

The Decision Hedgehog – Case study on Collaborative Authoring of Outcomes: “Project Dreams and Reality”

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Summary

This paper draws on analysis of a variety of problems emerging from practical applications of Group Decision Support Systems (GDSS) to propose a fundamental evolution of decision support models from the traditional single decision-spine model, focusing on a single proceduralised context to the *decision-hedgehog*. It positions decision making through the construction of narratives making the rhizome that constitutes the body of the hedgehog with the fundamental aim of enriching contextual knowledge for decision making. Localised processes developing proceduralised contexts for constructing and exploring prescriptions for action within a plethora of decision spines are rooted in this rhizome. It identifies a synthesis of theories that influence decision-making within organizations and proposes a comprehensive system of Group Decision Authoring and Communication Support (GDACS). In doing so it proposes that the iterative development of collective narrative within an organising system engaged with complex decision making leads to active engagement with implementation – a process we call Collaborative Authoring of Outcomes.

Introduction: Proceduralised context and the circular logic of choice in decision making

The tradition of rational choice employed in Decision support traditionally follows the prescriptions of Herbert Simon (1960), who conceptualised organisational decision making processes as linear, moving through three stages: intelligence, design and choice. *Intelligence* involves a search for “the conditions that call for decisions”. *Design* focuses on “inventing, developing and analysing possible courses of action” through the construction of “a model of an existing or proposed real world system”. Finally, the *Choice* phase focuses on “selecting a particular course of action from those available” according to what has been represented in the model. Decision-making is thus cast as organisational problem solving, the model provides a representation of “the problem” which can be “solved by” implementing a prescribed course of action identified as “preferred” or “optimal” within this representation.

In practice, the process of problem definition has its roots in the formulation of the issues of concern and spirals within what Nappelbaum called “the circular logic of choice” (figure 1) as the decision-making group sharpens the description of the problem by cycling through option descriptions, value judgments and instrumental instructions, reducing discretion in how these may be defined in developing structure and spiralling toward prescribed choice.

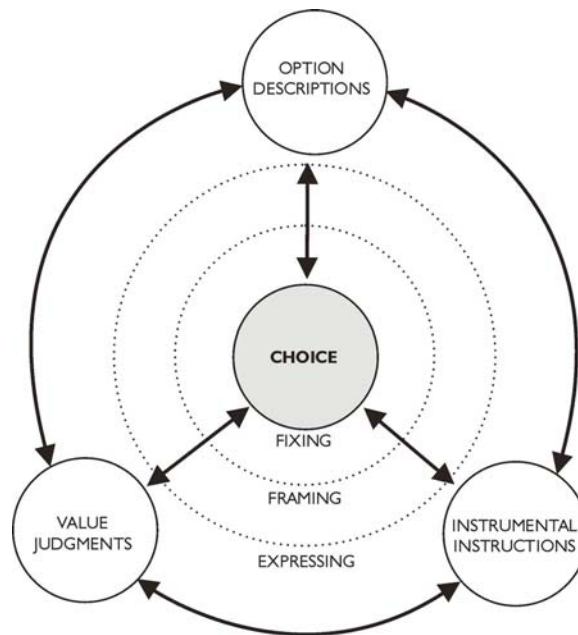


Figure 1: The Circular Logic of Choice

Brezillon and Zarate (2005), following Brezillon and Pomerol (1999) describe how, in initiating the spiral vortex of the circular logic of choice,

“One must distinguish the part of the context that is relevant at this step of the decision making and the part that is not relevant. The latter part is called the external knowledge. The former part is called contextual knowledge and obviously depends on the agent and the decision at hand. Always at a given step of a decision process, a part of the contextual knowledge is proceduralised. We call it the proceduralised context. I.e., the part of the contextual knowledge that is invoked, structured and situated according to a given focus.”

Thus, decision making and problem solving is, according to the circular logic of choice a process of a decision making group coming to an understanding and determination of the contextual boundaries (what is in and what is out), coming to a common understanding of what knowledge is relevant to the situation and shifting toward a proceduralised understanding of what is required to frame and fix a choice of action.

From feeling to action: Five levels of representation of decision problems

The desire to take prescribed action is generated from a feeling that there is a lack (or a gap) between the actual state of affairs (as perceived by the decision maker) and some imaginable preferred state. In theory, the participants in the decision-making process can start out, at the level of feeling, with complete freedom about how to think about translating this desire into action. At the outset all imaginable courses of action are candidates for implementation. The group process, aimed at developing a single, collectively agreed, representation of “the problem” then aims at progressively strengthening the constraints on how the problem is represented within a proceduralised context until only one course of action is prescribed: the one which “should be” actually embarked upon in the *real*.

