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Exploring what happens in a JOURNEY Making gathering – Using group communication software to support brainstorm-type activities.

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To my family and Adele. Thank you for doing your job of "keeping me sane"! A task you all contributed to in a special way. When it looked like you might fail you all dug in. It was a hard task, but you succeeded!

ABSTRACT

Brainstorming is a technique widely used in organisations to help groups of people share their knowledge of an issue. This research explores what happens during JOURNEY Making gatherings, which are similar to electronic brainstorms. It explores the reaction of participants' to the gatherings and builds a rich picture of how the process of facilitation might be enhanced for participants.

The thesis reflects on the development of a new format of gathering which aims to enable participants to consider a wider range of issues when decision making, by breaking bounded vision and encouraging an explosion of views. It gives participants incubation with the problem before stimulating them to consider aspects which they may have previously forgotten about.

This technique has been used nine times during four workshops with real-world organisations. This thesis reports on the exploration of five sources of data to enable an Integrative Evaluation of how participants work in gatherings, including computer logs of the participants' ideas and interviews with participants.

Findings indicate that this thesis can make contributions to knowledge on three levels. Firstly, the thesis has implications for practice. Facilitators might benefit from knowing that alternative forms of gathering exist and that findings suggest that participants benefit from them. For example, participants working in the proposed format were found to explore, on average, a wider range of themes in the problem than participants of other gathering formats, and might be able to share more contributions to that diverse range. Also participants have difficulty in accurately identifying causal links in the group map.

Secondly, this thesis makes contributions to academic knowledge. For example, the thesis develops innovative techniques for analysing participants' contributions and causal links.

Finally, this thesis contributes to future research directions by suggesting six areas for future research into JOURNEY Making and Group Decision Support.

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CHAPTER 1. - INTRODUCTION

In groupwork it has been argued in several places that the 'quality' of knowledge shared in groups is not wholly dependent on the 'quality' of the knowledge the group members have to share (Stasser and Stewart (1992), van der Heijden (1996), Eden and Ackermann (1998c) and Winquist and Larson (1998)). When some people work in groups they seem to suffer from phenomenon which can have detrimental effect on their ability and willingness to access and share their relevant knowledge, for example bounded vision (Huxham and Dando, 1981), groupthink (Janis, 1982), or evaluation apprehension (Camacho and Paulus, 1995).

Much work on the sharing of knowledge in groups aimed to develop theory of how one might construct a process, and create the right environment, to breed creativity and encourage group member collaboration (for example, Osborn (1953)). Some of this work, particularly over the last 15 years, has harnessed the power of computer technology to construct computer-supported group support systems (for example, Group Systems (Dennis et al, 1988), SAMM (DeSanctis et al, 1991) and Group Explorer (Eden and Ackermann, 1998c)). Computer-technology can bring a number of benefits to the process of sharing knowledge over the verbal discussions, for example they enable 20 people to share knowledge simultaneously which might be impossible in verbal group discussions (Briggs and Vreede (1997), Gallupe et al (1991)). This research aims to explore a method of groupwork which supports the sharing of knowledge between group members using computer technology. The approach is somewhat similar to brainstorming (Osborn (1953) and Rawlinson (1981)) and this research aims to uncover how participants are actually able to share knowledge during JOURNEY Making brainstorms (called 'gatherings' by the JOURNEY Making facilitator).

Much of the research on computer-supported group support systems is performed by American researchers (who Eden (1995b) refers to as 'narrow-band' researchers, as opposed to the UK researchers, who he refers to as 'wide-band' researchers). Many so-called narrow-band researchers concentrate on a process of sharing knowledge in groups which is of great interest to this research programme, that being computer-supported brainstorming, for example Dennis et al (1999), Grise and Gallupe (1999) and Pinsonneault et al (1999). However, although that research might be expected to contribute to this programme of work because it is concerned with gathering (or brainstorming), that research fails to contribute

substantially as it addresses computer-supported brainstorming from a perspective which is radically different to that of a so-called wide-band researcher (a proposition supported by Eden (1995b) and one that is discussed in Chapter 4). Briefly, it is thought that the limitation of narrow-band work centres on it being grounded largely in a positivistic approach to analysing constructs which are not directly relevant to a JOURNEY Making approach and being based on tasks which the participants might not have considered before. It will be argued that when analysing how people share knowledge in JOURNEY Making gatherings (a wide-band approach) one cannot rely solely on the wealth of knowledge from a narrow-band perspective (see Eden and Ackermann (1998c) for a discussion of JOURNEY Making).

It was thought that in order to gauge the ability of the participants to share knowledge during JOURNEY Making gatherings (which are used with real groups) it is necessary to consider what is important to real-world group facilitation interventions. This thesis will ground an appreciation of the success of a gathering firmly in the benefits the participants of that gathering might expect to enjoy from such an intervention.

1.1 THE MOTIVATION FOR STUDYING GATHERINGS

This research was inspired by a real-world practical problem. This researcher was sitting in a real-world JOURNEY Making gathering and was watching what the people in the group were doing. According to the facilitator's instructions, the participants should have been typing their ideas (or contributions) about a problem into a computer console in front of them. After exhausting the bank of contributions in their mind, participant should have been reading the public screen (which was displaying all the contributions that all the participants had already typed in) to stimulate their thinking about new contributions which they would then type in. Instead, some of the participants were only reading the contributions displayed on the public screen and not typing in new contributions. The practical problem appeared to be that some participants were distracted by the public screen which was up-dating with new contributions being entered by other people.

This could a practical problem for the facilitator, and potentially for the participants, because it seemed that reading the public screen did not encourage participants to share more knowledge - effectively the reading was treated as an end in itself, not a means to an end. Although reading the public screen might have been very interesting to them, it did not

seem to help them share more of their knowledge of the problem. The practical problem that this might cause for the facilitator of the workshop would be that if the participants were unable to share their understanding of the issue then they might perceive that they had not actually had a good opportunity to contribute to the outcome during the gathering. This might lead to the participant not accepting the outcome during or after the workshop (as they were not able to contribute fully to it). A main aim for many facilitators (certainly those who were under scrutiny in this research) is to build participants' commitment to an outcome so that they are keen to implement the outcome in their organisation (as will be explained in Chapter 2). If the participants were to leave the workshop with little commitment to the outcome (because they were not able to contribute to it) then this would be very concerning to the facilitator.

Furthermore, in this situation the participant might be very concerned that they had not had an opportunity contribute their knowledge during the gathering. Therefore they might try to share all of their knowledge during the group discussion which follows a gathering. This could result in the participant trying to take up most of the air-time promoting their position, at the expense of other people having air-time. This could result in the facilitator the practical problem of having to spend considerable time and effort in equalising air-time between participants and try to give space to other people to verbally discuss knowledge.

It was felt that it was worthwhile to solve this practical problem so that participants would not be exposed to a process of sharing knowledge that actually prevented them from concentrating on exactly that. It was though worthwhile to attempt to develop a process which might overcome the weaknesses for the participants of the existing process. The objective of this research (in terms of the practice of facilitating a gathering) was to develop a format of gathering which might avoid the potential consequences of participants being unable to share knowledge due to being totally distracted by the public screen updating during the gathering. This 'practical' objective was to avoid the facilitator and participants experiencing those consequences which have been very briefly explored above (but will be considered in more depth in Chapter 3). It was considered appropriate to attempt to reduce the possibility of participants actually experiencing these effects, and it was decided that some detailed exploration of JOURNEY Making gatherings was necessary.

The initial exploration to find a solution to this problem began with an exploration of the relevant literature on sharing knowledge in groups, and concentrated more specifically on group brainstorming. However, this initial literature search returned very little work that had been performed by wide-band researchers on brainstorming. Furthermore, the literature search highlighted that most research on brainstorming and related topics (for example, persuasion in groups (Harkins and Petty,1981)) had been performed by narrow-band researchers. This literature search also made the researcher aware of a resistance among wide-band researchers to practice the way in which narrow-band researchers performed their research. This encouraged the researcher to deeply consider the transferability of narrow-band research methodology and found his own concern with this crossed a number of dimensions which will be explored in Chapter 4.

It was decided that in order to help participants to share knowledge more effectively in a gathering it would be necessary to initiate a programme of research which addressed this issue. It was felt that this programme should explore a more academic question of what might be going on for the participants when sharing knowledge in groups with the aim of building a more informed appreciation of what participants might experience during the entire JOURNEY Making gathering. The research objective was to develop a process of sharing knowledge in gatherings which overcame what this researcher had observed during the observed gatherings and which might address the practical problem by enabling participants to share more of their knowledge in future gatherings. Also the research objective was to fill the gap in our knowledge by performing a detailed exploration of JOURNEY Making gatherings, a piece of research which had not previously been performed. The process which was developed to address the practical problem of participants just reading the public screen aimed to enable participants to share knowledge whilst also enabling them to reflect on other peoples' contributions (and critically to share that reflection). An exploration of the merits of the process which was developed is the focus for this thesis.

1.2 THE AIMS OF THIS RESEARCH PROGRAMME

In his exploration of this real-world problem, the main aims of this researcher are,

- To explore what happens in gatherings that are run as part of a real-world JOURNEY Making workshop, in order,
- To improve practice in facilitating real-world gatherings.

These includes the aims of,

- Providing theoretical support for changing the format of the electronic gathering to enable participants to more effectively share their knowledge on a problem.
- Generating useful insights from the data that has been collected during real-world JOURNEY Making gatherings. Specifically, this includes aiming to discover how the participants use the computer technology and GE and view the process of sharing knowledge in real-world JOURNEY Making workshops when they are working in the process which was developed.

The importance of this research being grounded in real-world interventions merits comment. It is a firmly held belief of this researcher that to usefully study how participants who experience a real-world problem might react to a process which has been developed to address that real-world problem, the research needs to be based on those real-world people (a belief supported by McGrath (1984), Eden (1995b), Fjermestad and Hiltz (1996), Christensen and Fjermestad (1997)). This research is aiming to help real-world participants of JOURNEY Making interventions, hence it must be grounded in that population.

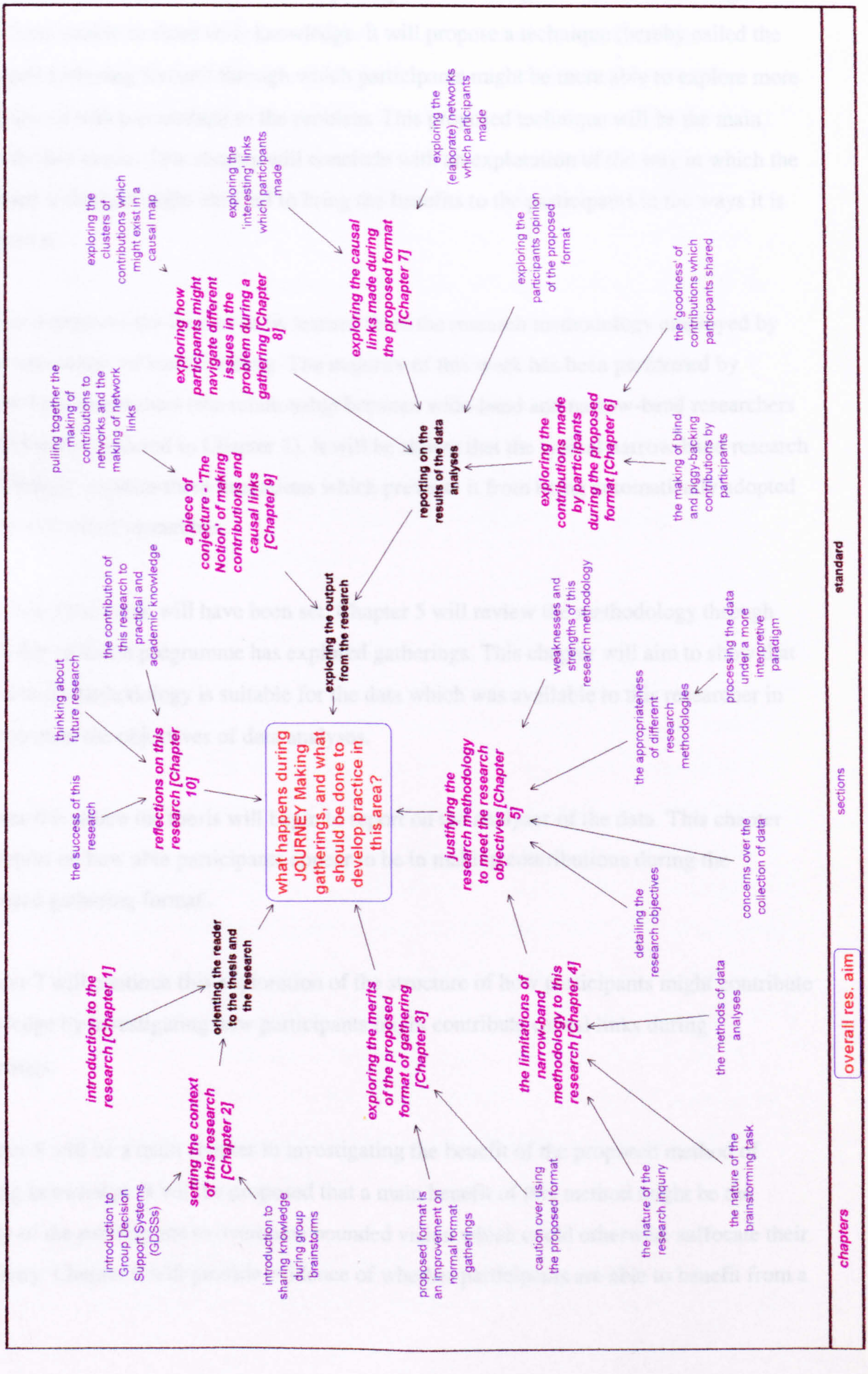
1.3 MEETING THE FOUR RESEARCH AIMS

The programme of work performed, and results obtained, focussed on accomplishing the four aims which were outlined above. This section will detail the structure of the thesis which will report on this programme of work. This structure is also represented in a map, in Figure 1.1.

Chapter 1 has briefly explored the motivation to initiate this programme of work. It has also introduced the four research aims which have been met and will be reported on in this thesis.

Chapter 2 will set the scene. It will introduce two fields of research in which this research is couched, those being group decision support systems and sharing knowledge in groups. This chapter will lay the ground on which the proceeding chapters will be based.

Figure 1.1 – A map of the chapters in this thesis



Chapter 3 considers the current technique through which the sharing of knowledge in JOURNEY Making workshops is facilitated. It will suggest that the current technique is one which might breed dysfunction and lock participants into a negative spiral which might make them unable to share their knowledge. It will propose a technique (hereby called the 'proposed gathering format') through which participants might be more able to explore more of the issues which contribute to the problem. This proposed technique will be the main focus for this thesis. This chapter will conclude with an exploration of the way in which the proposed technique might also fail to bring the benefits to the participants in the ways it is designed to.

Chapter 4 explores the lessons to be learned from the research methodology employed by many researchers of brainstorming. The majority of this work has been performed by narrow-band researchers (the relationship between wide-band and narrow-band researchers will be briefly explored in Chapter 2). It will be shown that the typical narrow-band research methodology contains three limitations which prevents it from being automatically adopted by this wide-band researcher.

Then, since the scene will have been set, Chapter 5 will review the methodology through which this research programme has explored gatherings. This chapter will aim to show that the research methodology is suitable for the data which was available to this researcher in order to meet the objectives of data analyses.

Chapter 6 is where the thesis will begin to report on the analyses of the data. This chapter will report on how able participants appear to be in making contributions during the 'proposed gathering format'.

Chapter 7 will continue this exploration of the structure of how participants might contribute knowledge by investigating how participants might contribute causal links during gatherings.

Chapter 8 will be a main chapter in investigating the benefit of the proposed method of sharing knowledge. It will be proposed that a main benefit of this method might be the ability of the participants to overcome bounded vision which could otherwise suffocate their creativity. Chapter 8 will provide evidence of whether participants are able to benefit from a

change in gathering format in terms of them being able to consider a wider range of aspects of the problem.

Chapter 9 will perform a piece of conjecture which is based on two main streams of argument proposed in this thesis. It will suggest a framework which might give access to how holistically people consider their problems in JOURNEY Making gatherings. It will explore how this might be analysed and could be transparent through the knowledge participants share in a JOURNEY Making gathering.

Chapter 10 will reflect upon the process of performing this research. It will conclude the thesis by presenting what are believed to be the main contributions of this work to knowledge as well as to the practice of facilitating JOURNEY Making gatherings.

CHAPTER 2.- SETTING THE CONTEXT OF THIS RESEARCH : TWO FIELDS OF RESEARCH

In order to set the scene for what this thesis intends to investigate when *'exploring what happens in gatherings that are run as part of a real-world JOURNEY Making workshop, in order to improve practice in facilitating gatherings'* this chapter will lay the ground for this programme of research. This chapter will introduce the two fields of Group Decision Support Systems (GDSS), with particular emphasis on the field of the application of computer-mediated technology in facilitating the sharing of knowledge between group members during brainstorming.

Empirical data has been collected in four JOURNEY Making workshops and this chapter aims to give the reader the general context of the conditions in which these participants worked and this data was captured. These JOURNEY Making workshops are 'real-world' (Vreede and Vogel, 2000) as they involve participants from organisations which operate in the real world and who concentrate on solving a real problem which exists in their real world (hence these are 'real-world groups').

This chapter will first contextualise this research into JOURNEY Making and specifically in the use of Group Explorer (GE) in a JOURNEY Making workshop (in Section 2.1). A main reason for this research concentrating on GE is that it is the latest group support software and has yet to be researched in detail. Hence it is felt that some useful insights might be gained through this research programme. The first section (Section 2.1.1) aims to introduce the reader to the basic format of the JOURNEY Making workshop and to set the scene of the facilities which people are offered through which they can share their knowledge of a problem. Section 2.1.2 will introduce the philosophy of the JOURNEY Making approach, compare that to narrow-band computer driven approaches and then review the main benefits which the participants of a GE gathering might hope to enjoy. Section 2.1 will conclude by positioning this research programme in the context of previous research on JOURNEY Making. It will show (in Section 2.1.3) that this research programme will fill a gap in the literature as there has been no in-depth consideration of the type of knowledge that the participants of a GE gathering might share.

The second stream of this chapter (in section 2.2) will concentrate on the sharing of knowledge in groupwork. The discussion will explore why group members might benefit

from sharing knowledge when negotiating the generation of an outcome in a JOURNEY Making workshop (discussed in Section 2.2.1). The chapter will review selected process loss phenomena which are widely-considered to be detrimental to the working of group members who are asked to share their knowledge verbally (in Section 2.2.2). This discussion of how computer technology might help participants to overcome these detrimental effects of group working will be discussed in the context of Group Explorer and JOURNEY Making.

Firstly, it is necessary to introduce GDSSs. Particular consideration will be paid to the brainstorming-type tools and techniques that GE offers the JOURNEY Making facilitator to capture the knowledge of the participants. This discussion will also give a flavour of a main focus of this research, which is to *'explore how participants might share knowledge during groupwork using computer technology [specifically using Group Explorer]'*.

2.1 INTRODUCING GROUP DECISION SUPPORT SYSTEMS

This introduction to GDSSs will be split into three sections. The first section will give an introduction to the nature of a JOURNEY Making workshop which uses GE. This aims to give the reader a context on which to read the second section (in Section 2.1.2). That second section will give the background to the philosophy of the JOURNEY Making approach in the context of the focus of this research. The third section will very briefly review a selection of the previous work that has been performed in JOURNEY Making with the aim of positioning this research programme in the context of what has been performed already.

2.1.1 The software of Group Explorer for JOURNEY Making gatherings

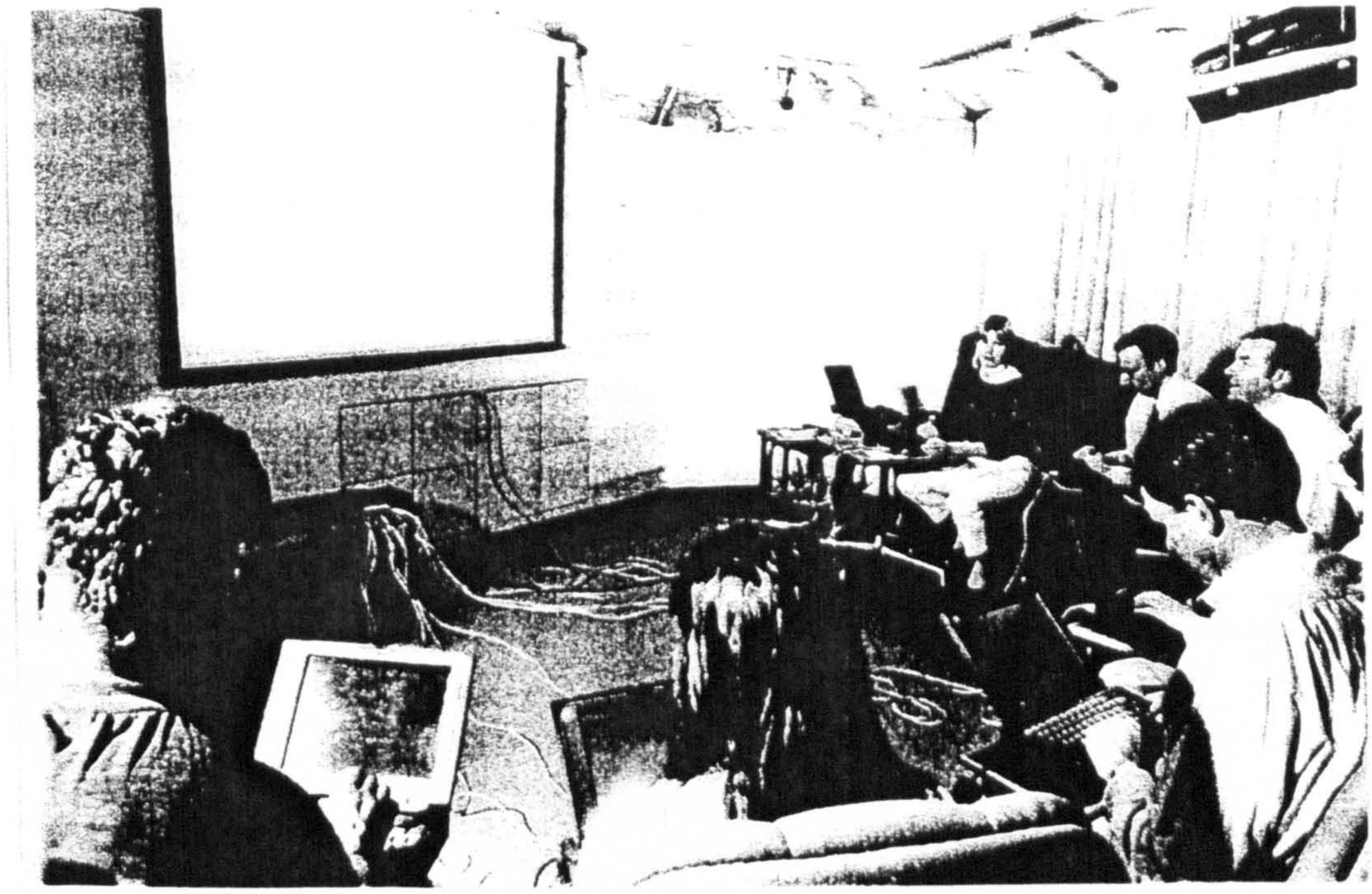
This section will introduce the process that JOURNEY Making facilitators sometimes offer participants to help them to share knowledge using Group Explorer with specific regard to the nature of the process the participants in the workshops under scrutiny here experienced. It will also introduce the general tools which are available to the JOURNEY Making facilitator to manage this process.

A technique associated with JOURNEY Making is group causal mapping (Eden and Ackermann, 1989). Based on Personal Construct Theory (Kelly, 1955), which argues that people try to make sense of their world so they can control what happens in that world, cognitive mapping (Eden, 1988) attempts to capture a participants' understanding and interpretation of the world in which they live and operate. Kelly (1955) and JOURNEY

Making propose that to appreciate a problem in groupwork, one needs to appreciate how the different group members understand that problem to exist in their world i.e. what are the causes of problems and the consequences of actions to solve the problem. To facilitate this, a JOURNEY Making facilitator might ask the group members to share their knowledge of that problem in a Multi-User Group Support (MUGS) workshop (Ackermann and Eden, 1995), so that the way forward to tackle that problem is informed by a broad understanding of that problem. In a JOURNEY Making MUGS workshop typically up to 20 group members can share their knowledge of a problem in a 'gathering session', which is much like a brainstorm (Osborn, 1953).

A GE MUGS gathering session is a period of time during which participants are able to share their knowledge in the form of 'contributions' concerning a problem. The 'contributions' reflect the issues which participants perceive to have a significant impact on the situation and would have to be considered in the generation of a way forward to tackle the problem. A GE MUGS gathering session has a particular room set-up. To explain, each participant has access to a computer which is normally mobile around the room. Sometimes the participants have a computer each, but at other times they have to share one computer between two or three group members. The participants are seated in a layout which enables them all to see a public projector screen (as Figure 2.1 displays).

Figure 2.1 - Photograph of participants working in a real-world GE JOURNEY Making session



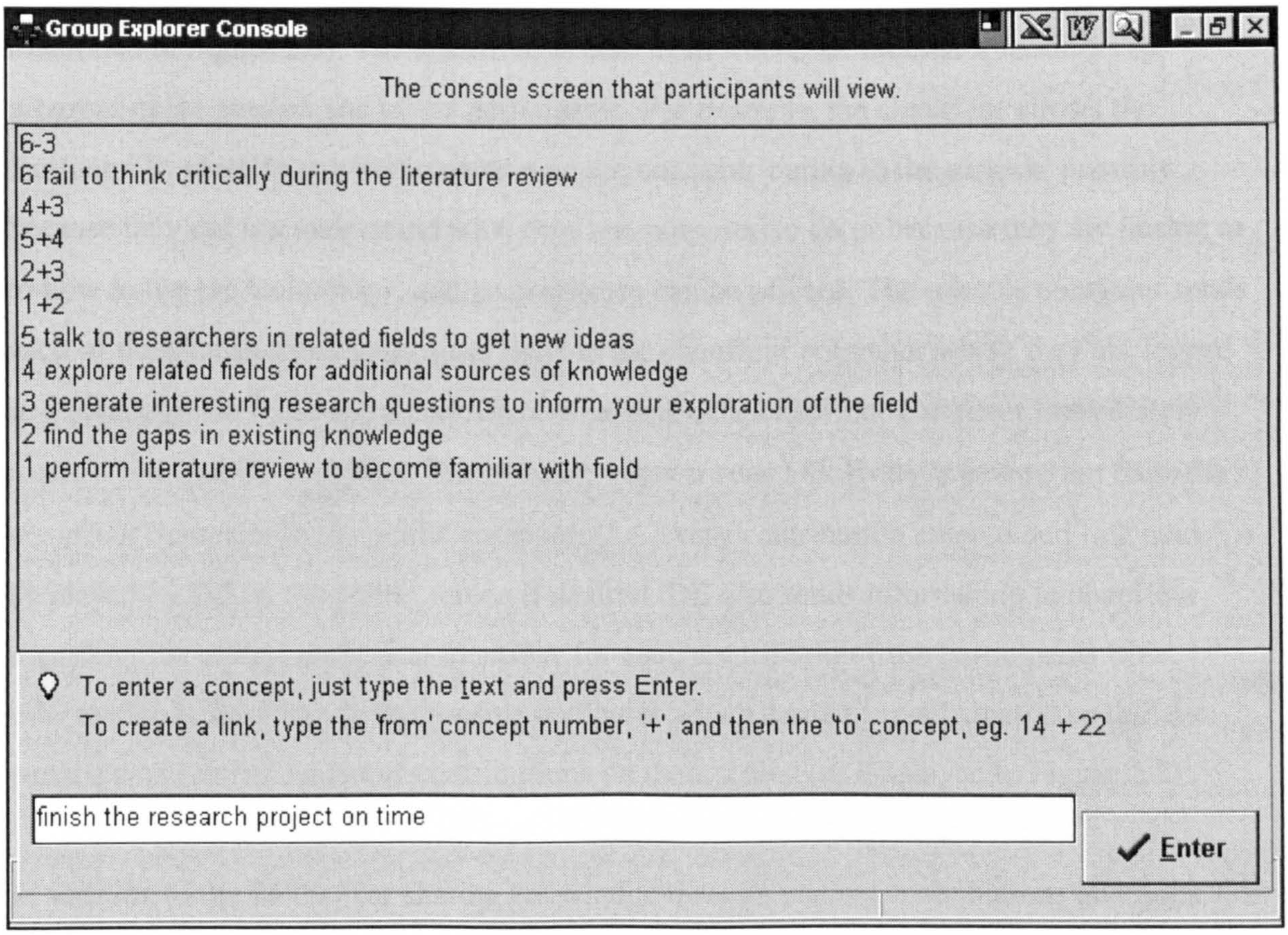
Photograph taken from Eden and Ackermann (1998c)

Participants are asked to type their contributions (of 8-10 words in length) into a computer console and each time a new contribution is entered it is given a unique numerical identifier code – the first contribution is number one, the second number two, and so on (each contribution entered is displayed on their own console, as represented in Figure 2.2). Those contributions are displayed on the public screen for everyone to see. Once that knowledge has been shared it is structured so that participants are able to understand how all the issues that have been contributed interact and effect, and are effected by, the situation. Thus any outcome based on this structure can be considerate of all the issues which have been shared. This structure is called a 'group map' (Ackermann, 1992a).

In order to structure the contributions, group members are asked to identify causal interactions and causal relationships between the issues represented by the contributions. To explain, participants are able to share their knowledge of the causal relationships between the contributions by inserting causal links between contributions using GE. If the participants identify two contributions that they think are causally related (for example, in

Figure 2.2 'performing a literature review to become familiar with the field' (contribution number 1) might enable a researcher to 'find the gaps in existing knowledge' (contribution number 2)) then they simply type the numerical identifier code contribution number one, followed by a plus sign, followed by the numerical identifier code of the consequence contributions, i.e. 1+2 (as displayed in Figure 2.2). In cases where participants identify two contributions that they think hold a negative causal relationship (for example, 'a failure to think critically' (contribution number 6) might hinder a researcher 'generating interesting research questions' (contribution number 3)) then they enter a negative sign between the contribution numbers, i.e. 6-3 in Figure 2.2.

Figure 2.2 - Snapshot of what the participants see on their console computer screen.



After participants have identified causal links they are encouraged to discuss the contributions and the issues in more detail. Further linking of the contributions by the facilitator is performed based on their interpretation of these discussions, i.e. assistance in the linking of contributions is given by the facilitator working in a single-user group support mode (SUGS) (Ackermann et al, 1995). When all the causal relationships between the contributions have been identified then the resulting group map might be said to be representative of the real situation that the participants are considering. Hence the

participants can remind themselves of what options are available in a situation and what consequences of a proposed action might be by simply referring to their group map.

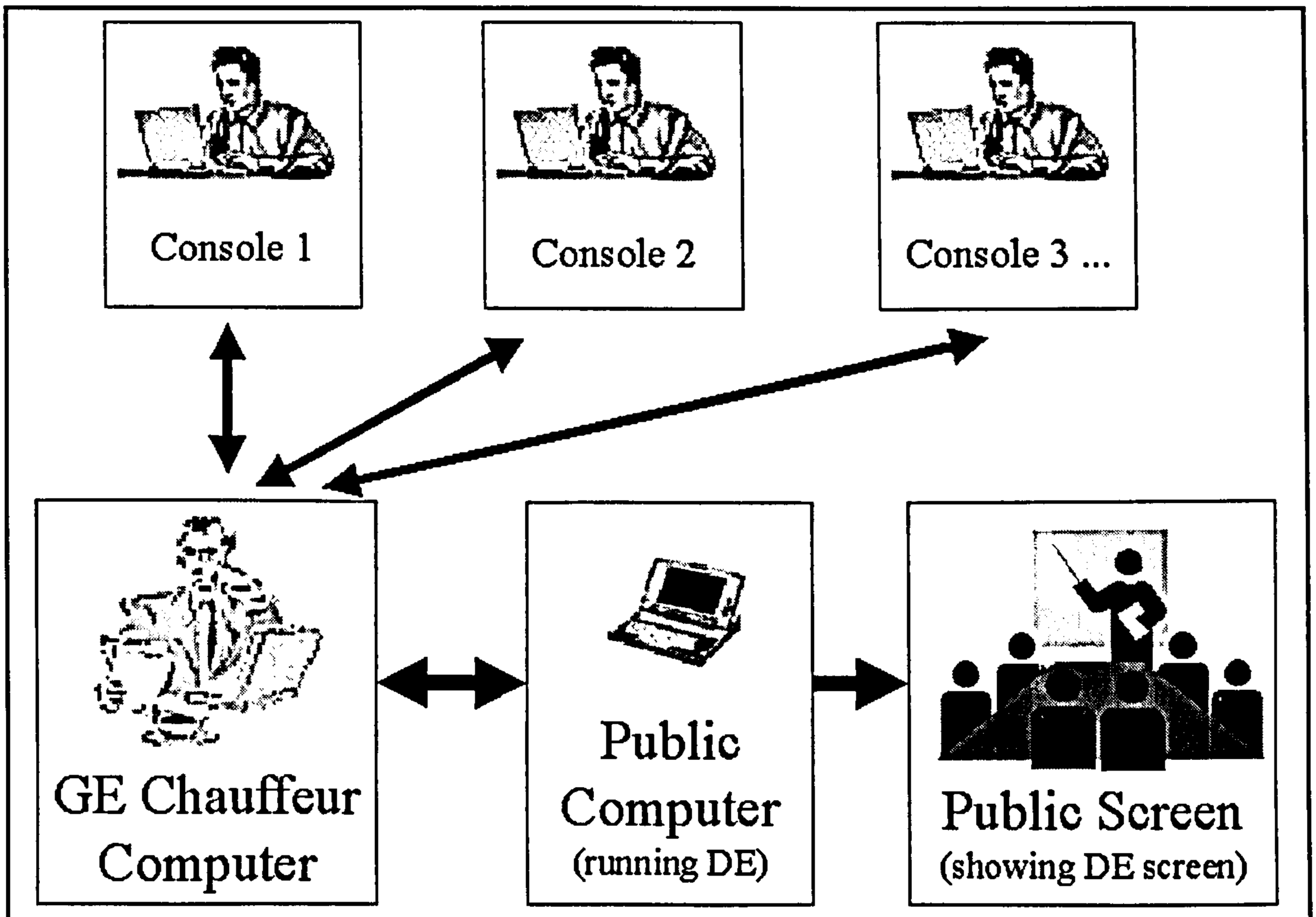
Group Explorer (GE) may assist this capturing of knowledge in the form of contributions and causal links. The management and display of those contributions and causal links which have been contributed is performed using the Decision Explorer (DE) software. The relationship between GE and DE will be highlighted in the following discussion.

When using GE, participants are requested to type each contribution or causal link into a 'console' computer which they have been given (or which they share with one of two other group members). Their console computer is network linked (using a local area network (a LAN)) to a 'chauffeur' computer which controls the network and runs the GE software (as illustrated in Figure 2.3). The chauffeur is also from where the facilitator monitors the progress of the session and of the participants. For example, the chauffeur allows the facilitator to identify any participants who are not contributing to the session, possibly because they did not understand what they are supposed to do or because they are unsure as to how to use the technology, and so assistance can be offered. The console computer sends each of the contributions and causal links to the chauffeur computer where they are logged in a database. On receiving a contribution (or link), the chauffeur computer immediately sends it to a 'public' computer. The public computer runs DE. Every transmission from the chauffeur computer to the public computer (i.e. every contribution entered and link made) is displayed by DE on the public screen if desired. DE also sends information to chauffeur regarding the unique numerical identifier for each contribution from participants (this information is then sent to the console computer which made the contribution so that the participants can have a list of contributions on their screen (as displayed in Figure 2.2)).

In addition to the facility for sharing knowledge through making contributions and links, GE chauffeur also offers rating and preferencing facilities through which group members can share their opinion of the situation (see Eden and Ackermann, (1998c) for a discussion). However, the facility which GE offers to the group members is outwith the bounds of this research on brainstorming. Rating and preferencing are not brainstorming tasks and as such fall outwith the scope of this immediate programme. Also to capture data from the rating/preferencing sessions which would be suitable for meaningful analyses this researcher would have had to significantly compromise the intended format for gathering data which

would have eliminated a primary objective of discovering how people might share knowledge during gatherings. This thesis will not explain the nature of this facility considering that is has no input to the rest of this thesis.

Figure 2.3 – The relationship between the GE computers (chauffeur, public and consoles) and DE and the public screen



DE is used by a facilitator to manage the contributions which have been made by participants using GE regarding the problem at hand. DE displays all the contributions on the public screen so that the participants do not have to remember their contributions and instead can concentrate on sharing more contributions (Briggs and Vreede, 1997). In a group setting when participants offer contributions about a problem, the groups members (or the facilitator with the group members help) ultimately link the contributions together to make a group map to understand how they interact (an example of a group map is given in Figure 1.1 on Page 6). DE displays all those contributions enabling their actual content and arrangement on the public screen to be changed by the facilitator after negotiation by the group members. DE enables new contributions to be entered directly into the group map and contributions to be deleted (contributions are deleted only by the facilitator and only with the agreement of the group members). DE also enables the display of all the links between

contributions and allows the deletion and insertion of links. These changes and additions to the group map is typically done during the group discussions which follow the GE gathering and can immediately be seen on the public screen.

The GE software collects every transmission from a participant's console computer and sends it to a DE map where it is stored for future use (as is shown in Figure 2.3). Each contribution made, and link entered, is also captured and stored in a GE database. The data (of contributions and causal links) from both the GE database and the DE map will be analysed to gauge the ability of participants to share knowledge in real-world JOURNEY Making interventions using GE.

Now that the process of sharing knowledge using GE has been explained, the discussion will move onto contextualising JOURNEY Making in the research which has been performed on groupwork.

2.1.2 Contextualising the JOURNEY Making approach to groupwork

This section aims to discuss the background to the JOURNEY Making philosophy. In order to accomplish this Section 2.1.2.1 will position JOURNEY Making with respect to the GSS community. This will lead to a brief background check on JOURNEY Making in Section 2.1.2.2. Then the aims of the JOURNEY Making approach (which are relevant to this researcher) will be reviewed in Section 2.1.2.3 in order to appreciate where effort is placed when the JOURNEY Making facilitator manages a group workshop which is similar to those from which data was able to be collected for this research study. Then, in Section 2.1.2.4, the discussion will explore what the claimed benefits are to a group of people who use Group Explorer.

This work aims to set the context of JOURNEY Making in a wider community as well as to set the context of the workshops on which data analyses sections of this thesis are based.

2.1.2.1 Background to 'wide-band' and 'narrow-band' GDSS research

In what is being labelled the 'narrow-band GDSS research community' (Eden, 1995b), the development of GDSSs has largely been from a computer science perspective and has focused on providing decision support to groups through computer technology. Examples of

two narrow-band systems are, Group Systems (Dennis et al, 1988) and MeetingWare (Lewis, 1993). Eden (1995b) claims that many narrow-band systems, including "probably the best known GDSS", Page 303, Group Systems (Nunamaker et al, 1989) concentrate on improving the amount of increased meeting productivity and quality of group interaction. These systems have dropped the GDSS label in favour of a Group Support System (GSS) label as the developers believe that the systems do more than just helping in the group decision making process (Briggs and Vreede, 1997).

In the so-called 'wide-band GDSS research community', the focus of building GDSSs has been on developing methods for aiding group decision making, some of which can be performed both with and without the use of computer technology. This focus has been provided by the Management Science research community and has concentrated on developing methodology for the structuring of problems and on the planning and evaluation of strategies. Examples of two wide-band GDSSs include: Soft Systems Methodology (SSM) (Checkland et al, 1995); and JOURNEY Making (Eden and Ackermann (1998c) previously known as Strategic Options Development and Analysis (SODA) (Eden and Ackermann (1989) and Eden (1995a))).

This brief introduction to the narrow and wide-band research approaches is an important one because of the differences between each approaches' main research objective - while GSS research primarily aims to mobilise the creativity of participants for the generation of lots of ideas around a problem, GDSS research primarily aims to develop methodology to assist in the considered planning and evaluation of options which aim to tackle a problem. It is claimed by Eden (1995b) that the objectives of the wide-band systems are more ambitious than those of the narrow-band. This is because (as is true for each of the workshops which will be analysed in this thesis) the wide-band systems emphasise reaching consensus between group members and build each member's commitment with respect to a strategic way forward in the situation, while (which seems true for most of the research which the literature review of narrow-band research surfaced) narrow-band systems tend to seek to mobilise creativity and productivity of participants. Consensus and commitment is achieved in a wide-band philosophy by helping the group members "decide how to act in relation to a complex problem situation", Page 303, and ensuring that everyone has input to the decision. Therefore the group members decide how to progress by developing a coherent plan (Eden, 1992a), not only generate a list of creative ideas about what might be done.

2.1.2.2 Background to JOURNEY Making - a wide-band GDSS

JOURNEY Making, a wide-band GDSS, is the focus for this thesis because it is a GDSS which has relatively recently developed a computer-supported facility and that is under researched. JOURNEY Making can be based on manual methods, for example oval-mapping (Eden and Ackermann 1998b) or on computerised methods, for example Decision Explorer (to assist a single person in decision making) or Group Explorer (to assist a group of people in making a decision) (Ackermann, 1996). In any JOURNEY Making session there can be a combination of manual and computer methods (Ackermann et al (1995), Eden and Ackermann (1998c)).

This research will concentrate on the participants' use of Group Explorer (GE), a state of the art computer-based facilitation tool which can mediate the sharing of knowledge between group members in a JOURNEY Making intervention. GE is a software package that has been developed by Professors Colin Eden and Fran Ackermann of Strathclyde University (see Eden and Ackermann (1998c) for a detailed discussion of GE).

2.1.2.3 The aims of JOURNEY Making (in the context of this research)

When used to assist in the making of decisions (which is the case for all the workshops under scrutiny in this thesis), the use of a wide-band approach to groupwork, like JOURNEY Making, does not automatically improve the quality of the decision that the group members make. Rather it offers a group the potential to improve the quality of their decision. This is hoped to be achieved through certain aims. In the specific workshops which will be the analysed during this thesis, the aims of JOURNEY Making were, in part, a focus on mobilising and structuring a participant's thinking about an issue in order to generate an outcome which is appropriate to the situation, whilst developing a participant's cognitive, and emotional commitment to that outcome. These aims will be discussed below.

Thinking about an issue was encouraged in the workshops (on which the data analyses in this thesis is based) by giving each group member the opportunity to contribute their ideas and opinions to the generation of a way forward in the situation. The synthesis of these ideas can uncover new options or ways of looking at a situation. Being creative, even playing with ideas, might help participants to identify the merits of proposed options. In this, the

participant might be more likely to understand the wider context of the option (i.e. the range of alternative ways forward and the potential benefits and consequences of those ways forward). Through considering the alternatives to, and consequences of, any option the group members are considering the practicalities of that option (Eden and Ackermann, 1998c). The group members are considering what would happen if the option was to be implemented - whether it would offer the type of change that is sought and whether it would fit neatly into the environment, for example, the people and the technical systems in the organisation. Hence they are considering the "political feasibility" of that option (Eden, 1992a). This exploration of the problem is also enabling the group members to share their understanding of the problem and, critically, to better understand other peoples' perspective (van der Heijden and Eden, 1998). In this, the group discussion is enabling the group members to negotiate a shared understanding of the situation by sharing their rationale for holding a preferred option and enabling themselves or others to identify strengths and weaknesses of that option in the light of unshared information. However, the complexity which can arise from having a number of people share competing views of a problem is not suppressed by JOURNEY Making, rather it is managed through the facilitator helping the group members to navigate their thinking of the problem (Eden and Ackermann, 1998c) based on what is displayed on the public screen.

The facilitators of the four workshops under scrutiny in this thesis were largely concerned about developing each participants' cognitive commitment to the outcome. In order to feel cognitive commitment to an outcome, Eden (1992a) suggests, participants should feel two things about that outcome: that it is based on logical reasoning; and that the process through which it has been generated is a sensible one. The first feeling of "substantive rationality" is thought to emerge from the confidence a group member has in being able to demonstrate to others, and themselves, that the outcome is based on solid reasoning i.e. they can justify their outcome. Hence the participants can feel confident in the intellectual robustness of the outcome decision and defend the outcome to anyone who might ask. If substantive rationality is perceived to exist then participants will have attached some cognitive commitment to the outcome as they perceive it as being coherent, logical for their group and defensible.

The facilitators of the four workshops under scrutiny in this thesis also aimed to enhance the second feeling of cognitive commitment in participants (that the process of decision making

is a sensible one) by offering a process which makes real progress through a problem and which gives each participant the perception that they have had some real impact on that outcome. Furthermore this feeling can be enhanced by making the process transparent so that participants can see how they are influencing the outcome and how the group is working towards the generation of a sensible outcome. If a participant understands, and has confidence in, the means by which an outcome has been generated then they may be more likely to have confidence in that outcome. Eden (1992a) refers to this as "procedural rationality", as participants feel they have "followed an appropriate process", Page 202, to generate the 'best' outcome for them.

Hence, perceiving the outcome to be substantially rational and perceiving it to have been generated through a procedurally rational process can contribute to a participant's investment of cognitive commitment to that outcome.

One of the other aims of the facilitators of the four JOURNEY Making workshops on which this thesis is based, was to build each participants' emotional commitment to the outcome. If a participant perceives that they have had significant impact on the generation of that outcome (in that their opinions have contributed to its generation) then they may perceive the outcome to be one that is good for them (as they have contributed to it). The combination of the outcome being good for them and them having a real impact in its generation can help to build that participant's emotional commitment to that outcome. Essentially the participant might feel motivated and committed to implement the outcome because they have invested their time and effort in negotiating its generation i.e. they have invested emotionally in the outcome and so are emotionally attached and committed to it.

So, JOURNEY Making (in the context of this research) has three main aims:

1. To mobilise the thinking of the participant to enable them to generate and consider the consequences of, and alternatives to, a politically feasible outcome. This involves the managing, not reduction, of complexity by the facilitator.

2. To build each participant's cognitive commitment to the outcome, through enabling the participants to appreciate how the outcome is based on solid reasoning (i.e. substantive rationality) by providing a procedurally rational process i.e. developing a shared understanding of the group members as to what the best outcome.

3. To build each participant's emotional commitment to that outcome, in that the participants perceive that the outcome is one in which they have invested their energy in developing.

It is felt that if these aims were accomplished then not only could the outcome be appropriate for the situation, but also might it have a strong chance of being successfully implemented because of the real commitment of the participants.

The aims of JOURNEY Making (specifically those relevant to the facilitators of four workshops which will be reported on here) suggest that is a philosophy which is focussed on the generation of a politically feasible outcome, which has the real commitment of the participants to its implementation. Creating a transparent and sensible process has been argued above to be critical in enhancing this. The following discussion will introduce the way in which the JOURNEY Making facilitator creates a transparent and sensible process by exploring what are the claimed benefits to group members from using this process.

2.1.2.4 The claimed main benefits to group members from using Group Explorer

Some main benefits to participants from employing a computer-based approach to managing the development of a strategy are claimed to include: making better use of the "air-time" which is available to them; participants contributing their knowledge anonymously; and managing the contributions from their knowledge better to use in group discussions. Each claimed benefit will be discussed below, both (if appropriate) in the context of when the participants work alone on a console computer and when they share it between two or three others.

Better use of "air-time" is achieved by allowing all participants to share aspects of their knowledge simultaneously through the computers. Instead of everyone fighting to contribute their knowledge at the same time in group discussion, and possibly failing, GE allows everyone to share their knowledge at the same time. This process ensures that everyone has the opportunity to have their say.

When group members work together in sub-groups (i.e. pairs or trios as was the case for 2 out of the four workshops under scrutiny in this research) they might again enjoy a better use of air-time. The sub-group members can negotiate a single contribution to explain what

it is that they have discussed. Alternatively the sub-group can contribute two (or more) contrasting views of that issue, but whatever they chose to do, the group members still have had the opportunity to air their ideas and contribute to the outcome, for the following reason. They certainly might have more opportunity to share their opinion in a group of three than they would do in a group of (say) 12 people. Although sharing a console might cause the contributions from each sub-group to have less individuality for each sub-group member, each member might gain some confidence from being able to discuss their contribution with someone before typing it in. Hence although the compromise of individuality might be made when working in pairs, this might be balanced with the feeling of confidence from being part of a sub-group when sharing knowledge.

Due to the contributor of an idea remaining anonymous, GE can heighten the egalitarian status of the contributions made during the workshop. This is not to say that each member is perceived by the other group members to be their equal (in terms of their status in the group). Rather it means that considering no-one can identify with certainty who made a contribution, then each contribution can be evaluated on its own merit, not on the merit of the person making the contribution. Hence, the participants are not able to support a contribution just because it has been made by their superior (or someone they like). Similarly the participants are not able to dismiss a contribution just because it has been contributed by a junior member (or someone they do not like). In this regard, if the contributor of an idea does not identify themselves and remains anonymous, then GE can support the egalitarian status of the contributions. However, when participants identify themselves to being the contributor of an idea possibly during group discussion, other group members are able to view their contribution as more or less powerful (depending on their opinion of that contributor). However, there are potential pitfalls to having anonymity, including for example, participants willingness to make "flaming contributions" which might be destructive of the harmony or group feeling (Cooper et al, 1996), or people might not be able to demonstrate and be rewarded for their skills.

When participants work in pairs or trios the facilitator takes advice from the client as to the best sub-groups. In this the facilitator will pay close attention to the sub-groupings so that a productive working relationship might be built between sub-group members. Hence facilitators might aim to get members of similar status together (or a pairing that they believe will be productive i.e. possibly avoiding a very dominant and senior member with a

very junior member). Similarly they might ask the client of the likely attitude of different members to specific issues so that strongly opposing members are not put together where they might fight all the time rather than contribute those disagreements so that the group can contribute to them. Ultimately it is assumed that the client is able to recommend productive sub-grouping and highlight what might be destructive sub-grouping.

The DE map displayed on the public screen can act as a "[negotiative] device to promote psychological negotiation", Page 33 (Eden, 1995a) in that participants can negotiate a shared understanding of the situation with other members in the group who might hold different opinions. To explain, the DE map shows a display of what has been contributed by participants, therefore participants are able to point at a screen to highlight the particular contributions which illustrate a phenomena that they are trying to explain. The group member can illustrate their point of view with reference to a model of the world which is shared amongst the group i.e. they can point to the public screen and say "This is what I think might happen if we do that". Other people can illustrate their reason for their opposing view with reference to the same public screen. By highlighting these differences the group members might be able to gain a deeper and richer understanding of the problem as they are considering it from multiple perspectives. Essentially these participants might be negotiating a shared understanding of the situation, possibly by integrating each of their perspectives (Eden and Ackermann (1998c), Johnson and Johnson (forthcoming)). In this regard, the DE map can act as a negotiative device as participants are using it to illustrate an argument and on which to negotiate a shared understanding of the situation.

Now that the main claimed benefits from the JOURNEY Making approach (those benefits claimed to be offered to the participants of the four workshops on which this study is based) have been explored, the thesis will turn to position this research programme in a context of what research has already been done.

2.1.3 Research on JOURNEY Making

This section will firstly explore the nature of the research which has been performed on the JOURNEY Making process. This very brief and very selective exploration will only seek to show that effort has not been exerted on investigating how participants actually share knowledge using computers technology and Group Explorer.

Then in Section 2.1.3.2 the thesis will introduce the nature of the research which will be the focus for this thesis. It will show that this research aims to uncover the way in which participants are able to share knowledge in a new format of computer-supported gathering.

2.1.3.1 What has been done on JOURNEY Making?

It should be noted that it is the way in which participants are able to share knowledge using computer technology which is of interest to this research. However, there has been no in-depth wide-band study of the way in which participants use computers and GE to share knowledge. This very brief review is performed in order to give the reader a flavour of the nature of the research which has been performed. It does not aim to perform an exhaustive review of that research, really it aims to give the reader some context in which this research programme is positioned with respect to JOURNEY Making.

There is a body of research on JOURNEY Making (known as SODA in the pre-1998 studies). Much of this is performed through Action Research (Eden and Huxham, 1996) and concerns learning points from facilitating group decision making using a JOURNEY Making approach. A brief chronologically ordered review of some of a variety of studies will be given below in order to sample the nature of this research to date.

Eden and Simpson (1989) reflect on their building of cognitive maps during individual interviews and their running of a group workshop (manually, not using computers). A composite group map was built from the individual cognitive maps. However, here group discussion was used during the group workshop to share additional knowledge of the composite group map.

Ackermann (1994) discusses how group decision making is affected through using computer technology. She looks at the effect on social interaction of using technology.

Roginski (1995) reflects on her experience of implementing a SODA methodology in the NHS. She does not gather knowledge in group workshops but in individual interviews.

Ackermann et al (1995a) contrast the use of GSS and GDSS. They reflect on a strategic change workshop for Scottish Natural Heritage. They inform the reader of the design of the

workshop and the implications for facilitators when running such a GSS or GDSS workshop.

In Ackermann and Eden (1999) the authors reflect on their experiences of running manual and computer-supported approaches to sharing knowledge in groups. They used GE MUGS gathering with senior managers of Scottish Natural Heritage and compare this experience to a manually-supported one. However, in the article they concentrate on reflecting their observations and beliefs, and do not attempt to analyse the data which they have captured.

Ackermann et al (1997) initially conduct individual interviews with the main actors in their consultancy work with a company contracted to the channel tunnel project. These cognitive maps from the individual interviews are merged to form a composite group map. They held group workshops to validate the composite group map. However they do not report using GE software to collect knowledge in groups. A similar process is discussed in Williams et al (1995) but again no group map is built using GE during a workshop.

Eden and Ackermann (1999) reflect a theoretical and practical application of GE to develop group maps in scenario development and strategy making. They discuss the process of developing the group maps using GE. Their's is a reflection on a process and as such they do not conduct any examination of the contributions and links made nor the way people appear to work in their sessions.

Ackermann and Eden (1998) explore their use of GE in 'Disruption and Delay' modelling consultancy work. They discuss how they explored the nature of the problem using GE and reflect on the implication from using computer support with groups. They explore the power of DE group mapping to build knowledge, explore issues and understand feedback loops.

The above review cites a few examples of research using a JOURNEY Making/cognitive mapping approach and all seem to be set in real-world contexts. A recent, and the most comprehensive, account of JOURNEY Making is given in Eden and Ackermann (1998c). In addition to the theoretical section of the book, the authors reflect upon the practical aspects of performing JOURNEY Making interventions (including using GE) and include vignettes of actual workshops they have performed. The authors give a thorough exploration of the design of the workshop, and where GE may be used. However, even this most

comprehensive account of JOURNEY Making fails to analyse the contributions and causal links which are shared by the participants of their GE sessions. The authors report on a process of capturing data, not the in-depth dissection of that data.

In terms of actually analysing the detail of group maps, there have been no studies found which perform this to a highly detailed extent through the intricate decomposition of the maps to the explore the ability of group members to share knowledge. Those studies which do attempt to analyse the actual cognitive maps stop short of getting fully immersed in them. For example, Jenkins and Johnson (1997) analyse the individual cognitive maps of managers. They decompose the cognitive maps of individuals and analyse specific themes contained in their maps, and reflect on their opinions of so doing. They do not seem immerse themselves in the structure of the entire cognitive map, rather they seem to extract parts of it which are of interest to them. They do not report having any access to group maps. Hence their overlap with this research appears to be that they too have an inquisitiveness of the ability of causal maps to offer more than just a structure of a situation.

It is interesting to note that no research has been found in the context of JOURNEY Making/SODA which seems to analyse the actual thinking displayed by participants in workshops using GE (as evident through a dissection of the contributions and links which those participants share). There is certainly documentation of the theory and practical approaches to analysing cognitive maps (Eden et al (1992), Eden and Ackermann (1998a and 1998c). However these documents indicate the type of analyses which might be performed on a cognitive map (for an individual) or group map and explore their significance. They do not actually perform intricate dissection of the contributions and causal links to uncover their nature (or the nature of the participants who share them). This researcher aims to fill this gap in the literature by exploring the actual contributions and links which participants make and attempts to generate theory of how able and willing participants are to share knowledge using GE. Also this thesis will attempt to explain any interesting features which might be found in the context of the workshops.

No analyses of the GE databases have been performed as this feature of logging each contribution and link has only recently become available. GE is the latest GDSS technology and has yet to be researched in detail. Consequently no researchers have attempted to synthesise the data in the maps with the data in the GE database. This research aims to fill

these gaps by performing meaningful analyses of the DE maps and the GE databases to explore the ability of the participants of a GE gathering to perform some of the cognitive tasks a facilitator sets.

2.1.3.2 How does this research aim to further knowledge about Group Explorer ...

As the brief review of JOURNEY Making literature indicates (i.e. that review performed in Section 2.1.3.1) JOURNEY Making is an approach which has been used with an extensive variety of public and private sector organisations in their development of an organisational strategy or in strategic problem solving. The workshops conducted normally involve between 3 and 20 key people in the organisation. This section will discuss how GE is actually used to facilitate the interaction of individuals in the normal gathering conditions (in Section 2.1.3.2.2). Also it will introduce the proposed gathering format which has been developed during this research (in Section 2.1.3.2.3). However, before this is performed the classical instructions for brainstorming should be compared to the instructions for gathering, in order to understand some of the differences between brainstorming and gathering.

2.1.3.2.1 ... considering the instructions for brainstorming and gathering

It should be noted that Osborn's (1953) instructions for brainstorming (which are typically employed by narrow-band researchers, for example Gallupe et al (1992) and Dennis and Valacich (1993)) are not entirely relevant to JOURNEY Making gatherings. Briefly, Osborn's instructions include: do not judge other peoples' ideas, free-wheeling is welcomed, quantity is wanted, and combination and improvement is sought (Page 300). Going through each of these in turn, the JOURNEY Making facilitator does want people to judge the worth of the contributions which are made as it might encourage them to concentrate on them, from their own perspective and so be able to share their opinions of those ideas. The JOURNEY Making facilitator might not really want the participants to free-wheel as this gives the impression that wild ideas are useful, and the facilitator normally might prefer to have realistic, politically feasible contributions, rather than wild and wacky ones. The JOURNEY Making facilitator would readily sacrifice a large number of 'ordinary' contributions for one which has significant impact on the development of an outcome and so quantity is not important. The JOURNEY Making facilitator does want 'combination and improvement' of contributions in the way Osborn describes (as will be shown in the discussion on piggy-backing in Chapter 3).

Instead of Osborn's instructions the facilitator of a gathering session emphasised two critical things to participants :

1. share your own idea of the problem with the group - anything that you think is relevant to this problem, type it into the computer - don't sit there generating lots of ideas without typing them in.
2. read other peoples' ideas and see what you think. If you do not agree with them then tell us why you don't agree with them by typing the rationale into the computer. If you do strongly agree with them then type into the computer why you do agree.

The facilitator does not seek to put any pressure on the participants to only share lots of ideas or only to share 'high quality' ideas or wild ideas. Instead the instructions are more just to think naturally and share their own knowledge of the problem.

Now that the facilitator's instructions for gathering have been briefly introduced the discussion will move onto explore the nature of the normal and proposed gathering conditions where these instructions are used.

2.1.3.2.2 ... the 'normal' conditions for sharing knowledge

In order to generate a politically feasible outcome, it is the responsibility of group members to contribute their knowledge but it is the responsibility of the facilitator to offer participants the opportunity to contribute their knowledge (Ackermann, 1996).

As explained in Section 2.1.1, in a gathering session participants are invited to contribute their knowledge of an issue by typing that knowledge, in the form of a contribution or causal links, into a console computer. Each contribution and link entered by a participant is shown in a list on their console computer as they are made (as shown in Figure 2.2). A public display of the contributions is made which contains all the contributions and links made by all the participants in the group. This DE group map is displayed by the public computer, via a projector, on a large screen so all the members of the group can see everyone's contributions as they are made (as illustrated in Figure 2.3). The size of the public screen constricts the number of contributions which can be displayed legibly to 65 contributions.

In 'normal gathering' sessions, the public computer is permanently displaying the group map, thereby allowing participants to identify everyone's contributions as they are made (but not identify who contributed them as contributions are anonymous). In these sessions the facilitator attempts to arrange those contributions into related clusters of content similarity on the public computer while participants are contributing them, thereby enabling easier identification of 'core themes' i.e. those themes which emerge from the contributions of group members. For this thesis the 'normal' gathering conditions (i.e. those conditions which are normally employed in a MUGS session) are assumed to be a group working with the public screen switched on and displaying all contributions and links as they are made, as summarised in Table 2.1.

Consequently, the normal conditions assumes that all members can piggy-back off other participants' contributions when, or if, they feel that they wish to (i.e. they can read other peoples' contributions to stimulate their own thinking about issues they had not previously considered (as contained in the contribution they read)). The normal conditions normally enable the participants to freely share causal links from the very start of the workshop (as the participants can see what other people have shared hence can link those contributions and their own).

2.1.3.2.3 … the proposed conditions for sharing knowledge

The above discussion has highlighted the normal conditions for gathering knowledge using GE. This section will only introduce (not argue the merits of why) a proposed format which might enable participants to think more widely about a problem and so share more of their knowledge. This discussion will be critical to the remainder of the thesis. This section will not argue for this proposed format for that is the focus of Chapter 3, where the thesis will develop argument which suggests that the format of GE gathering sessions should be altered to this format in order to enhance the richness of the information shared by group members.

Instead of allowing participants to contribute their knowledge and simultaneously expect them to consider how other participant's contributions affect their world, it will be proposed that two different sessions be used to gather knowledge.

The first gathering session (Stage 1) could allow participants to initially contribute their original contributions regarding the problem with the public screen switched off (essentially

a 'blind' condition as people do not know what contributions other participants have made). Off-line (i.e. not while the participants are viewing the group map) the facilitator would cluster the contributions so that potentially related contributions sit beside one another on the public screen. It should be noted that the participants are not able to see other peoples' contributions so cannot identify causal links between other peoples' contributions during the blind gathering. However, participants can see the identifier code of their own contributions on their console screen so are able to link only their own contributions together during the Stage 1 blind gathering session.

Only after the blind gathering would the public screen be switched on to display the clusters of contributions which were made by the facilitator (in Stage 2). This would enable participants to contribute their perspective on the contributions made by other people in the second gathering session (called a piggy-backing gathering). This perspective would be contributed by participants piggy-backing off themes which are displayed on the public screen. These themes would be up-dated on the public screen to display piggy-backed contributions as they are entered. Participants are able to see the contributions made by other group members and so can also identify causal links between other peoples' contributions. The proposed gathering conditions are summarised in Table 2.1.

Table 2.1 – The normal and proposed operating conditions for knowledge gathering sessions.

	Operating conditions
Normal gathering conditions	• The public screen is switched on and displays all the contributions as they are made. • Participants are able to piggy-back off other peoples' contributions from the start of the gathering. • Participants are able to link other peoples' contributions from the start of the gathering in the workshops reported on here.
Proposed gathering conditions *(The Blind and Piggy-backing Gatherings)*	• A two stage gathering process. • *Stage 1 – The Blind Gathering* - The public screen is switched off and participants are given quiet time to contribute their knowledge without distraction of the public screen up-dating. - No piggy-backing off other peoples' contributions is enabled. - Participants are not able to link other peoples' contributions but can link their own together as they have the identification number for the contribution on their console screen. • *Stage 2 – The Piggy-backing Gathering* - The public screen is switched on and participants are able to see the contributions that other people have made. - Participants are able to piggy-back off other peoples' contributions. - Participants are able to link other peoples' contributions from the start of this piggy-backing gathering.

2.1.4 Concluding the Introduction to GDSSs

This introduction to GDSSs has concentrated on the introduction of one wide-band GDSSs, JOURNEY Making. This has introduced the specific context of how group members were asked to work during the gatherings on which this research is based, and the philosophical basis for so doing. Also explored was the claimed benefits of using GE within a JOURNEY Making philosophy. This section has contextualised JOURNEY Making as being a wide-band GDSS and has considered the aims of the JOURNEY Making intervention, and the claimed benefits from using GE.

The thesis aims to add to knowledge by arguing that, in order to more fully consider a problem, the gathering format be changed so that participants are firstly allowed to share their knowledge of the problem. Then, participants should be encouraged, through piggy-backing, to share their impression of the issues which other group members see as

important. The thesis will propose (in Chapter 3) that this two stage approach is an advance on the normal conditions of GE sessions.

However, as this research will concentrate on those tasks which aim to facilitate the sharing of knowledge between the group members in brainstorming-like activities, it seems necessary to briefly introduce the topic of sharing knowledge during groupwork. The following section will perform this introduction.

2.2 INTRODUCTION TO SHARING KNOWLEDGE IN BRAINSTORMS DURING GROUPWORK

This thesis concentrates upon the sharing of knowledge in brainstorms during groupwork, and so it seems necessary to briefly introduce the basic elements of sharing knowledge in groups, as will be conducted over two main discussions. The first discussion will introduce some main reasons for why individuals might be encouraged to share their opinion of the problem in the development of an outcome to overcome that problem.

The second discussion will briefly introduce the theory which has emerged from much research (typically by narrow-band researchers) on the dysfunction of sharing knowledge in face-to-face interaction during brainstorms. Four main 'process loss' phenomena will be introduced. Significantly though, this discussion will also show why it is believed that GE (in being computer-supported) can generally help the group members overcome these negative process loss phenomena.

2.2.1 Why group members should be encouraged to share knowledge.

It is argued that to understand a problem participants in groupwork might need to understand the wider context in which the problem is set (Eden, 1995b). Hence, when groups investigate a problem the members might benefit from understanding how they, and other group members, understand the interaction of that problem with the rest of the environment in which the problem is set (van der Heijden and Eden, 1998). In other words, the participants must ask themselves "What are the wider causes of these problems and the wider consequences of potential actions?".

However, Stasser and Titus (1987) claim that some participants might enter a group discussion with a fixed opinion of what they want the decision to be. In JOURNEY Making, the basis of this opinion might be their understanding of what the outcome should be such

that it has a positive effect on their department. However, in any group there may be many competing fixed opinions of what the best outcome is as each member might prioritise what seems to be best for them. Stasser and Titus argue that a method by which participants can be 'persuaded' to change this fixed opinion is through introducing them to "unshared information".

Unshared information is that knowledge which is not possessed by every member of the group i.e. that knowledge which one member is aware of but other members are not. The unshared information, when disseminated in the group, might raise the awareness of participants to issues they had previously not considered in their assessment of the situation (Gigone and Hastie, 1993). Therefore these participants may be more able to consider a wider range of consequences of, and alternatives to, potential ways forward because their understanding of their world has been expanded by this new information (Eden and van der Heijden, 1995). This new information might cause the participant to reject their initial opinion of the best way forward and support an opinion that they previously opposed. These participants have experienced a "cognitive shift" to support a different opinion (Eden, 1992a). Essentially Stasser and Titus seem to propose that participants should take the unshared information and re-align their understanding of the best way forward in the situation (a view supported by van de Heijden and Eden (1998)). Stasser and Titus (1987) write, "we argue that unshared information plays a distinctive role in facilitating movement to consensus, altering members' salient information about the decision alternatives, and establishing postdecisional commitment to the group's decision", page 83. Hence, the sharing of unshared information may be one way which the strong divergent opinions of multiple group members can be moulded into one, more consensual, way forward.

The sharing of unshared information enables the process of psychological negotiation to take place (van der Heijden and Eden, 1994). Effectively if group members are able to promote their points of view, and hear the views of other people, then they might start to experience cognitive shift such that they begin to converge their cognitions and develop more shared understanding of the situation, rather than holding their divergent individual views (van der Heijden and Eden (1998), Eden (1995a)).

Burnstein and Vinokur (1975) developed Persuasive Arguments Theory. Essentially they propose that people will modify their opinions to the extent that they have been offered

substantive informational reasons for so doing. Therefore if a participant is presented with unshared strong evidence which supports a way forward that they had previously opposed, then they may be more likely to move more towards adopting that opinion than a participant who is offered weak evidence, or evidence which has already been shared. Hence, a JOURNEY Making group member might perceive that the onus is on them to develop the most persuasive arguments which support their position such that their best interests are incorporated into the outcome.

However, when lots of participants might have unshared information then the group members might have to be creative in the way it is synthesised in order to be able to manage it appropriately, else there could be much confusion over what new information is relevant and relevant information might be overlooked. The philosophy that JOURNEY Making holds is that this complexity of information should be managed effectively, not reduced and the process is one that is designed to manage complexity through group mapping. However, "In general, shared information dominated discussion, and therefore the presumed potency of unshared information is diluted by its underrepresentation in discussion", page 83 (Stasser and Titus, 1987). Essentially a sensible process needs to be provided to facilitate the sharing of knowledge so that people can learn effectively from the unshared information and not overlook it or be overwhelmed by it (a view supported by van der Heijden (1996)).

It is thought that GE might give such a process by each participant having the opportunity to contribute their own understanding of the best way forward without being influenced by shared knowledge. DE then can display, and so hold a constant reminder of, what the unshared information is for each participant as they can view the public screen and realise new pieces of information themselves. Using the public screen as a negotiative device might enable group members to negotiate more effectively as it might help unshared information to be explained and illustrated with reference to a shared model. DE can also enable the group members to be creative and play with the nature of the relationships (and keep a record of these) between those contributions in order to consider the best way forward in the situation. Hence it would seem that using DE might be one way that unshared information is not forgotten during discussion as the public screen can display a constant reminder of it, and the DE map can be up-dated to be relevant given the developments in the negotiation. This might ensure that the potency of unshared information is not as diluted as it might be in

group discussion, as group members are constantly able to refresh their memory of this unshared information it they read the contributions on the public screen.

By extending this argument into the context of the aims of JOURNEY Making (three of which were discussed in Section 2.1.2.3) one can explore how unshared information can turn a strongly opposing participant to be cognitive and emotionally committed to an outcome which is politically feasible. Sharing and learning from unshared information using GE and DE in the way described above might enable group members to learn from the perspectives of other group members and begin to realise where their initial opinion of the best way forward can be improved to take into account the wider perspective (a view supported by van der Heijden and Eden (1998)). It is thought that participants might see procedural rationality in this process which uses the sharing of unshared information as a catalyst for participants changing their opinion. Furthermore, it is believed that the public screen might assist in the negotiation of a shared understanding of the problem in the way described above.

On the ability of unshared information to create cognitive commitment, Stasser and Titus (1987) write, "if discussions are biased towards producing and sustaining agreement [which is the case for most wide-band GDSSs] ... substantial amounts of unshared information, because of its persuasiveness, should facilitate the emergence of agreement and the establishment of stable and certain post-discussion preferences [or commitment]", Page 83 (my emphasis). It seems clear that they might support a claim that unshared information can create real and lasting cognitive shift to create a participant's sustained commitment to the way forward.

Stasser and Titus suggest that the sharing of knowledge might create a real cognitive shift in the participants (i.e. the participants perform reflective learning to create that cognition shift (van der Heijden and Eden, 1998). It might be that only if the cognition of the group members really change to whole-heartedly support the outcome will the group member really be cognitively committed to the outcome for a sustained duration (the development of a sustained outcome is critical to JOURNEY Making (Eden and Ackermann, 1998c). Only then can group members experience the "establishment of stable and certain post-discussion preferences". If the group member simply says that they agree with the outcome, and do not raise the grave concerns they have over it, then the commitment they might claim to have

might vanish after the workshop and they will return to their old opinion. This might seriously threaten a successful implementation of the outcome. In facilitating the sharing of unshared information, and negotiating a consensual way forward which incorporates that unshared information, it is hoped that JOURNEY Making can create real cognitive shift and real cognitive commitment to the outcome.

The "establishment of stable and certain post-discussion preferences" in a group member from creating cognitive shift though sharing knowledge is believed to be heightened in JOURNEY Making by generating a participant's emotional commitment to the outcome. If the group members not only appreciate intellectually (or cognitively) why the outcome might be the best, but have also invested their enthusiasm, effort and hopes into the outcome, they may even more firmly believe that the outcome is the best way of achieving the desired effect. Consequently, they may be even more committed to taking part in implementing the outcome.

It is interesting to note that the above discussion has dealt with the influence of information to change one's opinion. There is a body of research on Social Impact Theory (Latane, 1981, Latane and Wolf (1981), Harkins and Petty (1983)), which explains from a normative perspective why people might change their opinion in groupwork. This theory proposes that group members will change their opinion to the extent of the force with which people in the group pressure them to change (and essentially pressuring them to conform to their way of thinking). However, one might question whether it is actually cognitive shift which takes place when one person changes their opinion simply because the people around them are pressuring them to do so. Instead it might be more likely that the participants will simply cave in to the pressure rather than truly change their opinion and so they might not "establish stable and certain post-discussion preferences". Consequently these pressured group members might actually have no commitment to, what they see as being, the wrong decision and will walk out of the session with no commitment to implementing the outcome.

To enable participants to truly change their opinion and give their commitment to an outcome which they have previously opposed, it seems that the JOURNEY Making process should facilitate the sharing of persuasive reasons for the cognitive shift. If participants are simply bullied into conforming then their commitment to the outcome might be transitory. However bullying can be used in JOURNEY Making (with the agreement between the client

and the facilitator) when the client wants to push through their own agenda and the client can continue to promote the outcome to ensure that it is not transitory. However, it may not only be a process which facilitates the sharing of persuasive unshared information that can create group members' lasting commitment to the outcome. A process which couples this cognitive commitment with the generation of emotional commitment might make group members even more committed to the outcome.

So the main argument here is that sharing unshared information might help in creating cognitive shift which can help the group members come to a shared understanding of the situation. However, it seems that one must consider how participants are able to share these pieces of unshared information. As will be demonstrated in the following section, this thesis would not agree with a view that a process comprising solely of face-to-face discussion is the most effective method for the sharing of new information. It is possible that the potential dysfunction of such a method of sharing knowledge might cause "substantial amounts of unshared information", Page 83 (Stasser and Titus, 1987) to remain unshared.

2.2.2 Four weaknesses of verbal brainstorming in the context of Group Explorer

Much research has been performed into the causes of the dysfunction of face-to-face groups in idea generation tasks where ideas are shared verbally (Diehl and Stroebe (1987 and 1991), Price (1987), Harkins and Petty (1982) Marsh et al (1997)), however this is performed largely from a narrow-band tradition. Narrow-band and wide-band researchers have discovered a number of aspects of groupwork which can negatively affect the ability of the participants to share ideas, for example: the blocking effect; self-censoring; personal agendas and politics; and social loafing, each of which will be discussed in more detail below. However, GE gatherings (in being computer-supported) might enable participants to overcome some of these process losses as the following discussions will also show.

2.2.2.1 The Blocking Effect

During group discussions members of a group can sometimes realise that something else is relevant to their consideration of problem i.e. they have generated a new idea. However, they might be unable to verbally share these relevant pieces of knowledge immediately because someone else is talking. These members are experiencing the "blocking effect" because they are unable to share their idea when it arises (Diehl and Stroebe, 1987). They

are being blocked because they are unable to generate more contributions while they are waiting to share their current contribution.

One reason for this is that communication is distractive. Diehl and Stroebe (1987) claim that people cannot listen to other peoples' arguments and simultaneously generate ideas because of the limitations of short-term memory. To prevent them forgetting ideas, participants might rehearse their idea while they are being blocked by someone else. This rehearsal means that during discussion participants might not be able to use their waiting time effectively by generating new piggy-backed contributions. In fact they might not even be able to listen attentively to the discussion because they are rehearsing their contribution to get the wording just right.

This effect was overcome in Diehl and Stroebe's (1987) experiments when people were free to write down their ideas when they arose. In this condition, people contributed as many ideas as when they were not blocked. The authors concluded that the note-taking enabled participants to record and store ideas more effectively while they were being blocked. Diehl and Stroebe (1991) state that "because blocking slows down the generation of ideas in groups, it might be more effective to ask subjects first to develop their ideas in individual sessions and next have these ideas discussed and evaluated in a group session", Page 508.

Taking this statement and the blocking effect into the context of sharing knowledge in a JOURNEY Making gathering, one might appreciate how GE can be a powerful device for managing the interaction of group members. GE facilitates simultaneous 'speech' of group members by allowing everyone to type contributions into their console computer at the same time. Hence each group member can make all of their contributions when they arise, provided they can type as fast as they are generating! Even during the group discussion the computers are left on and people have the opportunity to type their idea in the DE map if they wish. Hence it might be less likely for people to be blocked as they can make a note of their point by typing it into their computer and see it recorded on the public screen. GE and DE can store and display those contributions and so can act as a memory to help the participants recollect important points during group discussions (Ackermann et al, 1992). Therefore, participants might not suffer from the blocking effect when using GE in the gathering sessions because they can generate and record ideas alone, and then discuss them with other group members.

However, when sharing a console between two or three people some people might feel that they are not free to think about the issues that they want to think about and instead have to follow the direction of a dominant partner. Hence they are being blocked because they are not free to generate and share the contributions that they want to as they have to wait until their partner is finished typing in an idea before they can share theirs. This might be a very productive phenomenon as a group member is able to explore different areas of the issue with their partner. However it might be very frustrating for a participant when they feel that they cannot make their contribution because someone else is dominating their console. The facilitator, with the help of the client, pays close attention to the composition of the sub-groups so that dominant personalities are paired with an appropriate partner. Also sub-groups are frequently changed during a workshop so that people have experience of working with different people, and also so they are not stuck with someone who is dominant.

The blocking of people working in pairs is one trade-off which is made when participants work in sub-groups when sharing contributions through GE. The attraction of having a large number of people in the room (which dictates that people share consoles) contributing to the outcome and producing a (potentially) diverse understanding of the problem conflicts with the potential benefits of participants working alone on the consoles and sharing contributions anonymously. However, a main aim of JOURNEY Making is to build commitment to the outcome, not necessarily to give everyone lots of time to air their opinions (although one might be related to the other it is a trade-off that facilitator and clients are sometimes willing to make).

GE can also allow all participants to review all contributions thereby allowing people to generate and contribute arguments or counter-arguments in response to someone's contribution, through piggy-backing. DE might aid those people in displaying their contributed counter-arguments so that they do not forget it in the heat of the discussion or when they are blocked by someone else. Hence the group map might contain a greater amount of unshared knowledge which might enhance its ability to act as a 'negotiative device'. In this, the map can be used by participants to remind them of what knowledge has been contributed and can act as a focus for group discussion - to point at and illustrate arguments possibly by moving contributions around the screen to get a better understanding of the nature of their causal relationship.

If a facilitator were to rely on group members only sharing knowledge during group discussion then the outcome might be one that is politically infeasible, as it might be one that is a product of the most vocal members of the group (who might block the quieter members) and so might be infeasible to the worlds of the blocked group members. Furthermore, participants who have been continually blocked and have been unable to contribute their understanding of the problem might not see any procedural rationality in a process which has prevented them from sharing their knowledge. By using GE computer technology to give the facility of simultaneous 'speech' the facilitator might hope to avoid these negative outcomes and offer a procedurally rational process which gives everyone the opportunity to contribute their knowledge to what might more likely be a politically feasible outcome.

2.2.2.2 Self-censoring and evaluation apprehension

Diehl and Stroebe (1991) claim that ideas are sometimes not verbally shared with the group because, after hearing the contributions of others members, participants can suppress these ideas through self-censorship. This self-censorship might arise because a member perceives the group to be fully supportive of one course of action and would not be receptive to his/her opposition, or the idea might now sound less relevant or less original given the discussion, or the contribution is very controversial and they do not want to be the one to bring it up. The self-censoring group member might be apprehensive of whether other group members will evaluate their contribution negatively, and so keep quiet. The results of this self-censorship is that the group members may only consider information which supports one way forward, because opposing participants are unwilling to verbalise their ideas and so all the knowledge that is shared is supportive of that way forward.

This self-censoring might not be experienced when using GE technology because participants might get the courage they need from knowing that the contributions are anonymous. The anonymity could give participants the impression that if their contribution is evaluated harshly then they do not look silly in front of the rest of the group as they are not going to be identified as its contributor.

As raised in Section 2.1.2.4, the facilitator and client are careful in the pairs or trios they asked to work together. Sometimes the self-censoring participant might run the controversial

idea past a partner they trust, to gauge their reaction before making the contribution. This might be performed because they feel that they can more easily brush off a negative remark from a partner in private then from an entire group in public. Alternatively, they might perceive that they can negotiate with the partner the re-wording of the idea to make it seem less controversial and more acceptable.

Participants might make more controversial contributions when in pairs than they would when alone, because of a lesser feeling of vulnerability. Essentially they may be more willing to put the group in the firing line of opposition rather than themselves i.e. they hold a perception that there is safety in numbers. Social Impact Theory would propose that a two person group which had opposition directed at it would be more able to stand up to the opposition because the force of the impact is shared between two people, than when it is directed at a single person.

Participants could use the anonymity strategically to their own advantage. They could make the contribution that they have apprehension over and wait to see if there is any support (or opposition) to the contribution. They may gain confidence in how their contribution will be received by the group, and so gain confidence to support it during group discussions. Again this anonymity is not given during group discussions and so the sharing of knowledge during discussion might be restricted in the ways described above.

It is important to note that research does not indicate that GE, or other GDSSs, is able to make self-censoring members contribute freely what they think through using the technology (Ackermann, 1994). However, anonymity (or support from a partner) might give nervous participants the courage they need to make what they see as a controversial contribution.

2.2.2.3 Personal agendas and politics

Another potential dysfunction of participants when working in groups is their potential to seek an outcome which is not the best for the whole group or organisation but one which is personally or politically driven (Carlsson and Walden (1995), Briggs and Vreede (1997)). Participants might seek a personally beneficial outcome to further their own career, for example, the merging of two departments could create promotion opportunities for them. Participants may try to curry favour by agreeing with the opinions of their Chief-Executive,

not because their department would benefit from the resultant changes but because they want to show this power-holder that they support them completely and are a "company man" who should be given more responsibility.

While the identification of the contributor of an idea is certain if shared during group discussion, GE can provide anonymity to group members so that others cannot identify the contributor of certain ideas. Therefore some participants will not be able to support a contribution (possibly by positively piggy-backing off it) just because they know that it was contributed by the Chief Executive (Briggs and Vreede, 1997). Similarly participants will not be able to negatively evaluate a contribution just because they do not like the individual by whom it was made. Also this anonymity of who has shared the contributions can give a political dimension to the sharing of knowledge as the facilitator will be aware, but not the group, if all the contributions that are the focus of a particularly discussion belong to one group member. For example, if the client (with the prior knowledge of the facilitator) makes five similar contributions then that might indicate to the facilitator that this is an issue which the client wants to be raised and see be successful during the group discussion. Hence the facilitator might politically manipulate the group to discuss that issue and use the contributions on the public screen to assist in 'pushing it through'.

2.2.2.4 Social Loafing

Another aspect of groupwork which can be dysfunctional to the sharing of knowledge is social loafing (Latane et al, 1979). This is a narrow-band theory which has been investigated by a wealth of research (Williams et al, 1981). Social loafing (Harkins and Petty (1982), Price (1987), Kerr and Bruun (1983)) is the term used to describe the reduced effort a participant in groupwork exerts because they believe the collective group will compensate for their reduced effort.

Harkins and Petty (1982) explain social loafing as resulting from a perception of task difficulty and task uniqueness. They claim that when people know that their contribution to the group is unique in that no-one else has their expertise nor insight, that individual is less likely to loaf, or loaf to a lesser degree. This is explained in terms of those participants gaining motivation to share knowledge because they are the only person in the group who possesses this knowledge. Furthermore, Harkins and Petty suggest that participants loaf less if the task that they are performing is more difficult, possibly because participants again feel

that their contribution will have more impact on the group because it is their expertise which will guide the group i.e. they feel needed as not just anybody can do this task. Price (1987) suggests that by increasing the task's importance you can reduce social loafing. He suggests that if participants regard a task as important to them, or to the organisation, then they will exert more effort to obtain a favourable outcome.

The social loafing research community seem equivocal as to whether participants loaf less if they believe that their contributions are identifiable. Price (1987) claims that participants do exert more effort when they know that someone can identify those ideas which they have contributed, however, Harkins and Petty (1982) claim that identifiability has no effect. These results would suggest that the facilitator of a GE gathering should not rest alone on letting the participants know that their contributions are monitored by the Chauffeur computer to discourage their loafing. A more effective method might be through making the participants feel that they bring a different understanding of the world from other members and that it is essential that all those understandings are shared with group.

However, the JOURNEY Making facilitators which this researcher has talked to are not actually that bothered if people loaf. They are concerned about meeting the aims of JOURNEY Making in their facilitation practice and are not that concerned if people loaf if the aims are met. If participants have had an opportunity to share their ideas (i.e. not being blocked continually), have felt free to share those views (i.e. not self-censored because of evaluation apprehension) and have not been ambushed by personal agendas (other than those of the client) then these are more important than if some of the participants loaf. In fact it is almost expected that people will pay more attention to some of the discussions which are more personally interesting to them, than to a discussion that has nothing to do with them. People loafing in JOURNEY Making is fine, provided that they firmly commit to the outcome, and that their commitment is real.

This discussion of how to motivate participants to contribute knowledge during groupwork is one that is central to most narrow-band research on brainstorming, but as has been shown has peripheral relevance to JOURNEY Making. This is an issue that will be picked up on extensively in Section 4.1.

2.2.3 Concluding the Introduction to sharing knowledge

It has been argued that only by group members sharing their knowledge of the situation can group members generate an outcome which is considerate of the wider context in which it is to be implemented, and so be politically feasibly. It has been argued that the sharing of information that is unshared can be a catalyst for people changing their opinion as they are able to identify weaknesses in their initial perspective and the merits of other perspectives. Hence the sharing of unshared information can also be a catalyst for the group negotiating an outcome to which the members have real cognitive commitment.

This section has also sought to understand some of the potential dysfunction of groupwork when participants share knowledge verbally. Specific reference has been made to how GE can overcome some of this dysfunction and how the facilitator typically manages the sessions to enhance the effectiveness of sharing of knowledge.

2.3 CONCLUSION TO THIS CHAPTER

This chapter has set the scene for the following chapters to build upon. It has :

- discussed the use of Group Explorer as a tool to facilitate the sharing of knowledge between group members in JOURNEY Making gatherings, as well as explored the benefits that participants might enjoy from using GE.
- explored the nature of the relationship between JOURNEY Making, Group Explorer and Decision Explorer.
- introduced the wide-band GDSS called JOURNEY Making and briefly reviewed it aims in the light of the four workshops on which the data analyses of this thesis will be based.
- uncovered reasons why the sharing of unshared knowledge in groups can be a powerful way to generate real consensus and sustained commitment of group members to a politically feasible outcome.
- explored some potential dysfunction of group discussion as a medium for sharing knowledge and suggested that computer-support can help overcome some of these dysfunction.

This chapter has also introduced a discussion which will be developed further in Chapter 3 which proposes that the format of gathering knowledge in gathering might be changed to a two stage format. The proposed two stage format enables participants to firstly contribute their understanding of the problem during a blind gathering. Then participants would be

encouraged, through piggy-backing, to consider the issues which other group members see as important. It will be argued in the following chapter that this two stage approach might *'improve practice in facilitating gatherings'* over the normal gathering conditions.

CHAPTER 3. - EXPLORING THE MERITS OF THE PROPOSED FORMAT FOR GATHERING

As introduced in Chapter 2, this thesis will explore the potential contribution of the proposed format for gathering knowledge during JOURNEY Making MUGS workshops. In Section 2.1.3.2 it was proposed that a two session format might be better in some dimensions than the normal gathering conditions, however no rationale for that proposition was offered. The discussion in Section 3.1 will provide such a rationale.

However this researcher acknowledges that there are good reasons why facilitators might be nervous about running a proposed format gathering on a real-world group. Hence it is felt important that this research reflects upon the potential pitfalls with running a proposed format gathering (as will be done in Section 3.2). This discussion aims to raise the facilitators' awareness of how they may wish to approach the proposed format such that they might not experience any problems.

However, firstly this chapter will explore the rationale for suggesting that the proposed format might *'improve practice in facilitating gatherings'* over the normal format.

3.1 PROPOSING THAT BLIND/PIGGY-BACKING SESSIONS ARE IMPROVEMENTS ON NORMAL SESSIONS

It is believed that the process of sharing knowledge using a normal gathering format is flawed in a number of ways, as will be explored in this chapter. Furthermore, this chapter will show how the proposed format might make some contribution towards enabling the participants to free themselves from these flaws, for example freeing participants from bounded vision ((Huxham and Dando, 1981) also called cognitive inertia (Dennis et al, 1997)). It is thought that gathering information using the proposed format might bring new process gains which could enhance the feeling of the outcome being politically feasible and building the participants cognitive and emotional commitment.

