Technology for Collaborative Decision-making in People-Centered Multiple-Bottom-Line Organizations

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Notes:

1. This is a draft.   Please send your comments to the author.

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2. See the companion document to this one: "Perspegrity in On-Line Communication: An introduction and overview" at www.perspegrity.org.

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Contents:

1. Introduction

Cognitive tools and human-centric decision-making. Organizations are increasingly realizing the importance of using inclusive and participatory approaches to decision-making and knowledge creation. For organizations and groups with large memberships who are geographically disparate, on-line technologies, often in coordination with face to face meetings, can increase the participation and efficiency of these processes. Many technology solutions have been created under the umbrella of "cognitive tools," which is a general term for tools that enhance our abilities in communication, learning, creativity, and/or problem solving. Tools that support collaborative decision-making need to address all four of these areas, as members engage in brainstorming, critique, synthesis, and learning as they create and implement decisions. Numerous technologies and e-services for supporting collaborative decision-making are currently available, and include features such as discussion forums, voting, and polling tools. But existing technologies do not go far enough in supporting "**people-centered multiple-bottom-line**" decision-making. We will use the acronym PCMBL or the phrase "**human-centric**" to refer to groups or processes that aim for deep participation ("deep democracy") with a fundamental goal of meeting multiple human needs (not only financial gain). Human-centric decision-making values and explicitly deals with diverse needs and opinions more than traditional "voting." It differs from surveys which aim to gather stakeholder opinion merely to inform management

or marketing. The term "consensus building" is often used to describe such approaches, but this often involves bringing stakeholders together to convince them of the opinions or priorities of management. We prefer to use the term "consensus *finding*" to emphasize a real concern for diverse stakeholder world-views.

There are many types of organizations whose missions place value on human-centric decision-making, and such organizations are in need of new tools to support group processes. Our initial focus is on "grass-roots" organizations, non-profits, cooperatively owned businesses, and other organizations that hold deeply democratic values. However, most of this material is relevant to decision-making in any group. We can summarize the core values that we bring to the development of new technology with two **core concepts: integrity and perspective.** In another article ("Perspegrity in On-Line Communication: An introduction and overview") Murray describes goals to bring ethics-oriented concerns to the design of collaboration and communication software. The article describes how the core values of integrity and perspective include many others, including: transparency, inclusion, inquiry, reality-checking, and reflection. Our goal is to support human-centric businesses and organizations committed to "learning organization" principles (see Senge) by embedding all aspects of decision-making processes with elements supportive of integrity and perspective. Decision-making processes include agenda setting, issues framing, brainstorming, visioning, dialog, critiquing, voting, polling, monitoring, and evaluation. Our design is based on previous experiences and research by the senior personnel in the development of cognitive tools and in facilitating large group consensus-based decision-making processes. It also draws from leading theories and research results.

In addition to our goals to thoroughly embed integrity- and perspective-supporting features, there are two additional elements that distinguish our project. The first is to provide tools that support facilitators as well as tools supporting participants. The second is, in acknowledging the very different needs and styles of different organizations, to allow our tools and software services to be quickly customized to fit the culture of a group (for example, some groups will have a greater need for transparency than others). The facilitator of a group process will be able to easily customize the software according to their overall estimation (or measurement) of the groups "level of trust" and "tolerance for complexity/uncertainty," as described later.

We hope that our software will produce these types of reactions---that members of traditionally top-down hierarchical organizations will say "I felt much more involved, informed, and empowered," while maintaining the efficiency they are used to; and that members of traditionally bottom-up democratic organizations will say "that was unusually efficient" while maintaining the participant empowerment that they are used to.

