the perceived relationship between Shared Understanding and Commitment to Action?

2 Research Design

The larger study referred to earlier included a total of 70 semi-structured, tape-recorded, face to face interviews with Decision Conference participants, conducted within 12 months of the conclusion of each of the Decision Conferences. This study also included a quantitative questionnaire survey of all participants. Here we report on the qualitative findings from the face-to-face interviews with participants in one of these cases, a Northern UK District Council.

2.1 Case Study Participants

Semi-structured tape recorded interviews¹ were conducted with 12 of 14 participants in a Decision Conference held to address a resource allocation issue. Two participants were not available for interview. Five of those interviewed were Members of the Council and the other seven were Chief Officers (Council employees). Participants in the Decision Conference included the Council's management team i.e. the Chief Officers together with the Chairs of all the service committees and the Leaders of the two largest political groups. Officers had a significant role to play as they prepared the budgets in consultation with the elected members although they had no part in the final decision-making.

The Decision Conference facilitation team consisted of a facilitator and an analyst from an external service provider. The decision analysis software, EQUITY™ was used to capture and manage the data generated during the Decision Conference.

The Decision Conference objectives were to allocate £1.4M towards a capital works program and specifically:

1. To evaluate bids (options) for capital resources against the District Council's strategic criteria

¹ Interview schedules for the structured components of the interviews are available from the principal author on request.

2. To agree a prioritised list of bids for recommendation to full Council

(ESP2 1997) p5

2.2 Analysis of the Qualitative Data

After transcription of the recorded interviews and subsequent storage and coding of the transcripts using the qualitative software NVIVO™, the major analysis of the data was carried out using a modified cognitive mapping approach drawing on Eden and Ackerman (1998) and utilizing the Decision Explorer™ software².

A cognitive map is basically a visual representation of what an individual or group thinks about an issue or situation.

Cognitive Mapping allows users to structure accounts of problems. As such it may provide valuable clues as to the client's perceptions of the problem giving indication as to where the "nub(s)" of the issue may lie. Aims and objectives can be identified and explored, options examined to see which are the most beneficial and whether more detailed ones need to be considered. Dilemmas, feedback loops and conflicts can be quickly distinguished, explored and worked upon. Moreover, it may increase the user's understanding of the issue through the necessity of questioning how the chains of argument fit together and determining where isolated chunks of data fit in...

(Ackermann, Eden & Cropper 1995)

The mapping capability of Decision Explorer™ captures and displays all the concepts raised and the specified links between these concepts. It is therefore possible to investigate any aspect of the model, exploring and expanding elements of interest or "collapsing" on specific aspects. Decision Explorer™ utilizes its own descriptive and analytical terminology, the major terms for the purposes of this paper being the following. "Concepts" are short phrases that capture an idea from the data, "Links" are lines drawn between concepts and represent the positive or negative relationship between them. Concepts can be grouped into "Sets", identified using different "styles" (using text attributes, such as colour, font and size)

and edited as required. Of the many analytical tools available in Decision Explorer™ the main ones referred to here include "Cluster Analysis", which split a large model into related sections based on the similarity of links between concepts, (Jones, 1994)) and "Path Analysis", which explores the various paths or routes between specified concepts. For example, in order to address the research question "What is the perceived relationship between Shared Understanding and Commitment to Action?" various path analyses were conducted to trace the routes between those concepts representing shared understanding and commitment. The term "map" is used to refer both to the whole data set, i.e. the composite map, as well as for any "views", or sections of the whole map (Banxia Software Pty Ltd, 1998).

The construction of the cognitive maps in this study involved identifying the various concepts raised in each of the interviews in turn, capturing these ideas in the software and specifying the relationship(s) between the various concepts. In this way a map of each of the participants interviews was constructed. It is important to note that both the concepts and the relationships between the concepts were drawn from the interview transcripts. Links were based on participants' perceptions and primarily reflect a perceived causal relationship.

Having completed the individual maps, the next task was to construct a composite map for the Decision Conference in question. This was accomplished by merging topic areas rather than complete individual maps. For example, a concept would be selected from the individual map and copied into the new group map. All of the remaining maps were then checked for matching concepts and associated links. Where a match was located, the interview identification number was then included in the concept text box, indicating the source of support for that particular concept.

² A more detailed discussion of the research design, with particular attention to the modified approach devised by the authors

To ensure that all of the elements had been considered, all constructs and their associated links on the individual maps were manually checked and crossed off as they were transferred to the group map. It is possible to automatically merge maps in Decision Explorer™, however it was felt that such a process would have increased the risk of misinterpreting concepts and their existing links prior to the merge. The chosen approach was perhaps a little more cumbersome, but was seen as more rigorous. The overview map that emerged thus presented an aggregation of many different views, including conflicting perspectives, slightly different standpoints and issues of common significance to the group.

2.3 Reading the Maps

The diagram below provides an example of how concepts are presented in this paper. The number at the start of the concept (5) indicates the *concept number*. There is no significance

associated with this number. It is a label that Decision Explorer™ attaches to concepts as they are entered into the software, although it is possible for the researcher to override this.

5 Committed to outcome 48,49,50,51,52,53,54 ,55,56,57,64,65 ... not committed to outcome 48,51,53,64,65

The *concept label* 'Committed to outcome...not committed to outcome' is intended to capture the topic that the participants addressed in the interview.

Here the concept label relates to whether or not participants felt committed to the outcome of the Decision Conference.

The numbers following the label are an approach adopted by the researcher to identify those interviews most strongly associated with a concept. The number is the actual interview identification number. The convention used in this study is that those numbers appearing

for analysis of the cognitive maps is available from the primary author and is the subject of an upcoming paper.

before the ellipsis (the three dot shorthand for 'rather than') indicate support for the initial statement i.e. 'committed to outcome', while those following the ellipsis indicate support for the opposite pole. For example, without recourse to the interview transcript, it is possible to observe here that 12 participants stated that they felt committed to the outcome, while five said that they did not. By looking closely at the identification numbers it is also possible to observe that there was some degree of ambivalence evident in the transcripts for five of the participants in that they are represented in both poles – committed and not committed.

Where no alternative pole is indicated for a concept, those numbers appearing before a minus sign (-) indicate support for the concept and those behind the minus sign express disagreement. When referring to a concept in discussing the maps, the convention used in this study is a hash sign followed by the number, both in brackets. For example, (#5) refers to concept number 5 (i.e. commitment).