It will be argued that the proposed two stage approach is an advance on the current format of GE sessions as it might allow participants to consider argument supporting, or opposing, other participants' contributions in a more productive way (as discussed in Section 3.1.1). Using piggy-backing to generate this argument pre-discussion will be shown to have

potential impact on the effectiveness of the diversity of the knowledge shared which might have impact on group discussions. Also causal linking by participants will be shown to be one form of inter-relating the knowledge of other participants and the proposed format will be shown to better enable the sharing of causal links in the piggy-backing session.

In arguing for the benefit of the proposed format over the normal one, Section 3.1.2 will contrast the sharing of knowledge in each of these formats. This contrast will be performed by exploring the possible consequences of extreme cases where participants exploit the freedom they have to make contributions - for if one can consider the consequences of extreme cases then we can also appreciate the consequences of standard cases. However, before such a discussion is begun, it is necessary to offer some background to the terminology which will be used in this chapter. Also a deeper discussion of the type of knowledge which is aimed to be collected from better facilitating the process of piggy-backing off other peoples' contributions will be performed.

3.1.1 The nature of the knowledge which is shared in JOURNEY Making gatherings

This section will introduce that type of knowledge which participants are encouraged to share in JOURNEY Making gatherings in Section 3.1.1.1. It will be argued that it is important for meeting the aims of the JOURNEY Making intervention (those aims explored in Section 2.1.2.3) that these types of knowledge are able to be shared. This section will set the ground on which the discussion (in Section 3.1.2) will be based. Section 3.1.2 will show how the normal and proposed formats of gathering facilitate the sharing of each of these different types of knowledge.

3.1.1.1 Classifying the contributions that are made

Essentially one might view a group map as containing three types of contributions:

1. **natural contributions** - These are contributions which have been generated naturally i.e. without being stimulated by other contributions, possibly during the blind gathering or before the participant has read the public screen. These are pieces of information that a participant thinks should inform the outcome.
2. **piggy-backed contributions** - These are contributions which have resulted from piggy-backing. These are aspects of knowledge that the participant has been stimulated to remember as being important, through synthesising their knowledge with other peoples'.

Paulus et al (1995) comment on piggy-backing, "ideas generated by other [people] could stimulate novel associations for individuals exposed to those ideas", Page 250.

3. **original contributions** - These are contributions which stimulate the piggy-backed contributions to be generated. This is a term which will more be used to refer to the contribution which stimulates the sharing of a new piece of knowledge. If during the piggy-backing session the participants share a piggy-backed contribution then it is the original contribution which stimulate that piggy-backed contributions to be made. Original contributions cannot explicitly be found in this research, i.e. one cannot search the group map for original contributions as a researcher cannot tell which was the original contribution for a piggy-backed contribution. Similarly one cannot purposefully share an original contribution i.e. one cannot say "Right, I am going to share a contribution that someone will piggy-back off".

The process of gathering which is proposed in this thesis is one which aims to enable participants to contribute natural contributions then piggy-backed contributions and causal links. For reasons that will emerge during this chapter, it is believed that if participants (using this proposed format) can exhaust their own knowledge when making contributions and then identify relationships between their knowledge and other peoples' knowledge, then the participants might be able to contribute a greater amount of their substantive knowledge to inform the generation of an outcome. It seems necessary to discuss the importance of each type of knowledge to understand the nature of the knowledge it represents. However, as a participant cannot decide to share an original contribution on purpose then this discussion is limited to natural contributions, piggy-backed contributions and causal links.

3.1.1.2 The importance of natural contributions

Natural contributions are those which have emerged naturally in the participant rather than being stimulated by other contributions. They are contributions that might represent issues that a participant thinks are very important to their world and should be considered when an outcome is being generated.

In asking the participants to share their own contributions the facilitator is essentially asking the participants to think in a 'differentiated' way about the issue (Grise and Gallupe, 1999). Differentiated thinking 'asks' the participant to consider the multiple dimensions of the problem from their own perspective.

It is important that participants have an opportunity to make their natural contributions because these might represent the issues which they confront every day and might be regarded as being issues that must be considered in the generation of an outcome. Any outcome that did not incorporate these everyday issues might be one that is politically infeasible. Hence it might be an outcome will not have the cognitive commitment of the participants when they realise the significant omission that has been made.

3.1.1.3 The importance of piggy-backed contributions

Piggy-backing is a term used in this thesis to describe how people process the contributions of other participants in a session to stimulate their own generation of contributions (Jablin (1981) calls this practice *hitchhiking*). Osborn, arguably the founding grandfather of brainstorming, said about piggy-backing, "a spark from one mind will light up a lot of bang-up ideas in the other just like a string of fireworks", Page 300, 1953. Therefore, he would clearly support a proposal that people can generate new contributions by considering the contributions that other people have already made.

A piggy-backed contribution might arise from a participant's understanding and interpretation of the world in which the contribution has effect. For example, an original contribution might be to "improve customer relations". A Computer Analyst might piggy-back "build web site for potential customers" while a Transport Officer might piggy-back "guarantee delivery within 24 hours of receiving the customer's order" and a Marketing Representative might piggy-back "offer incentives to long-standing customers". This illustrates how a group of people with different understandings of the world can build a more detailed picture of the situation when piggy-backing is encouraged. By enabling other participants to expand on existing issues, the group might build a richer picture of the situation from a number of perspectives because more knowledge is able to be contributed (as found in research by Connolly et al (1993), Dennis and Valacich (1993) and Dennis et al (1997)).

In any type of gathering session the aim of piggy-backing is to gather insights into how each participant understands their world to interact with other participants' worlds. Therefore, by piggy-backing, the group members are sharing substantive data of how each participant's 'world' would be affected by the phenomena which another participant regards as impacting

on their 'world'. Consequently, participants can gain insight to the wider implications of a potential outcome by understanding how that outcome affects each participant's world (effectively the participants are reflectively learning about the situation (van der Heijden and Eden, 1998)).

Also knowledge of the way in which contributions relate to one another can be shared by the participants through causal linking. This is another way in which group members can share understanding of the way in which their 'world' interacts with that of another participant, as will be described in Section 3.1.1.4.

This insight of the inter-relatedness of the participants 'worlds' can build cognitive commitment to the outcome because the procedure through which knowledge, firstly about their own world and secondly about its interaction with other worlds, is gathered might appear rational and can be argued as being rational (an argument performed above). In addition to building cognitive commitment to the outcome, gaining insight to the wider implications might build emotional commitment, as participants feel pleased that they are able to encompass such a range of information into their outcome. The feeling of joy, or maybe relief, that the outcome is based on a process which allowed everyone to contribute might enhance their emotional commitment. This process can also build a belief in the procedural rationality of the workshop as participants are able to share their own knowledge as well as learn about the perspectives of other people.

Piggy-backed contributions are important because they also represent knowledge which has been realised as being important after considering the contributions made by other people. They are a product of the synthesis of other peoples' contributions with one's own knowledge. Grise and Gallupe (1999), in their Integrative Complexity Theory (ICT) framework, talk about encouraging people to perform integrative thinking by getting people to make conceptual connections between different piece of information. One way of integrating one's thinking with other people is through piggy-backing as people are asked to think about a piece of information and develop connections to their own knowledge, possibly by re-conceptualising the problem (also integration can be performed through causal linking as will be shown in 3.1.1.4). However, piggy-backing might also be thought of being differentiated thinking in Grise and Gallupe's ICT framework, as the participants are being exposed to another view of the problem and might generate different perspectives

of that view. Whether one is performing integrative or differentiated thinking when piggy-backing will depend on the nature the piggy-backing, as will be described in 3.1.1.3.1.

Before the discussion moves on to the importance of causal links (the third form of contributing knowledge in JOURNEY Making gatherings) it is thought worthwhile to consider how participants might actually perform integrative and differentiated thinking when piggy-backing. This will be considered through a discussion of the types of piggy-backing that participants might perform.

3.1.1.3.1 Types of piggy-backing

It is proposed that, theoretically, piggy-backing can be categorised in three ways: creative; bounded; and abstract. The category into which a contribution would fall (if it were possible to code the contributions in this way which it is believed not possible to do) would depend on the thinking strategy through which the contribution was generated. The reason why it is not possible to code the piggy-backed contributions into these categories is that one cannot identify what is the original contribution. However, as will be shown in Chapter 8 some analysis of the nature to the piggy-backed contributions is possible.

Firstly, a piggy-backed contribution can be *bound* within same the domain to which the original contribution pertains. Instead of using the original contribution to stimulate creative ideas about the issue, the participant only thinks within the 'boundaries' of the original contribution. Satzinger et al (1996) might call these contributions paradigm-preserving (PP) or paradigm-neutral (PN) ideas, because they can be thought of as contributing more understanding and refinement to existing knowledge, rather than re-defining the problem in creative ways. These contributions may emerge from participants who have suffered bounded vision whilst considering that contribution, for they are simply creating a contribution which lies within the same boundaries of the original contribution - that is not to say that it is not a useful contribution they have made. This might indicate that the type of thinking being performed here was integrative piggy-backing in the ICT framework (Grise and Gallupe, 1999), because the participant's thinking is essentially converging on the original detail of the contribution whilst integrating it to their own perspective. To exemplify, an original contribution might be "improve customer relations" and the *bounded* piggy-backed contribution could be "hold more meetings with customers" as a means of achieving better relations. The bounded contribution, it is proposed, is not a creative

contribution because it is not generating new themes for consideration, it is adding more refinement to existing themes.

Osborn (1953) suggests that piggy-backing is justified if it "takes a lead from what someone else has thought up", Page 241, but it is not appropriate to simply plagiarise other peoples' contributions. Hence, he might support the notion that bound piggy-backing is useful, which (provided participants does not contribute a mass of similar and redundant ideas) this researcher would agree with. They are thought to be useful because they indicate the level of different participant's support for an issue being thought of as important. A lot of contributions from one participant might indicate that the issue is highly important to their world and must be considered.

Secondly, a contribution can be regarded as being generated *creatively* from an original contribution. For example, an original contribution might be "improve customer relations" and the *creative* piggy-backed contribution could be "improve cash flow". The participant might argue that as a consequence of improving customer relations the customer will pay more speedily thereby improving cash flow. Therefore the piggy-backed contribution will be unique in that it is using the original contribution in a creative way to generate new issues for consideration about the situation. Creative piggy-backing is essentially differentiated thinking as per Grise and Gallupe's ICT framework (1999), because the participants is able to diverge off the issue in a creative way and see new perspectives of the original contribution. Satzinger et al (1996) call these paradigm-modifying (PM) ideas because they really re-define the original contribution and offer a new slant on it, rather than just refining what is already known (as in *bounded* piggy-backing). One might suggest that the participant is just thinking a little more about the consequences of issue (for example), but it is that thinking which is the creative element of the piggy-backing.

Finally, the contribution might be *abstractly* related to the original contribution, or not related at all. The only argument which could be made for the contribution being regarded as piggy-backed is that the original contribution is some way stimulated the participant to generate that contribution. For example, the original contribution might be "improve customer relations" and the abstract piggy-backed contribution might be "expand current premises". If asked, the participant might explain that the piggy-backed contribution came to her because a customer was talking yesterday of a spare piece of ground nearby which might

have been suitable for the company's expansion. Therefore the piggy-backed contribution is in no way related to the original contribution, but was the reason for its generation (and so this thinking might be thought of as being differentiated thinking which diverges from the original contribution in Grise and Gallupe's ICT framework (1999)). In Satzinger et al's terminology one might refer to these contributions as paradigm-modifying (PM), as they are introducing a completely new area to the group members consideration of the problem.

In the above examples, it may be that the facilitator has asked the group to piggy-back off contributions regarding customer relations and the abstract contribution of "expand current premises" might be viewed as not contributing to that specific issue. However, if the contribution is one which the group regard as relevant and important enough to discuss then it should be explored, as only once all salient options have been exhausted can the participants be confident that the outcome is informed by the consideration of a wide proportion of relevant issues. Consequently, only once these issues have been explored can the group be sure that their outcome is the best and their confidence in the substantive rationality be secured, and their cognitive commitment be built to that outcome (as a wide range of alternatives have been considered but not selected). Hence it is thought that each of these piggy-backing categories is important, just as each contribution during a gathering session is important as the group members will decide what is directly relevant to the problem.

3.1.1.4 Importance of causal links

Participant-entered causal links are essentially a demonstration of an understanding of how the issue represented by one contribution might effect another (Eden and Ackermann, 1998a).

If a participant did not make any causal links then it is not felt to be gravely concerning because it does not necessarily indicate that the participant has not thought about the relationships between the contributions, it just indicates that they might not have typed it into the computer. Granted, the facilitator might be concerned that there are no links to give some initial structure to the material and so the job of identifying suitable links during the discussion might be harder. However, this might not have serious consequences for the sharing of knowledge as some structure will be exerted on the contributions. It is not felt that main elements of the problem will be ignored if participant-entered links are not made,

and so the failure to contribute links might not have significant impact on the political feasibility of the outcome, as when natural (or even piggy-backed) contributions are not shared.

However, if the reason that the participants have not shared any causal links is because they do not know what to do then this is concerning to the facilitator as it might put into jeopardy the procedural rationality of the session as participants are sitting there not knowing what they are supposed to do.

Gathering knowledge from the multiple perspectives of participants (through them making both natural and piggy-backed contributions) has been shown to increase the amount of substantive data available to participants. This greater availability of information can increase the rigor of participants' consideration of the issues impacting on the problem, thereby potentially increasing the political feasibility of the outcome (Kameda et al, 1997)). Therefore by group members making natural and piggy-backed contributions, one might hope that the outcome can be based on a more detailed understanding of the problem. Furthermore, in the same way as piggy-backing can be thought of as being integrative thinking (as commented on in Section 3.1.1.3), so might be the identification of causal links as the participants are able to integrate other peoples' ideas into their own knowledge of the issue and thus build a richer understanding of the issue.

The following section will explore how the different formats of the normal and proposed sessions support the making of natural and piggy-backed contributions. It is believed that it is very important for participants to have opportunities to make natural contributions as well as piggy-backed contributions. However, it is felt to be less important in terms of sharing knowledge if participants do not make causal links. The reasons for this belief will be given in the following section.

3.1.2 Contrasting normal and proposed gathering formats

This section will concentrate on exploring the way in which normal and proposed formats of gathering can facilitate the sharing of natural and piggy-backed contributions and the participants' identification of causal links. It will begin (in Section 3.1.2.1) by introducing the contrasting ways in which natural and piggy-backed contributions can be shared in the proposed gatherings as opposed normal ones. As will be shown, the proposed format for

gathering (as will be argued in Section 3.1.2.3) might be able to manage the piggy-backing of participants to a greater extent than the normal format which (will be explored in Section 3.1.2.2) and this is one main benefit of the proposed format.

3.1.2.1 Making natural and piggy-backed contributions and causal links in normal and proposed gatherings

In a normal gathering session natural contributions are made at will. The participants have the freedom to concentrate on their own generation of contributions or they can read what others have contributed and make piggy-backed contributions or identify causal links. Although the facilitator does ask them to make natural contributions then piggy-back and link, it is completely up to them if they actually do this. Participants might be distracted by the public screen up-dating with new contributions and so ignore their sharing of vital natural contributions in favour of contributing piggy-backed ones. Or they may completely ignore the making of any contributions and spend all the time linking other peoples' contributions. Hence participants may not contribute their knowledge about an issue before they start to piggy-back and become interested in other issues, or link contributions made by other people.

However, in the proposed gatherings, participants are strictly controlled as to when they are able to view other peoples' contributions and piggy-back off them (or link them). The facilitator is in control of the public screen and the participants can only begin to piggy-back off, or link, other peoples' contributions when the facilitator decides it is time and activates the public screen. Hence the participants are given time to exhaust their natural contributions before they are distracted by the public screen up-dating with natural contributions and participants feel compelled to read them and piggy-back off them, or link them.

Under the proposed format participants might be more likely to contribute a greater proportion of their natural contributions before being stimulated to make contributions on some other issue. Whereas under normal conditions participants are free to contribute any combination of natural contributions, piggy-backed contributions and causal links at any time.

However this potential benefit of the proposed format does come at the cost of time, for it is possible that the proposed format might take longer than the normal format. That extra time is taken with introducing the participants to the contributions after the blind gathering and letting the participants read the contributions before starting to share their new contributions or causal links. Also time is lost by splitting the sharing of contributions into two sessions i.e. the blind and piggy-backing sessions. It seems necessary to expand this brief discussion of the differences between normal and proposed formats of gathering. Section 3.1.2.2 will explore the characteristics of the normal gatherings and Section 3.1.2.3 will explore the proposed format gatherings.

3.1.2.2 Normal gathering format - free switching from making normal to making piggy-backed contributions?

In the normal gathering conditions (the format which was described in Section 2.1.3.2.2) the participants are asked to make all their contributions regarding the problem at hand and, when they wish, to view the public screen and use the contributions which are displayed to piggy-back off and to identify causal links between. It is felt that participants in the normal format might benefit from being given clear instructions by the facilitator - exhaust your natural contributions, and then piggy-back and link.

However, it is proposed that some participants might ignore these instructions (sub-consciously or otherwise) and start piggy-backing or linking when they feel like it, not when they think they have exhausted making their natural contributions. Marsh et al (1997) found that participants can sometimes unconsciously fail to follow clear instructions when participating in idea generation activities. In their experiments they explicitly asked participants not to plagiarise previously contributed ideas, yet plagiarism occurred. In two other studies people were asked to try their hardest in cognitive tasks (Harkins and Petty (1982), Price (1987)) and yet social loafing was found to exist each time so they ignored their instructions. Hence, it seems that even if a facilitator asks participants to follow instructions they may fail to do so.

Failure to make natural or piggy-backed contributions (or both) appropriately might have severe consequences for the outcome that is generated, as will be demonstrated through an exploration of three scenarios. The first scenario (Section 3.1.2.2.1) will explore the consequences of when a participant spends all of his time making natural contributions, and

the second scenario, the consequences of one participant spending of her time making piggy-backed contributions (in Section 3.1.2.2.2). The third scenario (in Section 3.1.2.2.3) will explain the consequences of a participant spending all of her time contributing causal links.

3.1.2.2.1 A participant spends <u>all</u> of his time making natural contributions

Participants might have lots of natural contributions that they feel are relevant to the group's consideration of the problem. Both the normal and the proposed format allows the participants to make only natural contributions. In the normal session participants might become engrossed in their own contributions and never look up from their console screen until the facilitator asks them to stop making contributions. It is thought that participants are less likely to be solely focussed only natural contributions in the proposed format because the facilitator interrupts their chain of thinking during the gathering (by the facilitator switching on the public screen and drawing the attention of the participants to it by talking). Hence it seems more likely that where participants do ignore all other contributions and concentrate on their own idea generation, the proposed format might be able to better disrupt this, for it is believed that participants might benefit from looking at other peoples' contributions. The following example illustrates some of the potential consequences of only making natural contributions.

In this example, one participant of a MUGS group workshop is a Marketing Director who only generates natural contributions. He uses all the time available to him to contribute all the issues affecting Marketing and fails to take the opportunity to piggy-back off other people's contributions or make causal links. He has considered the problem widely and wants to promote his points of view extensively.

However, the Marketing Director might suffer from bounded vision without realising it. He may be contributing lots of natural ideas but they might all relate to one aspect of an issue when he actually has a wide understanding of the issue. If one were to look at his contributions they might all convey a similar message, or even re-word already made contributions, and so contribute nothing new to the group understanding. Essentially this Marketing Director is sharing lots of contributions which are bound to the same definition of the problem (in the same way bounded piggy-backed contribution were). Dennis et al (1997) claim that group members should generate ideas on divergent issues rather than concentrating on one or two issues and generating a plethora of ideas around those issues,

because those ideas might contribute very little which is new to the understanding of the problem. The outcome that is generated might be one that is informed by only a small proportion of the issues which face the Marketing Department, although those issues may be explored in some depth. Consequently the outcome might not adequately take account of the multitude of other factors which are important, rendering it to be politically unfeasible. One might expect however that the Marketing Director would be able to redress the imbalance of the contributions he has made by raising the issues he has missed during group discussion.

When group discussions occur he is unaware of the potentially damaging consequences on his world of some of the contributions which other people have contributed. He did not spend any time thinking about other peoples' contributions and so has not contributed any critique of them from his perspective. Again one might expect that he would be able to contribute that critique during group discussion.

However, in the group discussion he is victim of the dysfunctional workings of the group when trying to share his knowledge (possibly those described in Section 2.2.2). For example, he might be continually blocked and is unable to share his concerns. He might be nervous about verbally opposing some vocal group members who are promoting their position and is so consumed with the conversation that he forgets that he is able to type his thoughts into GE (which is still switched on). He may be concerned of evaluation apprehension as everyone will be able to measure the worth of his concern, so he does not contribute his ideas to put himself on the firing line. He might feel that he is wrong and everyone else is correct so he does not even bother to contribute his concerns (although there is a silent mass of participants who share his concerns but also think they are alone on their view). Whatever the reason the result might be that the Marketing Director does not share his concern over other peoples' contributions and so the outcome that is generate is not feasible in his world.

If this Marketing Director had contributed these concerns anonymously, when he was given time to, then he might be able to refer the group to the anonymous contributions which argue against the position being presented. This might have opened a discussion of why the outcome was one that is not politically feasible for all departments. Also if he had been able to navigate the problem more effectively then he might have been able to contribute his thoughts on a variety of aspects of the problem, not just the one or two he thought about in

some detail. From this example one can appreciate why it is important that the people do make their natural contributions, but also contribute their thoughts on what other people have contributed. By reading what other people have written the Marketing Director might have realised that he had omitted critical issues as well as been able to share his opinion on other peoples' contributions.

Granted, this is a severe example of the potential dysfunction of groupwork, but major dysfunction do occur with disastrous effects (see, for example, Weick (1991) for an example of dysfunctional groupwork).

3.1.2.2.2 A participant spends <u>all</u> of her time making piggy-backed contributions

A normal gathering session allows the participant to start piggy-backing when they want to so a participant could use all of her time to piggy-back thereby fail to generate contributions naturally. She might do this because she sees it to be very important to defend her world rather than promote it, or simply because she fails to grasp what she is being asked to do. The following example will highlight the potential problem with this strategy for sharing contributions.

In this example, our piggy-backer is a Finance Director and is the only person in the group with a deep knowledge of the organisation from a Finance perspective. If this person fails to make her natural contributions i.e. those issues which affect the world of the Finance Department, then at the end of the gathering session there may be no themes central to Finance (Ackermann and Eden, 1995) i.e. the Finance world might not have core concerns displayed on the group map. All the other themes might have detail from a Finance perspective, because that is what the piggy-backer has been contributing, but Finance's core concerns might not be adequately represented.

One may argue that if a Financial issue was central to the problem then someone else would contribute it, but those people might expect the Finance Director to contribute it and suppress their own contribution. Another argument might be that the deficiency could be picked up on in group discussions, however it may be possible that the blocking effect, distraction or evaluation apprehension prevents a participant from being able to verbalise the issue in group discussions. One might claim that the facilitator might be able to spot what is happening. However, GE chauffeur software would indicate that the Finance Director is

generating lots of contributions and the facilitator might see lots of Finance-related contributions and assume that everything was going smoothly.

This participant might be suffering from bounded vision as she might only be able to generate ideas which lie within the bounds of those which have already been contributed. She may not be able to contribute any new issues through creative or abstract piggy-backing, but more just contribute her perspective of existing issues through bound piggy-backing. Hence, the Finance Director might also suffer from bounded vision but in a different way to the Marketing Director (who was bound within a narrow set of his knowledge base and contributing very similar contributions).

Ultimately, the outcome might be politically infeasible and illogical to the Finance world, however the nature of the sharing of knowledge and the dysfunction of doing so have prevented this unfeasibility from being highlighted sooner. The realisation by participants (both within the group and actors external to the group) that a major deficiency has been encountered could cause them to doubt the procedural rationality of what they are doing because "Surely this should have been highlighted sooner to prevent us wasting our time". It might be easier for the group members to blame a third party (the facilitator or the process) than a group member. This scenario might never have been encountered if the Finance Director had contributed the Finance world's main concerns, not just react to everyone else's concerns, when she was given the opportunity to do so.

This research does not start from the view that piggy-backing is an undesirable phenomenon. Rather it seeks to explore if controlling piggy-backing might enable participants to share their natural contributions, prevent participants from experiencing bounded vision, and increase the diversity of contributions which are generated. It is not assumed that this diversity will automatically lead to better contributions or better decisions. Only by considering as wide a set of contributions as possible can one maximise the potential to develop a better solution.

3.1.2.2.3 A participant spends <u>all</u> of her time making causal links

Participants are encouraged to share their knowledge of how the contributions on the public screen relate to one another by contributing causal links (see Section 2.1.1 for a more detailed discussion of participants making causal links). In order to be able to identify the

causal relationships, participants must read the contributions on the public screen in some depth.

In this third example of the potential problems with the format of normal gatherings, the Production Manager does not make any contributions, but prefers to synthesis other peoples' contributions by linking them. She might perceive that she can share her contributions during group discussion when she can exert her personality on them so people will take more notice, than if they got lost on the public screen if she typed them in. In effect, the Production Manager will use group discussions to share knowledge rather than discussing the knowledge that had been shared.

It is thought that if the Production Manager only contributes causal links and does not contribute any of her knowledge of the problem in the form of contributions, then this is the most concerning scenario of the three described here. Not making any contributions means that she does not have <u>any</u> of her contributions represented on the public screen. Also none of the other group members will be able to piggy-back off her contributions and so might not consider their department's interaction with a production perspective.

The outcome might be one that is politically infeasible to the Production environment, if the participant is (in the same way as the Marketing and Finance Directors) prevented from sharing any of her knowledge during group discussion. However, in this case the Production Manager might need to share far more of her knowledge because she has not contributed any ideas during the gathering. It may be that the Production Manager is the one who is blocking other people because she is talking so much, and not letting people contribute their ideas. This could be because she needs to use the discussion to promote her department and so other people suffer because they cannot get equal air-time. The facilitator might be very aware of trying to stop individuals dominating discussion, so even if this Manager was successful in getting air-time during group discussion, the facilitator might try to encourage other participants to speak by giving them more space at her expense.

The Production Manager might leave the session full of enthusiasm for generating a strategy using computer technology. She might believe that the outcome is great and be committed to helping implement it. However, when she goes back to her department she might have problems in demonstrating its substantive rationality to her colleagues. She might have big problems in explaining how an outcome which (as she only realises when questioned) is

politically infeasible can be generated. One consequence might be that her emotional and cognitive commitment would vanish as she realises that she cannot demonstrate to her colleagues that their department is benefiting from the outcome (as her department's concerns are even not represented in the map).

It seems that the Marketing Director has been so busy promoting his world, that he has failed to acknowledge its interaction with other worlds. Furthermore, the Finance Director had been concentrating only on sharing contributions of how her world interacts with other worlds, and has not shared any of her understanding of her own world. The worst case is perceived to be that with the Production Manager, where she contributed only causal links and did not share any of her knowledge during the gathering. These situations might have been avoided if two sessions were created to give participants a clearer structure to follow - one to share their own knowledge about the world, the other to share the synthesis of that knowledge with other peoples' knowledge. Therefore it initially seems beneficial to only allow participants to make their natural contributions and then allow them to piggy-backing off others' contributions and identify causal links. This two stage process might ensure that at least the main themes are captured.

Furthermore, it seems that participants might need guidance as to when it would be an appropriate point to start piggy-backing. Although a facilitator could perform this guidance verbally i.e. "Please feel free to start piggy-backing now", this researcher would argue that two separate sessions would ensure that natural and piggy-backing idea generation were controlled and seen as separate in what knowledge they are trying to gather from the participants.

3.1.2.3 Proposed gathering format - controlled switching from making normal to making piggy-backed contributions?

The above section has introduced the type of idea generation which participants are currently encouraged to perform under the normal conditions, and some of the potential dangers of this approach. This section will discuss the benefits to be gained from sharing knowledge in the proposed format of a dedicated blind and piggy-backing sessions (the format described in Section 2.1.3.2.3).

The thesis proposes that to fully facilitate piggy-backing a facilitator might like to consider offering the participants two gathering sessions. In the first gathering session (which has the public screen switched off) participants would concentrate on sharing their natural contributions regarding the problem which are important in their world. [Participants would not necessarily consider the relationship between their world and any other world]. Essentially participants would work in a nominal group set-up (Burton, 1987) employing a method of sharing knowledge which is somewhat similar to brain-writing (Nagasundaram and Bostrom, 1995a). It is proposed that when the group members exhaust their natural contributions (i.e. their memory is "empty" of natural contributions (Getty et al, 1987)) they begin to contribute more and more redundant contributions (redundant in that they have already shared a contribution on that same issue made and so it is not new). Although the facilitator will not know when participants become 'empty' (and need stimulating to make new contributions), they can switch on the public screen to show all the natural contributions which had been made at a time that they think is appropriate (and this might have the effect of giving the participants mental refreshment as they are asked to perform a different cognitive activity (Ackermann and Eden, 1995)). The facilitator would briefly introduce the themes which they have identified as existing in the contributions (themes were generated by the facilitator in a way similar to that performed by Ackermann and Eden (1995)). In the second session, participants would concentrate on sharing their understanding of how other peoples' contributions impact on their world.

At the start of the second session the facilitator could ask participants to first make piggy-backed contributions and when they are ready to link the various participants' contributions that are displayed on the public screen. It would be hoped that when reading the contributions to identify causal relationships, the participants might be stimulated to contribute thoughts that they see as very important i.e. continue thinking and piggy-backing as they link.

De Bono (1971) says that discontinuity in the mind of an individual enables them to consider very different aspects of a problem. In the proposed gathering format, the new contributions that people are able to see when the public screen is switched on might break the continuity of their thought. Hence they may be able to access discontinuous information from the variety of contributions on the public screen and be able to free themselves from bounded vision (similar to that experienced by the Marketing Director) and consider new

issues of the problem. One benefit from asking the participants to share ideas in a blind format or in a piggy-backing format is to help them to overcome the phenomenon of bounded vision (Huxham and Dando, 1981). Blind gathering might help participants to escape from bounded vision as the participants will not be exposed to other peoples' ideas and so might be free to think about any aspect of the situation they think is relevant, rather than being bounded by what other people see a relevant. Piggy-backing gathering might help participants to overcome bounded vision by offering them discontinuous stimuli that aim to enhance their divergent thinking through providing themes on which participants can generate contributions. Dennis et al (1997) suggests that piggy-backing off diverse stimuli enables people to piggy-backing in a diverse way). If participants are stuck in a rut during the blind session (or suffer continuous thought which they cannot break out of) and cannot think of any different issues of relevance (Nagasundaram and Bostrom, 1995b) then they could view other peoples' contributions during the piggy-backing session and realise areas of relevance which they had not yet considered.

Another benefit of the proposed format is that participants will have dedicated time before the group discussion to critique other peoples' contributions. Participants would have the time to consider issues within themselves and then build argument for, or against, some issues (Burnstein and Vinokur, 1975). It is proposed that participants might enter group discussions with a clearer understanding of the course of action which is best for them if they had an opportunity to quietly consider the consequences for their world of the issues proposed. Also participants would have had an opportunity to record their argument supporting their thoughts in DE which will eventually be displayed on the public screen and will be able to remind them of the aspects of the issues they had considered relevant.

By allowing each participant to critically appraise the issues before group discussions people might be more committed to their stance on the issue because they have an argument to support their position (Harkins and Petty (1981), McGuire and McGuire (1996)). Hence people might be less likely to be bullied into unfavourable options because they have had time to mount a defence (or attack) as to why that option is unfavourable for them (Latane, 1981). Therefore the purpose of group discussion would not be to share knowledge. Rather discussion would be used to discuss the knowledge which has already been shared with the group through natural idea generation and piggy-backing so that consensus can be achieved as to the best way forward.

3.1.3 Conclusion : Arguing that the proposed gathering format is an improvement on the normal one

Section 3.1.2 has performed a detailed discussion of the making of natural and piggy-backed contributions during normal and proposed gathering format. It has argued that it is important for the participants to be able to share natural contributions as well as piggy-backed contributions. It has suggested that the gathering of causal links maybe should not compromise the gathering of either natural or piggy-backed contributions. Each type of contribution represents a different type of knowledge and failing to gather one type of knowledge might have concerning consequences for the political feasibility of the outcome.

A case has been made for changing the normal format of GE MUGS gathering sessions to prevent participants from piggy-backing when, or if, they feel that they wish to. This section has argued that to create two gathering sessions, one to capture a person's understanding of their world and the second to capture their understanding of how their world interacts with other people's world, is an advance on the normal format. The proposed format might enable the participants to understand more about the context of the problem and therefore can be confident in the political feasibility of the group's outcome. Considering that participants might have already contributed a lot of their salient knowledge, group discussions might be used to allow participants to discuss the knowledge which has been shared and to use the group map as a negotiative device which can aid discussions. Hence the primary function of the group discussion would not be to share unshared information.

It is thought that there is a reasonable theoretical basis on which the changing of the format for gathering knowledge in GE sessions might be justified. However, there may be potential problems which facilitators could experience if they were to try the proposed format. It seems worthwhile to consider these problems such that any implementation of the proposed format might be informed be a critical assessment of the format.

3.2 WORDS OF CAUTION OVER USING THE PROPOSED FORMAT

So far it has been implied that the participants might benefit, almost unconditionally, from the change in gathering conditions to the proposed format. However this might not always be the case. This section will reflect upon four reasons which might cause the proposed format to be ineffective.

The first reason (discussed in Section 3.2.1) concerns the potential of the participants to make a mass of redundant contributions, because they do not know what contributions other people have made and so the facilitator has to waste a long time deleting or merging these redundant contributions with the participants. The second reason is that participants might be bored in the blind gathering if they have exhausted their generation of contributions and are sitting there doing nothing (as explained in Section 3.2.2). The third reason (in Section 3.2.3) is that participants might suffer the debilitating effects of cognitive overload at the start of the piggy-backing session when they are first shown a mass of contributions made during the blind gathering. Lastly, participants might simply be unsure how to correctly identify causal relationships between contributions and so either fail to contribute causal links, or contribute incorrect causal links (as discussed in Section 3.2.4).

This section will offer insight to those group characteristics which might negatively effect the amount of benefit that participants might gain from the proposed format. Hence this discussion will explore the group characteristics which could indicate which groups might respond well to the blind and piggy-backing gatherings. Any understanding of the conditions under which the proposed format might not be effective will govern its application in real-world sessions. It will also further understanding about the nature of groups who benefit from GE, and about GE in general.

3.2.1 Collecting a mass of redundant contributions during the blind gathering

The first reason why the proposed format might fail to benefit participants in the way it is designed to centres upon a significant problem which might be encountered whilst performing the blind gathering session. The problem is that participants might duplicate a mass of contributions which have already been shared by other participants in that gathering and that when these are removed from the public screen the participants might only have a much reduced number of their contributions left. They could share redundant contribution unwittingly as they are not able to see what contributions other people have made (as Dennis and Valacich (1993) found in their brainstorming experiments).

Redundant contributions are those which add little new knowledge to the group members' understanding of the issue, according to Taylor et al's (1958) definition. The process of merging and deleting redundant contributions (hereby referred to as deleting for simplicity,

but will imply merging of contributions as well) could be lengthy and very frustrating, for both the group members and the facilitator. The reason for this being lengthy is that facilitators cannot just delete contributions as they wish, rather they ask the group if a contribution is redundant and for their permission to delete it (Eden and Ackermann, 1998c) so that the group members take ownership of the group map (Ackermann (1996), Graham (1977)). The group members typically negotiate the deletion between themselves and might decide to merge the wording in compromise, in which case negotiation takes place on what the right wording should be. This can take some time to perform.

Sometimes a small amount of overlap in the contributions from participants is welcomed by the facilitator, as it gives some indication of how wide-spread the feeling that an issue is important (Eden and Ackermann, 1998c) and how much group ownership there is on that issue. However, if the degree of redundancy captured in a session is very high i.e. say 30-40% of the contributions are redundant, then this might be destructive of the continuity of the session, as the negotiation of redundant contributions needs to be done before any real progress can be made. This research is only concerned with the potential of group members to contribute a mass of redundant contributions, not the potential to contribute a rogue few redundant contributions as these might not be disruptive to the gathering process.

Through an example, it is possible to highlight the problem which might exist from a high number of redundant contributions, when only a few basic contributions are duplicated. If there were 10 group members each with their own console then (for demonstration purposes) say that there are 5 basic contributions each which receives one duplicated contribution from 6 of the group members i.e. 6 members duplicate each of the 5 basic contributions. Therefore there are 30 contributions which refer to 5 different themes on the public screen. These 30 contributions might take up nearly half of the public screen, yet when deleted, the public screen has around 5 non-redundant contributions left. This extreme example demonstrates the consequences of gathering a small number of redundant contributions on the number of contributions which have to be deleted and the impact on the public screen before and after deleting contributions.

Only by appreciating how participants might be able to generate the same idea can a process of gathering be developed that hinders that happening. Consequently, Section 3.2.1.1 will seek to understand how participants might be able to generate redundant contributions

because of 'shared knowledge'. Section 3.2.1.1.1 will discuss how the gathering process might be developed to reduce the probability of making redundant contributions. Then Section 3.2.1.1.2 will explore the difference (in terms of the likelihood of making redundant contributions) between individuals working alone and those working in sub-groups. Section 3.2.1.2 will consider some causes of participants making redundant contributions other than their shared understanding of the problem. Finally, the discussion of redundant contributions will end by reflecting upon why a mass of redundant contributions might be made in blind sessions but could be less likely to be made in the normal gatherings (in Section 3.2.1.3).

3.2.1.1 Why lots of redundant contributions might be captured

It is thought that one reason why a large number of redundant contributions might be captured in a gathering is because of the degree of shared understanding between participants. If two participants perceive similar issues as being relevant to a problem then they have a high-degree of shared knowledge regarding this problem, argue Lumsdaine and Lumsdaine (1995). Therefore when asked what these views are in a gathering session, one might expect that the two group members would share similar contributions, hence they might share a number of similar, or redundant, contributions.

So from where might this shared knowledge in participants originate? Participants are sometimes from the same organisation, and often from a similar level of the hierarchy in that organisation (or possibly even from the same department, for example, if the client wants to get them 'on board' with the initiative that is being developed). Hence some participants might hold a similar understanding of the pertinent issues because their understanding of their occupational world has been coloured and shaped by the world in which they co-exist (van der Heijden and Eden, 1994). Therefore, one might expect that they would contribute some similar contributions as each other because their occupational cognition has been developed in a similar working environment as each other.

It could be thought that the proposed format would be most suitable for multi-organisational groups where group members might have a wider diversity of occupational cognisance about the problem and so might naturally approach the gathering from different perspectives. It also could be thought that the proposed format might be suitable for single organisational groups but where the group members are from diverse departments in the organisation (for example, one member from Marketing, Finance, Production, Personnel, Information

Technology and Quality Control) and so again might have diverse occupational cognisance. It is possible that where group members hold a significant level of shared understanding (for example, if they all come from the one department in an organisation), the blind gathering conditions might cause participants to share a large number of redundant contributions. So how might the facilitator be able to help participants to generate a unique understanding of the problem? The following discussion will explore one possible approach.

3.2.1.1.1 Overcoming capturing lots of redundant contributions

One way to approach the problem of participants making redundant contributions could be to help participants approach the problem from subtly different perspectives to other group members.

By creating slight ambiguity in the exact nature of the problem (but not the extent that participants have not got a clue what the problem they are considering is), participants might be able to hold subtly different interpretations of what is the problem. This subtly different interpretation might result from participants being able to interpret the problem in line with their understanding of the world in which they operate. Their understanding of the world will be subtly (or dramatically) different from other participants understanding, hence they might be able to use that difference to interpret the slight ambiguity in the problem. This might enable them to consider the problem from an angle that is different to other group members.

However, there might be many problems in the facilitator setting a slightly ambiguous problem. For example, some participants might doubt the procedural rationality of generating contributions on a slightly ambiguous problem. In this, the new JOURNEY Maker might not have the confidence that the facilitators know what they are doing because they perceive that they are not running the session well. Another problem with setting a slightly ambiguous problem is that if many of the participants approach the problem from a wildly different angle then linking their greatly divergent contributions could be a difficult problem. Hence it is important that while some ambiguity in the problem is desirable, the problem should certainly be clear in its primary focus, but can be subject to interpretation.

3.2.1.1.2 Exploring redundant contributions of individual and sub-groups

It seems worthwhile to consider the different operating conditions under which JOURNEY Making sessions are run, and explore how the number of redundant contributions might be effected by the shared knowledge of participants. This discussion might give some insight to whether participants working alone on their console might somehow be more prone to making redundant contributions than participants working alone or when sharing a console in a sub-group of two or three participants.

When individuals work alone on their console computer they might do so in silence, without talking to their neighbour (much in the way of nominal group technique (Burton, 1987) but Nagasundaram and Dennis (1993) contend that social interaction between individuals is not necessary in ideation tasks, as ideation is primarily a cognitive activity rather than a social one (Page 464)). Therefore if an individual is a little unsure of exactly which angle they are to approach the issue from (because of problem ambiguity) then they may not be able to get social comparison information as to what the neighbour understands the task to be.

However, when working in groups of two or three people one might expect that if members are unsure of from which angle they are to approach the problem, then the participants could be able to negotiate some common understanding of the problem within the sub-group as they see it. It is possible that each sub-group will negotiate a different understanding. However, when the members verbally negotiate this understanding it is possible that members of other sub-groups listen in, if they are still not completely sure of what is the exact problem. This might result in a common understanding between the sub-groups of from which angle they might approach the problem. Essentially, this might result in many of the participants approaching the problem from a similar angle, which might heighten the probability of them sharing similar, or redundant, contributions. Furthermore, some participants might even hear other sub-groups negotiating the precise wording of a contribution, and decide that they too will contribute that same idea because it is also relevant to them.

A participant in a sub-group might gain social comparison information from listening into the negotiations of other sub-groups. Hence the two sub-groups might work on the same understanding of the problem and this might cause the number of redundant contributions to be higher than for sub-groups than for individuals working alone. This is because individuals working alone might be able to hold a unique understanding of the problem and

so make contributions from their unique perspective. Hence it might be that sub-groups contribute a greater number of redundant contributions that individuals working alone.

Three key points seem to have emerged from this discussion of the potential pitfalls of collecting lots of redundant contributions. A facilitator might like to consider these key points before running a proposed format gathering session. These points are that,

- The proposed format might be best for multi-organisational, or multi-departmental groups where a great amount of shared knowledge might be less likely to be found.
- Where group members are from the same organisation then slight problem ambiguity might enable participants to interpret the problem slightly differently which might enable them to share different perspective.
- When the group members work in sub-groups then participants might negotiate a shared understanding of the problem and so might be more likely to share redundant contributions.

It seems necessary to consider if there are other reasons for redundant contributions being made as will be discussed in Section 3.2.1.2. This will enable the consideration of whether the gathering process needs to be developed in different directions to hinder the mass making of redundant contributions arising from other causes.

3.2.1.2 Exploring the cause of cognitive overlap between JOURNEY Making participants

At the beginning of Section 3.2.1.1 it was proposed that one reason for the making of redundant contributions was a shared understanding of what the problem is. Problem ambiguity has been offered here as one method for helping participants to overcome this. However, there may be other characteristics of the blind gatherings which have impact on the number of redundant contributions that might be made. The following bulleted discussions will consider what additional factors to problem ambiguity might be needed to overcome the sharing of redundant contributions during the blind gathering.

- The suppression of real concerns in politically tense groups - It is possible that some group members will feel comfortable with the group and so have little concern over sharing their real opinion (Shah and Jehn, 1993). However in other gatherings the environment might be tense and the participants might suppress their real concerns for fear of being attacked. Therefore participants who suppress themselves might only

contribute safe contributions which they believe they know the reaction of the other group members. It may be that these safe contributions are those issues that everyone talks about every day. Hence if lots of people only share the contributions that they hear everyday then it is possible that GE will capture lots of redundant contributions because they may all talk about similar issues every day and so the ideas are shared. In order to develop a gathering process to overcome this potential problem, it might be that emphasising the anonymity of contributions will give the participants the confidence to share their ideas that diverge from the safe line that they may think exists (Cooper et al (1996) found that anonymity encouraged the sharing of controversial ideas).

- The size of the group when all members work alone i.e. 4 compared to 10 members - Members of large groups from an organisation might be more likely to overlap in their shared knowledge about a problem than members of small groups, simply due to the fact that there is more knowledge in the group, hence there is more knowledge that might be shared. Hence it might be that members of large groups might be more likely to contribute more redundant contributions as they have more shared knowledge between them. Consequently it might be that there is a greater likelihood that large groups will overlap in the contributions they make than small groups (a finding which Dennis and Valacich (1993) made with groups size of 6 and 12 members). In order to develop the gathering process to overcome this impact of shared knowledge, it is thought that slight problem ambiguity might contribute somewhat to the capturing of non-redundant contributions. However, it is possible that a significant number of redundant contributions might still be made due to the cognitive overlap of participants.
- The difficulty of the problem - Hard problems might make participants think more rigorously about the issues and so generate contributions from more divergent perspectives. To explain, a problem might be deemed to be hard because the participants have not thought about it before and so do not have a lot of salient contributions about the issue. Therefore the participants might need to generate new contributions in the session rather than just make those contributions which are immediately apparent. This might effect the number of redundant contributions that are made as thinking about the issue causes people to contribute different contributions rather than the bog-standard ones that are salient and might be shared. It would seem that slight problem ambiguity can be used to add complexity to the problem.
- The amount of time participants have in which to make contributions – Participants might only generate redundant contributions in the latter stages of the blind gathering or

in the piggy-backing gathering, because they have finished making salient contributions from their own unique perspective, and have resorted to contributing the bog-standard contributions. This might suggest that the blind or piggy-backing gatherings could in fact be cut short in order to hinder redundant contributions being made.

The above list outlines four additional elements of gatherings that might increase the likelihood of participants sharing redundant contributions. It is believed that if the problem is one that is sufficiently ambiguous to enable the group members to interpret it in different ways, then that is one step towards helping participants not to share redundant contributions. However, it is felt that there may still be a risk of participants making mass redundant contributions for these four reasons. Hence a process of sharing knowledge that also accounts for these four elements might be most effective in hindering the sharing of a mass of redundant contributions.

Now that the conditions under which the number of redundant contributions might be greatest have been explored, Section 3.2.1.3 will introduce one explanation for why blind gatherings might capture redundant contributions while normal gatherings might not.

3.2.1.3 Redundant contributions in blind gatherings, but not in normal gatherings.

The sharing of redundant contributions has not been a significant problem in normal gathering sessions in which this researcher has been involved as an assistant facilitator. The structure of blind gatherings might cause participants to generate and make contributions somehow differently to participants in a normal gathering.

In normal sessions, participants are encouraged to look at the public screen to see what other group members have contributed. Participants appear to restrain themselves from reproducing contributions that are already displayed on the public screen. Therefore group members might generate a norm or heuristic that dictates that they only contribute non-redundant contributions i.e. a duplication heuristic. When the group members have the ability to find out if their contribution is non-redundant by searching the public screen, they might take the opportunity to do so (a proposition that Dennis and Valacich (1993) call redundancy avoidance and evidence for which their study discovered). This suggests that in normal sessions the public screen might allow participants to identify if their idea has already been contributed before they type it in, and so it might prevent them from making a

mass of redundant contributions. This is also the case in piggy-backing sessions so it might indicate that there might not be a mass of redundant contributions made in those sessions.

The inability to practice this heuristic in blind gatherings might cause participants to duplicate a large number of contributions in the proposed format, resulting in having to perform an unacceptable level of deleting redundant contributions.

3.2.2 Participants become bored during the blind session

A second potential problem from changing the format of GE gathering sessions is that participants might become bored while performing the initial blind gathering session. This is because participants may be finished generating contributions before other group members and so have to sit there and wait until the session gets moved on, and they are asked to do something else. The participants will be unable to move on themselves because the public screen is switched off, and so the participant might perceive that they have to sit there waiting to move on.

One might argue, on a theoretical level, that these participants could spend the time productively by thinking deeply about the problem and so make new contributions (Rawlinson, 1981). However, in practice this might not be the case. Once people have had the opportunity to share their salient contributions they might just switch off mentally and decide not to think deeply about the problem. These people might quickly become bored and frustrated that the group is not making good progress.

If a participant does become bored and frustrated then they might begin to doubt the procedural rationality of a session in which they are sitting around doing nothing. A feeling of procedural irrationality might effect their interest in the following sessions and maybe compromise their commitment to the outcome, as a perception of procedural rationality is thought to contribute to a participant's cognitive commitment, as seen in Section 2.1.2.3 (and as proposed by Eden (1992a)). It might therefore be critical to these participants that the reasoning behind the blind session be explained and any concerns or frustrations be addressed. Only then might the participants who are bored still be confident in the procedural rationality of the two sessions. Also the facilitator might like to watch the participants for signs of boredom (for example, participants looking impatient) and so gauge the feelings of the participants to indicate when the group should move on.

One might say that participants might also become bored during the normal gathering or during the piggy-backing gathering. However, during these two gatherings participants have some focus for their attention. If they do finish making contributions in either of these sessions then they can spent their time actively doing something like reading the other peoples' contributions which are displayed on the public screen. Hence they might not perceive that they are wasting their time sitting doing nothing in the normal gathering as they might with a change in format to the proposed gatherings.

3.2.3 Cognitive overload during the piggy-backing session

The third way in which the proposed format might fail to bring the benefits it is designed to could be due to cognitive overload (Nagasundaram and Dennis (1993), Grise and Gallupe (1999)). For this thesis, cognitive overload is the partial inability of the brain to efficiently and accurately process new information, due to the mass amount of that new information that it has to cope with. Cognitive overload might be experienced by participants at the start of the piggy-backing session during their first opportunity to see all the contributions made during the blind gathering.

Two possible consequences of cognitive overload in the piggy-backing session might be that,

- participants are unable to process the content of the contributions and dumbly read the contributions (possibly repeatedly) without actually learning from them (as suggested by McLeod and Liker (1993)). If this happened then participants might not learn about the range of different issues that are contained on the public screen and instead only be aware of a small proportion of them.
- participants just give up trying to read the contributions because they are unable to manage the contributions and possibly become frustrated (as suggested by Miller (1962) and Gallupe and Cooper (1993)). Hence participants might not use that time to consider other peoples' contributions and share their own perspective of them.

Each of these consequences might result in the participants not sharing their own opinion of the range of issues that are contained on the public screen. This could effectively result in a similar situation to that described in Section 3.1.2.2.1, when the Marketing Director did not make piggy-backed contributions, but instead only made natural contributions. Briefly, this

could cause the outcome to be one that is not informed by some participants strong opposition to the contributions from other people, because they did not know what were the range of thoughts. For this reason, and for the reason of the participants not seeing procedural rationality in a session where they are unable to do what the facilitator asks of them because of cognitive overload, a facilitator might prefer not to ignore cognitive overload.

One way the process is designed to help participants work through their cognitive overload, is by the facilitator giving a brief verbal overview of the themes they have identified in the contributions which are displayed on the public screen. This might help participants to realise where the different themes appear to be so they can move around those different issues rather than concentrating only on one (a similar technique was adopted by Nagasundaram and Dennis (1993) to help their participants with cognitive overload).

Participants might also suffer from cognitive overload during normal format gathering sessions. Curiosity might encourage participants to read the public screen to find out what other participants are thinking rather than contribute their own knowledge of the issue. The speed at which the public screen can up-date with new contributions might cause participants to quickly become overloaded with the mass of information to which new contributions are continually being added. Hence the issue of cognitive overload might not be particular to the proposed format. However, one way around cognitive overload might be for participants to share some contributions in the blind session of the proposed gathering format as during that time they might not suffer cognitive overload as they are not receiving a mass of new information.

3.2.4 Contributing a mass of incorrect causal links during the piggy-backing session

The last reason why the proposed format might fail to run as it is designed to, is concerned with the making of causal links by participants during the piggy-backing session. It might be that participants are simply unable to identify potential causal links, or even understand what they are supposed to be doing. As the discussion in Section 2.1.3.2.3 highlighted, in the proposed format the facilitator asks participants to identify and contribute causal links during the piggy-backing gathering. However, often the facilitator gives participants a very brief introduction to the principles and thinking strategies behind causal mapping and maybe

these instructions do not enable participants to understand what they are supposed to be doing.

It is possible that when the participants actually try to identify causal links for themselves they get them wrong, in which case the facilitator might need to delete or review them. Deleting a causal link does not take a long time at all, but as with the deletion of redundant contributions, the process of the group negotiating the deletion of the link can sometimes take some time.

However, this problem of participants contributing incorrect links is one that might also be found in the normal gathering format. Both formats involve participants reading the contributions on the public screen and identifying and typing in the causal links. Hence there does not appear to be any reason for why participants will be unable to contribute causal links in the proposed format and yet be able to contribute them in the normal format. Consequently this might not be a potential problem which is particular to the proposed format.

3.2.5 Conclusion : On the words of caution

This section has reviewed four aspects of the proposed format gatherings which any JOURNEY Making facilitator might benefit from being aware of. It is not felt that these potential problems are reasons for automatically dismissing the proposed format, for it is believed that if the facilitator considers the merits of the ways of overcoming the potential problems then the proposed format might work smoothly. Specifically, this section has discussed how:

- a mass of redundant contributions might be made in the blind session. This has been explained through a number of causes, one of which is from the participants interpreting the problem in a similar way and possessing a high degree of shared knowledge. Making the problem slightly ambiguous has been offered as one way of overcoming this potential pit-fall.
- participants might become bored (and consequently frustrated) during the blind gathering as they have exhausted their contribution of ideas and are sitting there waiting for the session to move on. Hence the facilitator might like to re-iterate the procedural rationality of what they are doing and watch participants for signs of boredom.

- cognitive overload during the piggy-backing gathering might stop participants from being able to contribute knowledge of their perception of other peoples' contributions. Hence facilitators might like to consider how they can introduce the contributions to the participants to help them with navigating the contributions effectively.
- the identification and contribution of causal links might be difficult for the participants and so they might contribute a mass of incorrect links, as they might do during the normal format.

The thesis has offered ways of overcoming each of these potential pit-falls. Hence facilitators might gain some confidence that they can be avoided when they run a proposed. Facilitators might also gain confidence in the merits of the proposed format from realising that this method has been used in practice on several occasions with groups from real organisations. During these occasions, data were collected of how the group members were working. This data will be used to *'explore what happens in gatherings that are run as part of a real-world JOURNEY Making workshop, in order to improve practice in facilitating gatherings'.*

3.3 CONCLUSION

This chapter has explored the reasons for why this researcher is proposing to change the format of gathering knowledge in JOURNEY Making gatherings.

It has been suggested that the sharing of three types of knowledge (those being natural contributions, piggy-backed contributions and causal links), is important to the participants of the workshops (in terms of being able to explore a broad range of the problem), and also to the JOURNEY Making facilitator (in the development of a smooth gathering). Section 3.1 suggested that the proposed format is able to structure the sharing of knowledge such that participants are able to share (possibly) all three types of knowledge as well as to see procedural rationality while they do so. Furthermore it was suggested that when working in the normal conditions some participants, albeit in extreme cases, might concentrate on sharing only one type of knowledge which might result in the outcome being politically infeasible to them.

However, as was explored in Section 3.2, the facilitator who considers running a proposed format gathering should be aware of four potential pit-falls, namely, the capturing of

redundant contributions, the cognitive overload of participants, the participants being bored when they have finished the blind gathering and the making of a mass of incorrect links. However, some potential strategies have been offered to the facilitator which might help them to avoid these pit-falls.

It is believed that this chapter has provided a reasonable theoretical basis to justify the exploration of the proposed format of gathering. Hence the rest of this thesis will concentrate on developing an appropriate methodology through which the proposed format gatherings can be analysed (Chapters 4 and 5) and on reflecting on the data analyses of the data which this research has been able to capture (Chapters 6 to 9). Chapter 10 is 'Reflections' on the research process.

The following chapter will explore the type of research which has been performed on group brainstorming. It is hoped that this review can inform this researcher as to how he might construct a solid research methodology through which this research programme can *'explore what happens in gatherings that are run as part of a real-world JOURNEY Making workshop, in order to improve practice in facilitating gatherings'.*

CHAPTER 4.- EXPLORING THE SIGNIFICANCE OF NARROW-BAND RESEARCH METHODOLOGY TO JOURNEY MAKING RESEARCH.

Most of the research performed on brainstorming is done from a narrow-band perspective. Wide-band GDSS researchers seem to assume that the brainstorm (or 'gathering' in JOURNEY Making terminology) is a means to an end, whereas typically narrow-band researchers treat the brainstorm as an end in itself. Wide-band researchers seems more interested in exploring how the method of groupwork can be developed such that the group members can gain benefit from new methods (see, for example, Johnson and Johnson (forthcoming) who report in their experiences of facilitating distinctive competencies mapping by group members).

However, it is believed, for the reasons given in Chapter 3, that progress can be made in sharing knowledge better in gatherings using the proposed format. It is necessary to develop a robust research methodology such that the benefits (and potential pit-falls) participants might experience from participating in the proposed format can be gauged appropriately. It was hoped that some indication of how to explore these gatherings might be gleaned from reviewing narrow-band research methodology for brainstorming.

However, as was mentioned in Chapter 1, there are three significant limitations in narrow-band research on brainstorming which hinders it in guiding how to gather and robustly analyse data from JOURNEY Making sessions. The first of these limitations concerns the whole perspective from which these researchers study brainstorming. They adopt a positivist's approach to exploring the working of participants which does not sit comfortably with the more interpretive and reflective JOURNEY Making approach, as will be explored in Section 4.2.

The second limitation of lessons to be learned from narrow-band research methodology centres on the surprise nature of task the researchers use in their brainstorming experiments (as will be explored in detail in Section 4.3).

The third limitation is the primary focus of researchers in the outcome of the brainstorm. It will be argued that the ideas made during the brainstorm are decomposed for positivistic analysis in a way that is inappropriate to JOURNEY Making because they analyse the

number and quality of contributions which is not that interesting to JOURNEY Making research. For this research it is necessary to explore the ability and willingness of participants to work in a group and it is felt that narrow-band research fails to go far enough in how the ideas are analysed, as will be shown in Section 4.4.

Considering that these three limitations cover the narrow-band researcher's approach to data collection and philosophy of inquiry, the task they use, and the nature of the analyses they perform, it will be argued that narrow-band research methodology on brainstorming is of limited value to JOURNEY Making researchers. However, before the limitations of the narrow-band methodology are explored, it seems necessary to conduct a short overview of which elements of narrow-band electronic brainstorming literature which has been reviewed in this thesis.

4.1 NARROW-BAND RESEARCH

A mass of narrow-band research was used by this researcher to shape his understanding of brainstorming. That research gave indications of potentially interesting aspects of brainstorms which he might explore in his own data. This thesis has already incorporated that theory into previous chapters, specifically

1. Persuasive Arguments Theory, page 33
2. General theory on sharing information in groups, page 33-36
3. Social Impact Theory, page 36
4. Blocking effect, page 37-38
5. Evaluation apprehension, page 40
6. Personal Agendas (although not exclusively narrow-band work), page 41
7. Social Loafing, page 42-43
8. Cognitive inertia, page 46
9. Piggybacking, page 49, 57, 64,
10. Integrative Complexity Theory, page 50-53
11. Paradigm preserving and modifying ideas, page 51-53
12. Plagarism possibly resulting from social loafing, page 56
13. Sharing redundant contributions, page 66
14. Social comparison information, page 70
15. Social interaction during brainstorming, page 70
16. Group size, page 72

This theory has been useful to this researcher, however, it is felt that it might contain three limitations with respect to transferring it directly to JOURNEY Making, as the following sections will explore.

4.2 THE FIRST LIMITATION : THE NATURE OF THE RESEARCH INQUIRY.

The first limitation of some narrow-band research performed on brainstorming, concerns the researchers' aim to uncover the nature of the way people work in groups. This section will start by showing that narrow-band researchers are interested in manipulating experimental conditions to gauge the way in which group members react to the changes. Secondly, the aims of JOURNEY Making will be re-introduced (in Section 4.2.2) to explore the conflict between manipulating experimental conditions and the nature of the research philosophy which can inform JOURNEY Making.

4.2.1 The constructs which are researched by narrow-band researchers

The theories explored by narrow-band researchers include (references to meta-analyses are included below): evaluation apprehension, bounded vision (or cognitive inertia), distraction/conflict theory, cognitive overload, anonymity (identifiability of group members), productivity loss (encompassing social loafing and free-riding), sucker effect, production matching, contextual cues, co-ordination of effort, group cohesiveness, heterogeneity and homogeneity of group members, social facilitation effect (encompassing social comparison theory, mere presence and learned drive), and entrainment.

No discussion of the theories will be performed in this section. Instead it is thought more sensible to explain these theories at a relevant point in the thesis (if they have not already been explained at a relevant point). If the reader desires to explore these in more detail then the following meta-analytic-type reviews offer good overviews and are a source of references:

- Mullen et al (1991) provide a meta-analytic integration of 18 articles on productivity loss in brainstorming groups.

- Bembasat and Lim (1993) perform a meta-analysis of 31 experimental studies of the effects of Group Support Systems. They integrate the characteristics of the group, the task, the context and the technology.
- Dennis et al (1996a) found 21 studies which satisfied their selection criteria of using a same time, same place, GSS (manual and computer supported studies).
- Sanders's (1981a) article details an integrative review of 44 articles on social facilitation i.e. the theories of mere presence, learned drive and distraction/conflict.
- Bond and Titus (1983) meta-analysed 241 studies on social facilitation theories.
- Karau and Williams (1993) report in their meta-analysis of 78 studies of social loafing.

These meta-analyses are based on a significant amount of quality research and are themselves important pieces of work. This researcher certainly found narrow-band research to contain a plethora of well-informed theory which contributed significantly to his basic understanding of the issues facing the participant of a brainstorm. While most of the theory which as emerged from narrow-band work is very relevant to this research in informing the phenomena participants might experience when JOURNEY Making, it is felt that the nature of their inquiry is inappropriate for transfer, for reasons to be raised below. Hence it is the process of the narrow-band research, and not the theory, that is in question here.

4.2.2 The constructs which are researched under JOURNEY Making

JOURNEY Making researchers are interested in understanding how the process of groupwork can be developed to better achieve the aims of an intervention. As was claimed in Section 2.1.2.3, the aims of the JOURNEY Making interventions on which this research is based were, in part, a focus on mobilising a participant's thinking in order to generate an outcome which is appropriate to the situation, whilst developing the participants' cognitive, and emotional commitment to that outcome. Hence this JOURNEY Making researcher is interested in developing methods of group working to better achieve these aims. It is believed that the approach to analysing social behaviour which some narrow-band studies adopt does not contribute to understanding how participants work in real-world workshops and so it is inappropriate for transfer to this research as will be discussed in Section 4.2.3.

The aims of the JOURNEY Making interventions (those aims on which the data analyses in this thesis are based) can be re-interpreted to explore the constructs of groupwork in which

these researchers have interest [and the nature of the research JOURNEY Making might perform to better understand how this can be achieved is given in square brackets].

1. Thinking can be encouraged by giving each group member the **opportunity to contribute** their opinions to the generation of an outcomnalty].
2. The **synthesis of these contributions** can uncover new options or ways of looking at a different participants' knowledge].
3. Participants should **understand the wider context** of the option through considering the alternatives to, and consequences of, any option i.e. its feasibility for implementation [developing a process which better enables the consideration of alternatives and consequences].
4. Substantive rationality (the first feeling of cognitive commitment) can emerge from the confidence a group member has in being able to demonstrate to others, and themselves, that **the outcome is based on solid reasoning** [researching how a process which enhances solid reasoning can be built].
5. Procedural rationality (the second feeling of cognitive commitment) (that **the process of decisions making is a sensible one**) can emerge by making real progress in a problem and giving participants the feeling that they are having real impact on the outcome [establishing how a sensible process which makes progress and is transparent can be offered to participants].
6. **emotional commitment** can be built if a participant perceives that they have had significant impact on the generation of that outcome (i.e. procedural rationality) as they may perceive the outcome to be one that is good for them [a process which gives participants the perception that they are having impact on the outcome].

The aims of JOURNEY Making can be fulfilled through providing a suitable, rational and robust process in accordance with the six aspects of the aims listed here. For JOURNEY Making researchers it is the development of process which facilitates the JOint Understanding, Reflection and NEgotiation of strategY which is the target of their effort. These researchers' reflections of applying the process can inform the continual development and better achievement of those aims. The researchers are not interested in manipulating experimental conditions in order to understand the conditions under which participants (for example) are less likely to loaf during a brainstorm, for the reasons described in Section 2.2.2.4 and explored further in the following section.

4.2.3 Contrasting narrow-band and JOURNEY Making research

Researchers of JOURNEY Making are not interested in explaining the performance of group members in the same way as narrow-band researchers. The latter category of researcher assumes a very positivistic stance to exploring the way in which participants work during brainstorms. They seek to control and explain social behaviour by performing controlled experiments. Wide-band researchers welcome the messiness and unpredictability of real-world research. Just as "strategic decisions are shaped by a variety of contextual influences arising from past events, present circumstances and perspectives on the future" Page 307, Eden (1995b), so might social behaviour.

Consequently, this wide-band researcher will not test experimental conditions in a positivistic fashion. Rather he must listen to, observe and learn from the participants and react to what they feel is important. Also he can explore the activities participants perform to gain some insight as to how participants might work during them. Ultimately his work should contribute to understanding the sharing of knowledge in groupwork from the perspective of the participants. As Bryman (1988) writes, "any attempt to understand the social reality should be grounded in people's experiences of that social reality", Page 9.

4.2.4 Conclusion on the first limitation

From this researcher's reading of brainstorming literature, narrow-band researchers tend to test the conditions under which the participants exhibit the greatest, or least, amount of effect from a variable being changed using a positivistic research methodology, an approach whish is antithetical to JOURNEY Making. For this reason this aspect of the research methodology of narrow-band work on brainstorming might only be able to give partial clues (through the theory they suggest) to inform the research methodology which this study will perform.

4.3 THE SECOND LIMITATION : INTENDING THE TASK TO BE NEW TO THE PARTICIPANTS.

The second limitation of some narrow-band research concerns the task used for brainstorming which might be thought of as being completely new to the participants and failing to enable them to use their wealth of knowledge to inform their consideration of the issue. The core argument of this second limitation is that if real-world participants are to

effectively share their knowledge in a JOURNEY Making gathering then they should be able to access their (possible occupational) cognisance to inform their consideration of the tasks.

4.3.1 What type of tasks do narrow-band researchers use?

In conversation with one narrow-band researcher it emerged that a reason they tend to use a particular set of brainstorming tasks is to achieve consistency across studies as well as to face students with a task that they have not thought of before. Hence it is a purposeful aim of these researchers to get participants to brainstorm issues that they had not even considered prior to the brainstorm. They hope then that the subjects will not contribute a bog-standard set of ideas that they have thought about in some depth but more have to be creative on the spot. Some of the tasks they use to achieve this aim include,

- 'What are the uses for a brick?' (Pinsonneault et al, 1999),
- 'What are some uses for a knife?' (Harkins and Szymanski, 1989),
- 'What are some uses for a detached door knob?' (Harkins and Petty, 1982),
- 'Consider the attributes of a frankfurter' (Salisbury et al, 1997),
- 'What are the practical benefits or difficulties that would arise if everyone had an extra thumb on each hand after next year' (Gallupe et al, 1991).
- 'How could the tourist industry [of your area, or the United States] be improved?' (Dennis et al, 1997),
- 'How can the campus security be improved in your university?' (Dennis and Valacich, 1993).

It is believed that these tasks might have tapped the creativity of the participants (for that is what they seemed to be designed to do (which was apparent after discussion with one of the authors in the above list)). However, it may be doubtful that participants will have been able to use their occupational or life knowledge when brainstorming on these tasks.

This is a main difference between the embedded assumptions behind choosing the tasks for narrow-band and JOURNEY Making sessions. Briefly, the participant of JOURNEY Making typically knows the reason for them coming to the workshop and might even have taken the opportunity to canvas their employees of what the critical aspects they perceive to be relevant (Eden and Ackermann, 1998c). Hence the fact that these narrow-band tasks might be designed in a way that aims to catch the participants off their guard indicates

clearly that they are not relevant to JOURNEY Making, for JOURNEY Making in interested in the sharing of knowledge about a real lived-in problem, not the sharing of ideas about something they have never thought of before (van der Heijden and Eden, 1998). Furthermore, this researcher would question whether these types of task are of the nature from which narrow-band researchers might extrapolate the working of managers (for example), for it would seem that managers typically have a detailed cognisance about an occupational issue from which can inform their sharing of contributions rather than making them up completely 'cold'.

4.3.2 Conclusion on the second limitation

The narrow-band conclusions drawn from such tasks might provide some insight to how participants might act in brainstorming sessions when they do not know anything about the task. They might also provide insight to how immediately creative people are when presented with a small issue. However, it is not thought that this qualifies the conclusions to be similar to those that they might gain if participants experience the problem everyday. When people experience the problem they might develop an enriched cognisance and from opinions on how to overcome the problem. When it comes to a gathering on this issue, the participants might already have a set of contributions to share because they have a context in which to conceptualise the problem. It therefore seems critical that the tasks on which this research is based concern issues which the participants experience everyday.

Limitation 1 argued that narrow-band research, in its positivistic testing of the importance of variables, causes it to be of limited value to JOURNEY Making research. Limitation 2 has suggested that the surprise nature of tasks cause further limitations over the lessons to be learned from narrow-band research methodology. However, it still might be that the analyses of data that narrow-band researchers perform on the contributions those participants share could be of significant relevance to JOURNEY Making and might inform the analysis of the data which will be collected by this research. Section 4.4 will explore if this is the case.

4.4 THE THIRD LIMITATION : THE WAY IN WHICH NARROW-BAND RESEARCHERS ANALYSE DATA FROM BRAINSTORMS?

It was hoped that some learning might be gleaned from narrow-band research methodology to inform this researcher how he might analyse the contributions made during a gathering. It

soon became apparent that the analyses of the ideas concentrated largely on the number of ideas generated (as will be explored in Section 4.4.1.1.1) and the quality of those ideas (explored in Section 4.4.1.1.2).

However, there is a body of research on the paradigm-relatedness of the contributions made during a brainstorm. This work will be briefly reviewed (in Section 4.4.1.1.3) to gauge the transferability of this method of analysis to JOURNEY Making. One aspect of data analyses which narrow-band researchers perform relates to an interest in the perception of the individuals towards the brainstorm and this is thought to be potentially transferable to JOURNEY Making, as will be discussed in Section 4.4.2.

This discussion will first review the nature of how narrow-band researchers have calculated the quantity and quality of the ideas, and then explore why this is of limited use to JOURNEY Making.

4.4.1 The quantity and quality of the ideas in a brainstorm

Many studies count the quantity of non-redundant ideas (for example, Gallupe et al (1992), Dennis et al (1996b), Diehl and Stroebe (1991). In each case coders scrutinised all the ideas and eliminated any idea that had been given more than once within the same group (in groupwork), or by the same individual (when working individually). The count of the remaining ideas give the number of non-redundant ideas. This policy is in line with Taylor et al (1958) who decided, "whenever the second suggestion appear[s] clearly to add something to the first, it [will be] regarded as a different suggestion", Page 32, otherwise it will be regarded as being redundant.

Diehl and Stroebe (1987) propose that, in the context of their narrow-band research, the quality of an idea is composed of the ***originality*** and the ***feasibility*** (i.e. feasibility for implementation) of the idea for implementation (an approach also adopted by Dennis et al (1997), Diehl and Stroebe (1991)). Therefore, for an idea to be highly creative it should be unique and yet feasible for the situation. Gallupe et al (1992) also calculated the originality and feasibility for each idea (on a 1-5 Likert scale, 5 being very good), but they averaged the two scores to produce a ***quality score*** for each idea.

Gallupe et al (1992) regarded a highly-creative idea as being that which had an average of 3.5 on the Likert scale for both originality and feasibility (3.5 was chosen because it represented a value just above the mean across all of their data set). Diehl and Stroebe (1991, Experiment 1) defined a good idea as attaining a 1 or 2 on the Likert scale for either originality and feasibility, and no worse than a 3 for the other (where a score of 1 is very good).

Wierenga and van Bruggen (1998) claim (in the context of Creativity Support Systems (CSSs)) that the ***fluency*** of the participant (i.e. the ability to generate a large number of ideas) is an indication of creativity, because they propose that someone who can contribute a proliferation of ideas is more creative than someone who can only create a handful of ideas.

Work performed on the creativity of high-IQ children (Kershner and Ledger, 1985) also used the measurement of fluency, originality and feasibility of the ideas they contributed. However this research also measured the ***flexibility*** of participants to identify how able they were to generate ideas relating to different topics of interest. Therefore if a participant is able to generate ideas on a wide variety of topics it is assumed that they are more creative than a participant who concentrates on generating ideas around a small set of related topics. Much of the narrow-band research (and research on some other areas like creativity) concentrates on examining the fluency of participants, and the originality and feasibility of an idea in attempting to analyse the creativity level of individuals and groups.

4.4.1.1 Why is this not sufficient for JOURNEY Making?

The methods of analysing the contributions that are made in a narrow-band brainstorm have limited suitability for transfer to JOURNEY Making methodology, as the following discussion will show.

4.4.1.1.1 The quantity of ideas

This research will seek some indication of the ability of the participants to make contributions through calculating the quantity of ideas. However, it is not thought to be appropriate to eliminate redundant contributions, in the way performed by narrow-band researchers, from this so early in the analysis for the reasons outlined below.

A redundant idea is, by definition, contributing less new knowledge about the group members' understanding of the decision task and so are deleted in the calculation of the number of non-redundant ideas in narrow-band research methodology (as performed by Diehl and Stroebe (1987 and 1991), Gallupe et al (1991 and 1992), Taylor et al (1958), Bouchard and Hare (1970) and Pinsonneault et al (1999) to cite a few studies).

It is felt that a researcher needs to be very careful if deleting redundant contributions from the analysis as one would be removing a potentially critical category of data. During a JOURNEY Making session the group members negotiate the deletion of redundant ideas they see. However, these redundant ideas also provide some indication of the importance of that aspect of the problem as one might propose that if lots of people contribute to an issue then that issue is of wide-spread importance (a point which Vreede (1997) also suggests). Hence it is felt inappropriate to the analyses of JOURNEY Making contributions to simply delete redundant contributions that the group members did not delete because they might not actually be redundant (but be subtly different) and they also give a flavour of how widespread is the importance of an issue.

4.4.1.1.2 The quality of an idea

The measure of the quality of an idea is not wholly appropriate for transfer to JOURNEY Making for the following reason. In calculating the number of quality ideas, Dennis et al (1996b) introduce three approaches. They note how the approach "which has proven to be the most consistently reliable measure across studies" Page 271, was total quality (simply the sum of the quality scores for each non-redundant idea). They explain "a group generating five very poor ideas (each rated a 1 by judges) would have the same quality score as a group generating one very good idea (which was rated a 5)", page 271. The JOURNEY Making facilitators this researcher has talked to (and it is believed, participants) would willingly sacrifice quantity for 'quality', because one really 'good' contribution which makes a significant step forward in the group members consideration of the problem, can be of more use to the group members than 5 'poor' contributions which are quickly glossed over. Hence it seems inappropriate to gauge the quality of a contribution through some calculation of 'quality'. It seems possibly more appropriate to gauge the usefulness of the contribution as seen by the participants of the JOURNEY Making session.

On reflection it is maybe not surprising that the approach to measuring quality is not transferable to JOURNEY Making. An aim of narrow-band GSS research is to release the creativity of its participants, and so calculating a 'quality score' might be appropriate. However, the aims of JOURNEY Making are quite different and centres on the commitment of the individuals to the outcome, whilst also attempting to release their thinking. Hence it is felt that any sensible measure of the contributions that are made in a JOURNEY Making gathering, should be based on the perception of contributions from the point of view of their usefulness of the participants in the generation of an outcome.

4.4.1.1.3 Flexibility of participants and the paradigm-relatedness of ideas

The flexibility of a participant is measured through the ability of them to contribute ideas on different aspects of the issue. This seems to be an important measure to gauge if the proposed format enables participants to contribute more ideas to more issues (i.e. navigate their knowledge on more themes) than the normal format. If this is found to be happening then it might suggest that the proposed format meets the aim of enabling participants to contribute more of their knowledge and enabling group members to appreciate a larger amount of the wider context.

In the analyses of contributing ideas to different themes during a brainstorm, some researchers explore the paradigm-relatedness of the contributions (Nagasundaram and Bostrom, 1995a). Paradigm-relatedness is a measure of the level of innovation of the ideas which a participant makes. Contributions can be paradigm-preserving (PP) or paradigm-modifying (PM). PP ideas are those which can be thought of as contributing a modest change in the existing definition of the problem. PM ideas can be thought of as those which contribute a big change (i.e. very innovative) to the group members thinking about the problem. They might even redefine the problem by approaching it from an entirely new direction.

The theory of paradigm-relatedness presented by Nagasundaram and Bostrom was not tested in their paper. Theirs was a theoretical exploration which performed a grounding of their theory in the GSS field. They made a call for laboratory experiments and field studies to explore the consequences of this theory for different idea-generation techniques, among other aspects of GSS. Garfield et al (1997) and Satzinger et al (1996) answered Nagasundaram and Bostrom's call. Both papers gave very sparse indication of how PP and

PM ideas were actually coded. This researcher will use their sparse reflections to inform his own development of a coding format in order to identify PP and PM ideas. More on the developed approach will be given in Chapter 8 when the thesis comes to reflect on the analysis of the PP and PM contributions.

4.4.2 Perception of participants

Many narrow-band researchers are interested in how the subjects in a brainstorm perceive the session and this might give a very valuable insight to the perception of participants. Only if this researcher gains insight to what the participants like, dislike and how they feel during the process of sharing knowledge in a JOURNEY Making gathering, can a process which is procedurally rational to the participants be developed. Also this insight might assist in the development of new research questions he might want to investigate, or indeed answers to old research questions which he has.

Some narrow-band researchers include in an appendix the questionnaire which they gave to their subjects (for example, Dennis et al (1996b)). This researcher will attempt to learn from the published questionnaires which have been given to participants of narrow-band research studies. However, the questionnaire that this researcher will develop will be one that is tailored to the exact process which the JOURNEY Making participants have experienced.

4.4.3 Conclusion on the third limitation

This section has concluded that the methodology through which the **quantity of contributions** be calculated needs some modification (including the deletion of redundant ideas) before it is suitable for a JOURNEY Making methodology. Calculating the quality for ideas was concluded as being inappropriate for transfer to JOURNEY Making. However, it does seem appropriate to gauge the ability of participants to contribute ideas to different issues within the same problem in order to gauge the ***flexibility*** of participants. This might indicate the ability of the proposed format to help participants overcome any bounded vision they may experience. This might also enable the research to gauge if the process enables the contribution of paradigm-preserving or **paradigm-modifying** contributions.

It is thought that the approach and principle of investigating the **perception of participants** to the brainstorm is one that should be transferred to JOURNEY Making. This research will

develop its own questionnaire but that can be informed by the approach of narrow-band work. Other methods of gaining this insight will be reflected upon in 'Justifying the Research Methodology', Chapter 5.

4.5 CONCLUSION

This chapter has:

- Explored the lessons can be learned from narrow-band research methodology to inform the collection of data for this wide-band research.
- Proposed that the tasks need to be able to be answered from a participant's occupational cognisance rather than being a surprise to the participants.
- Reflected upon the potential usefulness of the narrow-band approaches to analysing the data which is collected during the brainstorms.

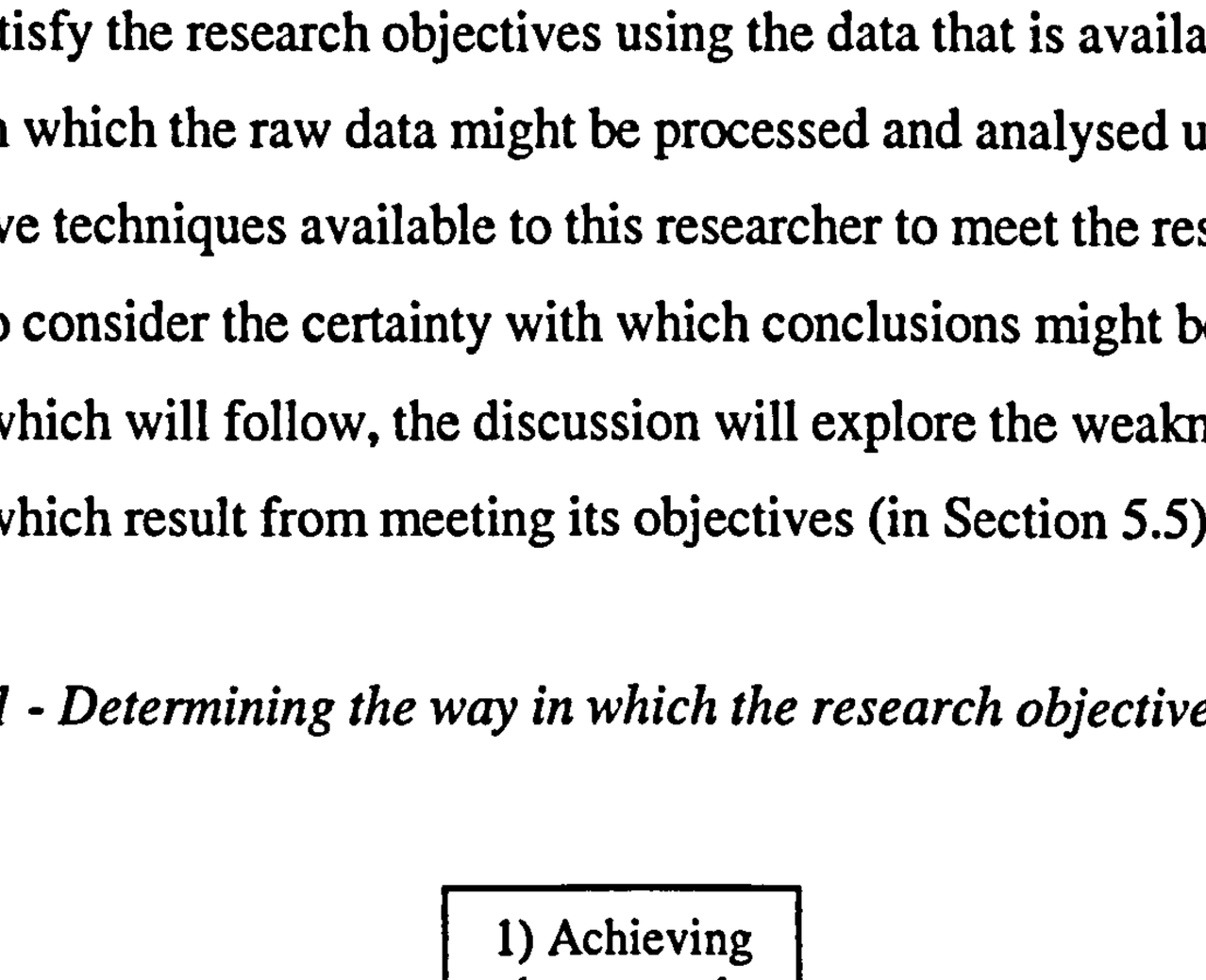
This research is grounded in the real-world application of a format of gathering knowledge. It will explore the data collected during four such real-world workshops and aim to develop useful theory from the analyses of that data. Chapter 5 will 'justify the research methodology' that might contribute to this research being considered as answering Vreede and Vogels' (2000) call in being innovative research of the application of group support technologies which has practical relevance for real-world facilitators and academics.

CHAPTER 5.- JUSTIFYING THE RESEARCH METHODOLOGY TO MEET THE RESEARCH OBJECTIVES

In order to perform rigorous research into *'what happens in gatherings that are run as part of a real-world JOURNEY Making workshop'*, this research must adopt a suitable research methodology. Chapter 4 has performed a detailed discussion of what lessons can be learned from the narrow-band researchers' positivistic approach to analysing brainstorms – acknowledging the limitations of the nature of research inquiry, the types of tasks researchers use and the way in which these researchers analyse their data. This chapter will seek to justify the approach which this research programme will adopt to satisfy the research objectives of analysing JOURNEY Making gatherings.

This chapter will be structured in the following way. First, in Section 5.1, the objectives of the research will be reviewed to set the scene for the second discussion, of what raw data has been collected and why it has been collected in the way it has (which will be discussed in Section 5.2). Then (in Section 5.3), the two perhaps most accepted the research philosophies of positivism and interpretivism will be briefly introduced to gauge the appropriateness of each to satisfy the research objectives using the data that is available. Section 5.4 will discuss the way in which the raw data might be processed and analysed using qualitative and quantitative techniques available to this researcher to meet the research objectives. Finally, in order to consider the certainty with which conclusions might be drawn from the findings chapters which will follow, the discussion will explore the weaknesses and strengths of this research which result from meeting its objectives (in Section 5.5).

Figure 5.1 - Determining the way in which the research objectives could be met



Note: Figure 5.1 will be referred to at numerous points during this chapter. Essentially the chapter will explore what objectives are aimed to be achieved through this research (box 1 of Figure 5.1). Then it will look at how those objectives governed the nature of the data which could be collected (box 2), and how that lead to determining the appropriateness of a research methodology (box 3). Then how research methodology determined the nature of the analyses (box 4) which in turn informed the nature of the findings (box 5) will be explored. Finally the way in which the nature of the research findings determine whether the research objectives are met is considered.

5.1 THE RESEARCH OBJECTIVES OF ANALYSING GATHERINGS

The objectives of analysing the gatherings (which will be discussed in Section 5.1.1) in which participants share their knowledge of a problem had significant impact on what data was actually able to be captured to meet them (i.e. the link between 'achieving the research objectives' (box 1) and 'nature of data collected' (box 2) illustrated in Figure 5.1). This section will firstly explore those objectives which this research aims to meet from analysing data from the gatherings. Secondly, the consequences of those objectives will be discussed to understand the impact they have on the data that has been collected to facilitate that investigation.

5.1.1 What are the research objectives for analysing gatherings

The data analyses component of this research programme has two main research objectives which happen to respond to a comment by Vreede and Vogel (2000) on the "real-world application of group support technologies", Page 96. Those objectives are to discover how the participants,

1) in real JOURNEY Making workshops are able to use GE computer technology to share knowledge between themselves.
2) view the process of sharing knowledge in real JOURNEY Making GE workshops when they are working in the proposed gathering format conditions.

The links between each of these research objectives and the objectives of JOURNEY Making need to be explained. If it is found (through the first objective) that participants are able to effectively share knowledge using the proposed format (the gathering conditions of which were described in Section 3.2.3) then this might support a notion that the outcome might be informed by a wider understanding of the domain in which the problem exists (Eden and van der Heijden, 1995) (which was argued in Section 2.4.1 and mentioned in Section 4.1.2 to contribute to the aims of JOURNEY Making). Briefly, this contributes to the aims of JOURNEY Making through enabling better exploration of the problem which might

heighten the probability of generating a politically feasible outcome as it is one that considers a wide range of the relevant issues (Eden and Ackermann, 1998c).

In terms of the views of participants towards the process of a gathering (the second objective), if the proposed format can help people to view the format of sharing knowledge as effective then it might help JOURNEY Making to more effectively meet its aims of cognitive commitment (i.e. the feeling of substantive rationality and the feeling of procedural rationality as reviewed in Section 2.2.2.1) and emotional commitment (Eden, 1992a). To explain, if participants perceive that they are very able to share knowledge in the proposed format then they might perceive the process to be a sensible one, hence they might perceive procedural rationality. Being able to share knowledge might help participants to explore, and realise the importance of, a wide range of relevant issues (van der Heijden and Eden, 1998). Hence they might perceive substantive rationality as they perceive that their search for an outcome is exhaustive of the relevant issues (Eden and van der Heijden, 1995). If participants feel that the process is transparent and they are able to appreciate their own impact on the outcome then it might be that they attach emotional commitment to the process as well as to the outcome (Niederman and Bryson, 1998). If participants do feel cognitive commitment to, or perceive substantive rationality or procedural rationality in, the outcome resulting from them being able to share more knowledge of the problem, then it might enable JOURNEY Making to more effective in meetings its aims (Eden and Ackermann, 1998c).

