# Two Group Model Building Scripts that Integrate Systems Thinking (using Vensim) into Strategy Workshops (using Group Explorer)

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*Abstract:  We worked with care providers who work with the elderly clients to create strategies for providing an adequate scope of dementia care services over the next fifteen years.  The group model building sessions were based on two new scripts that combine the speed, efficiency and legitimacy of Group Explorer mapping with some of the additional analytic power that comes from the system dynamics modeling tradition.*

Andersen , Richardson, and Vennix (1997) have called for a greater sharing of knowledge and experience in group model building (GMB) projects (Richardson and Andersen, 1995; Vennix, 1996; and Andersen and Richardson, 1997) to disseminate innovative practices and to increase the effectiveness of products being delivered to our clients.  This paper responds to that call by describing two 'scripts' based on system dynamics group model-building practices that have been used in strategy workshops using both causal mapping (Eden and Ackermann, 2001) and *Group Explorer*.

Eden and Ackermann (1998) have developed workshop-based approaches for the rapid development of strategic options and strategies working directly with client teams.  In its most recent manifestation, this approach uses specially designed group support system software (*Group Explorer)*  to facilitate rapid mapping  and analysis of issues, goals, and distinctive competencies into well-integrated business plans, livelihood schemes, and statements of strategic intent (Ackermann and Eden with Brown (2005).

Recently, Howick *et al.* (2006) demonstrated how scenario maps developed in this tradition of strategic analysis and modeling could be usefully integrated with system dynamics models to improve overall impact and value being delivered to client groups. Andersen *et al.* (2006) have presented a curriculum for co-teaching Eden and Ackermann's (1998) approach to strategy explicitly linked to both Bryson's (2004)

approach to leadership and strategy development and to key elements of system dynamics and systems thinking. This note continues these threads of work by presenting two additional workshop 'scripts' that serve to knit together these several threads of strategy planning.

The scripts presented here are based on workshops jointly conducted by the authors and are therefore developed and tested using a Research-Oriented Action Research approach (Eden and Huxham 2006). These types of scripts can be seen as relating ideas presented in the Group Decision Support System field where episodes (referred to as "ThinkLets" (Briggs et al 2003, and Kolfschoten et al 2006)) are developed that comprise a set of steps that can be used and re-used to support particular problem situations.

To help understand the nature of the scripts, the project background is discussed before exploring each of the scripts and discussing their significance.

**Project Background.**

Between 1995 and 2007, care providers working with elderly clients in the region of this study have witnessed increasing strains on the service delivery system for persons suffering with dementia. Several local and national health care agencies work with private providers to provide a continuum of diagnostic, community support, and residence-based services to a rapidly growing population of senior citizens suffering from dementia. These agencies – a multi-organizational collaboration – had formed a working partnership to address what they all believed to be an acute strategic problem. It was one of the primary members of this group that commissioned the work we report. She discussed the possibility of our involvement in July 2006 and finally attained approval in October 2006 for the work to take place in January 2007.

Concerned that the existing scope and balance of services may not be able to meet future projected growth in demand, a coalition of medical providers, social workers, and health care system managers met for two separate one-day workshops to design their strategic

future. The multi-organization group consisted of 28 health care practitioners and managers.

The first one-day workshop centered on several activities supported by *Group Explorer* and using well-established issue mapping, ranking, and scenario development approaches as described by Eden and Ackermann with Brown (2005) along with system dynamics elements. We first describe briefly the use of those *Group Explorer* activities in the Dementia workshop and then present the two scripts designed to integrate elements of system dynamics thinking into the process.

**Initial Mapping and Structuring of Issues**

The workshop opened with an introduction to the day followed by the elicitation, linking, structuring ranking, and re-structuring of key issues that the client team saw themselves facing over the next ten to fifteen years. This 'issue structuring' process was supported by *Group Explorer*, using standard facilitation techniques described in (Ackermann and Eden with Brown 2005: chapter 3). Figure 1 presents the facilitation team getting the participants working on the initial set of issues that would form the basis of much of the subsequent discussion. For this portion of the workshop, the room was organized with one screen that was projecting only the *Group Explorer* model. Participants were able directly to enter their views via a computer console about the key issues they saw the group facing (both in terms of statements and their possible causal links). These views were displayed to all on a public screen. This not only enabled members to piggy back off one another, but also to share perspectives and began a process of developing a common understanding. The process arrived at an issue map with 63 concepts and 113 causal links, shown unedited in Figure 3.

Figure 3 has been modified so that most of the initial issues elicited, reflecting sometimes sensitive or confidential concerns of individual members of the workshop, can not be read. However, the original complexity and geometry of the initial diagram is preserved in Figure 3. In addition, the higher level and more abstract issues identified as most

important have been preserved in the red issues in Figure 3. Therefore, Figure 3 should not be viewed as a final product of the group, rather as an initial and unrefined result of initial issue brainstorming that formed the basis for most of the other issue maps discussed in this paper.

Once Figure 3 was constructed, the group then proceeded to express preferences electronically about their renewed views about priorities. Figure 2 shows how this exercise looked from the point of view of one of the small groups working. The group is looking at the public issue map while voting on their local computer about what issues seem to them at this initial stage to be of most importance. This stage identified five strategic areas of highly ranked concerns:

- Funding ("gain more funding")
- Range of options ("broadening the range of accommodation options for people with dementia
- Shared responsibility ("increase feeling of shared responsibility for range of services between SWD [local] and NHS [national]"
- Private sector care ("increase quality of care in private sector")
- Demographics ("uncertain but growing future demographics")

After voting, the concepts in the issue map in Figure 1 closely connected with each of these areas were pulled out in separate maps (not shown here). Identifying these five strategic areas jointly highly ranked by the participants provided the group with a clear progress milestone for a coffee break.