Arrows drawn between two or more concepts represent links between concepts. In this study, links are usually read as 'may lead to', 'supports' or 'causes'. A negative link indicates that the concept the link is coming from may lead to the *opposite* of the concept it is going to, or to the negative pole should it contain one. For example, in a subsequent section it may be observed that Concept #30 *Concerns, difficulty with the computer modeling process* may lead to the negative pole of #27 *not focused on key issues* i.e. real or perceived difficulties with the modeling process was seen by the identified participants as negatively impacting on the ability to focus on the key issues. Note that Decision Explorer™ places the minus sign arbitrarily at points along the line it relates to. There is no significance (e.g. degree of influence) associated with the actual placement of the sign along the line.

3 Findings

3.1 An Overview

Overall analysis of the composite map presented an image of 12 people who emerged from the Decision Conference feeling relatively committed to act on the list of items they had produced. A closer look revealed that all 12 interviewees indicated that they were committed to the outcome, although as 5 participants have also been marked as not committed there were evidently some mixed feelings. Some of the participants also had reservations about the feasibility of the process and how this might impact on the Council's ability to implement all of the bids exactly as they stood. Despite this, all 12 interviewees indicated at least some degree of commitment to the outcome.

The facilitator was seen as playing a key role, helping to keep people focused on the main points and minimizing the problems experienced with the computer modeling. This was important because difficulties in this area distracted people from the decisions to be made and had the potential to make people feel they had somehow lost control of the decision-making.

Notwithstanding some difficulties with the computer modeling, nine of the twelve interviewed saw the process as one that had integrity and thus inspired confidence for people who participated. Unfortunately, this was not the case for those not participating in the Decision Conference. Non participants were perceived by eight of those interviewed as feeling bitter, excluded and concerned that they had lost control over the decision-making process. This was seen as potentially decreasing the likelihood of implementation, however the fact that people from the main power groups were part of the Decision Conference seemed to mitigate this effect. Nevertheless, the long-term result for at least three of those interviewed was that the Council was unlikely to use the Decision Conference process again because of its perceived exclusivity.

The opportunity to discuss issues openly and question different view-points played a central role in enhancing people's understanding of each other and the issues being addressed. Developing this understanding was seen as enhancing the quality of the decision, convincing no less than five participants that the outcome was their best bet and once again strengthening participants' commitment. For four people, this was also tied up with a sense of relief that a decision had been made in response to the difficult problem faced by the Council.

Eight of the twelve participants felt that they were responsible for the outcome as part of a team. Five expressly stated that the outcome reflected the discussion that took place and at least seven individuals felt that it echoed their personal views, thus further reinforcing the sense of shared responsibility and commitment. For Chief Officers an additional factor regarding responsibility and commitment was their perception that it was part of an officer's job to see that the decision was implemented.

The importance of good preparation was commented on by more than half of the participants, impacting as it did on process factors (e.g. coping with the cognitive load of the computer modeling process) and content factors (e.g. providing the opportunity to focus on the key issues). Getting the criteria right was another fundamental concern for the group, with mixed views on whether this was accomplished. Four participants clearly felt that that this had been accomplished, while two were adamant it had not.

A small group (3 participants) saw the Decision Conference as having a longer-term impact on their decision-making by encouraging the adoption of a more strategic view.

Detailed analysis of the data also revealed the following themes a) commitment - issues impacting on commitment such as the ownership of the outcome (incorporating the notion of compliance), understanding of the issues and perceived decision quality and the importance of the criteria in the process, b) likelihood of implementation - concepts related to the perceived

likelihood of implementation of the outcome, feasibility; pressure to comply with the outcome; likelihood of gaining support from the full organisation and the perception of Decision Conferencing as a defensible process, c) exclusivity - issues surrounding power relationships within the organisation and the impact of the perceived exclusivity of the Decision Conference process and d) loss of control over decision-making - perceptions regarding the potential for loss of control over the decision making process. This primarily revolved around difficulties with the computer modeling process and the role of the facilitator. However, what we will primarily report on here are the outcomes as they directly relate to the research questions. Accordingly, the following sub sections report these findings with specific reference to the research questions.

3.2 Computer Modeling & Shared Understanding

The first two research questions concern the perceived relationship between the computer modeling process and shared understanding i.e.

Research Question 1.1 Is the Modeling process perceived by participants as generating a Shared Understanding of the issue(s) to be addressed?

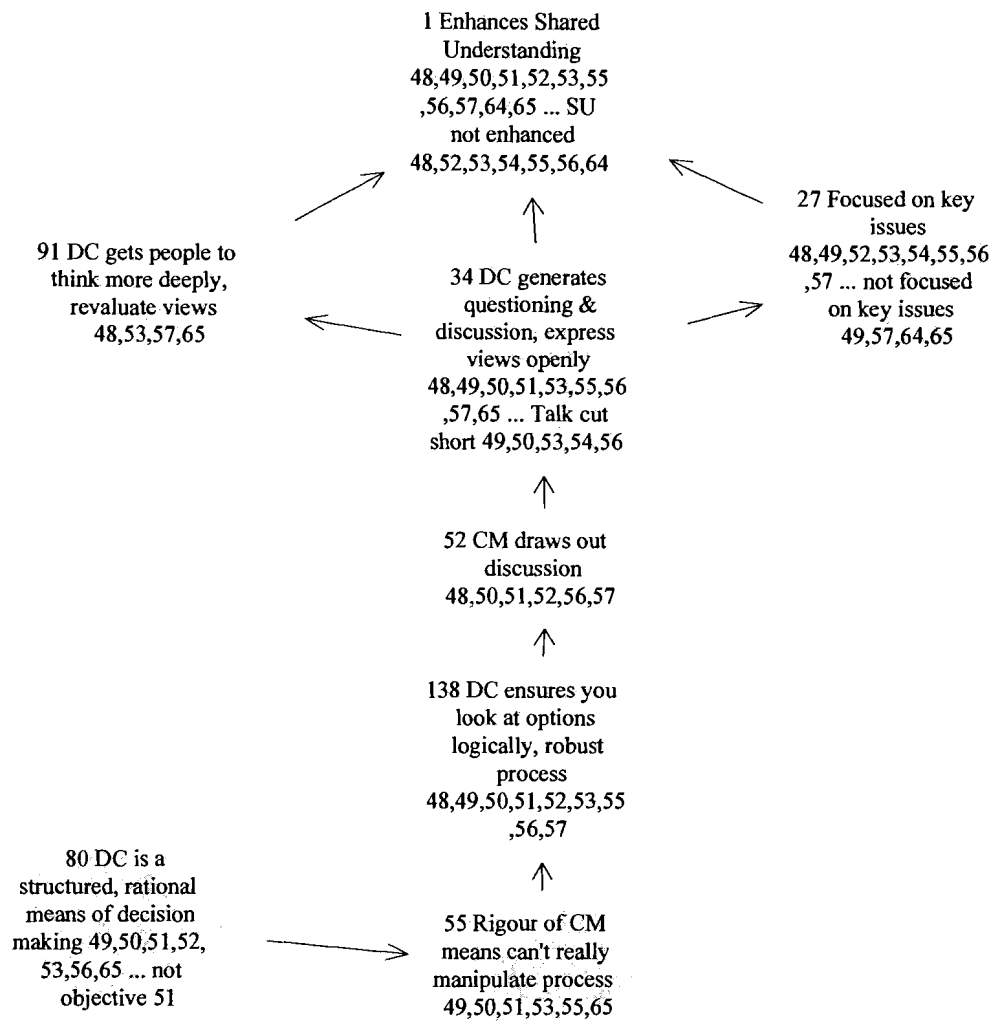
Research Question 1.2 What is the perceived relationship between the key aspects of the modeling process and the development of a Shared Understanding?