5.1.2 The consequence of these research objectives

There are two main consequences for 'the nature of the data collected' (box 2 of Figure 5.1) gathering from striving to 'achieve the two research objectives' (box 1) of analysing real-world workshops. The first is that the research must collect data in real gatherings performed during real workshops (hence this research would not be interested in analysing the data from any of the task meaningless brainstorms that have been discussed in Section 4.2.2 (for example, those performed using the 'thumbs problem' (Paulus et al, 1996)). Consequently this researcher is completely reliant on the availability of real-world JOURNEY Making interventions (as real-world is defined in the introduction to Chapter 2) in which to collect data (similar to those studies described in the vignettes by Eden and Ackermann (1998c).

The second consequence is because these are real-world interventions then the researcher is limited in terms of the nature of the data which he is able to capture during these workshops. He must adopt a methodology of data collection which is suitable to the aims of the

intervention. The aims of the intervention is to help the group members make a JOURNEY, not to supply him with research data (Eden, 1992a). Therefore, he must collect data which might have all the messiness of real groups in real situations as he cannot get nice 'clean' data by manipulating the workshop for his agenda of data collection (a point which Jenkins (1998) agrees with). So, a main consequence of the researcher basing an investigation on the working of real group members is that the data he is able to collect may be difficult to make comparisons between because of the idiosyncrasies of the conditions under which it was collected (i.e. conditions of the gathering format, group characteristics, task complexity) (McGrath, 1984).

In order to set the scene for a discussion of Research Methodology issues it seems helpful to present the type of data that was able to be collected for this research. Section 5.2 will explore the types of data collected and review some methodological issues that should be raised concerning data. Then the thesis will consider the appropriateness of different research methodologies in the analyses of this data (in Section 5.3) before it considers (in Section 5.4) the way in which the raw data will be processed and analysed.

5.2 METHODOLOGICAL ISSUES CONCERNING THE RAW DATA CAPTURED TO FULFIL THE RESEARCH OBJECTIVES

The data on which these analyses will be based has been collected from four real-world, task meaningful JOURNEY Making workshops, as detailed in Table 5.1 on Page 100, and four pilot tests using student groups, as detailed in Table 5.2 on Page 105. The raw data which were able to be collected from these experiences has been accessed largely from five sources (in fact these sources are similar to that captured by Vreede and Dickson (2000)):

1. The actual natural and piggy-backed contributions and causal links made during the nine real-world proposed format gatherings across four workshops, including which participant or sub-group contributed it and the time it was contributed. These were captured by GE and DE computer logs as the gatherings were being run.
2. Observations by the researcher of what group members were actually exhibiting doing during the gatherings.
3. Interviews with six participants from two real-world workshops (five of whom were from the same workshop) and interviews with three members of a real-world pilot workshop.
4. Opinions from the facilitators of the workshop.

5. Completed questionnaires from real-world participants of one workshop and students of four pilot workshops which used the proposed format for gathering. The actual contributions and links from the pilot gatherings have not been included in the data analyses due to the gatherings lacking of task meaningfulness for the participants. However, one might argue that the opinions of these students do have some interest to this research, after all they did experience the process.

As claimed in Section 5.1.2, the issue was not which data this researcher wanted to gather, it was what was he able to capture. The first four sources of data in this list were all able to be collected from real-world sources. The last source was collected from a combination of a real-world workshop and four pilot gatherings. The results have been used to inform this researcher's thinking about the process as well as substantiate points in the findings chapters. It seems necessary to explore some issues concerning the collection of data from the sources. Sections 5.2.1 to 5.2.4 will seek to accomplish this.

5.2.1 Participants awareness of the possible use of the data

Regarding the first source of data (i.e. contributions and links), it is important to note that participants were aware of this researcher's interest in the workshops. Typically the facilitator (but sometimes the client) introduced the researcher to make the participants aware of his interest of how people work in JOURNEY Making gatherings. Often this is a topic of discussion between the researcher and participants during the breaks or during dinner.

It is possible that the participants suffered from the Hawthorne Effect (Mayo, 1990) in that they felt watched and under scrutiny. However, participants knew the reason for their attendance was to make corporate strategy as that is what they had been invited by a senior person in their organisation to do. All the people around them were people who were chosen specifically for this task, so they might not have thought that they were among other research subjects (Remus, 1989). There was no researcher who was taking notes of everyone's activities and reaction (as will be described in Section 5.2.2). In fact there was no apparent sign that they were being observed. The only reason they might have thought that this was the case was the facilitator's initial introduction. It is possible in the heat and excitement of the workshop they might quickly forget about this aspect of the initial instructions and forget about this researcher's interest.

5.2.2 Researcher's dual role in the workshops

Regarding the second source of data (i.e. observations by the researcher), in three real-world workshops the researcher held roles of assistant facilitator and an observer of the process of facilitating a JOURNEY Making workshop. In the other real-world workshop the researcher was the sole facilitator. Hence participants were not subjected to the note-taking researcher in the corner of the room. The researcher was actively moving around the room during most of the workshop assisting in computer and room preparations and managing the chauffeur computer before, during and after the gatherings.

Consequently, the researcher was only able to make brief notes during the workshops and mostly these concentrated on the format of the session so that he knew with accuracy what process had been employed. However, when remarkable events happened during a workshop (such as a participant jumping out of her chair and shouting "This is great, this is so wonderful!" as happened in one session) he did exert additional effort to make brief notes of the situation and any thoughts he had at the time. These would be later used to stimulate his deeper recollection and reflection on events.

Table 5.1 - Details of the data from each meaningful workshop

	ELZ	NYPZ	GEA	GP
Primary facilitator for gatherings	Facilitator A	Facilitator A	Facilitator B	Facilitator C
Number of participants	14	19	5	6
Style of working	Single User/ Pairs	Pairs/Trio	Single User	Single User
Number of consoles used	7	9	5	6
Number of gatherings	6	6	1	2
Blind/piggy-backing gatherings	4	2	1	2
Normal gatherings	2	1	0	0
Multiple stimuli gatherings – Immediate linking of entries	0	3	0	0
Length of workshop	2 days	2 days	2.5 hours	1 day
Purpose of session	To develop corporate strategy	To develop corporate strategy	To develop strategy for a project	To develop organisational strategy
Source of data collected	- GE database - Researcher observations - Facilitator's comments	- GE database - Researcher observations - Facilitators' comments	- GE database - Researcher observations - Facilitator's comments - Participant interviews	- GE database - Researcher/ facilitator observations - Client/ participant interview - Participant questionnaires

5.2.3 In-depth Interviews

Regarding the third source of data (i.e. from the interviews) it is important to comment on how interviews were able to be conducted with one entire group of real-world participants and not the others that are included in this research. It is also important to comment on how this researcher was able to interview the client of the GP session and also three participants of a second real-world pilot workshop.

The client for the GEA workshop was an academic so knew the importance of research data but also the workshop was performed at very short notice as a favour between the facilitator and client group. One condition of it being performed for the client, considering the short notice, was that interviews between the researcher and the participants be allowed. The client

asked all the members of the group if they would be willing to spend time in a brief post-workshop de-briefing - all agreed. It is not felt that with this particular group any post-workshop de-briefing jeopardised the perception of the participants as to the reason for the workshop, because all participants were aware of the short notice they had asked of the facilitator and were prepared to get the benefit of the workshop for the sake of sparing a little time after it. This was in contrast to the ELZ and NYPZ workshops of which the clients were members of an external organisation and they were paying handsomely for the services of the facilitator. [It is not felt that the issue of payment has effect on the working habits of the participants. It is thought that the perception of task meaningfulness is the perception which might cause a difference in commitment to exert effort. A participant who has someone else in their organisation paying for a service might still not care about the outcome if it is not meaningful to them. However, paying for the service might heighten the opinion of the participants that the issue is one of significant importance to the organisation as it is having money and time spent on getting it right.]

Four of the participants of the real-world GEA workshop were interviewed in pairs (these were conducted within 1 hour of the workshop). One participant was interviewed alone (this was conducted the morning after the workshop). Hence the participants' experience and impressions might still have been very fresh in their minds. Some participants were interviewed in pairs because they had to leave the workshop location quickly and so it was decided that interviewing them in a 30 minute pair interview might give more insight from each than two 15 minute individual interviews. This was expected because introductions and formalities to the interview would not have to be performed twice hence saving time, and pairs might spark off one another quicker than one person dredging their brain for a piece of information and so we might cover more ground in less time.

The client of the GP session was a personal friend of the facilitator, this researcher. Also the facilitator was working for free. As part of the bargain, the researcher agreed to assist in the strategy development process if he was able to interview the client after the workshop. The client readily agreed. The client also offered to ask the participants if they would be willing to fill in a questionnaire of their comments on the process. The participants also agreed.

The researcher was able to gain interviews with three members of a real-world pilot workshop. The researcher was not at this workshop and so it was decided that he would be unable to explain any of the context of the workshop and any of the reasons for the

behaviours exhibited through the GE database. Hence this GE and DE data was not included in this research project as the research has little context of how it was gathered. He does however have some interesting reflections from participants in that session of how they felt during the blind gathering (as far as this researcher can tell there was no piggy-backing gathering). These anecdotes will only be mentioned in general contexts as the researcher does not have confidence that he is aware of the entire context.

All interviews were reacting to the participants concerns as they raised them. However, in order to initiate conversation the researcher had some ideas of loose areas that could be used to prompt discussion, hence it is felt that these are brief, but in-depth interviews (Easterby-Smith, 1999). The three open-ended questions to stimulate discussion were "How did you feel about working in the blind gathering?", "How did you feel when you saw all the ideas for the first time on the public screen", and "How did you feel during the piggy-backing session?".

One observation was that the pairs of interviewees seemed to hold a discussion of the issues between themselves rather than with the interviewer. The 'interviewer' did not have to prompt the interviewees in the same way he has had to do in single person interviews performed elsewhere. It was observed that in the pair interviews the interviewees would piggy-back off their partner considerably during the chat. In this, it is felt that the richness of the insight gained was tremendous as the conversation explored avenues that might not have been explored if the interview was conducted only with individuals. Also it enabled the participants and the researcher to identify areas of conflict between participants in how they felt which, it is felt, enabled a deeper exploration of the opinions of these participants.

The disadvantage of conducting interviews in pairs might have been a hesitation to share deep secrets while another person was sitting beside them, and who would be witness to their comments. However, given the frank nature of some of the comments from interviewees this may not have been a big issue for some interviewees. Another disadvantage of interviews in pairs is that some people might have agreed with a view simply because their interview partner said it. However, it could be that the interview partner raised issues that the person had forgotten about and would not have mentioned if they not been reminded of it.

5.2.4 Remarks from the facilitator

During the time that the participants were actually typing in their contributions and links the researcher was normally sitting beside the chauffeur computer watching what was going on as he could see the participants faces from there which might give more feedback. However, this gave him the opportunity to listen to the facilitator make off-the-cuff remarks of their opinion of the gathering (i.e. opinions from the facilitator). One example of an off the cuff remark was when participants were generating lots of ideas and the facilitator remarked to himself (which this researcher happened to overhear) that there was too many contributions on one DE view - immediately after this he stopped the blind gathering by switching on the public screen. Not all the remarks were collected by chance. Often the facilitator explicitly commented on the process to the researcher sometimes during the lunch break (if there was time) or after the workshop or during dinner on the night of the workshop. [It should be noted that to heighten anonymity, while every facilitator will be given a male persona, every interviewee will be given a female persona.]

This researcher was also the facilitator for one of the real-world workshops and one of the pilot gatherings. It is felt that these experiences of conducting the proposed format might have heightened his awareness of the issues that the other facilitators might have experienced. Also it might have raised his awareness of the practicality of any alternative facilitation strategies he might explore during the course of the thesis.

Although the comments from the facilitators might appear to be invaluable, it does not contribute to the core objectives of the research (reviewed in Section 5.1.1) . The research objectives do not aim to satisfy the JOURNEY Making facilitator by developing a process that they enjoy. Each of the objectives are participant-centred. However, it seems that by appreciating the facilitators' opinion of the proposed format the researcher might gain understanding of how the process might be further developed. For example, if the facilitator picks up on something they did not feel comfortable with regarding the process then it would be possible to ask what impact that might have had on the participants, or what alternative gathering strategies might be used and what impact they might have. Hence, although reflections from the facilitator do not contribute directly to research objectives they may offer useful stimulation for further thinking.

5.2.5 Pilot workshops and insights from questionnaires

Regarding the fifth source of data, there was one real-world workshop and four pilot workshops in which to collect questionnaires. Access was gained to the real-world participants when the client for the GP workshop offered to ask the participants if they would be willing to fill in a questionnaire. The participants were aware that the facilitator was working on a research project and were willing to spend a few minutes in return for a days facilitation.

The pilot workshops were used to test-drive the proposed format before it was tried on a real group. The contributions and links from these pilot sessions will not be included in this data analyses. The reason for this is that the pilot workshops were run with students and they may not have perceived the task to be meaningful (McGrath, 1991). In this, these participants attended the class as part of their course and they did not express a concern before the workshop about the issue they would be asked to think about (much like the research by Salisbury et al (1997)). In fact, the facilitators generated the issues themselves, but they did attempt to build in some relevancy (or personal meaning) to the issue to attempt to engage the students intellectually (Petty and Cacioppo, 1979). For example, Honours students were asked to consider "How can the Honours year be made better?", (each stimulus question used is detailed in Table 5.2).

Table 5.2 - Summary of the four pilot gatherings in which questionnaires were handed out

	Number of participants	Duration (hours)	Number of participants per console	Number of blind contributions	Number of piggy-backed contributions	Special operating conditions
Honours	7	1	1	16	2	Question: How can the Honours year be made better? Public screen : – Switched off during blind gathering – Switched on during piggy-backing displaying all new contributions as they are contributed
Ph.D.	6	1.5	1	33	1	Question: What are the issues a facilitator should be aware of in group facilitation? Public screen : – Switched off during blind gathering – Switched on during piggy-backing displaying all new contributions as they are contributed
MSc	23	1	4-5	44	0	Question: How can the MSc year be made better? Public screen : – Switched off during blind gathering – Switched on during piggy-backing displaying all new contributions as they are contributed – no navigation around the clusters by the facilitator – lots of people could not see the screen as they were sitting too far away
MBA	15	2	2	64	27	Question : How can we develop organisations to be more effective with strategy development and implementation? Public screen : – screen left frozen during blind displaying the stimulus 'question' – the facilitator highlighted key issues in preparation for the piggy-backing session – Screen frozen again so not to up-date with piggy-backing ideas

Those four pilot workshops adopted slightly different formats for blind and piggy-backing gathering contributions, as detailed in Table 5.2, which were also different to the GP real-world workshop in which participants completed the questionnaire. Consequently, the

participants were asked to complete slightly different questionnaires which sought to gain insight to their opinions regarding the particular process of the gathering they experienced. However, all questions in the questionnaires could be answered quickly on a 1-5 scale of 'Agree to Disagree' with any particular statement. This scaling approach was used because the population were students and it was felt that they might be more likely to answer by circling an alternative than by spending the time writing in textual answers, especially since class was over and they might have to go to another class (or home). More detail on the analysis of questionnaires will be given in Section 5.4.5.

5.2.5.1 Health check on the data from the real-world GEA workshop

It is worth being explicitly clear of how the GEA workshop was thought to be very peculiar in comparison to other sessions under scrutiny here (and other JOURNEY Making workshops in general). This researcher deeply considered if this data was valid and considered removing it from the analysis for three reasons which this section will introduce. The following three points explore the peculiarities in the nature of the workshop and the participants which might give reason for discarding the data.

- The facilitator felt he had very limited time to help the group make the JOURNEY - There was only one gathering in the GEA workshop that was performed in under 3 hours. The normal workshop contains a series of gatherings, sometimes performed across 2 days. Furthermore, the time given to GEA participants to share their contributions in the blind session was significantly shorter duration than other participants whose contributions are under scrutiny here (7.75 minutes as opposed to an average for the other blind gatherings of 11.3 minutes). Also, the participants came 20 minutes late which caused the time pressure.
- Some group members might have thought that they had experience of causal mapping, and so work differently to the typical participant who does not have experience.
- The facilitator worked in the same organisation as three of the participants - This might have caused some personal relationships between the facilitator and the participants, which are might be directly related to the familiarity between the two parties.

It is accepted that these three unusual characteristics of the GEA gathering and its participants might have caused the participants to act in ways that the typical participant of a JOURNEY Making workshop did not and for that reason it should be considered to be peculiar. However, as Miles and Huberman (1994) comment "the outlier is your friend",

Page 269. Hence it was decided that the GEA gatherings were valid for inclusion, but that the data should be treated with caution and interpreted in the light of these three peculiarities.

The reasons for not deleting this data from the analyses will not be debated here. It is thought sensible to consider the validity of the particular types of data (namely, contributions and links) in the context which it is going to be used, i.e. in the validity of results from analysing the contributions (in Chapters 6 and 8) and that from analysing the causal links (in Chapter 7).

5.2.6 Compromising reflections on facilitation by supervisors

Revisiting the second and third source of data (i.e. the researcher observations and interviews, respectively), it is critical to note that the researcher is in a potentially compromising position when reflecting on these of sources of data concerning the ELZ, NYPZ and GEA workshops. This is because the best persons to observe facilitating a JOURNEY Making workshop are the developers of the methodology, the researcher's supervisors, each of whom were the facilitators for at least one of these three workshops. Hence while the researcher reflects on a process, he is explicitly reflecting on a style of facilitation and offering constructive observations of how to improve the process and possibly their style.

The researcher has not made conscious effort to say nice things about the process in order to please his supervisors. He has compared their styles against some ideal. This ideal, however, is one of his own construction. It is with the benefit of hindsight that this ideal is generated and these comparisons are made, but it is that hindsight which can allow to process to be improved upon. The researcher has reflected on these observations in order to improve the process of gathering knowledge. Hopefully they will be seen as being constructive in this attempt. It is not felt that the compromising position he is in has had any impact on the results and interpretation in this thesis. He believes that one main reason for him feeling free to constructively explore their methodology of facilitating groupwork is because of their willingness to listen to, and maybe even accept, his point of view.

5.2.7 Conclusion : Methodological issues of the data available

The discussions under Section 5.2 have reviewed the data which has been able to be captured during the real-world JOURNEY Making interventions. The importance of the success of the intervention for the participants dictated that no other relevant data could have been captured. Certainly it would have been nice to interview each participant for 30 minutes after

the workshop or be able to validate the causal links in the group maps with each of the participants, but this was impossible (for the reasons on which as Jenkins (1998) reflects and have been noted here). The issues around data collection have not been discussed as yet. No issues of processing the raw data have been discussed. It is felt that it is more appropriate to establish the methodology which will guide the processing and analyses of this raw data (in Section 5.3), and then reflect upon the processing of that raw data into analysable data (in Section 5.4) and then the analyses of that processed data (in Chapter 6, 7 and 8).

The data may have been collected without knowing exactly how it would fit into this research programme, however it was not collected without purpose. It was collected whilst always maintaining the focus of how it might enable the research objectives (explored in Section 5.1.1) to be pursued. Now that the available data has been introduced, it seems worthwhile to consider issues of research methodology suitable to the research objectives, in the context of what data is available.

5.3 THE APPROPRIATENESS OF TWO RESEARCH METHODOLOGIES TO THIS RESEARCH

The research methodology which has been employed by this research is one that has been dictated by the research objectives and developed in the light of the data which has been able to be captured (i.e. the link between 'nature of data collected' (box 2) and 'appropriate research methodology' (box 3) as illustrated in Figure 5.1), rather than research method driving data collection.

This section of how valid analyses might be performed on this data is structured in the following way. First, it is necessary to briefly introduce the beliefs of this researcher regarding the world in which the data has been collected and that which the research claims to study. This discussion will lead to a consideration (in Sections 5.3.1.1 in 5.3.1.2) of the appropriateness of two main approaches to research methodology, positivism and interpretivism (Easterby-Smith, 1999). Then, in Section 5.3.2, this research will be grounded in a particular research methodology, namely Integrative Evaluation.

5.3.1 Propositions of the world of which the research claims to investigate ...

This researcher supports the view that some phenomenon can be measured through objective methods, but that mans' interpretation of the world is based in subjectivism. To explain, the number of contributions a participant makes can clearly be analysed objectively, however, some phenomenon might be best understood through subjective interpretation, for example

how the interpersonal relationship between two group members might effect their willingness to work productively with each other. This view underlies the reason for this research to combine quantitative and qualitative approaches to data analyses to more fully satisfy the research objectives than might be achieved by either approach in isolation (as advocated by Todd (1979), Rossman and Wilson (1984) and Firestone (1987)).

5.3.1.1 ... and the appropriateness of more positivist approaches

Considering that the research will adopt a quantitative approach to data analyses, and that when the narrow-band researchers do this they do so in a positivistic research tradition (Laughlin et al, 1998), one might suspect that this research will also adopt a positivistic **methodology** (see Easterby-Smith et al (1999) who discuss the underlying principles of positivistic research). One might expect that in order to understand the ability of participants to make contributions (for example) one must take the contributions from a gathering, code them according to some framework, analyse the codes, generate results, then statistically compare the results across a range of other gatherings (Easterby-Smith et al, 1999).

However, although this research will employ quantitative analysis to certain types of data it will not do so in the way in which positivism does. The positivistic paradigm demands the multiple testing of hypotheses in order to increase the confidence with which one might justifiably make claims of the way in which the world operates (McNeill, 1990). From an early stage in this research, the researcher was aware that he would be able to only gain access to a few gatherings and that he would have very little control over the format of the gatherings through which data would be captured. Hence this research does not have access to multiple test of gatherings performed under controlled conditions. Instead the researcher must explore and interpret a small number of gatherings (nine to be exact) which have many different operating conditions (for example, the number of people in the workshop) and develop persuasive argument of what might have been the causes of a particular finding.

The positivistic paradigm makes the **ontological** claim that the world is external to the researcher. However, this researcher and the other facilitators are integral to the process which the participants in the workshops experience. In this, the process participants experience depends on the process which the facilitator(s) employ and the subtle (or tremendous) differences between each workshop.

Furthermore, this researcher would disagree with the positivist's contention of the value-freedom of the researcher. This researcher will adopt approaches to coding with which he feels comfortable and which he thinks are appropriate for his application, and therefore they might not be free of the researcher's own values. He will not argue that the approaches are the only ones that are available, or even that they are the most rich ones that are available, but they will be argued to be the ones which he feels are most appropriate for his application.

Positivism also suggests an **epistemological** model of a hypothetico-deductive process whereby hypotheses are generated and scientists set about proving they exist under certain conditions (Easterby-Smith et al, 1999). However, this research is interested in exploring the use of a new format. It aims to investigate the way in which people use the technology. This researcher does not have any hypotheses to test. The research is not designed so that the researcher has different conditions to test the robustness of the way in which participants operate. Rather the researcher will immerse himself in the data and explore the nature of the contributions which participants share and the causal links which they make.

Within this epistemology, positivism suggests that one should reduce the problem into its simplest form. This researcher would disagree with this because he is intends to take the different types of data which he has been able to amass and synthesis it to be richer than a single source. This researcher will have to reduce some of the data to a more simple form to make it amenable to analyses (for example, the nature of the links), however, he will also have very messy data which he will try his best not to reduce (for example, the interviews) as he feels that there might be more richness if this data is kept in a complex form.

Hence positivism does not appear to be appropriate for this research for the reasons that it has an inappropriate ontological, epistemological bases for the analyses which will be performed by this research.

5.3.1.2 ... and the appropriateness of more interpretivist approaches

In order to meet the first research objective of *'how participants in real JOURNEY Making workshops are able to use computer technology to share knowledge'* between themselves one might use a more interpretive **methodology**. It would seem necessary to base this aspect of the research on a quantitative analyses of the contributions and links which might enable investigation of how participants are able to share knowledge. That is to say that the quantitative data collected by the GE database log might be coded, manipulated and analysed

to enable investigation of the contributions and links people have made (Miles and Huberman, 1994). However (and this is where this methodology diverges from a positivistic one), in order to get any meaningful understanding of these results it would probably be necessary to interpret what impact certain aspects of the particular session might have had on the results (Walsham, 1995). For example, it might be proposed that the results from analysing the ability of the participants to make correct causal links is related to the clarity with which the participants understood the instructions. Hence a significant level of interpretation might be made of what the level of understanding of the instructions the participants had in each different workshop, based on the effort of the different facilitators to explain the process and any observed reactions participants made. Also multiple methods might be employed to seek confirmation that this interpretation was accurate, possibly from interview data.

This researcher feels more comfortable with the **ontology** of the more interpretivist methods which suggests that the world is socially constructed and to investigate that world one needs to consider the meanings which different people place on experiences. This researcher will certainly take this approach as he tries to explore why some people might have reacted in a way which others did not, possibly looking at their different experiences in the organisation in which they work. As was claimed in Section 5.3.1.1, this researcher and the facilitator is part is the situation in which the participants are working. Hence it is believed that in having a role in the workshop, this researcher will have a personal context in which to explore the feelings or reactions of the participants.

In terms of the **epistemology** of the more interpretivist methods, it seems more appropriate that instead of only gathering facts and figures about the situation which we have reduced down to the simplest form, the entirety of the situation is accepted and explored. In this, the interpretivist might take the understandings of the participants (of the gathering) and consider what was their experience of the workshop and attempt to explain why this was the case. Also triangulation can be performed to explore the issue from multiple angles using multiple sources of data. This might inform a greater understanding of what the participants are experiencing by inducting theory from the data which is available (Easterby-Smith et al, 1999) and help the researcher to try to understand what the participants are experiencing.

The following discussion will explore some of the research methods through which it is believed a more interpretive **epistemology** can be employed by this research.

In order to research the second objective (from Section 5.1.1) *how participants viewed the process of sharing knowledge in real JOURNEY Making workshops when they are working in the proposed gathering format conditions* it would seem that this could also be explored through a more interpretivist methodology. Granted one could perform positivistic analysis of well designed questionnaires which use a numerical scale to meet this objective (Chisnall, 1986). However, the nature of the real-world interventions in this research means the completion of research questionnaires by real-world participants was not possible, unless exceptional circumstances exist (issues around the use of questionnaires in this research were very briefly discussed in Section 5.2.5). In order to research if the proposed format (which was introduced in Section 3.1.2.3) can meet this objective, three sources of data are available.

First, one might be able to observe the displayed effects of the feelings of real-world participants which might give insight to their views on the process (see Denzin (1970) for a discussion of 'simple observation', in particular 'observations of exterior body and physical signs'). For example, if participants shout "This is great!" then this is a clear display of one view. In simple observation the researcher is exerting a significant level of interpretation of what constitutes a displayed effect, as well as exerting a significant degree of interpretation of the causes of observed reactions, but triangulation of observations with theory, interview data, and analyses of the GE database data (and with common sense) might enable this to be managed. Denzin (1970) notes how observers might get tired or bored with their observational role, but considering this researcher was constantly doing other things, this might not have happened to him. Researcher observations are thought to be a valid source of research data (Bryman (1988), Silverman (1993)) which might give useful insight to the working and feeling of participants (Webb, 1966), although it is acknowledged that the researcher might have missed some things.

Second, the participants' views towards the process which they have experienced might also be gained through interviewing the participant (Denzin, 1970). In-depth interviews might be appropriate for use in this situation because the research is interested in the views of the participants. If the researcher was to ask a structured series of probing questions then the participants might be forced to generate on the spot responses to questions on issues that were not relevant to them, or they did not wish to reveal (Benney and Hughes, 1970). Hence it was felt that it would be best to enable participants to talk freely about their opinions of

their experience (Maccoby and Maccoby, 1954). Obviously this method relies on the participant remembering to mention a particular opinion, but the explorative nature of the interview (i.e. the researcher helping them to explore views and experiences) might help them re-construct the situation and recall their opinions (Denzin, 1970). This technique might be thought of as being challenging and risky for a novice researcher, because they might lead the interviewee in certain directions purely according to the researcher's own agenda (Easterby-Smith, 1999). However in this regard the researcher might not be thought of as a novice at exploring peoples views in interview-type situations. It is felt that over five years as a person-centred counsellor (although different to in-depth interviews) prepared him for the messiness and manageability of these in-depth interviews.

Third, it is felt that questionnaires using Likert-type scales can be used to gain some data on the opinions of participants (Chisnall, 1986). However, to investigate these using more interpretive principles one might need to interpret the numerical results of the questionnaires by accounting for the different contexts in which they were completed and the different participants by whom they were completed.

Now that the appropriateness of a method which is more interpretivist in nature has been argued, it seems necessary to ground this research in a particular research methodology which sits comfortably within a more interpretivist framework. The following section will seek to do this.

5.3.2 Grounding this research in a particular research methodology

There are many approaches to analysing data under a more interpretive framework. The following gives a very brief consideration of three of perhaps the most closely appropriate methodologies and aims to consider how appropriate they might be to this research.

Action Research (Eden and Huxham, 1996) was initially thought to be appropriate for this research because the researcher was entering a real situation and changing the method through which participants share knowledge. However, on reflection the researcher is not really changing the way participants share knowledge i.e. changing them from one way to a different way then studying the difference. Rather he is simply exploring how they share knowledge in a new format. Hence it does not appear to be Action Research that he is using.

Grounded theory (Lowe, 1996) could be suitable as the researcher intends to immerse himself in the data and explore its nature. However the researcher is beginning the data analyses with some specific things he intends to explore, for example, exploring the nature of the contributions which participants make and investigate how they might indicate if bounded vision effected the participants. Hence Grounded Theory does not seem to be appropriate.

There is however one research methodology which appears to be appropriate to the data this researcher has available. Integrative Evaluation (Draper et al, 1996) is an approach which strongly defends the findings of research which has been based on varied sources and types of data. It encourages researchers to pull together varied types of data which cross the quantitative/qualitative divide and demands that what is learned is integrated back into the situation being researched. The researcher is able to explore and explain the findings of the analyses using a variety of data sources and then integrate those findings into the development and evaluation of new processes, or in the case of this research, gathering formats. Essentially the researcher is evaluating the situation through different types of data and integrating what is learned back into the research project.

Integrative Evaluation also allows researchers to collect data from (in this case) workshops which have performed under different operating conditions. No two real-world gatherings under scrutiny in this research project are the same, as each has a different brainstorming problem or are even run under different operating conditions, for example, whether participants share consoles or work in pairs. Again it seems that Integrative Evaluation is a suitable approach which is sympathetic to the data which this researcher has been able to collect under different conditions.

Integrative Evaluation is an approach which demands reflection in the system which is being studied, as it is being studied (Draper et al, 1996). In this research the discoveries made during preliminary data analyses will be used to inform the continuing development of the JOURNEY Making format for gathering knowledge. This is an important element of Integrative Evaluation. If this researcher was be simply performing an evaluation of gatherings and not using what is learned about the gathering to inform the development of the gathering format within this study then this researcher would not be performing Integrative Evaluation, it would simply be performing 'Summative Evaluation', i.e.

evaluation performed to only reflect upon the formats that were employed, rather than integrating what is learned into the research study (Draper et al 1996).

Integrative Evaluation has been used in psychology (for example, Leonova (1992)) and medical research (Jacob et al, 1998) but more extensively in educational research (for example, Draper et al (1996) and Arnold et al (1994)). It is felt that Integrative Evaluation under a framework which is more very much more 'Interpretivist' than it is 'Positivist' is a suitable research methodology for this researcher given the various types of data he has been able to capture, the various conditions under which it has been captured and the integration of preliminary research findings into the continuing research project.

5.3.3 Conclusions: Valid data analyses to accomplish the research objectives

It is concluded that this research should analyse the raw data which is captured from somewhat of an interpretive point of view. Furthermore it is likely that some reduction of contributions and links to codes which can be analysed quantitatively may be performed such that one might explore how able participants are to share their knowledge during the proposed gatherings. However, to generate an understanding of the situation, this research will interpret any quantitative findings in the context of a social system in order to understand why participants might have the psycho-social reaction to that which the quantitative analyses suggests they did. Also the qualitative opinions of participants data will be provided to give indication of the views of individuals to the part of the process they were experiencing.

However, generating reliable results also depends on the way in which the raw data is analysed, as there is little point having reliable raw data to be analysed under an appropriate methodology if the approaches to analyses are inappropriate, for example by developing techniques that cannot even be understood by other people (Miles and Huberman, 1994). Hence Section 5.4 will explore the way in which the raw data will be processed and used to enable quite an interpretive analyses of gatherings.

5.4 PROCESSING THE RAW DATA TO MEET THE RESEARCH OBJECTIVES UNDER A MORE INTERPRETIVIST FRAMEWORK

Section 5.3.1.2 has briefly introduced the approach to data analyses under a more interpretivist framework. This section will build upon that discussion. It will show the link between quantitative and qualitative analyses which might be possible considering the raw

data which is available to this research (i.e. the link between 'appropriate research methodology' (box 3) and 'nature of the data analyses' (box 4) in Figure 5.1). To that end this section will introduce some of the approaches that will be used to process and analyse the five sources of raw data which has been able to be collected from the real-world JOURNEY Making interventions. To recap those five sources are:

1. The actual contributions and links made by participants recorded in the GE log.
2. Observations made by the researcher during gatherings.
3. Six in-depth interviews with real-world participants.
4. Brief remarks from the facilitators.
5. Completed questionnaires from real-world and pilot study participants.

The following sections will not give exhaustive detail of the actual techniques which might be used on every piece of data to meet the research objectives, as such a discussion might be very abstract and not grounded in any context of the actual elements being explored. Rather this discussion will introduce the general approaches to processing the raw data to prepare it for analyses. However, where thought suitable the actual approach to processing the data will be given, if it is brief and straightforward (this will hopefully help the flow of the discussion in the findings chapters). This discussion will seek to provide additional evidence that quantitative and qualitative approaches to data analysis must be performed. The actual analytical techniques will be detailed in the following chapters where the results of the analyses are reflected upon.

5.4.1 The actual contributions and links made by participants recorded in the GE log

Every participant-entered contribution and causal link is recorded in the GE database exactly as it is made. The DE model gives an exact representation of the final version of the contributions (and links) as they appear after the group has negotiated upon them. The GE database can be analysed in MS Excel to understand how the participants make blind and piggy-backed contributions and links simply by counting them.

However, to investigate deeper issues in the actual ability of participants to construct contributions, it is likely that some manual decomposition of the contributions will be employed in order to make the contributions more manageable. This might enable one to discover the ability of the participant to make contributions that are different across some dimension. It is thought that some form of Repertory Grid analysis (Bannister and Fransella, 1971) might be performed on a batch of the contributions in order to discover what

dimensions these contributions hold. This would not be Repertory Grid technique as described by Kelly (1955) as it would not have the aim of finding personal constructs. However, by modifying it for this application this researcher might be successful in discovering different dimensions within and between contributions. More detail on the technique used will be given in Chapter 6.

It is possible that once the dimensions of differentiation have been identified then manual Content Analysis (Berelson, 1952) might be suitable for the decomposition of the contributions as this is an approach which "classifies textual material, reducing it to more relevant, manageable bits of data", Page 5 (Weber, 1990). This would enable some quantitative tools to be developed to analyse the data. Interviewees' comments concerning the making of contributions, and any displayed effects by participants that were observed, will also inform the understanding of how participants may feel about making contributions electronically using GE in the proposed format.

The way in which participants make contributions might be thought of in terms of the different aspects of their cognition which is relevant to the problem (van der Heijden and Eden, 1998). Just as contributions might have dimensions which can be analysed, it is thought that the problem might have different dimensions (or themes) on which participants might share their ideas (Rutkowski and Smits, 1999). In order to understand something about the qualitative nature of the different themes to which those contributions might be thought to pertain, it will be necessary to qualitatively analyse the contributions (Miles and Huberman, 1994). It is not thought that NUD*IST or other similar tools for qualitative data analysis are sensitive enough for this type of construct comparisons as it is felt that these packages simply compare the synonymous elements of contributions, rather than the meaning behind them (Eden and Ackermann, 1998a) which itself is "inadequately simplistic and misses the most important aspects of exploring cognition", Page 197. Considering that this research will qualitatively analyse the contributions from numerous people who are likely to use different language and expression to convey their opinions (because they might represent different departments or countries) then it is thought that this construct comparison should be performed manually by the researcher. The path to developing an appropriate technique to perform this coding of contributions across different themes in the problem will be discussed in Chapter 8.

In order to investigate the ability of participants to make causal links between contributions, it is thought necessary to establish categories of links and gauge the ability of the participants to make links to those different categories (possibly learning from the works by other researchers, for example Jenkins and Johnson (1997) who immerse themselves in the cognitive maps of managers). This ability will likely be gauged by exploring the quantitative evidence of the number of links made to enable the investigation of how the different types of gathering session might be able to facilitate the sharing of links. However, the comments made by participants or interviewees about the linking session and any displayed effects that were observed can also inform the understanding of how participants feel about making links.

To summarise, the analyses of contributions will involve both quantitative and qualitative analyses. The contributions will simply be quantified across some dimensions, as well as their context being qualitatively explored. The aim is to enable an integrated evaluation of the differences between the contributions which are made in different gatherings run under different formats. It is also thought that the classification of links might be necessary so that one might be able to understand the ability of the participants to make links that are different in some dimension. Also the comments from participants during the interview and observations by the researcher will be included to inform the discussion of participant abilities to share knowledge through contributions and links.

Support from approaching the analyses of data from both quantitative and a qualitative positions is given by Todd (1979) and Abrahamson (1983) who advocate methodological triangulation. Todd (1979) notes that triangulation is a good way of increasing the amount of data on which findings can be based. Abrahamson (1983) notes how methodological triangulation enables the researcher to compensate for the inherent weaknesses in each of their measures by triangulating the findings with another approach. However, Easterby-Smith et al (1999) caution the researcher who mixes research methodologies. They identify a concern over combining the philosophical positions of positivist and interpretivist methods. This researcher does not intend to try to analyse any data from the gatherings in a positivistic way, for example the number of contributions. Rather the researcher will try to objectively and subjectively explore the situation of the gathering to investigate how *'participants might share knowledge during groupwork using computer technology'*.

5.4.2 Observations made by the researcher during gatherings

Regarding the second source of data, the researcher's observations of how people appeared to work during the gatherings were mentally logged and (to stimulate his recollection of those) brief notes of the incident of activity were made at the earliest opportunity. Very soon after the workshops (normally that night) these written and mental notes were written-up into formal notes (much like the Contact Summary Sheets proposed by Miles and Huberman (1994).

It was often found that if the researcher was to mentally replay the session by thinking through the activities which took place, he would realise the importance of episodes which might have been previously overlooked - and these were then logged appropriately. The fallibility of memory is acknowledged here and it is possible that additional elements of the episodes were forgotten or embellished according to what was salient in the researcher's memory (see Denzin (1970) who discusses issues of data arising from simple observation).

The observations that were made have had a significant impact on this researcher's thinking of the process of the proposed gathering. Due to observations being recorded as anecdotes in a written form, they will be used in this thesis as anecdotes to explore the reaction of participants. These anecdotes will almost be mini-vignettes (see Miles and Huberman (1994) who discuss the construction of vignettes) which will seek to contextualise the phenomenon that are being discussed in a real gathering (see Eden and Ackermann (1998c) who used vignettes in a similar, yet more elaborate, way).

5.4.3 Notes from in-depth interviews

Five of the in-depth interviews were conducted with participants from the GEA workshops and one interview was conducted with the client of the GP workshop. As many notes as possible were made during the interviews of who said what, and what was their partner's opinion of the issue (if being interviewed in pairs). The researcher performed "total listening" during the interviews, as commented on by Johnson and Johnson (forthcoming). As Johnson and Johnson comment, total listening enables the researcher to "if asked, ... repeat or reflect back (word for word or para-phrase) what the speaker has said and mean to communicate", Page 19. Total listening enabled the researcher to, where possible, record verbatim statements in linear notes. The experience this researcher has in total listening, gained in the role of counsellor, enabled quite comprehensive accounts of the interviews to be made.

Also immediately after each interview the researcher brain-dumped all the issues the participant(s) covered as he could remember into a recording device (using the notes to stimulate his recollection). Both these sources of notes were immediately written into detailed notes on the interview (similar to those Contact Summary Sheets suggested by Miles and Huberman, 1994). The notes from each interview was themed into related issues.

The themes from the different interviews were compared and similarities identified. Issues contained under similar clusters raised by the participants were synthesised into one document and explored to investigate the nature of the opinion (for example, whether the feeling was positive or negative towards the issue). This document was assumed to be the definitive account of the interviews and informed the writing of the following chapters of findings. The comments which make up a cluster are reflected upon in the findings chapters in a context which is appropriate over the course of the three findings chapters.

When reference to any reflection made by a participant is made in the following chapters, the participant will always be given a female persona. This will heighten anonymity of participants which is important considering that the participants are sometimes members of the facilitator's organisation.

5.4.4 Remarks/opinions from the facilitators

The remarks of the facilitator were logged mentally as well as being noted down and typically discussed with the facilitator after the workshop. These mental notes were brain-dumped into a recording device and (with the written notes) were transferred into more detailed written notes as soon as possible after each workshop (normally that night) (as suggested Miles and Huberman, 1994).

These remarks have mostly been used to inform this researcher's thinking of the process and so might not be included in this thesis (as discussed in Section 5.2.4). However sometimes the comments inform the thinking of why participants might have reacted as they have, in which case they will certainly be incorporated into the discussion.

5.4.5 Completed questionnaires

The results of these questionnaires will be used to substantiate points where relevant. It is thought relevant to include the results of the students' questionnaires in the thesis even

though they are collected from 'task meaningless' workshops. The reason for this is that these students were participants in a process and so their opinion of the format of that process is valid. Although the link between the students feelings and those of a real group of JOURNEY Making who have real concern in the problem is unclear (McGrath, 1984), the students response may give a flavour of the feeling toward the process of someone who has participated in the gatherings. As in-depth insight of the feelings of the 'real' JOURNEY Makers on the process is largely unable to be collected (due to the data being collected in a real-world interventions) the students' feeling is a proxy.

All the questions on the questionnaire were to be answered with a numerical score of how much a participant agrees with a statement about the gathering, a Likert-type 1-5 scale was used (Chisnall, 1986). However, the questionnaires will not be analysed statistically using SPSS, or another statistical software package. This is because the questionnaires from different gatherings cannot be bundled together because of the different working conditions of the gatherings and sometimes there are only 6 questionnaires from a particular gathering. Consequently it is not thought that detailed statistical analysis would be robust. It is thought suitable to simply calculate the 'mean' of the response of the participants in each workshop and the 'standard deviation' of the respondents. These descriptive statistics will give a flavour of the opinion of the respondents.

Also, the respondents to the questionnaires were invited to write comments at the end of the questionnaire. Very few participants actually made comments (possibly because they were keen to leave, or because they simply could not be bothered), but these contribute additional insight to the feelings of participants and will be included in the discussion where appropriate.

5.4.5.1 Point of information : Includingquestionnaire results in the text

When questionnaire results are quoted in the following chapters, GP participants (the only real-world participants to have filled out the questionnaires) will be underlined to distinguish that result from others. **Honours** student's results (probably the most life-inexperienced of all four student groups) will be type in a **bold** font. ***Ph.D.*** student's results will be typed in a ***bold italics*** font. *MSc* student's results will be type in an *italic* font. MBA student's results will be type in a normal font. Following Vreede (1997) all results will be followed immediately by a standard deviation value in parenthesis.

Each group of participants were given a different questionnaire containing questions relevant to their operating condition (see Table 5.2 for differences between those conditions). The MBA questionnaire (the most detailed which envelopes most of the questions from other workshops) is attached in Appendix 5.1. When the results of the questionnaires are discussed and means (and standard deviations) are quoted, also quoted is the question number that corresponds to the question in Appendix 5.1 from which these results were gained. When discussing the results to a question the thesis will attempt to give the reader a feeling of the slant of the question by suggesting an approximate wording within apostrophes, ' '. However, as the terminology used has changed with the development of the research, the approximate wording given in the discussion will vary from that in the questionnaire in Appendix 5.1. Students were told on the questionnaire that, when answering the questions, 1 = strongly agree, 2 = agree, 3 = no opinion, 4 = disagree, 5 = strongly disagree.

5.4.6 Conclusion : How the raw data can be analysed

For this research to meets its objectives, and considering the types of raw data that have been able to be collected and the varying conditions under which it was collected, mixing quantitative and qualitative seems the best way to investigate the relevant issues, a view proposed by Todd (1979) and Abrahamson (1983).

The various methods which are thought as possible ways forward in this research to investigate the different aspects of sharing knowledge have been very briefly introduced (for example, Repertory Grid, the generation of descriptive statistics and the generation of vignettes). It is felt that a better place to conduct a discussion of how they have been used is when the results of that analysis is being conducted.

However, before the thesis reflects upon the analysis which has been conducted it seems worthwhile to explicitly reflect upon the limitations and strengths of this research. Such a reflection might guide the certainty with which theory be proposed, and conclusions be drawn, in the following three chapters of research findings.

5.5 WEAKNESSES AND STRENGTHS OF THIS APPROACH TO MEETING THE RESEARCH OBJECTIVES

There are six main weaknesses which can be seen in the nature of this researcher's data. Those have arisen partly from the research objective of understanding how real participants share knowledge using GE computer technology in JOURNEY Making gatherings. Those

weaknesses will be discussed in Section 5.5.1. However, there also six main strengths which are believed to result from the approach of basing analyses on the data from real-world groups. Those will be discussed in Section 5.5.2. This section essentially explores the link between 'nature of data analyses' (box 4) and how that effects the 'nature of the research findings' (box 5) in Figure 5.1.

5.5.1 Limitations of this approach

As with most research, the data on which this research is based contains some weaknesses which might strike to the core of it being seen as a serious and meaningful piece of research (Easterby-Smith, 1999). It seems necessary to uncover these weaknesses in order to gauge the impact this work might have on being accepted by the GDSS community. The weaknesses can be categorised into those which arise from the data analyses being based on a small number of gatherings and those which arise from the limitations caused from using real groups of people in real workshop environments.

There were only four computer-supported workshops which this researcher was involved with which satisfy the principles for a task being seen as meaningful (and so is real to the participants). Details of those workshops are summarised in Table 5.1. The analyses have been based on the work by the participants from nine gatherings which follow the proposed format. It is accepted that this is a small number of gatherings on which to base an exploration of the working habits of participants of JOURNEY Making gatherings. However, to use the pilot studies as data would have prevented the research from meeting its objectives of analysing the working of real group members when facing a task which has real meaningfulness. There are five sources of weakness in this research resulting from analyses being based on a small number of gatherings.

First, it might be thought that basing these research findings on only four workshops (or fifteen gatherings of which nine followed the proposed format), is basing it on a very small sample, maybe rendering results to having very limited generalisability (Miles and Huberman, 1994). However, it is supported by experience and theoretic consideration that the gatherings are ones that do represent a wide variety of possible operating conditions for the group members. The gatherings have been a mixture of different number of participants working in sub-groups and individuals using a single console. The different gatherings have all worked on different 'meaningful' problems and participants have had different amounts of time to share their knowledge. These various conditions enable the consideration of the

different effects that the conditions might have on group members. Hence this investigation of JOURNEY Making gatherings has been based on what might be thought of as a small, but representative, sample of real-world workshops.

Second, in addition to only having access to a small number of real-world, task meaningful JOURNEY Making gatherings, the researcher has only been able to access data from gatherings performed by three different facilitators. This could be seen as a strong limitation for it may be thought that these facilitators' stylistic qualities affect the way in which participants work. Also, two of these facilitator are strong proponents of the methodology, and the third facilitator is a student of those facilitators. Hence, it seems unlikely that any useful conclusions of the effect of style can be reached. If this thesis was to incorporate a detailed consideration of the effect of facilitator style it would need to incorporate more observations of the same facilitators as well as observations of different facilitators in order to get a better appreciation of the typical practices of a JOURNEY Making facilitator. Hence it would appear that these facilitators style is a variable that can only be observed, noted, and reflected upon in the interpretation of the affects the whole process might have had on the complete performance of the participants.

The third weakness centres on the limited set of affects which might have been displayed by participants, possibly due to the limited set of gatherings that were observed. It is possible that some affects (which other participants of other workshops might experience) might have failed to have been experienced by these group members simply because the conditions were not conducive to them and therefore the researcher could not observe the affects and explore the causes. One might argue that observing and analysing more gatherings of different types of gathering would enable more cause and effects to be discovered. However, many qualitative researchers might subscribe to that view, yet they would still propose that their research is valid and useful.

Fourth, even if the participants of these observed sessions did display some affect, there is no guarantee that it was observed and noted by this researcher (Denzin, 1970). This might be a consequence of two issues, the dual roles of the researcher and the few number of gatherings which the researcher was able to observe. In addressing the first issue, one condition of this researcher being able to gain access to the data analysed here, was his help during the workshop and so it is possible that he was too busy with his other facilitation responsibilities to notice an affect being displayed. It was not possible to get the data and get perfectly

recorded observations. In addressing the second issue, in addition to the researcher being involved in these four real-world workshops and the pilot studies reported upon here, he was also involved in over 25 manually-supported Oval Mapping gatherings (Eden and Ackermann, 1998b) prior to the computer-mediated workshops reported on here. Around 95% of these were performed for real-world clients on problems that they saw as highly meaningful to their organisation. Although these workshops did not contribute to the data on which this thesis is based, they did contribute a wealth of experience to this researcher in his knowledge of facilitating groupwork and his practising of observing workshops and recording notes whilst performing his other responsibilities. This experience (for example, of how to make use of spare time and how to take effective notes) was critical to him in his role for this research of observer of the computer-mediated facilitation process. Hence, while this weakness of failing to observe some affects still exists, the condition of access to the data forced this methodological weakness. The weakness is to some extent counter-balanced by the researcher's experience of the OMT sessions which prepared him for observing the process during JOURNEY Making computer-mediated gatherings.

Fifth, there is a problem which arises from using different tasks with different groups. It is felt that no gauge can be made of how difficult the task is for all the participants. What is a hard task for some people might be an easy one of others (as it might depend on their occupational cognition (Mintzberg, 1987)). Task difficulty might be a function of the saliency of the contributions which are stimulated by the task. Therefore if a participant might not have considered a particular problem before then that might be a hard task as they have to think deeply about the issue (Argyris and Schoen, 1996) and raise issues into their conscious awareness (Posner, 1977). Consequently, any reduction in the number of contributions (for example) might not be due to the conditions under which the gathering is run, but more due to the difficulty of the task. However, a main reason for having groups of decision makers is so that the problem of task difficulty may not arise. The variation in the cognition of group members is expected, hence it might also be expected that some people in a group will have lots of salient ideas about a task, whilst other might not. In the next gathering the task will be different and the 'low-producer' might become the 'high-producer' just because the task changes and they have more salient ideas to share. The way in which the participants are chosen to participate in the workshop, and the way the tasks are chosen (largely by the participants) indicates that different people will have different quantity and quality of relevant contributions to share about the different tasks. Hence it is not thought that task difficulty is main weakness, because for some of the participants the task might

stimulate a lot of salient contributions, whilst for other it might not as in all real-world gatherings.

In addition to the five real weaknesses of this research which centre around the small number of gatherings, there is a significant weakness from analysing real groups. This research claims to seek to understand how participants are able to operate within a JOURNEY Making gathering in being able to generate and link contributions, read the mass of information on the public screen and try to piggy-back off other peoples' contributions. However the researcher has only been able to formally interview six participants, five of whom were from a gathering which might be thought of as being atypical (as introduced in Section 5.2.5.1). It seems that this is a fifth weakness. It would be ideal if the researcher could have de-briefed each participant after the workshop to gain maximum feedback and insight. However, this was not possible (as Jenkins (1998) and McGrath (1984) discuss). The facilitators were not willing for the members of the workshop to view this as anything other a strategy development meeting for them. If a participant's lasting memory of the workshop was one of being interviewed by a researcher, it could cause them to view the workshop as a research project which could put in serious jeopardy their cognitive commitment to the outcomes that they had generated throughout the workshop.

It is for these six reasons that this research may be viewed as a piece of work that will be based on thin data. However, this research aims to inform how the contributions and links made during real-world JOURNEY Making gatherings might be analysed to give useful insight to the 'performance' of participants. It aims to initiate the development of a gathering process and the development of techniques to measure the 'performance' of participants. It does not aim to conclude these developments.

If the focus of this thesis is to offer a definitive account of JOURNEY Making gatherings then these six weaknesses suggest that it will clearly fail. However, this research will aim to explore the structure of how one can consider the usefulness of JOURNEY Making for real-world participants and will be base this on (what is believed to be) the best (and only) data that is available. Hence any shortcomings are ones that might be addressed by the debate and continued research that this thesis aims to initiate.

5.5.2 Strengths of this approach

So the data might be thought of as having six dimensions of weakness and might be thought of as being dubious. However some data has been collected which offers rich insight to the perception of the real-world participants. This data can be thought of as strengthening ones' confidence in the significance of the research findings in the achievement of the research objectives (i.e. the link between 'nature of research findings' (box 5) and 'objectives of the research' (box 1) as illustrated in Figure 5.1).

First, six interviews were performed with real-world group members from two different gatherings which were run by two different facilitators (although one of the workshops from which five of the participants were interviewed was peculiar in a number of dimensions as discussed in Section 5.2.5.1). This opportunity gave rich insight to the opinions of the participants. The format of the interviews (in-depth and some in pairs) is believed to have given the participant a great opportunity to make their own opinions and be stimulated to comment on their feelings of other peoples' opinions (see Section 5.2.3 for further discussion of issues around the interviews). This researcher was able to stimulate discussion about the most pertinent aspects of the process and gain directly relevant, fresh answers. Also many participants critiqued the gathering process during the interview and suggested potential improvements. These suggestions gave further insight to the difficulties they faced during the process and potential ways that they thought would help them. In summary, it is believed that the interviews provided rich insight to the opinions of these participants from two different gatherings by two different facilitators.

Second, opinions of the participants of workshops where interviews were not possible have been gleaned through observing their working during the gathering and observing their obvious reactions to the process (as well as through questionnaires from all participants of one of the workshops). For example, when the participant in the ELZ workshop shouted "This is great, this is so wonderful" after seeing the number of contributions after the blind gathering, or when other participants in the same workshop sat back, folded their arms and read the screen rather than piggy-backing. Although these observations might be less rich, they are spontaneous and real. Instead of the interviewees giving the answers they think the interviewee wants to hear, these natural reactions to the process give tremendous insight to what the participants feel, when they feel it. Granted, a significant number of these feelings may not be displayed in observable ways, however the ones that are give useful additional insight.

The third strength of this research centres on a belief in task meaningfulness (as discussed in Chapter 4). Although researchers who use some of the meaningless tasks identified in Chapter 4 believed those tasks to personally relevant (Petty and Cacioppo, 1979) for their research subjects (Valacich et al, 1994b), this researcher would not necessarily agree. If participants are very concerned about an outcome being negative for them, then they may be more likely to contribute a proliferation of positive ideas to the potentially negative theme. Participants of a meaningless task might not see any consequences for them for the gathering so might have no interest in making contributions. Also real-world participants may be less likely to loaf by letting their partner type in all of their ideas rather than contributing their own as students might do. In this the real-world participant may be more pro-active, or even forceful, in ensuring that their opinion is also represented (Briggs and Vreede, 1997) because the outcome might have real consequences for them, whereas the student participant might not see any consequences for them and so might not care about the final result. Numerous of these examples which highlight the difference between the motivation of real group members and students could be generated, but the fact that the distinction can be shown to exist is sufficient for the argument here. It is believed that a main strength of this research is the proposition that the participants might have identified some meaningfulness for them in the task on which they were working and so will desire, or even might demand, to contribute their knowledge and to have their opinion included in the final outcome.

Fourth, the discussions about task meaningfulness withstanding, these observations and interviews from the real-world workshops have been supplemented with the results of 57 questionnaires from workshops. While the way in which participants approach a workshop, as a strategy meeting (for real-world participants) or a lecture on a methodology (for student participants), is thought to have significant impact on the way in which people work during the gathering, it has been argued that the opinions on the process of the latter category of participant are somewhat useful as they are valid. They are thought to be valid because these people have experienced the process and therefore can comment on it. The opinion of the 51 students on the ease of performing certain tasks, the concerns they had over their own contributions being right, and their reaction to the method could give some indication of how real-world participants might feel. It is a strength of this research that these questionnaire results have been coupled with the questionnaires of 6 real-world participants to substantiate points identified from real-world gatherings (although it is acknowledged that this is a compromise on real-world participants filling in the questionnaires). In support of the third

strength raised here, this research is thought to benefit from triangulating real-world data with data collected from other pilot gatherings rather than a whole thesis being based on these student groups.

Fifth, a main strength of this research to real-world practice is the belief that the results of the exploration of these workshops might be practically useful to facilitators and to real-world practice (which is the nature of the research Christensen and Fjermestad (1997) extend a call for). In this research, for issues to be investigated they have to pertain to some issue thought to be of relevance to the facilitator. The findings are believed to be useful to the extent that they might re-align the expectations that facilitators have of how the group should operate i.e. the results have real relevance to practice. Also they are felt to indicate the worth of the gatherings in being able to facilitate the thinking of participants, and so might even inform on how gatherings should be performed in order to maximise the benefit of some of the constructs examined here.

Finally, it is a strength of this research that theory supports the development of gathering sessions in this way. The early chapters of this thesis have attempted to provide a theoretical justification for believing that changing the gathering format might be a positive move, rather than a step into the unknown. Hence this research has not sought to justify the proposed format only through analyses of data. It has sought to provide persuasive theoretical arguments to justify changing of the normal format to the proposed format. Furthermore, it is this theoretical base to which this research aims to contribute something useful. It is believed that this research has found a gap in the literature and that, when filled, facilitators of gatherings and brainstorms might find benefit in the findings from this research.

For these six reasons, it is believed that this research is useful to the JOURNEY Making community and to the wider group facilitation community. The main strengths of this research are believed to lie in the fact that the research objectives are tailored to explore a process of gathering that might be adopted by JOURNEY Making facilitators to provide a better facilitation service for the real-world problems that the real groups of participants attempt to tackle.

5.5.3 Conclusion on the limitations and strengths

This thesis reports on an exploration of the way in which participants of JOURNEY Making gatherings are enabled to share knowledge during groupwork. This section has attempted to highlight the possible weaknesses and strengths of this research to providing results which are important to JOURNEY Making for effective group facilitation.

It seems that the shortcomings of this research centre around it being based in data from only nine proposed format gatherings and from having limited access to the real group members opinion of the process. The main strengths appear to be that the research is based on real reactions of real people who are tackling real problems, and that this is triangulated with the opinions of participants of pilot studies as captured through questionnaire and interviews with a few real-world participants.

This research is not based on the contrived environments created for, possibly loafing, students to explore problems they may see as being meaningless. It is concerned with how people with responsibility and power in an organisation share their relevant knowledge about a real problem in order to generate a real outcome that has real consequences for them.

5.6 CONCLUSION : JUSTIFYING THE RESEARCH METHODOLOGY

This chapter has explored the research methodology for how this researcher will *'explore what happens in JOURNEY Making gatherings'*. Specifically, it has:

- Described how the objectives of analysing the data relate to the general objectives of this research and in turn how those relate to JOURNEY Making.
- Reviewed the five sources of data which have been able to be collected, and methodological issues regarding the collections of these.
- Concluded that both quantitative and qualitative approaches to data analysis will be employed and that the research methodology of Integrative Evaluation best suits this approach.
- Explored where quantitative analyses and qualitative analyses might actually be employed to generate useful results which can support one another in the investigation of an issue.
- Highlighted the main weaknesses and the main strengths which are caused largely because of the research objective of analysing real groups.

This chapter has set the scene on which the three findings chapters which will seek to *'explore what happens in gatherings that are run as part of a real-world JOURNEY Making workshop'*. It has reviewed the source of data which will be used to generate results. Where appropriate the results of quantitative investigations will be complimented with qualitative support, and vice versa. The following three chapters will report on the findings from this data analyses. The first findings chapter (Chapter 6) will reflect on how able participants are to share contributions, and the second findings chapter will concentrate on how able participants are to share causal links. The third findings chapter will reflect further on the nature of the ability of participants to share contributions.

CHAPTER 6 - ANALYSES OF THE CONTRIBUTIONS

This is the first of three 'findings' chapters that *'explore what happens in gatherings that are run as part of a real-world JOURNEY Making workshop, in order to improve practice in facilitating gatherings'*. The findings have been split into three chapters, briefly: the way people share knowledge though the contributions they make during gatherings (Chapter 6), the way participants causally link contributions (Chapter 7); and how participants might be able to navigate different theme in the problem when making contributions (Chapter 8). Hence this chapter details the way in which participants share contributions during groupwork using computer technology in four real-world JOURNEY Making workshops. Essentially it presents an argument that these participants are able to work in blind and piggy-backing gatherings. It evaluates this with a quantitative appreciation of the contributions made by participants and, critically, by integrating qualitative data from the participants of their opinion of the proposed format.

It will show that not only are these participants able to share their knowledge during the blind session, but also that they might enjoy doing so. It presents evidence that the piggy-backing gatherings are not highly successful in getting these participants to think about other peoples' contributions and synthesise them with their own knowledge. It suggests that these participants spend more time during the piggy-backing gathering seeking to establish causal links between the material rather than think critically about the opinions from others. This is not proposed as a wholly negative consequence, for it suggests that the structuring of the material might be quicker considering the participants greater familiarity with the contributions. It proposes that the reason for this inability of these participants to make piggy-backed contributions is cognitive overload (Gallupe and Cooper, 1993).

The chapter then turns away from the reflections of these participants and from the making of contributions during the four workshops. It re-focuses the discussion onto an investigation of the nature of the actual contributions that were made. In this, it introduces the concept of what might make a contribution 'good'.

This researcher has made 'Reflections' during each of the findings chapters. He thought that, considering the number and context dependency of these reflections, it seemed more sensible to make the reflections in the context of the argument rather than only in some later

chapter. Hence while the reflections will be performed at the time the research findings are discussed, the Reflections Chapter will more be reflecting on the entire process of the research rather than on the nature of the results that were found.

It seems that a sensible place to begin the investigation of *'what happens in gatherings that are run as part of a real-world JOURNEY Making workshop'* is first by reviewing the validity of the contributions made by the participants of the GEA session and then by revisiting the instructions given to participants during the blind and piggy-backing gatherings.

6.1.1 Health check on the data from the real-world GEA workshop

As was said in Section 5.2.5.1, it is worth being explicitly clear of how the peculiarities of the GEA workshop might have caused that data to be invalid. This researcher deeply considered if the data on the contributions were reliable and did consider removing them from the analyses. The following points review the reasons why this data was not discarded in the light of the peculiarities raised in Section 5.2.5.1.

- **The facilitator felt that he was under tight time pressures to help the group make the JOURNEY -** Instead of considering how much time the group members had to share their ideas in the blind and piggy-backing sessions, it seems more relevant to consider that the facilitator is limited to having about 65 contributions on the screen. It might not matter how quickly these participants share up to 65 contributions, for it is the fact that they have shared up to that number in whatever time that is more important than the duration of the gathering. These participants quickly shared 44 contributions (during 7.77 minutes from Table 6.1) during the blind session (the average for the other sessions under scrutiny here was 52.9 contributions in 11 minutes).

The GEA participants also were able to share 15 contributions during the piggy-backing gathering, hence had 59 contributions to links at the start of the group discussion. The length of the GEA piggy-backing gathering was 6.75 minutes (from Table 6.1), with the average for the other sessions under scrutiny here being 10.28 minutes. Hence the piggy-backing session was much shorter than normal, possibly because the facilitator explicitly asked participants to stop entering links because they were doing so incorrectly (as will be seen in Chapter 7). At the end of both the gathering and the group

discussion, there was 94 contributions on two DE screen views! This was a very large number of contributions to link in the short discussion time available. However, it is thought that this only puts into question the validity of the links, not the validity of the contributions for the following reason.

Participants of a gathering are often under time pressure (although not maybe to the extent that these participants were). Maybe if the participants felt under a significant time pressure then they might have tried to share their contributions quickly, or be selective in what contributions they shared. However, in interview none of the participants remarked feeling under pressure to share their contributions quickly during the blind and piggy-backing sessions. Three interviewees remarked on the tight time scales in the blind session (as will be discussed in Section 6.2.2.3), but they did not say that they felt pressured during the gathering to share contributions quickly.

The results of analysing GEA contributions will be interpreted in the light of the amount of time the participants had. The knowledge gained from this analyses will inform the reader of what might be the consequences of time pressure for the other gatherings which are under a similar pressure.

- **Some group members might have thought that they had experience of causal mapping, and so react differently to the typical participant who does not have experience -** The analyses of the contributions is not interested in the causal links between the contributions and so should not effect the validity of this data.

- **The facilitator worked in the same organisation as three of the participants -** This might have caused some personal relationships between the facilitator and the participants, which are might be directly related to the familiarity between the two parties. However, in the blind gathering participants were working in a near-nominal group activity (see Pinsonneault et al (1998) who discuss nominal brainstorming) and were not really communicating with the facilitator during the time of the blind gathering. Granted, there may be more communication during the piggy-backing session, but it was observed that if participants did talk to the facilitator then it was regarding the linking of contributions, rather than the sharing of contributions. Hence it would not appear that the making of contributions should be deleted from analysis.

The GEA workshop might be thought of being an outlier, but it is not felt that the peculiarities raised above will have had much effect on the sharing of contributions by the participants. This conclusion does not indicate that the causal links which participants made will be also be valid for analysis, but that will be decided in Chapter 7. In conclusion it is felt that the contributions made during the GEA session are valid and that there is little reason to suggest why they should not accurately represent other gatherings of a similar format if they are also run under a similar time pressure.

Table 6.1 - Length of gatherings and the time between public screen being activated and the first contribution to the piggy-backing session

Length of blind gathering	Average time for introducing the public screen & participants reacting to it	Standard deviation for people to react to the public screen	Length of piggy-backing gathering	Total length of time the consoles are actively being used
ELZ 1	0:09:47	0:06:43	0:03:08	0:07:34	0:17:21
ELZ 2	0:11:22	0:04:36	0:02:31	0:04:49	0:16:11
ELZ 3	0:13:04	0:09:48	0:01:04	0:06:49	0:19:53
ELZ 4	0:11:19	0:08:52	0:00:26	0:16:03	0:27:22
NYPZ 1	0:14:12	0:07:11	0:00:59	0:09:41	0:23:53
NYPZ 2	0:08:17	0:04:11	0:01:10	0:11:06	0:19:23
GEA 1	0:07:46	0:08:29	0:01:16	0:06:44	0:14:30
GP 1	0:12:18	0:20:16	0:01:06	0:12:48	0:25:06
GP 2	0:07:40	0:07:48	0:03:41	0:13:17	0:20:57
Average	0:10:38	0:08:39		0:09:52	0:20:31
Standard Deviation	0:02:23	0:04:44		0:03:42	0:04:16

6.1.2 Revisiting the instructions for making contributions.

At the beginning of similar gatherings which are under scrutiny in this research the facilitator gives participants explicit instructions regarding the making of contributions. These instructions are discussed below. It should be noted that these instructions do not follow Osborn's (1953) guidelines for brainstorming (for reasons discussed in Section 2.1.3.2.1).

Firstly, the facilitator asks participants to type each contribution into the console. Participants are made aware of why the public screen is switched off. It is explained that viewing other peoples' contributions can bound your own thinking. Participants are asked to consider the issue from their own perspective and type in the contributions that they see as relevant. The facilitator asks for contributions to be ways forward in the situation or possible concerns which should be monitored or any other knowledge they have around the issue. Participants are asked to make those contributions action-oriented by inserting a verb in order to act as a call to action (Eden and Ackermann, 1998c). Therefore the organisation can actually perform the call to action if the group members decided that the action is a rational thing to do (Eden and Ackermann, 1998b). Participants are informed that the public screen will be switched on at a later time and they will be able to view other peoples' ideas and think about them.

When the public screen is actually switched on (i.e. the blind session stops), the facilitator introduces the clusters of contributions that they have constructed and invites the participants to read the contributions and contribute their own perspective of them. They are invited to agree or disagree with the contributions but critically to contribute the rationale for their reaction. Also participants are invited to insert causal links between contributions which they think are related causally.

6.2 THE MAKING OF CONTRIBUTIONS DURING THE BLIND GATHERING

In order to explore the worth of the blind gathering to the participants of those four workshops it is necessary to consider benefit from two perspectives. The first will consider if the participants are actually able to share contributions using computer technology in a blind gathering i.e. exploring if participants will be able to gain a cognitive commitment to the proposed format in that it facilitate their sharing of knowledge. The second will explore how the participants felt when they shared knowledge in this way i.e. exploring from a more emotional perspective of whether participants enjoyed the format.

6.2.1 What is the profile of making contributions in the blind gathering?

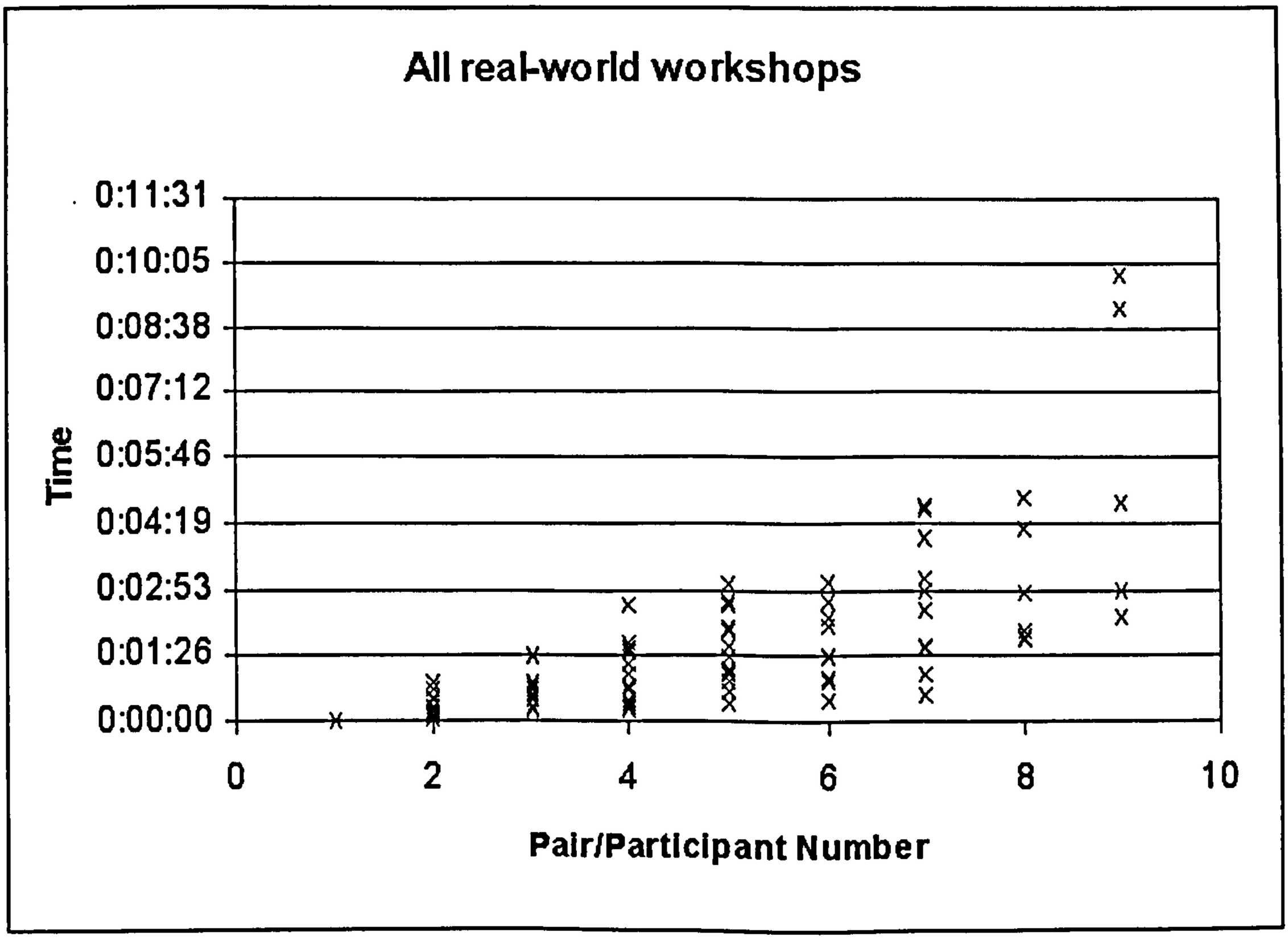
It was found that over the nine proposed format gatherings explored here, participants were able to make (on average) 49.8 contributions during the blind session, as Table 6.2 on Page 165 indicates. One stream of the research concentrated on investigating how participants

make these contributions during blind gatherings. The contributions made during nine blind gatherings (from the four workshops detailed in Table 5.1) were analysed.

Firstly, an investigation was performed of the time it took participants to make their first contribution. As a guiding point, the first contribution that was made in the gathering was found. Then each contribution made after that was compared to that first contribution. Essentially it was assumed that the first contribution was made as soon as the participants were able to make contributions. This enabled a comparison of different gatherings as there is a fixed point in the gathering from which the time to make all the contributions can be calculated.

From Figure 6.1 on Page 137 it can be seen that the vast proportion of participants make a contribution within 3 minutes of the first contribution being made, 91% to be exact. 77% make that contribution within 2 minutes of the first contribution, and 57% within 1 minute.

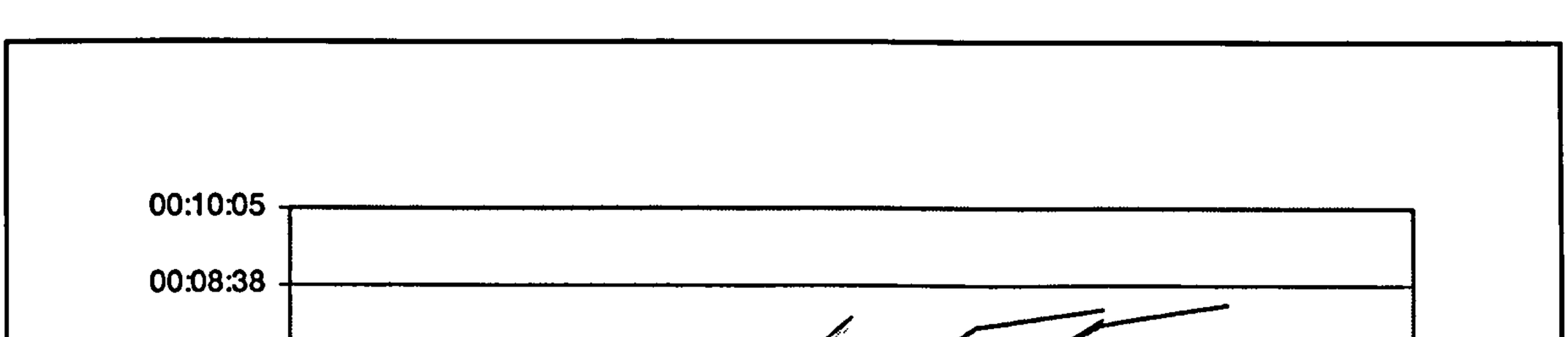
Figure 6.1 - The length of time for each pair/participant to make a contribution after the first contribution has been made



This is positive news for the facilitators of these blind gathering. Although it might take a minority of these participants a few minutes to actually start generating contributions it suggests that most participants in these workshops were quickly able to consider the issue and make some attempt at contributing their knowledge. However, this work does not indicate if these participants were able to sustain the momentum from making their first contribution.

Figure 6.2 shows a typical profile of the time to make contributions from a console by a pair of participants of one of these JOURNEY Making gathering. It is clear from charting the times between a console making each contribution that there is little difference in the time it took them to make their first few contributions than it did to contribute their last few in the blind gathering. This indicates that the participants had been able to freely generate contributions throughout the session, effectively not sitting there for long periods trying generate new ideas. Across all six 'pairs' gatherings under examination here, the average duration between contributions was 1.25 minutes with a standard deviation of 0.97 minutes.

Figure 6.2 - A typical profile of the time to make blind contributions from a console by a pair of participants of a JOURNEY Making blind gathering



However this result may be peculiar to these pairs of participants working on the same console, and thus is not representative of the single users. To explain, it may have been that having two participants using a console resulted in each being blocked by the other when they wanted to type in their contribution. Therefore the time between contributions is in fact the time it takes to type in a contribution. Consequently, this could hide the fact that some participants would be unable to generate new contributions and therefore sit thinking while their partner was contributing. Then the partners swap roles (quite naturally) as the other begins to realise new contributions want to share those with the groups. The other partner by this time has exhausted their current contributions and so stops to think for a moment whilst the other partner makes contributions. This tag-team style would mask a potentially low ability to consider the problem by individual group members.

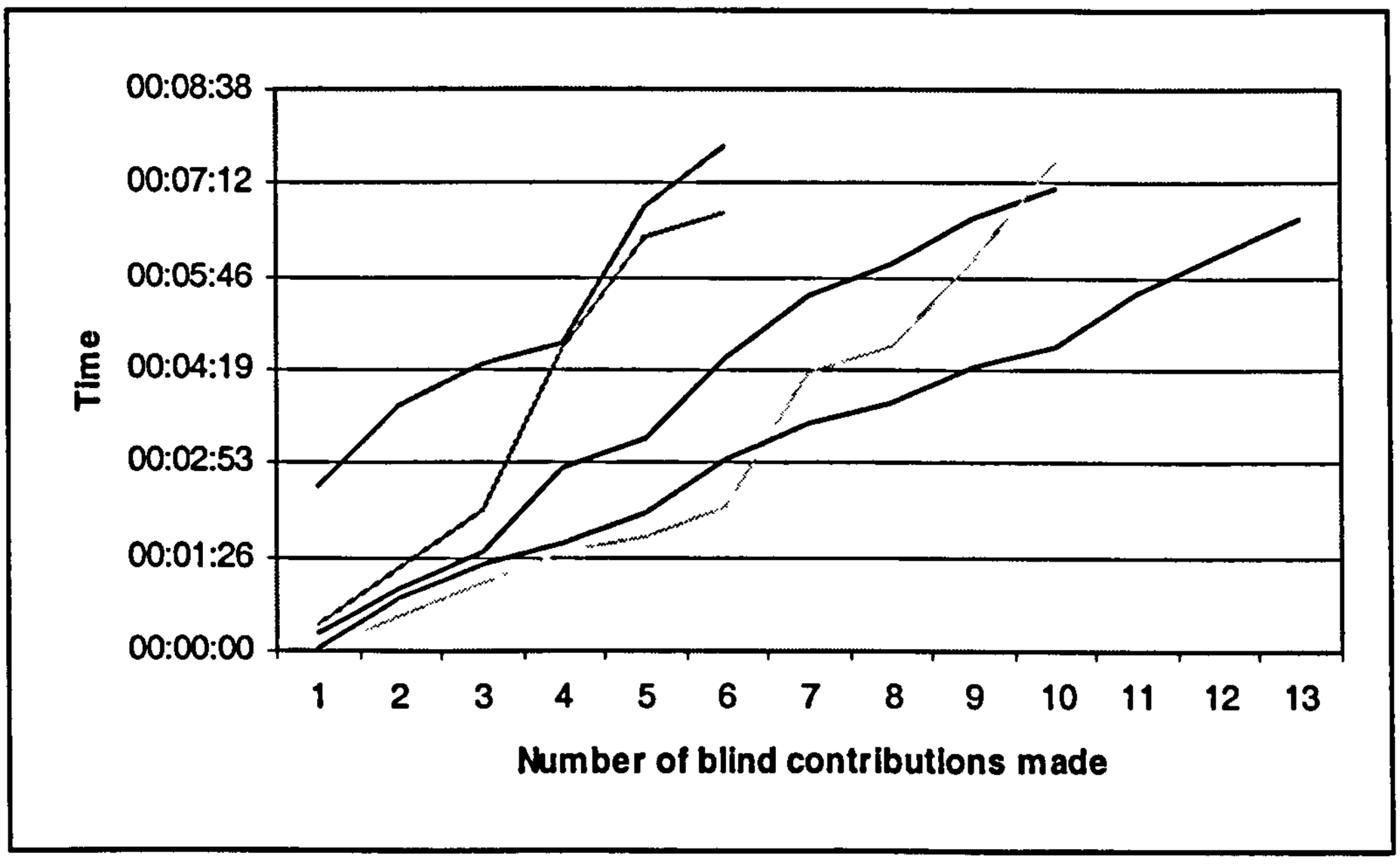
In order to explore if this was the case the profile of contributions from single-user participants was generated.

The example of a profile of single-user participants (from a typical gathering under scrutiny in this research) making their contributions (see Figure 6.3) shows that single user participants (from that gathering) do not slow down their rate of generation after an initial flurry of contributions. Instead across all 'individuals working alone' gatherings, the participants contributed very uniformly with an average of 0.85 minutes between contributions, with standard deviation of 0.80 minutes.

Hence it would seem that for this small data set, the rate of making contributions is quicker for the individuals who worked alone (0.85 minutes between contributions) than it was for the pairs who worked together (1.25 minutes between contributions) (however both result have a high standard deviation of 0.80 and 0.95 minutes, respectively). It would appear that these pairs were not able to exploit the two people 'advantage' to contribute knowledge more quickly and more fluently. To explain this finding, it is possible that these pairs held more of a discussion over the wording of their contributions rather than the unilateral decision making of an individual. This debate could have shifted the focus of the pair from generating and typing to debating semantics. Hence this could have slowed the rate of making contributions. This result does not suggest that the individuals working alone are more able to generate contributions than the pairs in this study. It might however suggest

that the time of the individuals working alone in the workshops under examination in this research is spent more on contributing knowledge than on debating it within themselves.

Figure 6.3 - A typical profile of the time to make blind contributions from a console by a single participants of a JOURNEY Making blind gathering



However, both the pairs and the individuals working alone seem to contribute very uniformly over the duration of these blind gatherings. In response to theoretical concerns regarding the generation of highly salient contributions and those constructed during a period of intensely deep thought it is apparent that these participants (neither individuals working alone nor pairs) did not sit and ponder over the construction of later contributions for any longer than they pondered over the construction of earlier ones. Hence this might indicate that the contributions which were made were kept in short-term memory as this is where Santanen et al (1999) suggest that salient contributions are stored.

6.2.1.1 Reflection : Implication of short blind gatherings

This finding might indicate that the length of these blind gatherings was not long enough for the participants to reach the point where they are unable to recall salient contributions because the rate of making contributions does not appear to slow.

The result from analysing these facilitator workshops may have positive or negative implications for the facilitator of JOURNEY Making gatherings. It might indicate that the participants under scrutiny here are unlikely to be concerned about their lack of ability to make contributions as they are actively and regularly able to access and share contributions from their knowledge of the issue. Therefore procedural rationality might be unlikely to be lost through these participants sitting in their seats unable to contribute any thoughts they have over the issue. However, it could also indicate that these participants are not making contributions that are searched for during a period of incubation (Posner, 1973). One might expect that if these participants were spending rigorous mental activity searching, developing and constructing new contributions then the duration between each contribution might be longer than when one is sharing a salient thought. Consequently these results might indicate that contributions from these participants are being quickly generated rather than the deep and incubated thought that is so often advocated when participants construct ideas from deep knowledge (Lumsdaine and Lumsdaine (1995), van Gundy (1987), Amabile et al (1996)).

So if it holds that it is during the time of deep, incubated, thought that unusual and rare contributions are made and that this is done once all the highly salient (or bog-standard) contributions have been made then this might indicate that participants in these gatherings did not share these type of rare contributions. Support for this proposition comes from Burton (1987) who found that the early ideas in a brainstorming were the least 'creative ones', and the later ones were most 'creative'. Instead the blind gatherings under scrutiny here might only have captured the bog-standard contributions that participants think of regularly i.e. the salient ones.

However, before the facilitator of these workshops were lengthen the duration of the blind gathering so that participants were able to share deep thoughts, these facilitators might consider the effects on procedural rationality from the participants sitting feeling as though they are wasting time - when the facilitator thinks they are considering the problem. This consideration will be performed in the following reflection.

6.2.1.2 Reflection : Lengthening the blind gathering

So the blind gatherings under scrutiny here might not have put the participants in the position that they are unable to construct any more contributions from their wealth of relevant knowledge. Certainly one member of the GEA gathering would strongly agree with this, for she had not finished making contributions when the blind session was stopped. As will be shown in the discussion in Section 6.2.2.3, for this participant the length of the gathering failed to allow her to share some pertinent information. It may be that the piggy-backing session will capture some of that participant's missed points, but similarly the participants' attention might go down other avenues (as stimulated by the contributions they read).

However it would seem that the blind gatherings under scrutiny here might be capturing the most salient concepts from most of the participants. Hence these participants might identify procedural rationality in the gatherings as they have had the opportunity to contribute THEIR opinion. However, if these participants were not able to contribute all their opinions (as the blind gathering was stopped and they knew that they still have a few critical contributions to make) then maybe these gatherings should have continued beyond their actual length in order to capture these extraneous contributions.

A main reason for a blind gathering being cut short (by the facilitator switching on the public screen) is because the participants are making so many contributions that the public screen has too many contributions to be manageable. Switching on the public screen slows the rate of contribution dramatically as participants turn their attention from generating contributions to reading what other contributions have been made. If the facilitator ran a blind gathering without considering the number of contributions that were collected, then the public screen that participants were presented with at the end of the gathering might be illegible. In order to get all the contributions on the screen simultaneously they may be too small to read, or may be too tightly packed together to be easily identifiable and the time to link that number of contributions might be unworkable within the philosophy of JOURNEY Making workshops.

It seems that the screen size is a significant constraint to the number of contributions that facilitators should capture in one gathering session. If participants are not given the opportunity to completely exhaust their knowledge then they might become frustrated with

the gatherings, because there is always one or two ideas they never have time to contribute. In conclusion it seems that the ideal situation in the gathering examined here would be for participants to keep generating contributions for as long as they wish as then they will have contributed all the issues they want to. However the limitation of having only 65 contributions on the public screen makes this impossible.

A simple solution would be to have a smaller number of participants in each workshop, hence each participant would be able to contribute more ideas before the public screen becomes full. But given that often a main attraction of JOURNEY Making is to get everyone in the same room to generate a shared way forward in a situation, this would be antithetical to the philosophy of JOURNEY Making in certain situations. Another solution would be to use two screen views to display the contributions, but the difficulty of this would make it impractical. For example, the difficulty of remembering where concepts are (in order to link them) could result in a very poorly linked map or a linking process that took too long within the existing philosophy.

Within a JOURNEY Making philosophy it seems unreasonable to reduce the number of participants or use multiple DE views to display the contributions so that participants can make more contributions each to exhaust their knowledge about an issue. And so currently the facilitator has to accept that the participants are limited to around 65 contributions (65 in total, not 65 only during the blind gathering). Thus they must accept that participants might not exhaust their salient contributions during the blind gathering but also be aware that participants do have an opportunity during the piggy-backing sessions to finish off making any critical contributions.

6.2.2 The feelings of participants towards the blind gathering

The above discussion concerning the ability of participants to share knowledge in blind gatherings is concerned purely with the practical ability of participants to share contributions in this blind condition. It does not seek to consider the feelings of the participants when they make the contributions. However, for a participant to see the procedural rationality of a gathering session they may require to have some emotional pleasure from the process (Eden, 1992a), not just know that it is an opportunity to share their knowledge.

It seems important to consider how the participants' perception of the blind gathering under scrutiny here might have affected their work during it. In order to understand what these participant's emotional reaction to the blind gathering was it seems worthwhile to synthesise some of the findings from the interviews of real-world the GP and GEA participants, researcher's observations and pilot workshop questionnaires into a discussion of the feelings participants may have about blind gatherings and the possible consequences of these for the outcomes of the workshop.

6.2.2.1 The absence of Social Comparison Information

With the public screen switched off during these blind gatherings, participants might spend a significant amount of time seeking social comparison information (Shepherd et al, 1995) from sources other than the public screen, rather than making contributions to the group's knowledge base (Sanders et al, 1978). Theory suggests that when participants of groupwork are unable to identify how other group members are performing they might generate within themselves the opinion that other people are not exerting as much effort as they are and so not making as many contributions (Kerr and Bruun, 1983). The participants might then experience the "sucker effect" (Kerr, 1983) as they might feel aggrieved that some other people are loafing on their effort and they are making the bulk of the contributions (Harkins and Szymanski, 1988). The sucker effect can result in the participant matching (what they think is) the productivity of the lower performing group members. This is called the "downward matching" or "downward spiral" effect (Kerr, 1983). Therefore without the availability of social comparison data participants might reduce their effort so as not to be taken for a sucker.

However, this chain of argument was not supported by data gathered from participants of the blind gatherings under scrutiny here as it was found that many of these participants were not really that interested in gaining social comparison information about the effort being exerted by other group members. This section will explore the effect which the unavailability of social comparison information might have had on the real-world participants. It will start with a discussion of the effect of not being aware of the quantity of contributions being made, and then progress onto a discussion of being unaware of the type of contributions being made.