This issue surfacing and mapping process provided the participants with relatively equal air-time, and at least enough air-time to surface their key concerns, to express their views about how the issues relate to each other, confirm clusters and identify priorities. This stage was particularly important as there were very different views in the group – reflecting the different views, priorities and activities of the collaboration. During the coffee break typical comments heard across the group were "it is amazing what we've achieved in such a short time", "it is nice to get some 'equality of voices'". These

comments are not untypical. Groups using *Group Explorer* usually comment that it adds significantly to group productivity.

**Script #1: Graphs Over time to Support Scenario Mapping.**

The facilitation team then asked small working groups of 3 participants to draw between 2 and 4 'graphs over time' (Luna-Reyes *et al.* 2007) of key variables that "tell an interesting story" with respect to one of the five identified high-priority issues and the cluster of related statements. All groups were asked to label the time axis to give a time boundary to the issues and identify where the group saw the present situation on this time scale. All groups were encouraged to plot inertial, aspirational, as well as best-case and worst-case futures. One facilitator collected and posted the graphs into clusters on the wall while another encouraged members of the team that had drawn the graph to "tell the system story" inherent in the graph. Figure 4 shows one of the clusters of graphs-over-time generated by the group from this exercise. The cluster of hand-drawn graphs in Figure 4 all center on the emerging policy issue of "Broadening the Range of Services" available to clients in the Borders.

While the groups were telling their dynamic stories, another facilitator, skilled in using *Decision Explorer* (causal mapping software that is the public display used by *Group Explorer*) captured the group discussion data and mapped the stories into the broader issue maps developed during the issue structuring session. Figure 5 shows the issue map centering around the concept, "Broadening the range of accommodation options for people with dementia. This concept had earlier been ranked as of high strategic interest by the whole group in the initial phase (the ranks are appended after the variable in the map shown in Figure 5) and is derived directly from the graphs over time shown in figure 4. The issues displayed in black in Figure 5 were recorded from participant comments during the Graphs-Over-Time exercise. Brief reviews of this material were made with the group to ensure accuracy. This whole exercise including generating five clusters of dynamic variables on the wall, elaborating on them in group discussion, and mapping their key concepts into the issue map took 65 minutes of group time.

At the lunch break the sponsor of the workshop reported high energy in the group for more group work. There had been some initial concerns by the group over the requirement to produce the graphs-over-time but overall they were seen as very helpful as it helped "force us to think hard about how things might change over time". Capturing the stories and associated discussion was seen to work well because it served as a check on the record of the story, a way of enabling other sub-groups to be clearer about the details of the story, and a symbol of the seriousness of the listening to the story. Combining the issues surfaced earlier with the dynamic stories enabled the group to work swiftly with a sense of process legitimacy. Theoretically, this combination meant the demands of both procedural rationality (Simon 1976) and procedural justice (Kim and Maugborgne 1995) were attended to.

**Script #2: using System-Level "Pressure Points" to Generate and Map Feedback-Rich Discussion.**

A fortuitous aspect of this project was that prior written material provided by the client to the modeler-facilitation team revealed that service providers in the area under study already spoke about their dementia service system as an organized "Pathway" that could be easily redrawn as a stock-and-flow chain representing the flow of clients through the system. In addition, an inventory of service providers in the region explicitly linked to client needs revealed each of the stocks in the "client service pathway." This existing structure set up a classic client-flow model controlled by provider service stocks—a commonly occurring generic structure in social service systems (Zagonel et al (2004) and Richardson (2002). Documentation made available by the client before the first workshop also described clearly the pressures being brought to bear on the system as the ratio of clients in one stock to services in another stock became overloaded.

This documentation revealed a clear dynamic hypothesis that was a strong candidate to become a series of further themes (beyond the priority clusters established by the group) around which to organize client discussion and mapping activities. In 'standard' system

dynamics group model building sessions a dynamic hypothesis usually does not emerge this clearly until after at least a day or more of client discussion and structural mapping. In this project, however, we were able to use this dynamic hypothesis, manifest as a high-level system diagram as an artifact around which the second script emerged (Figure 7).

As illustrated in Figure 6, one of the facilitators, a seasoned system dynamics group modeler, "rolled out" the system diagram one small step at a time, using the same approach that Richardson (2006) has described for working with concept models. Note that in Figure 6, the left-hand screen is blank. This space was reserved for the construction of a *Group Explorer* model driven by participant inputs in response to the system dynamics flow diagram being developed by the facilitation team. This gradual development allowed the client team to learn about system dynamics iconography and thereby fully grasp the insights from the system-level diagram.

Figure 7 shows the simple "backbone" view of the stocks and flows of clients in the Scottish Borders dementia care system, as unfolded for the participants. Figure 8 shows the next step in the unfolding, presenting "pressures" that the modeler hypothesized would have to develop if the number of Dementia Sufferers in Community Care began to overwhelm Community Services Capacity. Using a hydraulic or plumbing metaphor, with the services capacity seen as a tub and the dementia suffers were seen as water in the tub, the modeler suggested there were only three kinds of things actors in the system could do:

1. Increase the size of the tub, that is, increase Community Services Capacity
2. Turn up the outflow from the tub, that is, increase transfers to palliative care
3. Turn down the inflow to the tub, that is, decrease admissions to community care.

He then asked the group to answer the crucial question: "What would real actors in the system, responding to these three pressures, actually do, and who would do it?" Small subgroups, thinking independently and typing their ideas into *Group Explorer*, produced a map of some thirty strategies actors in the system might actual follow. The entire process of brainstorming those thirty strategies took the group about 12 minutes.