An initial examination of concept #1 (shared understanding) in the cognitive maps in Figure 2 shows that the answer to the first question is not a simple one. Whilst the majority of responses show support for the efficacy of modeling in promoting shared understanding, a substantial number of responses indicate the opposite perceptions. Furthermore, six responses register in both the positive and negative poles of this concept, i.e. responses 48,52,53,55,56 and 64 – a finding which may be interpreted as ambivalence on the part of these interviewees about the extent of their shared understanding as generated by the modeling process.

To throw some light on how these findings may be explained, a closer examination of the possible relationship between modeling and shared understanding was undertaken. To do this Path analysis was conducted first regarding possible routes from concept #1(*shared understanding*) to concept #80 (*Decision Conferencing is a structured, rational means of decision-making*), then from concept #1(*shared understanding*) to concept #30 (*Concerns and/or difficulties with the computer modeling process*).

Figure 2 shows there are three paths or routes that can be traced from the perception of Decision Conferencing as a structured, rational means of decision making (#80) and the development of a shared understanding within the group (#1).

The first route indicates that six participants felt that the use of the very structured decision modeling approach in the Decision Conference meant that it wasn't really possible to manipulate the process. Nine of the twelve participants saw this as ensuring that options were looked at logically, thus facilitating discussion. The majority of participants (9/12) also felt that this in turn generated open discussion and debate, although some ambivalence is again shown in responses 49, 50, 53 and 56 which register in both the positive and negative poles. This was then seen by 11 participants as leading to the development of a shared understanding amongst group members. Concept #34 – the generation of questioning and discussion and the open expression of views - is clearly a critical node for the development of a shared understanding and is explored further in the remaining two routes. Figure 2 Computer Modeling & Shared Understanding (1)



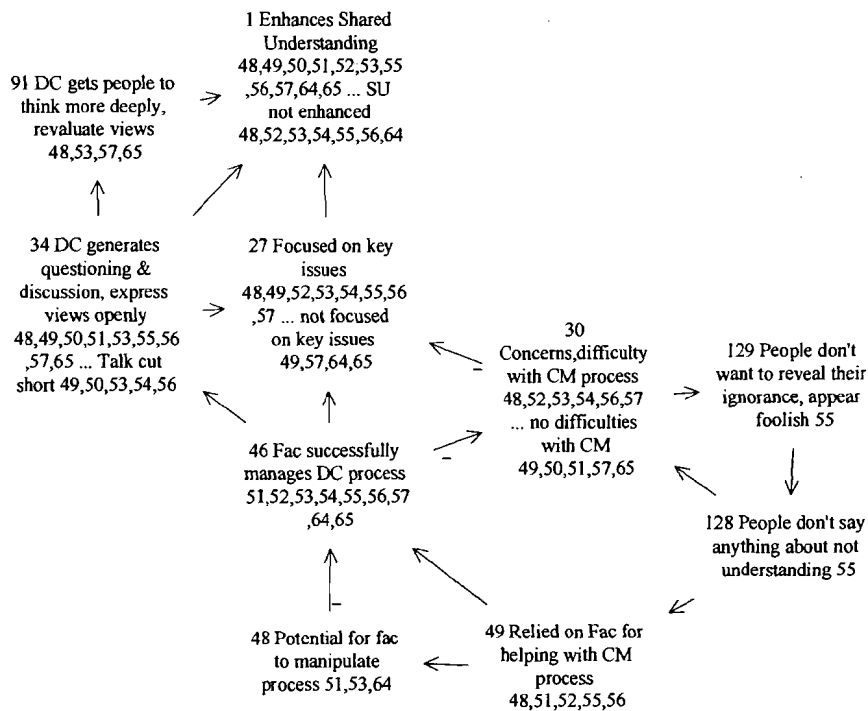
The second route follows on from #34, *DC generates discussion* and draws in an additional concept (#27), which relates to whether or not the content of the discussion focused on key issues. That is, discussion was also seen here potentially enhancing shared understanding, but in this route, it was seen as doing so if it enabled a better focus on the key issues.

The third route again follows the path to #34, *DC generates discussion*, but adds an additional factor (#91) for four of the participants. As the computer modeling generated questioning and discussion, it led these people to think more deeply about the issues and possibly re-evaluate

their views. In one case, response 53, this was true even when it was felt that talk had been cut short. In all four cases this was seen as enhancing shared understanding.

As indicated, in exploring the relationship between computer modeling and shared understanding, the other important concept to track through was that relating to participants' concerns or difficulties with the computer modeling experience (#30). A path analysis indicated 9 routes linking these concepts. These are illustrated in Figure 3.

Figure 3 Computer Modeling & Shared Understanding (2)



Evident here is a positive feedback loop or 'vicious cycle' (Eden & Ackermann ,1998: 411) created by the interactions of concepts #30, #129 and #128 where people experience difficulty with the process, but didn't want to reveal their ignorance. Consequently they remained quiet, which potentially lead to more problems, less inclination to appear foolish and so on,

continuing around the loop and impacting negatively on the capacity to focus on the key issues, i.e. concept #27. Only one participant directly raised this point, but it illustrates that any problems with the computer modeling can impact both on shared understanding and ultimately commitment and emphasizes the importance of the facilitation in breaking this cycle.

In summary, it would appear from participants' perceptions in this case study, that the structure and rigour of the computer modeling in Decision Conferencing has the capacity to generate a shared understanding of the issues under discussion. Its perceived success was mediated by the extent to which discussion, questioning and the open expression of views were facilitated and key issues addressed.