Advantages of collaborative decision-making. When an organization's leaders, members, and/or stakeholders engage in "consensus finding" and collaborative decision-making their commitment to that organization increases . Through successful collaborative processes leaders are more informed, members or workers are more motivated and empowered, consumers or users are more satisfied. There are two key aspects to collaborative processes: the **flow of information** and the **flow of process control**. The traditional "command and control" organizational management paradigm is slowly giving way to more distributed and member-empowered approaches. In the old paradigm information flowed upward and decisions (control) flowed downward in the organizational hierarchy. In order for organizations to survive in today's knowledge-driven economy information must flow freely in all directions (up, down, and laterally within the organization). Free flow of information enables leaders to fully utilize the essential tacit and pragmatic knowledge of those most closely involved with the execution of organizational objectives. Workers, consumers, and other stakeholders need sufficient information to maintain awareness about their relationship to processes upstream and downstream in work-flow. Having a "systems perspective" is no longer a luxury, it is a requirement. For stakeholders to feel empowered, motivated, and committed they not only need to provide and receive *information*, they need to feel involved in the flow of *control* (decision-making). Each organization will have its own needs and constraints concerning the amount of information exchange and decision-making empowerment allocated to each layer of the organization, but within these logistical and policy constraints, organizations have found that maximizing open flow of information and process control helps them "turn on a dime" to respond to rapidly changing conditions, improve productivity, reduce attrition, and increase stakeholder satisfaction. In the new paradigm both decision-making and organizational learning are **dialogical and dialectical processes**. Participants from all levels and perspectives share their knowledge, experiences, and insights, and in turn learn form each other in an iterative feedback-rich process as the collective intelligence of the organization evolves to respond to each situation.

Cooperatively and democratically run organizations. Decision-making in human-centric businesses and highly democratic organizations have unique challenges compared with traditional top-down organizations. Consider cooperatively run business, which our group has significant experience working with. Compared to investor-owned businesses, who's boards are primarily concerned with providing return on investment to the stockholders, coop

members (i.e. owners) are intimately concerned with many aspects of the business, such as the range and quality of the product or service, distributing and marketing practices, and how raw materials are acquired. They tend to have more concern and influence on the societal and ethical outcomes of how the business is run (e.g. concerns over environmental impact, worker satisfaction, effect on local economies, and effect on related businesses)--thus the term "multi-bottom-line." Our ideas are applicable to organizations such as **unions, cooperatives, regional planning boards, and grass roots activist groups**, who want to involve many members or stakeholders in decision-making dialog. Small or medium sized municipalities could use the technology to involve citizens in fully democratic and informed decision-making processes. Any dynamic business that uses Learning Organization principles and wants to involve workers and other stakeholders more deeply would benefit. One key distinguishing factor is the degree to which the organization uses coercive vs. communicative means to motivate. Many organizations motivate people using "carrots and sticks" or punishment and reward methods. They manipulate people's fears and desires to motivate them to do things that may not be in alignment with their personal goals or intrinsic values. Human-centric organizations rely on the authentic commitment and enthusiasm of members who feel that their goals and values are aligned with those of the organization. Our tools should help leaders in traditional organizations move their organization toward being more human-centric. Many non-traditional organizations whose missions emphasize human-centric values find it difficult to realize these values in their day-to-day, person-to-person operations. Our tools should help such organizations "walk the talk."

The members of many human-centric organizations meet once or twice a year to learn how the business is doing and engage in collective decision-making. Off-line processes such as questionnaires, newsletters, and, increasingly, web sites, are used to create the necessary flow of information between the members and the board or administration. Often members are quite concerned about the details of how their collective decisions are being implemented, and the organizational leadership has a higher level of responsibility to inform and educate the membership on a regular basis. For all of the reasons mentioned above, the complexity of large group decision-making in democratically run businesses and organizations is much higher than in most other organizations.

As these groups get larger and/or more geographically disparate, logistical issues become more acute. Meetings become conventions and generative dialog is minimized. Paper and email questionnaires become the norm which again reduces the generative aspects of dialog. Turn-around time can be slow, and participants receive information and feedback too slowly to enable efficient dialog. Also, as more people become involved the amount of information increases to a level that most members do not have the time to process. The end result is that there is a trend toward the elected leaders and office staff of these organizations controlling the information and decision-making, using relatively low-bandwidth means to gather and process member input. As the flow of information and control involves proportionally fewer stakeholders collective expertise is lessened, and members lose touch with the mission and operation of the organization.