Figure 9 shows just the part of the *Group Explorer* map associated with strategies designed for option 2, increasing the outflow from the pool of dementia sufferers in community care. The richness of the detail in these strategies would be "below the lever of aggregation" in a system dynamics model structured like Figure 8 but is crucial for the strategic thinking of the workshop participants as they grapple with dementia policy options and was generated remarkably quickly, with complete client involvement.

The facilitator-modeler continued in this fashion to address with the group five other pressure points in the system (associated with the flows in Figure 7) that would arise if a client population overwhelmed available resources in one of the several areas identified on the client service pathway. Each time the group was asked "Who would do what to relieve the pressure?"

This 'brainstorming' stimulated by the aggregate system dynamics stock-and-flow diagram and facilitated by *Group Explorer* served both to confirm the existence of potency of the pressure points as well as to define what concrete actions or responses might be used to manage these system-level pressures.

To complete this script, the group as a whole used *Group Explorer's* electronic preferencing and ranking features to ask sub-groups to rank all the actions associated with each pressure point along two separate criteria. First, what will occur by default if we take no action to make things happen differently? Second, what actions would we 'as a group' prefer to be taken to manage this pressure point? Each of these ranking tasks took about 5 minutes of group time – the process demanded discussion and agreements within each sub-group. Most often the outcomes yielded measured consensus both around what the inertial and aspirational policies most likely would be. These focused action priorities were integrated into the broader *Group Explorer* map and incorporated in to the further discussions in the second workshop.

The results of this ranking process can be seen in Figure 9 for the policy area associated with increasing transfers out of community care, since the final votes have been appended

to the variable names. Voting with red dots (denoted with a "R" in Figure 9) was intended to indicate the group's perception of what would be inertial policies—outcomes if no action were taken. On the other hand, voting with blue dots (denoted with a "B" in Figure 9) indicated high leverage preferred policies. Hence Figure 9 shows that the group feared that "Social Welfare Department (SWD) would change eligibility requirements" and "Create more home beds" whereas the group rather hoped to "speed up assessment process" and "improve the quality of care & environment in care homes, activities, trips out, accessibility, etc."

Feedback from the client subsequent to this stage suggested that the group felt "we have achieved more in this one day than we have achieved over several months of meetings". The picture of the system showing pressure being passed around the system enabled "lots of 'light bulbs' to go off." Having the practical specifics of how the system would or should resolve pressures added greatly to the value of the discussion and insights.

**Discussion.**

We believe that both of these scripts capitalize on and combine distinctive strengths from the strategy making approach incorporating *Decision Explorer* and *Group Explorer* with those from the system dynamics traditions to deliver greater value to client groups. Both scripts used *Decision Explorer* and *Group Explorer* to enable clients to speak about detailed actionable issues and activities within the system that the higher level system dynamics diagram tended to aggregate into obscurity. The methods were fast and efficient at getting out and ranking many ideas swiftly and in a manner that builds consensus and alignment within the group.

On the other hand, using the system dynamics concepts of system over-time dynamics (Script #1) and system structure (Script #2) brought some of the additional analytic power of the system dynamics method into the conversation. The graphs over time yielded mappable stories that were linked explicitly to reference mode dynamics drawn by participants. Group participants were forced to consider how each issue/variable

behaved over time. The process also revealed various exogenous events that could be used as a starting point for scenario development, thus furthering the strategy work. The pressure point script (Script #2) used a qualitative analysis of high-level feedback-generated pressures existing within the system to focus group discussion in a very productive fashion.

In sum, these two scripts got some of the best out of both traditional approaches by combining the speed, efficiency, and legitimacy of *Group Explorer* mapping with some of the additional analytic power that comes from within the system dynamics modeling tradition.

Finally, we believe that Script #1 could be repeated with good results in most any situation where the process needs to move from an initial issue map to a focused discussion of scenarios where future dynamics matter.  However, Script #2 can probably only be applied in situations where a fairly clear and compelling dynamic hypothesis exists to point the way to potential high leverage discussion points.  Typically this will occur late in a two-day group model building session or even in a second workshop.

By publishing this work, we hope to contribute to a continuing discussion about how to integrate system dynamics and systems thinking with other strategy development approaches as well as to continue to document teachable scripts to encourage the dissemination of group model building practice.

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**Figure 1: Facilitation Team Starting the Group on Initial Issue Elicitation**