3.3 Modeling & Commitment to Action

The two research questions here concerned the perceived relationship between the computer modeling process and the development of commitment to action i.e.

Research Question 2.1 Is the Modeling process perceived by participants as generating a Commitment to Action?

Research Question 2.2 What is the perceived relationship between the key aspects of the modeling process and the development of Commitment to Action?

However, before addressing this relationship we turn first to an overview of what participants had to say about their commitment to the Decision Conference outcomes and about why they felt as they did.

3.3.1 The Concept of Commitment

Interviewees were asked a number of questions about their commitment to the workshop outcome, which was a prioritized list of bids for recommendation to the full Council i.e.:

Q11 How do you feel about this outcome?

Q12 Would you say that you feel personally committed to the courses of action indicated by the outcome of the Workshop?.

Q13 What made you feel committed/not committed to this outcome?

Q14. Do you have any personal reservations about the outcome?

All twelve interviewees indicated some degree of commitment to the outcome (#5), although five of the participants also expressed some ambivalence about their commitment.

Further exploration of this concept through use of the *Explore* command in Decision Explorer™ showed that there were eight concepts directly linked to commitment i.e.:

- whether the outcome reflected the participant's personal values and beliefs (#6)
- the degree of confidence in the quality of the decision (#8) – note that one of the key routes to this concept was based on the perception of Decision Conference as a structured rational means of decision-making (#80)
- the extent to which the outcome was seen as the 'best bet' (#4)
- relief that a decision had been made (#25) implying that the aim of the Decision Conference had been achieved
- generation of a sense of shared responsibility for the outcome (#29) – an important element for the majority of participants
- whether participants felt responsible for the use of the Decision Conference process by the organisation (#143)
- the extent to which the commitment was publicly made (#40)
- the extent to which participants felt that it was part of their professional duty to comply or that there was some other external pressure to commit to the outcome (#41)

All of the above were perceived as contributing to commitment, which in turn was seen as making it more likely that the outcome would be implemented. Commitment also meant that participants felt they would be more inclined to defend the outcome to non-participants.

Evidence of the degree of confidence in the quality of the decision and the extent to which participants felt it was part of their professional duty (dot points 2 and 8) above are captured in the following comments:

(Commitment was due to).. the way the way that (the Facilitator) did it, having agreed the criteria, having had my opportunity to argue on each score that was given... if you accept the integrity of the process I think you have to stand by the result N056 P51 Councilor (This quote illustrates dot point 2)

(I'm committed because) the role of this department is very much to bring about corporate projects...So (in developing commitment),...there's that

departmental responsibility, the professional pride, there's member's expectation .. (and) we will be measured, our performance will be measured by (Members). If we don't deliver, then they'll be disappointed and we've got to answer the consequences. N057, P90 Officer (This quote illustrates dot pt 8)

Inherent in the above comments are issues regarding decision quality, ownership, belonging and professional integrity. As indicated earlier, five individuals directly expressed some ambivalence regarding commitment. For these participants there was evidence of the impact of their position on the degree of personal commitment. Other factors include notions of status, feasibility and perceived decision quality. Typical comments included:

Yes and no (re feeling personally committed). Yes I will go along with it because I think it is essential to keep the integrity of the process together. No because two of the projects that came within the band that we can afford as I have already said, I think and it is not just a personal view, were based on false assumptions of what would be available from outside matched funding. N048, P126 Councillor

In terms of spend of capital resources. I personally didn't feel it was the best way that we could have spent our resources. And I think also, we didn't relate, it didn't relate totally, it related in certain parts to what our strategic objectives are... (however I am) committed in the sense that if that's what's come out and that's what members have agreed, then, fine, let's get on and do it. The debate's as far as I'm concerned is now over. It was agreed at full council yesterday, that, that's what we're going to do, so let's do our best. And let's do our best to deliver it. N064 P43 & P62 Officer

For some interviewees, most of the outcome was acceptable, but they had doubts about sub elements of the overall outcome. A typical example of this follows, where this individual expressed some personal reservations, but was prepared to put these aside once 'the group' had made the decision.

Well I will defend it.. (but) I am not totally committed to it...I am not quite satisfied that this is the only way that we can do things (but) once we'd made the decision I was committed to it, because that is the decision and the result of that is that I fought for the decisions since then... N065 P80, P114 Councillor

For Councillors, commitment was generally linked to whether the outcome reflected their personal views and their confidence in the integrity of the process. With the Officers,

commitment was generally more a reflection of their professionalism rather than their support for a particular outcome.

3.3.2 The Modeling/Commitment Link

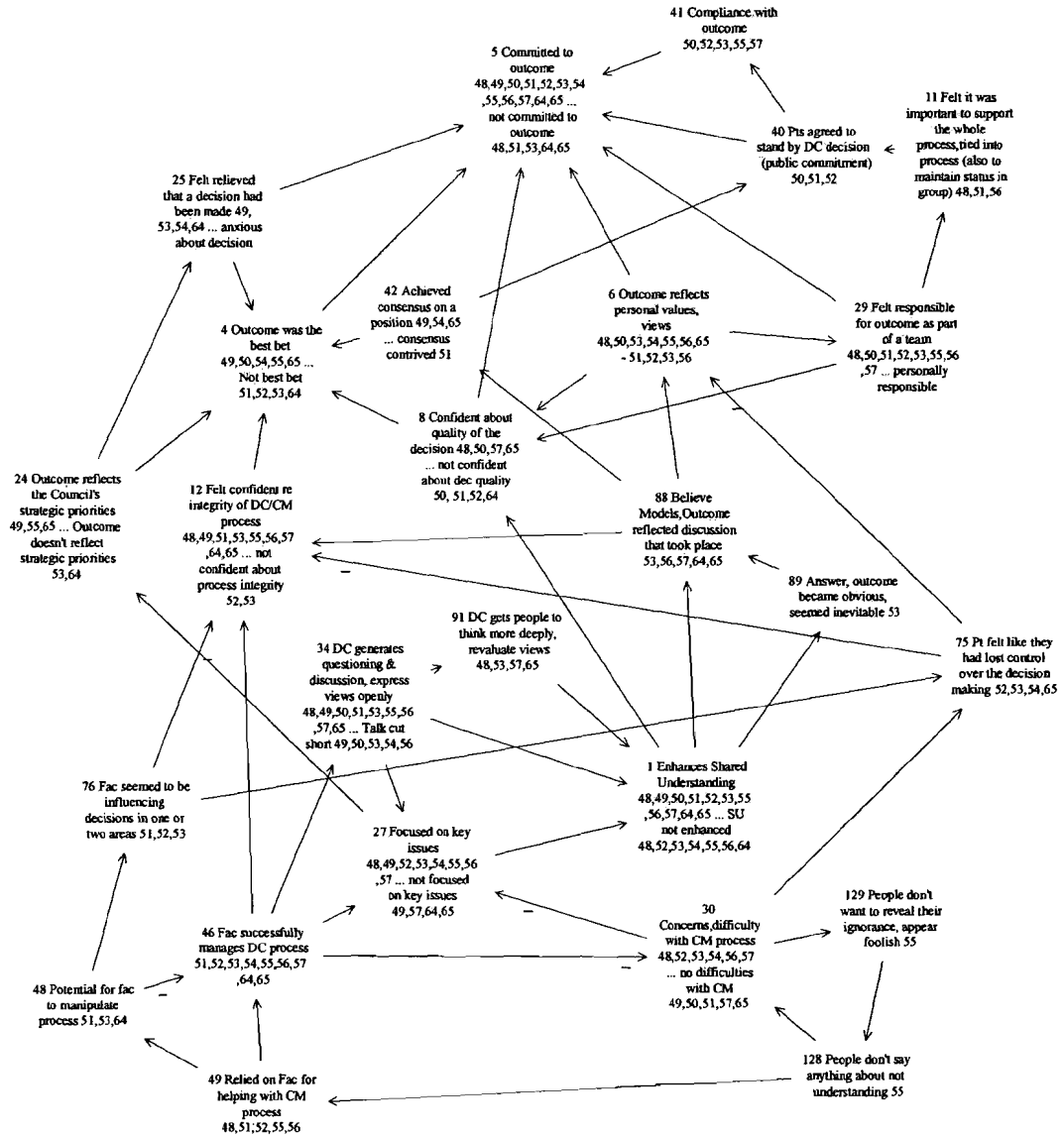
The perceived link between modeling and commitment was explored by tracing the paths between the two key computer-modeling related concepts i.e.:

- Concerns and/or difficulties with the computer modeling process (#30)
- Decision Conferencing is a structured, rational means of decision-making (#80) and Commitment i.e.
- Committed to outcome (#5)

A) The Link between Concerns and/or difficulties with the computer modeling process (#30) and Commitment (#5)

Path analysis of the composite map revealed 270 possible paths or routes between concerns or difficulties with the computer modeling (#30) and whether or not participants felt committed to the outcome (#5). The consequence of 159 of these paths was a potential reduction in commitment to act on the outcome. However, experiencing difficulties did not necessarily preclude commitment. There is still a path to commitment, although it requires mediating influences such as successful facilitation. The various approaches are indicated in Figure 4.

Figure 4 Computer Modeling (as represented by #30) and Commitment (#5)



In partial response to Qu 2.1 and 2.2, the path analysis illustrated in Figure 4 suggests that participants perceived computer modeling as potentially both a facilitating and a blocking agent in the generation of a commitment to action. For example, participant no.53 felt that concern with the process, potentially lead to a perceived loss of control over decision-making, with the consequence that the outcome was no longer seen as reflecting personal views. This

impacted negatively on the degree of commitment. A closer look at this participant's interview also showed that the absence of problems with the computer modeling meant that the group could focus on the key issues, thus enhancing shared understanding, resulting in an outcome that reflected the discussion, reflecting personal views, impacting positively on commitment.

The absence of perceived problems in relation to computer modeling was seen as generating commitment via 11 different paths, however some of these are only minor variations encompassing similar concepts. That is, computer modeling was perceived as generating commitment where:

- participants experienced few concerns or difficulties with the computer modeling process (#30)
- participants felt that they maintained control over the decision-making process (#75)
- successful facilitation of the process occurred (#46,#48,#49,#76) – the majority of participants (9/12) saw the facilitator as being the key factor in the successful management of the process (#46). The facilitator was perceived as keeping people on track (#140), providing structure (#68), enhancing discussion (#127, #34) and enhancing people's confidence in the integrity of the process (#12).
- the modeling helped the group to remain focused on key issues (#27)
- the modeling was used as a means of generating questioning and discussion (#34) and to think more deeply about the issues (#91)

Where the above transpired, interviewees were definite that a greater understanding than they had before had been developed, with participants feeling that the modeling reflected the discussion that took place, incorporating their personal views and values. Their belief in the integrity of the process was enhanced, as was their confidence that the outcome was the best bet. In turn, these factors were linked to concepts such as enhanced feelings of personal responsibility and were more likely to generate either a public commitment to, or in some cases compliance with, the outcome. The final result of achieving all of this was the potential for a greater degree of commitment than might otherwise have developed.

The corollary of the above is where these factors didn't occur (e.g. people didn't understand the modeling and didn't feel free to express their lack of understanding), or if the opposite happened in that the outcome was not seen as reflecting personal values or views, then commitment was reduced for many of the participants.

B) The Link between Computer Modeling as a structured rational means of decision-making (#80) and Commitment (#5)

The second concept that captured the essence of computer modeling was #80 *Decision Conferencing is a structured, rational means of decision-making*. Path analysis revealed 86 different routes between these two concepts although once again many of these were only small variations of major pathways. **Error! Reference source not found.** illustrates these various routes. In all instances, support emerged for the view that where Decision Conferencing (incorporating computer modeling) was seen as a structured, rational means of decision-making, this that ultimately had a positive relationship to the development of commitment to action. For example, for participant no.50 the rational approach offered by Decision Conferencing (#80), meant that the process couldn't really be manipulated (#55), thus ensuring options were looked at logically (#138), drawing out discussion (#52, #34), enhancing shared understanding (#1), enhancing leading to confidence in the quality of the decision (#8) and a degree of commitment to the outcome (#5).

Overall, computer modeling was perceived as generating commitment where:

- rigour of the computer modeling process reduced manipulation of the process (#55)
- the computer modeling ensured that options were looked at logically - the process was robust (#138, #9)
- the modeling helped the group to remain focused on key issues (#27)
- the modeling was used as a means of generating questioning and discussion (#52, #34) and to think more deeply about the issues (#91)
- the process allowed participants to consider unexpected options (#21) and ultimately to actually get to a decision (#22, #100, #25)

Again, where the above occurred, path analysis revealed links through to the development of a greater degree of shared understanding, with participants feeling that the modeling reflected the discussion that took place, incorporating their personal views and values. Their belief in the integrity of the process was enhanced, as was their confidence that the outcome was the best bet. In turn, these factors were linked to concepts such as enhanced feelings of personal responsibility and were more likely to generate either a public commitment to, or in some cases compliance with, the outcome. The final result of achieving all of this was the potential for a greater degree of commitment.