Five qualitatively different levels of constraint setting may be identified, each associated with a different kind of discourse concerning how to structure the constraints at that level (Humphreys, 1998). The nature of the knowledge represented at each level, and the cognitive operations involved in generating these knowledge representations, has been discussed in detail elsewhere (Humphreys,

1984, 1989; Humphreys and Berkeley, 1986). These levels have been presented in a point-down triangle as shown in figure 3, indicating the progressive decrease in discretion to exploring contextual knowledge as one moves downward from level 5 (exploring fantasy scenarios and dreams with conjecturality beyond formalization or structure) towards fixed structure, within a fully proceduralised context (with all other knowledge now external to the “representation of the problem”) and zero discretion at level 1 (making “best assessments”). At this point the problem-representation model is developed to the extent that the “best” course of action is inevitably prescribed.

In the actual decision making process, movement through the levels is not linear, but corresponds to a spiral through the circular logic of choice (fig 1) to the point where a particular course of action is prescribed as the “true solution” to the decision problem.

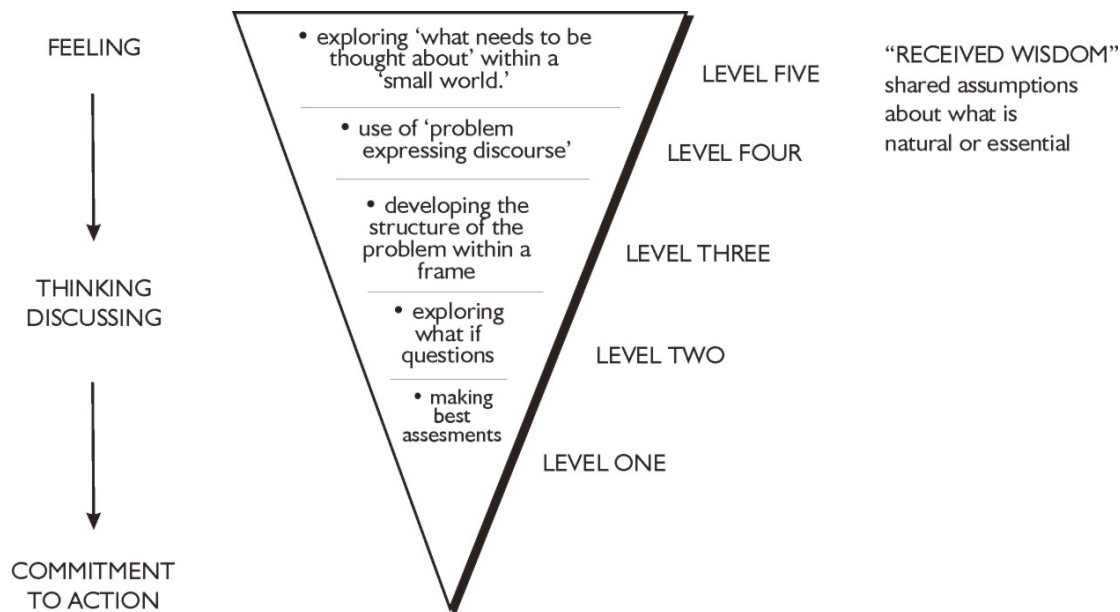


Figure 2: Five levels of representation of decision problems

At the top level (level 5 in figure 2), the roots of the decision problem are imagined through explorations carried out within a ‘small world’ (Savage, 1955, Toda, 1976) whose bounds are defined by what the participants in decision making within the spine is prepared to think about. Explorations within these bounds are made within what Sandler and Sandler (1978) called ‘the background of safety’. The results of what is encountered in this exploration constitutes the contextual knowledge which is available in forming the content elements of problem representations that are manipulated in problem structuring at lower levels.