**Figure 2: Small Group Working with *Group Explorer* on Initial Issue Elicitation**
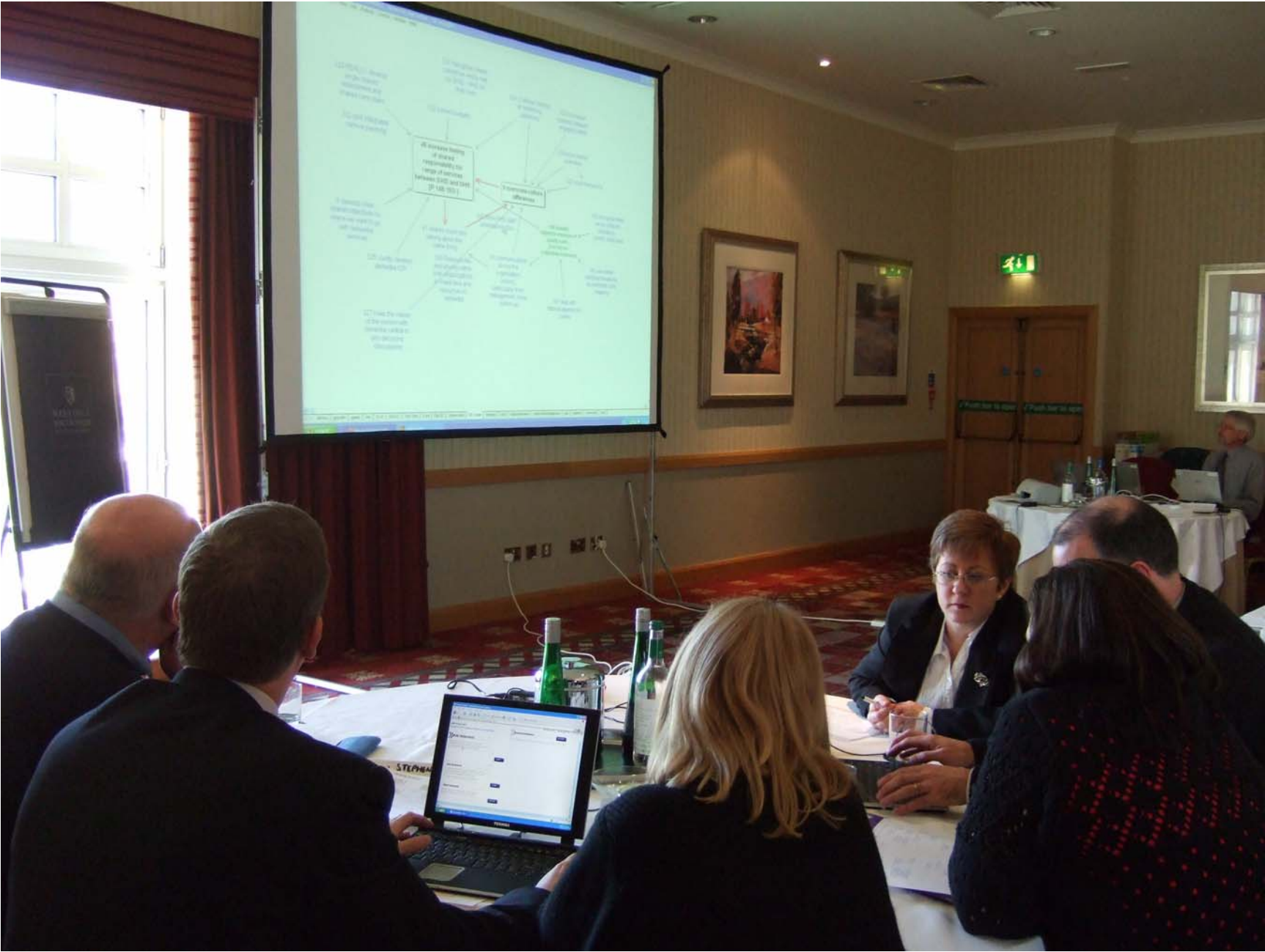
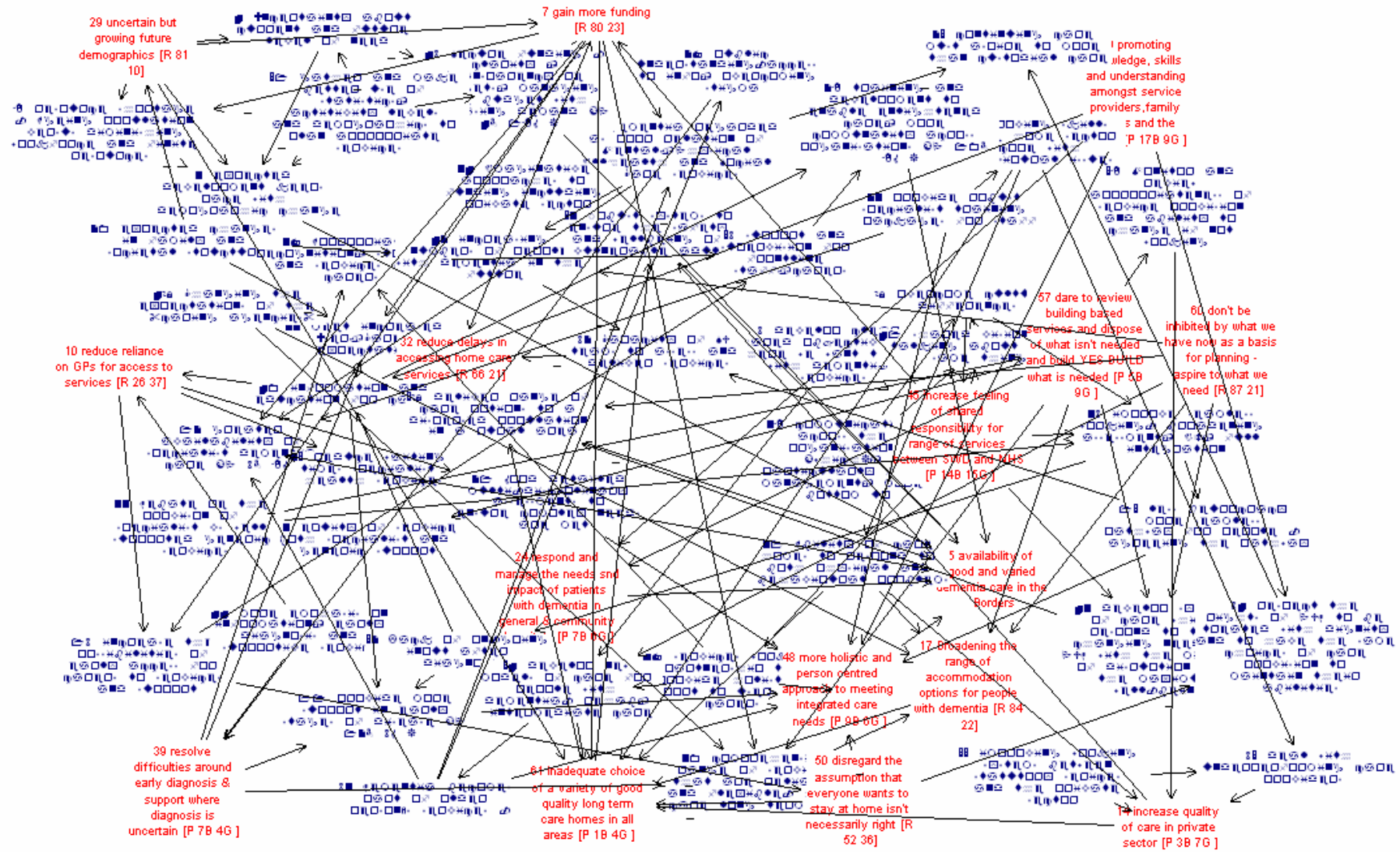**Fiure 3: Unsorted and Unranked View of Public Map 48 Minutes into the Meeting (68 concepts and 116 links)**