Again, where these factors didn't occur then commitment to act was reduced for many of the participants.

3.3.3 Shared Understanding and Commitment

Research Question 2.3 What is the perceived relationship between Shared Understanding and Commitment to Action?

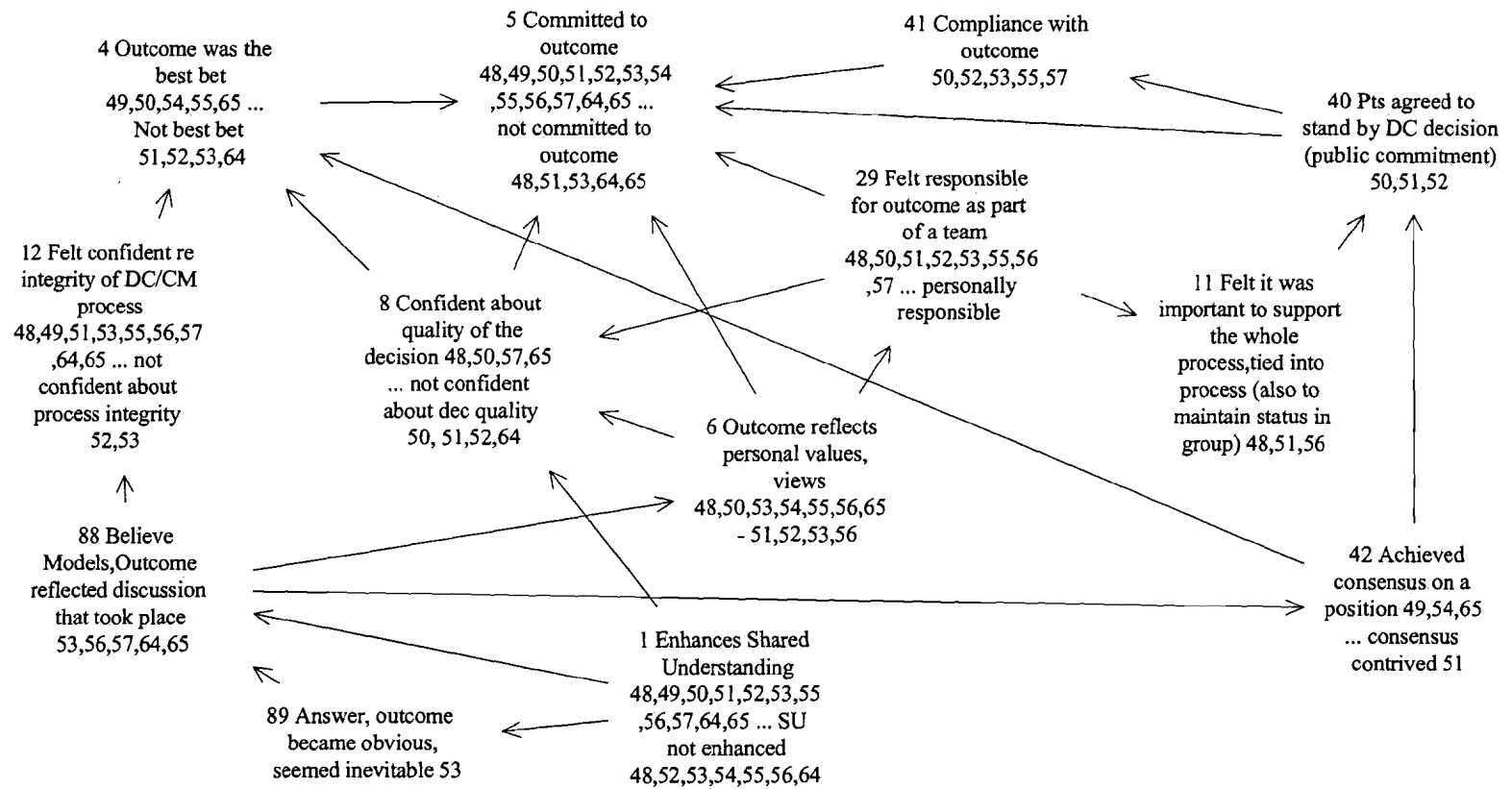
Findings show that the relationship between these two concepts was an indirect one, mediated by a number of other variables. A path analysis examining the connection between Shared Understanding (#1) and Commitment (#5) revealed 26 alternative routes to commitment from the shared understanding node (#1). Figure 5 illustrates these various approaches.

While there are 26 different approaches, essentially the mediating variables can be interpreted as follows: creating a shared understanding amongst Decision Conference participants may lead to a greater commitment to act on the outcome if it

- increased the likelihood that people felt that their personal values and views had been incorporated into the decision-making (#6, #88)
- resulted in people believing the decision they made was the best bet given the circumstances (#4)
- raised the confidence of participants in the integrity of the process (#12), which in turn reinforced people's feelings that the chosen outcome was the best bet (#4)
- developed a feeling of shared responsibility and ownership of the process and its outcomes (#29, #11)