At the next level down, (level 4 in figure 2), problem-expressing discourse may be employed to make claims that particular elements of what was explored should (or should not) be included in the representation of the decision problem (Vari, Vecsenyi and Paprika, 1986). This discourse determines the parts of the contextualised knowledge, expressed as “representatives” in ‘illocutionary acts’ (Searle, 1979, following Austin, 1962) that will be proceduralised. This discourse is usually argumentative, wherein representatives” are expressed as claims about what aspects of context should be explicitly proceduralised are supported by warrants and backings (c.f. Toulmin, 1958, van Eemeren et al, 1997) by their advocates in order to gain their acceptance by all those participating in the decision making process. In developing the proceduralised context, the claims thus established through problem expressing discourse need to be linked into frames, so that their collective implications for potential prescriptions for action can be explored (Beach, 1990).

At level 3, framing discourse is employed to develop the structure of the problem within a frame (within ‘soft systems methodology’ this is presented as ‘conceptual model building’; c.f., Checkland,

1981; Checkland and Scholes, 1990, Humphreys, 1989), Framing discourse focuses on developing structure within the proceduralised context until sufficient coherence is reached where it is possible to explore the structure so developed using ‘what-if?’ discourse at level 2 to see the impact of changing the assessment of one element within the structure. By the time level 1 is reached, sufficient constraints have been set for the remaining task to be only to make best assessments of ‘the most likely value’ at those points in the represented problem that have been represented as ‘uncertain’ within the constructed decision-making frames, such that a particular course of action is prescribed.

Figure 2 is not intended to indicate a prescriptive methodology for decision-making (i.e., ‘start at level 5, establish constraints, then go down, one by one through the levels until action is prescribed at level 1’). All that can be established, *in general*, is that the use of the employment, in decision-making practice, of the discourses identified at each level in figure 2 serves to constrain what can be explicitly considered at the levels below in establishing the ‘truth about the decision situation’.

Discourses of Truth within the Decision Spine

According to Foucault, ‘truth is a thing of this world: it is produced only by virtue of multiple forms of constraint’ (Foucault, 1980, p.131), and in this sense, all the discourses identified at the various levels in figure 2 are involved in identifying “relevant” contextual knowledge, developing the proceduralised context, structuring the “problem” and prescribing choice of the one and only best course of action (the “true solution”). Collectively, they can be considered as particularised and, sometimes, artificial discourses of truth. Conversely, the representation of the proceduralised context, constructed through the use of this discourse, does not reveal the ‘real’ situation. Rather it is an artefact, providing and structuring information about objects and relationships within a frame, to be communicated in restricted language (Eco, 1985, De Zeeuw,1992). Such *telling* about what “is” or what “will be if these prescriptions are implemented” may be useful for establishing control or coordination in local decision making processes, but locks out consideration and exploration of potential resources and pathways that are not described explicitly and exhaustively in the structure of the problem representation (Humphreys and Brezillon, 2002).

In sum, the whole process constructs, and spirals within, a *decision-spine*, by analogy with the structure and characteristics, in the real world, of an uprooted spine from a real hedgehog, as illustrated in figure 3.