6.2.2.1.1 Participants reactions to being unable to compare their quantity of contributions

One interviewee from a real-world workshop was so "engrossed in my own ideas" that she reported not seeking social comparison information by looking round to see what other people were doing. Interestingly, she did say that she did not have enough time to contribute all her ideas. She had been thinking of the issue for a number of days, but the blind session did not give her enough time to contribute all her ideas. This might explain why she might not have looked around to seek social comparison information - she had not finished making her contributions, and so "engrossed" herself with the console rather than looking around.

One reason for a student not seeking social comparison information was that, "Our group was too busy putting ideas in to really notice that the screen was frozen". This feeling was supported by other real-world participants and also students in the pilot workshop who disagreed on their questionnaire that they did 'seek to find [social comparison information of] how many contributions they were generating compared to other people/groups', averages of 4.20 (0.84), **3.67 (1.37)**, ***3.60 (1.52)***, *4.38 (0.86)* and 4.08 (1.12) [Question 5] for GP, **Hons**, ***Ph.D.***, *MSc* and MBA (where 1 = strongly agreed with the statement, 5 = strongly disagreed). Nor did people (the ***Ph.D.*** groups excluded) feel that they did 'try to find out how their contributions compared to others made during the session', averages of 3.84 (0.84), **3.50 (1.22)**, *3.71 (1.31)*, 3.50 (1.16) [Question 6]. The ***Ph.D.*** group did feel that they tried to gauge how their contributions compared to other people's, average ***2.00 (0.71)***. However the results of Question 6 was gained from the somewhat loosely worded question of "I tried to find out how my group's contributions compared to other groups"'. These responses give general support to the anecdote of how the group member did not seek social comparison information in the GEA gathering.

One issue regarding participants comparing their quantity of contributions with the productivity of other group members raised during interviews with the real-world participants was the effect of the level of perceived anonymity of contributions. It is important to recall that these interviewees were working alone on a console. One interviewee reflected on how anonymity was good because she did not feel under pressure to contribute faster, but it was also bad, because she had no sense of what other people were doing. Hence anonymity may have an effect of immunising some of these participants against the social pressures to make as many contributions as other participants that may otherwise have been experienced (which Kerr (1983) suggested they might feel).

However, this is not to say that all participants are comfortable in not gaining social comparison information of the number of contributions. Three participants in pilot and real-world gatherings reflected upon how they did seek social comparison information of the number of contributions. One participant of a real-world pilot workshop (not reported in extensively here as the researcher was not present at the workshop) told how she was keen to establish how she was performing in terms of the number of ideas she was contributing compared to the group average. The participant was unsure how she might feel if she discovered that she was above or below average, but she was keen to find out nevertheless. That participant also told how she sought social comparison information when all the ideas were displayed on the public screen. The participant calculated the number of ideas on the screen and the group average from that, and then counted the number of ideas she had on her console screen. Then she deduced whether she was above or below the group average by comparing it to her own productivity. Another participant of the same real-world pilot workshop told how she calculated the group average during the session. Each time that participant typed in a new idea it would appear on their console screen along with the number Decision Explorer (DE) gives to the contribution. By taking this DE number and dividing it by the number of people in the group, the participant was able to calculate the group average. The participant calculated her own productivity by counting the number of contributions on her console screen. By comparing her own productivity to the group average that participant discovered how she was performing. Hence that participant could gain real-time social comparison information (!), although she was being distracted from the task at hand by seeking it. One interviewee from a real-world workshop reflected how she "noticed that some people were typing fast when I was doing nothing" and this caused her to be somewhat nervous about her productivity in terms of quantity of contributions.

One interviewee from a real-world workshop reflected on how the anonymity of the number of contributions she was making masked the impression of quality of contributions she was making. She felt that people often form opinions of how 'good' a person is from their productivity from the quantity of contributions they make. She found it "quite intimidating" that she received no indication of whether other participants had made more contributions than she did (maybe this participants experienced the "burden effect" (Burton, 1987) where she felt the burden to contribute her fair share and might feel embarrassment if she were not able to do so). She reflected on asking herself the question "Was I the least creative person

in the whole room?", and for her creativity was measured through the quantity of contributions she made and this measure held some indication of her worth as a team-member. Her partner in the interview was totally unconcerned about this. She said how, if she was less productive in the brainstorm session, she would be able to contribute her knowledge at some other time during the session. Another participant of a real-world pilot workshop supported this thought as she reflected upon how social comparison information was irrelevant to her as the quantity of ideas would not indicate the quality of those ideas (which to her was more important).

In summary, the results of this work indicate that many participants were not at all concerned about gaining social comparison information, yet some were. However, those interviewees who were interested (but not necessarily concerned) in gaining social comparison information might have wanted the validation that their effort was contributing to the group, so that they were not seen to be loafing. Those interviewees who were not concerned were either too busy sharing their contributions to be bothered with finding out how they were performing, or perceived no relationship between the number of contributions and their worth to the group. Furthermore, no interviewees remarked on being concerned that they were doing all the work and were being taken for a sucker (Kerr, 1983).

On reflection, it is not felt that the anxiety that might have been created by a lack of social comparison information should necessarily be alleviated by the facilitator, for example by displaying on the public screen a count of the number of contributions being made (in a similar way to WinEBT (a computer-driven GSS) displays how many contributions have been made (Clapper, 1996)). It might be that if the facilitator offers such a source of comparison then they are almost suggesting that quantity is important. This research would not necessarily agree with the proposition that a high quantity of contributions necessarily indicates a high quality of contributions (when quality is not defined according to *originality* and *feasibility* by a researcher, as found by Diehl and Stroebe (1991) and by Bouchard and Hare (1970)). Hence, it might be considered important for the facilitator to emphasise that quantity is not important, for it only takes one 'good' contribution to redirect the emphasis of the group or significantly effect the outcome which is generated.

It is felt that the results of this work suppresses some concerns that participants working in a nominal group environment with no social comparison information of the quantity of their

contributions might feel very uncomfortable (Herbert and Yost, 1979), and as a result spend considerable effort (and time) finding 'hidden' or subtle information instead of sharing their knowledge, for example, through interpreting facial expressions (Hatfield et al, 1992). However, it remains to be seen how these participants felt about not knowing what type of contributions other people were making. The following discussion will explore this.

6.2.2.1.2 Participants reactions to being unable to compare the type of contributions

Although most participants in these workshops did not seem to be overly inquisitive of the number of contributions being made by others, 4 out of 6 interviewees conveyed an inquisitiveness of whether were they were making the 'right' type of contributions. These participants reflected that initially the absence of any of this type of social comparison information made it hard for them to feel confident that they were 'on the right track'.

One interviewee from a real-world workshop reported having "initial concern that I was approaching the issue from the wrong angle ... but it does not matter as the only person who knows is [the facilitator]". Another real-world interviewee admitted that they were "frightened at the start, but the barrier and boxes frame thinking, and [the blind gathering] allowed those to be lifted" - her interview partner strongly agreed with her. In support of this view of initial concern one participant of a pilot workshop commented on their questionnaire how they were "very unsure at the start". However, making contributions when they did not know what other people had contributed was "exhilarating" to one interviewee from a real-world workshop. That interviewee said that it allowed them to "think without having to be concerned if you were in the right zone". Another real-world interviewee discussed how "not being able to see other participants stuff [enabled me to] try to get all ideas out of your system without any influence - which is good". One interviewee from the GEA session thought that "some ideas would definitely not have come up if we had not had done it blind before". She was of the opinion that other people's ideas would have framed her thinking. Therefore her own ideas would lie within the bounds of what other people have contributed and this would have reduced her own creativity.

One real-world interviewee reported on preferring the blind gathering over the public screen updating, because the latter would be "distracting for me as ideas would pop onto the screen" (she had participated in both types of gathering). She thought that the blind gathering would stop them from "falling into the trap" of putting in complementary ideas

that were related to the stimulus ideas i.e. suffering from bounded vision when seeing other peoples' contributions.

It seems that any concern these participants had was normally felt that during the early stages off the blind gathering. After this some participants seemed to relax and begin to enjoy the freedom of being in any 'zone'.

Honours students and ***Ph.D.***s were more concerned than other students that their 'contributions might not have been as 'good' as those of [fellow] students', averages of 4.40 (0.55), **3.17 (1.33)**, ***3.40 (1.82)***, *4.57 (0.81)*, 3.93 (1.07) [Question 2]. This difference in level of concern could be explained by the fact that the **Honours** and ***Ph.D.***s were working individually, whereas some other participants were working in pairs and possibly gaining confidence from their partner. In this, **Honours** and ***Ph.D.*** students might be more affected in being unable to validate the 'goodness' of their contributions as there is a far greater feeling of uncertainty when working alone than when working closely with other participants. However, the GP participants were working alone also, but they were real-world participants and might have known without doubt that they were sharing relevant contributions from their expert knowledge base.

It may be that the lower concern of *MSc* students over MBAs is due to the former working in groups of 4-5 participants (as they feel less vulnerable to embarrassment if their group did contribute the least number of contributions (called evaluation apprehension by Camacho and Paulus (1995)) and the latter working in pairs (experiencing more embarrassment if this was the case). As the **Honours** and ***Ph.D.*** students worked individually and reflected most evaluation apprehension, one might propose that concern is inversely related to the number of people sharing a console i.e. the fewer the people sharing the console the more concern you experience. Ultimately the theory of Social Impacts (Latane, 1981) could be applied here to explain why such an inverse relationship exists.

Social Impact theory proponents might argue that when the concern of a group is diffused over a large number of group members then the concern each group member experiences is lower then when the group is small. Hence, pairs might be more likely to make contributions when experiencing evaluation apprehension as the perceived risk or consequence of doing so is diffused between two people. Individuals might find it far more difficult to shake off

the feeling of evaluation apprehension as they have no mechanism for generating the confidence in their own contributions as they do not have anyone to give them that confidence (as they lack any type of social interaction (Ackermann et al, 1995)). Therefore this result might be explained by the diffusion of perceived consequences amongst a larger number of group members, as explained through Social Impact Theory. However, this explanation of evaluation apprehension might only be true for student groups who may perceive that they do not possess expert knowledge. The GP participants were expert in their field and were sharing their wealth of accumulated experience on the subject and so might be thought of being able to back their contributions up with real-world examples of their points. Hence they may have not perceived any consequences because they knew they were right and could defend their contribution as being right and so they had little concern of the Social Impact from being wrong.

Ph.D. and MBA students disagreed that they were 'concerned of whether they might be making the wrong type of contributions during the blind gathering', average ***3.60 (1.95)***, 4.29 (0.91) [Question 7]. This is a positive result that further confirms the reflections of the real-world interviewees. It implies that participants have concentrated more on generating contributions than being distracted by worrying about the correctness of their contributions in terms of whether they were 'in the right ball-park'. However, this questionnaire result again raises the distinction between individuals and pairs working on a console. For this result, there is noticeable difference in the confidence of ***Ph.D.*** and MBA students in terms of their calculated average. A large standard deviation indicates a wide spread of feeling, suggesting that some respondents were very confident that they were making the right contributions (or correct contributions), but others were not. This self-confidence within these group members who work in pairs might be resulting from their partner validating their contributions before they type them in. Hence, while an individual cannot get any sense if they are in the right ball-park with their contributions, the pairs can validate each others' contributions.

In conclusion, it seems that these blind gatherings might initially have caused some concern in some participants over the correctness of their contributions. However, some interviewees report quickly overcoming this and experience the "exhilaration" and freedom to think in any zone they choose. The absence of social comparison information might be a distraction for participants as they wonder how their contributions compared to others. However, this

might be more relevant for individuals working alone than for pairs working together. In these gatherings people in large groups seemed to be the least concerned about the absence of social comparison information to gauge the worth of their contributions. This finding has been explained through the perception within participants of consequences of their inappropriate contributions and the diffusion of these consequences amongst group members who share a console (as Social Impact Theory explains (Latane, 1981)).

6.2.2.2 Anonymity and evaluation apprehension for participants working alone

As has been mentioned above, the perception of anonymity was significant to many of the real-world GEA interviewees who worked alone. One participant reflected on how this perception was created by "[the facilitator's] instructions at the start [of the gathering] letting us know that our ideas were completely anonymous to our fellow group members".

One participant of a student pilot workshop noted on their questionnaire how the proposed format "might be interesting as a way of managing conflict - people would not instinctively back off". This thought was supported by two interviewees from real-world organisations, one whom remarked "some people in our organisation are aggressive when you make a wild suggestion" – "but here I was not afraid as your idea is not seen until everyone's idea is seen". Hence the evaluation apprehension (Harkins and Szymanski, 1988) that might exist for these participants in their normal meetings might be dissolved in the blind gathering, mainly due to the anonymity of their contributions (a finding which McLeod (1997) discovered).

Interestingly, the perception of anonymity may have been heightened for the participants who worked alone as there was a delay between typing in the contribution and everyone else seeing it (due to them being in the blind mode of working and the public screen being switched off). One real-world interviewee volunteered how she felt that if it had been on a more controversial topic then she would have benefited far more from this blind process than she would from non-blind. She continued to explain that the temporal delay of making a contribution and seeing it on the public screen reinforced and even heightened her feeling of anonymity. Her interview partner noted how the subject of the gathering was not really that controversial a subject therefore no-one was really going to attack you on it. She continued that she would probably have made fewer contributions if it had been a more controversial topic, just because of the apprehension

around for her (a findings which supports Cooper et al (1996)). This apprehension about making controversial contributions might be less true of participants working in pairs. It is possible that pairs might gain confidence to make controversial contributions due to the diffusion of the consequences of doing so among the members of their small group (in the same way as social impact theory was argued to diffuse the embarrassment of making incorrect contributions in Section 6.2.2.1.2). Alternatively working in pairs might suppress the sharing of controversial contributions as a participant is no longer anonymous (as their pair knows they have made the contribution).

It might be that because all the contributions come onto the public screen at the same time after the blind session then they dissolve the impact that any single contribution coming onto the public screen alone might have (as in the normal format). This is because after the public screen is activated (when the blind session is being stopped) everyone might not read the same contributions at the same time as there are lots of new contributions to chose from. However, when the screen up-dates with a new contribution (in the normal format) and the facilitator moves it into a cluster, the facilitator is effectively highlighting it and this might pull peoples' attention to it. Hence if a number of people in the group find the contribution funny, or controversial, then those people might gain confidence from the reaction of the other people in the group and cause more of a scene over it. However, if all the contributions come onto the screen at the same time then different people might see these controversial contributions at different times, therefore they cannot gain confidence from other people's reaction to it and react in unison to it.

In summary, it seems that the sometimes lengthy delay between making a contribution and the other group members seeing it on the screen has a role in heightening the perception of anonymity for some participants in this sample of workshops. This heightened perception of anonymity during a blind gathering could have positive effects when the topic is one that is controversial or when participants are apprehensive of the reaction of their group members.

6.2.2.3 Effects of time pressure in the blind gathering session

Time pressure is a factor which has received attention by some researchers. Kelly et al (1993) comment on how "excessive time pressure may adversely affect performance on a variety of tasks", Page 180. In their work Locke and Latham (1990) found that time pressure

caused people to be less rigorous in their information processing. As claimed in Section 6.1.1, the issue of time (or the length of the gathering) is one aspect of the blind gathering which held some concern for 3 out of 5 of interviewees from the GEA workshop. However, the nature of the concern was different for each of these GEA interviewees. When considering this discussion the reader should bear in mind the unusual conditions under which the GEA session was performed (as outlined in Sections 5.2.5.1 and 6.1.1), specifically with respect to the time pressure. This present discussion aims to highlight some findings which might arise for other participants who feel under time pressure in gatherings (and gatherings are often performed under time pressure).

Typically the facilitator monitors the contribution rate of participants so that each makes at least one contribution. However, one interviewee from the GEA session was very concerned about "not [having] enough time – I still had 2 or 3 ideas to contribute", but there was not enough time to share them. Interestingly, this participant did make more contributions than any other during their blind gathering, 13 compared to 10, 6, 10 and 5 from the other participants. The length of a blind gathering is completely dependent on the number of contributions and the time constraints of the workshop. Hence, although students in the MBA pilot workshop offered weak disagreement with the proposition that 'the blind gathering was not long enough' at being 11 minutes long, average 3.12 (1.19) [Question 26], this research will not advocate a precise 'ideal duration' for the blind gathering as it depends on the situational conditions. However, an exploration of how the appropriate length of a blind gathering can be gauged in Section 6.3.3.

During the GEA workshop one participant asked the facilitator how long they had for this gathering, but the facilitator did not want to set any expectations so gave a sufficiently woolly answer without quantification. In interviewee the participant reported that this had the effect of making her feel very uneasy during the exercise as she never knew if she had 2 minutes or 20 to go. She could not gauge how much time she should allocate to thinking and how much to typing an idea into the computer – "if I spend a long time on one idea then will I not have enough time to type in my other ideas". This made her “anxious which blocked my thoughts”. It might be that the facilitator would like to set some loose expectations of duration, but make it clear that it really depends on the number of contributions that are made (Ackermann, 1996). Then if a lot of contributions are made in a short period of time the facilitator can activate the public screen and anyone who has paced themselves for a

longer time and still have contributions to make can type them in during the piggy-backing session - when all the gathering facilities are still activated.

Another interviewee from the GEA workshop reflected upon how "the abrupt halt [at the end of the blind gathering] was scary" as she perceived there was not even enough time to type in the idea she was on. This particular reflection was somewhat unexpected for the reason that the facilitator of a JOURNEY Making gathering always notifies participants of its impending cessation. No explanation can be offered here as to what initiated this reaction in the interviewee, maybe they were so busy concentrating that they did not hear the facilitator. Nevertheless, this comment supports the importance of the facilitator continuing to make an announcement of the cessation of the gathering, and also highlights the potential discomfort for participants if this was not given.

The concern of these participants over these issues was obviously memorable enough for them to be raised during interview. It may be useful for participants to have some expectation of the length of the gathering and the facilitator might consider continuing to make it clear to participants when they should stop generating new contributions. As for the length of the gathering not being long enough for each participant to exhaust their generation of contributions, it is not thought useful to enter into a discussion of how long a blind gathering should be, for the length depends on many situational factors. Instead, in Section 6.3.3, the thesis will discuss a process whereby the facilitator can gauge the length of the whole blind and piggy-backing gathering for themselves.

6.2.2.4 Why participants might prefer not to make any contributions in a blind session

Some participants might not make many contributions during the blind gathering even though they might be actively generating lots of ideas. There could be many reasons for this, for example, a nervousness of computers, an attentional conflict between generating ideas and actually contributing those ideas (Sanders, 1981), or a desire to verbalise their ideas rather than type them into a computer. In addition, participants may have no understanding of what the question is or what they are supposed to be doing, or know anything relevant to contribute (van der Heijden and Eden, 1998). It seems worthwhile to consider each of these reasons in turn and offer evidence of where they might have been experienced by participants.

Firstly, the roles of people who participate in JOURNEY Making workshops range from the Chairman of multi-national corporations to members of the general public. This wide range of backgrounds brings with it an equally wide range of familiarity with computer-technology. It is reported that some participants are computer-phobic and react to this through a hesitation to use the computers to make their contributions (Eden and Ackermann, 1998c). It is interesting to note that no reaction like this was observed during any of the workshops reported on here. This is not to say that some participants were not uncomfortable using computers, but maybe participants who work in pairs and who do feel uncomfortable let their partner do the typing.

Secondly, some participants might be so busy thinking about a topic that they do not actually spend the time to type those into the computer. This may more likely when the participants are working in pairs and are having a dialectic with their partner, to the extent that they discuss the issue, but never type the main issue into the computer. At one workshop (not reported upon here) mid-way through a couple of the gatherings one pair of participants walked to a window and talked about the issue. These two participants were obviously engaged with the subject matter, because they continued talking about it when they left their console. However, they did not share the product of those discussions with the other group members.

Thirdly, some participants might perceive that their contributions will have more impact on the direction the group takes if they verbalise their ideas. Then they will be able to argue their case in more detail than they could in the few words of a contribution. These participants may try to hi-jack the discussion rather than (or as well as) make contributions during the gathering. This hi-jacking of group discussion was witnessed during the NYPZ workshop. The facilitators were caught unaware by the personality of one group member who seemed to have a personal agenda of hi-jacking the event. This participant was effective in exerting his personality on the group discussions which resulted in the facilitators having to try to manage air-time more equally. It is important that such situations are closely managed to ensure that egalitarian participation is preserved (as much as is possible) and that the outcome is not only reflective of the most dominant group members.

Finally, some participants may not make any contributions because they actually have absolutely nothing relevant to contribute. It may be that they have come to the session with

the thought that they would be able to make some useful contribution, but when posed with the particular issue it turns out that it is completely outwith their knowledge base (Walsh, 1995). However, maybe when the discussion moves onto another issue then that participant will be able to contribute their wealth of knowledge and other participants will have less relevant knowledge to share on that particular issue (van der Heijden and Eden, 1994). One stunning example of a participant not contributing anything during a gathering was observed during an OMT session (a non-blind, non-computer supported method of working). The participant volunteered to come along to the session but when the gathering started she made it quite clear to the facilitator that she had no experience of the issue at hand. The facilitator gave special time to the participant in helping her to discover where her expertise of the issue might exist, but she was adamant that she was unable to contribute at all. It is very interesting to note that although the participant failed to make one single contribution during the OMT session, she was very involved (but not dominant) in being able to critique and improve upon other peoples' contributions during the group discussion. The participant obviously did have some knowledge that was useful to the group members' consideration of the issue (for she contributed that during the discussion), but she did not contribute any knowledge during the OMT gathering. It may have been that this participant paralysed by evaluation apprehension which caused her to be unable to assimilate his knowledge into (what she thought were) useful contributions. Possibly the participant did actually have no knowledge directly related to the issue, but managed to identify loose links to her own knowledge when she heard other people talk about the issue.

It might be concerning to the facilitator if participants fail to make contributions during the blind session. The discussion in Section 3.2.2 (the example of the 3 participants who did not contribute certain types of contributions for various reasons) highlights how any outcome which reflects only a portion of the group members relevant knowledge is one which might fail to be politically feasible. In order to ensure the (albeit, brief) consideration of everyone's relevant knowledge, that knowledge should be represented on the public screen for every group member to consider and critique.

6.2.2.5 Accessing the affective states of participants by the facilitator

There is one significant compromise that a JOURNEY Making facilitator must make when running a blind gathering. That compromise is one which limits the degree of understanding they glean of the affective state of the participants (Hollingshead et al, 1993). One

participant of the ***Ph.D.*** student pilot workshop noted on their questionnaire how from a facilitator's perspective, "the process did not offer the facilitator the opportunity to calibrate affect - individual or group". They continue to note that "in removing 'emotion', the process may possibly restrict achievement of goals in some fora for facilitation". Essentially then, this participant perceived that the facilitator of the gatherings would be unable to monitor the affective state of the participants, which is an accurate observation. However, the facilitator never really did have a significant level of insight to the participants affective state when they employed the normal gathering format. When participants are sharing knowledge using GE, the facilitator's knowledge of the affective states of the participants is typically gained during the discussion after the gathering. If the facilitator was very interested in affective states (possibly because the client was wanting some insight to the affective state of particular individuals in the group) then the facilitator might use OMT which is a manual group support process which enables the sharing of affectivity real-time (Ackermann et al, 1995).

These comments about a facilitator possibly preferring to access affective states during the actual gathering have uncomfortable consequences for group members' "liberation". If the affective state of the participants is transparent to the facilitator, then they will also be transparent to the other group members – which may not be useful when making certain emotional-type contributions or "flaming" contributions (Cooper et al (1996), Castella et al (2000)). The blind and piggy-backing gatherings give anonymity to the individual and pair who make contributions, it can also mask affective states and allow participants to make strongly worded contributions in the comfort of anonymity (Jessup and Tansik, 1991). By masking affective states, participants might be liberated to make contributions that they would not normally make (Castella et al, 2000) and so give insight to their affective state.

Any affective state the participants feel that they wish to exert on (or share with) the group can be done so during group discussion which follow the proposed format gathering under examination here. Hence the facilitator is trusting the group members to highlight when they have an emotional concern over the issue so it can be considered in the generation of the outcome. By the blind gathering essentially suppressing the assertion of an individual's affective state on the gathering it is also offering the participants the opportunity to temporarily avoid the emotive pressures that one dominant member might attempt to exert on the group. An affected dominant participant will have the opportunity to share their

stance after each participant has had the opportunity to contribute their opinions on the issue in isolation of this member's views (for support of the concept that computer-mediated communication eliminates much of the interpersonal 'noise' which can distort clear judgement see Lea (1991)). Consequently both positive and negative views of the issue might be collected and so the outcome is based on a wider representation of the issues (Cooper et al (1996), Jessup and Tansik (1991)).

Hence it is possible that working in isolation from other group members does have positive implications as well as negative. Certainly it would appear that if the main focus of an of the workshops under scrutiny here was to unite the members of the group and allow them to gel and build productive working relationships then the blind gathering might not facilitate this. It is possible that computer-supported GSS would not be the best way of working here and one would expect the JOURNEY Making facilitator to propose the use of OMT (a far more inclusive group process), or a suitable mix of the two approaches (Eden and Ackermann, 1994). Alternatively the JOURNEY Making facilitator might ask the group members to work in small break-out groups which can be useful for group members to build productive affective relationships between specific group members (Paulus et al (1995), Eden and Ackermann (1998c)).

6.2.2.6 Reflection : Implications of blind gathering on group member satisfaction

It is clear that individuals working alone (in the workshops under scrutiny here) seemed to enjoy the freedom of the blind gathering and this might be a boost to the participant's perception of procedural rationality. The heightened perception of anonymity from the delay in making the contribution and seeing it on the public screen (which one interviewee reported feeling) might have caused a significant reduction in evaluation apprehension for this participant which might have encouraged her to make contributions that they otherwise might not have made (Eden and Ackermann, 1998d). The liberation from bounded vision caused by viewing other peoples' ideas was thought (by some participants) to facilitate the exploration of new aspect of the issue. One student participant noted on their questionnaire how "I value the anonymity of the process very much".

Anonymity and the lack of Social Comparison Information appears to free some people from the social pressure of production matching. Hence the contributions made might be ones the participants see as relevant, not just ones to make their productivity look good. When asked,

none of the real-world interviewees proposed that any changes be made to make the blind gathering more pleasurable for them. One student participant noted on their questionnaire that "I think [Group Explorer] is a powerful tool and [this is] a powerful method", potentially a message of her emotional commitment to the process.

However, in terms of the potential disadvantages of blind gathering, individuals working alone might feel anxiety from social isolation (an argument supported by Camacho and Paulus (1995)). This researcher's observations of these real-world gatherings indicate that individuals operate in far more isolation than pairs do. These individuals seem to work alone and in silence, whereas these pairs seem to talk between themselves and with other pairs about the issue. One student participant in the ***Ph.D.*** pilot workshop (who worked alone on her console) gave feedback to the facilitator that "human interaction is non-existent". Another participant of the ***Ph.D.*** session fedback how "most importantly (for me), the process disallowed person-to-person interaction which is what group work (all kinds) is about". However, none of the real-world interviewees reported a lack of human interaction as a negative issue and they also worked in near social isolation. This may lead one to question if the issue of groupwork being a social activity was a primary academic view for the Ph.D. students. It may also lead one to question whether the task did not captivate the Ph.D.s in the way that it might have captivated the real-world participants who had an invested interest in the outcome. Essentially this discussion might support the task meaningfulness issue that task meaningfulness, not task relevance, does drive motivation to have your say and concentrate on the issue.

The individuals working alone in these workshops are able to experience the 'person-to-person interaction' during the group discussion which always follows the gathering session (in a similar way to that suggested by Paulus et al (1995)). It is at this point that the social element of groupwork is introduced in the proposed format of gathering. The gatherings are a means of collecting knowledge from every participant in a short period of time to enable the group to be more able to consider the range of issues in the development of a robust outcome. Unfortunately if the participants work alone on their console then they do not have the social contact that pairs sharing a console will have. However, if the sole aim of the workshop was to improve group interaction (which it sometimes is) then it is probable that OMT would be used to facilitate interaction instead of GE.

In terms of participants seeing the procedural rationality of the blind gathering, one real-world interviewee was "very, very happy doing it blind" because she felt they knew the reason for doing it that way (maybe from the facilitator's initial explanation) and saw the sense in it. Effectively she saw the procedural rationality in the method. Hence if a facilitator was concerned about procedural rationality, then he might like to consider the effectiveness of the initial instructions for the blind gathering.

6.2.3 Reflection : Implications of blind gatherings for the facilitator

It seems that not only are participants able to share contributions in the blind gathering, but they also might find procedural rationality in doing it this way. Some interviewees working alone in these workshops reflected a satisfaction with being free to think on their own about the problem before they are exposed to other peoples' ideas.

This could indicate that initially participants might be somewhat concerned that they might be contributing the wrong type of ideas, but after they had made a couple of contributions they gained confidence in what they were doing. This confidence could feed an exhilaration of being free to contribute anything they want without regard for the contributions from other people.

Some participants might feel liberated from the distraction of falling into a bounded vision of contributions from other people. Furthermore it might enable them to contribute ideas that would not have been generated of they had seen the contributions from people. However, some participants might view that working alone and in isolation of other group members is antithetical to the purpose of groupwork.

6.2.4 Reflection : What does this work contribute to understanding blind gatherings?

A main result from analysing the contributions was the appreciation of the profile of contributions over the different sessions. The profile of the contributions made during these gatherings was interpreted to indicate that the blind gathering was not long enough to capture the contributions that participants have to think deeply about. Therefore the blind gathering might only capture the most salient contributions. That is to say that the

participants do not necessarily construct contributions by synthesising knowledge and developing naïve ideas into well-thought-out contributions.

Theoretically, facilitators might consider not making the gathering very long in order to capture these deep views for a number of reasons, for example,

1. There is a chance that the contributions made during a lengthening period of a gathering will merely be re-hashes of contributions they have already made. This would be due to participants not trying to construct new contributions, but rather take a cognitively easier option of reviewing those contributions that they have already made and piggy-backing off these. This will result in the additional contributions simply adding more detail to existing knowledge, not exploring new areas previously uncharted. Analysis has been performed to investigate if contributions made are merely re-hashes of previously made contributions. Briefly, this researcher has explored the data and has found no evidence to support such a claim, however the discussion in Chapter 8 will reflect upon this analysis in some detail.
2. Participants might become frustrated with the blind gathering if they have exhausted their bank of substantive contributions on the issue, yet the facilitator keeps pressing them for more. Therefore instead of viewing blind gathering time as an opportunity for incubation they view it as a boring waste of time. However, it is felt that the given the status of the participants in the normal JOURNEY Making session they will convey their frustration over the speed of the session, either verbally or electronically. One participant of the ELZ session typed into their console "Isn't it time for lunch!" while on several occasions participants have gone to get a cup of tea near the end of a gathering.
3. There might be a large number of contributions shared during the blind gathering which might create more pressure of cognitive overload for participants during the piggy-backing session (Grise and Gallupe, 1999). The greater the number of contributions, the longer time it might take for people to read, process, piggy-backing off contributions and so they might want more time to ensure that they have not missed any.
4. There would be more time needed to structure and link the contributions, hence amplifying the length of each gathering. As with point 3 above, participants might need more time to read, process and link the contributions, because there might be many more causal relationships between the greater number of contributions.

6.3 MAKING PIGGY-BACKED CONTRIBUTIONS

The discussion in Section 6.2.2 has highlighted the impression the blind gathering makes on participants. It has also investigated the nature of the making of contributions in the blind gathering.

During the early stages of developing a new format of gathering, after a blind gathering (which was not followed by a piggy-backing gathering) one participant of a real-world pilot session expressed a desire to have a period of time to contribute her opinion of what other people had contributed. This was clear support for the procedural rationality of the format that was being developed. This section will discuss a technique for conducting a piggy-backing gathering which may be useful to the participants and the facilitator after a blind gathering. It will reflect on the analyses of the contributions made during the time for piggy-backing and look at what people actually use this time for. The discussion will also uncover the opinions and reflections of participants in the workshops under scrutiny here to the piggy-backing session as JOURNEY Making is also supposed to be fun so that participants can emotionally commit to the process (Eden, 1992a).

6.3.1 Initial impressions: Seeing the contributions on the public screen for the first time?

So what do participants actually do once the public screen has been activated to display all the contributions made by the group members? According to the theory of social loafing (Harkins et al, 1980), it is possible that the participants will seek the easiest cognitive activity and so might simply sit there and read the screen, or just do nothing. However, if the participants have embedded interest in the outcome then they might perceive that this session is another opportunity for them to try and get the best outcome for them (Carlsson and Walden, 1995). One way to get the best outcome might be for participants to consider the contributions that they are reading and contribute some critique of them which will add substantive information to the group's consideration of the issue from their perspective.

On seeing the contributions for the first time once the public screen has been activated, researcher observations indicate that there has been the general feeling of 'haven't we done well'. During one of the real-world ELZ gatherings immediately after the public screen was activated one group member shouted “This is so great. This is wonderful" and most of her colleagues had broad smiles of approval at their work. Three interviewees from the real-

world GEA session reported a similar feeling of elation over the number of contributions. They are quoted as saying, "I was pleased that so many ideas came out", "[I had a] very positive feeling, very optimistic as we had lots of ideas" and "pleasantly surprised". One participant of a student pilot workshop noted on their questionnaire how "I loved the concept, a lot of ideas were generated". Another student in the same pilot workshop noted how "the timing was short but nevertheless a lot of things came out of it", again emphasising the ability to collect a lot of ideas in a relatively short space of time.

One interviewee from a real-world workshop used the sudden availability of social comparison information to compare her productivity levels to the group average. "I judged my ideas and got the idea that other participants contribute equally as many". She reflected upon how she found the highest numbered contribution on the screen, and divided that number by the number of people in the group. This gave her the group average. Then she could compare her productivity to that of other participants. One participant in the same real-world session did the same but was disappointed with the number of contributions she made against the group average. This participant also attempted to find her own contributions on the screen but "could not find my own ideas on the screen so I thought that [the facilitator] might have deleted them ... though I really knew [the facilitator] they had not". The participant also said that she reviewed clusters to see if her own ideas fitted in to the other ideas that were in that cluster. Hence she validated the facilitator's clustering of her own contributions. Instead of generating new piggy-backed contributions or links the participant spent effort in ensuring that her own contributions had been handled appropriately by the facilitator, both in terms of them actually being in the group map and being in the right cluster in the group map. Although this might not have been the task they were asked to do, it might have been critical to that participant to confirm that her effort before she could concentrate on the task at hand and build procedural rationality within her.

One real-world interviewee realised that "other people thought about the same things as me". They knew this because they had the opportunity to gain social comparison information of where her contributions lay in the group map. This appeared to reassure her that the other group members were thinking along the same lines as she was.

There was weak disagreement among students with the proposition that the piggy-backing sessions was not long enough at being around 7 minutes long, average 3.43 (1.09) [Question

27]. Although that this is a little shorter than the typical piggy-backing sessions (as the average for the 9 real-world workshops reported on here was just under 10 minutes (from Table 6.1)), it is not thought useful to begin a discussion of how long a piggy-backing session should be, for the length depends on many situational factors. Instead the thesis will discuss a process whereby the facilitator can gauge the length of the gathering for themselves. This will be discussed in Section 6.3.3.

So, initial impressions from these participants on activating the public screen seem very favourable. Some participants experience the Eureka effect and suddenly realise the produce of their efforts. Social comparison information is suddenly available and some participants recall the comparing their productivity to the group average. The discussion will proceed to consider what these participants actually did with the mass of information that was displayed in front of them.

6.3.2 What do participants actually do during piggy-backing sessions ... ?

The ELZ workshop was the first real-world attempt of running a blind gathering followed by a period for piggy-backing in a real group. It is significant that it was during this workshop that participants only made one piggy-backed contribution during 4 gatherings (as seen in Table 6.2 and possible reasons for which will be explained in Section 6.3.2.2).

The NYPZ, GEA and GP workshops support the claim that participants are able to piggy-back off original contributions during gatherings. During five gatherings participants contributed an average of 14.2 piggy-backed contributions (calculated from data in Table 6.2). It is significant that these workshops were facilitated by three different facilitators, thus suggesting that the success of these sessions is not peculiar to one facilitator. It seems worthwhile to explore why the participants of the ELZ workshop might not have made piggy-backing contributions while the participants of NYPZ, GEA and GP certainly did.

Table 6.2 - Spread of contributions across proposed format gatherings [note 1]

	The number of the blind/piggy-back gathering	Total number of blind contributions	Number of piggy-backed contributions	Number of links made during blind sessions	Number of links made during piggy-backing sessions
ELZ	1	42	1	6	27
	2	39	0	5	28
	3	66	0	2	43
	4	71	0	2	57
NYPZ	1	42	9	0	47
	2	57	9	2	69
GEA	1	44	15	1	22 [note 2]
GP	1	53	25	5	48
	2	34	13	0	44
Total		*448*	*72*	*23*	*385*
Average		*49.8*	*8.0*	*2.6*	*42.8*

Note 1 - This is not the number of links made across all gatherings in these workshops. It details only those for the gatherings that followed the format of a blind session followed by a time for piggy-backing.

Note 2 - The linking by participants of the GEA workshop was deemed by the facilitator to be so poor that he asked people to stop linking contributions mid-way through the piggy-backing session and concentrate their effort on making new contributions from what they read.

6.3.2.1 ... make piggy-backed contributions

In four gatherings the participants of the ELZ workshop only made one piggy-backed contribution, however, in five gatherings the participants of the NYPZ, GEA and GP workshops combined made 71 piggy-backed contributions (from Table 6.2). Hence it is clear that some participants are able to share piggy-backed contributions.

One interviewee of a real-world workshop reflected on how "seeing other people's ideas did not raise new issues ... [however, it did help me to] focus on issues that I had not considered in great depth" and she mentioned an example of the timing of the process regarding the issue of 'marketability'. She continued to say that she had never even considered that they should get two projects very early on and then seek new ones "I do not know why I did not think of it". She had considered timing, but not that aspect of timing.

The GP real-world participants and all four pilot student groups were in some agreement that the clusters helped them to think about issues they had not previously considered, averages of 2.20 (1.64) **1.67 (0.52)**, ***2.40 (1.52)***, *2.05 (0.97)* and 2.36 (0.93) [Question 10]. This supports the above anecdote that the piggy-backing time gives people the opportunity for making contributions that they have not previously made i.e. enable them to consider (possibly) new issues and make new contributions which emerge from that consideration.

One interviewee and her interview partner from a real-world session thought that piggy-backing was made easier by their perception of anonymity. They related this concept into their organisation which they described as being a hostile and aggressive environment. They thought that if no-one knew who made the contribution then no-one could attack the contribution just because they did not like the person who contributed it. One of the real-world interviewees commented on how people cannot deliberately undermine anyone's ideas because they will not know which ideas are theirs, a thought which is supported by Eden and Ackermann (1998c). These interviewees said they had often done 'post-it exercises' in their own organisation to the point where group members now know each other's hand-writing. They are now able to tell who the ideas were made by and feel that some people can target ideas and either support, or oppose, them based on who contributed them. In this piggy-backing session these real-world interviewees reflected that the session enabled the sharing of perspectives "in an uninhibited fashion".

One real-world interviewee reflected on how reading other peoples' contributions "generated more questions than stimulated ideas – I wondered why other people's ideas are contributed and what they meant". This participant obviously read the contributions in some depth. However, instead of stimulating a response from their own understanding of the world, the contributions stimulated questions that they could not answer by themselves.

However, for the present discussion, it might be that participants make links rather than new contributions because participants are cognitively overloaded and linking is an easier cognitive activity to perform. The following section will explore the notion of cognitive overload in more depth to investigate if participants in this study might be overloaded cognitively.

6.3.2.2 ... if they do not make piggy-backed contributions?

In blind gatherings participants make their contributions without knowing what are other peoples' contributions. Then the screen is activated to display all of the contributions that have been entered. Participants (more so single-user participants than pairs) have experienced operating in the near complete absence of social comparison information and may have natural inquisitiveness of the nature of the contributions that others have been contributing. Then they receive an avalanche of such information. It might be expected that the attention of the participants will be taken by the large screen which is directly in front of them changing colour noticeably and the facilitator starting to talk to them and referring them to the screen (Sanders et al (1978) discusses other types of distraction).

Support for this theory was particularly apparent during the ELZ workshop. The researcher observed that while the public screen was switched off the participants were physically huddled over their console computer and actively discussing the issue with their partner. When the public screen was activated, many of the participants sat back in their chair and literally stretched their legs out. Some even folded their arms across their chest. Most participants stopped discussing the issue with their partner and focussed their concentration on the contributions displayed on the public screen.

The participants of the four proposed format gatherings in the ELZ workshop contributed only one contribution between them - and this reaction needs to be explained. This failure of the ELZ participants to make piggy-backed contributions might have been due to the initial instructions the facilitator gave to the participants which may have emphasised the linking of contributions rather than the sharing of piggy-backed contributions. Entrainment theory (Chidambaram and Bostrom, 1996) suggests that individuals might become trained in the pace at which they work during a brainstorming (in their experiments). If people can be trained in terms of pace, then it is possible that they become trained in terms of what activities they perform. Hence in the first gathering because they might have been guided towards sharing links rather than piggy-backed contributions, they might have continued to share links rather than piggy-backed contributions during the subsequent gatherings, because that is what they have been trained to do. This is one explanation of why these participants might have shared only one piggy-backed contribution during the entire workshop. One other explanation might be that they were overloaded cognitively (cognitive overload will be

discussed in Section 6.3.2.3) by the amount of information being displayed on the public screen and they reacted to this by 'grinding to a halt' (as found by Miller (1962)).

One real-world interviewee remarked how when she tried to read the themes she "got myself in a tangle ... wanted to be methodical and know that I had read it all" but the sheer number of contributions on the public screen made that hard for her.

From the questionnaires from the GP and pilot study workshops there was agreement of varying strength that participants actually 'did read the contributions on the public screen to stimulate their thinking' when they were shown, averages of 2.20 (1.64), **2.00 (0.63)**, ***3.00 (0.71)***, *2.90 (1.09)* and 2.14 (1.10) [Question 8]. This is a surprisingly low response to this particular issue. Experience suggests that the majority real-world participants (if not all) do look at the contributions on the screen when the screen is switched on. Over 20 gatherings have been observed and this researcher cannot recall a time that he was aware someone never read the public screen at some point – and this is one aspect of piggy-backing gatherings that is particularly watched for. However, in the *MSc* gathering some participants were particularly far away from the public screen (and possibly could not actually read the contributions) so this might explain the rather mild support for reading contributions when they were shown (2.90 average). Alternatively, participants may have read the public screen but did not use the contributions to stimulate their thinking. Hence they may have responded indifferently to this question because they did not actually use the themes to stimulate their thinking.

There was a feeling among real-world and student group members of the pilot workshop who shared consoles that they 'spent a lot of time reading the public screen when it was displaying contributions', average 2.00 (0.71), ***2.60 (1.14)***, *2.62 (1.02)* and 2.73 (1.29) [Question 18]. Again, one might expect all participants would have more strongly agreed with this statement considering what has been observed during these, and many other, gatherings. Maybe however the participants perceived that they spent lots of time working during the piggy-backing session, not just spending lots of reading the public screen.

Like other participants of real-world and pilot workshops the members of the ELZ piggy-backing gathering were observed by the researcher to read the public screen to find out what other people had contributed. Between the 19 participants in the ELZ workshop, only 1

piggy-backed contribution was made in four piggy-backing gatherings. However, these participants made an average of 39 links during the four ELZ piggy-backing session (calculated from data in Table 6.2 on Page 165). Therefore it would seem that instead of mindlessly reading contributions, these participants seemed to actively read the contributions with the view of finding causal relationships between them. Over the four ELZ gatherings, 170 such causal links were made by the participants, of which 155 were made during the piggy-backing gathering.

It is important to note here that reading the contributions is an important activity in its own right. In reading the public screen, participants are becoming familiar with the contributions of other participants, and are priming themselves to be more able to link contributions considering their enhanced familiarity. This might be very useful to the facilitator as it might speed up the linking process. Chapter 7 will investigate how people actually perform the activity of linking contributions during the piggy-backing gathering. In this, it will attempt to discover the principles and techniques that people use to link the contributions.

To summarise so far, the participants of the piggy-backing gatherings under scrutiny here seem to be more likely to contribute links than they are to make new contributions through piggy-backing. While participants (of all the workshops under scrutiny here) were willing to read the public screen and (as a group) make an average of 42.8 causal links (from Table 6.2 on Page 165), those same participants made (as a group) an average of 8.0 piggy-backed contributions (this result is significantly effected by the four ELZ gatherings in which only 1 piggy-backed contribution was made). Two possible explanations for a participants' inability to share piggy-backing contributions have been offered. Firstly, it might be that the participants are guided by the facilitator concentrate more on linking contributions than the sharing of piggy-backed contributions i.e. the facilitator's instructions encourage people to link contributions. Alternatively, it is possible that the synthesis of someone else's contribution with your own knowledge and the development of that synthesis into a new contribution was too complex a cognitive operation for these participants when there were so many distractions on the public screen. Hence this result might be because linking is experienced to be an easier cognitive activity than generating piggy-backed contributions. Chapter 7 will explore if linking is an activity that people seem to perform easily. It will seek to discover the principles that participants might use when linking.

6.3.2.3 ... become overloaded cognitively

In the four piggy-backing gathering sessions that were run during the ELZ workshop participants generally did not contribute their perspective of other people's contributions, as the facilitator's instructions initially request. What participants appeared to do (from analysis of the GE database and from this researcher's observations) is sit and read the contributions displayed on the public screen and try to link them, as the facilitator's instructions also requested. One reason why participants might not generate lots of piggy-backing contributions (in the ELZ session and in other sessions) may be due to cognitive overload arising from the mass of information contained on the public screen (Nagasundaram and Dennis, 1993). Support for this view also comes from Grise and Gallupe (1999) who suggest that "Groups that are extremely productive in the idea-generation phase ... may find themselves bogged down by an overwhelming volume of ideas and comments to organize", Page 158. To explain, instead of participants fitting the contributions on the public screen into their knowledge to stimulate the generation of new ideas, participants might be cognitively overloaded by the mass of information contained on the public screen. Santanen et al (1999) suggest this might cause it "very difficult to traverse one's cognitive network", Page 21. Support for this view comes from Hymes and Olson (1992) who report that as lists of ideas become unwieldy during brainstorming sessions, the average rate of idea production per group member decreases (the authors do not discuss the display of ideas in map form).

In terms of the number of contributions on group maps becoming unwieldy, one real-world interviewee reported on how “the more ideas and links that came onto the public screen the more difficult it became to read those ideas” because there was just too much information on the public screen, a finding also found by McLeod and Liker (1993).

A participant may cope with this cognitive overload by trying to manage the information themselves i.e. to process it by reading it all, or by ignoring some of it (Gallupe and Cooper, 1993). In this, participants might have read one contribution after another learning how their contributions compared to other peoples'. However, participants might not have searched their own knowledge base for knowledge that relates to the stimuli and contribute that during the piggy-backing session.

There was mixed reaction from real-world GP participants and students to the statement “when I saw all the contributions together on the public screen, I found the quantity

overwhelming", averages 3.60 (0.55), **3.33 (1.21)**, ***2.60 (1.14)***, *2.48 (0.98)* and 2.36 (1.01) [Question 17]. The GP participants and **Honours** students contradicted the other groups by mildly disagreeing with this statement. It is possible that the participants of the GP did not find the quantity overwhelming because the facilitator gave them special help in considering the contributions, as will be discussed in Section 6.3.2.3.2. Possibly because **Honours** students made only 16 contributions and so it might not have been difficult for them to manage this number of contributions. Hence **Honours** students may not have suffered cognitive overload to the same extent as the other student groups, as ***Ph.D.***'s made 48 contributions, *MSc*'s made 44 contributions and MBA's made 91 contributions. The magnitude of agreement with this statement might relate to the number of contributions made during the blind session.

In the workshops under scrutiny here, after the public screen is switched on the facilitator introduces the group members to the themes that have been built, simply by talking briefly around the themes sequentially. This brief navigation of the map aims to help the participants locate the boundaries of the different clusters of contributions that have been made (as was done by Nagasundaram and Dennis (1993)). This might inform the participants of the broad nature of each cluster. The participants' reactions to this introduction of the clusters was mixed. Two interviewees from the GEA session commented on how it "was a vital guiding tour around the map as we structured ideas" and "helped to familiarise me with the model". However one interviewee from the GEA session reported that it "went right past me as it was too fast - and it did not register". One interviewee of the GP session also felt that the initial navigation of the public screen was too fast and "only after the piggy-backing session did I know what the themes really were".

When students in the pilot workshop read the themes they seem to agree that it was easy to grasp what the themes referred to, average **2.17 (0.41)**, ***2.00 (1.22)***, *1.81 (0.75)* and 2.36 (0.84) [Question 9]. It is surprising and concerning that the *MSc* group, which had one of the lowest feeling of the student groups that they read the clusters (from Question 8, reported on in Section 6.3.1), had the strongest feeling of all four student groups that the clusters were easy to grasp. This may be because the *MSc* participants found the linking easier than other participants and, as all participants answered the questionnaires after they have structured the contributions, their opinion was coloured by how easy they found the structuring of the contributions, but this is unsubstantiated speculation.

Note: On reflection it is odd that participants seem to read the contributions on the public screen, but seem not to acknowledge that they did so. Their responses to Question 8 and 9 (reported on in Sections 6.3.2.2 and 6.3.2.3, respectively) suggest that they almost do not acknowledge that they did spend time reading the screen. Possible reasons for this might be that they perceived that by reading the public screen people might have perceived that they were loafing rather than working hard, and so preferred to give the impression that they were actively working rather than just reading.

It seems that student participants do report reading the contributions displayed on the public screen. However, observations suggest that this is done more than the students believe they do it, possibly because participants do not like to think that they are only reading the screen, as that might be another consequence of the burden effect. However, interviewees and questionnaire respondents did seem to be of the opinion that the contributions on the public screen did help them to consider aspects of the issue which they had not previously considered. This supports a notion that these participants used the piggy-backing session to reflect upon and critique other peoples' contributions, however cognitive overload might be a significant problem in this and the following section will explore this issue in more detail.

6.3.2.3.1 Reflection : On cognitive overload

It seems clear that this introduction of the themes by the facilitator was critical to familiarising the participants in these workshops with the layout of the material. However, some interviewees felt that in order to be a useful introduction, the facilitator might like to consider the information processing abilities of the group members (Miller (1956), Walsh, (1995)). It is suggested by this researcher that instead of reviewing each contribution which builds a theme, the participants might benefit from a brief and slow overview of the clusters in general terms - and use a few of the contributions to illustrate the essence of the cluster (maybe in a similar way to Nagasundaram and Dennis (1993)). However, it is possible that all the participants might have to read the contributions for themselves to be able to cognitively process the contributions. participants might gain benefit from the facilitator's introduction merely giving signposts as to where the clusters are and roughly what they contain. However the facilitator might like to be aware that some participants might prefer a more detailed discussion and so be ready to respond appropriately to the participants' wishes if they make clear their preference.

Participants might read other peoples' contributions because they are focused on what other people have contributed rather than focused on contributing their own knowledge. The

participants may be so distracted by all the contributions and are so keen to see what other people have 'said' that they prefer to read rather than to contribute critiques of the contributions (see Northcraft (1990) who discusses the seeking of inter-personal comparison feedback). That is not to say that some participants might not critique the contributions, but they just do not take the time to formulate their thoughts into coherent contribution and type it in to the console. Rather they may store the critique in their memory and move on to another contribution to see what it says. Whether participants simply read contributions or actually critique them but do not contribute the critique, the result is only a few piggy-backed contributions which piggy-back off other participants' contributions.

This reading of the screen without contributing ideas can serve a useful purpose. It might enable the participants to become familiar with material and thus potentially speed up the structuring process. It also might give participants the social comparison information to confirm that they have been making similar types of contributions to other people, if this is indeed the case. However generally it does not fulfil the function of the piggy-backing session i.e. to stimulate participants to share their knowledge on aspects of the issue that they had not considered.

In order to capture these stimulated ideas the piggy-backing session might need to be modified. Facilitators might like to consider better facilitating the cognitive processing of participants and reduce the likelihood of immediate cognitive overload. Although the participants might still be shown 65 contributions (because alternatively strategies of reducing the number of contributions on the screen has been argued to be impossible), facilitators might like to better present this vast amount of material. Section 6.3.2.3.2 reflects upon two ways of facilitating the contribution of piggy-backed contributions by a participant of a JOURNEY Making session.

6.3.2.3.2 Reflection : Helping participants to manage cognitive overload

Two approaches which have been designed to help participants overcome the debilitating effect of cognitive overload and be able to generate new contributions from the stimuli during the piggy-backing session are outlined below. This section will first discuss the first approach and then use to lessons learned from implementing that approach to guide the development of the second approach.

Regarding the first approach, although the approach's suitability seems theoretically robust for the purpose of freeing participants from the harnesses of cognitive overload, neither of the two JOURNEY Making facilitators talked to seem confident in its potential. Hence this casts doubt over its practical suitability. Cognitive overload is a real problem for group members and it is the facilitator's role to provide a method of making contributions that maximises the potential for their rigorous thought (5 out of 6 interviewees remarked pointedly on their suffering from cognitive overload). The following approach is aimed at beginning a debate of how facilitators can help group members to cope with the mass of information contained on the public screen.

The first approach was inspired by the interviewees' frustration with being presented with a "sea of blue" (the colour of the contributions from the blind gathering were all blue). The way the facilitator typically manages the piggy-backing session is by starting with a quick tour of the clusters. This tour typically involves the reading of a few contributions from each clusters. Then the participants are normally invited to navigate the clusters for themselves and share any new contributions they had. However, some of the GEA participants had strong feeling that the facilitator "needs to distinguish some clusters from others" as well as needing to "get rid of the clutter, but do not delete the ideas". The interviewees reported finding it a real challenge to manage the presentation of the contributions. They began discussing ways in which they would be more able to manage the contributions. The first approach suggested here has been developed from the suggestions of those interviewees.

The facilitator will theme the contributions during the blind session in the normal way but will attempt to leave clearer boundaries between different themes. The public screen will be switched on and the facilitator will give a quick tour of the themes. The facilitator will then suggest that certain contributions (hereby referred to as "anchors") seem to capture the essence of individual themes. The number of anchors is not critical, it is more important to capture the themes accurately than aim for a pre-set number of anchors. However, it is possible that if there is over fifteen anchors then cognitive overload might make the piggy-backing session more of a reading session. The facilitator must give the impression of doing this with the group, not for the group. They must engage the participants in validating the suggested anchors

and locating additional ones. All the anchors should be distinguished in the same new colour, thereby breaking the "sea of blue".

The participants should use the coloured anchors to identify the location of different themes, essentially acting as anchors for their eyes. The facilitator can make it clear to participants that they might find benefit in navigating the map in the structured way by reading all the contributions near an anchor. After reading the contributions in a theme the participants can contribute any comments regarding the contributions they have read. When the participant is satisfied that they have performed this for one theme, they should select a different anchor and repeat the process of reading the contributions and contributing their comments. This method might help participants to at least identify the location of different themes and realise which themes they have not yet considered.

The anchors nominated by the facilitator can also be used by participants to locate where they were last looking on the screen when they turned to type in a contribution. In this, the anchors can help a participant to quickly and easily locate an issue they are considering rather than getting lost in the "sea of blue" i.e. participants can recall that their contribution was above the red anchor in the top left of the screen.

It is important to note that this first approach is not a prescriptive 'problem structuring' approach similar to that of Dennis et al (1996b). In this first approach the facilitator is not attributing descriptive titles to themes to initiate a type of directed brainstorming (Briggs and Mittleman (1997), Santanen et al (1999)). Rather the JOURNEY Making facilitator would use the participants' own contributions to represent the themes anchor, after the participants have shared the contributions (i.e. not prescribing what the themes will be). It is felt that this approach might benefit participants over the Dennis et al (1996b) approach, as participants might not stop themselves from visiting a cluster because they do not know anything about that title or directing question. For example, if the Marketing Director does not know about finance issues she might decide purposefully not to look at a theme which is titled "How do we finance this project?". However, she might have some pertinent knowledge on that issue, but is not stimulated to share it because she does not even bother to read the contributions. Also the Dennis et al (1996b) and Briggs and Mittleman (1997)

approach (if the prompts were to be displayed on the screen and not verbally given to the participants) is not thought to be suitable for this research because displaying several theme titles on the public screen would take up valuable screen space. It would also take time to negotiate the wording of such a title and time in the JOURNEY Making workshop is always precious.

The strength of the first approach is that all the contributions are contained on the public screen simultaneously, therefore the participants are always able to view all the contributions. This might be important to prevent massive duplication of contributions. However, instead of being expected to read the whole public screen, participants are encourage to concentrate on a small section of the screen, finish processing that area/theme and then move on to a new theme. Effectively the public screen is being divided up from a large unmanageable "sea of blue" to a small number of theme pools. The weakness of this approach is that the group are still limited by screen size which will cause contributions to be illegible if there is too much space between themes.

The first approach was tried on the MBA student pilot group.

In the gathering for the MBA students the facilitator selected 11 anchors that indicated the location of different themes, then had a very quick validation of these with the group. However, students responded on their questionnaire that they did not agree that 'the anchors selected by the facilitator did not accurately reflect themes contained in the map', average 3.57 (1.02) [Question 13]. One participant noted on the questionnaire that they had "concern that piggy-backing draws participants ideas towards the [anchors] without due consideration that the actual [anchors] might not be right". They continue that they had "concern that there is a self co-operative towards their justification". Furthermore, mild support was found from the group members in the hypothetical question of "I would prefer if the group had more time to chose the anchors that we piggy-backed off rather than the facilitator doing this", average 2.57 (1.09) [Question 14]. The message here seems rational - participants might prefer to select anchors themselves although the themes built by the facilitator did appear to be accurate. This result suggests the importance of the group member validating the suggested anchors and, critically, adding their own in order to return ownership back to them. However, the extra time it takes to perform this anchor selection might mean that it is

impractical under the current philosophy, as the benefit might be marginal when compared to the cost of time.

In terms of 11 anchors being selected there was mild disagreement with the proposition that 'too few anchors were selected', average 3.71 (0.91) [Question 15]. However there was also mild disagreement with 'the number of anchors being too many', average 3.43 (0.85) [Question 16]. Hence it would appear that for this group, 11 anchors was manageable.

There was indifference that students 'read both the highlighted anchors and the supporting material/contributions', average 2.86 (1.10) [Question 11]. Also indifference was found for 'the contributions around the highlighted anchors distracted the participants when they read the public screen', average 2.71 (1.07) [Question 12].

When piggy-backing, *MSc* participants seemed to not want to 'have the public screen up-date with the piggy-backed contributions and only displayed the original contributions i.e. have a 'frozen screen', average *4.14 (0.73)*. ***Ph.D.*** students disagreed with the *MSc*'s by agreeing with this statement, average ***2.20 (1.10)***. Some MBAs actually suggested this as a potential improvement on the process during informal discussions after the session. Stopping up-dating the public screen with piggy-backed contributions obviously stops participants from piggy-backing off those new contributions. This would somewhat contradict a primary focus of piggy-backing which is to use other peoples' contributions to stimulate one's own thinking.

The second approach was developed in response to the feedback on the first approach. It appeared that participants might have gained some benefit from the general approach but that they wanted to have some input to the selection of the anchors. The second approach sought to give them this input. The second approach will be detailed below.

> The facilitator should attempt to cluster the contributions as best he can during the blind session. When appropriate, the facilitator should activate the public screen and ask the participants to briefly read the contributions. Then after a minute or so the facilitator should interrupt the participants' concentration and introduce the clusters he has loosely developed. He should highlight each contribution in turn and validate

with the group if the contribution is in the correct cluster. Hence the facilitator is effectively generating clusters with the group.

Once a cluster seems to have been validated, the facilitator should ask for suggestions for which contributions might be thought of as capturing the essential element of the cluster. That contribution should simply be highlighted in the way that the anchors were, and turned to a different colour (so that it can act as an anchor and as a description of the cluster). Then once all the clusters have some description, the facilitator should ask the participants to piggy-back or link, or both, the contributions. However, the facilitator should emphasise that the participants should navigate the different clusters which the participants have identified and share some ideas on each (i.e. not concentrate on only one).

This approach might benefit the participants in helping them to exert some loose structure on the contributions so that they can navigate the contributions more effectively (for example, rather than them reading the same contribution four times). This structure might help the participants to identify where the distinction between contributions are so that they know how to navigate the clusters and roughly what the clusters represent. This might help them to cognitively process the contributions as they might be more effective in chunking the contributions into clusters and navigating those rather than trying to navigate the whole map. Hence this approach might substantially help with cognitive overload.

This approach was tried in Gathering 1 of the GP workshop.

From Table 6.1 on Page 135 one can clearly see that the length of the break between the blind gathering and the piggy-backing gathering was longer (at over 20 minutes) than for the other sessions (which averaged under 7.25 minutes). This extended time was due to the facilitator clustering the contributions with the participants. However, when filling out their questionnaire, the participants of the GP session disagreed that 'I found it easy to grasp what the themes in the contributions were before we clustered the contributions', average 3.60 (1.34), as was remarked upon by the interviewee from the GP workshop. However, the participants agreed that 'I found it easy to grasp what the themes in the contributions were after we clustered the contributions', average 1.60 (0.55).

It would appear that the participants clustering the contributions themselves has significant impact on their knowledge of what other people have shared. It seems that these GP participants gained more understanding of the clusters than the students of the pilot workshops as they agreed less strongly with this statement (as detailed in Section 6.3.2.3) when they were given their navigation of the contributions by the facilitator. This greater understanding might have contributed to these participants being able to share 25 piggy-backed contributions (the largest number of contributions in the 9 proposed format gatherings as detailed in Table 6.2, however this is not to say that other participants would not have shared piggy-backed contributions if the facilitator had not emphasised the sharing of piggy-backed contributions.

In the GP workshop, the facilitator firstly asked the participants to share only piggy-backed contributions, then after a number of contributions had been shared, he asked the participants to stop sharing piggy-backed contributions and concentrate on sharing links. This resulted in the participants being able to share the greatest number of piggy-backed contributions (25 contributions compared to 15 an average of 8.0 contributions across all proposed format gatherings), the third largest number of causal links (48 compared to an average of 42.8 links across all proposed format gatherings) and the participants were able to do so in 12.8 minutes (when the average length of the gathering was 9.86 minutes). Hence it would seem that the participants were remarkably productive during the first GP gathering when they had constructed the clusters themselves and when they had been given clear instructions from the facilitator of making piggy-backed contributions first and were then asked later to share causal links.

As seen in Section 6.3.2.3, the GP participants reflected that they did not feel overwhelmed with the number of contributions on the public screen, and maybe this process of the facilitator talking the participants through the contributions during clustering had some impact on their perception.

One interviewee from the GP workshop (who helped her group to chose their themes themselves) "was happy that the themes were right" and commented on how the group members "were quite effective in picking up on things that were not in the right place [or theme]". The GP participants who filled in the questionnaire disagreed that 'I do not think that the themes that were selected accurately reflected the map', average 3.40 (1.67). Hence,

although the facilitator might spend additional time on clustering the contributions with the participants that time might be well spent. It might be that the heightened familiarity with the clusters and contributions could enable the participants to share more causal links which could give greater initial structure to the contributions. It might also be true that the participants will be more able to share piggy-backed contributions during the piggy-backing session because they do not have to spend a great deal of time learning the contributions and the clusters, and can effectively get on with sharing more ideas because they are more aware of the issues that they have so far neglected.

Hence it might be that facilitators would like to consider this second approach to helping participants to overcome cognitive overload by leading the participants through the contributions when they have not been able to share many contributions for some reasons, possibly because they have never considered that problem before. In this case, the participants might benefit from more assistance by the facilitator if the issue is one that is very important, because this approach might enable the participants to share more contributions as they are more able to manage cognitive overload and navigate the screen more productively.

6.3.3 Reflection : Implications for the facilitator - a strategy for conducting smooth gatherings

The issue of an avalanche of information being made available to participants is crucial to the success of the piggy-backing sessions. It is the responsibility of the facilitator to aid the participants cognitive management of this "sea of blue" that they suddenly receive. Two methods, inspired by participants of a real workshop, have been suggested in Section 6.3.2.3.2 above.

However it is acknowledged that the facilitator must remain focussed on the wider goal of the workshop (and immediate situational factors) when making the decision of what to do about cognitive overload. Facilitators might benefit from being aware of the manipulation which they can perform on the format of a gathering. This manipulation enables the facilitator to react to the productivity of the group members to ensure that the number of contributions captured is manageable for the time left for linking. Thus instead of trying to help participants deal with cognitive overload, the facilitator can time the impact of cognitive overload to have a strategic affect on participants.

To explain, it is clear that one constraint in a gathering is that the maximum number of contributions that can be fitted comfortably on the public screen (about 65). Therefore the facilitator can adapt the format of the gatherings to ensure that the number of contributions made is not significantly over the 65 threshold. Cognitive overload is a phenomenon which the facilitator can strategically employ to manage the number of contributions made up to, and over, this threshold.

If asked to by the facilitator, some participants will turn their attention from generating piggy-backing contributions to generating links between the contributions. The facilitator can use these powers to capture around 65 contributions.

The blind gathering can be used to capture a large number of contributions in a relatively short time. The piggy-backing session can be used to slow down the generation of new contributions significantly after a blind gathering. The time for piggy-backing can also be used to familiarise the participants with the contributions from other participants. Critically the time for piggy-backing is also a time for participants to begin structuring the material on the public screen by linking the contributions. This might increase the participants ability to navigate the screen as they might have an informed view of what contributions have been contributed and will also give an initial structure for the group map which might speed up the linking during the group discussion.

6.3.3.1 When might this strategy be used - constraint of 65 contributions?

To show how these strategies can be used, a real-world proposed format NYPZ gathering (Number 2 in Table 6.2 on Page 165), will act as an example. In this example, the group of 8 pairs of participants quickly generated 57 contributions (under the threshold of fitting 65 contributions on the public screen comfortably) and 2 causal links. It is likely that the 57 contributions are those which are most salient to the participants about the issue. It is also likely that given more time the participants would be able to generate more contributions, possibly up to the 120 contributions that are sometimes made in group OMT sessions.

The facilitator switched on the public screen in order to slow down the rate of contribution as the 57 contributions did not include any piggy-backed contributions. The facilitator hindered the flow of salient contributions by talking the group members through the clusters

that had been built during the blind gathering. It is possible that the participants still had some original contributions to make, and they could do so during the piggy-backing session. However most participants stopped the generation of original contributions and (as the facilitator asked them to) turned to linking the contributions (69 links were made). Four participants synthesised other participant's contributions into their own cognition resulting in 9 piggy-backed contributions.

So, after some time for piggy-backing and linking, the group total for contributions was 66 contributions. The facilitator asked the group members to stop reading the contributions with the view of piggy-backing off them. The facilitator emphasised to participants to try to find causal connections between the contributions already on the screen. Inevitably some participants might have continued making contributions but that is to be expected. If anchors had been on the map the facilitator could have removed them from the screen by returning them to their original colour. This might make the navigation of the map harder, but might also cause participants more difficulty in linking (as the screen would no longer have aids to locate known contributions). At the end of the gathering there were 66 contributions, a number which is legible on the public screen. By the end of the piggy-backing session participants also had the opportunity to view other people's contributions and learn roughly what other peoples' views are on the issue (in addition to the 69 links shared during the piggy-backing session and the 2 from the blind session). This might have speeded up the structuring/linking of contributions as participants are more familiar with the lay-out of the public screen.

This example gives indication of how the facilitator can strategically use the piggy-backing gathering to slow down the rate of idea generation from the blind gathering. Furthermore the instructions to concentrate the participants on the linking of the contributions rather than the sharing of piggy-backed contributions can slow this down even further. In the first of the GP sessions the facilitator initially emphasised the making of piggy-backed contributions and (maybe as a result of this) 25 piggy-backed contributions were made (as seen in Table 6.2 on Page 165). In contrast, the facilitator of the ELZ session may have initially emphasised the making of causal links and only collected one piggy-backed contribution. This might indicate that the facilitator can significantly influence the activity of the participants through his instructions.

6.3.3.2 When might this strategy be used - constraint of time

A second constraint under which the gatherings explored in this research are run is the time available. If time available is getting tight but group members would discard procedural rationality of JOURNEY Making workshops if the issue was not included in their group map, then the facilitator might use cognitive overload to shorten the duration of the gathering. This can be done using one of two methods, each of which have been employed in a real-world group.

The first method (which has been called the '**normal**' gathering format throughout this thesis) is when the facilitator conducts a gathering and leaves the public screen to update with all the new contributions as they are made. Participants tend to spend a significant period of their time watching the new contributions pop onto the screen. This results in less contributions being made and participants being more familiar with the material when they start linking (hence take less time to link). This format might be used if the facilitator want the participants to converge their consideration of the issues, because each person might read the contributions being made and so essentially suffer from bounded vision. This bounded vision might enable the participants to achieve agreement quicker, because their consideration of the topic has not been free, rather it had been coloured by the contributions that have been made. Consequently participants might converge their thinking quicker than if they were to work in a blind session when their thinking is completely free from other peoples' influence. This might happen because during the blind session participants have an opportunity to develop a solid perspective of the issue without being influenced by other people', hence they might hold onto that view more firmly. However, if everyone has read the same contributions which have been displayed on the public screen then they might all have a less rigid and less well personally considered perspective of the problem, then they might achieve agreement quickly (van der Heijden and Eden, 1998). This is because they are less attached to their own view as they have not had the same opportunity to develop that view in isolation.

This strategy of the normal gathering format was employed on two occasions during the ELZ workshop and on one occasion during the NYPZ workshop (as detailed in Table 5.1 on Page 120). At the ELZ workshop participants shared 18 and 19 additional contributions and at the NYPZ workshop participants shared 70 contributions (as detailed in Table 8.4 on Page 291 where more consideration of these sessions will be performed). In these two ELZ

normal gathering the number of contributions is obviously significant lower than the average of 56 contributions (calculated from data in Table 6.2 on Page 165) that these same participants contributed during their 6 blind sessions. The NYPZ session of making 70 contributions requires explanation. The participants were very keen to perform this gathering. It was a topic that many were very keen to share their knowledge on and a few said that it was a primary reason for them attending the workshop. From the fact that they made 70 contributions it appears that this keen attitude was because they had considered it in some depth and so had a lot of salient contributions to make. The results would suggest that these participants were less able to focus all their attention on the making of contributions in this format of gathering. However, where the participants might have spent a considerable amount of time considering the issues then the participants might not be distracted by the public screen up-dating until they have exhausted their bank of salient ideas.

A second method (called the '**multiple stimuli**' format by this research) is when the facilitator gives the group member up to 10 existing contributions during the blind gathering to stimulate their thinking, however the screen does not update with the new contributions (the participants are blind to what other people are contributing). The facilitator asks the group members to look at the stimulus and then contribute one or two thoughts on each of them. After this the public screen is activated and participants have an opportunity to consider each others' contributions. This process has the effect of slowing the rate of contribution during the blind gathering. Participant can also be asked to link their contribution into the issue that stimulated it. Hence at the end of the gathering the facilitator can save a lot of time by just validating the links rather than identifying them from scratch. This strategy might be used when the facilitator wants the group members to share a very broad appreciation of the important topics. In this method the facilitator puts emphasis on only making the most important contributions. Hence the participants might be more likely contribute the very broad contributions rather than any of the supporting detail.

This multiple stimuli format of gathering has been used on three occasions during the NYPZ workshop when time was very tight. On the first occasion the public screen was frozen so that it did not update with the contributions, essentially the gathering was blind but had 7 stimuli. Participants made 50 contributions during the blind session and during the time for piggy-backing made 4 contributions and 53 links, but during this time considered 7 different

issues instead of the normal one issue. The second occasion the screen displayed 10 stimulus and up-dated with the participants contributions as they were entered, hence piggy-backing was enabled throughout the session. Participants were asked to make a contribution then link it directly into the relevant stimuli. Participants made 19 contributions and 25 links during their consideration of 10 different issue in this one gathering. On the third occasion, participants were asked to make a contribution them immediately link it into a contribution which was already on the screen (the screen was up-dating with the contributions as they were entered). One this third occasion participants made 13 contributions and 20 links.

These results could suggest that the screen being switched off did aid these participants in focussing their attention towards the task of making opinions through the console. When the screen up-dated these participants only made 19 and 13 contributions, compared to 50 when the screen was switched off. However another reason for this difference could be the emphasis on linking the contributions into the stimuli during the second and third occasion that took longer to perform than the more straightforward idea generation of the first occasion. Participants were observed by this researcher to be watching the public screen at the beginning of the first occasion. They quickly lost interest however when they realised that it was not updating with new contributions. This obviously was not the case for the participants of the second occasion who had an up-dating screen to view which showed each new contribution as it was made. Consequently, if the facilitator wants only to gather a small number of contributions to be made then these results might indicate that they could allow the public screen to up-date with all the new contributions.

Each of these methods might save time over the proposed approach of blind and piggy-backing gathering and seeks to converge the participants in terms of their thinking about the problem. However the time saved might be at the expense of a fuller consideration of the issue as the participants might converge their thinking on a few stimuli rather than explode the problem. From talking to facilitators it seems that these methods might not to be used when the issue is one of significant importance to the group members and when the facilitator has enough time to conduct a more elaborate gathering. They do however seem useful in surfacing a proportion of the issues quickly.

6.4 WORKING IN THE BLIND AND PIGGY-BACKING SESSIONS - CONCLUSIONS SO FAR

So far, this chapter has sought to uncover the way in which the contributions are made during the proposed format JOURNEY Making gatherings.

The discussion this far has,

- explored the feelings of participants towards the blind and piggy-backing gatherings.
- reviewed results and proposed argument, which is substantiated by theory, of what participants actually do during blind gatherings and the piggy-backing gatherings.
- explored the application of two methods through which facilitators might provide help to group members to manage cognitive overload.
- considered how facilitators might strategically use the effect of cognitive overload to capture a suitable number of contributions.
- commented on how facilitators can use cognitive overload to react to time constraints in a workshop.
- considered that participants might concentrate more on linking contributions because it is an easier cognitive activity than the generation of piggy-backed contributions - a topic which will be explored in Chapter 7.

The above discussions have concentrated on the way in which participants are able to make contributions during the blind and piggy-backing gathering, and on how the participants feel about working in these gatherings. No attempt has been made to explore the nature of the contributions which the participants made. As was found in Section 4.3, many of the narrow-band researchers of brainstorming analyse the ideas in terms of quality, as well as quantity. However, the quality measure which these researcher seem to use had been argued to be inappropriate for this research as it does not consider quality from the perspective of the participants in how it helps them think about the problem. The following discussion will explore the 'goodness' of contributions in how good the contributions might be in helping the participants think about the problem.

6.5 MEASURE THE 'GOODNESS' OF A CONTRIBUTION

The work reviewed above on the profile of making contributions does not offer any indication of the nature of the contributions being made. That work is concerned only with the number of contributions being made.

It is true that the format of calculating the *quality of the ideas* has been argued (in Section 5.3.1.1.2) to be of little real use to JOURNEY Making facilitators. However some indication of the usefulness of contributions to participants might benefit facilitators in understanding the nature of the contributions being made and how that might change over the 'life' of a gathering and a workshop. This work on the process of conducting gatherings will now turn to concentrate on the nature of those contributions being made by participants.

6.5.1 The rationale for *goodness* being important to a JOURNEY Making facilitator.

The researcher thought that to distinguish the contributions in some way might enable the comparison of contributions. Instead of comparing contributions in terms of *quality*, a measure which dealt with the holistic nature of the contribution was sought.

Contributions were thought to differ across a number of dimensions or constructs. One element of this research focussed on investigating the nature of these constructs. To consider the ways in which the contributions vary it was necessary to elicit the constructs which the contributions could be said to possess. Then each contribution made could be coded in terms of them possessing each construct. It was hoped that this work would enable the consideration of how to facilitate a participant making *good* contributions in order to maximise the benefit group members received from each contribution.

6.5.2 Discuss the method through which some differentiation between contributions can be gauged.

The Repertory Grid is a tool that enables the generation of constructs across which observations of a phenomenon vary. The Repertory Grid was initially developed by Kelly (1955) and later developed by Bannister and Fransella (1971) and Eden and Jones (1984). In this research the Repertory Grid was used to help the consideration of the dimensions across which contributions might vary.

50 contributions were selected at random from across the ELZ, NYPZ and GEA real-world workshops. The GP data was not captured when this analysis was performed and, for the reasons discussed at the end of Section 6.5.3, the GP data was not coded for *goodness*. The process of eliciting constructs involved three contributions being taken simultaneously for

comparison. For each trio of contributions the ways in which two contributions were similar and the other was different was considered. The emerging distinction between the three contributions formed the generation of constructs. This process was repeated for all of the selected contributions. The resulting constructs are displayed in Table 6.3.

Table 6.3 - Elements of interest resulting from the Repertory Grid-type comparison of the contributions

Code	Explanation : Does/Is the contribution ...	Rationale for including it
Complex contribution	... contains some of the later codes? Specifically: *jargon, information-info, more than one bit of info* or *understandable.*	... complex contributions might receive little attention during the piggy-backing, due to their complexity.
Typo	... contain a typing error?	... could indicate the level of precision of participants. It could enable assumptions of whether errors in linking are due to a group member's lower level of precision.
Punctuation	... contain any punctuation?	... might draw special attention to itself or 'catch the eye', either in piggy-backing, linking or preferencing.
Information – information	... contain information followed by more information on the same issue?	... to gauge the complexity of a contribution from the amount of information it contains.
Jargon idea	... use jargon?	... if participants or facilitators are confused by jargon then a contribution might be less likely to be well linked.
Understandable	... one which is easily understandable?	... if understandable then a participant can use it as a stimuli during piggy-backing.
A ... B	... contain an opposite pole e.g. contain a rather than statement?	... represents additional information that may add clarity to the issue.
Capital to start	... start with a capital letter?	... do people learn not to start each new contribution with a capital letter - exhibits learning of JOURNEY Making procedure.
> one bit of info per idea	... contain information on more than one issue?	... any link into this contribution might be intended to link into one aspect of the contribution, but not the other. Confusion over the validity of certain links can result.
Parenthesis	... use parenthesis?	... same rationale as that for *punctuation.*
Emphasis used	... draw attention to itself by using any emphasis? For example, whole words in capital letters or exclamation marks.	... same rationale as that for *punctuation.*
Stupid	... simply a silly idea that does not contribute to the development of an outcome? ... as deemed by this researcher, for example, "Isn't it time for lunch!".	... coded to see their frequency and timing in the session. If we can understand the conditions then we can gain insight as to the reasons for them.
Clear orientation	... clear in its orientation towards the issue it details i.e. it makes explicit whether it supports the issue rather than is neutral?	... some link may exist between how understandable a contribution is and the clarity of its orientation.
Unclear orientation	... unclear in its orientation towards the issue it details i.e. unclear as to whether it supports the issue rather than supporting it?	... same rationale as that for *clear orientation.*
Question	... a question?	... may be more likely to be responded to in piggy-backing than other contributions.
Constructive/ Destructive	... constructive or destructive towards problem solving?	... might show the state of mind of the participant towards the issue.
Quantifying statement	... does the contributor seek to quantify the principle they are considering?	... possibly more likely to get a piggy-backed response to contributions that specify parameters, than woolly ones.
Error	... contain a clear error e.g. was the return key pressed too early?	... so that these contributions can be considered separately in later analyses.

Once the constructs were identified from the Repertory grid analysis, each contribution made during the three workshops was coded to identify which of those possessed these constructs. The results of this coding was every contribution each having a 0 or 1 to indicate if it possessed a construct (1) or not (0).

6.5.3 Interpreting this measure of *goodness*.

During the initial stages of interpreting the results of the analyses of the *goodness* codings it was becoming apparent that nothing meaningful would be able to be extracted from the results of such analysis, as the following discussion will explain.

Different types of contributions were compared to see if they held different characteristics. To explain, the contributions that were compared were those made during the piggy-backing session (piggy-backed), the contributions which had been deleted (deleted), those which the facilitator had entered (facilitator-entered) or those the facilitator had changed in any way (facilitator-changed), and also all the contributions made during the blind session which did not fit into the above categories (blind). The researcher was under the impression that if he could discover that piggy-backed contributions are more likely to hold spelling errors, for example, then the facilitator would be aware that they might like to re-iterate the importance of good spelling specifically during the piggy-backing session.

To be considered in the coding analysis, each code had to have at least one robust reason for it being included. That reason had to contribute to improving the facilitator's instructions which are given to participants at the beginning of the gatherings (the reasons are mentioned in Table 6.3).

On deeper reflection of the robustness of these reasons it seems inconsequential to participants if other group members use *punctuation* in their contributions or *parenthesis*, or if the contribution is an *error*. It also seems unimportant if a contribution contains a *rather than* statement or is a q*uestion* or seeks to *quantify the principle it is referring to*. What is critical to a participant is that they perceive that they understand what the maker of the contribution intended a reader to understand from their contribution. It seem irrelevant that the contribution's *spelling* is perfect, or that it contains *emphasis* or starts with a *capital letter* for these are not constructs that will help the participant to understand the meaning of the contribution and help them piggy-backing off it. The fact that a contribution is

constructive or destructive might not help in understanding what it refers to although it might certainly encourage participants to piggy-backing off it to defend their position, or attack someone else's. Furthermore, *clear* or *unclear orientation* might not affect the stimulation the contribution makes when read by a participant, as their experience will drive their interpretation. For the main reason that participants' understanding of a contribution might not suffer from a contribution possessing, or lacking, these specific constructs, no analysis of these specific codes seems relevant to this research. Certainly contributions that contain emphasis or are destructive (for example) might have effect on the nature of the response they invoke within different participants which might have effect on the nature of the group discussions. However, these constructs are not thought to be ones that would necessarily ensure that a contribution would have significant effect on the final outcome for it might be that the group members simply dismiss the destructive contributions as being emotional rather than as being relevant to the outcome. This is because if the constructs are not important to participants in terms of their understanding of the core issues then it seems unjustified to suggest that the facilitator's instructions should orient participants' attention to constructs that are irrelevant to them. In short, the sharing of knowledge with greater attention these constructs would not benefit the participants who read them in terms of their intrinsic understanding of the issues.

A contribution which was not *understandable or* just plain *stupid* would not be useful to participants as stimuli for their deeper consideration of the issue. Also, if a contribution contains *jargon* a participant is unclear about then this might be a source of confusion rather than a source of stimulation. If a contribution contains multiple pieces of information about the same issue (*information-information*), or more than one issue (*1bit*) then this might create some confusion about the actual issue being referred to in the contribution. Essentially then, the facilitator might only be interested in identifying contributions which are marked as being *stupid*, or *complex* (in that the code for *complex* is one which identifies a contribution with any of the constructs of containing *jargon*, or *information-information*, or *one bit of information* or being not *understandable*.

It was clear to the researcher that when coding *stupid* or *complex* contributions it was quite easy to generate a measure of complexity that was reliable in that the coder could expect to be consistent in their coding (for those measures see Appendix 6.1 - "Manual for coding links and contributions"). The coding of all ELZ and NYPZ contributions was done twice

(once on computer and once on paper to create the impression of a different set of data) by the same coder with a space of at least 3 weeks between codings (a similar method to that advocated by Miles and Huberman (1994) to check internal consistency). The inter-coder reliability for the ELZ session was 78% and for NYPZ was 71% (calculated by [number of codes which did not agree/(number of codes which did not agreed + number of codes which agreed] as suggested by Miles and Huberman (1994, Page 64)). Miles and Huberman suggest an initial code-recode reliability of close to 80%. However, before any further work was initiated to explore the reason that code-recode reliability did not reach 80% for both sessions, this work was halted for the following reason.

A significant concern surrounded the internal validity question of was this measure of complexity a valid one (Miles and Huberman, 1994)? No robust argument can be generated to support that this is a valid measure of what the participants saw as being complex (for this reason no coding of the GP data was performed using this framework of goodness). The issue was not that the researcher used a Yes/No measure over a 'degree of complexity scale of 1-5'. To be a valid construct to research, the measure should accurately code those contributions which participants might have difficulty understanding due to their complexity. It is not thought possible for an independent coder to perform this task and expect results to be representative of 18 different participants in a workshop. It was found that a coder is able to reliable code the construct, but why would one want to when it will give no insight to the contributions which were able to make a significant contribution to the final outcome?

Eighteen different people might see 18 different contributions as being *good*. The *goodness* of the contribution will depend on the ability of the participant to generate persuasive arguments within themselves supporting it being thought of as *good* (McGuire and McGuire, 1996). As the coder is unable to get inside the head of a participant, the coder is unable to decide which contributions are persuasive to a participant.

What is it then that research should be concerned about in terms of the type of contributions made in JOURNEY Making gatherings? In order to answer this question one needs to revisit the initial rationale for *goodness* being important to a JOURNEY Making facilitator, as discussed in Section 6.5.1 above.

6.5.4 Justify what *goodness* can contribute to understanding the contributions .

The intention from coding this data in terms of goodness was to differentiate (and potentially measure) each contribution in terms of the constructs each possessed. The researcher anticipated that some representative measuring tool, probably giving a numerical result, which would distinguish *good* contributions from *less good* contributions could be developed. Essentially the hope was to replace the *quality of ideas* with something more meaningful and would be useful to facilitators, but the term meaningful was misinterpreted. Meaningful was interpreted to be 'something more detailed than the quality measure - some measure that is reliant on the properties of the contribution itself i.e. not the high subjectivity of a *quality measure*'. However, in some ways, this work seems to have just re-engineered the *quality of an idea*. This is because the measure of *goodness* (now gauged through the measures of *stupid* and *complex*) is one that relies on a third party coder's interpretation of the contributions. Hence someone with a vastly different perspective and understanding is making a judgement on how useful and stimulating a contribution is to them, not to a group member.

On deeper reflection, the initial intention of this work was also misguided. To explain, the development of such a measurement tool implies that the facilitator's desire is to maximise the *goodness* or *quality of the contributions*. It also implies however that this should be done whilst minimising the cost to the running of the session of capturing the poor (or lower quality) contributions. However it is not thought useful to turn the facilitation of a gathering into an optimisation problem where the objective is to maximise the number of *good* contributions while minimising the cost of collecting those *good* contributions. Hence, it is not thought that to judge each construct of *goodness* and to decide which are the very *good* contributions, according to some output value, is beneficial to the consideration of which contributions stimulate the most persuasiveness.

To conclude, the worth of this coding of contributions in terms of *goodness* is fundamentally flawed on a number of dimensions, as detailed in the following list;

1. Some constructs arising from the Repertory Grid analysis do not reflect the dimensions of the contributions that can assist, or hinder, a participant's understanding of the contribution.

2. The coding of complex contributions (*jargon*, *information-information*, *one bit*, and *understandable*) cannot be representative of the group members' perception of the contributions. This is because the coder has a different cognitive base on which to base their interpretation of the contributions, and subsequently their coding.
3. The generation of a measure of goodness implies that the facilitator might like to attempt to optimise a gathering to maximise the number of good contributions, whilst minimising the time spent collecting them.

6.5.5 Reflection : So what actually is a 'good' contribution then?

The contributions which participants would say are very *good* might be ones which stimulate the most persuasive arguments within them. Any substitute measure of *goodness* might not accurately uncover which contributions are the most significant to the variety of perspectives held by the participants. The *quality of the ideas* or the *goodness of contributions* are examples of such substitute measures. These substitute measures might contribute very little that is meaningful to the JOURNEY Making facilitator's understanding of which contributions group members would regret not having in their group map. After-all, it is those contributions that participants would regret not having in the map that might be deemed to be *good* or *influential* to their consideration of the issue. Those contributions are likely to be related closely to what contributions are the ones that actually contribute to the final outcome, after-all if the those contributions were not made then the outcome would be different, and maybe not as 'good'.

So, how therefore can these *influential* contributions be identified? A researcher could ask the participants which contributions they thought were most *influential*. In fact the facilitator already does this within the typical process which follows a gathering. In identifying the 'key contributions' which make a significant contribution to the group members' consideration of the issue, the group members identify *influential* contributions.

The most *influential* contributions to an individual are those which stimulate their generation of robust and positive arguments supporting them being the most *influential*. Normally the facilitator suggests that some contributions are *influential* based on some visual appreciation of a high domain score (Eden et al (1992), Eden and Ackermann (1998c)). The facilitator does this to indicate which contributions might be preferenced (or sometimes rated) in order to find which are perceived to have the most *influence* on the

current issue. Also group members suggest the contributions they think are also highly *influential* contributions and which are missing from this initial list. It seems that the place to restart this debate of what are the most *influential* contributions to participants is to consider the nature of those selected for preferencing, or rating.