Readable concept labels within the figure:

29 uncertain but growing future demographics [R 81 10]

7 gain more funding [R 80 23]

I promoting knowledge, skills and understanding amongst service providers, family s and the [P 17B 9G ]

57 dare to review building based services and dispose of what isn't needed and build YES BUILD what is needed [P 5B 9G ]

60 don't be inhibited by what we have now as a basis for planning - aspire to what we need [R 87 21]

10 reduce reliance on GPs for access to services [R 26 37]

32 reduce delays in accessing home care services [R 66 21]

increase feeling of shared responsibility for range of services between SWD and NHS [P 14B 16G ]

24 respond and manage the needs and impact of patients with dementia in general & community [P 7B 9G ]

5 availability of good and varied dementia care in the Borders

48 more holistic and person centred approach to meeting integrated care needs [P 9B 6G ]

17 broadening the range of accommodation options for people with dementia [R 84 22]

39 resolve difficulties around early diagnosis & support where diagnosis is uncertain [P 7B 4G ]

61 inadequate choice of a variety of good quality long term care homes in all areas [P 1B 4G ]

50 disregard the assumption that everyone wants to stay at home isn't necessarily right [R 52 36]

14 increase quality of care in private sector [P 3B 7G ]

**Figure 4: Cluster of Hand Drawn Graphs Over Time with Centering on "Broadening the Range of Services"**
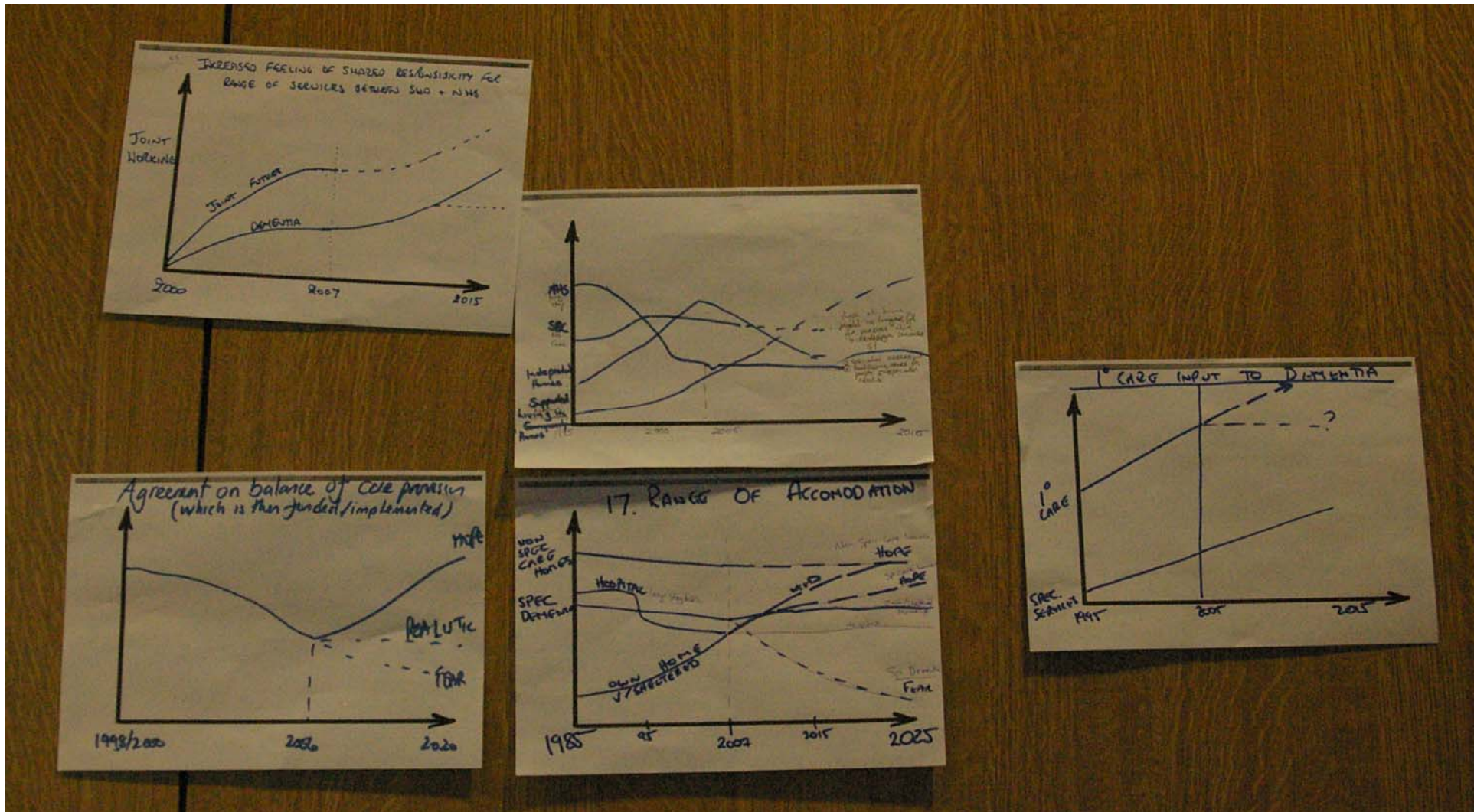
**Figure 5: Group Explorer Map with Key Issues Centering on "Broadening the Range of Services"**