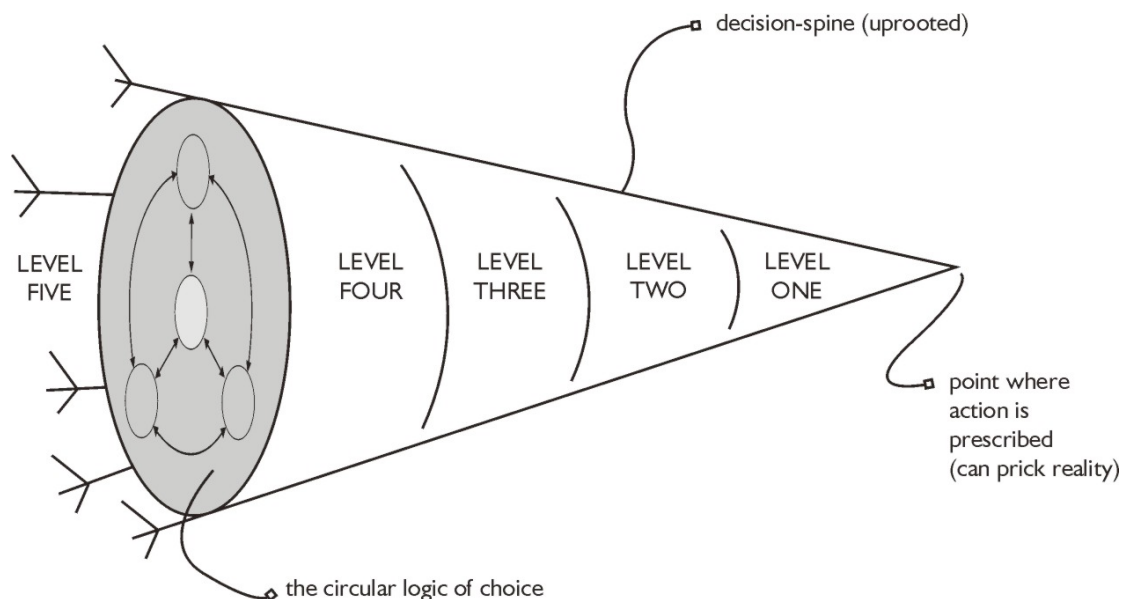


Figure 3: Decision-spine (located in the *symbolic/imaginary*, capable of pricking the *real* at its point) – by analogy with an uprooted spine from a real hedgehog)

However, this decision spine is rooted in contextual knowledge at level 5 - “exploring what needs to be thought about”- (see figure 2), which, as we shall see in the following sections, is *not* necessarily always bounded within the spine, ready for proceduralisation but extends throughout the unbounded body of a imaginary and symbolic *decision-hedgehog* – “ a body without organs” in the language of Deleuze and Guattari (1988, pp 149-166), The process of constructing levels 5 and 4 of a decision spine serves to excludes much of this contextual knowledge which thus becomes “external knowledge” . But this knowledge is external only to the particular decision-spine, not to the body-without organs of the decision hedgehog.

Drawbacks of the Decision-Spine as the Hegemonic Decision-Making Structure.

In a survey of attempts to implement, in a wide range of organizational contexts, courses of action prescribed as “true solutions” through decision conferencing and related group decision support techniques, Humphreys and Nappelbaum (1997) identified the following typical outcomes:

- Failure within the implementation scenarios to identify properly and provide for handling side effects of the main, intended, effect;
- “Throwing the baby out with the bath water” through focusing on the rolling back of initial scenarios without the opportunity to create innovative pathways to goals, as they lie off the roll-back route;
- Missing of opportunities and creation of problems for change implementation management;
- Underestimation of the value of (or even the existence of) local skilled knowledge in place within the organization.

Not surprisingly, the view that the core of successful organizational decision-making lies in constructing and prescribing the solution to “the decision problem” within the proceduralised context of a single decision-spine has come to be contested. Qualitatively different views of the core process of decision making, not founded on the hegemony of proceduralised context, have emerged. These include Decision making as learning (Schein, 1992; Argyris and Schon, 1996; Senge, 2003) and, most recently, decision making as an integral function of the authoring of collective narratives in a literary view of organisation (Imas, 2004).

Saving Grace of the Decision Spine: proceduralising context?

We do not challenge the useful, and indeed, essential function of constructing decision spines, proceduralising contextual knowledge, and spiralling within them in moving from feeling that “something has to be done”, experienced in the in the plane of the imaginary, through symbolic structures that reduce the variety of the group imagination about “what is to be done” to the prescription of a single course of action to be implemented in the real. The ability of this decision technology to enable the group’s imagination to “prick the *real*” is invaluable as this is crucial for effective reality testing of the collective fantasy about the context of the decision making which, in the first place, identified the action to be taken in the real as “preferred” or “optimal” (Humphreys,1989. Checkland and Scholes, 1990).

However, we do contest the hegemony of proceduralising context within a single decision-spine as the sole fundament of support for effective, innovative and creative decision-making – understood as a rich and continuing process at the core of organisational and social life.

In conventional decision-theoretic logic, the act of choice within a single spine (i.e., gaining commitment of the participating group to implement the course of action prescribed within the spine as “preferred” or “optimal”) “solves the problem” and therefore terminates the decision-making and the processes that support it (Kleindorfer, Kunreuther and Schoemaker, 1993; Nappelbaum, 1997).

Narrative accounts of the decision making process which led to the chosen action tend to be justificatory (Humphreys, 1998). These accounts are formed and located within the immediately proceduralised context through racing back along the paths modelled within the frame from the point of choice. They ignore (as “irrelevant” or “confusing”) any narratives that traverse pathways that were not connected to the “mainline” trajectory of the ever-increasingly constrained path to the choice point at the tip of the spine. This is a major contributor to the failures practical efforts of decision support, predicated on this logic, which were identified by Humphreys and Nappelbaum (1997).