3 out of 5 of the interviewees from the GEA gathering reflected a frustration of how they felt the facilitator did not consult them over the selection of the contributions on which the preferencing would be based. It is typical that the facilitator selects the contributions for preferencing and then the participants nominate any that they feel have been overlooked. On this occasion however the group were very short of time (recall the discussion in Section 6.1.1 on how the GEA gathering was under time pressure). The facilitator quickly selected the contributions thought to be appropriate and after quick consultation with the group, began the rating exercise. However, all the participants commented on how the contributions that were selected were not ones that were they saw as being 'correct'.

The fact that on this occasion the contributions to be rated were not 'correct' (as perceived by the group members) might reiterate the importance of selecting the most *influential* contributions for preferencing/rating. Most importantly however, it reminds the facilitator of the crucial nature of consulting the group members and giving plenty of time for this consultation. Only then can the group members be confident that the outcome is one of their own construction and can the psychological attachment to that outcome be heightened.

6.5.6 Conclusions on identifying the contributions which group members would regret not having in a group map.

The outcome of this stream of the data analyses on *goodness* seems clear, but it is worth extracting the main points by way of conclusion.

The development of a measurement tool to gauge which contributions had significant impact on the thinking of participants was abandoned for the following reasons:

1. It was not possible to directly ask participants which contributions they found particularly useful to their consideration of the issue, not that it is thought that they might actually know because they might learn from the entire map rather than single contributions, and;

2. The work on the *goodness of contributions* was not satisfactory in being able to use proxy constructs to understand those constructs that a *good* contribution might possess. Also;
3. This coder could not accurately gauge which contributions different participants might view as being significant to their consideration of the issue. The impression of significance depends on the persuasiveness of the arguments which the participants are exposed to supports it being seen as being *influential* (either those offered to a participant, or those the participant generates within themselves). Hence;
4. The results which might have been gained from further analyses of the *goodness of contributions* was deemed by this researcher to make any real contribution to a facilitator's understanding of how to gather contributions that were highly significant to the participants. However,
5. A place to restart the debate of which contributions group members (or client, or facilitator as a representative of the client) would regret not having influence on their consideration of the issue might be to explore those selected for preferencing or rating immediately after the linking exercise.

It is disappointing that any claims made in terms of the nature of the contributions made during the three real-world sessions cannot be backed by some measure of the *influence* of those contributions, but that is the nature of the work of this research. However, to gauge that measurement the researcher might need to consult with the participants and that it is impossible in this research for the reasons given in the discussion on research methodology.

6.6 MAIN FINDINGS FROM THIS WORK

The work reported on in this chapter has performed an examination of how participants were able to share contributions in three real-world workshops, and four pilot workshops. The main results of '*exploring what happens in gatherings that are run as part of a real-world JOURNEY Making workshop*' include:

1. A greater understanding has been gained of the feeling and opinions of these participants to the format of blind and piggy-backing gatherings. This has shown that some real-world participants do appreciate the procedural rationality of the blind and piggy-backing gatherings. In particular, the blind gatherings were thought to be very effective in liberating these participants from the bounded vision from other peoples'

contributions. Some real-world interviewees felt that the benefit from the piggy-backing session is more the participants greater awareness of the issues from reading and linking the contributions, than new contributions being stimulated by other peoples' contributions.

2. Knowledge of the way in which participants make contributions during these blind gathering. In this study pairs and individuals working alone seem to contribute very uniformly over the entire duration of the blind gathering, suggesting that the are contributing salient ideas rather than those constructed from deep incubated thought.
3. An appreciation that these participants did make some piggy-backed contributions but that largely participants contributed causal links. This is thought to be the result of cognitive overload and two techniques for facilitating the participants in managing this better have been offered.
4. Considering the strategies which facilitators might use to employ cognitive overload to manage the smooth running of the gathering, in terms of the number of contributions captured and the time available.
5. Briefly exploring the characteristics of normal, multiple stimuli gatherings to see when each might be more suitable to employ, given the amount of time available and the desire of the facilitator to diverge or converge thinking of participants.
6. A recommendation that the debate of what contributions group members would regret not having in their consideration of the issue should concentrate on the *influential* contributions, possibly as identified by the group members prior to their rating/preferencing.

The thesis will now pick up on an issue that has been central to the discussion of the piggy-backing session, that of the links participants make during the gathering. It has been proposed that participants using the computer technology to link contributions during the groupwork rather than to share new contributions which have been stimulated, possibly because the linking is an easier cognitive activity. Chapter 7 will seek to explore this issue in more depth. It will uncover the nature of linking and generate theory of what guides participants linking of contributions during JOURNEY Making computer-supported workshops.

CHAPTER 7 - ANALYSES OF THE LINKS

The focus of these three findings chapters is to *'explore what happens in gatherings that are run as part of a real-world JOURNEY Making workshop, in order to improve practice in facilitating gatherings'*. One way in which participants can share knowledge in a Group Explorer supported JOURNEY Making session is by sharing their understanding of the causal relationships between contributions. During the gatherings in every JOURNEY Making gathering under scrutiny here, headway was made on exerting some causal structure on the contributions. This headway was made by the facilitator clustering the material and the participants beginning to enter causal links between causally related contributions (as was described in Section 3.2.3 and will be re-iterated in Section 7.1.2). It is the process of the participants and the facilitator entering links and impressing a causal structure on the contributions after the gathering which will be the focus of this chapter.

This chapter will explore the nature of the participant-entered links to understand what they contribute to the structuring of the contributions. The discussion will also seek to explore the way in which the facilitator assists participants to link their contributions during the group discussion. It will be shown that a number of the participant-entered links are deleted from the final model and it will be argued that the correctness of links can be viewed as having a level of correctness that is not robust over the duration of the session.

This chapter concentrates mainly on the ability of participants to make 'correct' links. In that vein the links will be examined for corrections by this researcher, the type of contributions they link, and attempt to support the construction of a hierarchy of preference within participants for making certain types of links. Also the ability of participants to identify relationships between contributions and construct networks by linking a number of contributions together is of interest as it is another way in which participants can share their knowledge of the situation.

No attempt will be made at this point to gain access to the way in which participants might navigate the issues over the course of the workshop as transparent through the links between contributions. That attempt will be made in Chapter 8 by analysing the clusters which can be seen to emerge out of the participant-entered and facilitator-entered links.

7.1 GENERAL BRIEF ON THE NATURE OF STRUCTURING/LINKING CONTRIBUTIONS

Before launching into an examination of the causal links that participants make, it seems worthwhile to revisit some of the fundamentals which lie behind the exploration of how participants make causal links. The current section will pinpoint the type of links in which the researcher has interest. However, before this is done it seems necessary to consider the validity of the links made by participants of the GEA session as the session was thought by its facilitator to be atypical.

7.1.1 Health check on the data from the real-world GEA workshop

It was concluded in the discussion of Section 6.1.1 that the contributions from the GEA session were valid for analyses in the sense that they are potentially representative of other workshops. However, this stream of the research will be based on the linking performed by participants, and so the nature of the participant-entered links should be considered for validity using the criteria of time available, the experience of the participants and the facilitator/participant relationships (as mentioned in Section 5.2.5.1).

- **The facilitator felt he had very limited time to help the group make the JOURNEY**
  - Participants also reflected an awareness of the limited time that was available for linking. However they seemed more aware of the limited time during the group discussion (when the facilitator helped them to link the contributions) rather than during the piggy-backing gathering (when they link the contributions themselves). However, if the participants did feel under pressure during the piggy-backing session then this might have caused them to not scour the screen for the two very best contributions to link and instead just link the contributions that appeared to be related in some way - as this might be quicker (a proposition supported by Locke and Latham (1990) who discuss the effect of time pressure on group members).

It might be that if the links that the participants made were analysed then one might be able to understand if this proposition is supported. However, if the links were to be analysed then one must be aware that the participants might have felt under time pressure.

- **Some group members might have thought that they had experience of causal mapping, and so react differently to the typical participant who does not have**

experience - Considering that some participants thought that they knew causal mapping they may have been more confident in their ability to identify causal relationships. Hence participants might have either used this experience to share correct causal links or alternatively made causal links without much thought of their accuracy because of their (possibly) unjustified confidence. If the links are to be analysed then the analyses would have to be done with extreme caution and an awareness of the potential skill levels of these participants.

- **The facilitator worked in the same organisation as three of the participants** - As with the making of contributions, the making of causal links in both the blind and piggy-backing sessions is done in near social isolation. The facilitator does not want to distract the participants and so after the brief introduction of the clusters of contributions (which is the main social contact at this time) will really only respond to the participants. Again this researcher feels that the social dynamic (if indeed there was one) might be more apparent during the social element of the gathering session, i.e. during the group discussion, rather than during the making of causal links.

The peculiarities of the GEA session certainly might cause some strange results to be found in any analyses of the links. By acknowledging these peculiarities the researcher is in a better position to explain the results found in a context which adds meaning to the working of the participants. It certainly seems that any analyses of the links must be informed by a consideration of the time pressure, the potential confidence of the participants of their ability to map causally and, where relevant, by the nature of the relationship between the facilitator and the participants.

Hence it is concluded the links are valid as this is a real-world gathering (albeit run under some peculiar conditions). The researcher feels that analyses of these links can only be performed if the peculiar conditions inform the interpretation of the results.

7.1.2 Revisit the typical instructions for contributing links.

At the start of every new workshop, when participants might not be familiar with the principle of gathering and linking contributions, the facilitator demonstrates what is meant by a causal relationship existing between two contributions on the public screen. Normally the facilitator selects two contributions and demonstrates an argument for a causal link

existing between the two contributions. They then insert the link so that the participants know what it actually looks like on the screen. They then instruct the participants that if they identify a causal relationship between two contributions they should insert a causal link. The facilitator might display a powerpoint or A1 picture of what a finished causal map looks like so that the participants know what they are aiming to construct.

Participants are told that to insert a causal link, they simply have to identify the contribution number that the link is going from and type it into the computer. Then they are told to type a '+' sign to signify a positive causal relationship i.e. "A will help B to occur". Then they are told that they should type in the number of the contribution that the link is going to. If the relationship between contributions is a negative one then a '-' sign should be types in place of the '+' sign i.e. "A will hinder B occurring". These instructions are also displayed on the participants consoles screen, typically (and certainly for the participants of these workshops) from the very start of the blind gathering session. Hence participants are able to link contributions for which they know the identifier number, which, during the blind gathering, are their own contributions and the stimuli questions which are displayed on their console screen.

During the piggy-backing session participants are encouraged to insert causal links between contributions in addition to them being encouraged to contribute piggy-backed contributions. Briefly, one reason for this linking of contributions is that it gives the participants feeling that they are structuring their map (Eden and Ackermann, 1998b). It also assists in the speeding up of the structuring of the material after the piggy-backing session, because participants are more familiar with the material on the public screen and so should be more able to identify the causal relationships between contributions. The reactions of these participants of the sessions under scrutiny here to the instructions from the facilitator will be reviewed in Section 7.2.1.

The facilitator is also able to enter causal links and edit or delete the participant-entered links (typically with permission from the group (Johnson and Johnson, forthcoming)). The facilitator can change any positive causal link to be a negative one after, or during, the session when they think it is clear that a negative causal relationship exists, but that the participant has contributed a positive causal relationship, or vice versa.

7.1.3 Rationale for exploring links

The analysis of participant-entered links has been performed to enable the consideration of how able participants are to contribute to the group map in this way. The analyses of the links is hoped to give insight to the way in which participants navigate the pertinent issues within a problem.

It could be that people think about a problem in terms of chains of events (possibly in the way that Attribution Theory proposes (Abelson, 1994)). Attribution Theory suggests that knowledge is accessed by thinking of, for example, the causes of (chain down) or consequences from (chain up) a particular action. Jenkins (1998) claims Attribution Theory is a theory of psychology which "provides a more direct foundation for the causal mapping approaches", Page 235, "as a way of understanding interpersonal interactions and the interpretation of actions and events", Page 235.

From early scrutiny of all the group maps at the start of the work on data analyses, it was clear that if people in these workshops do generate contributions in chains, then the contributions did not appear to be linked in this way. Participants tended to have their contributions isolated from one another i.e. not directly linked.

However, this stimulated a series of questions about how participants made causal links between contributions. It was expected that some analyses of the links would give insight to the general rules employed by participants when structuring contributions. If facilitators can understand how participants make links then they might attempt to pay closer attention to the way this is facilitated in order to maximise the benefit of this task to each group members' understanding of the problem being considered.

7.1.3.1 Highlight that the research is exploring participant-entered links

It is the links that the participants have entered that are immediately of interest to this research, not those that the facilitator has entered. The research is focussed on exploring the way in which participants contribute their knowledge about an issue. One way participants contribute additional knowledge is through identifying a causal relationship between two contributions and typing in that link they have been identified. Linking is thought to be one way in which the participants might begin to appreciate how other people have conceptualised the problem (Eden and Ackermann, 1998c) and so enables them to begin to

synthesis other peoples' contributions into their own consideration of the problem (called "integration" by Grise and Gallupe (1999) and "alignment" by van der Heijden and Eden (1998)). Hence it is relevant that this research explores how participants make those links.

It would certainly be accurate to argue that facilitator-entered links are also dependent on the discussion between participants (see Johnson and Johnson (forthcoming) who comment on group maps built by group members working without the assistance of a facilitator and those built with a facilitator's assistance). One JOURNEY Making facilitator described how these links reflect the making sense of the contributions by the participants. In this, the facilitator was understood to mean that the links were reactive to the discussion between participants and effectively belonged to the participants (as they were stimulated and validated by them, a point also raised by Ackermann (1996)). However, the linking strategies that have been observed by this researcher to be employed by the facilitator support a notion that a considerable proportion of the facilitator-entered links seem to be entered by the facilitator, rather than being entered by the participants. It is therefore necessary to explore the extent to which participants influence the facilitator's linking of contributions. It might be that facilitator-entered links more represent the facilitator's interpretation of the discussion between participants. In this regard the facilitator might be thought of as being a participant who contributes their expert knowledge of the nature of the process and causality, combined with their understanding of the actual problem (Ackermann, 1996). However, before such a claim about the facilitator is made it is necessary to discuss the observations to see if there is any evidence for such a claim, as will be performed in Section 7.2.2.1.

7.2 THE BASIC MAKING OF LINKS BY PARTICIPANTS

It is clear that it is the participant-entered links that are of real interest to this section - although later the facilitator-entered links will be considered. The typical instructions given to participants (for the workshops considered here) have been briefly reviewed in Section 7.1.2. The discussion will now turn to explore, firstly, the observed reaction of the participants to the instructions for linking and, secondly, the actual linking of contributions as performed by participants of real-world JOURNEY Making sessions.

7.2.1 Participants' reaction to the instructions for linking

In all four of the real-world workshops discussed here there has been some quite strong negative reaction to the making of causal links by some members of each workshop. As with Chapter 6, all participants will be given a female persona to heighten anonymity and the facilitator will be given a male persona.

In interview, all five participants of the GEA workshop expressed their concern over the linking of contributions. It is worth noting that these participants were given the typical instructions for linking, as reviewed in Section 7.1.2 but that they might have felt under time pressure as discussed in Section 7.1.1. Generally some participants from all workshops seemed to feel that they initially needed far more explanation of what a link was, what it symbolised and what its direction indicated. For example, two participants from the GEA gathering reflected on how they did not know whether a link was to be made when any type of relationship existed between two contributions or only when two contributions were similar to each other. One interviewee felt that links representing a more general relationship, not necessarily a causal one, might have been easier for her to identify and be confident in. Some interviewees thought additional examples of 'correct' links might have helped them. These reactions are supported by Johnson and Johnson (forthcoming) who found that participants were unable to generate manual (not electronic) group maps when they were left alone to do so - they mention that the process of making connections between concepts was one component of the group members difficulty.

In the ELZ workshop the facilitator spent at least 2 hours reviewing a previously structured map with the group of participants. In the NYPZ workshop the facilitators spent at least 1 hour constructing a group map on a wall of paper (in an OMT format) with the participant. Both of these exercises were performed before the participants were asked to make contributions through the computer and link those contributions. This time would have given the participants an opportunity to see where links between contributions were appropriate - and maybe learn the process of mapping. It would also have given them a flavour of what the final outcome would be from the gathering i.e. a fully structured map of their contributions.

However, even after a 2 hour navigation of a fully linked map, and the instructions reviewed in Section 7.1.2, one participant of the ELZ workshop still did not understand what she was

doing. At the end of this group's first gathering that participant was observed by this researcher to suggest privately to the facilitator that a more detailed explanation of linking be given to the whole group as she did not know what she was doing (and that was why she did not contribute any links during the session). It is possible that participants thought that they knew what they were doing until they saw the links made by other people. When they did not understand those links then they may have begun to doubt their initial understanding of the linking process and become concerned that they were making incorrect links.

It was observed during the initial NYPZ gathering that participants stopped in the middle of the piggy-backing session to ask the facilitator for an additional explanation of what they should be doing when linking. Numerous other participants have performed similar pleas for advice during other gatherings which this researcher has observed.

7.2.2 Linking to structure a complete model - the facilitator's role

During the group discussion which follows a gathering a main task for the participants is to discuss the validity of the relationship between issues in the situation. In the four workshops observed in this study the facilitator's role during group discussion seemed to be to listen to the discussion and propose links based on this discussion. The researcher has observed that the facilitator controls the group to a significant extent in terms of the duration of focus the group gives to each cluster and, less significantly and possibly less importantly, to the sequence in which the clusters are discussed. The facilitator initially controls proceeding by asking "Will we start linking this cluster?" rather than the more inviting question of "Which cluster would you like to start linking?". Then the facilitator typically listens to the discussion group members conduct about the themes and issues contained there in and enters links and new contributions which seem to be missing but should be included.

This seems a sensible approach to facilitating a group of Senior Managers (Eden and Sims, 1979). It is thought likely (by this researcher) that the softly, softly approach of "Where would you like to start" might be fifteen different places that people want to start. Alternatively an apathetic response of "We do not care, lets just start somewhere" might be received. This is possible because people are not as familiar with the layout of the contributions as the facilitator (for it is the facilitator who has clustered the material) even though they may have read the material during the piggy-backing session. Once the facilitator has given a focus for discussion then participants can use their knowledge of the

contributions (gained whilst reading them during the piggy-backing session) and knowledge of the actual situation to inform their own contribution to the discussion (van der Heijden, 1996).

However, experience supports the claim that this approach does not work with every type of group. It is thought that a group of Counsellors in one OMT workshop (not a workshop that has been dissected in this analyses) probably would not have allowed the facilitator to take such a proactive and controlling role of deciding where to start linking. Those participants did not even allow the facilitator to move their contributions around on the wall without voicing their clear discomfort with this specific aspect of the structuring. Only once the purpose of moving their contributions was re-iterated did the Counsellors, somewhat reluctantly, agree to the facilitator handling their contributions.

Additional support for the claim that not all groups will respond positively to the facilitator taking a controlling approach was given by one interviewee from a real-world workshop. That interviewee perceived the facilitator to be "dictating rather than facilitating" because the sequence in which the themes were considered was driven by the facilitator. Effectively this participant was arguing that she had to follow the facilitator's mental pattern rather than the natural flow of the group discussion. The interviewee supported her frustration through an example of an instance when the discussion moved from one cluster to another on the other side of the screen. The participant was annoyed that the facilitator explicitly re-focused the participants to the original area. For the interviewee this caused disruption in the natural flow of the group discussion. This interviewee was being interviewed in a pair, and her partner in this interview did not voice any concern over this practice, she said that she did not even notice it happening.

It is possible that the facilitator's act of drawing the attention of the participants away from the new theme and back to the original one was critical to making real progress in the workshop given the short amount of time in which the participants had to make the JOURNEY. In JOURNEY Making strategy workshops the end product is a group map which reflects the JOint Understanding, Reflection and NEgotiation the group members have put into generating a way forward in their situation. In response to this interviewee's example, it is likely that the facilitator was aware that if the group discussion did move onto another topic without actually achieving any sort of closure on the existing topic then the

group could fail to make any progress in generating a way forward in the situation - effectively end up going round in circles for all of the workshop. By drawing the attention of the participants back to the original topic the facilitator focussed the group which might contribute towards achieving real progress in achieving closure on how they were going to tackle that particular issue. Otherwise the participants might simply have had a chat about the topics with no definite plans being developed and decided upon.

Although the JOURNEY Making facilitator does drive the group to a significant extent in terms of the focus of linking, it is likely that the nature of most participants, and their perception of the purpose of the workshop, can normally cope with this approach. However, while it seems appropriate for the nature of the Senior Managers and the like, the approach might not be appropriate for all other types of groups, for example the Counsellors mentioned earlier as they seemed to resist any facilitator intervention.

A facilitator might like to be aware that breaking group discussion to focus on a different theme can distract, or can possibly even be destructive of, the natural flow of the discussion within the group. However, when weighted against jeopardising real achievement of negotiating closure in considering their problem, the facilitator must prioritise the wider aims of the workshop - whatever those actually are. Also the facilitator is there to do job for the client and so must be aware of this responsibility when considering progress (Eden and Ackermann, 1998c).

7.2.2.1 Strategies in linking a group map - the facilitator's role

Although it is the participant-entered links that are of interest to this research, one should appreciate the nature of all of the links which contribute to the structure contained in the final model. If a major proportion of the final links have been entered by the facilitator then if one is to generate research findings on these links then it is necessary to understand the degree to which these links are influenced by the participants understanding of the situation.

In every map under scrutiny in this research, the facilitator makes a significant proportion of the total number of links in the final model. Analysis of the data shows that the facilitator-entered links represents a major proportion of the total number of links in the final model (56.8%, 59.4% and 59.0% for the ELZ, NYPZ and GP workshops, respectively, as shown in 'row i' of Table 7.2 on Page 212)). The GEA percentage of 87.6% in Table 7.2 is not felt

to accurately depict typical gathering but is a useful example of what can happen when participants try to link contributions. This higher figure for the GEA map might be explained through the fact that midway through the piggy-backing session, the facilitator asked participants to stop linking contributions and concentrate on piggy-backing. He did this because he felt that the participants were not linking the contributions properly and instead were making a lot of errors in linking which seemed to be blatantly wrong. Consequently the facilitator made a higher proportion of total links because the map was less structured by the participants than it is typically after a piggy-backing session when more participant-entered links have been shared. This result of participants making incorrect links might be a consequence of the very peculiar GEA session, as will be discussed in detail in Section 7.2.3. However, to explain briefly, it might be that the very limited time for the whole session which the group members had, caused them to link contributions without great care for linking them accurately - effectively they might have been concentrating on speed rather than on accuracy of argument (Locke and Latham (1990) note that processing information less systematically is one consequence of time pressure). Also the experience some GEA participants thought they had of causal mapping might have given them the encouragement to make causal links without much deep thought of their accuracy, hence they might have sacrificed the quality of their linking for quantity.

During the four workshops under scrutiny in this research it was observed that there were four methods which the facilitators used to capture the group members' reflection of the relationships between the contributions displayed on the public screen, each of which will now be introduced and is summarised in Table 7.1.

One method used by these facilitators was a pseudo-linking exercise by the group members with the linking actually being performed by the facilitator (essentially the facilitator is performing a Single User Group Supporting role (Ackermann et al, 1995)). When linking using this method, the facilitator drew the participants attention to a cluster of contributions to link and suggested possible links that might be made. Discussion between group members would normally ensue. During this discussion the facilitator would listen to the group members then, based on their interpretation of the discussion, link the material on the public screen. Therefore, the facilitators of the four workshops seemed to exert a considerable level of interpretation on the making (or the suggesting) of these links. However, this interpretation was informed by the discussion they have just listened to. In order to validate

their own linking, the facilitator typically drew the participants back to the public screen to confirm that the relationship between contributions they identified were valid i.e. they have linked the contributions correctly (Eden and Ackermann, 1998d). Then amendments and additions were made, as instructed by the group members and this assumed that the participants understand enough about linking and about the situation to validate the links.

Table 7.1 - The different types of linking strategy the facilitator might use

	Explanation of the facilitator's linking strategy
Method 1	The facilitator listens to the group members as they discuss an issue. The facilitator makes links based on his interpretation of that discussion.
Method 2	Group members control the discussion and navigate the discussion around the issues as they wish. They identify any causal links though discussion and explicitly suggest these to the facilitator.
Method 3	The facilitator controls the participants' navigation of the map by asking particular questions to direct discussion to a particular under-developed topic. This facilitates the identification of links by participants.
Method 4	The facilitator makes causal links. The facilitator trusts the participants to validate the links they make and speak up if they make an incorrect link, otherwise the facilitator's link is assumed to be correct.

A second method observed to be used was where the facilitator linked contributions which a group member explicitly picked out as possessing a causal relationship. To explain, a group member identified the contributions and typically offered a rationale to the facilitator and the other group members to support that link (that rationale might be captured as a new contribution). Group discussion would normally ensue through which the link might be supported or opposed by other participants. This discussion might stimulate the linking of further contributions, both as identified by group members (through this second method) or by the facilitator (through the first method outlined here). The discussion might also stimulate the making of new contributions or the re-wording of existing contributions to enable the true relationship to be accurately depicted.

A third method is perhaps the most inclusive of all the group members in the facilitator's linking. Instead of the group members talking between themselves, they were observed by the researcher to talk through the facilitator. In this, the facilitator might control the discussion by asking direct questions of group members. For example, it might be that they asked participants to explore more about an issue that appears to be under-developed. They

may have done this by suggesting possible links to make in order to initiate the participants consideration of the issue. For example, the facilitator might have asked the questions of "how do we actually get this to happen" (i.e. effectively asking which contributions link into this particular contribution) or "what are the consequences of this happening" (i.e. what does this contribution link into).

The fourth method is the least inclusive of the group member. This method is best explained through the statement from one facilitator of a real-world workshop reported on here of, "If I am wrong then tell me". Here the facilitator was observed to not necessarily seek confirmation from the group members as to whether the contribution is correctly linked. In this method it seems to be the responsibility of the group members to inform the facilitator if the link they made was wrong. It is critical to note that this method was typically employed only at the very last stages of linking and with a very small number of contributions and when there is time pressure to finish.

The researcher's observation suggests that the maturity of the linking session (i.e. the length of time the participants have been linking contributions in that session) and the familiarity of the participants with linking calls for four different strategies for linking. To explain, the linking process seem to start with the participants (possibly who are inexperienced at linking) discussing the issue and the facilitator linking contributions based on their discussion, the first method. Also the second method is used here when participants refer to the screen and suggest the linking of particular contributions. As the session progresses and the clusters are becoming very much more linked (or participants are more able to identify links themselves) then the facilitator seems to move into the third method and begins to ask questions of the group with regards to general topics or themes which appear to be largely under-developed. As the facilitator feels that the group should be moving on then they might adopt the fourth method where by they use their own knowledge of the situation (and their own interpretation of the contributions) to inform the linking of contributions that have yet to be linked.

From the workshops considered in this research this researcher observed that the majority of the links the facilitator makes is indeed based on the discussions group members conduct about the issue and in that case they may be argued to belong to the group members. However, the facilitator seems to exert a significant level of interpretation on the discussion

in order to translate that group discussion into causal links. It might be concerning that often the participants are asked to validate the links only once they have been entered rather than before they are entered. Somehow it seems more likely that participants will simply agree with the facilitator's links because the facilitator might market them as reflecting their discussion. Therefore participants might accept them as being correct because that must be what they said. This is a technique that some facilitators use to politically manipulate the group as the facilitator 'sells' the links as originating within them, and so belong to them (Eden and Sims, 1979). This tactic might be used to get the outcome the facilitator is in charge of achieving (as agreed with the client) (Ackermann, 1996) or to meet the time limits that have been set.

It is this researcher's judgement that the practice of a facilitator linking contributions for the participants is suitable for the purpose of creating a map which reflects the discussion and through which JOint Understanding, Reflection and NEgotiation of a strategY might be facilitated. The links in the maps may not be an exhaustive representation of reality. Rather they may be more of a combination of two things. Firstly, they seem to include participant's direct identification of causal relationships between contributions. Secondly, this is combined with a facilitator's interpretation of a conversation between a group of people being complemented by a quick validation by the members of that conversation.

7.2.3 What do participants do during the piggy-backing session - contribute links?

The linking strategies discussed above (which were observed during the four workshops under scrutiny in this research) would suggest that during the discussions which follows a gathering the facilitator might make a significant number of links in reaction to discussion between group members. From analysing the ELZ, NYPZ and GP DE maps, the facilitator contributed nearly 60% of all links from the entire workshop (i.e. piggy-backing and non-piggy-backing sessions [see row i in Table 7.2, and Note 2]). In the GEA map the facilitator contributed 87.6% of all links for the reason of the facilitator asking participants to stop linking because their linking seemed to be so poor (as described in Section 7.2.2.1).

Table 7.2 - Breakdown of who made the links which exist in the final model

	ELZ	NYPZ	GEA	GP
(a) Total number of links in the final model	352	572	113	200
(b) Number of gatherings this data was captured over	6	6	1	2
(c) Total number of participant-entered links for the entire workshop	179	286	23	97
(d) Number of participant-entered links deleted from the model	27	54	9	15
(e) Number of participant-entered links still in model	152	232	14	82
(f) Number of facilitator-entered links for the entire workshop	200	340	99	118
(g) % of participant-entered links that are deleted from the final model	15.1%	18.9%	39.1%	15.5%
(h) % of links in the final model that are participant-entered	43.2%	40.6%	12.4%	41.0%
(i) % of links in the final model that are facilitator-entered	56.8%	59.4%	87.6%	59.0%

Note 1: Recall that the linking by the GEA participants was so poor that the facilitator requested people to stop linking and concentrate on piggy-backing. Hence a high proportion of participant-entered links were deleted and a low proportion of participant-entered links are in the final model.

Note 2: It is impossible to break down this analysis from the level of whole workshop to the level of the gathering. This is because one cannot allocate the facilitator-entered links to being made within the discussion following one gathering. Hence one cannot eliminate sessions which did not follow the proposed gathering format of blind gathering format followed by a time for piggy-backing from this part of analysing the links. Consequently, this analysis includes data from normal and multiple stimuli session (as discussed in Section 6.3.3.2)

However, as argued above it is all of the participant-entered links that are of most interest to this research. Data was analysed by looking at the list of participant-entered links contained in the GE database and exploring these in the DE group map. Table 7.2 makes it clear that participants do make links during both the blind (the second last column) and the piggy-backing gatherings (the last column), with the vast bulk of links being made during the latter gathering. [The difference between links made during the blind and piggy-backing gathering is discussed in Section 7.4.1 on Page 229]. So while the facilitator may make nearly 60% of the links contained in the final model (row i in Table 7.2), participants do actually make a significant input to the structuring of the group map (about 40% from row h in Table 7.2). This input is through: the links they directly enter through the console (participant-entered links in row c in Table 7.2); links they explicitly suggest to the facilitator (the second and

third of the linking strategies (in Section 7.2.2.1 and Table 7.1)); and through the discussion they have which the facilitator can use to inform their linking (the first of the facilitator's linking strategies in Table 7.1).

From the results displayed in Table 7.2 it can be seen that the percentage of links made by the participants of the entire GEA workshop which were deleted (39.1%, from row g) is higher than for the other workshops. This is a finding that requires explanation. As was describe above, midway through the piggy-backing session, the facilitator asked participants to stop linking contributions because he felt that the participants were not linking the contributions properly. The facilitator's feeling is justified by the finding that 9 (row d) of the 23 links (row c) were deleted from the map (and a further 4 were deemed to be problem links by this researcher' coding, but not actually deleted from the map (as will be discussed in Section 7.3). This finding also confirms all of these participants' concern (discussed in Section 7.2.1) over not understanding the meaning of links and when one should be used was justified – a concern that all 5 GEA participants raised during interviews with them.

One other explanation of why GEA participants contributed a greater proportion of links that were deleted could be that they worked alone on their console whilst ELZ and NYPZ participants worked in pairs. It might be that pairs are able to validate the suggested links of their partner before they are actually contributed but individuals cannot because they are essentially doing it themselves. Maybe a contributory factor to the GEA being so poor at linking was that they had no-one to talk over their consideration of the linking of contributions. Hence instead of considering the correctness of the link with a partner, and coming to the conclusion that the link was wrong, the GEA participants might just have contributed links without much concern for this validation process because they might have thought that they were experienced at causal linking. However, the GP participants were also working alone and did not contribute such a lot of incorrect links. Hence it may be that the reason the GEA participants were so poor at linking was either due to their understanding of what they were supposed to do, the time pressure they were under which meant that they did not validate the links as rigorously before typing them in, or maybe it is more a characteristic of the facilitator of the GP session, as will be explained. To explain the last point here, the facilitator of the GP session might be thought of as being a novice facilitator. It seems likely that novice facilitators might be less good at linking contributions and therefore be less likely to identify and delete incorrect links (a point supported by Eden

et al (1992) who made a similar claim in the context of cognitive mappers). Therefore the fact that the GP participants did not share a lot of incorrect links, where as the participants of the GEA workshop who were also working alone did, might be due to the hesitation of the novice facilitator in questioning the validity of links. Hence the sharing of 'correct' links might still be more difficult for participants working alone than for pairs, but that might not have emerged from the GP session due to the experience level of the facilitator.

7.2.3.1 Reflection : Learning to make correct links over the duration of the workshop

All the links were explored to identify which were 'interesting' in that they were not included successfully in the final group map. Different dimensions of 'interesting' were coded, as displayed in Table 7.4 on Page 219. For the present discussion let us assume that an 'interesting problem link' is simply not wholly correct and does not correctly identify a causal relationship between contributions. This coding was performed because it might be that participants learn how to link properly. In this they might start off poorly in the initial gathering by having a large proportion of their links coded as being 'interesting problem'. In the later gatherings they might improve their performance and have less links so coded.

The data in Table 7.3 does not really support this proposition. Generally speaking, participants perform poorly in the first gathering relative to their performance in other gatherings (averaging 32% 'interesting problem links' column c in Table 7.3). However, it seems to be random as to whether the group members actually share less interesting problem links as they learn during the workshop. This is a small sample and the data does not really support the proposition that participants might improve their linking of contribution by sharing less interesting problem links over the course of the workshop. However, one might postulate that it might be a sensible interpretation of the learning of individuals to suggest that individuals might learn how to link over the course of the workshop.

Table 7.3 - Breakdown of 'interesting problem links' for all gatherings in all the workshops

	Type of session (see note 1)		(a) Total number of participant-entered links (see note 2)	(b) Number of 'interesting problem links' - as per the definition of 'interesting' from Table 7.4 and Section 7.3.1	(c) % of participant-entered links that were 'interesting'	(d) % of participant-entered links that were correct
ELZ	1	p	33	9	27.3%	72.7%
	2	n	0 (see note 3)	0	0	0
	3	p	33	17	51.5%	48.5%
	4	p	45	8	17.8%	82.2%
	5	p	59	6	10.2%	89.8%
	6	n	9	1	22.2%	77.8%
NYPZ	1	p	47	23	48.9%	51.1%
	2	p	74	18	24.3%	75.7%
	3	ms	53	30	56.6%	43.4%
	4	ms	25	3	12.0%	88.0%
	5	ms	20	1	5.0%	95.0%
	6	n	74	18	24.3%	75.7%
GEA	1	p	23	7	30.4%	69.6%
GP	1	p	53	11	20.8%	79.2%
	2	p	44	15	34.1%	65.9%

Note 1 : For 'Type of session', 'p' signifies a proposed format gathering, 'n' signifies a normal gathering, 'ms' signifies a multiple stimuli gathering.

Note 2 : 'Column a' counts all those attempts at making links which the participants seemed to perform. Hence it includes any clear errors or typos in linking and as such the data here might not correspond exactly with other calculations of the number of links, for example, Table 7.7 and Table 8.4.

Note 3 : In Gathering 2 of the ELZ session the facilitator did not encourage the participants to perform causal linking, and as a result no participant-entered links were made.

If this proposition of the learning of individuals is thought to be accurate then it might force re-consideration of the perception that the participants of the GEA were so poor at linking. It might be that they were just learning how to link and if they had been asked to link contributions in a second session then they would have improved their performance substantially. However, from Table 7.3 one can see that the GEA participants did not contribute the greatest number, or proportion, of interesting problem links. Participants in ELZ Session 3, NYPZ Sessions 1 and 3 and GP Session 2 all shared a greater number and a greater proportion of interesting problem links (from column c).

There is an interesting issue with the results of the GP sessions. In the first session the participants contributed the smallest proportion of interesting links of all the workshops under scrutiny here. Furthermore the participants made less interesting links in the first session than they did in the second session. One explanation for this 'good' performance during the first gathering might have been due to the gathering format being used. That format has been described in Section 6.3.2.3.2 and was designed specifically to help participants to manage cognitive overload by introducing them in detail to the contributions (through the participants clustering them) before they were asked to piggy-back off, or link, the contributions. It might have been that this more detailed introduction enabled the participants to share more accurate links which were more considerate of the entire map. Alternatively it might have been that the facilitator was less willing to question the correctness of the links during the session due to him being inexperienced and so less links were deleted. However, post-workshop analysis of the links suggests that this might not be the case and that the participants just linked the contributions better.

It seems necessary to uncover two aspects of this difficulty participants might have when linking. Firstly, the deleted links should be analysed to uncover where participants are making mistakes in linking. Secondly, the research should explore how participants actually make links and if their preference for making certain links correspond to their confidence in the correctness of those links. Only once the reasons for the difficulty in linking and the techniques employed in linking are understood can we understand how the linking process might be better facilitated.

7.3 EXPLORING THE 'INTERESTING' LINKS

If participants make a link between two contributions then this should indicate that there is a causal relationship or influence between issues represented by the two contributions and it is logged in the GE database. However, sometimes these causal links were actually deleted by the facilitator from the DE group map in these workshops which makes them particularly interesting to this research. It seems necessary to investigate the nature of these 'interesting problem links' rather than just to accept that each link made is one that is contained in the group map. Such an exploration might inform understanding of the difficulties participants have when linking - which could inform improvements being suggested to the linking process, as will be discussed.

7.3.1 What types of interesting problems cause links to be deleted?

This stream of the analyses involved every participant-entered link in the GE database being scrutinised to identify if it was in the final group map. This process of exploration aimed to uncover the reasons for why some links were not contained in the final group map. The researcher took the stance that every link was correct unless a very persuasive argument could be generated to support it being classed as 'interesting' for whatever reason (as Table 7.4 gives dimensions of the term 'interesting'). It is not argued that this process validated the links in terms of their correctness. Only the participants who have domain knowledge are able to say whether a link is correct or incorrect to them. More will be said on this issue of this researcher being unable to validate links in Chapter 8.

As displayed in Table 7.4 the 'interesting problem links' held 13 properties that could distinguish them from other links. Table 7.4 does not make distinction between the proposed format gathering and other formats of gathering (specifically, those formats discussed in Section 6.3.3.2 i.e. normal and multiple stimuli formats), because an interesting link is interesting irrespective of the type of gathering in which it has been contributed. Also it is not felt that the different nature of the gathering formats might cause a greater number of incorrect links to be shared. There is a very small number of gatherings on which to base this premise, however from Table 7.3 one can calculate that the average '% of participant-entered links that were interesting' (column c) is not substantially different for proposed and multiple stimuli formats (which have averages of 29.8% and 24.5% of all links being interesting). Only having two normal gatherings to compare is a weakness, but their average is calculated to be 23.3%, just below the average of the other two formats. However considering that this is calculated from percentages of 24.3% and 22.2%, it might suggest that some participants of normal formats do reach a similar level of 'interesting links' as the proposed and multiple stimuli sessions. This might be possible considering that 24.3% of links were 'interesting' in one of the normal format sessions in this study. Hence for the analysis of 'interesting problem links' in Table 7.4 it is felt appropriate to analyse the entire workshop rather than only the proposed format sessions.

Each interesting link was coded to see which of the codes accurately explained why it was deleted from the model. Each link was coded twice, normally two weeks apart, by the same coder (as advocated by Miles and Huberman, 1994). Intra-coder reliability for ELZ was 91.4%, for NYPZ was 81.5%, for GEA was 100% and for GP was 86.4%, in terms of the

number of interesting links that were coded consistently across the two codings (again as advocated by Miles and Huberman, 1994, Page 64).

It is proposed that some of these categories of interesting links would only contribute a 'minor' problem to the group map in that their impact on the final model (if they were to be included on the final model by mistake) would be less concerning to the group members than other more 'serious' interesting links. The following sections will introduce the reasons for these links being viewed as interesting and discuss their consequences on the final model if missed.

Table 7.4 – Explanation and proliferation of all 'interesting problem links' for the entire workshop (see Note 1)

Reason for being interesting	**Explanation of reason**	**% of all interesting links i.e. % of row n**			
		ELZ	**NYPZ**	**GEA**	**GP**
(a) Mistype links	Where the link includes a clear typing error. (excluding the use of minus rather than plus signs, that are accounted for in the Neg>Pos codes)	4.8%	17.2%	0.0%	7.7%
(b) Duplicated	The link that has been duplicated by someone i.e. the first link of one that is duplicated	0.0%	8.6%	0.0%	7.7%
(c) Duplicating	The link that duplicates a previously made link	0.0%	9.7%	0.0%	7.7%
(d) Neg>Pos (not changed at all)	Where a negative>positive link is wrong but not changed by anyone i.e. 23-12, instead of 23+12	0.0%	20.4%	0.0%	0.0%
(e) Neg>Pos by facilitator	Where a negative>positive link is wrong but changed by the facilitator after discussion	0.0%	3.2%	0.0%	0.0%
(f) Neg>Pos by group member	Where a negative>positive link is wrong and the group member has changed it themselves in another link	0.0%	2.2%	0.0%	3.8%
(g) 1 deleted contribution	Where a link has been deleted because one of the contributions it links has been deleted	23.8%	17.2%	18.2%	26.9%
(h) 2 deleted contributions	Where a link has been deleted because two of the contributions it links have been deleted	7.1%	3.2%	0.0%	0.0%
(i) Direction (changed by facilitator)	***Where the direction of the link has been changed by the facilitator i.e. 23+41 changed to 41+23***	***19.0%***	***6.5%***	***0.0%***	***30.8%***
(j) Direction (changed by group member)	***Where direction of the link has been changed by the group member in another of their links***	***2.4%***	***2.2%***	***0.0%***	***0.0%***
(k) 1 intermediary contribution	***Where a link has been changed by the facilitator to go through another contribution i.e. 41+31 changed to 41+45+31***	***14.3%***	***10.8%***	***9.1%***	***0.0%***
(l) 2 intermediary contributions	***Where two intermediary contributions have been entered between contributions previously linked***	***0.0%***	***1.1%***	***9.1%***	***0.0%***
(m) Simply wrong link, no explanation	***Where the link has been deleted by the group for the reason that it is links two contributions that do not have a causal relationship.***	***35.7%***	***3.2%***	***42.9%***	***26.9%***
(n) Total number of all 'interesting' participant-entered links from all gatherings in the entire workshop (not only piggy-backing ones)		42	93	7	26
(o) Total number of all 'serious' problem links		29	25	5	15
(p) Total number of participant-entered links for the entire workshop		179	286	23	97
(q) % of 'interesting' links that might cause 'serious' problems (seen Note 2), (q) = 3(***bold italic*** font)		71.4%	23.8%	61.1%	57.7%
(r) % of total participant-entered links that might cause 'serious' problems, (r) = ((q*n)/p)*100		16.8%	7.7%	18.6%	15.5%

Note 1 : To re-iterate a point made in the discussion above, this table of data does not make distinction between interesting links made in proposed, normal or multiple stimuli formats of gathering, because it is not felt that the nature of the gathering conditions should have significant impact on the propensity to make incorrect links.

Note 2 : Interesting links in ***bold italic*** font are those which are thought to be serious problem links (see Section 7.3.1.2 for further explanation). Other interesting links are thought to be minor problem links (see Section 7.3.1.1 for further explanation).

7.3.1.1 Minor problem 'interesting links'

It is this researcher's opinion that some interesting links (rows a to h as detailed in Table 7.4) have minor negative consequences if they were not discovered and allowed to exist in the final model. Furthermore, other interesting links might create serious problems in the final model if they were not realised, as will be discussed in Section 7.3.1.2. To illustrate, *mistyped links* (row a) are not problem links as they will never be included in the final model because they fail to satisfy Group Explorer's requirement in terms of valid links, possibly by not finishing the link, for example '234+'.

Duplicated (row b) and *duplicating* (row c) links are not problem links in the sense that they can cause a problem in the final model. These links simply are interesting because two or more people identified the contributions as being related, and did not notice that the link had already been contributed. Hence it is thought that duplicating links are not a measure of agreement with the link, as it might be interpreted to be in the making of duplicating/redundant contributions. The duplicating link will only over-write the duplicated link and the relationship between the contributions will not change.

The interesting links *Neg>Pos (not changed at all), Neg>Pos by facilitator, Neg>Pos by group member* (rows d to f, respectively) might not cause serious problems if they were to exist in the final model although one would certainly prefer that they did not exist. The reason for them not being serious is that participants might still see these links as being correct even if there is a negative sign on a link which is wrong. This is thought possible because the negative signs on these links are so faint, and are often over-written by other contributions, that they might not even notice that the negative sign exists. It is possibly for this reason that this researcher was able to identify 19 links (found from 20.4%*93 (rows d and n in Table 7.4)) from the NYPZ workshop which he believed represented a positive causal relationship but were contained in the final group map as a negative causal relationship. Furthermore only 5 other such negative links (found from [(3.2%+2.2%)*93]

(rows e, f and n in Table 7.4)) in the final NYPZ group map were corrected (by either the facilitator or a participant) to represent a positive causal relationship. If participants do notice the negative sign then they might just interpret it to be a positive link, rather than a negative one, i.e. ignore the negative sign. It is thought that considering the direction of the link is correct and participants will probably be able to handle any confusion over the negative sign, then the negative sign is a minor problem.

Another category of interesting links found in the GE database includes those links that did not exist in the model because one, or both, of the contributions it linked had been deleted (*1 delete contribution* (row g), *2 deleted contributions* (row h)). It is rare that contributions are actually deleted from the model. It is more likely that these interesting links have been merged into another contribution which has a very similar message to the initial contribution. To explain, sometimes different participants make contributions which are very similar to a fellow group member, for example "spending on advertising should be reduced" and "reduce spending on advertising". When the group discussion starts the facilitator might ask the group members if these contributions duplicate one another and ask if one can be deleted. In this case the facilitator merges the links that go into these contributions so that the links are not lost. Hence instead of having two similar contributions each linking into different contributions, only one of the similar contributions is left in the model and makes all the links that deleted contribution had made. It is possibly that if a link has emerged as being interesting because one or two of the contributions it links has been deleted, then the contributions it linked have actually been merged with other contributions, not deleted. Hence these may not be serious problem links as they will probably be contained in the model.

7.3.1.2 Serious problem 'interesting links'

The above categories of interesting links are thought to contribute minor problems to the participants if they had not been identified during the group session i.e. they contribute problems which can be easily overcome by the participants if they are not dealt with during the discussion. There are links however that could cause 'serious' problems if they had not been identified and dealt with, as identified (in rows i to m) in ***bold italics*** in Table 7.4. If these problem links had not been identified the model would contain them as incorrect links when they have no justification for being included in the model.

Links which have had their direction changed (either by the facilitator (*direction (facilitator)* in row i) or by the participant (*direction (group member)* in row j)) are serious because they actually represent a real error in linking (rather than a link which has been altered or replaced by a better link to more naturally explain the relationship of causality). The participants have identified a relationship between two contributions, but mistook the relationship of causality between them. It is possible that the facilitator will raise this when they spot an inconsistency with what the participants are talking about during group discussion with what the link would indicate. However if a participant corrects their own, or someone else's, incorrectly directed causal link, then the incorrect link will still exist in the model, again unless the facilitator or a participant identifies it. The participant typing in the new direction of the link will not over-write the initial incorrect links, it will simply add to it so that both links are included in the model.

Sometimes the participant-entered link identifies a relationship between two contributions, but this relationship is better explained when they are linked through one or more intermediary contributions, (*1 intermediary contribution* (row k) and *2 intermediary contributions* (row l)). If this original link was to exist in the final model then the true relationship would fail to be explained. In changing the relationship to include an intermediary contribution, the relationship is more fully and precisely expressed. These changes to the original links could indicate a failure of the participant to scour the screen for the best link to make, and perhaps indicate a scenario whereby they make the first sensible link they happen to spot.

Some links are *simply wrong* (row m of Table 7.4) in that other group members decide that the two contributions that have been linked do not share a causal relationship. In the four workshops under examination here, this accounts for a widely-varying percentage of the total number of interesting links - 35.7%, 3.2%, 42.9% and 26.9% for ELZ, NYPZ, GEA and GP (corresponding to 15, 3, 3 and 6 actual links) respectively. In terms of the proportion of total participant-entered links, 'simply wrong' links account for 8.2% (15 actual interesting links/179 (row p) total links), 1.0% (3/286), 13.0% (3/23) and 6.2% (6/97) of the total participant-entered links for the entire workshop (ELZ, NYPZ, GEA and GP, respectively). Again the GEA workshop is an out-lier here, however this result can be validated by revisiting the comments and actions of that GEA facilitator. That facilitator commented on how he felt that the participants did not link the contributions well. In fact he

even asked the participants to stop linking the contributions and concentrate on making piggy-backed contributions. The facilitators of the ELZ, NYPZ and GP gathering did not report any such feeling, nor did they ask participants to stop making links. Hence one might expect (as they have done so) that the results of the data analysis would suggest that the participants of the GEA session might contribute proportionally more 'simply wrong' links that participants of the other gatherings.

7.3.1.3 Indicating the proliferation of minor and major problem links

The data in Table 7.4 indicates the proliferation of interesting links, the nature of which have been discussed in Sections 7.3.1.1 and 7.3.1.2. However, it seems unlikely that many robust conclusions can be drawn from a deep interpretation of this data because the result found could be explained by many different causes.

There are 13 issues which one might raise as being interesting (rows a to m of Table 7.4), but only 5 of these might be of 'serious' concern to the facilitator of a JOURNEY Making gathering (i.e. those discussed in Section 7.3.1.2 including rows i to m). This work sought to investigate the accuracy of the links as validated by the group members during the discussion after the gathering. It has assumed that all links were correct unless there was clear evidence from analysing the final group map that the link was incorrect, or interesting. For example, it included links that had their direction changed, or links that were negative when it seemed that they should be positive.

However, this work almost assumes that the facilitator is very concerned about collecting interesting problem links of the magnitude of 23.5%, 32.3% and 26.8% of the total participant-entered links (as found in the ELZ (42/179 i.e. total number of interesting links from row n/total participant-entered links from row p), made in NYPZ (93/286) and GP (26/97) sessions, respectively (as calculated from data in Table 7.4)).

The facilitator of the GEA session was very concerned about collecting interesting links of the magnitude of 30.4% of total participant-entered links (again 7(row n)/23(row p) in Table 7.4). To that facilitator, the participants were contributing a lot of links that his expertise of causal linking suggested no causal relationship existed between. The reasons why the GEA participants were making a lot of incorrect links are thought to relate to the particular characteristics of the group which made this an untypical session (as outlined in Section

7.1.1). Hence the researcher feels that this data should be eliminated from the present discussion for the proportion of incorrect links is so great and untypical.

Considering that 71.4% of these 'interesting' links are 'serious' problem links for the ELZ map (row q), then only 16.8% of the total participant-entered links might be 'seriously' concerning to the ELZ facilitator and participants (a calculation made in row r of Table 7.4). Furthermore considering that 23.8% of 'interesting' links in the NYPZ session (row q) might be 'serious' problem links then 7.7% of the total participant-entered links (row r) might be 'seriously' concerning to the NYPZ facilitator and participants. Finally, considering that 57.7% of 'interesting problem links' might be 'serious' (row q), then 15.5% (row r) of total participant-entered links might be seriously concerning to the GP facilitator and participants.

This researcher believes that having only 16.8%, 7.7% and 15.5% of the total participant-entered links being 'serious' problem links (found in Table 7.4, row r) is a positive indication of the ability of participants to make links that will actually contribute something useful to the structuring of the contributions on the public screen.

Even if, as for ELZ workshop, 16.8% of the links (row r) did have to be deleted, then those deleted links might contribute a useful initial structure to the mass of material on the public screen. Therefore although the deleted links might have been replaced by more accurate links, they could have provided a useful starting block from which to begin a deeper exploration of the relationship between the issues. Hence even though 18.6% of the participant-entered links in the GEA gathering (row r) have been found to be 'serious' problem links (from Table 7.4) then they may still have contributed something useful to the participants initial structuring of the material.

7.3.1.4 Reflection : Problem links

This discussion of deleted and changed links has been unpersuasive to the extent to which facilitators might expect to have to change or delete participants' links. This is because there appears to be significant variability of the extent of the changes a facilitator was called to make during the gatherings investigated here. Also this discussion has hinted that deleted links might actually be useful to the group members in giving them some form of initial structure. It would therefore appear that this issue of deleting links must be considered in greater depth. It appears to be taken for granted by facilitators that the policy of deleting

participant-entered links with the group members permission is acceptable. Furthermore, this research almost took it for granted that deleted links were useless to the group members and that the process should be modified not to collect these useless links. Hence it seems that a useful place to re-start the discussion of participant-entered links (as Section 7.3.2 will do) is with a consideration of the policy of deleting links that participants have contributed, as these might actually be valid links which are not useless.

7.3.2 What is 'correctness' in this context? Do people link correctly?

The whole philosophy of deleting links implies that some links can be claimed to be correct and others incorrect. It is clear that JOURNEY Making facilitators and participants hold the view that some links are probably wrong. This view is clear through the fact that up to 39.1% of participant-entered links are deleted during the discussion following the GEA piggy-backing gathering and 27.3% during the first ELZ gathering (see column c in Table 7.5 for a breakdown by each proposed format gathering).

From the GE database, the only party who has been found to delete a link is the facilitator. However observation by this researcher suggest that the facilitator only deletes a link with the permission of the group. Therefore, it is possible that the facilitator gives the group members the impression that links can be seen as being wrong, and so should be deleted. But are these wrong links actually 'wrong', or is it better to understand links as having temporal correctness which is not robust over the duration of the workshop?

Table 7.5 - Breakdown of participant-entered links in proposed format sessions that are deleted from the final model

Proposed format gathering session		Number of consoles from which knowledge was contributed	(a) Total number of links per session	(b) Number of wrong links deleted during group discussion	(c) % of total links that are wrong c=(b/a*100)
ELZ	1	7	33	9	27.3%
	2	7	33	7	21.2%
	3	7	45	6	13.3%
	4	7	59	5	8.5%
NYPZ	1	9	47	3	6.4%
	2	9	74	4	5.4%
GEA	1	5	23	9	39.1%
GP	1	6	53	4	7.5%
	2	5	44	11	25.0%

The results for the GP workshop seem worthy of discussion as it is the only gathering in which the proportion of wrong links rises as the participants gain experience in linking the contributions. There are two main reasons for why the participants contribute a small proportion of incorrect links in the first gathering, but share more in the second gathering. One reason is that participants might have benefited greatly from their initial clustering activity which the participants did before the piggy-backing gathering, as described in the second approach in Section 6.3.2.3.2. This activity might have raised the participants' awareness of the contributions which were available to link, and the time for piggy-backing might have further raised their awareness of this. Hence the participants might simply have known more about the contributions which were available to link, and so shared less 'interesting' links which were later deleted. A second reason for the low number of wrong links in the first GP gathering might be due to the confidence of the facilitator. The facilitator was relatively inexperienced and might have been less willing to determine a link to be wrong, hence less links might have been deleted from the group map.

It is likely that most participants enter links with the belief that they are correct. It has been suggested in Chapter 6 that the glut of contributions on the public screen causes cognitive overload (a view supported by Nagasundaram and Dennis (1993)). This might cause participants not to scour the screen for the two very 'best' (or most correct) contributions to link (Gallupe and Cooper, 1993). Instead, they may take the first two contributions for which they can generate an argument to support the link being correct and, after successful

(but possibly very brief) validation against some others on the public screen, link the two contributions. This validation could take the form of a participant trying to find a more sensible pairing between contributions than the one they have identified.

The resultant link holds an authority of being correct simply because it has been contributed. However in the four workshops under scrutiny here the researcher observed that the facilitator sometimes questions that authority and this questioning can force the group members to consider if there are other contributions which might make more sense than the pair under consideration (Johnson and Johnson, forthcoming). Thus the group members (with the help of the facilitator) begin to identify where 'better' links might exist by using their enhanced understanding of the situation (as learned through the cognitive processing of the contributions they read) to identify these better relationships and links. Thus the group members are in fact synthesising the material on the public screen and the catalyst for that synthesis is the existing links (van der Heijden and Eden, 1998). Effectively linking contributions gives structure to the contributions which enhances their meaning - as they then have a context on the public screen. This enhanced meaning can lead to more links being made because participants have a greater understanding of the material on the screen and how it loosely fits together. This strategy is often used by the facilitator to get the group members to take ownership of the group map as 'they have linked it themselves, together', and the links are sold by the facilitator as being their links (Eden and Ackermann, 1998d).

Hence the fact that such a large proportion of participant-entered links are deleted should not be seen as an indication of the failure of the linking by the participants of the workshops under scrutiny here. These initial links have a crucial role of providing a good starting place for beginning the linking of the contributions. They provide an initial context for the contributions which might give the contributions initial additional meaning and this helps in the deeper consideration of the relationships between the contributions.

7.3.2.1 Reflection : Implications of deleting links for facilitators

Participants might benefit from being aware of the function of these initial links and so prepare themselves for their links being deleted or changed. It could be very disheartening for participants to see all their links being classed as wrong and being deleted. Although links are not identifiable to one participant or pair, some participants might be aware when it is their link that is being deleted. The visual exploration of the links in the final group maps

(performed by this researcher) highlighted several occasions where 75% of the links (from one gathering) entered by different pairs of participants were deleted. In these occasions if the participants did not realise the function of their initial links in giving loose adaptable structure then they might have become very disheartened at their own incorrect linking, which might have had effect on their contribution of links in future sessions.

It is however not suggested that the participants are told at the beginning of the gathering that their links are likely to be deleted, for then they might gain the impression that their linking is futile and so might encourage sloppy linking. Rather it is thought that the linking might be marketed by the facilitator as an exercise to get a more robust structure on the map than that of simple clusters. After the piggy-backing session the participants might be congratulated on providing such a good initial structure. They could again be reminded that this structure is a crucial beginning for the more considered linking, but that some links might be deleted as the initial structure is adapted and expanded. This might remove the feeling in participants that their linking was completely wrong so there is no point in making links in the next session as they will just be deleted again.

One function of the links made by the participants during the blind and piggy-backing sessions is to begin to structure the mass of contributions on the public screen. Participants might be congratulated for beginning to structure the screen full of contributions. Maybe they should feel good over their progress in structuring the material. Facilitators might like to consider making participants aware that the function of their linking is to gain an initial structure, not a final structure, so as not to be disheartened if their links are deleted. Furthermore, facilitators might like to also remark to participants that linking might be able to be learned quickly and that later on in the day there might not be the need to modify as many of their links.

7.4 UNDERSTANDING HOW PARTICIPANTS MAKE LINKS BETWEEN CONTRIBUTIONS

The analysis will turn to investigate the way in which participants actually generate links throughout the period of the gatherings. This section will begin with a brief discussion of the type of links that participants are able to make during gatherings. A theoretical model will be suggested which might explain the preference within participants for actually linking different types of contributions, both their own and other peoples' contributions. This model

will then be re-considered after analysing the real links made by participants of blind gatherings.

7.4.1 Look at how people link contributions

In any JOURNEY Making gathering participants are constrained to eight types of linking activity - hereby known as link-types. They can link two of their own contributions together (i.e. oWn to oWn - WW), or link two contributions which have been made by other participants together (i.e. oTher to oTher - TT). Alternatively they can link their contribution into someone else's (oWn to oTher - WT) or the other way around (i.e. oTher to oWn - TW). Participants can also link their own contribution into the stimulus contributions that has been displayed on the public screen during the blind gathering (i.e. oWn to **stim**ulus - W>Stim). Participants can also link other peoples' contributions into the stimulus (i.e. oTher to **stim**ulus - T>Stim). In the same vein participants can make links from the stimulus to their own, and to other peoples', contributions (i.e. **stim**ulus>oWn, **stim**ulus>oTher - Stim>W, Stim>T)

However, it is possible that some of these link-types are easier to make than others. This supposes that one can begin to define what 'easier' means in this context. A working definition that can be useful as a starting place by this research is this - 'easier' refers to "the perceived complexity of the link (as perceived by a third-party researcher) in terms of the confidence in correctness of the link with which participants can justifiably make each link". In this, 'confidence in the correctness' is reliant on a participant's clarity of understanding of the meaning of a contribution. Essentially, participants might justifiably be more confident in the linking of contributions which they clearly understand than those they do not. However they might link contributions which they are unsure of the causal relationship because they perceive that some relationship exists between them and they want to have it on record that there is a relationship.

It is proposed that participants will be more confident in having the correct interpretation of their oWn contributions, than they may be of having the correct interpretation of oTher peoples' contributions. Given this argument, it would follow that participants would be confident in the correctness of links which involve their oWn contributions because they know their 'correct' interpretation. They may be uncertain of the correctness when linking oTher peoples' contributions because they might not be completely clear of what the

contribution is referring to. The stimulus are also very well-known to the participants as they have been negotiated upon by the group members to emerge as being a stimulus. Thus participants may be confident in holding the correct interpretation of stimulus issues and thus be confident in linking it.

This line of argument suggests the existence of a hierarchy of preference of linking within participants. Participants may prefer to make links that involve contributions that they are highly familiar with (as they may be easier to be more confident in than others). Hence it could be easier for the participant to be confident in the 'correctness' of links involving their oWn contributions than those involving oTher peoples'. Consequently at the top of the hierarchy of those link-types which the participant might prefer to make would be ones which have both contributions that were most familiar to the participant own contributions and stimuli, i.e. WW, W>Stim and Stim>W links, as displayed in Figure 7.1. At the second level of the hierarchy would be those link-types that include only one contribution that was highly familiar (W or Stim) and one less familiar (T), i.e. WT, TW, T>Stim and Stim>T links. At the lowest level of the hierarchy would be the links that were made between two contributions that the participants was least familiar with, i.e. TT links.

Figure 7.1 - Hierarchy of preference of link-types according to familiarity of participant with the contributions

Top Level	:		WW		W>Stim	Stim>W
Middle Level	:	WT		TW	T>Stim	Stim>T
Lowest Level	:			TT		

This discussion assumes that participants desire only to contribute correct links depending of course on what they understand a correct link to be. Hence participants may prefer to make links that they believe to be correct, than ones that they are unsure of (as they will continue searching for a better link than the uncertain one they have identified). Consequently participants might prefer to contribute links in which they have confidence.

In order to discover if there is any evidence which supports the existence of such a 'hierarchy of preference', analysis of the link-types was performed. In this analysis it is inconsequential whether the links are actually correct, in that they are contained in the final

model, for this analysis is interested in the actual participant-entered links made, not the correctness of those links, hence the GEA data will be re-introduced to this analysis. Correctness of link-types is a complexity that will be introduced in Section 7.4.2.

7.4.1.1 Exploring the existence of a hierarchy of preference of linking

The nature of the actual contributions which participants made in the workshops under scrutiny here were discussed in Chapter 6. The data displayed in Table 7.6 summarises the nature of the contributions displayed on the public screen in the our workshops in terms of the average total number of oWn, oTher and stimuli contributions. Hence Table 7.6 indicates the availability of each type of contribution that the typical participant of these piggy-backing gatherings might wish to link. Each participant-entered link was coded simply by looking at the oWn, oTher or stim nature of each contribution which the link related. This coding was performed to gauge the tendency of participants to make each link-type in both the blind and the piggy-backing sessions. The results of that coding is displayed in Table 7.7. The synthesis of the data in Table 7.6 and Table 7.7 will be performed in order to better understand how the actual linking of oWn and oTher contributions by participants compares to the availability of these contributions on the public screen to link.

From the data in Table 7.7 one can calculate that 95.1% of all participant-entered links during the piggy-backing session are either WW, WT, TW or TT (respectively accounting for 24.0%, 22.9%, 19.3% and 28.9% of the total participant-entered links taken from data in row b). Furthermore, a small standard deviation for these link-types of 4.0% indicate that these four categories are roughly equal in the number of links of these types participants make. Links made during the blind session are omitted from this analysis as participants are constrained to making WW and W>Stim links considering the oTher contributions are hidden.

Table 7.6 - Average number of links made from each console in each gathering following the proposed format

		(a) Average number of oWn contributions made in proposed format	(b) Average number of oTher contributions	(c) Total number of contributions during proposed format	(d) Number of stimuli questions to consider in blind gather
ELZ	**1**	6.1	36.9	43	1
	2	5.1	33.9	39	1
	3	9.4	56.6	66	1
	4	10.1	60.9	71	1
NYPZ	**1**	5.7	48.3	54	1
	2	7.8	58.2	66	1
GEA	**1**	11.8	47.2	59	2
GP	**1**	11.5	66.5	78	1
	2	9.4	37.6	47	1
Average		*8.6*	*49.6*	*58.1*	*1.1*
Standard Deviation		*2.5*	*11.7*	*13.3*	*0.3*

This is however a surprising result when one considers the greater quantity of oTher contributions over oWn contributions on the public screen to link. From Table 7.6 (in column a) one can see that the average number of oWn contributions per console to be between 5.1 and 11.8 with average across all gatherings of 8.6 oWn contributions. If one compares this to any number of oTher contributions (of between 33.9 and 66.5 (in column b) with average across all gatherings of 49.6 oTher contributions), it is clear that there are a significantly greater quantity of oTher contributions to link than there are oWn contributions. In fact, to the average participant in these gatherings 14.5% [8.6/8.6+49.6+1.1)] of contributions on the public screen are their oWn, 83.6% have been contributed by oTher people and 1.8% are the stimuli. These figures of 14.5%, 83.6% and 1.8% are worthy of mental note as they will be used extensively in the following discussion.

In order to support the proposition that a hierarchy of preference of link-type exists, one should compare the probability of making a link-type (based on the quantity of oWn, oTher and stimuli contributions actually displayed on the public screen) to the reality of participants linking habits. This work will enable some appreciation to be gained of whether participants randomly select contributions to link or if they seek contributions which they prefer to link. The following discussion will demonstrate how this is possible.

Table 7.7 - Breakdown of link-type for each session where piggy-backing is enabled (only analysing the links made during the piggy-backing session)

		WW - Blind session (see Note 1)	WW - Piggy-backing session	*W>Stim - Blind session (see Note 1)*	W>Stim - Piggy-backing session	stim>W	WT	TW	T>stim	stim>T	TT	*Total number of links made during blind session*	Total number of links made during the piggy-backing session
ELZ	**1**	*(2)*	3	*(4)*	1	0	8	9	1	0	5	*6*	27
	2	*(1)*	12	*0*	2	0	2	7	1	0	8	*1*	32
	3	*(2)*	15	*0*	2	0	7	16	0	0	3	*2*	43
	4	*(2)*	14	*0*	2	0	26	8	1	0	6	*2*	57
NYPZ	**1**	*0*	10	*0*	3	0	9	4	2	0	17	*0*	45
	2	*(2)*	17	*0*	0	0	15	18	0	0	22	*2*	72
GEA	**1**	*(1)*	8	*0*	1	0	1	1	3	0	8	*1*	22
GP	**1**	*(5)*	6	*0*	0	0	12	5	0	0	25	*5*	48
	2	*0*	8	*0*	0	0	9	7	0	0	18	*0*	42
(a) Total links for all sessions		(15)	93	(4)	11	0	89	75	8	0	112	19	388
(b) % of total participant-entered links			24.0 %		2.8%	0.0%	22.9 %	19.3 %	2.1%	0.0%	28.9 %		
(c)Probability of link-type based on the average number of contributions on public screen			2.1%		0.27 %	0.27 %	12.1 %	12.1 %	1.6%	1.6%	70.0 %		
(d) Index of actual links made against what probability indicates should be d = (b/c)			11.5		10.5	0.0	1.9	1.6	1.3	0.0	0.4		

Note 1: Only for WW and W>Stim link-types were there links made during the blind element of the proposed format gathering. All other link-types were only made during the piggy-backing session.

Let us initially assume that linking during the piggy-backing gathering is a random process in that the probability of selecting an oWn contribution to link depend on the proportion of oWn, oTher and stimuli contributions, i.e. participants do not seek oWn contributions on the

public screen to link nor do they refer to their own console screen which displays their oWn contributions (this last point might not be accurate of reality but this will be accounted for in the following discussion). Hence, the probability of a participant making a WW link is based on the probability of the participant locating an oWn contribution among all other contributions on the screen (a probability calculated above to be 0.145) to link an already found oWn contribution into (again calculated to be 0.145). Hence, if linking is random, the probability of making a WW link is 0.021 (i.e. 0.145x0.145). Consequently, 2.1% of all participant-entered links should be WW ones (as shown in row c of Table 7.7). However, the reality is that the WW links the participants of these gatherings made account for 24.0% of the total number of participant-entered links (from row b in Table 7.7). Hence, it seems likely that the selection of contributions to link during the piggy-backing gathering cannot be a random process because the actual proportion of WW links far exceeds what the availability of oWn contributions suggests it should be. It seems more likely that such a strong result of participants making 24.0% of their links WW when random selection would suggest only 2.1% should be made is due to participants' preference for linking oWn contributions, so they actively seek these contributions to link or they look at their console screen for their oWn contributions. The proposition that participants hold a preference for linking oWn contributions and actively seek to link these contributions appears to be supported through this result.

According to the probability of locating an oTher contribution at random on the public screen during the piggy-backing gathering (a probability calculated above to be 82.6%), the probability of making a TT link is 0.70 (0.836x0.836), as seen in row c of Table 7.7. Hence, 70% of participant-entered links should be TT links if the selection of contributions to link is a random process. Yet only 28.9% of all participant-entered links are (from row b in Table 7.7) TT. As with the making of WW links, it would seem that making TT links during the piggy-backing gathering cannot be a random process, but that participants exhibit a preference for not making these links, possibly because they do not see them as readily. It seems more likely that such a strong result of participants making 28.9% of their links TT when random selection would suggest 70% should be made is due to the participants' preference for not linking oThers' contributions. Essentially then it would suggest that participants actually avoid linking oTher contributions together, possibly because these contributions are not displayed on their console screen and so it is harder to find a contribution that it seems sensible to link.

These results support a claim that linking is not a random process whereby participants of these workshops simply link any contributions they find on the public screen. The results support a claim that these participants sought oWn contributions to link as (compared to the probability of making WW link-types) they exhibit a strong preference for making WW link-types during the piggy-backing gathering. Furthermore, participants seem to exhibit a strong preference for not making TT links-types, which could indicate that they prefer not linking oTher contributions.

Further evidence for the claim that linking is not a random process can be found from examining the quantity of WT and TW links. If locating contributions to link was random then the probability of making a WT (or a TW) link would be 0.121 (i.e. 0.145x0.836). Hence 12.1% of links should be WT (or TW). However, the reality is (from row b in Table 7.7) that 22.9% of the total participant-entered links are WT ones and 19.3% of the total are TW ones. Combining this result with the proposition that participants seek to link their oWn contributions and avoid linking oTher's contributions (according to the availability of these types of contributions for WW and TT link-types), one might propose that this stronger preference to make WT and TW links is due to their familiarity with oWn contributions.

7.4.1.2 Reflection : The existence of hierarchy of preference of link-type

The calculation of the 'index of actual links made against what probability indicates should be' in row d of Table 7.7 is a calculation which takes the actual proportion of links made to each link-type and compares it to the predicted proportion as indicated by the number of oWn, oTher and stimuli contributions on the public screen. A relatively high index (above 1) indicates that there are a lot more of these links than random selection would expect to return i.e. people are seeking to link these contributions and link a lot of them. A low index (below 1) suggests that participants might avoid these link-types as if choice of contributions to link were random then one should expect to have more links of these types.

Interpreting the 'index of actual links made against what probability indicates should be' in row d of Table 7.7 makes it clear that there exists 3 levels of preference for link-type. The most preferred is WW and W>Stim links, as these contribute around 11 times the number of links that probability suggests should be contributed if participants had no preference for making link-types. The second level contains those link-types which are just above what one

have expected to get if participants had no preference for link-types, (1.3 – 2 times the expected number of links) i.e. WT, TW and T>Stim link types. The last level accounts for link-types that participants exhibit a clear discomfort in making. Essentially they shy away, albeit possibly unconsciously, from making TT links as they only contribute 40% of the links they would if linking was random and not based on preference.

It is not possible to generate empirical support for the theoretical argument made in Section 7.4.1 which attributes Stim>W and Stim>T link-types to the top and middle levels of the hierarchy, respectively. Although participants do seem reluctant to make these links they have a good reason for their reluctance for the following reason. The task the participants received from the facilitator is to generate ways of achieving the stimulus which suggests that the stimulus would be at the top of a teardrop i.e. always the issue that other contributions are seeking to contribute to (or link into). Hence the failure of participants in these workshops to make any Stim>W or Stim>T links may be a result of the facilitator's instructions rather than the preference of the participants against making these links.

Table 7.8 - Index of actual links made against what probability indicates should be in piggy-backing gatherings (row d in Table 7.7) detailed by each workshop

	WW - Blind session	WW - Piggy-backing session	*W>Stim - Blind session*	W>Stim - Piggy-backing session	stim>W	WT	TW	T>stim	stim>T	TT
ELZ	N/a	13.26	N/a	16.24	0.00	2.24	2.08	1.20	0.00	0.20
NYPZ	N/a	11.06	N/a	9.46	0.00	1.70	1.56	1.09	0.00	0.48
GEA	N/a	3.28	N/a	3.15	0.00	0.07	0.07	1.63	0.00	0.10
GP	N/a	1.73	N/a	0.00	0.00	0.45	0.26	0.00	0.00	0.16

The researcher thought it necessary to explore if these results were typical for each of the workshops under scrutiny here. Hence each workshop was analysed separately and the results are shown in Table 7.8. It was found that the results gained in row d of Table 7.7 are wholly typical for the ELZ and NYPZ workshops here (as confirmed by the results in Table 7.8).

In Table 7.8 there is sign that GEA participants did in fact exhibit a preference for the top tier of the hierarchy of preference. However, results do not confirm a preference of the lower level of the hierarchy. This researcher feels that a reason for this might be that participants had only the opportunity to make a handful of links and, given the opportunity to make more links the participants might have demonstrated the same preference as participants of the other gatherings. Results from the GP workshop loosely support the hierarchy of preference. There is support for the notion that many more WW links and fewer TT links are contributed that random identification would suggest was likely. Also WT and TW links have indices in between the WW and TT indices. However no W>Stim links were made by these participants, hence there is no support from the GP data for participants preferring to make W>Stim links.

Overall the results presented in Section 7.4.1.1 and Table 7.7 seem to confirm the existence of a 'hierarchy of preference' within the participants of these gatherings during their linking of contributions. At the top of the hierarchy are links between contributions participants might be highly familiar with, i.e. WW and W>Stim. One level down are links between one contribution that may be highly familiar and one that may not be familiar i.e. WT, TW and T>Stim. At the lowest level of the hierarchy is the linking of two unfamiliar contributions, i.e. TT link-type. Although argument has been generated to support the inclusion of Stim>W links into the first level of the hierarchy, and Stim>T into the second level, the instructions from the facilitator during these strategy workshops does not encourage participants to practice these link-types. Hence their position in the hierarchy is unconfirmed.

The result of this work is important as it indicates the existence of a 'hierarchy of preference' for linking types of contributions. This work however only looks at the quantity of these links. It fails to consider the quality of the links. In this case it is proposed that quality of a link can be gauged through whether it has been kept in the final model or whether it is one of the participant-entered links that have been deleted. Section 7.4.2 will explore how participants might be more able to make some link-types that are more likely to be correct than others.

7.4.2 Which link-types are more likely to be 'correct' i.e. in the final model?

It is possible that the hierarchy of link-types displayed in Figure 7.1 that has been supported by the data in Sections 7.4.1.1 and 7.4.1.2 might be seen to exist if one analyses the deleted links. To explain, it might be that participants are more likely to make incorrect links (which are later deleted) when they make links to the lower levels of the hierarchy. This could be because these participants are less confident in the 'correct' interpretation of the oTher contributions and so more likely to misinterpret it. Hence it might be proposed that when these participants make a link to the lower levels of the hierarchy, they are more likely to make an incorrect link. This proposition was explored by manual exploration of the GE database and the DE maps resulting in the construction of Table 7.9.

Table 7.9 – Breakdown of interesting links by link-type for proposed format gatherings

		ELZ				NYPZ		GEA	GP		
		1	2	3	4	1	2	1	1	2	Total
	Total number of links	5	13	17	16	10	19	9	11	8	108
WW	% that were interesting	20.0%	61.5%	23.5%	18.8%	30.0%	5.3%	0.0%	27.3%	37.5%	24.1%
	Total number of links	5	2	2	2	3	0	1	0	0	15
W>Stim	% that were interesting	0.0%	50.0%	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	13.3%
	Total number of links	8	2	7	26	9	15	1	12	9	89
WT	% that were interesting	75.0%	0.0%	28.6%	0.0%	44.4%	20.0%	100%	16.7%	0.0%	20.2%
	Total number of links	9	7	16	8	4	18	1	5	7	75
TW	% that were interesting	11.1%	28.6%	6.3%	25.0%	0.0%	11.1%	0.0%	0.0%	28.6%	13.3%
	Total number of links	1	1	0	1	2	0	3	0	0	8
T>Stim	% that were interesting	100%	0.0%	0.0%	0.0%	0.0%	0.0%	66.7%	0.0%	0.0%	37.5%
	Total number of links	5	8	3	6	17	22	8	25	18	112
TT	% that were interesting	0.0%	75.0%	33.3%	16.7%	41.2%	13.6%	50.0%	24.0%	44.4%	32.1%

It appears from Table 7.9 that there is little difference between the likelihood of deletion of links in the different link-types. Although no link-type appears to be clearly more likely to be deleted one might argue that there are three level of likelihood.

Approximately 13% of the W>Stim and TW links were found to contain interesting problems. Approximately 22% of the WW and WT links were found to contain interesting problems as were approximately 35% of the T>Stim and TT links. These levels do not neatly fit into the hierarchy of preference that has earlier been supported by the data, apart for TT links having one of the top likelihood for deletion. It is concluded that there is insufficient evidence from this analysis of this data to support the proposition that link-types

at the top levels of the hierarchy of preference would be more likely to be correct than other lower level link-types.

However, on deeper consideration of this work one might mistakenly draw a concerning conclusion. If it was found (perhaps from analysing the links from a different workshop) that there was greater likelihood of not deleting link-types at the top level of the hierarchy of preference then one might arrive at the conclusion that participants should be encouraged to make WW and W>Stim (and possibly Stim>W if appropriate) link-types rather than ones which might be deleted (possibly TT link-types). However, this researcher would suggest that this might be an incorrect conclusion to draw. Granted, one might prefer for participants to contribute correct links and so could assume that this means they should concentrate on the link-types that return the greatest proportion of correct links. However this is not thought to be the case for the facilitator of JOURNEY Making workshops as the following reflection will show.

7.4.2.1 Reflection : Correct links in the final map

It is thought that a JOURNEY Making facilitator is intently focused on creating a process which enables the participants to synthesis their own knowledge with other people's. The JOint Understanding and Reflection and NEgotiation of strategY is what the process is aimed at. Hence to enhance the JOint element of the process, participants should synthesise their oWn knowledge with oTher peoples'. The participants should be able to see the relationships between what they are wanting and what other people are wanting so that they can negotiate an outcome, possibly from a synthesis of the two perspectives (Eden, 1995b). Hence for a facilitator to advocate to participants that they should concentrate on establishing WW links would eliminate a main focus of this process - to synthesis knowledge between multiple knowledge holders (Eden and Ackermann, 1998c). Ultimately the resulting group map might be one which is composed of a lot of little clusters of peoples' own contributions rather than seeing the relationships between those contributions (which might fail to 'integrate' peoples' knowledge (Grise and Gallupe, 1999)). It seems critical to the entire process of developing shared meaning that participants are freely able to synthesise their thoughts with other peoples' (van der Heijden and Eden, 1998) and the linking process seems to be one element of this (Johnson and Johnson, forthcoming). One might prefer not to turn it into an optimisation process where the facilitator maximises the correct links by eliminating all the parts of the process that might be flawed in some way.

The analysis in Section 7.4.2 has concentrated on the quality of the links in terms of their correctness but has ignored the timing of the correct, and incorrect, links. It might be true that the deleted links are more likely to be contributed during the later stages of the gathering. If, for example, all the obvious links are made in the first few links and that later ones are less obvious, then the later ones may be the links that participants have less preference in making. Consequently, these links might be less likely of being correct and more likely of being deleted from the model. This might suggest that facilitators could manipulate the length of the gathering in some way to collect only correct links.

However, considering that such a small percentage of participant-entered links are both 'serious' and have been deleted from the model (16.8% for ELZ, 7.7% for NYPZ and 15.5% for GP (in Table 7.4)), there does not seem to be a significant amount of benefit which can be gleaned from such an examination as that outlined above. Also, considering that these 'serious' problem links might still be useful in contributing some initial structure on the mass of contributions then they may be welcomed by the facilitator. Consequently the facilitator might not desire to cut short a gathering if, say, it was found that all the serious problem links were contributed near to the end of the gathering.

It seems more worthwhile to continue this discussion of the linking process performed by participants of a JOURNEY Making proposed format gathering by moving away from the deleted links as it seems clear that they too have something useful to contribute to the process of JOURNEY Making. Hence the following section will consider whether participants might base their linking on the interpretation of the contributions, or on something less thoughtful and less exact.

7.4.3 More on the nature of linking – linking only causal relationships?

Results from analysing the link-type indicates the existence of a clear hierarchy of preference within participants of the analysed gatherings when making links. It has been proposed that participants of these four workshops display a strong preference to make WW or W>Stim during the piggy-backing session than other link-types. However, those link-types only account for 26.8% (24.0%+2.8% from row b in Table 7.7) of the total participant-entered links in these proposed format gatherings, hence 73.2% of participant-entered links are of link-types out with this top level of the hierarchy.

The analyses performed in Section 7.4 gives no insight as to how thoughtful participants in these four workshops might have been when they link contributions. For example, the participants might just have linked contributions that catch their eye by sharing similar words or link contributions that have a similar meaning (see McLeod and Liker (1993) who discuss how group members might expect others to pick up on what they have missed in groupwork). It seems necessary therefore to attempt to understand a little more about what might be the linking habits of participants. One such analysis, which will be reflected upon here, sought to understand if these participants might actually be more likely to link contributions that share similar wording.

Each link was coded to discover if the two contributions that it linked actually shared a main word, of phrase. Hence, the two oTher contributions of "build teams" and "create smaller teams" (my emphasis) that were linked by one participant in one of these four workshops are coded as containing the word 'teams'. The results of this coding is summarised in Table 7.10.

7.4.3.1 Exploring the linking of same worded contributions

There appears to be little uniformity across workshops as to the extent to which participants make links between contributions which share similar wording. In the ELZ workshop only 9.4% of participant-entered contributions were found to link contributions which share wording. In the NYPZ workshop 26.5% of links were made between such contributions, in the GEA 17.4% of links while 23.7% of GP links were so coded. The high standard deviation of 7.6% in preference for making close worded links across the four workshops suggests that these results are inconclusive as to the extent to which participants might prefer to make close worded links. However, the results may be meaningful if interpreted along-side the nature of the participants of the groups.

Table 7.10 - Number of links between contributions which have close wording that were made in the proposed format gatherings

	ELZ	NYPZ	GEA	GP
Number of links between contributions of close wording	16	32	4	23
Total number of participant-entered links in the proposed format gatherings (from data in Table 7.3).	170	121	23	97
% of close wording links of total links	9.4%	26.5%	17.4%	23.7%

If one considers the nature of the group members then this gives possible insight to reasons for such a wide spread of preference for making same worded links. The facilitator of the ELZ workshop noted how the members were particularly well-qualified people. Most participants had a Ph.D., some had two Ph.D.s. Hence it is possible to presume that those highly educated people, in working in the publishing sector, have a vocabulary which might have been broader than most peoples'. It is possible that these people used that vocabulary to make contributions which did not reflect the wording of their previous contributions. To explain, people who write extensively might attempt to avoid using the same word twice in the same sentence. Furthermore, they may even avoid using a similar phrase in two sentences in the same paragraph. In this they are almost trying to vary the vocabulary they use to keep the interest of the reader and avoid repetition. It is possible that the Publishing Executives in the ELZ session actively sought to avoid using the same terminology because that is what they habitually do when they write. If they sought to avoid repeating terminology then less contributions that shared the same wording would exist to link. Hence it would follow that less links would be based on close wording because less contributions shared the same meaning.

This argument would support the results in Table 7.10. It is however an argument that is highly speculative. In order to offer additional support to the argument, the contributions from each console in each gathering could be analysed to gauge the extent to which their terminology varies. However, two reasons suggest that it is enough for this research simply to highlight that linking could be based on shared wording between contributions and that between 10% and 27% of links made in these four workshops share wording. The first reason proposes that if linked contributions do share wording then this is not of great interest to the JOURNEY Making facilitator. Causal links will naturally link contributions

of similar content and so these contributions may be expected to share wording. It is only concerning if two contributions are linked only because they share the same wording. In this case the participants might not have validated the link for being causal, nor might have validated the link by seeing if any other contributions are more suitable to establish a link between. Essentially the link would be made simply because both contributions pertained to the same issue - not necessarily a sign of causality.

The second reason that this is a suitable place to stop this aspect of the research is that this researcher cannot validate the links for reasons that will be explored fully in Chapter 8. Briefly, the main reason the links cannot be validated by the researcher centres around his inability to determine that a link is right or wrong - because he does not possess the domain knowledge to be able to substantiate any such claim beyond doubt. It is not thought that the researcher can validate whether the links between same worded contributions have been made simply because they share wording, or because they have a causal relationship.

For these two reasons it seems impossible to continue this work of whether the proportion of same worded links is related to the availability of contributions which share the same wording. It is also for these two reasons that the research has not progressed with exploring if these participants link contributions only because they contain a similar message (which is different to shared wording). Granted, the facilitator might delete duplicate contributions but it is possible that the participants in the gathering under scrutiny in this research do link contributions purely because they perceive them to be making a similar message. Essentially this might highlight that these participants maybe do not understanding or remember what the making of causal links actually means.

There is one last main stream of analysis that should be discussed before this exploration of the links is concluded. That concerns how participants might actually construct networks through making a series of links.

7.5 EXPLORING THE CONSTRUCTION OF (ELABORATE) NETWORKS BY PARTICIPANTS

So far the exploration of the participant-entered links has viewed the making of one link as an isolated affair. However it is infrequent that the participants in these four workshops only make one link during a gathering. Typically these participants make a series of links and sometimes these can be viewed as forming a network between a number of contributions -

essentially linking a cluster of contributions. The following discussion (in Section 7.5.1) will uncover the linking habits of these participants during a whole gathering where they make a series of links. This will firstly be performed in the context of the actual habits as transparent through analysis of the 'network-links' participants made in these four workshops. Then the thoughts and reflections from some participants will be discussed (in Section 7.5.2) to see how they perceived their navigation around the screen during the construction of links.

7.5.1 Evidence from the actual links participants made

The participant-entered links made by each individual/pair (in each of the four workshops under scrutiny here) were coded according to the way in which the series of links shared identical contributions which they linked, see Table 7.11 for explanations of ten ways in which links can network-link contributions.