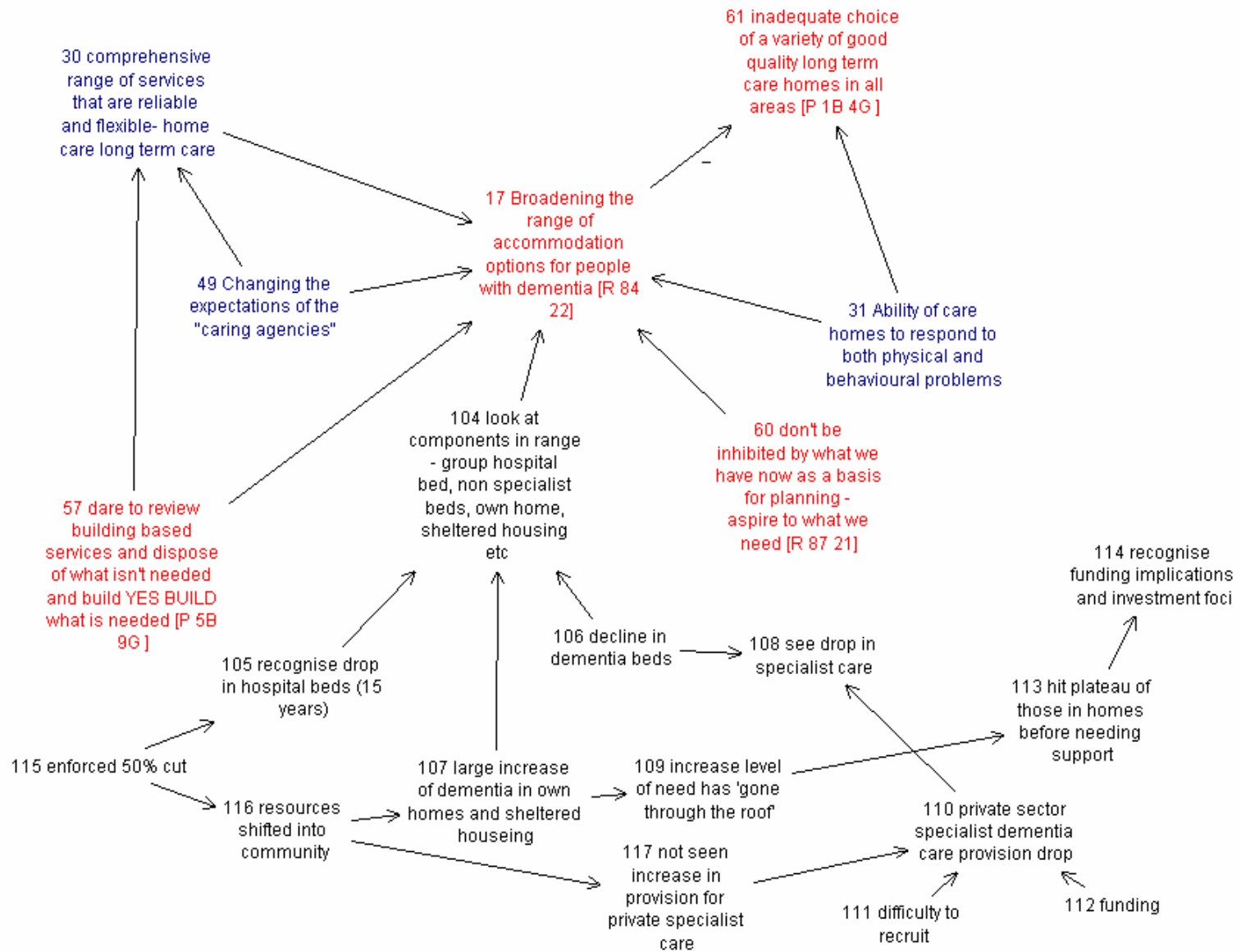**(developed from group discussion and mapping of the Graphs Over Time Shown in figure 4)**