Conceptualising decision making as “learning” requires gaining feed-back from the effects of embarking on “chosen” courses of action (pricking the *real* to gain information) that is not treated in isolation, like a diagnosis within a proceduralised context, but which extends the rhizome that constitutes the body-without-organs of the decision-hedgehog in which the roots of the decision spines are located, enriching the contextual knowledge for subsequent decision making along a plethora of other spines rooted in this rhizome (figure 4).



Figure 4: Decision-hedgehog: Body-without-organs, covered in decision-spines, open for exploration and nurturance in the plane of the symbolic/imaginary

Role of the rhizome in Group Decision Authoring and Communication Support (GDACS)

The decision-hedgehog rhizome is not a reference structure or high-level frame informing the selection of decision spines. Deleuze and Guattari (1988) point out:

“The rhizome is altogether different. Make a map, not a tracing.... What distinguishes the map from the tracing is that it is entirely oriented toward an experimentation in contact with the real...It is itself part of the rhizome. The map is open and connectable in all of its dimensions; it is detachable, reversible, and susceptible to constant modifications. It can be torn, reversed, adapted to any kind of mounting, reworked by an individual, group or social formation” (p. 12).

At the personal level, the rhizome is experienced as a map formed through exploring potential pathways to develop contextual knowledge, rather than as a tracing of “reality”. Resources for conceptualisation of collaborative outcomes may be innovatively accessed and their transformation imagined through voyages along these pathways, doubled in imagination and in reality. At the social level, the rhizome is activated, extended and revised by the participants in the group, through making and exchanging stories about discovery and innovation in the conceptualisation, utilisation and transformation of resources for living. When they are authored in multimedia, these stories involve *showing* as well as *telling* what is, and what *could* be, thus enriching context – rather than *being told* what *should* be, thus proceduralising context (Humphreys, Lorac and Ramella, 2001; Humphreys and Brezillon, 2002).

How can the decision-hedgehog best be nurtured?

Humphreys and Brezillon (2002) explain how this can be achieved through:

“[The] generation, exchange and interpretation of communications that enriches the context for distributed decision making within an open and extensible arena. Such communications would need to be in multimedia: comprising audio-visual strata founded in rich, open, language which can support innovative conceptualisation and generate new possibilities for exploration of the rhizome. However in order to prevent the interpretation of these communications by their receivers into what Eco (1985) called “infinite semiosis”, it is desirable that such communications comprise also strata in multimedia employing restricted language to provide directions on the pathways appropriate in assessment and monitoring these possibilities and in making tradeoffs in deciding between alternatives – a necessary precondition for turning fantasy into real action”

Plateaus linking strata comprising restricted and rich language root the decision-spines in the rhizome of contextual knowledge that constitutes the decision hedgehog’s body-without-organs (figure 5).

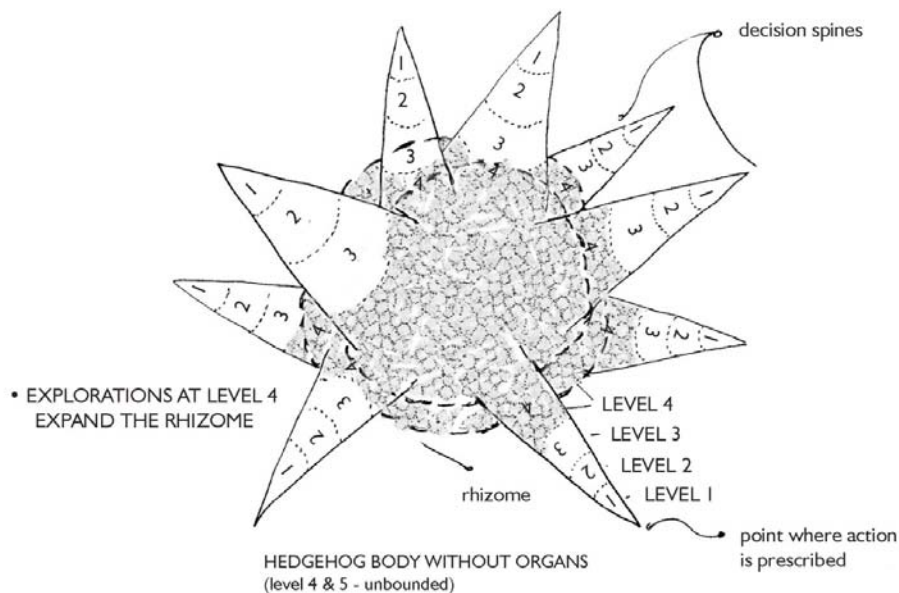


Figure 5: Decision-hedgehog cross-section: Decision-spines rooted in the rhizome constituting the body-without organs