Table 7.11 – Explanation of each network-link coding

	Network-link	Description of the network-link (with examples)
1	Single Link	Where there is only one link that does not form any network with any other link to which the participant has given attention. (a+b)
2	Explosion	When 2 or more contributions are linked from one core contribution to any others. These links do not have to be one after the other. (a+b, a+c)
3	Implosion	When 2 or more contributions are linked into one contribution by the participant These links do not have to be one after the other. (a+b, c+b)
4	Forward chaining	When one contribution links into a second and, in the very next entry, the second is linked into a third. (a+b followed by b+c, or the link a+b+c)
5	Backward chaining	When one contribution links into a second and in the very next entry a third is linked into it. (a+b followed by c+a)
6	Spread forward chain	Same as forward chaining but the links can be entered at anytime during the session rather than in immediate sequence. (a+b, d+e, b+c)
7	Spread backward chain	Same as backward chaining but the links can be entered at anytime during the session rather than in immediate sequence. (a+b, d+e, c+a)
8	Reverse	When a link is turned around by a participant. (a+b, b+a)
9	Elaborated network	When a series of links is made that links a cluster of contributions. (a+b, b+c, d+c). Effectively the accumulation of two or more of the 'network codes' 2-7 in this list. In this example, there is a forward link (a+b,b+c) followed by an implosion (b+c,d+c).
10	Duplication	When a participant has entered a link which is identical to one they have already entered. (a+b, a+b)

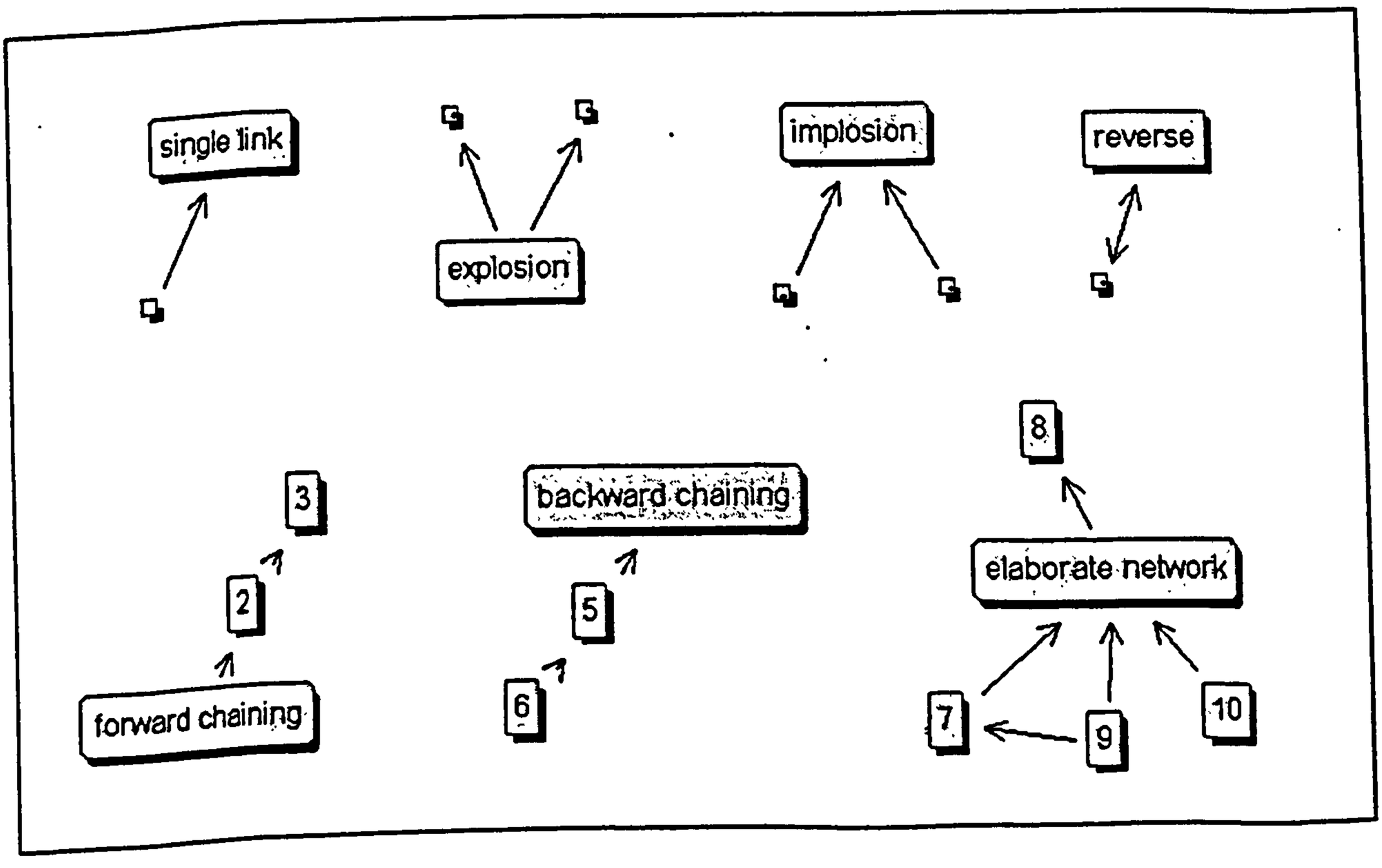
Figure 7.2 pictorially represents how these network-links might actually sit in a map (except for network links 6, 7 and 10 as these are difficult to represent in this way). Effectively a

participant could combine the network links 2-7 in order to generate an 'elaborated network'.

Appendix 6.2 gives detailed instructions (in the form of a manual) for how one might wish to code participant-entered links on a new batch of GE data using this framework. Included in Appendix 6.2 is a specimen table for coders to try coding links - and answers are provided so they can gauge their success in this.

Each participant-entered link in each of the proposed format gatherings during the workshops under scrutiny here was coded in terms of this framework i.e. proposed, normal and multiple stimuli gatherings. An initial coding of each link was followed by a second coding two weeks later by the same coder (this researcher). The two codings were combined to produce a final breakdown of all the links under inspection (given in Table 7.12). Intra-coder reliability (as per the formula given by Miles and Huberman (1994, Page 64)) across the two codings was found to be 94.4%, 89.7%, 100% and 93.7% for ELZ, NYPZ, GEA and GP (respectively) in terms of the number of links that were consistently coded.

Figure 7.2 - Pictorial representation of what the network-links might look like in map form.



It seems sensible to work down the list of network-links in Table 7.12 and interpret what might be happening for the participants of these workshops. It is important to note that in the following analyses this researcher is simply exploring the preference of these participants to make certain types of network-links in only in proposed format gatherings. It is thought that the nature of the different gathering formats might cause some difference in the nature of the linking, for example it might be thought that these participants of multiple stimuli sessions would be more likely to share single links than networks, because of the nature of the thinking the facilitator has asked them to perform.

It should be noted that if the participants had been given an extraordinary long time to make more links during these gatherings then it is likely that more links would contribute to elaborate networks or the like. However, this analyses explores the way participants might actually link contributions in the real-world proposed format workshops under examination here when the facilitator uses their experience and the needs of the session to dictate the length of the gathering. Hence the results here might be typical of real-world proposed format gatherings.

Table 7.12 – Exhaustive breakdown of all participant-entered network-links for real-world proposed format gatherings

		ELZ	NYPZ	GEA	GP
Single links (as detailed in Table 7.13)		31	22	3	12
Explosion	2 link explosion	12	9	0	12
	3 link explosion	4	5	0	2
	4 link explosion	0	0	0	1
	5 link explosion	0	0	0	0
	6 link explosion	1	0	0	0
Implosion	2 link implosion	17	16	2	6
	3 link implosion	8	4	1	2
	4 link implosion	1	1	0	2
	5 link implosion	1	1	0	1
	6 link implosion	1	0	0	0
	7 link implosion	1	0	0	0
	8 link implosion	0	0	0	0
	9 link implosion	1	0	0	0
Forward Chain	2 link chains	9	12	4	8
	3 link chains	0	0	0	3
	4 link chains	0	0	0	0
	5 link chains	0	0	1	0
Backward Chain	2 link chains	7	5	0	3
Spread Forward	2 link chains	6	4	0	2
	3 link chains	0	0	0	1
Spread Backward	2 link chains	8	7	0	3
Reverse		1	3	0	0
Elaborated Network (as detailed in Table 7.14)		18	63	1	11

Single links account for a proportion of the participant-entered links, of 18.2%, 18.2%, 13.0% and 12.4% for ELZ, NYPZ and GEA and GP proposed format sessions, respectively (as calculated in row c of Table 7.13). However a vast proportion of the links from a participant are actually attempting to do more than just identify single relationships between isolated contributions. Over 80% of the links made are attempting to construct clusters of related contributions as the '% of links made to networks' in row d of Table 7.13 suggests. This should have the effect of knitting together the contributions on the group map. Thus, instead of having a very fragmented map with lots of contributions linked in isolation, the map from proposed format gatherings should more closely resemble a loosely cohesive structure (Eden et al, 1993). A reason for this construction of networks by participants is that that they may see their job as being one of knitting together the contributions, rather

than identifying causal relationships. Consequently participants might link together some contributions just because they fit into the overall structure that they are creating rather than because they firmly believe in the accuracy of the relationship they are making.

Table 7.13 - Percentage of single links entered by participants in proposed format gatherings

	ELZ	NYPZ	GEA	GP
(a) Number of single links from proposed format gatherings (from Table 7.12)	31	22	3	12
(b) Total number of participant-entered links for proposed format gatherings (from data in Table 7.3)	170	121	23	97
(c) % of single links of total participant-entered links c = (a/b)*100	18.2%	18.2%	13.0%	12.4%
(d) % of total participant-entered links that contribute to a participants' network	81.8%	81.8%	87.0%	87.6%

Returning to Table 7.12, in terms of the participants tendency to create **explosions**, these participants seem to have a strong preference for only exploding to two or three contributions out of the one core contribution (once did a GP participant share a 4 link explosion). Only in one instance across 9 proposed format gatherings did a pair of participants make a larger explosion of this, of the magnitude of 6 contributions linking from the one core contribution.

These participants seem to have a stronger willingness to create larger **implosions** than they do explosions. However, again, it is the minority of implosions which link four or more contributions into the one core contribution. Comparing the number of '2 link implosions' to the number of '2 link explosions', it is seems that participants have a preference for linking to a core idea than they do in linking from a core idea (although this does not seem to be true for the participants of the GP session who shared more 2 link explosions than implosions). However, for three out of the four workshops analysed here, participants might find it easier to identify the ways of making things happen (represented in an implosion) than they do of identifying consequences of things happening (represented in an explosion).

In constructing **forward chains**, participants of these workshops demonstrate an ability to think in chains of what contributions they see on the public screen and on their own console

screens. Hence they are not identifying random links, but might be trying to think out sequences of what they think might be going on in the situation they are considering. Participants tend only to construct short sequences though, typically of two links. It might be that reason for the shortness of these sequences is due to the distraction of all the other links on the public screen and the instructions from the facilitator who asks them to link all the material on the public screen, not just locate their own material to link.

However, sometimes participants from these workshops attempt to make extended forward chain links. Instead of making the links 'a+b' and 'b+c' to make a forward link, the participant enters 'a+b+c' to make the same links. Further examination of these extended forward chains links raised some interesting thoughts. It may be that the reason that the GEA participants were so poor at linking contributions was that some tried to enter extended forward chain links rather than single forward links. 3 participants of the GEA gathering made four such extended forward chain links. Three of the extended forward chain links were of two links (i.e. 'a+b+c'), one was of six links (i.e. 'a+b+c+d+e+f+g'). Of the seven deleted links in the whole of the GEA workshop, five were made in the form of extended forward chain links. This might indicate that the contributors were wanting to 'stamp' their view of the issue on the group quickly and with effect (as Carlsson and Walden (1995) found when facilitating politically charged decision making groups). However, it might be that in stamping this view they did so quickly (and the timing of the contributions would support this) and so maybe the desire to stamp their view caused the participants to do it without much deep consideration of the accuracy of the links.

Furthermore, only eight other such extended forward chain links were made during the other three real-world workshops reported on here. In five cases the entire link was kept in the final model. In the three other cases one link was deleted. Out of 12 individual links (made in non-GEA sessions) which were merged with another link to form an extended forward chain link, 3 of the individual links were deleted from the model. Hence, 20.0% of all these individual links made in extended forward chain links were deleted, and when incorporating the GEA data, 29.0% of all these types of links were deleted. Granted this is a small sample from which to draw any conclusions, however, it might indicate that the participants are not very good at constructing big extended forward chains but that they can effectively construct small ones of around three links.

Backward chains are also contributed by participants of these workshops, but only chains with length of two links. It might be that the reason for only short backward chains (of length two links) being made it because participants find working backwards from a contribution to find new ways of doing is a difficult cognitive activity. They might see it easier to find the consequences of an issue, rather than think explicitly in terms of its causes. Nevertheless, backward chaining has been employed.

In terms of these participants' tendency for making **spread forward** and **spread backward** networks, participants demonstrate an ability to perform these. It might be that participants actually recall the previous linking of contributions and search for these when they find a another suitable contributions to link. Alternatively it could just be coincidence that participant links a contribution into a contribution that they have already linked. Hence the making of spread forward and spread backward might not be a demonstration of intentional network construction, but more a coincidental linking of contributions.

The making of **elaborate networks** is the practice of constructing an inter-linked cluster of contributions using more than one type of network-link. From Table 7.12, participants from all of these workshops have demonstrated an ability of being able to synthesis the making of network-links in order to construct elaborate networks. In fact, over 50% of all participant-entered links from three of the four workshops under scrutiny here were made to elaborate networks (as detailed in Table 7.14). The one workshop that shared a small number of links to elaborate networks was the GEA sessions and, considering that the participants were asked to stop linking the contributions, this is an entirely expected result as the participants might not have shared enough links to make an elaborate network.

This suggests that during the gatherings under scrutiny here participants might think in some depth about the relationship between issues (in one instance making 11 links into a network) in order to be able to identify and link contributions into an elaborate causal network. This result contributes to the argument that these participants of JOURNEY Making gatherings are performing a very useful activity during the linking of contributions as it would seem that these participants are able to synthesise a number of contributions into quite complex networks (see Newman et al (1995) who discuss the deep learning and critical thinking). If these participants are building complex structures then it might indicate that they are able to integrate other peoples' ideas into their own consideration of the issue (Olekalns et al, 1996).

Hence the group members might learn about other peoples' perspectives and so be more prepared to achieve alignment between their divergent views of the problem during group discussion (van der Heijden and Eden, 1998).

Table 7.14 - The number of links synthesised in elaborate networks in proposed format gatherings

	ELZ	NYPZ	GEA	GP
3 links	3	2	1	5
4 links	7	2	0	3
5 links	2	1	0	0
6 links	2	2	0	0
7 links	1	2	0	1
8 links	2	1	0	1
9 links	0	0	0	0
10 links	0	1	0	1
11 links	1	0	0	0
Number of links constructed into an elaborate network	93	63	3	52
Total participant-entered links for proposed format gatherings	170	121	23	97
% of elaborate network links of total participant links	54.7%	52.1%	13.0%	53.6%

The making of elaborate networks might also have very positive implications for the JOURNEY Making facilitator. It might indicate that the links that participants make could build a rather interlinked map. Instead of the map containing a lot of isolated single links or isolated two link forward chains which could result in a very fragmented map after the piggy-backing session, it would seem that the participants are merging their forward links with their implosions (for example) and thus are creating a more structured model than one which is highly fragmented (this issue of the nature of generating networks of links will be explored extensively in Chapter 9). Granted if the facilitators of the gatherings had enabled the participants to link contributions for longer then we might have found that more elaborate networks were built and more links were made to those networks. However, this analyses was based on the real-world linking by participants and so the time the participants spent in the piggy-backing session was dictated by the amount of time available and the progress of the participants.

One might also gauge the degree to which participants of these gatherings were able to link their group maps by reviewing the ratio of number of participant-entered links to the number of contributions. From Table 7.15 one can see that the ELZ, NYPZ and GP maps will be considerably more inter-linked than the GEA map as they have a significantly higher ratio of links to contributions. Again this result for the GEA is totally expected considering that the facilitator asked the group members to stop linking (because they were not linking correctly). This might have had the effect of the group members beginning group discussion on a poorly linked map, and so having to spend a lot of time initially getting some structure on the contributions. Hence it is possible that this will have put even more time pressure on the group.

Table 7.15 - Ratio of average number of participant-entered links to average number of contributions per console in proposed gatherings

	Average number of participant-entered links per console (calculated from data in Table 7.5)	Average number of participant-entered contributions per console (calculated from oWn contributions in Table 7.6)	Ratio - Average number of participant-entered links: average number of participant-entered contributions
ELZ	6.1	7.7	1:1.27
NYPZ	6.6	6.7	1:1.03
GEA	4.6	11.8	1:2.57
GP	8.8	10.5	1:1.19

Note: Table 7.15 includes only the making of contributions and links performed by the participants. It does NOT include facilitator-entered links. Hence these ratios are not for the entire group map. Ratios for the entire group map will be calculated in Chapter 8.

This work on the nature of the network construction might give ELZ, NYPZ and GP facilitators comfort in that the participants were able to synthesise contributions in the construction of networks. Furthermore, these participants were able to contribute around 53% of their links to elaborate networks (from Table 7.14) and contribute only 12-18% as single links (from row c in Table 7.13). These result might indicate that the maps created during these proposed gathering format were ones which will contain a large proportion of linked clusters on which to base discussion and further linking.

7.5.2 Reflections from the participants of the gatherings

The data from the real-world gatherings has been explored to uncover the tendency of participants to perform different types of network construction in their linking of contributions. However, the researcher also gained some valuable insight to the participants own perception of their network construction during the six interviews. These insights will be discussed in order to see what it is that these participants thought they were doing when linking contributions. The participants reaction to their difficulty of linking has already been discussed in Section 7.2.1 so will not feature in this section.

7.5.2.1 Concentrate on linking parts of the screen

One interviewee of the GEA session discussed how she felt that she focussed on a little area of the screen which was of significant interest to her. She reported on not navigating the whole screen during linking but more concentrating on an area of contributions that she would link together. Grise and Gallupe (1999) comment on how participants who suffer cognitive overload can employ a 'heuristic adjustment process' (Miller, 1956). This heuristic might cause them to ignore information and they use an example of how participants can concentrate on only a portion of a screen rather than on the entire screen. It is possible that the reason that this participant from the GEA session did not navigate the screen but instead concentrated on linking a small area, was due to the heuristic adjustment process resulting from cognitive overload.

However, it is interesting to note that no evidence for this claim by the participant to concentrate on linking part of the screen could be found from analysing the links she made in the group map. This participant made four links which still exist in the final map. Two links networked to make a forward link. The other two links networked to make an implosion. These two networks seem to be completely separate in the group map. Their links do not indicate that they are closely related. It may be that the participant linked a small section then moved onto another small section, but that the two sections were unrelated. However it might equally be true that the participant perceived both sections to be linked and yet when the actual linking took place they failed to be closely linked.

One participant of a real-world workshop suggested that instead of asking the participants to attempt to locate causal relationships on an entire screen of contributions, the facilitator should only show part of the screen, essentially zooming in on specific clusters of

contributions. However in practice this might dramatically reduce the degree to which participants are able to identify relationships between contributions that are not on the same view. Hence the facilitator might almost be pre-determining the structure of the map by limiting the participants linking to specific areas and reducing the ability of linking between clusters.

One participant of a real-world pilot workshop commented on how "the more ideas and links that came onto the screen the more difficult it became to read those ideas" in terms of the actual legibility of the contributions. It is true that sometimes contributions partially overlap another or links cross over the top of the contributions, but this is the nature of DE when the screen view is displaying over the threshold of 65 contributions.

Therefore participants may find it easier early in the gathering session to make links because the screen is less cluttered with other peoples' links so contributions are easier to read. This is a serious problem as how can a facilitator expect a participant to identify links, or learn from the contributions, when they are unable to read the illegible contributions. It seems important that the facilitator works on the basis of a maximum number of contributions they feel comfortable with, as suggested here that threshold is around 65 contributions. It may be that the facilitator can use cognitive overload in the way described in Section 6.3.3.1 to ensure that this threshold is not greatly overshot.

7.5.2.2 Connotive links

Some interviewees reflected on how they really wanted to have links that indicated any type of relationship, rather than only reflecting a causal relationship. While these (connotive) links are sometimes used in group maps, they are not as powerful in translating meaning of the exact nature of the relationship between the contributions they link i.e. the direction of the causality. Hence it would seem inappropriate to ask for only connotive links as in maps for strategy development the group might benefit from having no ambiguity in their understanding of the causes or consequences of an action.

7.5.2.3 Piggy-backing to make links more sensible

One participant of a real-world workshop noted how she was aware of a relationship between two contributions, however the relationship was not direct. In this she explained how she inserted another contribution and then was able to link the two identified

contributions through the new one she had just made. The participant noted how she did not just link ideas together, she build chains of argument by inserting the missing concepts and then linking them all together. This comment is supported by the data of the contributions and links she made. This making of a piggy-backed contribution in order to link existing contributions into has been used by other participants. In the ELZ session, the pair who made a piggy-backed contribution used it to link other contributions to. In each of the two NYPZ piggy-backing gatherings, four pairs made at least one piggy-backed contribution and linked it to other contributions in the map. In the GP piggy-backing gathering one participant shared a piggy-backed contribution and immediately linked another contribution into it.

Instead of simply reading the contribution, participants seem to have synthesised the contributions with others on the screen and found there to be a relationship between them (van der Heijden and Eden, 1998). In being unable to discover a suitable contribution to explain that relationship, the participants seem to have made a contribution which reflects their understanding of the relationship. This has allowed them to link the two contributions initially identified.

These findings give powerful support to a proposition that these participants were able to use existing contributions as a catalyst for new thoughts (as suggested by Osborn (1953) and Pinsonneault et al (1999)). Although the immediate linking of piggy-backed contributions into the original contribution was not performed very regularly (according to the GE database), but the example that do exist show that it was possible for some participants to perform this type of thinking. Also the ability of the participants to share piggy-backed contributions (as detailed in Table 6.2) supports this thought. It might be that it is the facilitator's instructions which determine to a large extent the nature of the thinking the participants perform. If asked, participants do seem to concentrate on piggy-backing or on linking, as was seen in the piggy-backing session of the GP session in Section 6.3.2.3.2. This might indicate that if the facilitator did want the participants to make links that were most accurate then he might like to ask the participants to make a piggy-backed contribution to link in-between the causally related contributions in order to best explain the real relationship.

7.6 TWO OUTSTANDING ISSUES FOR FACILITATING THE MAKING OF LINKS

There are two outstanding issues on the topic of participants making links during JOURNEY Making gatherings which should be highlighted. Notably the thesis has not offered any additional suggestions to improve the instructions that facilitators give to participants to guide their making of links. Also no implications have been raised of the impact these results might have on the areas facilitators might wish participants to concentrate on in order to gather correct links. These two issues will be addressed in Section 7.6.1 and 7.6.2 respectively.

7.6.1 Reflection : The guidelines for linking given to participants

The guidelines that are offered to the participants of the gathering under examination here at the start of the first gathering session often fail to educate participants completely of what it is that the facilitator is asking them to perform. This is apparent because most interviewees commented, and some have been observed to say to the facilitator during the workshop, that they are unsure of what it is that they are being asked to do in making causal links.

This researcher feels that there is little in the way of learning from best-practice in terms of improving the instructions given to participants in how they should make causal links between contributions. In each of the four JOURNEY Making workshops reported on here the researcher observed that linking was explained to the different groups of participants in different ways but none seemed to completely alleviate the concern within participants.

In the GEA workshops the participants were not given a substantial introduction to their task. The facilitator explained the theory behind making causal links and gave a quick demonstration of what might be a suitable link. When asked to do this themselves the participants expressed concern over the task and asked for clarification of what it was that they were supposed to be doing.

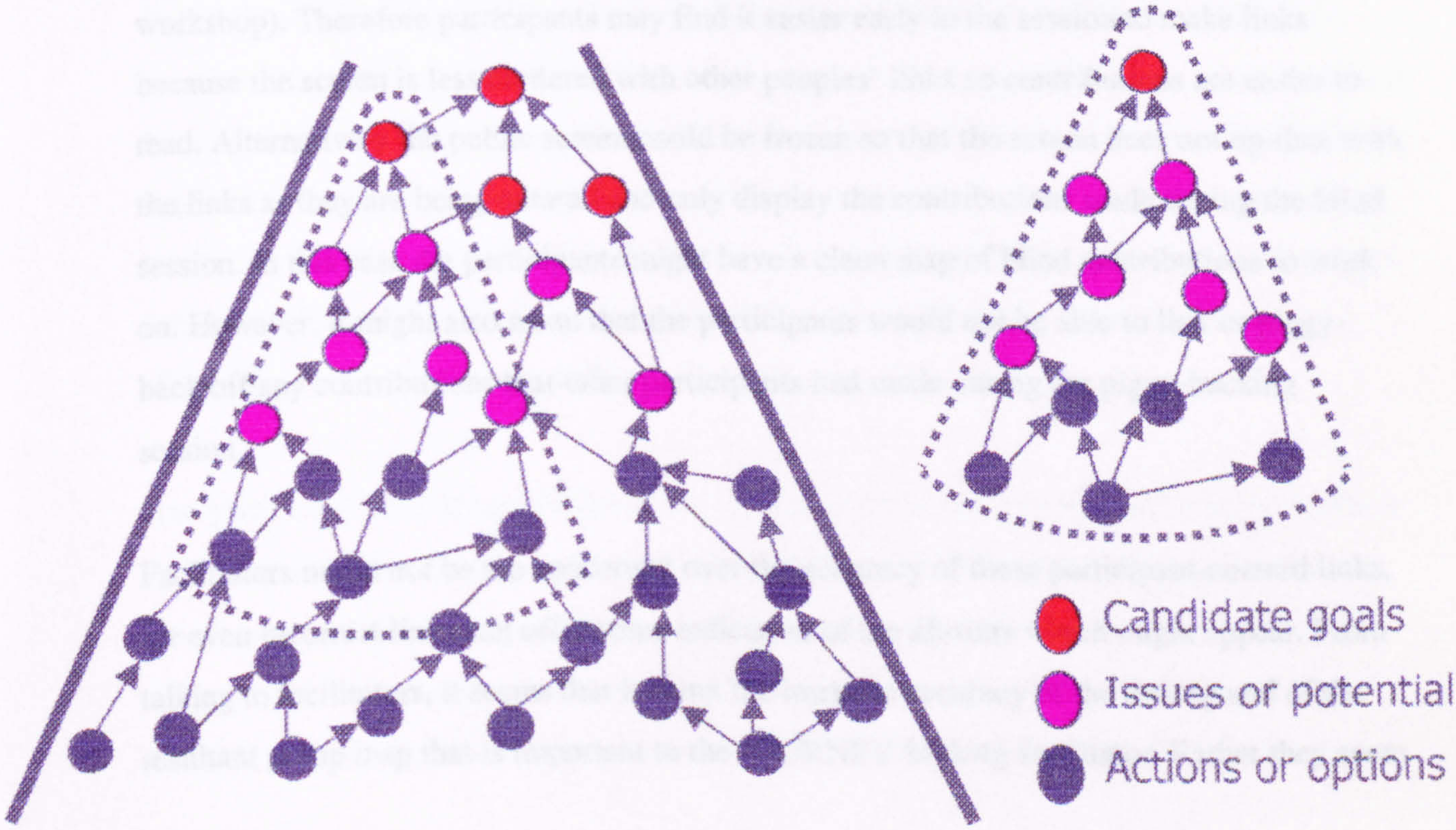
The instructions for the participants of the GP workshop was equally as brief as for the GEA workshop. However, before being asked to start linking, the participants clustered the contributions themselves (with the help of the facilitator) and they had also had the opportunity to piggy-backing off the contributions during time for piggy-backing hence they might have been more familiar with the contributions than is normal (the process for the first session in the GP workshop was described in Section 6.3.2.3.2).

In the NYPZ workshop the participants were actually asked to suggest causal links between contributions but the facilitator was taking an active role in facilitating this process. When asked to do it themselves using GE, participants reflected a confusion over what actually was a causal link and what did it mean.

In the ELZ workshop the facilitator spent a whole morning reviewing the links of an existing DE model with the group members. The participants were watching the facilitator, their task was not to link the contributions themselves. Still when the members were asked to do it themselves they were unclear of the process they were being asked to perform.

It seems that even a detailed and extensive tutorial before being asked to make causal links alone does not quash the uncertainty within participants of what exacting they are being asked to do. It seems therefore that it would be unlikely for this researcher to write a 5 minute speech of instructions which might convey something that a two hour tutorial failed to convey. Maybe a diagram, like the one in Figure 7.3, could be used to illustrate what the purpose of the linking process is and raise the awareness of participants of how they might link. A similar diagram is sometimes used by the facilitator for exactly this purpose, but in the workshops under scrutiny here the diagram was not used for reasons unknown.

Figure 7.3 - Diagram to illustrate to participants the nature of linking contributions.



Adapted from Eden and Ackermann, 1998c

However, it might only be with practice that participants can become confident in what the task linking is actually about. The facilitator might like to be aware of the widespread concern within many of these participants over the linking of contributions. Facilitators might prefer to continue to tackle this problem in the way that they have always done – that is by offering an initial explanation of the process of linking and offering additional support to participants who raise these concerns. It is possible that participants could gain confidence when they practice their linking during the first gathering session. Hence their concern might alleviate as participants accumulate experience of linking throughout the workshop.

7.6.2 Reflection : What links facilitators might encourage participants to make links

It is possible that facilitators might benefit from encouraging participants to make as many links as possible that the participants are confident are right. The more accurate links that are made before the group discussion, the less time might be needed to establish the clusters which emerge from the gathering (because the facilitator will be able to do this accurately during the participants' making of links).

The more links that the participants enter, the more they might learn from other peoples' contributions and the more they might synthesise their knowledge with the contributions of other peoples'. However, "the more ideas and links that came onto the screen the more difficult it became to read those ideas" (a comment from one interviewee of a real-world workshop). Therefore participants may find it easier early in the session to make links because the screen is less cluttered with other peoples' links so contributions are easier to read. Alternatively the public screen could be frozen so that the screen does not up-date with the links as they are being entered and only display the contributions made during the blind session. In this case the participants might have a clean map of blind contributions to work on. However, it might also mean that the participants would not be able to link or piggy-back off any contributions that other participants had made during the piggy-backing session.

Facilitators might not be too concerned over the accuracy of these participant-entered links, for even incorrect links can offer some indication of the clusters which might appear. From talking to facilitators, it seems that it is not the intrinsic accuracy of the linking and of the resultant group map that is important to the JOURNEY Making facilitator. Rather they seem

more concerned with the understanding and learning that is a consequence of participants making links and negotiating the making of links that is important (van der Heijden and Eden, 1998). The map can be used as a vehicle to enable the participants learning of different peoples' viewpoints and on which the negotiation can take place (Eden and van der Heijden (1995), Eden (1995a)). Hence the final group map is not the main product of a group session, for the main product is cognitive and emotional commitment to the an outcome, which the map can enable the learning to take place to create the necessary cognitive shift (Eden, 1995a).

One real-world interviewee would certainly seem to agree with this view of the correctness of the map is a distant second in importance compared to the learning of group members. That participant remarked on how she felt that "the group members became too involved in making a tidy map" and wondered if this actually helped them consider the problem. She thought that it might have been a waste of time to make the map more exact and wondered what benefit this brought to the group. Hence it would certainly seem that "quick and dirty" maps (a term Eden and Ackermann (1998d) use to describe their mapping of alternative futures) might be best for the facilitator as well as being best for some participants.

7.7 SUMMARY AND CONCLUSION

The work in this chapter has been an exploration of *'what happens in gatherings that are run as part of a real-world JOURNEY Making workshop [in terms of the sharing of causal links]'*. This researcher has observed that the linking strategies the facilitator uses can be very facilitator-driven and have varying level of group involvement but most group members seem to respond well to this approach. The construction of the group maps is not performed to give exhaustive representations of the situation to which they pertain. They are in the words of a JOURNEY Making facilitator, "a quick and dirty analysis". It is this researcher's belief that the maps are fit for the purpose of JOint Understanding, Reflection and NEgotiating strategY for they facilitate this process well.

Analysis of the GE database suggests that the participants of these four workshops exhibit a clear preference for making certain link-types. In fact, the findings have supported the development of a 'hierarchy of preference for making links'. The exploration of link-type suggests that the participants are actually synthesising their knowledge with that of other peoples' and this should be a significant boost for the process of linking. Essentially this is a

main reason why linking is encouraged by facilitators and it appears to perform this task splendidly. People also appear to demonstrate an ability to create complex network of contributions by chaining links together and developing clusters of contributions.

The process of participants linking the contributions on the public screen has been argued to be flawed, in that participants sometimes might not understand what it is that they are doing even though they may have had a lengthy tutorial explaining it. However, results for the GP workshop indicate that participants might benefit from clustering the contributions with the facilitator before the piggy-backing session. These participants seem to share more piggy-backed contributions, share a large number of links in total, share many of those links to elaborate networks, and share less interesting links (and so share less contributions which are potentially wrong).

Participants in these four workshops may also have made wrong links, sought to link their oWn contributions rather than oTher peoples', or linked based on shared wording between contributions rather than on the causality of their relationship. However, linking is essential to the process of creating JOint Understanding and Reflection on the situation. It should be encouraged because it might:

- Allow the participants to become familiar with contributions on the screen before they begin the group discussion i.e. it is a starting place for people to take an active role in synthesising their knowledge with other peoples'.
- Give confidence to participants to suggest links during that discussion if they are familiar with process of linking.
- Give initial structure to the mass of contributions on which to base a discussion – and does so quickly.
- Help to retain possession of the structure of the model with the participants because they have set the form of the structure with the early links before the facilitator became involved.
- Enhance the psychological buy-in of the participants to the results which are based on their linking of their contributions.
- Create a map that is fit for the purpose for which it is built.

This empirical investigation of *'what happens in gatherings that are run as part of a real-world JOURNEY Making workshop, in order to improve practice in facilitating gatherings'*

will conclude in Chapter 8, the final of the three findings chapters. Chapter 8 will explore if participants are able to share their knowledge to a range of issues which are pertinent to the group member's consideration of the issues, rather than a narrow sub-set of the issues.

CHAPTER 8 - EXPLORING THE NAVIGATION OF DIFFERENT ISSUES BY PARTICIPANTS

Chapters 6 and 7 have *'explored what happens in gatherings that are run as part of a real-world JOURNEY Making workshop [in terms of the sharing of contributions and causal links], in order to improve practice in facilitating gatherings'*. Also analysed during these chapters were the actual opinions of the participants to the tasks the facilitator asked the participants to perform. The exploration of how participants might share their knowledge during groupwork using computer technology has so far concentrated on investigating how participants actually use the tool Group Explorer to perform the tasks that a JOURNEY Making facilitator might set for the group. The analysis has not really moved away from concentrating on the participants' attitude and use of the technology in the gatherings.

Yet to be addressed is the issue of how participants (who either work alone or as a small group sharing a console) might actually navigate around a problem and contribute aspects of their knowledge. This is an important issue as it could give insight to if participants in the gatherings under scrutiny here tend to contribute knowledge on a number of various aspects of the problem or only one or two issues. If it is found that participants in these real-world gatherings (which contain all the politics and interpersonal elements associated with other groups) tend to make contributions to a number of different issues then this might suggest that the group members' consideration of the task is based on a wide representation of the problem (Johnson, Daniels and Asch, 1998).

One main stream of analyses concentrates on the actual navigation of the problem that participants might display when sharing ideas during a blind gathering and a piggy-backing gathering. In this, the thesis will now turn to explore the nature of the sharing contributions by participants, as might be evident through a detailed exploration of the different contributions they make during the real-world gatherings under scrutiny here.

This exploration is segmented into two main elements. The first concentrates on exploring the different clusters of issues that might be evident through some analyses of the group maps that are built during the workshops. As will be discussed, the failure of this exploration to produce consistent results caused the researcher to turn to some manual coding of the content of contributions. This second segment of manual coding will identify

clusters of similar contributions relevant to the problem. The researcher thought that analysis of the contributions in those clusters might give access to shared aspects of cognition (or cognitive overlap (Klimoski and Mohammed, 1994)) between participants. By paying attention to this cognitive overlap and exploring the variety of the themes within a problem which the group of participants might be said to have identified (McKay, 1998), this work will explore the ability of these group members to surface a number of issues within the problem. It is thought that if more themes are considered in the generation of an outcome then that outcome is more likely to be politically feasible as the outcome is based on a wider consideration of the issues (Eden, 1992a).

Before such an exploration of the ability of participants to share knowledge to a number of issues within the problem is performed, the thesis will revisit some of the main points made earlier about the nature of the navigation around a problem that individuals might perform. This will orient the reader to this stream of the research.

8.1.1 Why is this research interested in how participants might navigate the problem?

The themes to which a participant's contributions might be said to belong might be very interesting to this research for the following reason. At a basic level such an exploration of themes might inform us of whether people tend to concentrate on one theme during gatherings and expand on the detail of that theme, or whether they surf the themes giving some thought on a number of themes, which might be largely dependent on their familiarity with the topic. If one might understand the ability of JOURNEY Making participants at this basic level then one might consider what the effect on the outcome could be, at a purely theoretical level. For example, it might be that if participants do surf a number of themes then the outcome could encompass a wide consideration of the problem and so be more likely to be politically feasible (Eden, 1992a). If however the outcome is based on only a detailed examination of a narrow definition of the problem then it may be that the stakeholders (external to the group) of the 'missed' themes cause the outcome not to be implemented i.e. politically infeasible (Eden and Ackermann, 1998c).

It might be that the time for piggy-backing gives an opportunity for individuals to consider, reflect upon and make a contribution to, a theme which they had previously forgotten about as Osborn (1953) comments "a spark from one mind will light a bang-up ideas in the others

just like a string of firecrackers", Page 300. On a more sinister tone, it might be that certain individuals would prefer the group did not include a theme in their consideration of the problem, possibly because it is so volatile for them (Carlsson and Walden (1995), Vennix (1995)). By seeing that the theme has been raised (and so it will not be ignored), and still having anonymity in who is making the contributions, participants might be more willing to make their point electronically rather than verbally when the group can confront them (Cooper et al, 1996). Hence the outcome can possibly be sensitive to the wider consideration of the themes. Thus piggy-backing might actually facilitate the emergence of new, or forgotten, streams of thinking for individuals (a proposition opposed to that which was offered by Dennis et al (1997) who suggested "that groups following the piggy-backing rule suggested by Osborn (1953) - building on the ideas of others [when the themes are narrow in focus] - are more likely to produce a narrow set of similar ideas at the expense of a more diverse set of ideas", page 204.

The coding of these themes was performed in response to the proposition that the piggy-backing gatherings might give participants the opportunity to consider the problem from angles that they had previously not considered. If this was found to be true than it might suggest that the time for piggy-backing is well-spent.

8.2 USING THE LINKS IN THE GROUP MAPS TO CLUSTER THE CONTRIBUTIONS

The researcher hoped that some analyses of the group maps developed during the workshops under scrutiny here would enable access to the way in which participants might navigate around a problem. To explain, the researcher hoped that the structure of the maps would indicate clear boundaries between the clusters to which the contributions 'belonged' (as Boland et al (1990), Eden et al (1992), Ackermann and Eden (1995) Jenkins and Johnson (1997), suggests clusters of contributions might be contained in these types of maps). The researcher thought that people might cognitively navigate the problem in some systematic way (Anderson, 1983) and that this might be reflected in the contributions they made to the group map (as Henderson et al (1998) explored in individual maps). Essentially the programme of intended work anticipated that the maps would indicate main themes that could be neatly defined, bounded, extracted and analysed (and Eden and Ackermann (1998a) suggests that this is possible when using DE). The boundaries that were generated could then be used to explore the way in which participants contribute to certain themes within different boundaries.

However, the researcher expected that to a very large extent the links between contributions would be used to establish the clusters (an expectation that was fuelled by the work of Eden (1992b, 1994), Jenkins and Johnson (1997), Eden and Ackermann (1998c) and the DE User's Manual (Banxia Software, 1997a)). Considering the reliance this analysis made on the links being correct it seemed worthwhile to investigate the links in the final model. Consequently, the maps from a selection of the gatherings from the four different real-world workshops were selected and scrutinised as detailed in Section 8.2.1. This scrutiny was performed by the researcher in order to get some impression of the exhaustiveness of the links contained in the maps. An exhaustively linked map is thought to be one that contains a record of all the causal relationships between the contributions, such that every person, in for example an organisation, could look at the map and be confident that their perspective of the relationships are represented (as Eden (1992b) suggests a cognitive map is for one individual). Whereas the exploration of links in Chapter 7 sought to uncover the nature of the links that were made, this analysis of exhaustiveness sought to discover if some links that seemed valid to the researcher were not made, and if the relationships between other contributions could have been explained better through a different choice of links than were made.

In order to begin to generate clusters, the maps were visually scrutinised simply by looking at the links as they sat in the maps, as discussed in Section 8.2.1. The researcher also intended to use DE to establish the clusters and then comparing the success of the two approaches (see Jenkins and Johnson (1997) who discusses their use of DE to investigate clusters in their maps). However the manual themeing was performed first so that the researcher was not influenced by the themes that DE generated. Section 8.2.2 discusses the use of DE to establish clusters.

8.2.1 Visual clustering of the contributions

Visual clustering was performed on a printout of the DE map for each gathering of all participant-entered and facilitator-entered contributions which were in the final model. The contributions were arranged in what appeared to be a sensible layout, i.e. the researcher tried to minimise the number of links which overlapped.

The researcher then tried to identify where clusters existed in the contributions - much like that work which Eden and Ackermann (1998c) had to perform to subdividing key issues into manageable sections (as reproduced in Figure 8.1). For this research a cluster was decided to be an arrangement of contributions which appeared to be linked together and seemed set apart from other contributions in this regard (in Figure 8.1 Eden and Ackermann appear to define 6 clusters, for example, 'vision for the future' and 'partnerships'). A cluster also had to tackle a single issue so all the contributions would be focussed on solving or describing an issue within that problem. In identifying the clusters, the researcher also used his interpretation of the content of the contributions to inform his decision of where clusters seemed to exist. This process was repeated until most contributions appeared to be in initial clusters. For the reasons of client confidentiality it is not possible to publish the actual clusters that were developed in this analysis, however it is hoped that the clustering performed by Eden and Ackermann in Figure 8.1 gives some flavour of the nature of the work performed for this research.

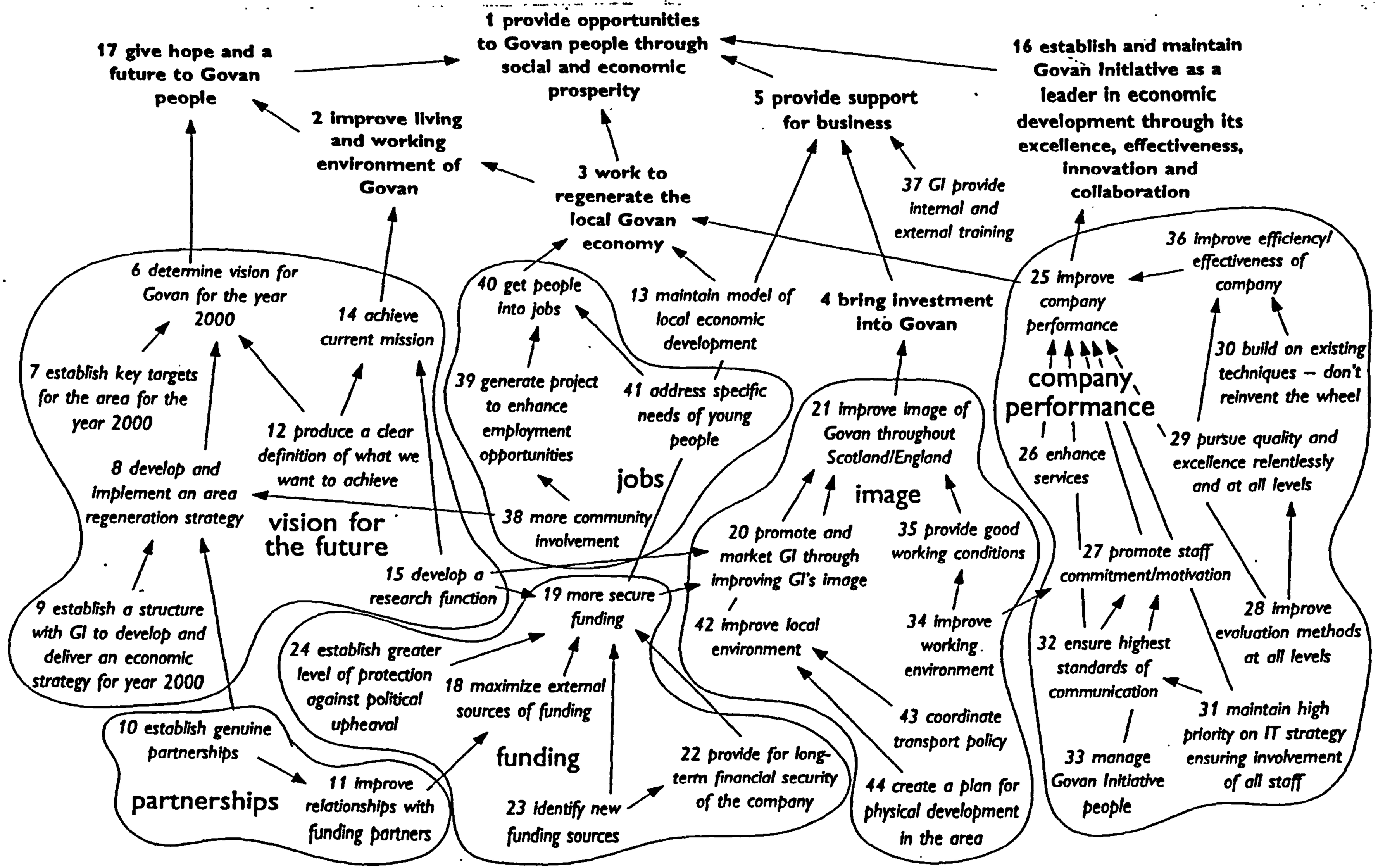


Figure 8.1 - An example of clustering contributions on a group map

The process was abandoned mid-way through trying to develop robust clusters as is was clear that this researcher would not be able to generate clusters for which he could defend the existence. The researcher decided that the generation of robust clusters using a visual clustering method was not possible for the seven reasons to be discussed in Section 8.2.1.2, however, firstly, it is necessary to discuss the validity of this research activity.

8.2.1.1 Issues of valid research practice

The researcher attempted to cluster the contributions based solely on the links and his interpretation of the topic to which the contribution pertains. This interpretation was based on his knowledge of the context of the contributions gained through being present at the workshop and being immersed in the contributions and group map for a number of months. However, is a very interesting methodological issue of validity in this practice of the researcher deliberately looking for, and identifying, missing or poorly explained relationships between contributions. This will be explained in reason 6 of Section 8.2.1.2.

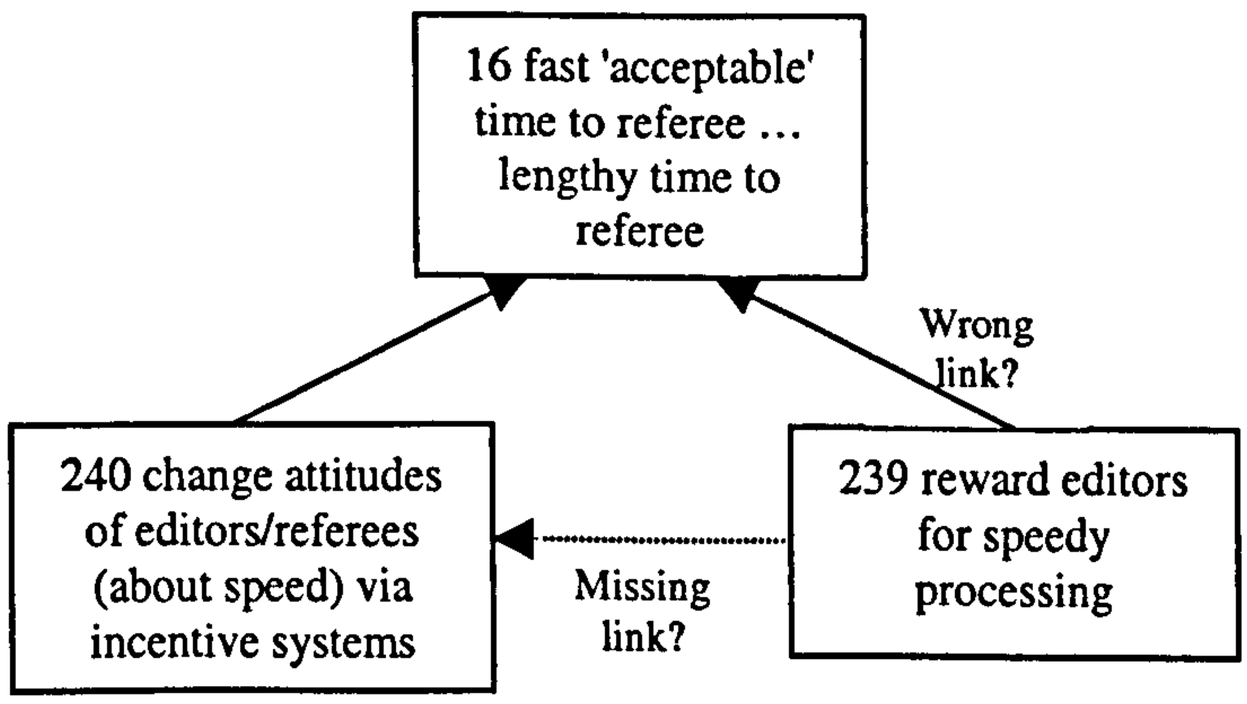
It does not seem worthwhile to enter into a lengthy discussion of the validity of performing a research task when that task was abandoned soon after it was begun, for reasons which the following discussion will explore. However, is does seem necessary to justify this work being stopped, so that other researchers might appreciate where their data has certain strengths which might enable such an investigation. Hence, Section 8.2.1.2 will explore why the work was stopped and Section 8.2.1.3 will offer one additional piece of analyses which contributes to this decision to stop the analyses.

8.2.1.2 Generating robust clusters visually is not possible - reliability of the links

The reasons for the visual clustering of contributions being abandoned is given below. These reasons are thought to support an argument that sufficient evidence has been found to suggest that the maps may be accurate portrayals of a situation, but they are not completely exhaustive portrayals that have been rigorously validated by the group members. Hence these reasons suggest that the maps are not able to offer access to the way in which participants navigate around problem. It is felt that the links are not reliable for the purpose of visual clustering nor for gaining access to the pattern of participants' navigation of the problem. The evidence (which is presented below) for this is seven-fold and was found from the scrutiny of the maps from four real-world workshops and from observations of the nine proposed format gatherings.

First, some links contained in the final group maps appeared to the researcher to be incorrect with respect to contributions being linked that (to this researcher) seem to be not related causally. It is possible that wrong links are included in the maps because links are contributed in a hurried fashion. To explain, the facilitator moves the group along quickly in order to make good progress. Therefore it is quite possible that a significant number of links have been wrongly included in the map because they have not been validated exhaustively i.e. the map has been scoured to validate that the proposed link is the most accurate to describe the relationship. On one map from one ELZ gathering which the researcher scrutinised there appeared to be at least 17 incorrect links (out of 67 links). Very persuasive argument about the nature of the relationship between the phenomenon contained in the contributions could be generated for those links not representing a true causal relationship. One example of what is believed to be a wrong link is shown in Figure 8.2 which is an extract of what is actually in one real-world group map. Briefly, it is believed that the link between contribution 239 and contribution 16 is wrong. It is believed that the correct nature of the causal relationship between 239 and 16 through 240, i.e. the nature of the causality is better explained by 239+240+16.

Figure 8.2 - An example of what is believed to be a wrong and a missing link



It is thought that an additional reason why these incorrect links were not found during the actual session was because of a different screen layout enabling discrepancies to be found. To explain, this researcher used different screen views from those that the participants viewed i.e. he shuffled the same contributions around on the screen to create what appeared to be a different map. This was done a number of times in order to get some sense of how volatile the maps were in this regard. These new layouts caused different contributions to sit

beside each other and enabled the researcher to spot where more natural links might exist than those which the participants nominated. Hence it is possible that the 'wrong' links were entered and validated because of the physical closeness of the contributions, rather than the correctness of the argument that a linked formed. It might be that if the contributions had been lying in a different layout on the public screen then a different map might have been built because different contributions would have been lying closer to one another. This might highlight a concern over the reliability of the causal maps, as Jenkins (1998) discusses how reliability might be found through the ability of another researcher to replicate the findings, and it is possible that given different screen layouts, the maps would not be reliable. The researcher concluded that some contributions contained on these new views in the group maps were linked by some dubious links.

Second, often links are contributed by participants who were not absolutely clear as to what a link means, as was suggested in Section 7.2.1. Does a link suggest simply any relationship between two issues? What does a causal relationship really mean? Does a link suggest a similarity or likeness between two issues? What does the direction of the link mean? If participants do not know exactly what they are doing then they may be unable to do it properly. If they try to do it then they might get it wrong, resulting in 'wrong' links in a map (as the analyses in Section 7.3 reported). Participants might learn how to link properly during the workshop and so their efforts early in the workshop might contain more incorrect links than later in the workshop (see Section 7.2.3.1 for an elaboration of this point). Evidence from analysing the links on the maps from four real-world workshops suggest that a handful of incorrect links have not been deleted. However, and possibly more importantly, there could be a significant number of links that are contained in the map but are thought to be wrong, in that they link contributions that do not seem (to this researcher) to be causally related. Even though some links are thought to be questionable, there is an unknown number that might be wrong but are not realised to be wrong. These might exist because the validation is done quickly and done real-time i.e. the group members do not really have a lot of time to consider the causal relationship. It is concluded that some participant-entered links might be wrong (but not found to be) because participant were not clear of their task but are not known to be so because validation was performed quickly. Hence in addition to the dubious links which have been found (as raised in the first reason here), other dubious links are suspected to exist but have not been located.

Third, the maps have been built to represent a structure of a situation. They have not been built to be an exhaustive representation of reality (a point which Vreede (1997) would seem to support in his proposition that the model a group builds is not 100% representational of each participant's understanding of the situation). The group maps from these workshops are, in the words of one JOURNEY Making facilitator, "a quick and dirty analysis". They are fit for the purpose of generating a JOint Understanding, Reflection and NEgotiation of strategY. They do not appear to be exhaustive so they may not accurately reflect the entirety of the situation (in the same way as a forensic model for litigation is (Ackermann et al, 1997)). It is more likely that they may just reflect the relationships that the participants have picked up on given the course of the discussion, hence links have probably been missed (for example, 239+240 in Figure 8.2). On the ELZ map that had 17 links (which was mentioned above) that might be missing, the researcher identified 12 links that he can generate robust argument for inserting, but were missing from the map. If the researcher can find 12 such links then it is possible that a group member would find a number of missed links that would explain a relationships he thought might exist but is not represented. This raises doubt over the completeness of the linking process, especially considering the time pressure that the participants are typically under. Again it is thought that the researcher building new screen views of the contributions to that which the actual participants worked with enabled the realisation of where some sensible links have been omitted. The group maps might be thought of being invalid for this research to base his explorations on because they fail to "gain full access to the knowledge and meaning of informants", Page 41, Easterby-Smith (1999), by capturing all the links between the contributions. It was concluded that some sensible links might have been missed from the maps and this might cause the maps to be invalid for this element of the research.

Fourth, some of the strategies the facilitator appeared to use for making links were perhaps not very inclusive of the participants in the linking process. The time-saving practice of linking a number of contributions into a core contribution (Method 4 as described in Section 7.2.2.1), typically towards the end of the linking session, does not suggest that the linking of these (small number of) contributions is done with same consideration as other contributions. Consequently, some links might be made under time-pressure and so do not link contributions which best explain the true nature of the relationship between the issues (as Ackermann et al (1997) comment how "the extended discussion over the nature of the links [for litigation groups enabled us to] validate the model with much more precision than

is normally the case ... for problem solving [groups]", Page 53). It is possible that the links just link the contributions that seem sensible at that time. Also Method 1 in Section 7.2.2.1 is based largely on the interpretation of the facilitator listening to the conversation. Granted, the facilitator seeks validation of the linking from participants however it must be easier for the participants to agree with a marginally correct link them to try and seek a new link to replace it. Hence, Social Loafing theory (Latane et al, 1979) would suggest that if the facilitators are willing to link the contributions, then participants might just sit back and let them do so without exerting much mental effort to help them, if the particular issue is one that does not have significant impact on their world (Thomas et al (1981), Zaccaro (1984)). It was concluded that the facilitator's linking strategies might not facilitate the in-depth consideration of the exact relationship between the two very best contributions which explain that causal relationship.

Fifth, no post-workshop validation of the links with an expert is possible (a problem Jenkins (1998) raises). JOURNEY Making aims to make everyone in the group an expert - through JOint Understanding, Reflection and NEgotiation, however in the ELZ, NYPZ and GEA workshops none of these people were available to assist in the themeing of these contributions (for the reason outlined in point 6 of Section 5.5.1). The client of the GP session was willing to spare some time to help the researcher but the researcher felt that it would be better using this time to complement his own abilities, rather than to perform an activity which was felt to be out with his abilities in terms of other workshops under scrutiny here. Considering the researcher felt that it was not possible for him to validate the links for the other three gatherings, he felt it more appropriate to use the GP client's time to perform an activity which will be described in Sections 8.3.1 and 8.4.1. The fact that no experts from the workshops were able to validate the links does itself not offer a robust reason for deeming the links to be unreliable. However, when combined with the contention that the links are not wholly reliable it prevents the researcher from gaining confidence by being able to validate the model with the real experts.

Sixth, the researcher feels that he cannot validate the logic of the links himself (issues of validity of the logic of models are explored by Landry et al (1983)). **Raising awareness of incorrect or missed links is not an attempt to validate those links. More, it is an attempt to spot where some glaring gaps in the linking of contributions may exist.** Validation of the links in the maps was attempted, but abandoned for two reasons. The first

reason is that the researcher does not have the knowledge to be able to say that the link between two contributions should be deleted because it is wrong (although Huff and Fletcher (1990) argue that the researcher often has an informed interpretation of the data because they have been immersed in it). However, this researcher feels that not being able to generate a good argument for the link between two contributions does not mean that one does not exist. A second reason is that a researcher cannot simply insert a link just because they can generate a persuasive argument supporting the insertion of, what appears to be, a missed link. It may be that the missed link was debated and its exclusion was purposeful, for an even more persuasive argument (Bonham, 1993). Thus, because the researcher is not aware of every argument he cannot simply enter or delete a link to make him think that the maps are more correct.

Finally, the practice of visually clustering the contributions raised serious concerns over the exhaustiveness and validity of the links. When visually identifying clusters of contributions in the maps, each time the same set of contributions were reshuffled on the screen, it seemed as if some contributions should switch clusters, or even that a new cluster could be developed. Taking at face value Figure 8.1 on Page 267, there appears no reason why contribution number 34 should be in the 'image' cluster rather than in the 'company performance' cluster (although in this example there is obviously supporting material below these key issues which support the contributions being in that cluster). However, the contributions which this researcher was trying to cluster could often be argued to belong equally to two, or more, clusters. Hence the clusters were not robust when the layout of the contributions was changed as this could change the perception of the researcher of which cluster the contributions best fitted. Furthermore when different arrangements of the same set of contributions were made, new concerns over the correctness of different links seemed to arise. Hence it was concluded that it would be impossible for this researcher to reliably cluster contributions by visually making boundaries around what appears to him to be clusters.

Pulling together the reasons identified above, it is felt that the group maps under scrutiny in this thesis are not suitable for providing robust insight to the real and accurate structure of the contributions made by participants of a JOURNEY Making gathering. This is because there has been sufficient evidence found to raise doubt over the accuracy of the existing links and concern over what links might have been missed. Some linking strategies do not

give the confidence in the exhaustiveness of the search for the best, most accurate, contribution to link to. However, the inability of the researcher to validate the links beyond question means he cannot simply insert or delete links as he sees fit and, as no experts are available for post-workshop validation of the maps, reliable validation is not possible. Essentially then one must question the validity these maps as a tool to give access to the real navigation of the issues performed by participants.

This discussion offers powerful support for video-recording the sessions. If the researcher had been able to review a video of the group discussion then he may have been able to review the tapes to gain confidence that the relationship between issues had been discussed by the group members and that links were valid.

The consequences for these participants of the conclusion of the unreliable nature of the links will be discussed more in the reflection in Section 8.2.3. Briefly it is felt that participant-entered links and the linking process that is facilitated is critical to the JOint Understanding Reflection and NEgotiation of strategY (JOURNEY) (Eden and Ackermann, 1998c). That linking process was not designed to give access to the navigation of the issues by participants, it was designed for participants to make the JOURNEY and so it should not be surprising that it cannot support the analyses attempted here.

Although the existing links certainly give a flavour of the structure and in places may offer a comprehensive and accurate portrayal of reality (as Johnson and Johnson (forthcoming) discuss how the map can reflect the views of all group members), the reason for their identification is not to give access to how participants navigate the issues in these JOURNEY Making workshops. The maps are constructed to help group members think about their problem in a more structured format (Eden, 1995a), and to that end they are powerful models i.e. they are fit for the purpose they serve. It is argued that in their current state they do not stand up to heavy duty validation that is required for the analyses proposed here. In conclusion, the maps have not been shown to be reliable enough for the visual methods of intricate dissection which this researcher has attempted to exert on them in clustering contributions, so any such analyses would be inappropriate and unreliable.

The researcher thought it might be possible to use the analysis functions in DE to mathematically cluster the contributions in the maps. However, before the discussion of this

thought is performed (in Section 8.2.2), there is one finding which gives additional support to the belief that the linking of these group maps is not truly representative of the multiple perspectives of all group members.

8.2.1.3 Ratio of total links to contributions in group maps

Additional exploration of the claim that these group maps are not exhaustive representations of a situation as perceived by the multiple group members can be found in the ratio of the number of links to the number of contributions. In Section 7.5.1, Table 7.13, the thesis calculated the ratio of participant-entered links to contribution. It should be noted that Table 8.1 calculates the total number of links, not just participant-entered links as was detailed in Table 7.13.

Table 8.1 – The ratio of the total number of links to the total number of contributions in the final group map

	ELZ	NYPZ	GEA	GP	Total
Total number of links in the final model, including, participant-entered and facilitator-entered but excluding deleted links.	352	572	113	200	1237
Total number of contributions in the final model, including, all participant-entered, facilitator-entered and facilitator-modified contributions, but not including deleted contributions	242	455	94	149	940
Ratio of total links : contributions in the final map	1.45:1	1.26:1	1.20:1	1.34:1	1.32:1

This researcher believes that the links between the contributions on the map must be exhaustive in order to be able to give an accurate portrayal of the real relationships between the aspects of the issue that the participants have thought about, as transparent through the contributions they have made. Hence the group maps might have to be accurate to the level of it being a cognitive map transferable to each individual in that session (although it is not suggested that this is possible under the current JOURNEY Making philosophy and the nature of the linking sessions). In Eden et al (1992) the authors report that the cognitive maps from individual interviews have returned typical ratios of links to contributions of

1.20:1. In the group maps under scrutiny here the ratio across all workshops of the number of links to the number of contributions was 1:32:1 (see Table 8.1 for this calculation).

Let us assume that Eden et al's individual cognitive maps of ratio 1.2:1 would be exhaustive in its linking of the contributions as one interviewee perceived a situation. In the groups represented in this analyses there were 14, 19, 5 and 6 participants in the ELZ, NYPZ, GEA and GP workshops at any one time (from Table 5.1). Hence if each of these individual's cognition was to be accurately reflected in the group map, then the link:contribution ratio might have to be much higher than 1.2:1 to be accurate. If 1.2:1 represents one person then to have competing views and broader knowledge represented the map might have to much more tightly linked than this. However, the average group map from these four workshops only has a ratio of 1.32:1. If a ratio of 1.2:1 is suitable for an individual with one perspective, a ratio of 1.32:1 might never be able to accurately reflect the multiple, and sometimes competing (Ackermann and Eden, 1998), perspectives of up to 19 people (in the NYPZ workshop) who will probably have more knowledge to be represented than one person (Milliken and Vollrath (1991, Lumsdaine and Lumsdaine, 1995). This ratio supports the proposition that the linking of the group maps are not exhaustive enough to be able to give insights to reality of the situation which might satisfy each of the members of the group.

It is proposed that the ratio of link to contributions which might indicate a more exhaustively linked map for a group of participants might need to be dependent on the number of people in the group. For a group ratio each additional group member would have marginally less impact on the number of links and number of contributions. This is due to shared knowledge between members causing those additional members bringing and sharing less unique knowledge to the group's consideration of the problem (van der Heijden and Eden, 1998). Hence, a place to begin to consider what the ratio of links to contributions might be for a group map,

For n f 1, the ratio could be, 1.2+o(n/12) : 1

(where n= number of group members, 1.2 = the proportion of links for an individual map and n/12 is the new links which are offered by each additional group member. The denominator of 12 was chosen to dilute the additional contribution that each person had to the group knowledge. Specifically 12 was chosen because it neatly related to 1.2.)

So, for a group of 19 participants (as in the NYPZ workshop), the ratio might have to be [1.2+o(19/12)] : 1, or 2.46:1, whereas the NYPZ ratio was 1.26:1. In conclusion, it is thought that the group maps under scrutiny here might not exhaustively reflect the cognition of the individuals in the group. However, this is already known as Eden and Ackermann (1998a) suggest that a group map is not a cognitive map. Nevertheless, in order to access peoples' cognition, the group maps are thought to be needed to be more like individual cognitive maps so that the knowledge bases of all participants can be accurately represented.

Consequently, any attempt to access the way in which people make contributions during JOURNEY Making gatherings should not be based on the links which structure those contributions. Such analyses might benefit from approaching the contributions from a radically different perspective. Two approaches to clustering the contributions based on the themes which might be within those contributions will be discussed in Sections 8.3 and 8.4 of this chapter.

8.2.2 Clustering contributions using the DE analysis functions

Although the visual generation of clusters is not thought to be a robust approach the researcher initially thought that DE could provide a consistent structure to clustering that a researcher cannot visually appreciate and replicate. Decision Explorer (Banxia Software, 1997a) has several analysis functions which enables an analyst to 'slice and dice' a map in many ways - one such function is the clustering algorithm (Eden and Ackermann, 1998a).

An analyst could use the cluster function to uncover those clusters which the map is calculated to contain. The cluster algorithm does this by analysing the similarity of links between contributions and chunking the map into "mutually exclusive topic areas" (Decision Banxia Software, 1997a, Page 53). The analyst can nominate a target size so that each cluster has in it approximately the target number of contributions (Banxia Software, 1997b).

However, the clustering algorithm that DE offers, relies wholly on the accuracy of links between contributions. Considering the concerns raised here about the exhaustive accuracy of those links in the group maps under scrutiny here, it is not thought that using the analyses functions within DE would give insights to the clusters and themes which participants did in fact make their contributions to. Again this conclusion is reached because of the nature of the analyses this researcher was intending to conduct on these maps.

It is certainly not suggested that any analysis of group DE maps by an analyst is futile (for example, that performed by Laukkanen (1998), Marchant (1997) or in the NHS vignette by Eden and Ackermann (1998c, Page 212-222)). The analysis that would enable this present researcher to access the possible navigation of the issues behind the contributions which participants were making would rely heavily on the structure of the map. Hence the links would have to be very accurate indeed, in fact they might need to be exhaustive. The analyses that a facilitator typically performs during a workshop aims to uncover the loose structure of the whole map (see *Practice* section (in particular Pages 414-423) of Eden and Ackermann (1998c) for a discussion of the nature of the analysis performed during a group workshop). It is performed in order to get a general flavour of which contributions have significant impact on the structure of the map - "The analysis of the maps is not intended to be anything other than a guide to exploring the properties of the map" Page 423, (Eden and Ackermann, 1998c), and for that purpose DE's analysis functions might be powerful. Therefore facilitators do not use the functions to gain detailed and precise insight to inform analysis of the navigation of the issues performed by the group members.

The analyses facilitators perform on the maps may be fit for their purpose. However, these analyses do not appear to be fit for giving precise segmentation of a group map on which to base further investigations regarding the nature of participants' navigation of the issues. The links might need to be exhaustive for that task, and it is argued here that they are not.

8.2.3 Reflection : On clustering group causal maps

The above analysis and discussion of the way in which the results from scrutinising the group maps from JOURNEY Making gatherings under examination here seems clear in its message. The work performed scrutinising the maps, exploring each link whilst also considering the linking strategies performed by the facilitator suggests that the links in

JOURNEY Making group maps may not be wholly accurate nor exhaustive of the situation they describe. This, combined with the inability to perform any validation with domain knowledgeable people has caused this researcher to be concerned over the fitness for purpose for which he was going to analyse the maps.

Two main reasons for not visually clustering the links between contributions have been suggested. The first reason centres on concern over the exhaustiveness and correctness of the links. The second reason is concern over the transient nature of the clusters depending on the screen layout - where changing the layout changes the perceived clusters. The reliance on the accuracy of the links eliminated DE's clustering facility as a means of clustering the contributions. The product of this work so-far on clustering the contributions to enable an exploration of the nature of the navigation of the issues during JOURNEY Making gatherings is that some method which is not reliant on the links between the contributions must be employed - a discussion and exploration of one tested method will be begun in Section 8.3.

However, although the links in these group maps may not be fit for the purpose of gaining access to the navigation of the issues by these participants, they certainly seem fit for the purpose for which they were constructed. In Chapter 7 the thesis reported on how the group members are able to insert causal links and how the facilitator can assist them in this task - and so the group members might be able to learn, understand and reflect upon the problem (i.e. they are beginning to develop "shared (socially constructed) cognition", (Johnson and Johnson, forthcoming)). As reported by Eden (1995a), the participants seem to use the group map as a "negotiative device" by pointing to and talking about the contributions and their relationship - so they might be are able to use the process to JOintly Reflect upon and NEgotiate "group collective cognition" (Johnson and Johnson, forthcoming). This is a main purpose for the construction of the group map - to allow the JOint Understanding, Reflection and NEgotiation of strategY. They are not constructed to give this researcher the precise and exhaustive insights to the cognitive activity and so it should not be surprising that they do not seem to be able to be manipulated for this purpose.

8.3 MANUALLY CODING THE THEMES IN THE CONTRIBUTIONS FROM ONE CONSOLE IN PROPOSED FORMAT GATHERINGS

The reasons for performing the coding to explore the chains of thought which participants might perform during the gathering has been discussed in Section 8.1.1. Given the failure of manually clustering contributions using the links between the contributions, a different approach had to be developed. That different approach to coding the contributions will be introduced and justified in Section 8.3.1. Then the results of the coding will be interpreted (in Section 8.3.2) with the aim of understanding the demonstrated navigation of different issues by participants during a gathering.

The contributions are made by one individual using a console. Sometimes that individual works alone (as in the case of the GEA and GP workshops), sometimes they work as part of a small group (as in the case of the ELZ and NYPZ workshops). This stream of work dealt with contributions at the level of the **console**. It analysed the contributions that were made by an individual or pair through one console, as it is impossible to break the level of analysis down to the person as the different contributions are not able to be identified to one individual in a pair - only to a console. Hence this analysis will break the data at the level of the console. When the thesis refers to a console making the contribution it implies that either the individual or the pair using the console made the contribution through the console.

8.3.1 The process of manually themeing contributions from one console

It seems necessary to detail how the themeing of contributions was actually performed, it was very much simpler than a Content Analysis approach (Berelson (1952) and Bailey (1982)) but more similar to other "clustering" approaches (Miles and Huberman, 1994, Page 248) and the 'themeing' approach of McKay (1998). It is important to note that this work was not aimed to perform Content Analysis-like work to develop a cognitive, or group, map (Erdener and Dunn, 1990) but to cluster the contributions which made a group map.

The process involved the researcher sorting each contribution by the console from which it was contributed. Hence he had a list of which contributions were made from each console. As was calculated in 'column a' of Table 7.6 on Page 233, the average number of contributions made from the average console in the average gathering was 8.6 contributions. Hence the average number of contributions that had to be themed for each console was 8.6 contributions. Appendix 8.1 displays the coding of individual themes for two participants of

the same real-world gathering performed here. Only three participants (approximately one third of the participants for that gathering) have been chosen so that the organisation strategy on the problem that was considered cannot be re-produced from this appendix.

The list of contributions from each console were taken and all the contributions from that console were read so that the researcher could appreciate all of them. Then the first contribution that had been made from a console was selected and scrutinised to find the theme within that contribution, effectively starting the "process of inductive forming categories", Page 249 (Miles and Huberman, 1994). In JOURNEY Making gatherings each participant is asked to only make one point in any one contribution. If they perhaps make two points in the same contribution then it is likely that the facilitator will separate out the points to enable them both to be linked appropriately. Hence it was typically found that each contribution contained one issue (and so the researcher did not code overlapping clusters in the way that Hodson (1991) did). Where contributions did appear to overlap themes, the researcher consulted the group map to be informed of which cluster the group thought the contributions more naturally belonged.

When the theme of that first contribution had been decided the other contributions made from the console were scrutinised to identify if any of them also pertained to the same theme. When two contributions were found which shared the issue they were thought to pertained to, they were categorised by attributing the same number to them which signified the number of the theme to which they contributed (similar to the example used by Easterby-Smith et al, Page 107, 1999). In this way Content Analysis would have suggested a descriptive code rather then a simple numerical identifier (see Strauss and Corbin (1990) for how one might generate the descriptive codes). However, this work was not attempting to code the nature of the detail of the contribution, it was simply interested in the similarity of the topic of the contributions.

This coding approach was performed for all contributions from each console for all normal, proposed and multiple stimuli formats of gathering under scrutiny in this research. New themes were started for each console so that these themes were not anticipated before the contributions were even scrutinised. No clear distinction was made to inform the researcher of which format of gathering the data came from. This was done to avoid potential criticism

that the researcher might subconsciously bias the results towards to be favourable for the proposed format sessions (Miles and Huberman, 1994).

The numbers attributed to each theme was important. The first contribution from a console was always given 'Theme Number 1', as the data in Appendix 8.1 shows. All other contributions which were thought to pertain to the same theme as the first contribution were also given 'Theme Number 1'. 'Theme Number 2' was given to the second contribution, if it did not belong in Theme Number 1. Each subsequent Theme Number was given to the first contribution which the researcher thought represented a new theme in the navigation of different issues performed by the participants.

This process of themeing the contributions was performed by the researcher for the ELZ, NYPZ and GEA workshop. However, for the GP workshop the researcher asked the client (a personal friend) if she would be willing to spend some time to help. She agreed, provided she could do it whilst travelling on a plane. Hence the client (who was also a participant in the workshop) used her expert knowledge of the problem domain to code the contributions in the way described above.

When this researcher coded the ELZ, NYPZ and GEA data, if he was unable to code any of the contributions because he was unclear as to which theme it might fit, then he sought confirmation from the group map. In this he would map the contribution and the predecessors and dependants of the contribution in order to get a flavour of the theme which the links might suggest the contribution belonged (Eden and Ackermann, 1998c). The researcher felt that where he was unsure, the group members opinion of the contribution might inform the coding of the contribution into what they might have thought would be the most appropriate theme (essentially giving the researcher some context to inform his coding). It was not thought that basing the entire coding on the maps was appropriate for the reasons that have been discussed in Section 8.2.1.2.

Once all the contributions from a console had been coded, the researcher double-checked his initial coding of all the contributions (Miles and Huberman, 1994) (and the client for the GP was asked to also do this). The researcher thought that the new themes that had been made by later contributions might raise new awareness of better themes for some earlier contributions to be placed (Lincoln and Guba, 1985). This process effectively validated the

themeing of the contributions and ensured that the researcher was satisfied with the content of all the themes (Miles and Huberman, 1994).

It is important to note that the researcher did not re-code the entire list of contributions without knowledge of the initial coding in order to gauge coder reliability (as suggested by Miles and Huberman, 1994). Instead he coded the contributions in terms of the group themes that he thought the contributions belonged to, the process of doing so is described in 8.4.1. This coding of group themes effectively generated a second set of codes for the same data set. The results of these two sets of codings were then compared to identify which contributions belonged to different group themes than the individual themes suggested that they would. To explain, if two contributions were in the same individual theme, but were in different group themes, then this difference was investigated. This investigation process involved scrutinising each of the contributions for each of the concerning codes and deciding if, on reflection, they were properly assigned to the correct individual or group theme. Often this investigation resulted in leaving the contributions as they were in their different individual and group themes as they best described the contribution in that context. It is felt that this process validated the group and individual themes.

The researcher tried to re-code the data two weeks after the initial coding (as was done with the other coding in this research). However, when the two batches of codes for the same data were compared by the researcher it was found that the themeing of contributions was somewhat susceptible to variation. Contributions that were coded as being in one theme in the first batch might be coded as being in a different theme in the second batch. It should be noted that the robustness of the themeing is felt to be substantially more robust than the clustering of contributions according to links. This is because in the coding of themes the researcher was at least able to theme the contributions and be confident in those themes, whereas in the coding of clusters using the links the researcher was at times unable to identify robust clusters and was not at all confident in the clusters he did manage to generate.

It was also for this reason of the slight variation in the themes which the researcher generated that he did not validate the GP client's themes against his own coding of that data. To explain, the researcher coded the same data as the GP client and compared the two batches of codes. While there was great similarity between the clusters, there was also some

differences. However, instead of further analysing these differences, the researcher decided to trust the client's expertise and discard his own codes. However, the researcher did scrutinise the client's codings to ensure that they seemed sensible to him and to explore if the client had made any glaring errors, for example, by not incrementing the theme number of a new theme.

8.3.1.1 Reflection : The appropriateness of themeing rather than clustering contributions

It is important to note that *themeing* contributions according to their similarity to other contributions accomplishes something very different to the *clustering* contributions according to links between contributions. When *clustering*, the researcher is using the causal links between contributions. Hence the relationship identified is a causal one (granted some contributions will be included in the same cluster for reasons of interpretation rather than the links between them). When *themeing*, the researcher has no knowledge of the links between the contributions (although on occasions the group maps were used to guide the researcher when he was unable to theme with confidence). Hence the relationship identified by the researcher between contributions in the same theme is one of similarity, not one of causality. Therefore *clustering* is based on the relationship of causality between contributions whereas *themeing* is based on the similarity in topic between contributions (as understood by the researcher).

On reflection, it seems sensible to base any insight of the navigation of different issues by participants on the similarity of the contributions instead of on the causal relationships between contributions for the following reason. There is no guarantee that similar contributions from one participant will be closely linked in the group map, as this researcher's experience if analysing the group map suggests that it is the spin given to a contribution that will depend on where it best fits into the model in a causal sense. Also, being closely linked in the group map depends on exhaustive links which the group maps analysed here have been argued to be lacking. Therefore it might be that two contributions about the same issue might not be linked in the map, but should be identified as being similar in the group themes. Given that the exploration of causal relationship was abandoned due to the maps not being robust, some exploration of the similarity of contributions could give access to the nature of the contributions being made by participants.

8.3.1.2 Justifying this researcher themeing contributions for a console when he cannot independently validate his interpretation

The accuracy of the themeing for the ELZ, NYPZ and GEA contributions is reliant on the researcher's own interpretation of each contribution and on him identifying similarities between contributions which seem to combine to make a theme (Miles and Huberman, 1994). One significant and inescapable weakness of this approach to themeing is that coding is based on the researcher understanding and interpretation of the contributions (Krippendorf, 1980).

However, the categorisation of contributions into the group themes is thought to be valid for the following four reasons:

1. The researcher was present at each of the workshops and was helping the facilitator with the smooth running of the event. Hence he was present during all gathering sessions and all group discussions which took place. Furthermore, he was actively listening to the group members during this time. This is not to say that the researcher remembers the content of the discussion, but it does mean that the researcher has listened to a prolonged conversation about the issues and is not coming to the data without any appreciation of what they are about.
2. The researcher had been immersed in the contributions from each workshop before he attempted to theme them (which Huff and Fletcher (1990) consider to be good experience for analysing group maps and making justifiable and informed propositions about them). In this, before he attempted to theme the contributions he had already:
   - scrutinised each of the contributions during other coding activities that have not been reported upon here - for example, the coding of *goodness* which involved the intricate dissection of each contribution according to the different constructs which each contributions might have thought to hold.
   - performed extensive exploration of the participant-entered links between the contributions which involved reading and interpreting them to identify clearly incorrect and missing links (reported on in Chapter 7).
   - explored the group maps to understand the clusters of contributions that the group members and facilitator thought might be apparent (reported on in Section 8.2 of this chapter).

These tasks had taken at least six months in total. Consequently it is believed that these tasks (as well as his involvement in the workshops) enable the researcher to gain a detailed appreciation of all the participant-entered contributions and the context of the

gathering and workshop in which they were made (a view supported by Huff and Fletcher (1990)). Thus when themeing the contributions, the researcher would have been able to theme all of them within a context rather than treating them as isolated fragments of thought with no context. Hence, instead of coding contributions in terms of shared wording, for example, the researcher was able to code them in terms of his interpretation of the topic to which they pertain - which he believes to be a richer construct which might indicate more about their true meaning.

3. The researcher used the group members' opinion of which themes contributions fell into when it seemed unclear. Often the themes within the contributions from one console appeared to be clear. More ambiguity was found during themeing the contributions across consoles, i.e. in the pursuit of group themes for entire gatherings (as will be discussed in Section 8.4.1). On occasions when the researcher was unable to code the contributions with confidence, he took counsel with the group map. Identifying the contributions that these linked into (and out of) informed him of the more appropriate themes as the participants might have seen it (as it was their group map which informed the final outcome).
4. The researcher was not under any time pressure to code the contributions. Hence he could ponder over the codes, double check that and revise them until he was satisfied in the codes which he had performed. Also the researcher could play with the codes by attributing them to different themes and exploring how well they would fit with the other contributions in those themes. Ultimately the researcher was satisfied with the final codes that were generated.

For these four reasons it is believed that the researcher is able to theme contributions and produce meaningful and useful results from the coding of themes. Granted, it would be more desirable for the themeing to be done by a group member or an expert in the field (as in the case of the GP data), or for them to validate the researcher's themeing, but this was not possible due to the data being collected under the research conditions of real-world workshops. Hence no validation of the ELZ, NYPZ and GEA themes was possible with experts in the field. This is because the experts were deemed to be people who were too busy to be bothered with an interruption with a task that would not bring them any benefit (a problem also reflected upon by Jenkins (1998)). Typically these people were not in mainland Britain, thus adding to the complexity and potential cost of this researcher following up the workshops in this way.

8.3.2 Interpret the results from themeing the contributions.

The themeing of contributions was performed based on the understanding and interpretation of the researcher. However it has been argued that the themes are believed to be valid and so one must now consider if they can indicate anything useful about the navigation of different issues which participants might perform in a JOURNEY Making gathering.

8.3.2.1 Results of manually themeing contributions from a console (by workshop)

Table 8.3 on Page 289 displays results from analysing the number of contributions that consoles are likely to make to their own first theme, second theme, and so on. Table 8.3 requires some clarification as to what the data actually represents, and a discussion around Table 8.2 will seek to do this. The data in Table 8.3 is initially decomposed to the level of the workshop i.e. ELZ, NYPZ, GEA and GP. Beyond that each contribution made from a console was coded in order to identify how many themes might have actually existed in the navigation of different issues by participants using that console.

To explain, (concentrating on the column titled "contributions in theme" in Table 8.3) in the example in Table 8.2 one single console makes four contributions in three different gatherings (called gathering A, B and C). In gathering A, the four contributions are made to only one theme i.e. the contributions might be very similar to one another as the participant had experienced bounded vision. Hence, for gathering A, the console would have made 4 "contributions in theme" against "Theme 1" (which is in a **bold** font in Table 8.2). In gathering B, the contributions are made to four different themes. Hence, for gathering B, the console would have made one "contributions in theme" against "Themes 1, 2, 3 and 4" (which is in an *italic* font in Table 8.2)).

In gathering C of Table 8.2 the console makes four contributions to two different themes. The contributions are themed as being one contribution to that console's first theme and three contributions to its second theme (the order in which the console made the contributions that differentiate the themes). In this case the "Theme 1" would have one "contribution in theme" (which is in a normal font in Table 8.2) while the "Theme 2" would have three "contributions in theme".

Table 8.2 – How to interpret the 'contributions in theme column in Table 8.3

	Gathering A	Gathering B	Gathering C
	Contributions in theme (for one console)	Contributions in theme (for one console)	Contributions in theme (for one console)
Theme 1	4	*1*	1
Theme 2		*1*	3
Theme 3		*1*	
Theme 4		*1*	

In the same way as Table 8.2 does for one console, Table 8.3 represents the number of contributions made by all consoles in a workshop to each of their individual themes.

The column titled "total no of consoles contributing to each theme" in Table 8.3 indicates the number of consoles that did actually make contributions to each number of individual themes. Hence, from Table 8.3, in the ELZ workshop, 22 consoles actually made in total 37 contributions to four different individual themes, but only 12 consoles made 15 contributions to 5 individual different individual themes.

Table 8.3 - The number of contributions made to progressive themes for all consoles across all types of gatherings?

	ELZ			NYPZ			GEA			GP			Total
	Contributions in theme	Total no. of consoles (across 6 gatherings) contributing to each theme	Average number of contributions per console to each theme	Contributions in theme	Total no. of consoles (across 6 gatherings) contributing to each theme	Average number of contributions per console to each theme	Contributions in theme	Total no. of consoles (across 1 gathering) contributing to each theme	Average number of contributions per console to each theme	Contributions in theme	Total no. of consoles (across 2 gatherings) contributing to each theme	Average number of contributions per console to each theme	% of 'consoles contributing to each theme'
Theme 1	83	39	2.13	103	50	2.06	31	5	6.20	40	10	4.00	100.0%
Theme 2	61	36	1.69	64	41	1.56	14	5	2.80	34	10	3.40	88.5%
Theme 3	47	30	1.57	50	30	1.67	5	3	1.67	28	9	3.11	69.2%
Theme 4	37	22	1.68	21	15	1.40	4	3	1.33	13	6	2.17	44.2%
Theme 5	15	12	1.25	11	11	1.00	3	2	1.50	6	4	1.50	27.9%
Theme 6	9	6	1.50	6	6	1.00	2	1	2.00	3	3	1.00	15.4%
Theme 7	3	3	1.00	2	2	1.00				1	1	1.00	5.8%

Interpreting the results in Table 8.3 gives some very interesting initial insights to the possible strategies consoles use to navigate different issues of the problem. It would seem that most consoles in these workshops were able to make contributions to more than one theme, up to a maximum of 7 themes. In fact, in total 69.2% of all consoles were able to make contributions to at least three different themes. This result contradicts Burton's (1987) thoughts on verbally interacting groups (not computer supported groups) that "groups tend to create a 'focus effect', as participants 'fall into a rut' and pursue a single train of thought for long periods of time", Page 226 . The consoles in this research do not seem to make just one contribution to each theme nor do they seem to make multiple contributions to just early themes. This is evident through the result that consoles are (on average) able to make 1.57 (in the ELZ workshop), 1.67 (in the NYPZ and GEA workshops) and 3.11 (in the GP workshop) contributions to their third individual theme. It is important to note here that the

actual topic considered in the third theme might be different for each consoles. However, what will be common is the fact that these consoles had made previous contributions which might be said to belong to two other different themes.

It is clear from the data in Table 8.3 that the number of consoles making contributions to an additional individual theme diminishes. In addition, the number of contributions being made to each additional theme reduces. Hence it seems possible to generalise a proposition (from 'the average contributions per console per theme' calculation in Table 8.3) that consoles in this study were less likely to make multiple contributions to later themes than they were to earlier themes. In general, the more themes they contributed to, the less likely they were to make multiple contributions to later themes. This result is common across all the workshops reported on here.

It is interesting to see from Table 8.3 that there is clear distinction between the ELZ and NYPZ 'average number of contributions per console to each theme' and the GEA and GP averages. The 'Theme 1' ELZ/NYPZ averages are between 2.06 and 2.13 while the GEA/GP are between 4.00 and 6.20. The distinction between the averages for Theme 2 is not as great, but is certainly apparent (as one can see by looking at Table 8.3). It is important to remember that in both the ELZ and NYPZ workshops participants had to share a console, whereas in the GEA and GP workshops participants worked alone on a console. It might be that these participants working alone get onto one stream of thought and share a proliferation of contributions on a theme, almost like a 'script' (Landman and Manis, 1983). Although individual working alone were also able to navigate up to 7 in themes, these participants did contribute a large number of contributions to their most popular individual theme. Hence this might indicate that these participants initially suffered from bounded vision as they seem to have concentrated a lot on early themes.

It is interesting to note that this mass concentration on early themes did not seem to happen for the participants who worked in pairs in the gathering examined here. This might be because the negotiation between these pairs of the nature of the contribution they wanted to share helped them to think more divergently than the individuals working alone. As suggested, it might be that the individual working alone were be able to get onto one stream of thought and share a number of contributions from a script. However, it might be that the pairs did not get onto one stream of thought because there are two competing steams of

thought each held by the different members of the pair. Hence it might be that pairs were more able to escape from bounded vision than individuals were because of the interruption to continuous thinking when they discussed matters with their partner and from the competing perspectives which may be discussed.

It is very significant that participants in these workshops have been found to be able to share contributions to up to seven different themes. In psychology the number seven is a "magical number" which places "limits on out capacity for processing information", Page 81, Miller (1956). From his experiments, Miller "maintains that ... span of [immediate memory] is usually somewhere in the neighbourhood of seven", Page 81.