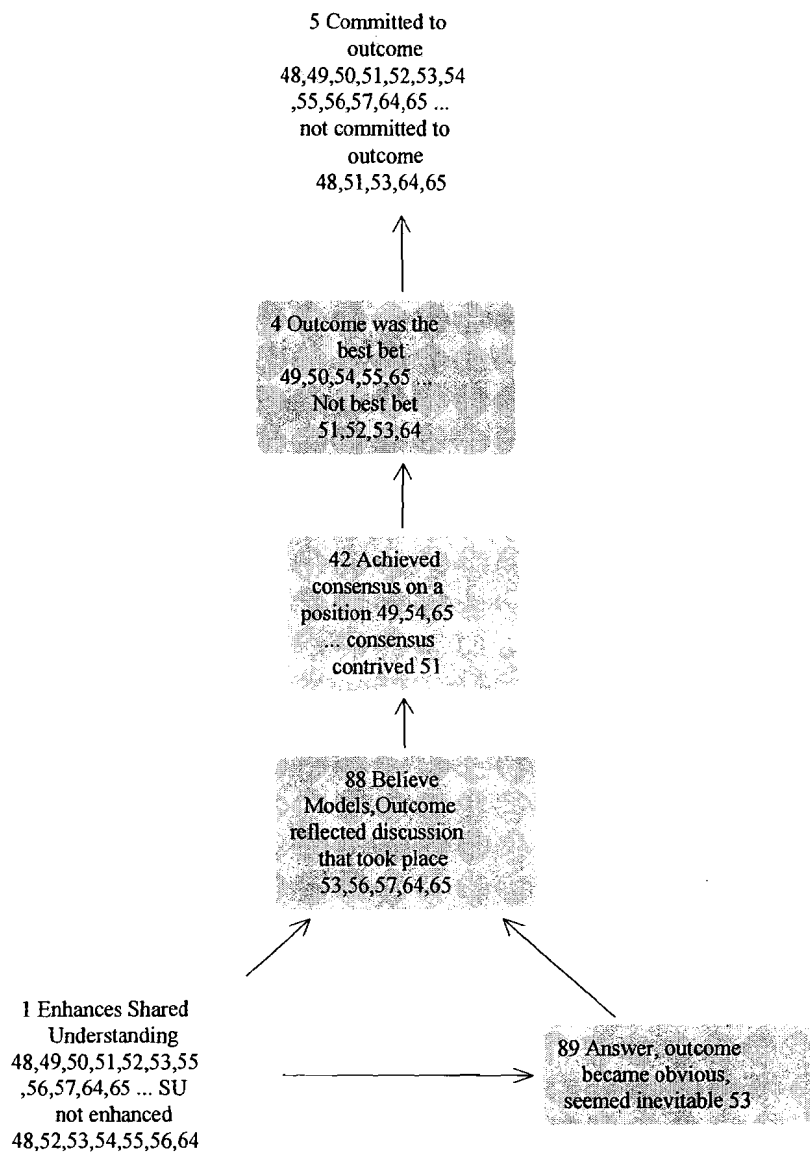
- helped to achieve a consensus (#42), thus leading to a public commitment to the outcome (#40), enhancing people's feelings of responsibility for the decisions made. This also encompassed the pressure for people to comply with the agreed outcomes (#41)

Figure 5 Shared Understanding & Commitment



Three relatively simple diagrams capture 14 of these 26 routes, with the remainder being relatively minor variations of these. Following is a presentation of these primary paths and some elaboration of the connections between shared understanding and commitment. A relatively common path is shown in Figure 6 Shared Understanding, Best Bet & Commitment.

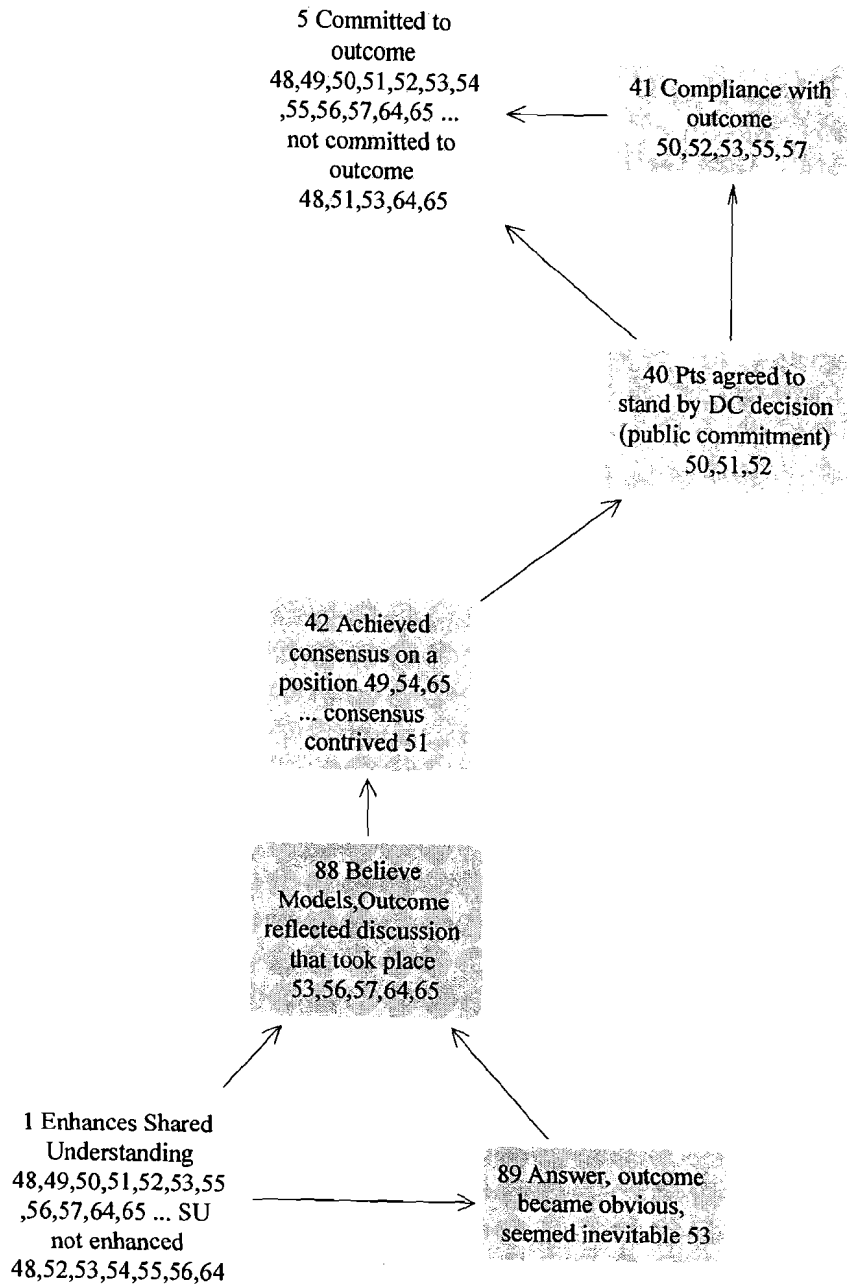
Figure 6 Shared Understanding, Best Bet & Commitment



Here we can see that through developing a shared understanding, the answer becomes obvious, indicating that the outcome reflected the discussion that took place, leading to a consensus on the position. For some this consensus was an indicator that the outcome was the best bet, a perception that in turn led to participants becoming committed to the outcome.

Represented in Figure 8 is an alternative but equally important route, more closely related to the notion of compliance. Here an enhanced shared understanding may lead to the outcome appearing inevitable and a belief that the model and associated outcome reflected the discussion that took place. Again, such a shared view was seen as potentially contributing to a consensus on a position, however here the path diverged from the previous diagram with commitment emerging as a consequence of participants either agreeing to stand by the outcome, or at least agreeing to comply with the decision made. From the participants' perspective both compliance and public commitment were seen as enhancing overall commitment.