Enabling Collaborative Authoring of Outcomes

Through an understanding of the changes in decision support models from the hegemony of proceduralised context in the single decision-spine model to the decision-hedgehog, this paper positions decision making within the planes of the *symbolic/imaginary*, with the fundamental aim of enriching contextual knowledge for decision making through authoring of narrative within the rhizome, linked with localised processes involved in proceduralising parts of this contextual knowledge, on a conditional basis, in constructing and exploring a variety of decision spines each of which has the capability to “prick the *real*” at its point, through implementing the course of action prescribed there. Groups engage in real activities, constructing mediated authored narratives (Imas, 2004) in attempting to move through the decision process with the aim of enhancing contextual knowledge: working with imaginary ideas and developing a variety of open symbolic representations

within a rhizome rather than a frame (Deleuze and Guattari, 1988). When we communicate these, we engage in real authoring activities using our imagination to create symbolic content and our production skills to communicate this content as mediated narrative.

We propose that the construction of mediated authored narrative is not only a means of more powerfully enabling attention within an organisation, but also a means of narrating pathways, as collaborating groups construct and explore maps of possibilities and opportunities, thus enriching contextual knowledge – and improving the resources for developing proceduralised contexts, particularised within a variety of decision spines – within the doubling structure of a rhizome taking form on a variety of levels (Kaufman, 1998).

Convergence of Processes Supporting Collaborative Authoring of Outcomes

Group decision authoring and communication support (GDACS) supports creative authoring: enriching contextual knowledge that can inform and improve the process of developing proceduralised context at levels 5 and 4 within a decision spine. This creative activity writes the rhizome where decision-spines are rooted in the Decision-Hedgehog’s body-without organs. It also incorporates artefacts crafted at levels 3 and below in spiralling through individual decision spines.

It works through continuous cycles of conjecturality, contingency and encounter with artefacts (Eco, 1986) to yield collaboratively authored outcomes, informed qualitatively by the convergence of processes that lead us from feeling to action. The converging processes identified here are *a facilitating environment, authoring in rich language, participatory multimedia, exploration of context within the rhizome, decision-spine construction, and utilization, group processes and design processes* (Figure 7).



Figure 7: Converging Processes in Collaborative Authoring of Outcomes.

Facilitating Environments range from purpose built decision conferencing rooms and “Pods” (Phillips, 1989), Accelerated Solutions Environments (Jones and Lyden-Cowan, 2002) and Flexible Learning Environments (Jones, 2005) to street furniture, wireless hotspots and public infrastructure designed by architects to enable group work in the internet-enabled laptop age. Facilitating environments for GDACS typically create knowledge rich arenas, interactive technology, feedback systems (visual and data), production support, and spatial facilitation of group, private and interpersonal work. In most cases the idea of the *proscenium* exists: incorporating a back stage and a front stage, where participants are enabled, and the work mediated, by facilitators and support teams.

Multi-media, however, enables us to create a stage on which the players, actors, authors, stagehands and audience are all present and where the proscenium shifts to the interface with the screen.

The principles operating within facilitating environments for GDACS are that “help is focused at the point within the problem structuring and decision-making process where the problem owner / decision maker is experiencing difficulty in proceeding” (Humphreys and McFadden, 1980). Such environments provide a means of enabling rapid and creative progress both in enhancing contextual knowledge in the body without-organs of the decision-hedgehog and in developing proceduralised contexts as required to “prick the real”, unencumbered by structural, logistical and information deficits (Humphreys and Jones (2005).

Case Study Application

You can find a web-journal – recording in multimedia of a case study of the successful implementation of GDACS at www.psych.lse.ac.uk/dreams.html. This event integrated the processes identified in figure 7 in a single one-day event, mounted in a *flexible learning environment* (Jones, 2005). The participants were 36 students on the LSE Organisational and Social Psychology MSc course facing collective and individual problems of all kinds on how to develop and manage their individual research work and logistics over the next nine months, leading to production of their MSc dissertations, as well as how to collectively gain mutual support for is work and for their career paths beyond this time.