It is significant to note that the researcher only became aware of the magical nature of 'seven' when he was discussing the findings of his work with a cognitive psychologist. Hence there was no opportunity for the researcher (or the GP client who also coded 7 themes in the first of the GP gatherings) to sub-consciously, or otherwise, develop up to seven themes in the contributions that were contributed to by participants. This raises a very interesting issue. One might question whether it is the information processing limits of the participants which determined that they share contributions to up to seven themes, or whether it was the information processing limits of the researcher (or the GP client) to manage the attribution of contributions to seven different themes! It may be that it is the coder's own cognitive limitations that have determined that seven themes were found in some participants contributions. However, this researcher would propose that this is an issue on which he can suggest no firm conclusion as it is an issue that psychologists cannot even answer, and so there seems little point in attempting to gain closure here. This is however an issue that will be revisited in Chapter 10, the Reflections Chapter.

Moving on, the analyses in Table 8.3 is performed at the level of the workshop (i.e. ELZ, NYPZ, GEA and GP), not at the level of the type of workshop (i.e. proposed, normal and multiple stimuli format of gathering). It is possible that the different formats of gathering might have effect on the how many contributions are made to progressive themes. Hence it is necessary to perform this analysis, as will be performed in the following discussion .

8.3.2.2 Results of manually themeing contributions from a console (by type of gathering)

There are three different types of gatherings (as discussed in Section 6.3.3.2), some combinations of which have been performed in the four workshops (as detailed in Table 5.1). **Proposed format gatherings** are the main focus of this thesis and have been explained fully several times. In **normal gatherings** participants are given one stimuli (but sometimes two stimuli - in the case of the GEA gathering) and asked to make contributions whilst the public screen up-dates with the contributions as they are entered i.e. piggy-backing is enabled from the very start. In **multiple stimuli gatherings** participants are given (say) 10 stimuli contributions which represent different issues of a problem and are asked to generate piggy-backed contributions off these. Participants are able to see the other peoples' piggy-backed contributions as they are entered. Details of the number of contributions and causal links made in each format of gathering is given in Table 8.4.

Table 8.4 - The number of contributions made in each proposed, normal and multiple stimuli session under scrutiny here

		Total number of participant-entered contributions (excluding 'silly' contributions)	Total number of participant-entered links (excluding typos)
Proposed Format	ELZ 1	43	33
	ELZ 2	39	33
	ELZ 3	66	45
	ELZ 4	71	59
	NYPZ 1	51	47
	NYPZ 2	66	74
	GEA	59	23
	GP 1	78	53
	GP 2	47	42
Normal Format	ELZ 1	18	0
	ELZ 2	18	9
	NYPZ 1	61	70
Multiple Stimuli Format	NYPZ 1	50	53
	NYPZ 2	18	25
	NYPZ 3	13	20

One might expect that the differing nature of these gathering conditions would create different environments that might enhance, or stifle, the ability of the participants to

navigate and make contributions to new themes. For example, one might propose that participants of a proposed format gathering might fall in a rut and contribute lots of ideas about one theme, effectively converging their navigation on one theme (Nagasundaram and Bostrom (1995b), van Gundy (1987)). This could happen because during the blind gathering in the proposed format participants might not be able to switch themes voluntarily in their navigation due to bounded vision of them concentrating on one train of thought and so not consider other issues (effectively if participants are only able to initially consider a narrow range of the problem then they will continue to do so (Dennis et al, 1997)). Then during the piggy-backing gathering in the proposed format the mass of information on the public screen might cause cognitive overload and participants cope by just reading the public screen rather than contributing their thoughts on what they read (Nagasundaram and Dennis (1993) and Santanen et al (1999) discuss cognitive overload arising from too much information being presented).

Also one might propose that participants of normal gatherings might be able to use the stimulation of other peoples' contributions to get them out of one chain of thought (Dennis et al (1997) suggests that piggy-backing off a diverse set of contributions will help people get out of a rut). Due to the public screen constantly updating, the participants might not be as distracted as participants of a blind gathering when the screen is suddenly activated (Grise and Gallupe, 1999). Hence the participants of a normal gathering might be able to use the public screen when they want to, rather than when the facilitator decides that they can (DeSanctis and Poole, 1994). Thus the public screen might be useful to participants of normal gatherings if they feel that they are getting into a rut as they can easily look to see what other people have contributed (Pinsonneault et al, 1999).

Furthermore one might propose that participants of multiple stimuli sessions would be even more able than participants of normal gatherings to make contributions to different themes. This might occur because in this format each stimuli will represent a new theme, and so they are more able to navigate around different themes rather than having to generate the different themes themselves (Briggs and Mittleman, 1997).

These three propositions would suggest that the proposed format of gathering would be the poorest of the three in offering participants the stimulation through which they would be able to get themselves out of a rut in their navigation of the problem. Essentially then, participants might actually fall into bounded vision whereby they are limited to generating

new contributions within the bounds of ones they have previously contributed (as argued by Nagasundaram and Bostrom (1995b)). If this was found to be true then it would cast serious doubt over the worth of the blind gathering because the contributions being generated might all centre around a main theme. This might cause significant concern within facilitators and participants if the consideration of the outcome was only based on a small proportion of the knowledge of these participants.

In order to understand if these three propositions are supported by data from the workshops examined here (and critically if there should be concern over the usefulness of the proposed format) in this sense, the making of contributions to different themes in different formats of gathering was investigated.

The first investigation centred around understanding if the participants of the different formats of gathering might be more likely to share contributions to a greater number of different individual themes.

Table 8.5 - The individual themes to which participants share contributions

	Maximum number of individual themes contributed to	Average number of individual themes contributed to
Proposed Format	7	6.2
Normal Format	7	5.0
Multiple Stimuli Format	5	4.0

From Table 8.5 one can see that the maximum number of individual themes to which participants share their contributions is 7 themes for the proposed format and the normal format and 5 themes for participants of the multiple stimuli format. However, on average, for these four workshops the participants of the proposed format seem more able to share contributions to a greater number of themes than any participants of any format of gathering, in being able to share contributions to and average of 6.2 individual themes.

However, this analysis does not indicate the number of contributions that participants are able to share to these individual themes and so the propositions made above might actually

still be true. It might be that participants of the normal format are able to share a great number of contributions to all their (on average) 5.0 individual themes, whereas participants of the proposed format concentrate primarily on one or two in themes and only make one contribution to their other individual themes. The analysis in Table 8.6 sought to investigate if the above propositions were indeed true.

Table 8.6 - The themes from all consoles across gatherings of different formats

	Proposed format			Normal Sessions			Multiple Stimuli		
	Contributions in theme	Total no. of consoles (across 9 gatherings) contributing to each theme	Average number of contributions per console to each theme	Contributions in theme	Total no. of consoles (across 3 gatherings) contributing to each theme	Average number of contributions per console to each theme	Contributions in theme	Total no. of consoles (across 3 gatherings) contributing to each theme	Average number of contributions per console to each theme
Theme 1	169	62	2.73	41	20	2.05	47	23	2.04
Theme 2	133	61	2.18	20	17	1.18	20	15	1.33
Theme 3	107	53	2.02	13	12	1.08	10	8	1.25
Theme 4	64	35	1.83	8	8	1.00	3	3	1.00
Theme 5	28	22	1.27	7	7	1.00	1	1	1.00
Theme 6	15	11	1.36	6	6	1.00	0	0	
Theme 7	4	4	1.00	2	2	1.00	0	0	
Total	520	248		97	72		81	50	

Note : In order to enable comparison between proposed, normal and multiple stimuli sessions in which a vastly different number of contributions were made, the 'average number of contributions per console per theme' will be the main source of comparison. This measure effectively equalises the number of contributions and the number of gatherings to enable comparison by taking their average.

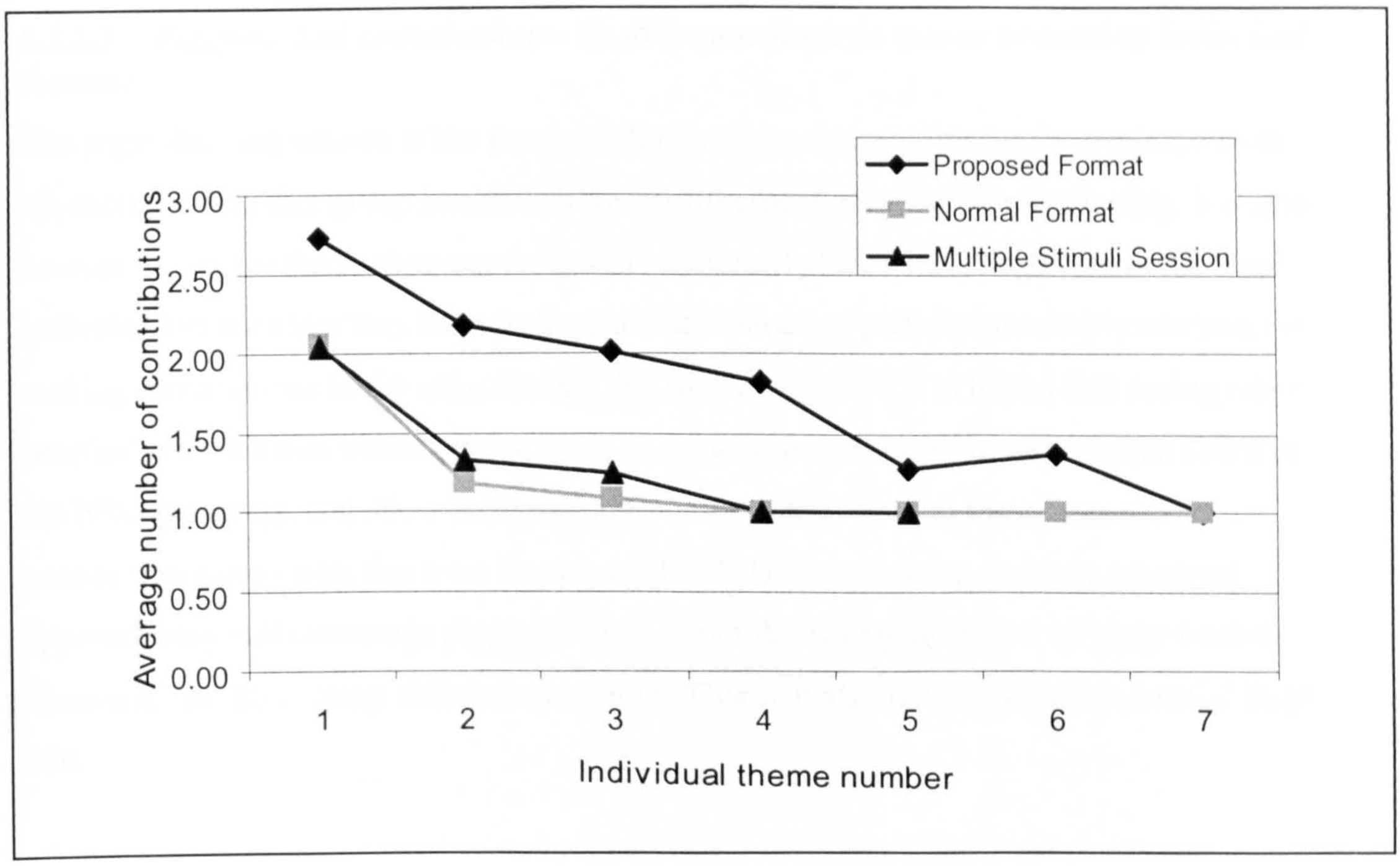
These results from different gathering sessions (in Table 8.6) requires explanation as they fail to support any of the propositions. Working backwards through Table 8.6, one might expect that the number of themes covered in the multiple stimuli gathering would be larger then that of normal or piggy-backing gatherings. This is because the participants are actually

being asked to move around each of the stimuli and explore their thoughts of them. However, this is not supported by the data. It is possible that this result is due to the greater time pressure under which this particular format of gathering is typically run (see Section 6.3.3.2 for a review of this strategy). These multiple stimulus gatherings are typically used when time is short and the facilitator wants to converge the navigation of participants. Furthermore one might expect that the 'average number of contributions per theme' to be quite low because participants are being asked to only contribute one or two contributions then move on to different stimuli. This thought is support in Table 8.6 when compared to the proposed format.

The proposition that the ability to freely piggy-back in a normal gathering would enable participants to diverge their navigation of issues and get out of a rut and enhance their contribution to more themes above that of proposed format participants (who might get into a rut during the blind gathering) has also been found to be inaccurate for these participants. This might be because participants of both formats did not actually get into ruts in navigation of different issues and instead were able to navigate themes. This could explain how a few participants of both proposed and normal format sessions were able to contribute up to 7 individual themes. However, maybe due to the distraction from the public screen up-dating, participants of the normal format in the study were not able to concentrate as much on their own navigation of issues as the proposed format participants, hence the participants of the latter format were able to contribute more contributions to their individual themes.

Not surprisingly it appears (from the data in Table 8.6) that 'the average number of contributions per theme' diminish as the number of the themes contributed to increases. Hence, for each type of gathering examined in this thesis, the more themes to which participants actually make contributions, the less the number of contributions they actually make to those themes. However, as it seems clear from Figure 8.3, participants of proposed format sessions seem more able to make more contributions to all of their themes than participants of any other type of session.

Figure 8.3 - Profile of the average number of contributions made by participants each of their additional themes



8.3.2.2.1 Reflection : Results from manual themeing of contributions by gathering type

This result in Figure 8.3 is a positive indication that the participants in these four particular workshops seemed more able to consider a wide range of themes in more detail in proposed format gatherings than they were in normal gatherings or in multiple stimuli gatherings. Obviously this appears to be strong support for the notion that these participants of the proposed format might have gained some real benefit from being able to generate contributions during such a format of gathering. This benefit is evident through the finding that these participants might be more able to 'surf' diverse aspects of their cognition. Although these participants do not seem to have shared more aspects of their cognition, they do seem to have shared knowledge on a broad range of themes in more detail.

The exploration of the average number of contributions per console to each theme (in Table 8.6) raises an interesting point. Previously raised as a concern was that participants might contribute a glut of contributions to early themes without moving onto other themes. However, this does not seem to have happened. The data in Figure 8.3 would suggest that, in all three formats of gathering, one theme is not the sole focus of the participants

concentration of sharing knowledge. Instead, participants are able to move onto thinking about other themes and share new ideas from their knowledge of that theme.

8.3.2.3 Piggy-backed contributions - do they contribute to new or to existing individual themes?

The piggy-backing session in the proposed format is an opportunity for the participants to appreciate what other group members have contributed during the blind gathering. It is also an opportunity for the participants to identify themes that they have neglected in the blind gathering but ones that they have feelings about. Instead of participants simply carrying on making contributions to the same themes that they always did, it is hoped that seeing other peoples' contributions would remind them of some issues that they have forgotten about in the blind gathering, and allow them to make some contributions to these issues. This proposition agrees with that from Dennis et al (1997) "that viewing multiple [clusters] approach may still encourage piggy-backing ... but the emerging stream of piggy-backed ideas will still go in many different directions. This will also reduce cognitive inertia" Page 206.

This research will explore if participants can actually expand their navigation of the issues in piggy-backing gatherings beyond that already performed in the blind gathering. If this is not found to be possible then it would question the worth of the piggy-backing session (in terms of the contributions captured) if the piggy-backing contributions are merely re-hashes of previous contributions. This question would arise because the piggy-backed contributions might contribute nothing new to the bank of substantive contributions on which the group members can base their consideration of the problem, hence one would question spending time on this activity.

Table 8.7 - Breakdown of piggy-backed contributions made during all proposed format gatherings

	ELZ (note 1)	NYPZ	GEA	GP	Total
(a) Number of consoles in the workshop's piggy-backing sessions	28	18	5	11	62
(b) Number of consoles which actually made piggy-backed contributions	1	10	4	9	24
(c) Number of piggy-backed contributions	1	18	15	38	72
(d) Number of piggy-backing contributions made to **different** individual themes	1	15	10	25	51
(e) Number of consoles which contributed new individual themes through piggy-backed contributions	1	8	4	6	19
(f) Number of **new** individual themes that piggy-backed contributions are made to	1	9	5	12	27
(g) Number of consoles which really contributed innovative piggy-backed contributions	1	6	4	8	19
(h) Number of **really innovative** piggy-backed contributions	1	8	8	14	31

Note 1 : The columns of '1's in the ELZ column is due to only one piggy-backed contributions being made during the four piggy-backing gatherings, the reasons for which were explored in Section 6.3.2.2. Hence there is only one contributions that can contribute to different or new themes, or be really innovative.

If the time for piggy-backing is to be useful then it must benefit the actual group members, for that is what is of interest to this research. All the piggy-backed contributions made during the four workshops under scrutiny here were identified in the individual themes database and analysed. From Table 8.7 it seems that a total of 24 consoles (row b) were actually able to make piggy-backed contributions out of a total of 62 consoles (row a) in the four workshops reported on here. The nature of the total 72 piggy-backed contributions (row c) that these 24 consoles made can be considered across three dimensions of contributions being made: to **different** themes, to **new** themes, that were **really innovative** contributions. The following discussion will explain each of these dimensions and give guidance to their coding, as well as reviewing the results for the analysis of individual theme.

In terms of the number of piggy-backed contributions establishing **different** themes, the researcher simply counted the total number of different individual themes across which

participants shared piggy-backed contributions. However, one must be careful with how the number of different individual themes is interpreted. The first piggy-backed contribution from each console must establish a different piggy-backed theme for that console (as seen from the coding of the individual themes). Hence the 24 consoles (row b) will have automatically established 24 different themes with their first piggy-backed contribution. To calculate the number of **different** themes that are established by the second and third ... (and fourth etc) piggy-backed contributions from each console (different in that previous piggy-backed contributions had not established these themes), one should eliminate these initial 24 contributions from the analysis. These should be eliminated because they represent 24 contributions that must have established a **different** theme for the console, not ones made to **different** themes to which piggy-backed contributions have not already contributed for the console. Hence instead of 51 contributions having the potential of contributing to a **different** theme for their console (row d), there were only 27 (as the other 24 are the first piggy-backed contribution which must establish a different theme). Furthermore, instead of 72 piggy-backed contributions having the potential of contributing to an already established theme for that console (row c), there are only 48 such contributions (as 24 contributions must have done so). Consequently, out of 48 (72-24) eligible piggy-backed contributions across all the piggy-backing gatherings in this study, 27 (51-24) actually establish a different theme, and are eligible to be counted in this analysis. Hence, 56.3% of the eligible piggy-backed contributions were actually made to themes that were **different** to the other contributions the participant had contributed to during the piggy-backing session.

In terms of the piggy-backed contributions made to **new** themes, these were coded by looking at the codes of the contributions made during the blind session and counting the number of piggy-backed contributions which created new individual themes during the piggy-backing session for that console i.e. them themes numbers which contributions made during the blind gathering did not contribute to. Across all four workshops in this study, 72 piggy-backed contributions (row c) were made to 27 new themes which the contributors had failed to consider before (row f). Hence, at least 37.5% of all piggy-backed contributions were stimulated by the participant thinking of an issue that was new to their consideration (of the problem in that gathering). Possibly the opportunity to see other peoples' contributions enabled participants to consider the problem from the perspective of other group members and in doing so considered aspects of the problem which were completely

new to their previous consideration (Osborn, 1953). The result of this effort was 27 contributions to themes that were **new** to the participants.

The results in Table 8.7 might also hold positive indications of the ability of these participants to use a contribution to stimulate new diverse themes which the console had not previously considered. In this, the number of **really innovative** piggy-backed contributions (row h) is an indication of the ability of these participants to generate innovative contributions during a piggy-backing gathering. This researcher coded a really innovative contribution to be one that created a completely new individual theme or one that the researcher decided gave a completely new spin to an existing individual theme from that console. Using the terminology of Satzinger et al (1996) really innovative piggy-backed contributions could be thought of as paradigm modifying contributions.

31 (row h of Table 8.7) of the 72 (row c) piggy-backed contributions made across all the workshops were thought to be **really innovative** in the way they addressed the problem. Hence, 43.1% of all the piggy-backed contributions were thought to address the problem in ways in which the 24 consoles had previously failed to do. This result might be support for the proposition that people can creatively use other peoples' contributions to stimulate their generation of completely new aspects of a problem (Dennis and Valacich (1993), Satzinger et al (1996)).

8.3.2.3.1 Reflection : On the nature of the piggy-backed contributions

These three results in the above discussion are significant and might suggest that for the four workshops examined here:

1. 56.3% of piggy-backed contributions were made to **different themes.**
2. 37.5% of piggy-backed contributions were made to **themes that were new** to the consoles.
3. 43.1% of piggy-backed contributions were **really innovative** in how they addressed the problem, possibly creating new individual themes for that console or were paradigm-modifying.

The first result would indicate that some of these participants did not concentrate extensively on a deep analysis of one issue when piggy-backing. Instead it indicates that they might have piggy-backed off a number of different themes. The second result would

suggest that some piggy-backed contributions were made to aspects of the problem that the various participants might have failed to consider before. The third result suggests that some piggy-backed contributions might be ones which participants might strongly regret not having in the group map because no-one else in the group might have thought of them at all.

This seems to be positive indication of the worth of the piggy-backing session to these participants, as they seem to be stimulated to think about themes which are new to them. These participants do not seem to have been bogged down in one theme, instead they seem able to contribute knowledge to different themes. Effectively, these participants might seize the opportunity during the piggy-backing session to consider issues of the problem that they had previously not considered and maybe no-one else in the group had considered (i.e. they are making really innovative contributions). Hence (as participants from the GEA session claimed) the piggy-backing session may raise participants' awareness of the broader issues in the problem and might give them the opportunity to contribute their opinion on these new aspects of the issue.

There is no evidence that the contributions made during these piggy-backing gatherings are only re-hashes of contributions they have already made. It might be that these participants were trying to construct new contributions, rather than take (what might be) the cognitively easier task of re-hashing their existing contributions. These new contributions might contribute some significant benefit to other group members in their consideration of the problem, because they are possibly unique issues that others have not considered.

8.4 THEMEING CONTRIBUTIONS FROM ONE GATHERING – THEMING ACROSS CONSOLES.

The themeing of contributions has begun with an analysis of the individual themes to which contributions might be said to belong. However, the contributions to group themes are of equal importance as those to individual themes. If piggy-backed contributions are ones which contribute something new to the group members consideration of the task (not just to the participants who made the contribution), then they could be ones that the group members might regret not having considered.

The coding of these group themes was performed in order to explore how the contributions from each gathering might be thought of as belonging to themes of contributions in the

group map. Earlier work, reported on in Section 8.2, aimed to investigate the ability of the researcher to develop themes of how participants might have navigated issues through analysis of the links between the contributions. That work failed to develop a robust methodology for developing the clusters of contributions in group maps. The method employed here aims to develop robust clusters of contributions on which to gauge the ability of the participants to contribute knowledge to different aspects of the problem. If piggy-backing can be found to offer participants the opportunity to contribute something new to the group map (possibly stimulated by realising other people's contributions) then it might support an argument for time being spent on piggy-backing to enhance the group members consideration of the problem.

8.4.1 The process of themeing contributions from one gathering (across consoles)

Themeing contributions across all participants in the four workshops involved the researcher scrutinising each contribution and locating contributions from the same gathering that pertained to similar aspects of the problem. As with the coding of the individual themes, this researcher coded the ELZ, NYPZ and GEA contributions and asked the client for the GP workshop to code those contributions.

The group theme coding was performed in a very similar manner to that which the facilitator performs during a JOURNEY Making gathering when they move contributions into clusters on the public screen. Although the coding of group themes is very similar to that performed for individual consoles (discussed in Section 8.3.1) it seems worthwhile to briefly introduce the process the researcher used to code group themes. These instructions were given to the GP client to advise how she might group theme those contributions.

The coder took a single list of all the contributions and scrutinised the first contribution. Then he moved down the list of all the contributions and identified those which might be thought of as pertaining to the same issue as the first contribution. He then scrutinised the second non-coded contribution and went down the list until all contributions pertaining to that issue were identified. This process was repeated until all contributions had been initially coded and themed.

Appendix 8.2 displays the results of the coding of group themes for two participants from the same real-world gathering. Again two participants were chosen to limit the amount of

information which might be able to indicate the organisation's strategy on this issue. The same two participants displayed in Appendix 8.1 were chosen to maintain continuity.

After the initial coding the researcher reviewed the group codes for all the contributions. As with the themeing of individual themes the researcher felt that the later contributions might have established new group themes that some of the earlier coded contributions might be more appropriately coded into. Hence the coder effectively re-coded the contributions to ensure his satisfaction with the contributions being in the appropriate group themes.

If the researcher was unable to code any of the contributions because he was unclear as to which theme it might fit, then he sought confirmation from the group map and from the individual themes already coded. In this he would compare the map of the contributions and the coding from the individual themeing process. This gave some guidance of how the group members and the researcher had previously viewed the contribution and this informed the group themeing.

It is important to note that (with the exception of contributions the researcher was unsure about) the researcher coded each of contributions into a group theme without referring to the individual themes that have already been generated (and the GP client was asked to do likewise). The researcher felt that just because two contributions fit into the same individual's theme, they might not necessarily fit into the same group theme, because there might be more group themes and so greater ability to distinguish between contributions. However when the researcher was unclear about contributions the researcher thought that some guidance from the individual themes was appropriate.

However, the individual themes were not ignored completely when coding group themes. On the completion of coding the group themes, the individual themes were revisited, as explained in Section 8.3.1. Very briefly, any contributions that appeared to be in different group themes than their individual themes suggested they should be in were re-checked and validated. It is felt that for the same reasons offered in Section 8.3.1.2 the themeing of the contributions in a whole gathering is a methodologically appropriate activity to perform in this research by this researcher.

As with the coding of individual themes for the GP session (as described in Section 8.3.1) the researcher coded the GP data as well as the client. However, for the same reasons as discussed in Section 8.3.1 (i.e. the natural variation that might be contained in the coding by different people at different times), the researcher trusted the GP client's codes and only validated that they did not contain glaring mistakes.

8.4.2 Interpret the results from themeing by group gathering

The work on analysing group themes was split into four sections. Firstly, the analyses will explore if participants are able to navigate more group themes using either the proposed, normal or multiple stimuli formats. This work will continue that in Section 8.3.2.2 where the ability of the participants to contribute to different individual themes in the different formats of gathering was explored. The second section to be reflected upon here is the way in which the piggy-backed contributions are made to group themes (in Section 8.4.2.2). This discussion will be used as a base from which to explore how participants contribute to the same group themes using their shared knowledge of the problem (in Sections 8.4.2.3 and 8.4.2.4).

8.4.2.1 Making contributions to different group themes in different gathering formats

It was found in Section 8.3.2.2 that participants of the proposed format gatherings seem to be able to share more contributions to up to seven individual themes of their knowledge about an issue. However, it was found that they might not be able to share knowledge to more individual themes than normal format participant as both group of participants were able to share contributions to up to 7 individual themes. However, this work does not indicate the way in which these individual themes might overlap. For example, it might be that a large proportion of these individual themes are similar for each participant, which might indicate that the participants are able to consider a narrow range of just over 7 group themes. Alternatively it might be that these individual themes do not overlap and that participants are able to share to a very wide range of group themes. Hence analysis was performed to investigate this.

Table 8.8 - The number of group themes in different formats

	Number of gatherings	Maximum number of group themes	Average number of group themes per gatherings	Average number of group themes per console
Proposed Format	9	15	11.6	4.3
Normal Format	3	11	6.7	2.8
Multiple Stimuli Format	3	6	5.3	1.9

Table 8.8 indicates that participants of the these proposed format gatherings seem able to consider a greater number of group themes than the participants of either these normal or multiple stimuli formats of gathering in these workshops. It would seem that these participants of the proposed format can consider up to 15 different aspects of the problem during their group discussions but, on average, they are able to consider 11.6 aspects across the nine proposed format gatherings under scrutiny here. Furthermore, on average, the participants of the normal and multiple stimuli formats have only been able to share contributions to 6.7 and 5.3 different group themes represented on the public screen, respectively.

It also seems that the participants in these proposed format gatherings are able to consider more aspects of the problem than participants in the other formats, in term of the group themes. To explain, on average, participants in the proposed format seem able to share contributions to 4.3 group themes, whereas participants in the normal and multiple stimuli formats seem only to share contributions to, on average, to 2.8 and 1.9 different group themes.

The results in Table 8.8 offer very strong support for the notion that participants of these proposed format gatherings were able to consider a wider range of the problem than the participants of these normal or multiple stimuli formats. It suggests that if the main aim of the facilitator is to surface a wide range of issues of a problem then he might like to consider performing a proposed format gathering rather than a normal or multiple stimuli format, as this might enable the participants to consider the problem in the widest sense.

It might be that it is these pairs who work together who contribute a greater proportion of contributions to different themes as they are more able to escape from bounded vision than individuals working together, as the discussion around Table 8.3 on Page 289 explored. However, Table 8.9 shows that this is not the case. It indicates that there is very little difference between the average number of group themes that are considered by these pairs (an average of 4.36 group themes) and by these individuals working alone (an average of 4.28 group themes).

Table 8.9 - Average number of themes considered by individual working alone and pairs

	Average number of group themes considered by the console
Working in Pairs (ELZ and NYPZ)	4.36
Working alone (GEA and GP)	4.28

8.4.2.2 Exploring the making of piggy-backed contributions to group themes

The number of piggy-backed contributions made to different individual themes has been discussed elsewhere (in Section 8.3.2.3) so this discussion will concentrate on those results which are pertinent to making of contributions to group themes.

The researcher felt that there are three 'types' of analyses (or dimensions which might indicate the usefulness of the piggy-backing gathering to the participants) that might be performed on the coding of the group themes which will be interpreted here. Each of these deals with one aspect of making piggy-backed contributions to: a range of **different** themes that the participant considered; **new** group themes that the participants had not previously considered but others in the group had; **brand new** themes that no-one in the group had considered during the entire session. The following discussion will detail the meaning of (and method of coding) each type of code and explain the results of the analysis.

Table 8.10 - Breakdown of the nature of piggy-backed contributions made during the proposed format gatherings

	ELZ (Note 1)	**NYPZ**	**GEA**	**GP**	Total
(a) Number of consoles which made piggy-backed contributions	1	10	4	9	24
(b) Number of piggy-backed contributions	1	18	15	38	72
(c) Number of consoles which made piggy-backed contributions to **different** group themes	1	10	4	9	24
(d) Number of piggy-backed contributions made to **different** group themes	1	14	12	28	55
(e) Number of consoles that contributed to **new** group themes	1	6	4	6	17
(f) Number of piggy-backed contributions made to **new** group themes that the console had not contributed to before	1	7	8	15	31
(g) Number of consoles contributing **brand new** group themes	1	3	3	4	11
(h) Number of **brand new** group themes created by piggy-backed contributions	1	3	5	5	14

Note 1 : As with Table 8.7 the columns of '1's in the ELZ column is due to only one piggy-backed contributions being made during the four piggy-backing gatherings, the reasons for which were explored in Section 6.3.2.2. Hence there is only one contributions that can contribute to different or new themes, or be really innovative.

In terms of measuring the **different** group themes to which piggy-backed contributions in these four workshops were made, the researcher took each of the piggy-backed contributions and looked at their group theme number. He then simply counted the number of piggy-backed contributions which were made to different group themes. If one is interested in the number of piggy-backed contributions to **different** themes then one must eliminate those first piggy-backed contributions from each console (as these must certainly be made to different piggy-backed themes for the console) (this practice was also performed for individual themes and is more fully explained in Section 8.3.2.3). As 24 consoles make piggy-backed contributions (row a) then 24 piggy-backed contributions must be made to different piggy-backed themes. Hence out of 72 piggy-backed contributions (row b), only 48 contributions are eligible to be included in this analysis of different themes. Furthermore,

out of 55 piggy-backed contributions made to different themes (row d), 31 of those are eligible to be included here (as 24 must have established different themes). Hence 31 out of 48 eligible piggy-backed contributions (or 64.6%) established **different** themes. This results supports the notion that these participants navigated around different issues in the map and piggy-backed off a range of these, rather than becoming bogged down in piggy-backing a number of times off the same theme.

The second gauge of the usefulness of piggy-backing gatherings was the extent to which participants make contributions to **new** group themes that the participants had not previously considered but others had. In coding **new** group themes all the contributions were sorted in a list of the console which made the contributions. The researcher then compared the group themes to which their piggy-backed contributions were made and counted how many piggy-backed contributions were made to group themes to which the participants had not previously contributed.

It was found that 31 contributions (in row f of Table 8.10) were made to **new** group themes that the console had not considered before. Furthermore, there was a total number of 72 piggy-backed contributions made (from row b of Table 8.10). Hence it was found that 43.1% of the total number of piggy-backed contributions were made to new group themes that the console had not considered before. Therefore not only do these participants contribute to **different** themes in piggy-backing, but also they considered themes which either are **new** to them or they had forgotten about.

Support was found for the notion that these participants were able to perform the third gauge of the usefulness of piggy-backing gatherings - that participants might be able to make contributions to **brand new** themes that no-one had yet contributed during the blind session or that contributes something unique to an existing theme. In coding brand new group themes the researcher coded the number of piggy-backed contributions which established new group themes, or contributed something very unique to an existing group theme. 14 (row h) of the total 72 (row b) piggy-backed contributions made in these four workshops were deemed to be ones which contributed to the generation of a brand new group theme or a unique issue in that theme. Hence 19.4% of the piggy-backed contributions in this research were ones which actually created new group themes in their own right or contributed something unique to an existing group theme. The fact that completely new themes were

created by people piggy-backing off other peoples' contributions, might indicate that these groups had benefited greatly from the piggy-backing session. This benefit is due to the fact that the new themes created might give the whole group the opportunity to consider these new aspects of the issue in their exploration of the problem. Hence the participants can consider this new theme (or the new issue within the theme) in their consideration of the problem, thus any outcome can be one that is inclusive of these new pieces of knowledge.

To summarise, these three streams of results might suggest that for the participants of the four workshops under examination here:

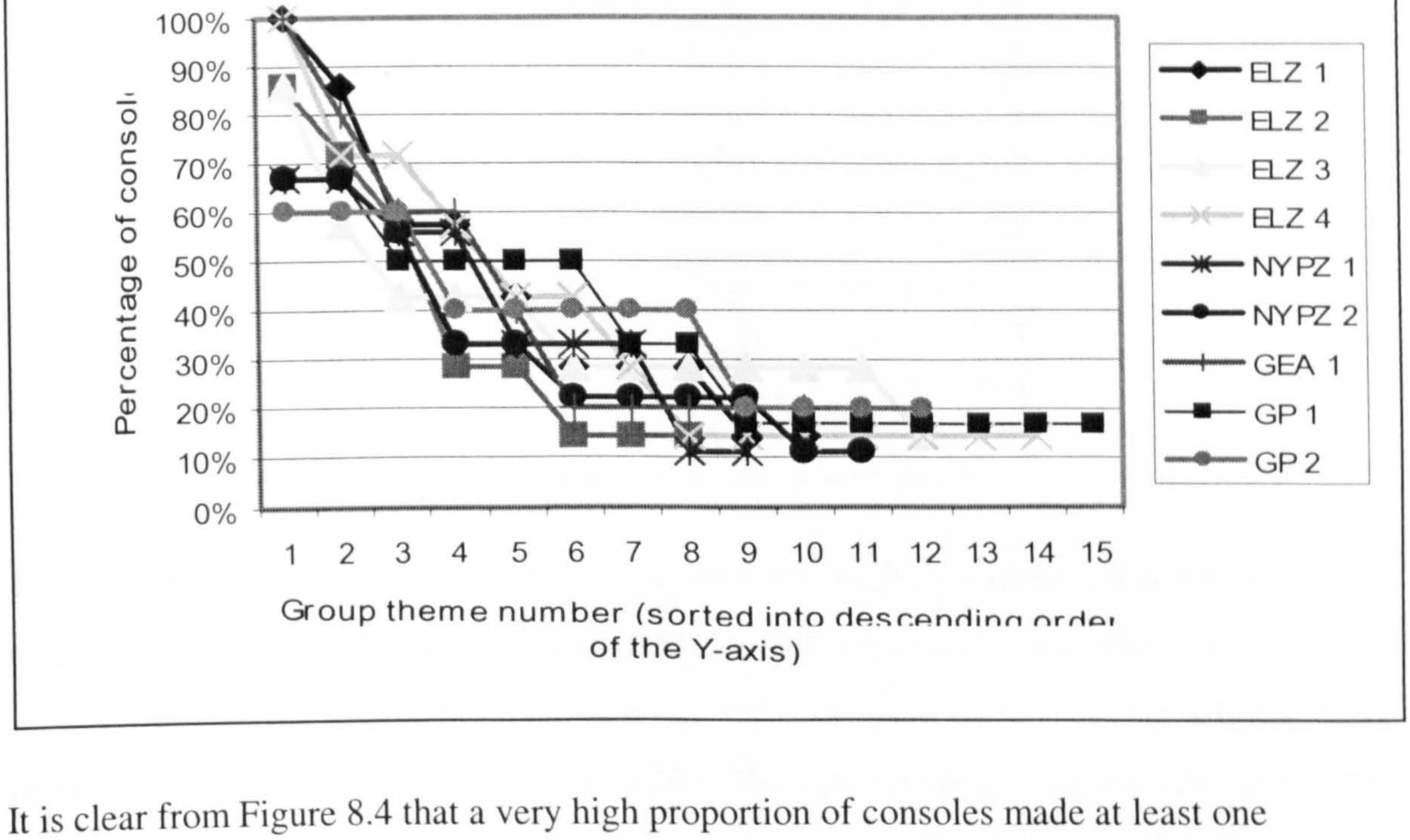
1. 64.6% of all piggy-backed contributions were made to **different themes** for the contributor of the contribution.
2. 43.1% of all piggy-backed contributions were made to **group themes that were new** to that the console i.e. they had not considered those themes before.
3. 19.4% of all piggy-backed contributions were ones which actually **created brand new group themes** (or a radically new relevant issue within the group theme) for the group members to integrate into their analysis.

These results seem to support the notion that these participants do seem to have been able to use piggy-backing gatherings to think about different themes, themes that they had not previously considered, and even were able to consider some themes that no-one else in the group had considered before. These results support Dennis et al's (1997) hypothesis that groups which piggy-back on a diverse range of contributions (as it is thought the group map will be) might generate a diverse range of piggy-backed contributions.

8.4.2.3 Consoles making contributions to the same themes

The final analysis regarding the exploration of the coding of the themes concentrated on the proliferation of the consoles to contribute to certain group themes in the nine real-world proposed format gatherings. This discussion will explore how diverse is the navigation of different participants in these gathering formats. It will explore if the group themes found in each proposed gathering are shared across a large proportion of the consoles, and to what extent piggy-backed contributions are made to each of these group themes. This work involved taking the first of the group themes and for each gathering simply calculating the number of consoles which had made contributions to each theme for each gathering. The product of this work is shown in Figure 8.4.

Figure 8.4 - The percentage of consoles contributing to each group theme in the proposed format gatherings (sorted into descending order of the percentage of consoles actually contributing to the group theme)



It is clear from Figure 8.4 that a very high proportion of consoles made at least one contribution to the most popular group themes in each of the gatherings with a comparatively small proportion contributing to less popular group themes. It is also clear that each of the proposed format gatherings under examination here is very similar in terms of the trend of the percentage of consoles making contributions to the themes. In terms of the ability of pairs and individuals working alone to share contributions to group themes they seem to do so in a very similar way to each other, with reference to Figure 8.4. Hence for the remainder of this analysis it seems appropriate to just concentrate on the average percentage of consoles (as detailed in Table 8.11). The result in Table 8.11 was calculated from the count of the number of consoles from which a contribution was actually made that lay in each of the group themes, from Table 8.6.

Table 8.11 - Percentage of consoles that contribute to each theme in the average proposed format gathering

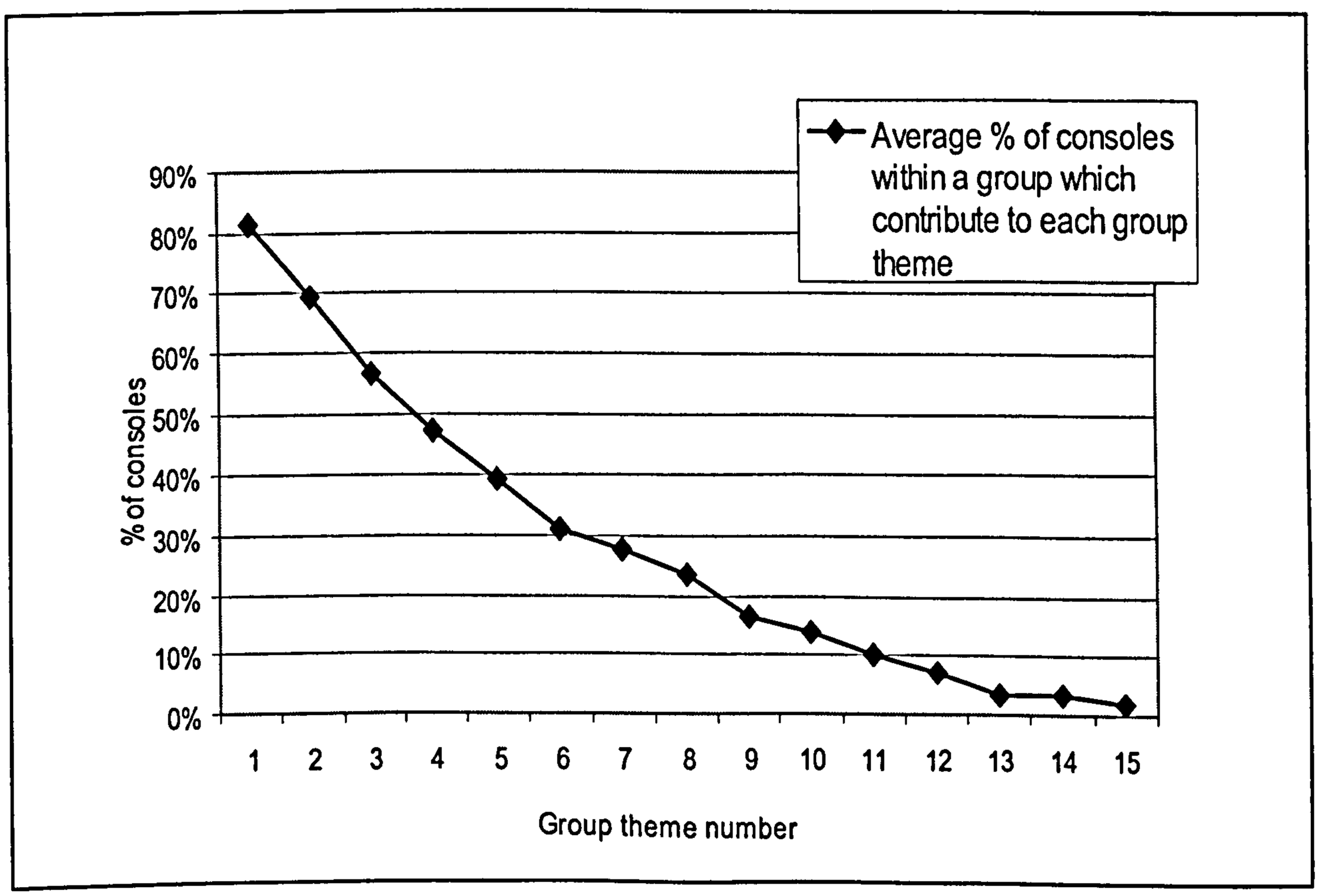
Theme Number	% of total consoles who contribute to each theme in the average proposed format gathering
1	81.3%
2	69.5%
3	56.6%
4	47.2%
5	39.3%
6	31.1%
7	27.7%
8	23.6%
9	16.3%
10	13.9%
11	10.1%
12	7.2%
13	3.4%
14	3.4%
15	1.9%

This analysis has shown, with data from the four real-world workshops, that a high proportion of consoles in the average proposed format gathering contribute to the same core set of group themes. In fact, from Table 8.11, 56.6% of the consoles contribute to the third most popular group theme. Hence, over 56% of the consoles in an average proposed format gathering contributed some knowledge to the same three group themes. In fact, by looking at the graph of this data in Figure 8.5, one can see more clearly that progressively less consoles contribute to less popular group themes. It does not appear useful to segment this data, in a Pareto-type (or ABC) analysis (Waters, 1998), to gauge the proportion of consoles sharing contributions to progressive themes, as the main thrust of the argument can be made without this. That is, a large proportion of consoles share contributions to the same core set of issues, and progressively less participants make contributions to subsequent group themes, up to 15 group themes for these consoles.

This is an important finding as it indicates that a significant proportion of the participants in these gatherings might overlap in what core aspects of the problem they think are important (a view supported by Moreland et al (1996) and McKay (1998)). This is a finding that is also supported by the Klimoski and Mohammed (1994) who suggest that group members

might have overlapping cognition (in addition to their suggestion that groups might have homogeneous or distributed cognitions) and Hodgkinson and Johnson (1994) who suggest that only some core elements of cognition might actually be shared. However, this finding also suggests that although some aspects of cognition might be shared, there are elements that might not be shared (apparent through the finding that some group themes were constructed by contributions from one console) which is a findings that is supported by Langfield-Smith (1992).

Figure 8.5 - Percentage of consoles that contribute to each theme in the average proposed format gathering



8.4.2.3.1 Reflection : Participants contributing to the same group themes

The findings in Section 8.4.2.3 are not unexpected because one might expect that participants would perceive a similar set of core issues to be relevant (Eden and van der Heijden (1995), Johnson et al (forthcoming)). The reasons for this is that factors contributing to them seeing the same issues as being relevant might be their understanding

of one organisation's culture or their shared experiences of an industry (Rutkowski and Smits (1999) and van der Heijden and Eden (1998) who suggest that participants might have 'alignment' in their cognitions). In fact if it is accepted that some participants should have a degree of overlap in the issues they see as important (as suggested by Resnick (1993)), but instead they contribute wildly different issues of the problem, then it might suggest that they held different understanding of what the problem actually was. This might cause it to be more difficult for participants to negotiate a shared understanding of the best way forward until this misalignment (or 'differentiation' (van der Heijden and Eden, 1998)) had been corrected (as up to that point they might be talking about different things) (van der Heijden (1996), Briggs and Vreede (1997)).

It may be that these high density group themes are what might be referred to as the shared knowledge of the group members (also referred to as 'the group's collective cognition' (Johnson and Johnson, forthcoming), 'shared mental models' (Rutkowski and Smits (1999) and Vreede (1997)), 'shared meaning' (Eden and van der Heijden, 1995)). Essentially these contributions would be the ones that would be highly salient to a lot of group members and ones that most group members think about daily (Johnson and Johnson, forthcoming). Considering that they may think about them and possibly talk about them with colleagues could mean that they are known throughout the organisation (for organisational groups) as being issues of relevance to the problem (Mintzberg, 1987). Hence these high density group themes could be referred to as the group members' shared knowledge of the problem and those aspects of the problem across which the group members have an aligned understanding of their importance to the problem (van der Heijden, 1996).

However, although some group themes are contributed to by a significant proportion of the group, other group themes depend on being created by single members. In this, Group Themes 11-15 (in Table 8.11) are only contributed to by a very small proportion of the console. This is not to say that these contributions are not valuable because other consoles did not substantiate them. On the contrary, it might be that those consoles raised very relevant point and other group members would regret having missed it (or forgotten about it) if that console had not contributed it. Therefore, these contributions to new or under-developed themes might be very valuable to the group members and they may represent some 'differentiation' between the cognitions of the group members involved (Mintzberg (1987), Eden and van der Heijden (1995), Grise and Gallupe (1999)). This differentiation

might be used by the group members (or the facilitator) to negotiate a shared understanding of the situation and so align their perhaps subtly divergent views (van der Heijden and Eden, 1998) in the creation of a negotiated order (Eden, 1992a), a process which Grise and Gallupe (1999), Olekalns et al (1996) and Gruenfeld (1995) call "integration". However, these differentiated thoughts on the elements which the organisation's strategy should incorporate will add to the organisation's "recipe" (Spender, 1989). The 'recipe' that the group members develop (i.e. the synthesis of the various perspectives contained in the organisation) may be one which is formed from their aligned (or shared, or integrated) understanding of the crucial issues of the problem, and possibly from their alignment of previously differentiated understanding of the issues (or issues which some people may have viewed as not being significant) (Eden and Ackermann (1998c), Grise and Gallupe, (1999)).

It seems therefore that this alignment or integration process is one that is critical to the development of a way forward that the group members have cognitive and emotional commitment to. However, Grise and Gallupe (1999) consider that 'integration' is "not commonly supported" by narrow-band interventions, Page 6. It is believed that, for this wide-band approach of JOURNEY Making, the processes of piggy-backing off, and the linking of, other peoples' contributions might facilitate the reflective learning that could encourage the development of shared meaning (van der Heijden and Eden, 1998). The reflective learning might encourage the alignment and integration of one's own perspective with those of other people in the group. This is because those other peoples' perspectives might be contained on the public screen and the time for piggy-backing will enable participants to discover what these views are and generate arguments within themselves to persuade them of the worth, or irrelevancy, of those views (McGuire and McGuire, 1996). Then during group discussion, the social element of negotiation in JOURNEY Making, participants might share more of their reasoning behind differentiated understandings and this sharing which might be a catalyst for this alignment or integration (Carley (1991) and Olekalns et al (1996)) to establish "harmony" in their views (Vreede, 1997).

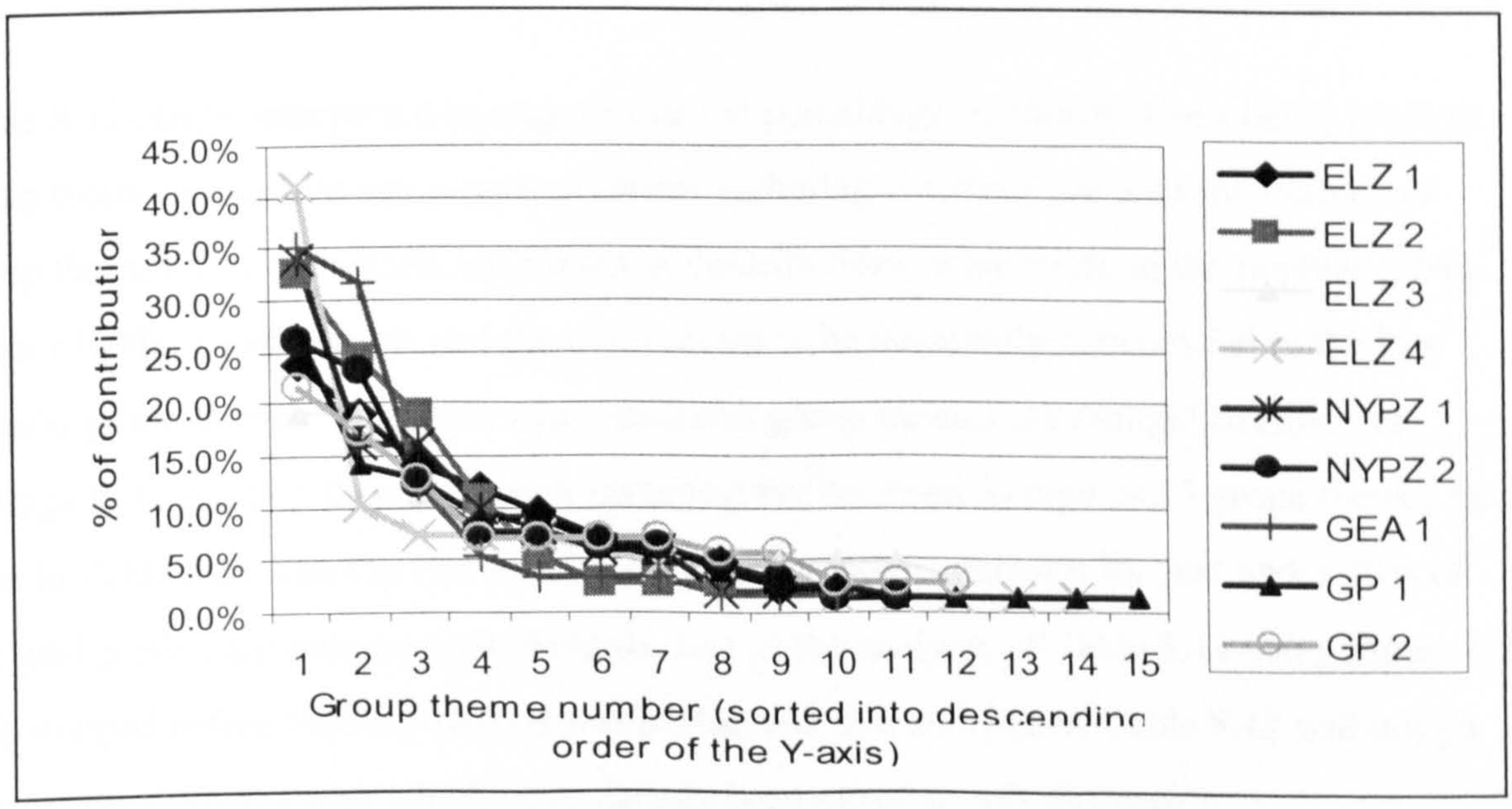
From the findings of the data analysis it seems that there is a high degree of overlap between participants of some of the issues they see as important, but in other cases single participants are responsible for highlighting the existence of themes. However, this result does not convey the proportion of contributions that are made to each theme. It might be true that on the themes to which many participants contribute (say 7 participants), they make only one

contribution each. Furthermore, it might be that where themes have been created by single participants, they have developed and explored the theme in significant detail and have made, on average, 8.6 contributions (from Table 7.6). These scenarios may be extreme, but if they did happen then it might indicate that the size of the clusters in each case would be largely the same. This however would not convey the degree of shared consideration that all the members put into one theme, and the apparent lack of this into the other theme. The following section will explore the issue for the participants of the four real-world workshops under scrutiny here.

8.4.2.4 Final investigation of themes – contributions being shared to the same themes

In terms of gaining some appreciation of the proliferation of contributions made to these (up to 15) different group themes the discussion will now turn to explore the number of contributions made to each group theme. Figure 8.6 shows a negative exponential trend of the number of contributions being made to less popular group theme numbers. Hence a few group themes have a lot of contributions being made to them whilst a large number have only a couple of contributions. Considering that each proposed format gathering examined here has a similar profile (i.e. there appears to be no remarkable difference between pairs and individuals working alone) it seems appropriate to consider what would the contribution to themes be like in the average proposed format gathering, as calculated in Table 8.12.

Figure 8.6 - The <u>percentage of total contributions</u> to each theme in the proposed gathering format (sorted in descending order of the number of contributions)



Note 1: Figure 8.6 does not show that the first themes being contributed to by participants are those which have the most number of contributions. Due to the group themes being measured across consoles, one cannot say that any single theme has been contributed to 'first', as each console might have contributed to a different theme first.

Table 8.12 Percentage of contributions to the group themes in the average proposed format gathering

Theme number	Average number of contributions made to each group theme in each proposed format gathering	% of contributions to each group theme in the average proposed format gathering
1	16.9	28.9%
2	11.1	19.4%
3	7.4	13.1%
4	4.9	8.6%
5	4.3	7.3%
6	3.4	5.7%
7	3.2	5.3%
8	2.3	3.8%
9	1.9	3.3%
10	1.2	2.5%
11	0.9	2.4%
12	0.7	2.2%
13	0.2	1.4%
14	0.2	1.4%
15	0.1	1.3%

Table 8.12 can be interpreted to suggest that the percentage of contributions being made to group themes in the average proposed format gathering is spread out over the number of group themes. Certainly there are a mass of contributions being made to the popular group themes by these participants and the trend seems to be negatively exponential to the less popular group themes. However, many different group themes are thought to exist - on average to 11.6 group themes in each gathering but has been as high as 15 group themes (as seen in Table 8.8). The top two most popular group themes account for just under 50% of the total participant-entered contributions. Just as the analysis of Table 8.11 using Figure 8.5 was stopped before Pareto Analysis was performed, this analysis of Table 8.12 will not go beyond the critical issues which have already been raised in this discussion.

To summarise, the results of analysing the group themes to which consoles in this sample of real-world workshops might make their contributions in Sections 8.4.2.3 and 8.4.2.4, indicate that:

- The percentage of the total consoles contributing to each group theme was negatively exponentially related to the number of group themes to which consoles had contributed. This indicates that a lot of these participants might have shared the most salient issues maybe using their shared perspectives to make contributions to the same themes.
- The percentage of contributions made to each of these group themes was also negatively exponentially related to the group themes to which the console contributes. This suggests that a large bulk of the contributions are made to the same small core set of group themes. Furthermore, many of the group themes are formed by only one or two contributions.

It is felt that the piggy-backing gatherings might be very useful to some group members in allowing them to contribute some ideas that either they had not realised were relevant to the problem, or themes that they has simply forgotten about. Hence this might suggest that the synthesis of their own knowledge with other peoples' contributions, might have stimulated these rich contributions to be shared (Osborn (1953), Rawlinson (1981), Jablin (1981), Dennis and Valacich (1993), Pinsonneault (1999)). It is believed that this divergent consideration of the pertinent issues by the participants (van Gundy, 1987) might enable negotiations to be based on a wide representation of the problem and so participants might be more aware of a wider range of the relevant issues (Walsh et al (1988), Niederman and Bryson (1998)).

8.4.2.5 What does this tell us about the nature of the themes of a problem?

The themeing of contributions across gathering has been the topic of Section 8.4 and results have supported the notion that participants might be able to use other participants contributions to inform their generation and making of contributions to group themes which they had not considered before.

Table 8.8 on Page 306 gives strong support to the notion that the participants of the four workshops under scrutiny here might have been more able to consider the widest range of aspects of the problem in the proposed format, over normal and multiple stimuli formats. It

was found that participants in the average proposed format gathering (in the nine gatherings under scrutiny here) shared contributions to 11.6 group themes, but (for one of these gatherings) to as many as 15 group themes. Not only do these participants seem to be able to consider a wide range of the problem in the proposed format, but they also seem to be able to use the time for piggy-backing effectively. This is apparent through the result (in Section 8.4.2.2) that nearly 20% of piggy-backed contributions either create new group themes, or contribute to an existing one in a unique way in the four workshops under scrutiny here.

It also appears that there are a lot of contributions made to the popular group themes and the trend seems to be negative exponential to less popular group themes (as displayed in Figure 8.6).

8.5 REFLECTION : HOW THE GROUP THEMES FIT INTO THE GROUP MAPS

It might be thought that a natural conclusion to this stream of work on group themes would be some exploration of how the group themes actually sit in the group maps. This work has been performed and the results interpreted, but it seems worthwhile to firstly reflect on the validity of the results to this research.

The coding of clusters and the coding of themes concentrate on a different type of relationship between the contributions (as discussed in Section 8.3.1.1). Identifying clusters aimed to identify the clusters of causal relationships which existed within the whole group map. Hence, the identification of clusters relied heavily on the causal links in the map and on the interpretation of the researcher as to which cluster a contribution should belong. Coding themes aimed to identify the clusters of similar types of contributions in terms of their content or the issues the participants saw as being relevant to the problem. Hence the coding of themes primarily relied on the interpretation of the researcher, and in a few cases which the researcher was unsure about, on the links between contributions.

There appears to be no good reason why the mapping of the themes should in any way resemble the mapping of the clusters. Clusters signify a relationship of causality. Themes signify a relationship of similarity. Hence it does not seem relevant to this research if the contributions which are said to belong to the same theme actually link into each other.

From actually mapping the themes, it appears that the contributions in some themes are actually closely linked to one another. However, the contributions in some other themes are not closely linked. In general, though, it would appear that the greater proportion of contributions do seem to build an elaborate structure of theme in the group map.

For the reason of themes and clusters being thought of as exploring different unrelated constructs of the contributions, no further exploration of this work will be performed.

8.6 CONCLUSION : ON ANALYSING THE PARTICIPANTS' NAVIGATION OF DIFFERENT ISSUES

This chapter has concluded the *'exploration of what happens in gatherings that are run as part of a real-world JOURNEY Making workshop [in terms of sharing to different themes of the problem]'*. It began with an exploration of the ability of a coder to cluster contributions in a group map which aimed to give access to the clusters of the contributions contained in the group map. First a visual clustering approach was tried but abandoned due to the robustness of the visual clusters when the layout of the screen was changed (among other reasons). Then the algorithmic approach in DE was considered but abandoned due to concern over the exhaustiveness of the links in detailing the actual relationship between contributions. Finally a manual coding approach of the contributions was tried. It was this last approach which has enabled analyses of the possible navigation of different issues by participants. However this approach is reliant on the understanding and judgement of a researcher to code the contributions appropriately. The validity of this approach has been discussed in Section 8.3.1.2.

The results from this chapter of work on group themes has raised many points of interest. This researcher believes that the group map will be richer when piggy-backing is allowed after a blind gathering, (which itself might enable a richer consideration of a wider proportion of the real issues which have impact on the problem). He believes this because it has been found that piggy-backing enables the participants in this study to make contributions on individual and group themes which they had previously not considered. Furthermore, these piggy-backed contributions were often made to different individual and group themes rather than concentrating on only one theme. In addition, it is believed that some participants had the ability to synthesis their knowledge with other participants (as shown in their contributions on the public screen) and generate new individual and group

themes or new innovative issues which might be positive news of the benefit gained from the piggy-backing session.

This researcher believes that the synthesis of these results with those that enable the construction of Figure 8.3 and Table 8.8 create one of the most persuasive arguments supporting the worth of the proposed format sessions to the group members' consideration of the problem. Participants of these proposed format gatherings seemed able to contribute additional detail (through making more contributions) to each individual theme than either the normal or multiple stimuli sessions. It is felt that the time for personal Reflection during the blind gathering might enable a greater number of contributions to be made. The piggy-backing session might give additional time for Reflecting and synthesising other peoples' contributions with their own knowledge (hence beginning to establish JOint Understanding). JOint Understanding is also facilitated through the discussion when group members NEgotiate meaning of the problem. Data from the four workshops suggests that the piggy-backing session can enhance this discussion by giving people the opportunity to Reflect on other peoples' contributions rather than being ambushed by them and not having time to generate a persuasive response. As well as giving time to participants to generate a sensible response, the piggy-backing session gives participants the opportunity to make that response 'public record' by displaying it on the screen, hence guaranteeing the participant will not forget it in the heat of the NEgotiation.

In summary, it appears that the sharing of knowledge in groupwork through piggy-backing fits into the philosophy of JOint Understanding Reflection and NEgotiation of strategY. It is believed that the opportunity of deep personal thought during blind gathering, followed by an opportunity of Reflection and synthesis of other peoples' contributions might be a powerful one for the process of JOURNEY Making.

It is clear that these three findings chapter have *'explored [quite different aspects of] what happens in gatherings that are run as part of a real-world JOURNEY Making workshop'*. It is felt that some conjecture based on these explorations would be useful in order to construct some integrated view of the potential of this work for exploring how participants might shared knowledge during groupwork using GE computer technology. Chapter 9 will seek to perform one possible piece of conjecture using different strands of the research.

CHAPTER 9 – 'THE NOTION' OF MAKING CONTRIBUTIONS AND CAUSAL LINKS

The three findings chapters of this thesis have *'explored what happens in gatherings that are run as part of a real-world JOURNEY Making workshop'*. It was felt that some attempt needed to be made to loosely pull together the different strands of the research reported on here. It was felt that some useful conjecture based on the work reported in Chapters 7 and 8 (on the ability to make different network-links (as detailed in Section 7.5) and the ability to share knowledge to different themes of the problem (as detailed in Sections 8.3 and 8.4)) could explore how participants consider an issue in a fragmented or holistic way.

This chapter reports on that conjecture performed by the researcher. The conjecture which is explored here is very loosely supported by results of data analyses and a sparse amount of existing theory which seems directly relevant. The researcher's conjecture was based on his thinking of how participants might make network-links and make contributions to different individual themes. His conjecture centred upon how participants might be able to share their knowledge of a problem by performing certain thinking strategies, perhaps subconsciously.

This chapter also attempts to bring to some natural close this work on the analyses of the data. A natural close is this conjecture based on the different data analyses that has been performed in this research programme. However, as there are many different conjectures which could be performed it seems appropriate to discuss only one in-depth and, comment on (in Chapter 10) but, leave the others for future research to identify and tackle.

9.1 ONE CONJECTURE BASED ON THE RESULTS : 'THE NOTION' OF HOW PEOPLE MIGHT SHARE CONTRIBUTIONS AND LINKS

Underlying the conjecture based on the network-links and contributions to different individual themes lies this researcher's notion (hereby referred to simply as 'The Notion') that people might consider a problem using one, or a series, of thinking strategies. 'The Notion' is this: a participant might access knowledge about a problem through four approaches, called here stories, expanded sequences, broadcasts and news-flashes. Furthermore, 'The Notion' proposes that this knowledge access is transparent through detailed analysis of the contributions and links which are shared by the participant. It should be noted that there is no theoretical justification for 'The Notion' as it is purely the conjecture of this researcher.

However, in order to attempt to give 'The Notion' theoretical credibility some loose reference will be made to known work.

It is worthwhile to re-iterate that the group maps which are under scrutiny here are not thought to exhaustively contain all the causal links that would fully explain the true relationship between the contributions on the group map, as discussed in Section 8.2.1.2. Hence 'The Notion' cannot be supported by empirical data of the contributions and links (because it depends largely on accurate links to signify the true relationship between the knowledge the participant has shared). Instead of this chapter supporting 'The Notion' with the data the researcher has available, it seems more appropriate to explore 'The Notion' and how it might be supported if good data were available. Also 'The Notion' is largely focussed on the thinking strategies of individuals. It might be that the thinking strategies of the two people who share a console are different and so they somehow effect the strategies that they would normally employ hence it might be inappropriate to explore 'The Notion' in depth with the data from pairs sharing a console. However, this researcher does have causal maps which have been developed by the real-world groups under scrutiny in this research, often by group members who share a console. However, in these maps this researcher has found clear instances which would support the existence of 'The Notion'. These instances will be reported upon where relevant, with the aim of contextualising the argument in real group maps, not with the aim of confirming the existence of 'The Notion'.

It is important to note that Johnson and Johnson (forthcoming) argue that research into Managerial and Organisational (MOC) issues cannot ever claim to investigate the thinking of participants, rather they "approximate the contents and/or structure of managers' mental models" and are not "actual paper or electronic transformations of managers' thinking". Essentially these authors suggest that cognitive maps should not lead researchers to making conclusions on the nature of thinking, and this researcher would agree with their belief. 'The Notion' is not seeking to investigate the nature of the content of a participant's cognition about a problem. Rather 'The Notion' proposes that participants might consider the problem in some way that could give insight to the thinking strategy they employ to consider the problem. This view is supported by psychologists who claim that it is possible to research the nature of thinking strategies which humans may employ (see for example the competing views of Associationism (Jenkins, 1974) and Constructionism (Claxton, 1980) which seek to do just that, or see Landman and Manis (1983) who provide a useful discussion of both

theories). 'The Notion' aims to perform some consideration of thinking strategies in the context of the data which this research has collected.

The structure of Sections 9.1.1 to 9.1.4 is this. Each section will concentrate on one of the four thinking strategies (i.e. stories, expanded sequences, broadcasts or news-flashes). Within each of these sections the researcher will firstly introduce the nature of each thinking strategy. Then the way in which participants might share causal links using this strategy will be discussed, followed by how participants might share contributions using this strategy. Finally, the discussion will briefly explore if any evidence can be offered from the data from the real-world workshops to support 'The Notion'. In Section 9.2 the discussion will consider what relevance this 'Notion' had for JOURNEY Making and Managerial and Organisational Cognition issues.

9.1.1 Stories

In these four thinking strategies, generating stories might be thought of as the most complex and varied thinking strategy performed by participants. Sharing stories might involve considering the consequences of a contribution as well as considering the causes of that contribution and developing a complex story of your thoughts. The participants might think laterally about the issue (de Bono, 1971) and yet relate that lateral thinking into their 'more conventional' streams of thought, to present their bank of contributions as a coherent network of inter-related contributions (Eden et al, 1993) (see Figure 9.1 on Page 328 for a pictorial representation of what a mapped story might look like). Essentially a story will present multiple arguments all inter-related into a coherent network.

It is important to note that two different types of stories may be constructed. A story might be constructed by a participant linking lots of other peoples' contributions together into a coherent network i.e. they have thought about the issue and the result is linking lots of different contributions into a network based on that thinking. However, a second type of story is when a participant shares a lot of different contributions about the same issue (or different issues) which are subsequently linked to make a coherent story i.e. they have thought about the issue and have shared their thoughts in the form of contributions. Each type of story will be discussed in the following two sections, and Section 9.1.1.3 will conclude this discussion on stories by supporting their existence with evidence from the links, contributions and group maps analysed here.

9.1.1.1 The nature of the links which might indicate a story

Stories might be seen by looking at the links a person makes, participants might construct stories by linking together other peoples' contributions (and their own) to construct a detailed network which they think represents the situation. These stories might be contained in the group map as a detailed and complex system of linked contributions. The links might pull together contributions from different streams of thought (maybe coded as being in different individual themes) to provide additional detail to their story on a topic. A core ingredient of a linked story would be the tightness of the network that is created by the links.

Stories might be identified through the coding of elaborate networks in the network-links described in Section 7.5. These elaborate networks indicate where participants have attempted to build a coherent system of contributions, essentially building a story. In the stories which have been formed by links, the linker is building the story as they are the ones who identified the story.

9.1.1.2 How contributions might indicate a story

Stories might also be seen by looking at the causality between the contributions from a participant. It might be that the participants have explored one of their concerns about the problem and shared their concern in the form of a series of contributions (possibly because they have accessed one of their mountains of knowledge about the problem (Bartlett, 1932)). A story is something that is a detailed exploration of a situation, for example, *'X happens and then Y happens and in order to allow X and Y to happen, Z must be like this'*. Consequently, in a fully linked map, the contributions which make the story might be linked. The participant might not have linked their own contributions into a causal network, for they might have run out of time. However, the contributions might have been linked by other group members, or the facilitator, because they construct a sensible causal relationship. Note that in the stories which have been formed by contributions it is the maker of the contributions who share the story, for it was their thinking that identified the story.

It might also be possible for stories to be explored through the individual themes which were coded (i.e. those individual themes that were created in Section 8.3.1). It might be that the actual story envelopes a number of pertinent issues and each issue might be mistaken coded as being isolated as different individual themes. Therefore it is possible that stories will cross individual themes. Hence, it is possibly more robust to explore the stories made by

contributions through the structure of a fully linked group map which will contain information of all the causal relationship between contributions in each individual theme.

9.1.1.3 Evidence of stories in the maps available to this researcher.

It is certainly the case that this researcher has been able to identify many networks of contributions which appear to be make stories through the contributions and links a participant shares during the workshops under scrutiny here. Interestingly some of these stories were found in the data from pairs who share a console. However, as was stated in Section 9.1 'The Notion' only might be demonstrated by individuals who think alone rather than by the potential competing of story telling by different individuals in a pair.

This researcher has found, what are thought to be, stories by analysing the participant-entered **links** to identify where they have constructed elaborate networks of contributions. Many times the elaborate networks of participant-entered links indicated that a story-teller has linked contributions made by other people into their story to better explain some issue. The minimum number of links in a story is 3 (below 3 links they are not an elaborate network as the coding instructions in Appendix 6.2 detail). The maximum number of links that was found in a story was 11 different links (in one example from the coding of the actual data) which all linked contributions together in a single network of causality (as the data on elaborate networks in Table 7.14 details). For the ELZ, NYPZ and GP workshops, an average of 53.5% of all participant-entered links were made to elaborate networks (calculated from data in Table 7.14 on Page 252). This offers support for 'The Notion' that participants are able to make stories through making causal links.

Also, all the **contributions** made from every console in the workshops being examined in this thesis were visually mapped using DE. On analysis of those maps, some were thought to display the characteristics of being a tightly-knitted cluster of contributions. Granted, it may have been that the story was linked by facilitator-entered links, or by links from a different participant, but nevertheless, some of the mapped contributions seemed to form a tightly-knitted clusters. However, caution has to be exerted here due to the lack of confidence in the correctness of the links contained in the group maps that were analysed. It is possible that very many more stories might be apparent if the maps were exhaustively linked.

In considering the existence of stories as evident through the **individual themes**, there were a number of examples of participants sharing several contributions to the same individual

theme (as the data in Table 8.3 on Page 290 indicates). However, individuals working alone did tend to share a greater number of contributions to the same theme than participants working in pairs. Hence it might be that the competing views of the different participants in a pair causes the console to be less likely to share stories through contributions than individuals working alone who have a free reign over what they think about. Most participants (individuals working alone and those in pairs in these workshops) appeared to navigate a number of themes rather than concentrate on one or two themes (as Table 8.5 indicates). However, considering that contributions to stories might cross individual themes, this finding is inconclusive.

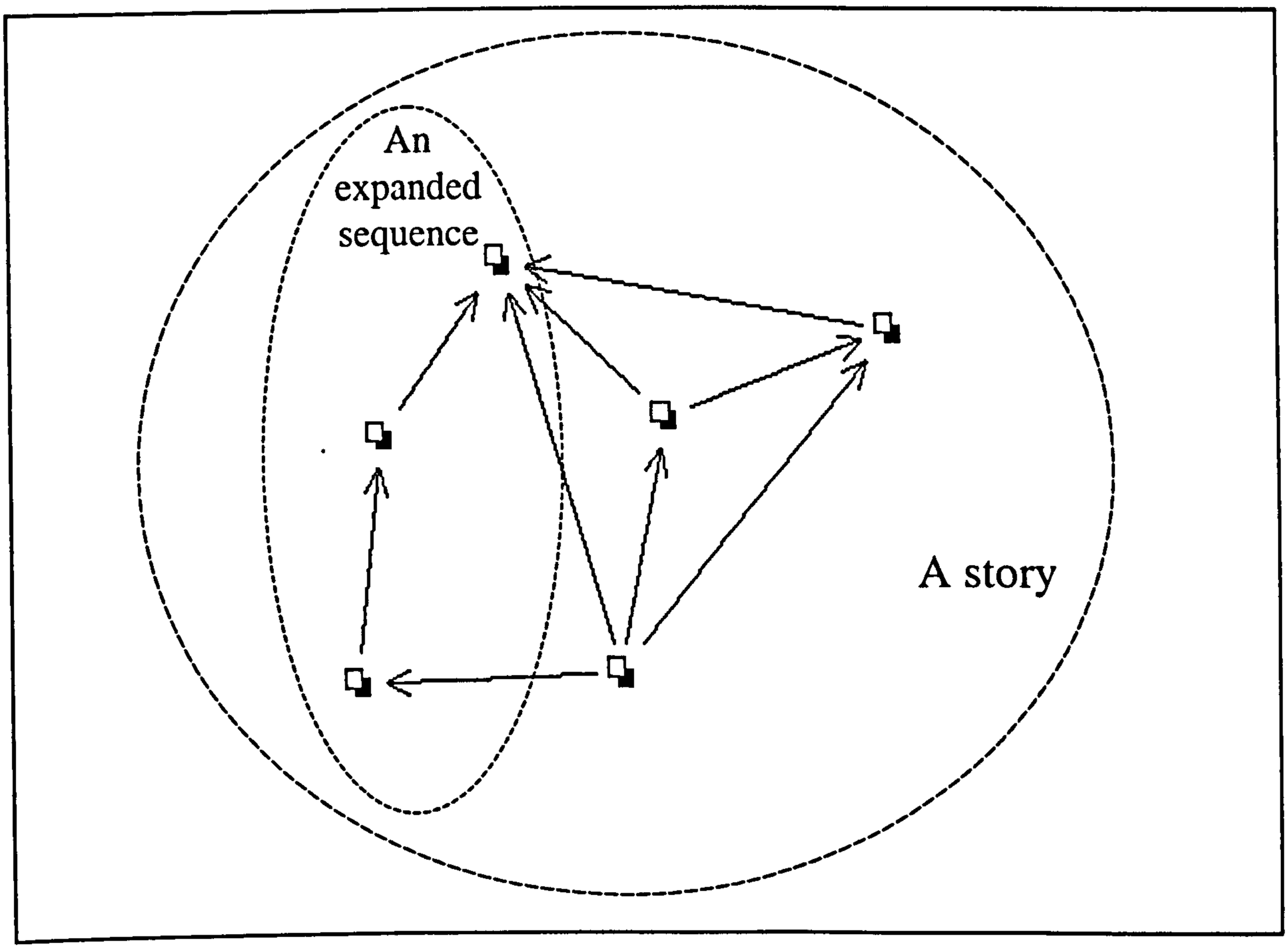
9.1.2 Expanded sequences

An 'expanded sequence' is the wilful concentration of a participant/pair on one particular issue in the problem. The participant makes contributions or links, but they do so as if they are thinking through a particular sequence of events and making contributions as they think of these (but not thinking of temporally ordered "scripts" in the Constructionist's sense of a "concrete processing of episodic and situational material", Page 36 (Abelson, 1976)). Hence all the contributions or links they make almost construct a single argument in themselves, in that they detail causes and/or consequences of an issue.

The distinction between a story and an expanded sequence is the degree of elaboration (as displayed in Figure 9.1). The contributions or links in a story might be thought of as describing a situation in some detail and making multiple arguments (i.e. a micro-map inside the group map). The contributions or links making a sequence would be thought of as being a straightforward chain of contributions on a much smaller scale than a story and which make a single chain of argument, which might (but not necessarily) contribute to a micro-map.

Expanded sequences thinking might be located through the links a participants makes, or in the contributions they share, as the following sections will discuss.

Figure 9.1 - Illustrating the degree of elaboration of an elaborate sequence and a story (and the possible relationship between an expanded sequence and a story)



9.1.2.1 How links might indicate an expanded sequence

The participants might think about the causes and consequences of a particular action and so might link a couple of contributions in a causal chain to illustrate a wider understanding than it is possible to illustrate through a single link (they would link existing contributions, not make new contributions by typing them in). When participants make two links in a chain then they have demonstrated that they might have thought in a more detailed fashion about a particular issue than if they were to contribute just one link.

When looking for evidence of linking in expanded sequences, the researcher might look for two links in a chain. As discussed in Section 7.5 and Appendix 6.2. The making of two links in a chain is coded through *forward*, *backward*, *spread forward* and *spread backward* chains. Hence these network-link codes might enable the identification of where participants have identified expanded sequences of links.

It is defined here that an expanded sequence only involves 2 links, before it becomes a story. If a participant makes 3 links then it is thought that this demonstrates a prolonged thinking

about the issue, and that this prolonged thinking merits being classed as a story (or the network-links being classed as an elaborate network a detailed in Appendix 6.2).

9.1.2.2 How contributions might indicate an expanded sequence

Expanded sequences thinking might also be apparent through the contributions the participants make. A place to begin looking for expanded sequence contributions might be to identify contributions which belong to the same individual themes - because the contributions might relate to the same issue if they represent an expanded sequence. Furthermore, the two contributions in the sequence might be (but not necessarily will be) sequentially numbered for the participant who made them because contributions would indicate a continuity in the thinking of the participants. [In being sequentially numbered for the participant, this is not to say that they will be sequentially numbered in the group map because the other group members might have shared contributions in between the participants typing in their expanded sequence. However the contributions might be sequentially numbered for the contributions from that console.]

In order to gain more confidence in whether two contributions represent an expanded sequence, one might refer to the group map to see if the contributions in the individual themes are indeed causally linked. If the contributions have been linked, or have intermediary contributions between them (which is easy to identify using DE), then it might indicate that these contributions were generated in an expanded sequence (intermediary contributions are mentioned in rows k and l of Table 7.4). It may be that the expanded sequence contributions have intermediary contributions between them as other participants have made contributions which better explains their relationship. However it should be clear that the two contributions could be interpreted to have an apparently sensible causal relationship if the intermediary contributions were removed.

It is felt that expanded sequences are really best found though analysis of the links in exhaustive maps, rather than quick and dirty group maps that might be generated in a JOURNEY Making session. The reason for this is that the exhaustive links will better confirm the existence of an expanded sequence than the interpretation of a researcher of whether the relationship between them is potentially causal.

9.1.2.3 *Evidence of expanded sequences in the maps available to this researcher.*

There are numerous examples of what might be expanded sequences in the thinking performed by the participants of the four workshops under scrutiny in this research. This was found through the analysis of the participant-entered **links** which highlighted the location of *forward*, *backward*, *spread forward* and *spread backward* chained links that were made by the participants (the results of this analysis is reported in Table 9.10). It was found from the data in Table 9.10 that participants of these four workshops were generally able to make each type of category of these network-links. Hence this data supports the thought that it is possible for these participants to make these types of expanded sequence chains.

However, these participant-entered links might not have contained some links that the participants would have made, for example, if they had more time, if they had been able to find their contribution on the overloaded public screen or if they had better understood the meaning of a causal link. Hence it is thought that a researcher only relying on these participant-entered links is not a robust method for identifying sequences in peoples' thinking. Interestingly, these expanded sequences were often found to be contained within a story which might indicate additional expanded thinking on the issue had been performed.

The identification of expanded sequences through the **contributions** and **individual themes** which were coded was not attempted. The reason for this was that the contributions and individual themes could not be explored using the group maps which were available for scrutiny. The causal relationships contained in those maps were concluded (in Section 8.2.1.2) to be not exhaustive and so little confidence could be gained from mapping the contributions or individual themes when looking for expanded sequences.

9.1.3 Broadcasts

The easiest way to describe a broadcast is by assimilating it to participants "getting on their high horse" and broadcasting their opinions to the group (Carlsson and Walden, 1995). Essentially these participants might be sharing their numerous opinions on one single issue (Higgins and Chaires (1980) discuss how the ability of people to access information is based on the recency and frequency of thinking about that piece of information (a view which has widespread support (Mandler and Mandler (1964), Landman and Manis (1983)). That is not to say that participants do not navigate different issues, but at the time when they are broadcasting, they are concentrating on 'making their point' on the one single issue.

Contributions in a broadcast may be causes of an issue, or consequences of it. The critical aspect is that the contributions or links which make a broadcast should have been made whilst the participants were 'on a roll' in their sharing of knowledge on that issue (Nagasundaram and Bostrom, 1995a). In addition to broadcasting by sharing contributions, a broadcast might be located through analysis of the links by the participant using other participants contributions to support their viewpoint.

9.1.3.1 How links might indicate a broadcast

A broadcast may be most apparent when participants make a number of links which link into, or out of, one contribution which is the 'target' of their effort. Essentially the participant might search the screen for all the contributions which they think causally effect a target contribution, or is causally effected by the target contribution. In map form it might appear like the participants have built a spider's web where the target contribution of their broadcast is at the centre of the web, and their links to causes, or consequences, are littered around the outside of the centre.

Here the network-links codes of explosions and implosions might indicate the existence of a broadcast. If one is to map all the links made by a participant then one might be able to identify where such broadcasts exist as the spider's web might be more clear.

9.1.3.2 How contributions might indicate a broadcast

Broadcasts might also be found through examining the participants own contributions as they concentrate on sharing their own opinion of the target contribution, possibly in addition to, or instead of, linking other peoples' contributions to/from it.

It might be found that these broadcasted contributions are made sequentially in the session, because the participants are concentrating on thinking about the causes or consequences of a particular issue. However, it might also be found that the participants revisit the target of their broadcast after making contributions on other issues. They might revisit the issue because they suddenly remember something crucial to their position and want to share it.

It is possible that the broadcasted contributions may belong to the one individual theme as they all may pertain to one issue (considering that they all may be causes or consequences of a target issue). Mapping the individual themes from each console (and the contributions

which link into and out of the contributions in the individual theme) might enable the identification of where broadcasted contributions all link with a target contribution.

It is not felt that it is suitable to base the identification of a broadcast solely on a researcher's interpretation of the contributions or the individual themes to which those contributions might belong. The reason for this is that many meanings might emerge from a contribution and it would be better to be able to cross-reference any interpretation with reference to a map which has exhaustive causal links (which unfortunately this researcher does not have access to). If exhaustive maps are ever available then this investigation might be performed in the way outlined above.

9.1.3.3 Evidence of broadcasts in the maps available to this researcher

There is much evidence from the analysis of the **links,** that people in these workshops shared knowledge in broadcasts (as shown in Table 7.12 on Page 248). From one console participants made 6 links out of one target contribution (an explosions) and from another console participants made 9 links into a target contribution (an implosion). These broadcasts were found simply by analysing the implosions and explosions made from the consoles.

No attempt was made to identify broadcasted **contributions** through analyses of the **individual themes** for the reason of not having an exhaustively linked map, as discussed in Section 9.1.3.2.

9.1.4 News-flashes

When a participant shares a piece of knowledge that bears little resemblance to the other knowledge that they have shared then it is called a news-flash by this researcher. It might be thought of being a news-flash because it might not form part of a strategic approach to thinking holistically about the problem (Sosik et al, 1998). It is almost like an unconnected flash of inspiration.

News-flashes might be links or contributions. A news-flash link is one that does not seem to fit into the other links that the participant has made. A news-flash contribution pertains to an issue that the participant(s) has not made any other contributions.

9.1.4.1 How links might indicate a news-flash

News-flashes might be links that the participant sees and contributes which are not contributing to part of their whole linking strategy. It might be that a link is made between two contributions that catch the eye of the participant, then they move onto another issue without exploring more of that issue. In the group map it might be that the news-flash link is isolated away from the other links that that participant has made as it does not fit into the other issues they made links on. That is to say that the contribution will not be linked directly into another of that participant's contributions, and in fact it might have a number of intermediary contributions between it and the closest other contribution from that participant.

The important issue about news-flash links is that they do not form any part of a coherent network of linking for that participant. News-flash links might be found through the single links in the network-links coding. Single links are ones that do not contribute to a participant's construction of any chain or elaborate network.

9.1.4.2 How contributions might indicate a news-flash

Contributions can also be made from news-flashes. The contribution symbolising a news-flash might form a new individual theme by itself, as it does not relate to the content of any other contributions the participant made. Hence it might be thematically isolated.

When one locates the suspected news-flash contribution through analysing the individual themes, one can cross-check if its position in the group map supports it being thought of as being a news-flash. In the group map it might be that the contribution is isolated from the other contributions the participants have made, in that it is not linked near any them.

News-flashes can be made at any time during the blind or piggy-backing session. However, it might be that many of the piggy-backed contributions are news-flashes. This might be found because during the piggy-backing session the participants might be suddenly reminded of an issue that they have completely forgotten to mention. Therefore the participants have been stimulated to generate, and share, a contribution which is far removed from the others they have shared. Hence only one contribution on an issue might be made from those participants.

9.1.4.3 Evidence of news-flashes in the maps available to this researcher

There is evidence that some people make news-flash **links**. By analysing the single links in the network-link coding one it has been possible to identify such news-flash links in the data from the four workshops under examination here. From Table 7.13 it is possible to see that 18.2% of ELZ, 18.2% of NYPZ and 12.4% of GP participant-entered links are single links and so might be news-flash links. Hence by coding network-links made by participants it might be possible to identify isolated links that do not contribute to a larger network of that participants thinking and linking.

It is possible that this result is heavily dependent on the ability of a group member to find other suitable contributions to link (which might be related to the number of contributions on the screen causing cognitive overload). It might be that if participants do make a link but are then unable to find other contributions which naturally links into or out of their previously linked contributions, then they change the focus of their thinking. Hence the initial link would be classed as being a news-flash. Alternatively some people might purposefully navigate different issues making one-off links which will be classed as news-flashes.

It is not possible to say with confidence that participants have made blind **contributions** or piggy-backing contributions as news-flashes. Contributions which are isolated in **individual themes** have been located. However, when one attempts to investigate if their position in the group map supports them being thought of as a news-flash, the lack of confidence in the correctness of the links makes it impossible to be confident in this support.

However, when one looks more in-depth at the piggy-backed contributions, there are a number of such contributions which may be news-flashes. From Table 8.7 (row f) on Page 300, one can identify that for ELZ, NYPZ, GEA and GP sessions, 1,9, 5 and 12 new individual **themes** for participants were created by piggy-backed contributions, respectively. Those contributions to new individual themes suggest that they are contributions which may be news-flashes (in that they may be ones that do not fit into their other thinking about that problem). In addition, the number of *really innovative* contributions (row h of Table 8.7) might also indicate news-flash contributions. Really to check if these contributions are news-flashes then one would need to view them in the context of the other contributions that console made, i.e. by reviewing their position in the group map. The triangulation of a contribution being seen as being an individual theme on its own for those participants, and

seeing that it is isolated on the group map, might give weight to it being though of as a news-flash for the participants by whom it was contributed.

9.2 RELEVANCE OF 'THIS NOTION' TO JOURNEY MAKING

This chapter has been highly theoretical, and one consequence of this is the lack of relevant literature which could be found to support the argument. However, it is believed that this theory might be useful and has a potentially interesting contribution to make to issues of Managerial and Organisational Cognition and to JOURNEY Making practice. This section will offer justification for such a belief.