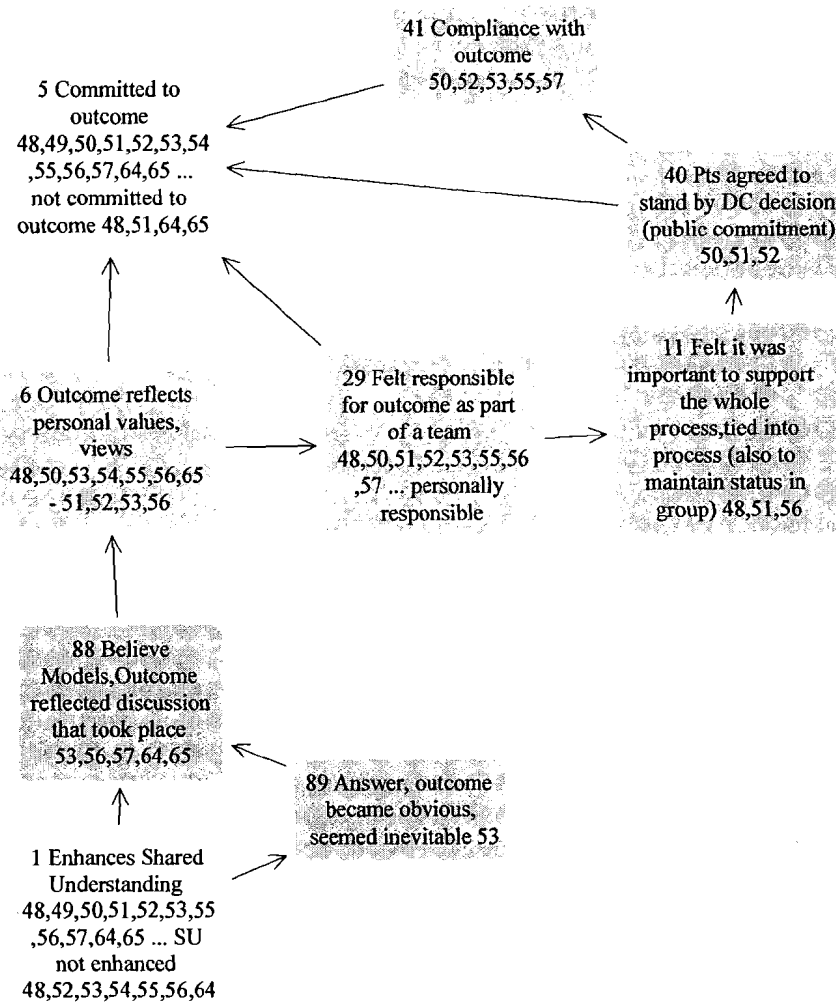
Figure 7 Shared Understanding, Compliance & Commitment



The final set of major routes is illustrated in Figure 8 and more specifically encompasses the notion of ownership. While again we see here the path from shared understanding leading to

a belief that the models and outcome reflected the workshop discussion, the route to commitment this time comes via a conviction that the outcome reflects the participant's personal values and views on the subject. This view was seen was either directly linking in with commitment or alternatively tying in with notions of personal responsibility and group cohesion. This last concept was again seen as linked to public commitment to the outcome, thus enhancing overall commitment either directly or as a result of compliance with the outcome.

Figure 8 Shared Understanding, Ownership and Commitment



4 Conclusion

This study suggests that whilst the process of computer modeling in Decision Conferencing can result in both shared understanding and commitment to act on the decision outcomes, the relationship between modeling, shared understanding and commitment is more complex than the diagrammatic representation in Figure 1 would indicate. The data in this case study indicates that this complexity results from the interaction of three important sets of factors

1. The relationship is not necessarily a linear uni-directional one, moving from the modeling process to shared understanding and then to commitment. For example, shared understanding was not a prerequisite for the generation of a feeling of commitment to act on the outcomes of the workshop (Figures 4 & 5). Conversely, it was possible to develop a shared understanding of the issues yet not to achieve a commitment to act on the outcomes (Figure 6). Some of these participants felt they had a good understanding of the issues and others' views but in spite of this did not feel that the correct decision had been made, or that the decision was irrelevant because they would have complied with whatever emerged.
2. Where a link could be traced between the modeling process and shared understanding on the one hand and the modeling process and commitment on the other, critical intervening variables mediated the relationship. For the commitment-commitment link, chief amongst these are
 - a. Participants' perceptions about the integrity of the process (eg #12, #88);
 - b. Whether or not discussion and debate was perceived to be genuine (eg #88);
 - c. perceived congruity between personal views and the outcome (eg#6);
 - d. perceptions about the degree of personal, professional and group responsibility for the outcome (eg#29, #40, #11);
 - e. the impact of external factors such as the likelihood of implementation and the perceived exclusivity of the process. For example, eight participants' clearly believed that Decision Conferencing was seen by non-participants as an exclusive process (#44), which failed to gain wider involvement from the Council (eg

#23,#26,#43, #116, #150, #152,#178) and thus was a threat to existing decision-making structures (#58).

- f. perceptions about the degree of control over the decision-making process (#17). There were two broad drivers to this loss of control i.e. concerns or difficulties with the computer modeling process (#30) and negative influences related to facilitation of the process (#76).

3. Both commitment and shared understanding were shown in some instances to result from factors other than the modeling process. "Commitment" was shown to be a complex variable with shades of meaning, from "dedication" through to "compliance" which could be generated by factors such as

- a. a sense of a commitment to the job (#61, #111), i.e. the sense of duty which those participants felt towards their employment responsibilities and their role in the hierarchy;
- b. external pressures to resolve difficult issues (#120, #124);
- c. feeling responsible for using the Decision Conferencing process (#143).

The findings from this study emphasize the importance of the facilitator's role in Decision Conferencing since many of the above factors were heavily influenced by the perceived quality of the facilitation. For example, successful management of the Decision Conferencing process, including both the modeling and discussion was critical in that this ultimately impacted on participants' commitment to the outcome. Where people were unsure about the process they tended to rely more heavily on the facilitator. Modeling imposes a heavy cognitive load on participants and the facilitator was relied upon to ensure that no major mistakes would be made, despite some of the difficulties experienced with the modeling process. Success here helped to reduce feelings regarding loss of control over the decision-making. The use of an independent facilitator was also perceived as keeping people on track, providing structure, moderating the discussion and enhancing people's confidence in the integrity of the process.

In conclusion, this case study demonstrates that whilst the modeling process has the capacity to generate a shared understanding between participants and a commitment on their part to act on the outcomes, it may not be the only factor at work to bring about these conditions. In addition, the modeling process appears to operate via mediating variables to bring about the

desired outcomes of shared understanding and commitment. It is suggested that the efficacy of the Decision Conferencing process could be enhanced by further study of methods to directly exploit these elements.

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