The “Crew” (creative design, facilitation and support team) for this event met for a half-day pre-event design session, at which the specific event aims were clarified and the event design developed as a sequence of modules founded in group work, collectively extending the rhizome and enriching context where possibilities for group and individual support could be created and explored, and intertwined with group supported individual work proceduralising the context in which strategies individual students had to investigate and refine individual strategies and actions needed over the next seven months to optimally meet the milestones for their personal research and dissertation production .The actual implementation of these modules during the event is described in detail in multimedia (including streaming video) in the case study website. In the following we present a brief description of the modules, in the sequence they were implemented, indicating how the decision-hedgehog model informed their design and implementation in this event.

Module: Introduction

Explores event aims and introduces the context in which the event is located – presented as a spark session between two expert presenters, with plenary group responsive participation

Module: timeline

Plenary group exploration, of the time line (on display, elaborated as shown in figure 8, examining, as we move along the timeline the range of contexts which need to be explored and the aspects that may need to be proceduralised in different ways by individual participants in optimally achieving their own milestones.

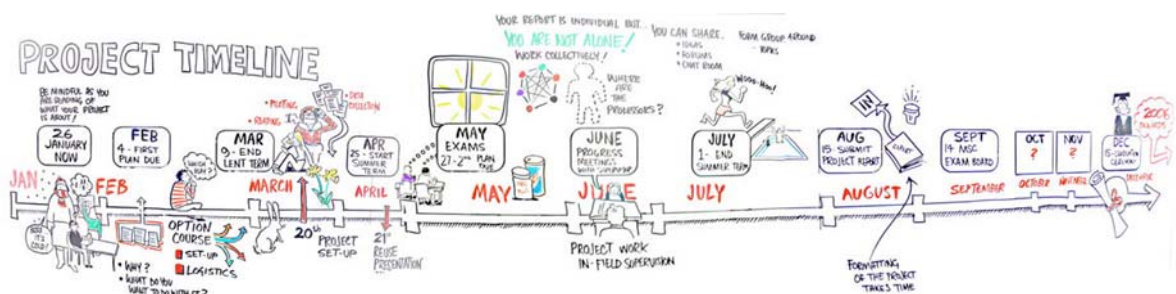


Figure 8: Timeline for project dreams and reality

Module: take-a flip (and shift-and-share)

Working in parallel on individual flip-chart sheets the students developed individual short-term solutions - proceduralising context within decision spines - on how to manage and develop their own MSc Dissertations over the next 6 months. The modules design (“shift and share”) enabled the participating students to exchange issues addressed and possible solutions, thus exchanging elements from a variety of individual proceduralised contexts rather than attempting to develop shared group solution within a single proceduralised context (c.f. Brezillon and Zarate, 2005).

Module: Swarm synthesis

Everyone gathered in the centre of the space and exchanged thoughts and impressions of what they had seen and heard, and pointed their colleagues in the direction of other colleagues looking at similar topics. This develops what Brezillon and Zarate (2005) have called the creating the *interaction context*, whereby elements of previously individually proceduralised chunks of knowledge can now enrich the patterning of knowledge contained in the body of the decision-hedgehog. Brezillon and Zarate point out that this is similar to the externalisation process given by Nonaka and Takeuchi (1995), but within the decision-hedgehog model, this is externalisation from individual spines into the rhizome that constitutes the body of the decision-hedgehog.

Module: Communities of interest (and report-out)

Participants formed five loosely knit groups based on similar interests (as discovered through the swarm synthesis) the groups scattered around the space with the following assignment:

“Working as a group, take the time to discuss and plan what needs to be done in order to create the best possible support environment? Useful questions, which you might want to think about, are:

- What support from each other do we need to get started?
- How will we do it in the time?
- How can we structure this so that we enjoy the process of conducting our projects and making our project happen?
- What support can we give to each other (group that meets together, communication networks), and what do we need to do to set it up?
- How can we provide or get support for how we conduct our research?
- Can we provide, or get support for how we conduct our research?”

Each group worked collectively to develop a project context, collectively transforming the granularity of the contextual knowledge available within the body of the decision-hedgehog, creating and spiralling through a decision spine, thus proceduralising the *project context* (Brezillon and Zarate, 2005). Each group then reported back to the rest of the participants, sharing multiple context and thus enriching and improving the granularity of context as a long term resource for future projects realising and sharing group decision support tools and techniques,

Module: Scenarios (and presentations)

Participants divided again into five groups, each with the assignment to

“Create, design and rehearse a five-minute presentation that tells a story about the journey from doing a successful project and gaining a successful career (you can tell it as an allegory if you wish with obstacles as well as achievements along the route)”

Each group then gave performed its presentation for the rest of the participants (you can watch these in streamed video at www.psych.lse.ac.uk/dreams.html) Here the focus is on enriching and sharing multiple contexts, collectively, exploring and extending the rhizome that constitutes the body of the decision hedgehog, providing resources for individual career decision-making in future contexts that, at this time, may be enriched but cannot be proceduralised.