**Figure 6: Facilitator Working with Two Screen Set up: Vensim Projection on Right Screen with Corresponding Group Explorer Model about to be built on (now blank in photograph) Left Hand Screen**
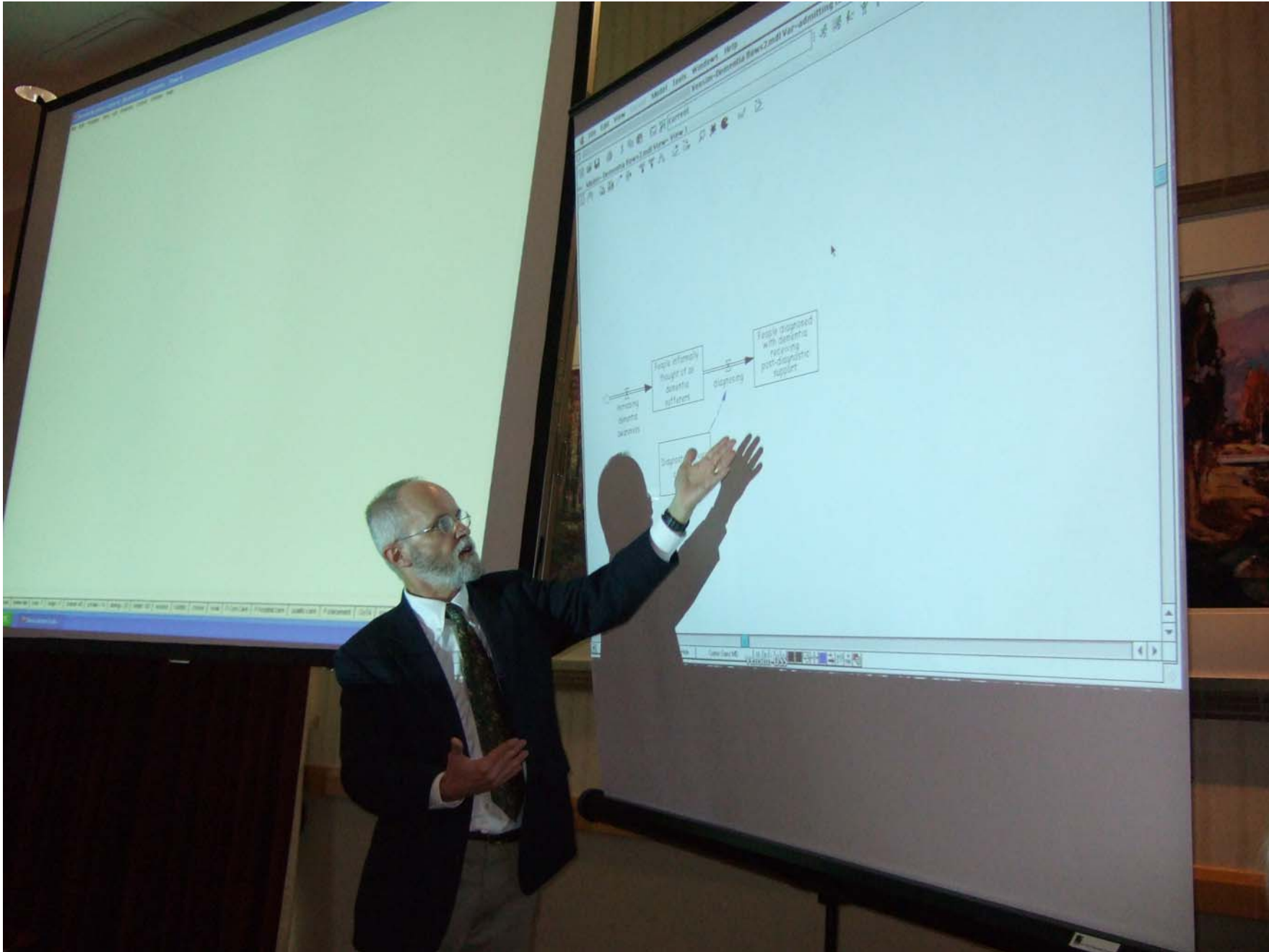
**Figure 7: High Level System Flow Diagram Used to Elicit detailed discussion of Key system "pressure points"**
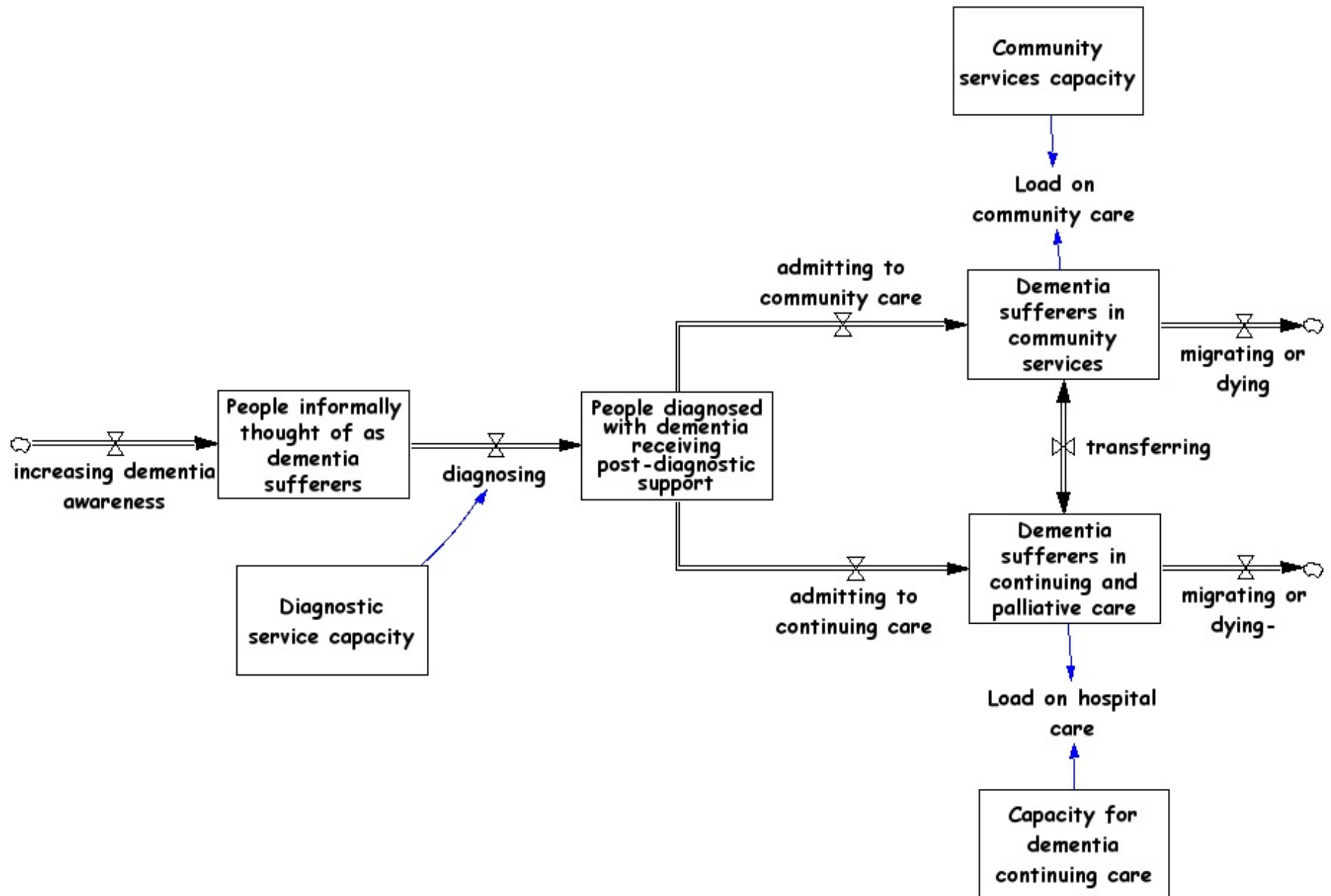
**Figure 8:  More Detailed System Flow Diagram Used to Elicit Discussion