9.2.1 The main contribution of 'The Notion'

Let us consider an extreme case where all participants in a hypothetical workshop share stories in terms of the contributions they share and the links they make. A reason that they might be able to share the stories is that they have a well formed opinion of the issue (Abelson, 1959) and they are simply letting everyone know about it during the gathering. The result after the piggy-backing session might be a highly linked group map which appears to contain a lot of well formed argument which is possibly linked by a highly inter-related network of causality. Essentially the group members might be somewhat of a 'monolithic structure' (Eden et al, 1993) because people have been able to deeply consider their position of the issue and have formed a strong argument supporting that position (Burnstein and Vinokur, 1975). However, one problem of this is that in having a well formed argument, those individuals might be less likely to change that argument in the face of opposition and instead hold their ground (Tesser and Leone, 1977). This might have the result of the group members coming to an impasse when they try to negotiate a shared understanding of the issue (Weingart et al (1993)).

At the other end of the spectrum let us consider a hypothetical workshop where all of the group members only share news-flashes. These individuals might do this because they are unable to construct any coherent and well formed opinion of the issue. Instead they may share snippets of knowledge (either contributions or links) which is not really helping them to form a strong opinion. Essentially the group members might be somewhat of an 'articulated system' (Eden et al, 1993) who are willing to listen and accept other peoples' points of view. Thus when it comes to the group members negotiating a shared meaning of a particular issue they may be more willing to listen to, and accept, the opinions of their fellow group members (Weick, 1986). Unlike the participants in the monolithic state, these

participants might be able to negotiate effectively instead of locking horns over issues (Quinn, 1996).

Eden et al (1983) remark on how "studies of managerial cognition need to uncover such differences between [the structure of] cognitive maps", Page 3. They comment on how the 'holistic properties' of their maps may give insight to how well the managers understand the environment in which they work. The authors make the claim that if one might understand how well developed is the manager's cognition of the situation then one might be able to appreciate the strengths and weaknesses of the organisation.

'The Notion' might give a potential vehicle for the consideration of the detail of a top manager's cognition which might enable one to consider the strengths and weaknesses of that person or a group of people. In this, 'The Notion' may contribute to understanding how real-world managers have the ability to lead an organisation through a problem based on the nature of the fragmentation of their cognition about the issue, and their ability to work effectively as a team to share knowledge. For example, if it is found that a leader has low performance in their role, then there might be many reasons for this. One reason might be that they fail to truly understand the organisational problem they are trying to overcome. By building an individual cognitive map for that leader then one might be able to grasp how well they actually understand their environment. If they have a very fragmented understanding then that might explain why it is that some of the decisions they make have negative consequences - for it may be that they did not know the ramifications of their action on other parts of the environment in which the problem is set. This is not an argument for firing someone, but it might indicate where effort has to be concentrated to help that leader to develop their cognition so that they can operate effectively.

'The Notion' might give a potential vehicle for the consideration of the detail of the shared cognition of a whole top-management team. For example, if it is found that the managers have a very fragmented shared understanding of the nature of a core competency (Johnson and Johnson, forthcoming) then this might indicate a potential fragility in that team to nurture that competency effectively (Eden and Ackermann, 1998c). If their shared understanding of one area of their business is lacking then that might indicate that this precise area needs to have effort concentrated on understanding it and its interactions with other areas of the business. It may be that the organisation decides to appoint a new member to fill this weakness in the top-management team. Then when considering who they might

appoint, they could use individual cognitive mapping and 'The Notion' to investigate how well each candidate really understands the situation that they are being hired to fill. This might give some indication of how much that person can 'hit the floor running' and make an immediate contribution to the organisation, for if they have a detailed understanding of the situation then they might have to spend less time learning the environment.

It is argued that 'The Notion' is one approach though which researchers might explore how well-developed a manager's cognition is about a situation by looking at the holistic properties of the contributions they make and the maps they construct. The thoughts of Eden et al (1983) give very powerful support that 'The Notion' is approaching a subject that has significant relevance to issues of Managerial and Organisational Cognition.

9.2.2 Other relevant uses of 'The Notion'

It is thought that in addition to contributing to the exploration of the structure of managers' understanding of the environment in which they operate, 'The Notion' has applications which are more pertinent to the JOURNEY Making gatherings in terms of understanding the reasons for participant making incorrect links.

If one might understand how fragmented the maps (i.e. to what extent are the participants sharing news-flashes in comparison to coherent stories) then one might be in a position to consider how much time the linking process will take. It might be that a main reason for the participants having trouble linking at the start of the workshops is because the they are thinking in terms of news-flashes and linking in that way too. Hence it might naturally take more time for them to develop a structured view of the problem. It might be that later in the workshop, if the participants are thinking more holistically about problems (and therefore making stories and linking stories), then this might account for their ability to more accurately identify causal relationships. Hence this might indicate that the facilitator's instructions on how to identify causal links might have little impact on the ability of participants to share links. It may be that their difficulty in making causal links has more to do with the partiality with which the participants are considering the problem. If the facilitator is aware of this being a problem them they might spend less effort trying to explain the instructions for linking and spend more time on raising the participants awareness of strategies for thinking (i.e. those four strategies reviewed in this chapter).

It may be that when the participants have lots of contributions on the public screen to view they are more likely to share news-flashes because there is more urgency in moving around all the issues to see what everyone has 'said' (see Kelly and Karau (1993) who discuss some effects of time pressure on performance in groups at the expense of 'quality'). It may be that this urgency encourages poor linking if people are determined to make stories. Poor linking might result because the participants are unable to incorporate the best contributions into the story in a short space of time and so they just make do with what they find. Hence participants who feel more desire to make stories might contribute more doubtful links than news-flashers who only contribute links that they think are right when they come across them, because they are under no pressure to force links to be right.

It is argued that the nature of the thinking process which participants might perform is one that has relevance to the JOURNEY Making facilitator. If one might appreciate how participants might initially think in terms of news-flashes at the start of the workshop, but then think more holistically later in the workshop then one might have a new perspective from which to appreciate why participants share incorrect links. Also 'The Notion' might give insight to the reasons for how cognitive overload might cause determined story builders to force doubtful links. It is believed that 'The Notion' does have some interesting contributions to make to the field of Managerial and Organisational Cognition, but it might only be with data that is very hard (if not impossible) to access (i.e. exhaustively linked maps) that this contribution might be realised.

9.3 CONCLUSION

The above discussion has attempted to demonstrate where one type of meaningful conjecture, based on the analyses reported in the 'findings chapter', might be performed. It is felt that evidence to support 'The Notion' might only be gained from maps which have exhaustive and reliable causal links. Hence this discussion has only suggested the direction for this work, rather than reporting in-depth on the results of it.

However, it is with experience of analysing the participant-entered links and the contributions that this researcher claims that there is evidence in these maps of participant actually performing the four type of thinking strategies which form 'The Notion'. This experience has been supported with real, but perhaps unpersuasive (due to the concern over the correctness of the links in the maps) evidence from the analyses of the contributions, links and group maps. Evidence was provided from the participant-entered links that

participants might construct stories, share sequences generate broadcasts and have news-flashes. There is also evidence from the individual themes in the contributions that some participants share stories and share news-flashes, however no attempt was made to explore the making of expanded sequences or broadcasts for they might be too effected by the partial nature of the linked maps.

The discussion in Section 9.2.1 suggests that 'The Notion' is not purely of academic theoretical interest with real-world irrelevance. 'The Notion' might give a potential vehicle for the consideration of the detail of a manager's cognition which might enable one to consider the strengths and weaknesses of an individual or an entire top-management team. Hence 'The Notion' may also contribute to understanding how real-world managers have the ability to lead an organisation through a problem based on the nature of the fragmentation of their cognition about the issue, and the ability of their top-management to work effectively together to share knowledge to overcome the lack of shared knowledge about the issue.

It is felt that 'The Notion' may have the potential of making a significant contribution to the knowledge of Managerial and Organisational issues. It might give insight to how well participants might understand the holistic nature of their environment during groupwork, or even when working alone using cognitive mapping. This could be valuable to an organisation in helping them to identify the areas of the business in which it lacks expertise.

This has been the final piece of conjecture and contribution to theory which this thesis will make. The following chapter will discuss this researcher's reflections on this research.

CHAPTER 10 - REFLECTIONS ...

This research programme has attempted to perform a scientific analyses of a real-world problem. This research might be thought of as "answering a call that is often heard and seldom answered", Page 96 (Vreede and Vogel, 2000) by "exploring the real-world application of [a format of gathering using] a group support technology". It has used real-world participants in real-world JOURNEY Making interventions. It has attempted to develop results which are useful to real-world facilitators in stimulating how they think about facilitating the sharing of knowledge in JOURNEY Making workshops. However the work has also been substantiated in robust theory. This thesis has defended the theoretical suitability of the research, substantiated results in theoretical frameworks and developed theoretical understandings of the real-world in which we operate as facilitators and as theorists.

This reflections chapter will reflect upon the success of the research that has been performed. It is felt that if the research can be argued to be successful then this might lead to some indication of whether the research has been performed well.

10.1 MEASURING THE SUCCESS OF THIS RESEARCH

This section of reflections on this real-world research will concentrate on exploring if this research has been successful. Four aspects of success have been identified. Firstly, this section will reflect upon real-world problem that this research sought to overcome to see if the problem has been adequately addressed. Then in Section 10.1.2, the discussion will consider if the research has met its aims that were outlined in Chapter 1 of this thesis. Section 10.1.3 will reflect upon the research methodology for this research to explore if it might be thought of as being able to provide useful results. In order to support the notion that this research might offer some useful contributions to knowledge, Section 10.1.4 will reflect upon what are considered to be some of the more interesting contributions of this research. These four measures are thought by this researcher to be critical in measuring whether the research has been academically and practically successful.

10.1.1 The real-world practical problem the research sought to solve

The initial motivation for this researcher was to address a real-world problem. This section will consider if the research has been successful by considering if that real-world problem has been adequately addressed.

This consideration will involve four discussions. The first (in Section 10.1.1.1) will provide argument for why it is thought that the real-world problem of participants suffering from bounded vision, or even simply reading the public screen without sharing contributions has been adequately addressed. However, from analysis of the data there appear to be two main limitations in the proposed format of gathering which has been the focus of this thesis, and this could suggest that further improvements to this proposed format could be made. The first limitation (as will be discussed in Section 10.1.1.2) causes severe cognitive overload within participants, when the public screen is first activated. The second limitation is that the group maps that are created through the proposed format are done so in a "quick and dirty" fashion and often seem to miss seemingly obvious, and include seemingly incorrect, causal links (as will be discussed in Section 10.1.1.3). The last discussion (in Section 10.1.1.4) will consider which form of gathering is 'best' i.e. it will compare proposed, normal and multiple stimuli formats to see which is 'best'.

10.1.1.1 The problem has been adequately addressed - escaping from bounded vision

A main reason for this researcher developing the proposed format of gathering was to help those participants in the so-called 'normal format' who might sit and read the new contributions which came popping onto the screen to share their knowledge of the problem. It was thought that the contributions they read in the normal format might frame their thinking such that they only make contributions which can be thought of as lying within the bounds of the existing contributions i.e. they might experience bounded vision.

It was encouraging to find that most participants working alone and those who share consoles were actually able to share some knowledge in both stages of the nine proposed format gatherings under scrutiny in this research (reported in Table 6.2 on Page 184). Most of these participants were able to make contributions during the blind session, as well as making causal links during the piggy-backing session. Yet, with some disappointment, it was found that only some were able to make piggy-backed contributions, possibly due to the

emphasis the facilitator places on making causal links rather than piggy-backed contributions.

In interview with participants from two workshops, some reflected liking the freedom to share their own knowledge without being framed by other peoples' contributions in the blind gathering. However, it was somewhat surprising that participants of these proposed format gatherings were not able to consider a greater maximum number of different individual themes (i.e. those themes which were coded in the contributions for one console (ignoring the contributions from other consoles in the same gathering, as discussed in Section 8.3 on 299)) than participants of the normal gathering (both reaching a maximum of 7 individual themes, see Table 8.5 on Page 313). However, the fact that participants of these were proposed format gatherings were, on average, able to consider a larger number of individual themes was encouraging of the benefit participants might gain from the proposed format (they considered 6.2 individual themes compared to 5.0 themes for participants of the normal format and 4.0 for the multiple stimuli format, from Table 8.5). Furthermore, it was encouraging that participants of these proposed format were able to consider a diverse range of themes in more detail than participants of the normal and multiple stimuli gatherings (as Table 8.6 on Page 314 and more clearly Figure 8.3 on Page 316 suggest). This set of results support the proposition that these participants were able to share more knowledge to a more diverse range of themes, and subsequently might suggest that these participants in the proposed format might suffer less bounded vision than the participants of the normal format or the multiple stimuli format.

In interview some participants commented on how, during the piggy-backing session, they became aware of issues they had missed from reading other peoples' contributions. These verbal reports are supported with evidence from the themeing of the contributions that participants might have gained benefit from the piggy-backing session. The results of the data analyses suggest that many of the piggy-backed contributions addressed aspects of the issue that the participants had not considered before (as data in Table 8.7 on Page 318 indicates). The nature of those piggy-backed contributions suggest that the participants thought about new issues during the piggy-backing session as 37.5% were found to contribute to themes that were new to the contributors, and 43.1% were found to contribute to really innovative themes (as summarised in Section 8.3.2.3.1). Contributions to new themes signify that they were made to themes which those particular participants had not

considered before. Contributions to 'really innovative' themes signify that they were contributions that either were made to completely new themes, or gave a new spin to an existing theme. Hence it seems that the piggy-backing session might give individuals the opportunity to consider more issues about the problem. However, the piggy-backing contributions can also be thought of as being potentially very valuable to the whole group because 43.1% of piggy-backed contributions were contributed to group themes (i.e. those themes which were coded from contributions across all consoles in the gathering, as discussed in Section 8.4 on Page 321) which those group members had not contributed to before, and 19.4% of piggy-backed contributions created brand new group themes (summarised in Section 8.4.2.2 from data in Table 8.10 on Page 327). These results seem positive support for the notion that piggy-backing enabled these participants to consider more of the problem than other participants had done in blind gatherings. Not only did they seem to explore issues that were new to them, but also did they seem to explore issues that were new to the entire group. This combination seems a powerful one which might suggest that the proposed format assists participants in their navigation of new aspects of the problem.

These sets of results would seem to support the notion that participants of the proposed format gatherings under scrutiny in this research seem able to share additional knowledge during the piggy-backing gathering about a range of issues and so they may have found the piggy-backing session to be useful to their own personal learning about the problem. Also it seems that the contributions made during the piggy-backing session were valuable to the group members in helping them consider new issues of the problem that they otherwise ignore. Furthermore, in comparing the proposed format gathering to the normal and multiple stimuli gatherings under examination here, it seems that participants were more able to consider a more diverse range of themes (on average) during the proposed format than either of the other formats (i.e. the blind or multiple stimuli formats).

10.1.1.2 The problem has only been partially addressed - participants' cognitive overload

Under the normal format participants were able to see contributions come on to the public screen as they were contributed, and as a result it was supposed that participants might quickly suffer from cognitive overload as they try to process all the contributions as they were made if they looked at the public screen before finishing typing in their own contributions. It was partly for this reason that this researcher developed the proposed

format - so that participants were not being distracted by the public screen up-dating rather than contributing their knowledge.

In the proposed format cognitive overload is not eliminated. Rather cognitive overload is suspended until after the blind session. Participants at least have a cognitive overload-free time to share their knowledge during the blind session, however as soon as the public screen is activated to show the contributions made during the blind session, participants who look at the public screen might experience cognitive overload from the mass of contributions displayed.

An inability to cognitively process the mass of contributions on the public screen might cause cognitive overload. It might be thought that this proposed format is weak because it cannot help participants to manage this more effectively. However, in showing participants a mass of new contributions, the facilitator is hoping that the participants will be able to learn from, and be stimulated by, the contributions that are displayed. When people are working in a process that asks them to cognitively process a lot of new information in a short period of time then cognitive overload might always be a factor. The thesis explored the merits of two approaches to helping participants to manage cognitive overload (in Section 6.3.2.3.2). One approach was tried during the MBA student pilot workshop, the other during the first gathering of the GP workshop. Certain weaknesses were found during the implementation of the first approach during the MBA student pilot workshop. This learning enabled that development of the second approach which was tried with the real-world GP group (in their 'Gathering 1'). It was found that the participants of the first GP gathering might have benefited from their own clustering of the contributions after the blind session before the piggy-backing sessions as the participants might have been more familiar with the contributions which had been made. It was found that GP participants might have been more able to make lots of piggy-backed contributions (as they did, and as is evident from Table 6.2 on Page 184) and make lots of causal links (as they also did, and as is also evident in Table 6.2) in only a little more time than other piggy-backing sessions under scrutiny here (as can be seen in Table 6.1 on Page 154). It is proposed that this finding might be due to the extended introduction to the contributions which the participants gained during their clustering of the contributions.

Overall this researcher believes that the fact that participants might suffer from cognitive overload is not a particular weakness of the proposed format for sharing knowledge over other formats. It is thought that any approach which involves participants absorbing lots of knowledge in a short space of time might cause the participants some level of cognitive overload. Even in reading this thesis the reader might have cause to read the same paragraph twice. This might not be because the paragraph is poorly written, but might just be because it contains is a lot of information that is difficult to absorb first time. The reader, in an attempt to process the information, reads the paragraph twice and on the second attempt might be clearer about what it is trying to say. This researcher believes that cognitive overload cannot be eliminated when participants are learning a mass of new detail about a problem from reading contributions. This researcher proposes that a process for sharing knowledge should be one that manages cognitive overload, in that the process does not cause it to completely disable the sharing of information. Furthermore, he believes that the proposed format accomplishes this as it seems to enable participants to at least share some of their knowledge during the blind session before the participant is expected to cognitively process the contributions. However, even in the piggy-backing sessions under scrutiny here some participants seemed able to share new, highly innovative, contributions or share causal links. This might indicate that those participants were able to continue to cognitively process data during the piggy-backing gathering.

The issue of cognitive overload is an interesting one as it is a phenomenon which facilitators might be able to employ to manipulate, strategically, the number of contributions the participants share. As was discussed in Section 6.3.3, the proposed format enables facilitators to initiate cognitive overload in the participants by activating the public screen when they have enough contributions. This activation can limit the number of contributions the participants make and so the facilitator can keep the number of contributions to the approximate maximum of 65 contributions (a number that is manageable on the public screen). By eliminating cognitive overload, one might be removing a stabiliser which the facilitator can strategically employ to control the number of contributions which the group members share. Hence cognitive overload might be very useful and is something the facilitator does not want to eliminate.

10.1.1.3 More evidence that the problem has only been partially addressed - linking group maps

Much of the analyses which might have been performed on the relationship between the contributions in the group maps (i.e. that analysis which would be based on the causal links between contributions) was avoided because of the early discovery that all the contributions were not exhaustively linked in these group maps. This was interpreted to suggest that the links might not be able to indicate the true nature of the relationship between the contributions. Reasons for the potentially unreliable nature of the links have been given in Section 8.2.1.2.

Although it has been suggested that researchers of how participants work in JOURNEY Making gatherings might benefit from analysing exhaustively linked and well-validated maps, this thesis can offer little guidance as how these might be constructed by real-world groups. The tendency of participants to take the first two sensible causally related contributions rather than scour the screen for the two best contributions to link might cause 'incorrect' links to be made. In addition, the complexity of real-world communication (in that people will disagree, alternative suggestions might be made, and people might try to move on without achieving closure on an issue) might cause quick and dirty maps to be constructed. This might result because the facilitator has a tough job to do to manage the process and the participants as well as concentrate on the content of achieving a fully linked map.

The validation of maps might be possible for a researcher who has unlimited post-workshop access to all the participants. Alternatively, if some changes in the GE technology took place then this might facilitate better the generation of more precise group maps for example, if participants had the contributions in map form on their individual console screens and they inserted links in that way. However, before advocating the worth of this technological development one must consider the benefit to the JOURNEY Making participants if they were to have a perfectly linked map at the end of the workshop. If a main purpose of the group map is to act as a facilitative device (and Eden (1995a) suggests it is) then there may be very little additional benefit for the participants of having a near-perfect map over the quick and dirty map they build under current conditions. If the quick and dirty map can enable the learning of individuals of more detail of the problem on which to base their development of an outcome, then it seems questionable (from the point of view of the participants) to develop a process which has the sole focus of getting research data.

It might be that this exhaustively-linked map is an ideal state which is not desirable, never-mind possible, under current JOURNEY Making conditions, as Vreede (1997) writes "a model that describes a situation perfectly, including every exceptional event that may occur, either is impossible to create or costs a disproportionate amount of modelling effort", Page 209. The group map is designed into the JOURNEY Making process to be a transitional object in that the participants are able to develop and refine it as they learn more about the situation (Eden and Ackermann, 1998c). Hence the group map is developed over time from a rough model to a more representative model. The process is not designed to deliver a perfect final model, it is designed to facilitate the cognitive transition (or learning) of the participants.

In striving for a perfectly linked map in a group workshop, one might develop the linking process in a direction that concentrates more on getting the map right than on helping the participants explore and learn about the problem. Also there may be a danger that such a process would attain a near-perfect map at the expense of a procedurally rational process, because if participants were spending lots of time getting the absolute precision in a map then they might wonder, justifiably, why there is fuss about getting every link correct. Hence it would seem that the current format of constructing a quick and dirty map might be suitable for the participants to JOintly Understand, Reflect and NEgotiate strategY.

10.1.1.4 Which format of gathering is 'best'?

It is not felt appropriate to propose that one format of gathering is 'best' - each have their own purpose.

The multiple stimuli format seems clearly set apart from the proposed and normal formats in terms of what it is attempting to do and when it is used. To explain, the multiple stimuli format is typically used when there is significant time pressure or the facilitator does not want the participants to explode the problem greatly (instead he wants the participants to converge onto an outcome). The multiple stimuli format helps in this as it constrains the thinking of the participants to a significant degree and limits the number of contributions which people share (i.e. very limited divergence of opinions). This can be useful when the facilitator is wanting the participants to take ownership of an outcome which might have been pre-arranged with the client. The facilitator can then arrange a number of stimuli on the

screen which supports the pre-arranged outcome and get the group members to consider only those. The contributions they make can (hopefully) be used to support the way forward as they will most likely converge on the stimuli rather than raising awareness of new alternatives. Also, as was seen in Section 6.3.3.2, the multiple stimuli format is useful when time is very tight and the facilitator wants participants to gain substantive rationality from knowing that they have considered an element of the problem and it is displayed on the public screen. Hence by using the multiple stimuli format the participants can be allowed to consider a range of issues in a short space of time and the end product can be a fully linked map (if the facilitator asks for linking as soon as the contribution has been made) that only requires validating with the group.

The distinction between the aims of the proposed format gathering and the normal gathering is less clear. Both formats of gathering enable the participants to explode and diverge the problem, however participants in these proposed format gatherings seemed able to consider, on average, a greater number of individual themes 6.2 compared to 5.0 in the normal format (from Table 8.5 on Page 313). However, participants of the proposed format gatherings under scrutiny in this thesis seemed able to consider, on average, 11.6 group themes, whereas participants of the normal format seemed to consider only 6.7 group themes (as detailed in Table 8.8 on Page 325)). These participants of the proposed format seem able to share more contributions to their individual themes. This might suggest that, during the proposed format gatherings under scrutiny in this research, participants were more able to develop a more coherent argument during the blind gathering, possibly an indication that they have been able to establish their own position on the subject more firmly within themselves. This seems a reasonable extrapolation because if participants have had the opportunity to consider the problem in the blind session then ultimately they have had a period of time in which to establish their own position on the subject, without influence from other people. During the piggy-backing session these participants may be able to consider other peoples' contributions in the context of their own position, and then generate argument and refine their own position. Then they can enter group discussions with a clearer appreciation of what they think. In contrast, the participants of the normal format might not be able to establish their own position as strongly, because they could be constantly interrupted by the public screen up-dating and their attention could be taken away and possibly their opinion being challenged before it has even been clearly formed (challenges can come from what they read on the public screen).

Hence it would seem that if the aim of the facilitator is for everyone come to an agreement as quickly as possible as well as partially exploding the problem (to a greater extent than is typical using the multiple stimuli format) then they might prefer to use the normal format. This could be the case because participants might not have developed firm beliefs of the best way forward and so negotiation might be easier as people might be more willing to let go of issues which they had only partially developed.

However, if the aim of the facilitator is to explode the problem as full as possible and consider a wide range of diverging positions then the proposed format might be better. The proposed format might better preserve each individual's opinion, as those opinions are not being challenged by anyone during the blind gathering and so might have greater probability of 'surviving' until the group discussion stage rather than participants adopting a more widely shared view which is displayed on the public screen. This might be especially important on a controversial topic where participants might gain confidence from the heightened anonymity of the time delay between typing the contribution in and seeing it on the public screen in the piggy-backing gathering. Also when making contributions on a controversial topic, the availability of social comparison information might be continually sought if the public screen were up-dating so that participants know what is within the bounds of acceptability. However it might be that removing that social comparison information would cause the participants to be nervous that they are the only one being controversial. Hence the piggy-backing session might also be used to enable the participants to realign their understanding of acceptability and share more contributions as stimulated by what they read.

We can see that it is not possible to argue that any one format of gathering is 'best'. However, by exploring the strengths of each format one might be more likely to appreciate the situation in which each might be 'best'. For the proposed format, which has been the primary focus of this thesis, it would appear that where the facilitator wants the participants to enter discussion with a well-developed understanding of their own perspective, or where the facilitator wants the participants to share a lot of their knowledge to inform the problem, or if the topic is controversial, then the proposed format might be 'best'. Furthermore, if the facilitator wants to demonstrate procedural rationality early on in the workshop then the

proposed format might do this as participants are often amazed at the number of contributions they share in the blind session (unlike any other format).

10.1.1.5 Conclusion - The first measure of success

It is concluded that the research has been successful in exploring a new method of sharing knowledge which assists participants in sharing their knowledge more effectively. However, there are two limitations in the approach which further developments might aim to address. With current GE technology the first limitation of cognitive overload might not be overcome because when people have to absorb a mass of new knowledge very quickly there might always be cognitive overload. However, the introduction the GP participants gained through their clustering of the contributions (during their Gathering 1) might have better prepared them to cognitively manage the mass of information on the public screen. The second limitation of the difficulty of generating an exhaustively linked group map is one that might be addressed and overcome by future research, but one must first consider what the real benefit would be to the participants of the session.

For the reason that the research has developed a new technique that has been shown to help participants share more knowledge, it is thought that this first measure of successful research has been accomplished.

10.1.2 Revisiting the objectives of this research

In Chapter 1 the aims of the thesis were introduced. It seems that a second measure of the success of this work can be found by measuring it against these objectives. This discussion will seek to make that measure. Each of the following discussions in the list below will very briefly introduce the research objective (in italics) and then give a few lines of argument of whether it has been achieved (what is thought by this researcher to be) satisfactorily.

Objective 1.- To explore what happens in gatherings that are run as part of a real-world JOURNEY Making workshop. This has been explored at a theoretical level, in Chapters 2 and 3 and (to a lesser extent) in Chapter 4. Also explored in these chapters were what the participants were supposed to have been doing during the gatherings. On a practical level Chapters 6, 7 and 8 have explored what the JOURNEY Making facilitator actually did during the workshops under scrutiny here. More importantly however these chapters have

also explored what the participants actually did, as was transparent through the analyses of data which was captured.

Objective 2.- To improve practice in facilitating real-world gatherings. Argument has been presented (theoretical argument in Chapter 3 and, critically, empirical evidence in Chapters 6, 7 and 8) which suggests that changing the format of the gathering does, in some cases, improve the practice of facilitating real-world gatherings. The conclusions from each of these chapters give support to the view that some participants find benefit in the proposed format of gathering.

Objective 3. - *Providing theoretical support for changing the format of the electronic gathering to enable participants to more effectively share their knowledge on a problem.* The argument developed in Chapter 3 gives weight to a claim that this proposed format has theoretical support - in terms of its potential to structure the nature of the thinking process performed by participants and maybe help them to overcome bounded vision.

Objective 4. - *To generate useful insights from the data that has been collected during real-world JOURNEY Making gatherings, to discover how the participants: in gatherings use the computer technology and GE; view the process of sharing knowledge in real-world workshops.* The findings chapters have reported on a number of different explorations which were performed using data from real-world gatherings. That data has been of the nature of the contributions and links which participants contributed and of the feelings of participants as captured through observations and in-depth interviews. This thesis has delivered those findings in Chapters 6, 7 and 8.

10.1.2.1 Conclusion - The second measure of success

Revisiting the research objectives suggests that these objectives have been accomplished.

10.1.3 Reflecting upon the research methodology

In order to further explore if this research has been successful, one should reflect upon the methodology through which this research has been performed to see if that can be thought of as being robust. Miles and Huberman (1994) propose five dimensions which research might need to satisfy before it can be thought of as being 'good' research. The five dimensions they propose are: objectivity, reliability, internal validity, external validity, and utilisation. It

seems appropriate to structure this reflection on the success of the research methodology by reflecting on each of these dimensions in this research.

10.1.3.1 The objectivity of this research

Miles and Huberman (1994) describe 'objectivity' as "relative neutrality and reasonable freedom from unacknowledged researcher biases", Page 278. This research might be thought of as containing many researcher biases, for example the bias the researcher exerted when coding the contributions into individual and group themes. Also the bias that might have crept in to the collection of data during the observation of the real-world - in terms of the researcher possibly being aware of reactions from some individuals who stood out in the group and possibly being less aware of 'quieter' people.

However, Miles and Huberman only reflect a concern with "unacknowledged" biases. This researcher has attempted to acknowledge the biases which he believes may have effected his data collection and data analyses. These biases have been raised throughout the justification for the research methodology (in Chapter 5) and during the three findings chapters where the procedures for, and backroom work performed on, coding the raw data was detailed and reflected upon (with the aim of leaving an audit trail (Miles and Huberman, 1994)). Hence instead of hiding the biases within this research, this thesis has explicitly raised them.

Other aspects of objectivity raised by Miles and Huberman are believed to be satisfied by this research. For example, the findings of this work have been summarised in appropriate tables and charts to illustrate the findings. Also the findings have been interpreted in the context of the situation and, where possible, rival interpretations have been made to offer a more holistic view of the situation than might be performed by any one explanation. This is especially the case when considering the data from interviewees of the GP workshop (from where five of the six interviewees came). When this researcher considered that the peculiarity of the GP workshop might have had impact on the attitude of the participants, effort was made to explore the context behind the participant's attitude and offer context for the interpretation of the participant's reaction.

10.1.3.2 The reliability of this research

Miles and Huberman describe 'reliability' as "whether the process of the study is consistent, reasonably stable over time and across researchers and methods", Page 278. This researcher believes that this research is reliable in a number of dimensions, for example:

- The analyses is considered to have been performed with care. As detailed in the findings chapters, all the coding of the data was performed twice or otherwise cross-checked, sometimes using different mediums (i.e. computer and paper based) and there was typically high inter-coder reliability across the two codings. Also any inconsistency between the codings were investigated and solved.
- The data that was collected is considered to adequately satisfy the objectives of the research, as was argued in Chapter 5 when justifying the research methodology.
- Research findings were analysed from a number of sources of data. Hence there was triangulation of findings from the analyses of contributions and links, with data from researcher observations, with data from the interviews, with data from facilitator comments (although infrequently) and (also to a limited extent) with data from the questionnaires completed by participants of pilot sessions.

10.1.3.3 The internal validity of this research

Miles and Huberman describe 'internal validity' through the question "Do we have an authentic portrait of what we are looking at?", Page 278. It is believed that the findings presented here do make sense. No robust criticisms of the findings can be generated by this researcher. Maybe one pleasing criticism of this research is that it does not generate any findings which appear to be internally invalid. Internal invalidity might offer some interesting avenues for additional exploration and research. However, it might raise problems in the research methodology or the techniques of data analyses.

It is possible that considering this research has used an Integrative Evaluation approach, it has enabled the researcher to explore the potential invalidity of findings in a real context. This approach has enabled him to dampen unexpected results being thought of as internally invalid, because, on deeper reflection, there might be a good reason for the result being unexpected. The knowledge of the context in which these potential internally invalid contributions are made are thought to be rich. This knowledge is used to synthesis background information with live observations, and with the hard data captured real-time to build an overall picture of the situation.

In terms of the internal validity of the coding performed during this research, it seems necessary to raise a point from the coding of the individual and group themes performed in Chapter 8. It was noted in Section 8.3.2.1 that the participants share up to seven individual themes, and it was mentioned that this might be due to the information processing limits of the participants in them only being able to consider seven different aspects of a problem within their short-term memory (Miller, 1956). However, it was also suggested that this might be due to the information processing capacity of the coder, in terms of their own cognitive limitation of considering seven different categories of codes to which contributions might be attributed. This issue also seems to be one of the 'objectivity' of the researcher in him introducing a researcher bias into the coding of the themes. However, it has been classed as an issue of 'internal validity' because it is thought that it pertains more to the validity of the entire method of analysis than purely of the interpretation of the researcher.

If one prefers the proposition that it is the processing capacity of the coder rather than the participants which has resulted in up to seven codes being found, then this puts into question the internal validity of coding themes. Nagasundaram and Dennis (1993) who acknowledged the limits of an individual's processing capacity also consider Miller's (1956) 'majical number seven'. However, they applied the 'majical number seven' to the participants of their experiments rather than to the coders who might equally have suffered from the effect.

It might be that a main reason why the narrow-band researchers have not gone beyond the quantity and quality of the contributions which participants share during brainstorms, to exploring the nature of the themes to which participants contribute is related to their awareness of the processing capacity of the coder. However, the validity of the process of this researcher themeing the contributions was explored in Section 8.3.1.2. When this researcher themed the contributions he had a wealth of experience with these contributions, gained from performing other analyses and he had a glut of time in which to perform the codings. Hence this researcher did not begin the coding of the themes 'cold' and have to work hard under tight time pressure to get a grasp of the contributions before he coded them. Instead the researcher had worked with the contributions for about 6 months and had intricately dissected the contributions for other analysis, some of which is not included in this thesis. Huff and Fletcher (1990) might believe that his experience with the contributions

puts the researcher in a powerful position to make claims about the nature of the contributions.

The researcher was able to take his time to code the contributions and revise and validate his codings as often as he wished until he was satisfied. Miller discusses the limits of the information processing capacity of participants in their short-term memory, however this researcher was able to deliberate, revise, and play with the codes for as long as he needed until he was satisfied with the coded which had been developed. Hence although he may have been using short-term memory, the researcher's codings were not immediate nor absent of the context of the other themes to which the researcher had coded the participants' contributions.

Considering that this researcher was experienced with analysing the contributions and had lots of time to perform the coding, then the theory about the 'majical number seven' might not dictate that the research on the themes is viewed as being suspicious, or internally invalid. It is felt that the researcher was in a good position to expand his thinking about the themes over the mark of seven, i.e. plus two as Miller (1956) proposes. If this researcher had found evidence to suggest that the participants actually shared 10 individual themes then his experience and knowledge of the contributions (combined with his lengthy deliberation and revision of the themes) might have informed his appropriate coding of those 10 themes.

The fact that, according to Miller (1956), the coder could be able to cognitively manage seven (plus or minus two) individual themes in his short-term memory but instead found a maximum of seven themes in the contributions, is believed to be more a result of the more immediate cognitive processing limits of the participants rather than that of the coder who was able to scrutinise and revise his codes without time pressure. Hence it is felt that the coding of the themes performed in Chapter 8 is not an internally invalid exercise to perform for this researcher in the context in which he performed his coding.

10.1.3.4 The external validity of this research

Miles and Huberman suggest that the answer to the question of "Are [conclusions] transferable to other contexts", Page 278, might indicate the external validity of the research.

Within JOURNEY Making these results are believed to be indicative of the way in which the typical participant might experience the process of sharing knowledge in the typical gathering. However, this is not to say that these results will be transferable to all JOURNEY Making sessions or all participants in any particular session. Effort has been made to reflect upon and loosely define the contexts in which similar results might expect to be seen. For example, these results might not be expected to represent the working of other groups who might use GE software, for example, students who use a meaningless task because these people may not have a developed cognition about the issue and so are not able to share knowledge from their expert point of view like other JOURNEY Makers might. Similarly these results might not be transferable to very large groups who use computer technology to share knowledge, for example when 50 participants are in the group and they work in sub-groups of 5 participants sharing console because the dynamic between a pair sharing a console might be very different to when 5 people share a console. However, these results might be representative of participants who use GE to share knowledge in small groups of less than 20 people and who are focussed on the development of some strategy to tackle a problem which is very important to them.

In thinking of transferring results from this research to contexts external to JOURNEY Making, Miles and Huberman claim that sometimes the product of the research is externally valid in that it contributes to the generation of theory which has transferability to other contexts. It is believed that this research can make five main contributions to theory which might be transferable to other contexts (as will be discussed in Section 10.1.4). However, it is not thought that the actual results of (say) the quantity of contributions made is necessarily transferable to the making of contributions using other group facilitation software, for example, Group Systems. The reason for this is that other approaches might use a startlingly different process to facilitate the sharing of knowledge or emphasise different elements of importance. For example, in much narrow-band work free-wheeling is welcomed (as the instructions to the participants indicates, for example, Gallupe et al (1992) and Dennis and Valacich (1993)). Hence one might expect participants to share more contributions when free-wheeling is welcomed and when wild and wacky contributions are encouraged than when the facilitator emphasises the sharing of contributions that should be feasible and be able to create a desired effect.

Where suitable the results of the data analyses have informed the generation of theory. For example, the observational data has informed the construction of a theory of how facilitators might strategically use the different operating conditions to control the amount of cognitive overload the participants might suffer to meet the wider aims of the gathering session (in Section 6.4). Also observed actions were used to build understanding and theory of the way in which the facilitator links the contributions in the group map during discussion (in Section 7.2.3) while quantitative analysis was used to explore the existence of a 'hierarchy of preference' for participants making different link-types (in Section 7.4.1). In Chapter 9 the thesis reflected upon the construction of a generic theory of how participants might think holistically about a problem and this was supported loosely with quantitative data. What might be transferred from this research to other contexts is a theoretical understanding of how group members might share knowledge and an understanding of how a facilitator might be able to facilitate this working. These theories might then be used to inform the generation of a sensible process by a reader in a context relevant to them. For example, it is not expected that a Group Systems facilitator will benefit from knowing that some participants in a JOURNEY Making session might prefer to share WW links rather than TT links, for participants using Group Systems do not share causal links. However they might be interest to know that there is theory (and empirical support from a JOURNEY Making context) which encourages the changing of the process of a normal brainstorm to capture different types of contributions in a two stage process which might give access to different types of knowledge about a problem.

10.1.3.5 The utilisation of this research

Miles and Huberman describe 'utilisation' as "[knowing] what the study does for its participants, both researchers and researched - and for its consumers", Page 280.

This work has been grounded in the real-world, in that the main sources of data have been real-world sources and the majority of the results have interest to people in the real-world.

The findings are believed to have interest to some facilitators of gathering sessions as they might raise their awareness of how to facilitate better these sessions (for example, the strategies for conducting smooth gatherings reviewed in Section 6.4). However the findings might also raise the awareness of facilitators to the potential pit-falls of using the proposed format so they can aim to avoid them using certain strategies which are also reflected upon.

For example, as discussed in Section 7.3.2.1, the problem of some participants making incorrect links and the facilitator having to delete them has been explored, as has the procedural rationality which the facilitator might build before participants begin making links so they know the reason for the links being deleted and their usefulness to exerting an initial structure on the contributions.

However, it is thought that a main strength of this research is that while real-world 'consumers' (for example, facilitators) might have interest in the findings to discover how the sharing of knowledge might be enhanced using computer technology, the findings also have significance to 'researchers'. The theory construction performed in this thesis, which has been based on, or substantiated by, theory might be of interest to a researcher who has interest in researching the sharing of knowledge in groups, as will be seen in Section 10.1.4 where the main contributions of this research to knowledge are explored. The theory developed here is believed to be developed through an appropriate research methodology (as defended in Chapter 5) and is believed to be of relevance to the field in which it is couched.

In terms of the impact which this research might have for 'the researched', one must look at its impact on the participants of a workshop, the users of GE. It is not expected that these research findings will have any interest to the participants of a gathering session as their interest is likely to be in making strategy, not in a research programme. However, participants will be effected by this research to the extent to which the facilitators adopt the proposed format. If the facilitators are persuaded by the argument for changing the format of the session then the participants will be effected.

10.1.3.6 Conclusion - The third measure of success

The discussion of Miles and Huberman's (1994) five dimensions of 'good' research suggests that there are many reasons why this research might be thought of as being 'good'. Hence it is concluded that this research is successful in that it might be thought of as using appropriate research methodology to investigate the problem.

10.1.4 Reflecting upon the main contributions of this work to knowledge

The last measure of successful research which this 'Reflection' will consider is the success of the research in providing output which has some contribution to knowledge. It is felt that

this thesis has reported research that may have contributions to make to three types of knowledge. Firstly, the research might contribute new knowledge to the practice of facilitating a JOURNEY Making gathering, as will be discussed in 10.1.4.1. Secondly, this research might have a real contribution to knowledge on gatherings (or electronic brainstorms), as will be discussed in Section 10.1.4.2. Thirdly, the research might raise awareness of some interesting avenues for new research, as will be discussed in Section 10.1.4.3.

10.1.4.1 Contributions to practice

There are four contributions to practice which this researcher believes this research can make, as will be reviewed in the following sections.

10.1.4.1.1 A new format for brainstorming

The process of brainstorming reflected upon in this thesis is one that is straightforward. However, it is one that breaks away from nearly 50 years of tradition as most of the brainstorming research reviewed for this thesis has (with the exception of Pinsonneault et al (1999) and the work on directed brainstorming, for example, Satzinger et al (1996) and Briggs and Mittleman (1997)) been based on a single traditional session format of brainstorming, much like the normal format. The researchers of brainstorms have moved from verbal brainstorms, to manually-supported brainstorms, and recently to computer-supported brainstorms and so it seems worthwhile for researchers to explore new and better formats for sharing knowledge using those new tools. It is believed that a useful contribution of this research is the development of a new format for brainstorming.

It is also believed that this research offers insight to useful ways of analysing the contributions and causal links that are made during the brainstorms or gatherings. The research is able to support the introduction of this new format of gathering with evidence that the format is able to help people to explore, and share, a wider scope of their knowledge than the normal format. The nature of this evidence is two-fold. Firstly there is evidence that participants in the proposed format can share knowledge during groupwork, and secondly that participants of the proposed format suggest that they like working in the proposed format.

10.1.4.1.2 The difficulty participants have in identifying causal links

The work performed in Chapter 7 suggests that participants have a real difficulty over how to make causal links, an issue of which facilitators might benefit from being aware. Section 7.6 explored the implications of this work for facilitator's practice of encouraging causal linking by participants.

The core of the argument is that, participants often relayed a concern over not knowing what they were supposed to be doing, especially during the first of the linking sessions. However, they seemed to learn how to links and became less concerned as the workshop progressed. Facilitators might not be too bothered about participants making incorrect links, in which case as many participant-entered links might be the best outcome. However the initial concern which many participants seemed to have might want to be addressed by the facilitator.

10.1.4.1.3 'The Notion' of how participants might think about a problem

Chapter 9 explored one approach to considering how transparent the thinking performed by participants might be, in terms of how holistic or fragmented it seems. The thesis suggested that the analysis of a participant's thinking strategies might be possible through the examination of the contributions and causal links which the participants share. However, the conjecture in Chapter 9 was not rigorously supported with high quality data as it was felt that this researcher did not possess such data.

This researcher is now in a position to explore the ways in which he might collect that high quality data (and appropriateness of so doing for the workshop objectives). Alternatively, if this researcher was to communicate 'The Notion' to the GDSS research community then other researchers might realise where their data could enable further consideration of the theory. This might enable the development of some interesting insights as to how much detail participants might be able to consider problems. This work might enable further development of the process of gathering or brainstorming to enable participants to share knowledge in a more holistic way (if that is desired by the facilitator) or in a more fragmented way (if that is desired).

It is suggested that 'The Notion' might have some potentially interesting applications in real-world contexts, as briefly discussed in Section 9.2. Further research, possibly by relating

'The Notion' to other researchers, might enable the community to make progress on realising the potential of 'The Notion'.

10.1.4.1.4 Redefining the role of the facilitator in the group

When this researcher first saw a JOURNEY Making facilitation he saw it as a process which freed the participants to share their knowledge. He saw the facilitator as a guiding hand which helped the participants, in terms of structuring the material which they contributed and structuring the process through which the outcome was generated.

However, since those first few experiences this researcher has become aware (more so since writing this thesis) that the facilitator is very much more than his first impression suggested. The facilitator seems to be a driver for an outcome, a manipulator of the psyche of the participants and a key member of the group who (maybe) has more influence on the outcome than any other single member (excluding the client). This has been apparent through how the facilitator determines the process almost unilaterally with the client, guides the thinking of the participants to clusters of material which they think are important, has an integral role in the structuring/linking of the contributions. The facilitator seems to have a powerful role.

It might be worthwhile pulling together these roles and appraising the real role of the JOURNEY Making facilitator. This thesis has begun to do that in exploring the role of the facilitator in the linking process (in Section 7.2.2), and in determining in how much detail the participants are enabled to consider the problem, for example, by choosing the multiple stimuli session over the proposed session (in Section 6.3.3). It might be very interesting to compare the role of the JOURNEY Making facilitator to the role of the facilitator in other GSSs. If this were done then it might enable the JOURNEY Making facilitator to be in a better position to compete for contracts (and persuade potential clients) as they might have a clearer understanding of where they actually differentiate themselves from other facilitators. Such an exploration might even enable a clearer understanding of what their powers actually are over the group so that they are more conscious of where they might be employed and what might be the potential pit-falls of using these powers. This might be especially useful for the novice facilitator.

10.1.4.1.5 Conclusion : Contributions to practice

This review of the contributions to practice which this thesis might make adds weights to the claim that this research has implications for real-world practice. Hence it also adds weight to the proposition that the research has been successful.

10.1.4.2 Knowledge outcomes

This researcher has identified five contributions which might inform researchers of how able participants might be to sharing knowledge in JOURNEY Making groups.

10.1.4.2.1 Relevant measures of the contributions made during brainstorms

This work is the first real attempt of synthesising various dimensions of the contributions that are made in a JOURNEY Making gathering. This research has moved beyond simply calculating the quantity and quality of the contributions. It has developed some useful, and some not so useful, approaches to building an understanding of what insights might actually be gained simply through analysing the contributions and links made by the participants. It is felt that other researchers might be interested in being stimulated to consider where these might be applied to their data.

10.1.4.2.2 Identifying causal links

It is felt that this research raises some interesting issues regarding the ability of participants to identify causal links during JOURNEY Making gatherings. Participants need not get all the causal links correct in order to make their contribution of causal links a success. Even if the links themselves are wrong then they still contribute to the understanding of the participant of the contributions on the public screen and also give some initial structure to the material. It is felt that this message might be useful to JOURNEY Making facilitators, and to other practitioners who might use a different approach to causal mapping.

10.1.4.2.3 Some characteristics of narrow-band research methodology

The discussion on narrow-band research methodology (in Chapter 4) sought to explore the potential limitations of their approach to this research on JOURNEY Making. The thesis would suggest that narrow-band researchers might benefit from analysing brainstorms in a similar way to this wide-band research if they are to generalise their results to real-world groups. That is not to say that they must adopt the techniques which have been reflected upon in this thesis. Rather this thesis makes a call for narrow-band researchers to use

problems which people have had an opportunity to consider and develop ways of investigating these from the perspective of the people they might be trying to help - the participant. In order to do this, so that it can indicate something about real-world interventions, this thesis has suggested that the task should not be a surprise to the participants. This is suggested because managers are able to exploit their occupational cognition when considering a problem in a real-world brainstorm, and so should students when considering a task.

10.1.4.2.4 Synthesising quantitative and qualitative data

This researcher has used all the data available to him to explore how participants work during JOURNEY Making gatherings. He has used the quantitative data on the contributions and links which he was captured by the GE software and that data captured from the questionnaires with pilot workshop participants. He has used the various qualitative data which was captured through interviews with participants, his personal observations and comments from the facilitators.

It is felt that the way in which this research has triangulated and build theory through synthesis might contribute some knowledge to the research of brainstorms. Granted, other researchers do combine quantitative analyses with comments from the participants, for example, but this research might take that to a new level in terms of the amount of data which was able to be synthesised. This research might give confidence to new researchers that useful findings can be secured if a more interpretive research methodology is utilised.

10.1.4.2.5 Integrative Evaluation

It is felt that a significant contribution of this research is in the employment of the research methodology Integrative Evaluation. The feeding back into the research any findings which are made during the research programme is a key component of this research.

The proposed format is one that has been developed and refined during the course of this research programme. For example, the adapting of the formats during the MBA gathering and gathering 1 of the GP workshop, as described in Section 6.3.2.3.2. Hence, instead of deciding on a format of gathering and performing Summative Evaluation of how the participants experienced one format, this researcher was willing to integrate what he learned back into the research during the data collection stages, and so collect data from gatherings which were run under subtly different formats.

It is felt that Integrative Evaluation is an approach which might be very useful to many researchers who seek to develop a technique during their research.

10.1.4.2.6 Conclusions : Knowledge outcomes

Five contributions which this thesis might make to knowledge have been identified. This seems a positive indication that this research has academic significance, as well as significance for practice, further suggesting that the research has been successful.

10.1.4.3 Contribution to future research directions

The discussion in Chapter 9 comments on one synthesis of the findings which have emerged from the data analysis of this thesis. Sections 10.1.4.3.1, 10.1.4.3.2 and 10.1.4.3.3 will comment on another three areas of potential exploration which have been raised during this work.

Three potential areas of research have been identified which are out-with the scope of this thesis but which this researcher thinks are potentially interesting for future research on GE. Sections 10.1.4.3.4, 10.1.4.3.5 and 10.1.4.3.6 will briefly explore each of these areas.

10.1.4.3.1 Cognitive overload

It might be interesting to perform some more detailed work on what might be the consequences of cognitive overload. This researcher has argued that while cognitive overload might be bad (in that the participants are being hindered in the sharing of their knowledge) it might also be good (as it gives the facilitator a stabiliser through which he can control the productivity of the group members).

However, it might be very useful if research could be performed on what effects cognitive overload might have on the nature of the piggy-backed contributions that are made. It might be that removing cognitive overload causes participants to navigate the contributions more freely which causes them to think less rigorously about the issues. This could have the result of the participants just making 'standard' contributions during the piggy-backing session rather than the 'valuable' contributions which were found to be shared by participants of the proposed format gatherings reported upon here. This might happen because participants

might think less deeply about their piggy-backed contributions if cognitive overload was lessened.

Also it might be very interesting to explore the nature of the linking which is performed by participants who are less overloaded cognitively. One might wish to explore if the causal links which these participants make are more likely to be correct. It might be that participants make wrong links, not because the instructions are unclear, but because cognitive overload is over-powering and debilitating. Furthermore, it might be interesting to explore whether participants who suffer less cognitive overload are more likely to make TT links if they are more able to navigate the public screen without grinding to a halt through cognitive overload. It might be that cognitive overload causes people to concentrate on WW links (or other links at the top of the 'hierarchy of preference'). Hence if cognitive overload was lessened then one might be able to encourage the synthesis of different peoples' contributions through making TT links and the like.

The natural continuation of this present discussion would be for the researcher to suggest ways of combating cognitive overload. However, this researcher is not so sure that cognitive overload is a bad thing. Not only can cognitive overload give the facilitator a stabiliser for productivity but it also might help to put the facilitator firmly in control of the session and thus reinforces his role in the group. Effectively if the facilitator can keep one step ahead of the group members (and this might be possible as he has trained to think in the way of cognitive mapping) then the facilitator might be in a better position to control the politics and interpersonal relationships which might exist in the group. If the facilitator is able to establish himself as the controller, and does so from the very first gathering, then it might set the scene for a smoother workshop than might be the case if some dominant members decide to hi-jack the event. Hence, before any approaches to cognitive overload were developed, one might like to consider the real benefits, and critically the drawbacks, from less cognitive overload.

10.1.4.3.2 What is a good contribution in a gathering?

In Section 6.6.5 it was claimed that further work on the goodness of a contribution might be useful as it might help facilitators to appreciate which contributions the group might regret not having considered in their generation of an outcome. On deeper reflection it might be

that this is an area where researchers are driven more by academic interest than by solving a real-world problem.

What might be the benefit to participants or the facilitator if they understand better which contributions they might regret missing? Sometimes the facilitator has a clear understanding of which elements of the problem the client wants the group to concentrate on. Then the facilitator can manipulate the group so that they might arrive at a similar outcome as to what the client desired. In this case it would seem irrelevant to the facilitator which are the good contributions, because the facilitator will just manipulate the outcome the group members' perception towards the desired outcome.

If this question of what contributions would participants regret not having considered in their generation of an outcome is deemed to be an interesting one, then it is proposed that researchers might begin by exploring more about shared knowledge between participants. It might be that the important contributions are those that lots of participants see as being important, else they would be ignored. Participants might only see a contribution as being important if they previously held an opinion that this was an important topic (in which case the knowledge was previously shared), or if they are given persuasive arguments (Vinokur and Burnstein, 1974) supporting the contributions being thought of as important (in which case new unshared information is being shared).

It is thought that the issue of shared knowledge might be an interesting place to start such an investigation, if the researcher can firstly justify what impact they hope their conclusions can have on the development of a process which better meets one of the objectives of their intervention.

10.1.4.3.3 Handing the clustering of contributions to the participants

This researcher strongly believes that the process of clustering the contributions during the blind gathering could be subjected to further consideration. It might be that certain types of participant might feel uncomfortable with the facilitator determining the clusters, for example, the Counsellors mentioned in Chapter 6. The participants of the GP Session 1 were exposed to an approach which involved their clustering of the contributions. The approach seemed to work practically, although it did take additional time for the clustering. It is thought that it might be useful to spend additional effort in considering alternative strategies

to handing the clustering of contributions back to the participants. These strategies might consider how time can be saved over the process the GP participants experienced.

However, the clustering of the contributions by the facilitator can be another strategic role by the facilitator. The facilitator can often use the clustering of the contributions to suggest that one issue in the problem (which has been previously agreed with the client) is very important. Hence the facilitator politically manipulates the group. By handing the clustering of the contributions back to the participants the facilitator is effectively losing some of that control. Hence the structuring of contributions might not be suitable for this type of groupwork.

However, where the focus of the JOURNEY Making session is groupwork and building teams, then the facilitator might be prepared to sacrifice this control for the good of the main focus of the session. Some work has been performed on exploring how group members can perform manual group mapping without the help of the facilitator (Johnson and Johnson, forthcoming) and they found that group members could not map very well. Nevertheless, this researcher believes that if, a methodology was built to facilitate the process of group mapping then this might build additional procedural rationality, as the group members have structured their map from scratch themselves. Researcher might like to consider the merits of the process which the GP participants experienced and use this as a basis to inform their development of alternative strategies.

10.1.4.3.4 Implications of this work for manual group support

There may be some implications of this work for manual group support techniques. However, on deeper consideration there appears to be no natural continuation of this work on the proposed format to the exploration of how Oval Mapping Technique (OMT), the manual GDSS used in JOURNEY Making, might benefit from the discoveries made here. A primary consideration in using OMT is the development of the social relationship between group members which might be less of a focus when using GE. However, the proposed format employs the nominal group approach during the blind gathering, and the social contact is very low in this blind gathering. In the piggy-backing gathering the social contact is again quite low, but this is to be expected.

One interesting link between OMT and GE which might merit researching relates to the nature of piggy-backing by the group members in OMT sessions. The facilitator of the OMT session typically encourages piggy-backing and they might be interested to know that the piggy-backed contributions are ones that might be very valuable to the group members as they might represent issues that they had not considered before. Hence, although not an automatically transferable result, this might give the OMT facilitator some interesting cause for thought. It may be that the OMT facilitator could identify the piggy-backed contributions through some technique, perhaps from the review of video tapes of the session, and conduct similar data analyses to that performed here.

Another area of research might be contrasting the nature of the group maps which are built during using an OMT approach and using a GE approach to facilitating groupwork. It might be that the OMT approach provides a less thoroughly linked group map which contains more 'islands' of contributions rather than interconnected contributions because the facilitator is less able to move contributions freely around the wall when they have been linked. This might cause it to be more difficult for participants to identify links. Again however, it is the participants' learning that might be more important, rather than the development of an exhaustively linked map. Nevertheless some interesting discoveries might be made by contrasting the maps which are developed using manual support and using computer support in facilitating groupwork.

10.1.4.3.5 GE for group counselling

One other area of application for GE might be in group counselling. Some people who are counselled might benefit from the detached nature of sharing their feelings in a group. When the contributions go onto the public screen some participants (during interview) have reflected feeling that the contributions are not their own, but belong to the group. Therefore it might almost be that people are able to detach themselves from their contributions.

Obviously significant further discussions with trained group counsellors would have to undertaken, but it might be that people who are having difficulties in their lives, and who prefer group counselling over individual counselling, might benefit from the anonymity when sharing their feelings, but still gain a reassurance that they free and able to share their deep feelings. The format of gathering feelings would have to be changed substantially from

the proposed or normal conditions, for example, possibly by eliminating the linking of feelings.

The sharing of feelings electronically might be one application for GE outside of strategy development. It is clear that group counselling is not an activity that the responsible group facilitator should endeavour to facilitate. Group counselling is starkly different from facilitation and it would be necessary for a trained group counsellor to be integrally involved with any such venture.

10.1.4.3.6 The other facilities within Group Explorer

There is scope for some exploration of the preferencing and rating functions which are offered within Group Explorer.

This researcher attempted to explore how participants might use these facilities however, due to the way in which the GE database logs the entries and the way in which the sessions under scrutiny here were run, no useful analyses was possible. It may be that the development of the logging facility is possible which could give access to the way in which participants share their knowledge using these facilities. A main problem this researcher encountered when analysing the GE computer log from the preferencing facility (the facility which seemed to be used the most after a gathering) was that the log recorded each movement of a preference blob. Hence one could not be confident in the participants different movements of the blob when making their final decision. This researcher felt that he could only be confident in the final decision by a participant, and this did not lead to any interesting explorations. Also the researcher did not develop any process for the session to capture the data he wanted, and so the data was not really informative.

What might have been interesting to explore is how peoples' opinion change during the workshop, as might be transparent through their preferencing or rating. Hence this might require a researcher developing a process which captures data on the participants' opinions at different points during a workshop. Then the researcher might analyse how these opinions might change when people are exposed to unshared information to inform their decision making. Also the researcher might like to explore how normative influences affect the participants in their development of an opinion, possibly applying the theory of Social Impacts to their work. Such a researcher might also need to find a suitable client with which

to use this process. If these were possible that some analyses of the nature of the changing of opinions by participants as they make the JOURNEY might be very interesting.

10.1.4.3.7 Conclusion : contribution to future research directions

From performing this research, this researcher has identified six areas which might merit some future consideration. Three of these areas have emerged from the actual data which has been collected and analysed during this research. The other (last) three areas have been out-with the scope of this thesis, but offer interesting areas for future work.

Hence this research might have uncovered new areas of potential research, and thus may have made a contribution to knowledge in this way.

10.1.4.4 Conclusion - The fourth measure of success

This researcher has been able to identify three categories of 'contribution to knowledge' which might be made by this thesis. It has been argued that this research might make a contribution to the practice of running a JOURNEY Making gathering, as well a making a contribution to academic knowledge and has uncovered new areas of potential research. The evidence which supports each of these 'contributions to knowledge' might add weight to the notion that this research has been successful.

10.1.5 Conclusion - Measuring the success of this research

It is suggested that this research programme has been successful for four reasons.

1. The motivation for the study has been satisfied, in that a method of overcoming the real-world problem has been shown to be developed.
2. The research objectives have been shown to be accomplished.
3. The research methodology which has been adopted has been argued to be appropriate and successful.
4. The research has been shown to have the potential of making some interesting contributions to practice and academic knowledge. Also it has uncovered some future directions for research.

10.2 CONCLUSIONS : REFLECTIONS

This research programme has focussed on the development and assessment of a format of brainstorming which aims to enhance the sharing of knowledge in groupwork. It is felt that it has performed this exploration to a standard that merits it being considered as a useful piece of research that delivers findings which are useful in a real-world context. However, as has been raised in the discussion above, this is one step in helping group members to consider the problem in more depth in the process of JOURNEY Making.

There seems to be great scope for further research to explore how group members might be able to share knowledge during in brainstorms or gatherings. This researcher would advocate that work should be:

- Participant-focussed in terms of how the participants might benefit from the development of a process for sharing knowledge.
- Performed using tasks which are known to the participants so that their occupational cognition and personal baggage all influence their generation of an unknown solution (in the same way as it might for participants of real-world gatherings).
- Analyse the product of the participants' effort (the contributions or links) using informative measures.

Hence this researcher would extend a similar call by Vreede and Vogel (2000) to concentrate future research on brainstorming in the application of group facilitation and group support technologies using known problems with possibly unknown solutions. Only when we research brainstorming using participants who "track all sorts of mud from the rest of their lives with them", Page 5 (Perrow (1972), quoted in Eden (1992a)) might we begin to try to understand how real-world group members can be facilitated to share their knowledge more effectively using these technologies.

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LIST OF APPPENDICES

APPENDIX 6.1 - THE QUESTIONNAIRE USED IN PILOT STUDIES

MBA Students – 10th June 1999

How can we help organisations to be more effective with strategy development and implementation?

Please circle the number which best reflects you opinion.

1 = Strongly Agree
2 = Agree
3 = No Opinion
4 = Disagree
5 = Strongly Disagree

Contribution Generation

1) I was concerned that my group might not be contributing as many contributions as other groups.
   [Agree] *1* *2* *3* *4* *5* *[Disagree]*

2) I was concerned that my group's contributions might not have been as 'good' as other groups'.
   [Agree] *1* *2* *3* *4* *5* *[Disagree]*

3) I was frustrated at not being able to see the contributions that other groups were contributing on the public screen during the first 'blind' gathering.
   [Agree] *1* *2* *3* *4* *5* *[Disagree]*

4) I would prefer to see other groups' contributions come onto the public screen real-time rather than have them hidden.
   [Agree] *1* *2* *3* *4* *5* *[Disagree]*

5) I tried to find out how many contributions my group was contributing compared to other groups.
   [Agree] *1* *2* *3* *4* *5* *[Disagree]*

6) I tried to find out how my group's contributions compared to other groups'.
   [Agree] *1* *2* *3* *4* *5* *[Disagree]*

7) During the blind brainstorm I was concerned that my group might be contributing the wrong type of contributions.
   [Agree] *1* *2* *3* *4* *5* *[Disagree]*

Piggy-backing

[The themes were those the facilitator highlighted during the initial gathering and you were asked to piggy-backing off.]

8) I looked at the themes to stimulate my thinking.
   [Agree] *1* *2* *3* *4* *5* *[Disagree]*

9) I found it easy to grasp what the themes referred to.
   [Agree] *1* *2* *3* *4* *5* *[Disagree]*

10) The themes helped me to think about issues I had not previously considered.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

11) I read both the contributions and the highlighted themes during the piggy-backing session.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

12) I found the contributions around the themes quite distracting when I looked at the public screen.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

13) I do not think that the themes that were selected accurately reflected the map.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

14) I would have preferred if the group had more time to chose the themes that we piggy-backed off rather than the facilitator doing this.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

15) I think there were too few themes to piggy-back off.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

16) I think there were too many themes to piggy-back off.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

17) After piggy-backing, when I saw all the contributions together on the public screen, I found the quantity overwhelming.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

18) I spent a lot of my time reading the public screen when it was displaying the themes.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

Group Work

19) My group discussed what the problem was before typing contributions into the computer.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

20) I got confidence in the correctness of my contributions from being able to discuss my contributions with my group members before typing them in.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

21) I censored some of my contributions because of the potential reactions of other people.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

22) I would prefer to have my own computer if I were to do this again.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

23) Sometimes my contributions were not heard by my group member and not typed into the computer.
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

24) When I was typing in the contributions I felt in control of my group. *(answer only if appropriate)*
[Agree] *1* *2* *3* *4* *5* *[Disagree]*

25) When I was not typing in contributions I felt that our contributions were being controlled by my group member. *(answer only if appropriate)*

[Agree] *1* *2* *3* *4* *5* *[Disagree]*

26) I did not feel that the length of the blind gathering was long enough.

[Agree] *1* *2* *3* *4* *5* *[Disagree]*

27) I did not feel that the length of the piggy-backing gathering was long enough.

[Agree] *1* *2* *3* *4* *5* *[Disagree]*

Additional Comments :

APPENDIX 6.2 - CODING MANUAL GIVEN TO TWO EXTERNAL CODERS

Manual for Coding Links and Contributions

In the gatherings we run, group members are asked to search their knowledge of an issue and share relevant pieces of that knowledge in the form of contributions. The group members are then asked to link these contributions in order to highlight interdependencies between concepts that have been contributed.

I am analysing these contributions and links in order to understand the nature of group members thinking during this time of gathering contributions and links. I am interested in understanding how people might follow chains of thought during both the contribution generation stage and the linking stage of the gatherings.

In order to analyse the contributions in this way I have developed a two frameworks that can help to extract the pieces of information in which I have interest. These frameworks are discussed below and forms the basis of the tables I will ask you to complete.

What I ask from you is this: Could you please work through each if the contributions and links contained in the following tables coding them in terms of the framework I have developed?

I am satisfying a number of agendas from asking you to perform this critical task for me. Firstly, and possibly most importantly, I will be able to gauge how understandable to the lay-person my instructions are for coding. This feedback will provide me with essential insight as to how understandable are my guidelines. Secondly, I will be able to validate my own coding of the links from your codings. I will use your codes to critique my own coding and to challenge the consistency of my own coding. Thirdly, I will gain insight to the coding practice of a lay-person. In this I will gain powerful insight as to methodology a coder might employ, and the skills a coder might need, when performing this type of coding activity. In order to satisfy this last agenda I ask your permission to contact you to arrange a discussion over how you found this task.

The insight I gain from this exercise will be used in my Ph.D. As the readers of my dissertation, and of the subsequent publications, will not have the ability to ask questions of me as to the practices I employed during my coding of these links, I ask that you perform this task purely

using the guidelines contained in this document. I have attached all the information I think you need to complete this task (that being guidelines of how to code contributions, definitions of the codes, graphical illustrations of the codes, and an example of links that have been coded and the contributions I ask you to code). The examples of links that have been coded are designed to offer a quick impression of how one might code links.

Please adopt any method for coding these links that you find appropriate. Feel free to check and re-check (but only if YOU wish) or to start again i.e. adopt ANY technique you find useful.

Thank you for your valuable time.

DUNCAN

GUIDELINES FOR CODING LINKS

A. Each link is grouped by the person who contributed that link. Therefore the links within a bold box should be regarded as originating from the same person (see Appendix 1 and the User 2 is in a different bold box to User 13). Hence they should be coded together and chains between links identified and highlighted. Any link not within the bold box is contributed by a different person and therefore should be coded separately.

B. Each gathering session should be viewed as independent from any other that proceeds or precedes it. Hence the Coder should treat as independent any links from the same person contributed in different gathering sessions (identified by different gathering numbers). In this, it is not possible to identify any relationships between links which have been contributed in different gathering sessions.

C. When a chain has been identified, mark the relevant codes to indicate that a specific type of relationship exists between the two links. This mark should clearly distinguish between the different links that might have the same type of relationships. Hence marking every related link as '1' will not highlight the individual relationships between the links. I suggest using an alpha-numeric identifier such that the first relationship is 'a' the second is 'b' and so on.

D. When coding forward chains and backward chains (also spread forward and spread backward) only code the next relevant link the person has contributed. To illustrate, if you were to code 1+2, 2+3, 2+4 and 4+1 from a person then the correct codes would be: 1+2 forward link to 2+3; 2+3 and 2+4 are an explosion; 1+2 and 4+1 are a spread backward; and 2+4 is a forward link to 4+1 (see table 1). Note that 1+2 and 2+4 are not a spread chain because the forward chain to 2+3 nullifies the spread chain link between them. To reflect the relationship between all four links one would code them as a network, in addition to coding the individual relationships between each link.

E. Duplicated links should be coded with caution. Two scenarios exist for duplicated links (original) and duplicating links (the duplicator).

   1) **Scenario 1** - The original and duplicator links are separated by links that have relationships to the original link. For example, a participant contributions links A+B$^{(1)}$, A+C and A+B$^{(2)}$ (see table 1). In this case the duplicated links should be

coded as being duplicates but each should also be coded for its relationships to any relevant links. In this example, A+B$^{(1)}$ and A+C is an explosion but A+B$^{(2)}$ offers nothing new to this particular network hence is not included. The two A+B$^{(1,2)}$ links are duplicates.

2) **Scenario 2** – The original link and duplicator are <u>not</u> separated by any links that have relationships to the original link, for example in Table 1, F+G, E+D and F+G. Again the original and duplicator links should be coded as 'duplicating'. If no relevant links have been contributed between the links then the original link should (effectively) be ignored and the relationships between the duplicating link and all subsequent links should be coded appropriately.

F. Some participants construct complex networks of links that merge a number of different contributions. Therefore they may use a combination of explosion and forward chaining to fully link all the contributions they see as related. The Coder can take account of this network by coding it under that column heading. The Coder should code all links that contribute to a network.

Table 1 - Guide to Coding Links

Link	single link	explosion	implosion	forward chaining	backward chaining	spread forward	spread backward	reverse	network	duplication	error
1+2		b		a			c		e		
2+3		b		a					e		
2+4				d					e		
4+1				d			c		e		
A+B (1)		g									
A+C		g									
A+B (2)											
F+G											
E+D	h										
F+G		k								1	
F+H		k								1	

3.1 Definition of the Link Codes

Single link	Where the link is one which is isolated. It will have no other connection to any other links entered by that user I that session.
Explosion	When the user has linked one contribution to a number of other contributions.
Implosion	When the user has linked a number of other contributions into one contribution.
Forward chain	When one link continues on from the previous link by furthering the chain, for example, A+B followed immediately by B+C.
Backward chain	When one link returns back to the previous link in backtracking, for example, D+E followed immediately by C+D.
Spread forward	Where two links have not been contributed in sequence, but are related in a forward chain i.e. the links have been spread over a number of links. For example, A+B, F+G, B+C.
Spread backward	Where two links have not been contributed in sequence, but are related in a backward chain i.e. the links have been spread over a number of links. For example, C+D, G+H, B+C.
Reverse	When a user inputs two links, the second of which reverses the initial direction of the relationship between the two contributions. For example, A+B and B+A.
Network	Where the links between the contributions are so complex that the relationship between links cannot be coded using this framework. For example, where the relationship between A and D cannot be coded: A+B, C+B and B+D (see guideline D).
Duplication	Where one link duplicates a previously inserted code.
Error	Where the link, or attempted link, contains a clear typing error.

MANUAL FOR CODING CONTRIBUTIONS

In coding contributions I ask you to scroll down the 70 contributions I enclose (in Appendix 2) and use the guidelines to inform your coding of them. These guidelines are intended to inform you of what each code refers to. They also detail the aspects of the contributions that I wish to analyse through these codes.

For each contribution, unless advised not to, the Coder should mark a '1' in the appropriate cell in the table if the contribution does contain evidence of belonging to that code. '0' should be inserted if the contribution is thought not to belong to that code.

3.2 Complex contributions

Complex contributions are ones that are more difficult to understand and consequently they might be ones that receive little attention during the piggy-backing stage of gatherings, due to their complexity. Ambiguity may be regarded as being one form of complexity but in coding for complexity the Coder should highlight contributions that are particularly difficult to read.

A guideline offered here is that if the Coder needs to read the contribution more than twice in order to understand it, then the contribution is a complex one, '*cpx*'. Coding for complexity should be performed first, before the Coder becomes familiar with the contributions.

I argue that complexity can be decomposed into three measures. I will ask you to also code each contribution according to the measures of information-information, 1-bit of information and jargon, as well as this code of complexity.

3.2.1 Information - Information

This code aims to enable the investigation of the contributions that contain supporting information. In coding for *I-I*, the Coders should highlight those contributions that

contain multiple pieces of information that pertains to one issue, for example, "work together in the community – both our community and theirs"" or "better use of IT for communications e.g. Video Links".

The Coder should only identify those contributions that offer additional explanation of the one construct on which it focuses. If a contribution contains information about more than one construct, for example, "increase sales by improving marketing(1) and eliminating production problems(2) " then it should be coded as '*1 bit*', not coded here.

3.2.2 One bit of information per contribution

The Coder must judge which contributions group members might interpret as containing information which pertains to two, or more, different issues. These contributions can cause confusion when linking and so should be highlighted as *1 bit*.

A technique that can be used to accomplish this is to read each contribution as if you were intending to find two different issues in it. The Coder should not highlight contributions that contain polemic information i.e. A rather than B, as these contributions are ones which two opposing views of the same issue. Furthermore the Coder should not seek to identify contributions that contain two piece of information which pertain to the same, for example, "implement strategies to tackle bullying and harassment" for bullying is one type of harassment.

What the Coder is aiming to identify are contributions that contain more than one different issue, not contrasts of the same issue or additional examples of the same issue. One example of a '*1 bit*' contribution might be "ask advisors to promote our product and hold advisor conferences".

3.2.3 Jargon

Participants are sometimes confused by a colleague's use of jargon. Unfortunately I cannot gauge which contributions the participants think contains jargon which they do

not understand. I can however gauge which contributions the layman might feel contains jargon, '*%$'.

As a lay-person, a Coder should code those contributions that may contain information which is outwith their own knowledge base. If you feel a term is jargon then code it as such.

3.3 Typing Error

In highlighting for typing errors the Coder is interested in identifying those contributions which were typed without care. This can indicate the level of precision the group members put into their typing. It will enable me to consider other forms of precision, especially in linking.

A guideline for coding errors is that the Coder should not necessarily mark every typing error, but only those that might have been contributed whilst typing without due care, '*typ*'. For example, the Coder should not mark as typing errors abbreviations which are, obviously, spelt differently from the full-length word, for example 'org' and 'organisation'. Also any words that one may mistakenly mis-spell, but would also mis-spell if one were to write it using pen and paper. Words which appear to be audibly correct, but are in fact mis-spelt should be included in this category of 'not-typing errors'. For example, 'accommodation' can often be mis-spelt as 'accomodation' and "marketing" can often be mis-spelt with two 't's'. Coders should not mark American spellings.

3.4 Parenthesis, Emphases, Capital letter to start, Punctuation

In coding any parentheses, emphases, capital letters which start off any first word or any punctuation that might be contained in contributions, the Coder is highlighting any contributions that might draw special attention to itself. This will enable me to investigate if these contributions which might 'catch the eye' of the group member are given special attention, either in piggy-backing, linking or preferencing.

Coding each type of distinction separately will allow maximum flexibility in later analyses. Although those contributions might fall into each of these categories may seem intuitive, some guidelines might help clarify what I regard as relevant.

3.4.1 Emphases

This can include any form of emphasis, excluding parenthesis. Hence, writing in capitals or using exclamation marks (!) should be coded as emphasis, '*mfs*'. Also writing in "quotes" or in 'apostrophes', which can draw particular attention to a word or phase should be coded. However, writing in parenthesis should not be coded as emphasis as it will be captured when coding parenthesis.

3.4.2 Capital letter to start

This form of coding relates to those contributions that start with a capital letter. What the Coder should be aware of here is that people habitually start each sentence with a capital, and so will start each new contribution with a capital letter. If people learn from others and stop performing this practice during the workshop then this exhibits learning. Therefore only contributions that start with a capital, that would not normally start with a capital should be coded here, '*Cap*'. Consequently, names or titles, for example, Chairman, or whole words written in capital letters should not be coded here (the former will be coded for talking to someone, the latter will be coded for emphasis).

3.4.3 Punctuation

Here I ask you to identify contributions which appear to have special effort spent on them in their construction in the form of punctuation. When a person uses a full-stop, a comma or any other form of punctuation it should also be coded as such, ':.,'. This code also includes parentheses as they are, after all, a form of punctuation. The analyses can be tailored to make the distinction between punctuation and parenthesis.

This coding does include the characters: & - < > / + # and other characters like them, for they show a certain degree of effort being put in by the participants when typing their contributions.

3.4.4 Parenthesis?

In coding parenthesis Coders should highlight any contributions that contain information in parenthesis, '*()*'. Therefore additional detail within common form of parenthesis such as brackets (x) [x] or dashes -x-, or commas ,x , should be coded as parenthesis.

3.5 A...B

Decision Explorer enables its user to highlight where an opposite pole of the issue may be relevant to the discussion. The Coder should highlight any contribution that includes an opposite pole as this represents additional information that the user has included, hence heightening the level of complexity contained in the contribution, '*A.B*'.

Three cautions should be drawn to the attention of the Coder:

- Some contributions that contain the short-cut '…' (three dots) which represent the opposite pole or a 'rather than' pole, do so in error. If the group member types in any full-stop punctuation mark then that contribution will contain '…'. Although the facilitator attempts to remove these '…' they might miss some and so they will be in the DE map. Hence the Coder should judge whether the short-cut of '…' is in fact a real opposite pole as it is in the example of "build a bridge … wading across the water".
- The Coder should be aware that all contributions containing an opposite pole do not necessarily include the DE facility of '…'. Hence the Coder must be vigilant to the meaning of the contribution, not simply the syntax used. Three examples of contributions that should be identified as containing opposing poles, but do not contain the '…' syntax are: "pay attention to profit not sales volume", "consider locating offices at site A v B", or "start now rather than later".
- A potentially confusing source of opposite poles can be seen when using the word "or". "or" does not necessarily indicate the existence of opposing issues, as it may

first appear. This can be seen in the following example: "train all staff a little or some staff a lot". This contribution does not seem to argue for either option, it simply states that one or the other should be done. If one were to replace "or" with "rather than" then the meaning of the contribution subtly changes to promoting the 'training of all staff a little' over 'training some staff a lot'. Hence, caution must be exercised if coding an "or" as an opposing pole. A guideline is to replace the "or" with "rather than" and if the meaning changes then the contribution does not contain an opposing pole.

3.6 Constructive or destructive

Many contributions do not actually contribute something positive to the group's knowledge base of how to move forward in the situation. These should be highlighted to enable analysis of the type of information the group members have to inform their decision making.

Contributions which contribute constructively to understanding how to move forward in the situation should be coded '1' i.e. a 1 should be put in the cell corresponding to code '*c/d*'. Such contributions might be "reduce over manning on night-shift" or "stop Jackie's people from throwing their weight around". Some contributions might make a point which is destructive in what the group members are trying to decide upon and these should be coded '2'. For example, "do not return to the middle-ages" and "avoid the panic we always have around publishing time" are, for this purpose, destructive. They are destructive because they do not offer constructive ways to tackle the issues they address. A '1' should indicate a constructive contribution, a '2' should indicate a destructive contribution. If contributions are neither constructive nor destructive then leave the cell blank.

3.7 Identifying silly contributions

Group members sometimes make contributions that do not contribute to the database of relevant knowledge the group members have on the issue at hand. These contributions may be humorous or destructive. However, they should be coded to see

their frequency and timing in the session, '*tsk*'. If we can understand the conditions under which they have been contributed then we can gain insight as to the reasons for them. It is very difficult for a Coder to gauge which contributions push the limits of reality and which cross those limits and enter into silly-land.

The only guideline I can offer here is to use your own judgement.

3.8 Orientation of the contribution

In coding for the orientation of contribution the Coder should concentrate on examining each contribution and deciding on whether it is clear in the angle it takes with regards to the issue it is discussing. Contributions that have a clear orientation should be coded as such, '*clr*'. Contributions that either are ambiguous of whether they support the issue or not, or ones that give no indication of orientation, should be coded as unclear orientation, '*ucl*'.

An example of a contribution that might be seen has having clear orientation is "proper and consistent copy-editing" as it clearly details the positive aspects of copy-editing that are important. If the contribution is "copy-editing effecting production times" then this does not really imply whether this is something to be concerned about, or to be pleased about, hence should be coded as being unclear. If the contribution was, for example, "copy-editing" then this contribution is without any orientation and should be coded as being unclear.

Questions may not be clearly-oriented but neither may they have an impact of confusion in terms of orientation on a group member. Hence questions should be coded under the question code '*Q?*'. Granted, the question may confuse the group member, but that will be highlighted in coding for complexity.

3.9 Contributions which contain quantifications or time-frames

Sometimes the contributions contain attempts to quantify the principles it describes or set time-frames in which the issue is couched. Granted, quantifications and time-frames

are quite different constructs to code as one. However this coding is thought to be suitable due to their common nature of trying to pin-down the extent of the issue or the duration of the issue into hard measurable constructs, that are so often omitted from contributions.

Coders should only code those contributions that attempt to quantify or put in time-frame something that is unfamiliar to the majority of people, '*no.*'. Hence "return to a 5 day week" should not be coded as being a quantifying/time-framing contribution as it is a phrase that is widely used. However "prisoner population increases by 25%" is a clear quantification of an issue and so should be coded appropriately. In terms of setting time-frames contributions like "achieve targets by March 1999" should be coded as it puts strict timeframes on the issue of targets.

3.10 Not finish typing in the full contribution

In order to identify which contributions are in sort errors, the Coder should highlight which contributions have essentially not been completed, '*err*'.

The Coder has to use their judgement to decide which contributions have not been completed before the return key was pressed.

3.11 Definition of the Contribution Codes

	Abbrev	Is/Does the contribution ...?
Complex contribution	cpx	... use particularly complex wording
Typing error	typ	... contain a typing mistake of any sort
Punctuation	:.,	... contain any punctuation
Information - more information	I-I	... contain an explanation of the issue being conveyed, as separated by parenthesis
Jargon contribution	*%$	... contain jargon or terms people might not be a familiar with
Opposing poles	A.B	... contain a 'rather than' statement
Capitals	Cap	... start with a capital letter on the first word
1 bit of information	1 bit	... contain more than one piece of information
Parenthesis	()	... contain words in any type of parenthesis
Emphasis used	mfs	... have any form of emphasis
Silly contribution	tsk	... a silly contribution that adds nothing relevant to the knowledge of the issue
Clear orientation	clr	... has clear orientation towards the issue
Unclear orientation	ucl	... does not make explicit its orientation towards the issue
Question	Q?	... asking a question of the group
Constructive/destructive	c/d	... it the contribution constructive towards solving the problem, or is it destructive
Quantifying information	no.	... try to quantify a principle
Error	err	... a clear error, for example, was the return pressed too early

Appendix 1 - Table for Coding Links

Gather No.	Group Member	Link	single link	explosion	implosion	forward chaining	backward chaining	spread forward	spread backward	reverse	network	duplication	error
1	USER2	499+495											
1	USER2	495+495+517											
1	USER2	485+499											
1	USER13	629+622											
1	USER13	629+622											
1	USER13	622+629											
2	USER2	499++											
2	USER13	603-454[1]											
2	USER13	603+207											
2	USER13	603-454[2]											
2	USER13	544+232											
2	USER13	594+207											
2	USER13	207+454											
3	USER2	605+251											
3	USER2	605+342											
3	USER2	605+223											
3	USER2	243+342											
3	USER2	251+223											
3	USER2	243+251											
3	USER2	223+342											

My own coding of the blank code guide in Appendix 1 - 'Table for Coding Links'

Appendix 2 - Contributions to Code	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	cmx	typ	:.,	l-l	*%$	A.B	Cap	1 bit	()	mfs	tsk	clr	ucl	Q?	c/d	no.	err
Maintainanonymiy																	
Free reprints for good referee reports?																	
Awards within communities, not to individuals																	
Make speed performance subject of editor contract renewal and appointments																	
develop a management responsibility																	
make top manager's remuneration dependent on ref speed																	
have relationship management between pub, eds and referees to make part of a team																	
Publish average refereeing times per article type/journal																	
Send referees papers they like refereeing (interesting, specialisation correct, etc)																	
let referees choose articles to referee																	
set clearer objectives for PARE project - Smartworks, virtual editorial office, system, etc																	
editing, annotation of author provided pdf's																	
use technology to enable whole process - not just PTS																	
author must submit efile to agreed standard/format																	
consistency of output is very important																	
no closed communities with regard to referee choices																	
increase safeguards to avoid blunders																	
proper and consistent copy editing																	
ensure quality of input to suppliers																	
editors to be rotated regularly and in a fair way																	
consistency in timeliness and production quality																	
Consistency - frequency of appearance																	
democratic choice of managers & Board members																	
consistent and reliable contact person in production who knows what is going on																	
develop partnerships between AES and suppliers is important																	
build in segregation/ separation as a legitimate need for managing disruptive prisoners																	
serve sentence free of fear'																	
IIP and NVQ targets																	
managers should recognise themselves as managers																	
leaders in the field, and mgrs at HQ???																	
conversion training to overt presentation as a leader for some people																	
create both thinkers and doers																	

My own coding of the blank code guide in Appendix 1 - 'Table for Coding Links'

This was not included for the coder, but is inclued for the readers' interest.

Gather No.	Group Member	Link	single link	explosion	implosion	forward chaining	backward chaining	spread forward	spread backward	reverse	network	duplication	error
1	USER2	499+495				1c			1d		1a		
1	USER2	495+495+517				1c					1a		1e
1	USER2	485+499							1d		1a		
1	USER13	629+622										1g	
1	USER13	629+622								1f		1g	
1	USER13	622+629								1f			
2	USER2	499++											1h
2	USER13	603-454		1k								1b	
2	USER13	603+207		1k	1L						1j		
2	USER13	603-454			1m						1j	1b	
2	USER13	544+232	1v										
2	USER13	594+207			1L	1n					1j		
2	USER13	207+454			1m	1n					1j		
3	USER2	605+251		1o	1t			1r			1z		
3	USER2	605+342		1o	1q						1z		
3	USER2	605+223		1o							1z		
3	USER2	243+342		1u	1q						1z		
3	USER2	251+223					1w	1r, 1x			1z		
3	USER2	243+251		1u	1t		1w				1z		
3	USER2	223+342						1x			1z		

APPENDIX 8.1 - EXAMPLES OF CODING INDIVIDUAL THEMES FOR ONE REAL-WORLD WORKSHOP

Individual theme	
	Console Number 1
1	217 send as annotatable PDF to referee
2	220 set time targets for referees
2	225 measure performance of referees with time as a measure
3	230 provide access to SD to assist referee
4	234 manage work round holidays
5	238 prioritize articles to referees
5	246 grade papers with priority ranking
6	253 pay expenses to referees in make them like Elsevier
7	255 pb extend GEJ programme to referees
	Console Number 2
1	227 e-distribution/commentary
2	235 Prioritisation by article (dis)quality
3	242Clear (published) responsibilties for Editors
4	245 Payment of referees(for quality referee reports)
5	250 Process to identify appropriate referees ASAP
	Console Number 3
1	213 recognize referees
2	221 check referee's availability
3	231 system to match pool of mss with pool of referees
4	239 reward editors for speedy processing
5	244 status mss transparent to author
6	248 electronic refereeing system

Note : A 'pb' after the concept identifying number indicates a contribution that has been made during the piggy-backing gathering. Again this code was hidden during the coding of individual themes.

APPENDIX 8.2 - EXAMPLES OF CODING GROUP THEMES FOR ONE REAL-WORLD WORKSHOP

Individual theme	*Group theme*	
		Console Number 1
1	*7*	217 send as annotatable PDF to referee
2	*2*	220 set time targets for referees
2	*2*	225 measure performance of referees with time as a measure
3	*2*	230 provide access to SD to assist referee
4	*4*	234 manage work round holidays
5	*6*	238 prioritize articles to referees
5	*6*	246 grade papers with priority ranking
6	*3*	253 pay expenses to referees in make them like Elsevier
7	*9*	255 pb extend GEJ programme to referees
		Console Number 2
1	*7*	227 e-distribution/commentary
2	*6*	235 Prioritisation by article (dis)quality
3	*10*	242Clear (published) responsibilties for Editors
4	*3*	245 Payment of referees(for quality referee reports)
5	*5*	250 Process to identify appropriate referees ASAP
		Console Number 3
1	*3*	213 recognize referees
2	*4*	221 check referee's availability
3	*5*	231 system to match pool of mss with pool of referees
4	*3*	239 reward editors for speedy processing
5	*7*	244 status mss transparent to author
6	*7*	248 electronic refereeing system

Note : The individual theme codes are also detailed for the reader's interest, but were not shown when coding the group themes.
A 'pb' after the concept identifying number indicates a contribution that has been made during the piggy-backing gathering. Again this code was hidden during the coding of group themes.