Module: Plenary Discussion

Participants addressed both the content and process of the event. Content focused on what people felt they had learned. Process focused on the characteristics of a flexible learning environment. Details of participants comments on this is presented on the case study website).

Evaluation of the event by the participants

An online forum for event evaluation was set up during the event, where participant could post evaluative comments and gain responses from the event organisers. This forum remains open to all visitors to www.psych.lse.ac.uk/dreams.html, where the complete set of anonymous, unedited comments form participants is open for review. GDACS relies upon the decision-hedgehog model as it claims decision support in complex contents where collaborative authoring of outcomes is called for, to be effective and comprehensive should nurture all of the decision hedgehog: its rhizomic body-without organs, as well as its decision spines. The evaluation comments were generally very positive, but all the comments both positive and critical confirmed that the design and implementation process for this even had succeeded in doing just that. Here are two representative comments:

“I was the most innovative way of learning, creating and reflecting ideas I had ever heard about. [Previously] when we had talked about it in class I could never imagine that it would be so productive - I had thought it was just a waste of time. I wish the company I will work for will create an environment like this in order to foster ideas...”

“It was the most attractive learning environment I have ever experienced. I found students willing to share their opinions, information, sources of learning in that relaxing atmosphere, and it is good to have this kind of bbs to get more feedback afterwards because sometimes we feel more about what we think afterwards...”

Implications and conclusions

We suggest that context in all its forms is structured like a rich language. The richness of the context that is shared is vital to the success of the decision-making process. Quality in decision-making is then a factor of the richness of the sharing of individual contexts.

The sharing of context then best goes beyond just semantic representation, but can be enriched through multiple modes of representation, as was evident in the above case study. Combining rich and restrictive languages in multi-media has been shown to have an impact on innovative decisions (Humphreys and Brezillon, 2002). The richness of the metaphors, labels and platitudes (Weick and Meader, 1993) that describe context in linguistic, visual and other media can have a powerful impact on the sharing of contextual understanding. This is not to say the volume of external knowledge is increased, rather that the dimensionality of contextual knowledge is extended.

The idea then for collective decision-making to be successful is that multiple shared contexts are shared multi-dimensionally to enable a condition whereby the group for the group generates new context knowledge at that particular moment in time. This has direct impact on the arena in which decision-making and problem solving takes place and the means by which multiple contexts are shared. Any restrictions of the arena lead directly to the restriction of the available options for rendering the dimensionality of each multiple context visible. The means, by which access to the dimensionality of context is achieved, is through accessing representation systems beyond the semantic.

We have suggested that powerful problem solving and decision-making is enabled through processes of collaborative authoring, especially of visual language and multi-media.

We have also suggested that decision-making is not only the transformation of contextual knowledge into procedural knowledge but is a process that enables procedural knowledge to be bounded by derived, newly enriched contextual knowledge developed through this same process.

Sharing of multiple contexts is vital for group understanding of external and contextual knowledge, as well as understanding of the granularity of context that exists within the group. The development of new contextual knowledge as a result of collaborative authoring processes, and the richness of its dimensionality is fundamental to the sustainability of decision-making and the generation of online presence.

In the current era, there are as many paradigms as there are problem solvers – (Deleuze and Guattari, 1988). Successful decision-making is predicated on the presence and visibility of as much external contextual knowledge as possible at the outset. Following Buridan, this implies that there is not just one global truth, nor is there one subject or one object. There are many perceptions of truth, many objects and many subjects, each framing their own contextual experience of the world. Each requires acknowledgement at the start.

GDACS holds that problem solving becomes then not the elimination of external knowledge in order to bound the problem within the restricted frame of contextual knowledge, but the co-authoring of entirely new contextual knowledge, which may or may not be a synthesis of pre-existing contextual knowledge. The generation of new contextual knowledge, of a similar granularity and dimensionality at the level of the group becomes useful then for that moment in time. It becomes regenerated itself as it moves through time, and context shifts.

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