around Increased Transfers from Community Care To Continuing and Palliative Care**
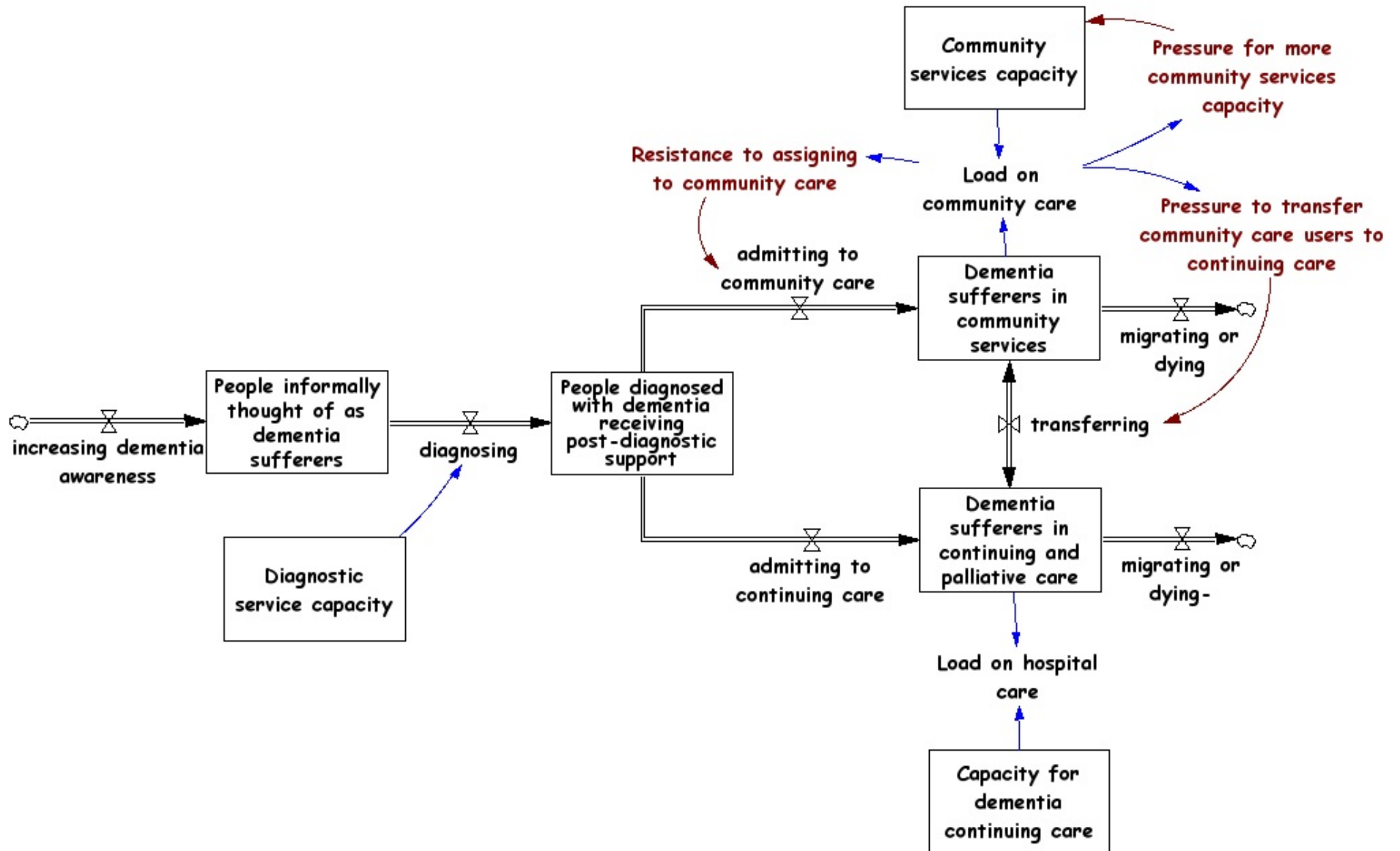
**Figure 9: Group Explorer Map of Specific Strategies and Tactics to "Increase Transfer from Community Care to Continuing and Palliative Care" (This view developed while group was working with Figure 8. "Red" dot counts [R] indicate most likely inertial policies and "Blue" dot counts [B]indicate high leverage (preferred) policy options)**