Opportunities for Technology Innovations. Human-centered organizations are increasingly turning to internet technology to help realize their goals. Commonly cited benefits of these technologies include: On-line processes can greatly reduce logistical barriers. Participants do not have to be in the same place or participate at the same time to be able to dialog. Technology allows information to be distributed with little delay, (long time delays in processing and feedback can have a very strong effect on the momentum and critical mass needed for an engaged group dialog). Technology can help summarize, organize, and graphically visualize information that is voluminous or complex. The "one person talks at a time" constraint of face-to-face meetings is removed in e-dialogs.

MoveOn.org and MeetUp.com are typical examples of trend-setting technologies that support community building. The services provided by such technologies help people find each other and come together to communicate. They can help expand membership, share resources, and disseminate information. However, once people use these technologies to "come together," if they want to move beyond the airing of opinions to take the next steps in finding consensus, making decisions, and taking actions, they run into most of the same problems seen in off-line group dynamics, as mentioned above. Our work is to support groups in taking these next steps. We think technology can help groups communicate with more consciousness and include more "perspective and integrity" in their processes.

It can be difficult to facilitate face-to-face group processes so that they include perspective, integrity, and human-centered values-- can technology and on-line processes really be of any help in this area? In "Perspegrity in On-Line Communication: An Introduction and Overview," Murray describe a vision of how the structure and affordances of collaborative software can be used to support perspective and integrity. Though on-line collaboration

has notable deficiencies with respect to face-to-face collaboration,[1] one important advantage of technology-mediated communication and collaboration is that we can constrain and manipulate the *structure* of the interactions themselves in ways that are not feasible in face-to-face processes. We articulate frameworks or principles that supports more ethically-oriented thinking and then incorporate these frameworks into the software such that it prompts for or reminds users of important principles. The previously cited article argues that: 1) "technology can be designed with a transformative intent to increase the "consciousness" of individuals, and the "wisdom" of groups;" and 2) that in *prompting* for these skills a system is *encouraging* them; that in encouraging them they will be *used* more; and that when people use these features the commensurate thinking skills are being *learned* (or improved). Of course, technology is not a "magic bullet" and can only assist or support these skills if the group's leadership and members are motivated to learn and use them.

2. Elements of Healthy Decision-making

Next we will consider the factors necessary for effective decision-making, and after that we will discuss how those factors can be supported through on-line collaborative tools. Many texts discuss the requirements for healthy and effective *organizations and organizational development*. Our focus is more narrowly on healthy and productive *dialog and decision-making* within organizations or groups. Decision making processes can include other types of processes, such as dialog, brainstorming, contemplative reflection, critique, and conflict resolution. Our goal is not to create a new theory of organizational decision-making (for which we would lack the credentials), but to fashion a robust decision making model that will be useful in supporting the design of collaborative software.

Integral commitment to self, group, world. When a group convenes to dialog with a particular agenda or set of goals, many factors contribute to success. We take a comprehensive or integral approach in considering the situation from the perspectives of the individual, the group, and the world (the people and environment outside the group). Our assumption throughout this article is that the group places high value on the needs of all three levels (when we talk about "groups" or "organizations" we are referring to human-centric or deeply democratic groups). I.E. the needs of individuals within the group are important; the mission, vision, or shared values defining the group are important; and the people and natural environment outside of the group are important. Many organizations focus on bottom-line goals (or worse, on the needs of those in power within the group) at the expense of group members and of the people and natural environment outside of the group. (The "ethics-orientation" of this project is in supporting the needs of the individual and world, which in turn is assumed to contribute to organizational sustainability and effectiveness.) In contrast, many participant-centered or grass-roots groups over-emphasize the needs of the individual, at the expense of the goals and agenda of the group. In addition, an excessive focus on what is external can be detrimental to the health and longevity of a group (just as it can be for an individual). Because their missions and memberships are so varied, each group finds a unique balance in meeting the needs of members, group, and world. We can not prescribe a universally correct balance between these three realms, but we can prescribe processes and principles that help any group monitor, maintain, and fluidly evolve how it is meeting needs at the three levels.

A vital or "healthy" system has appropriate boundaries at all levels. That is: 1) members feel free to express and advocate for their needs, yet are also skilled at bracketing (taking cognitive distance from) their personal needs as they consider what is good for the whole; and 2) The decisions and processes of the group as a whole respect and value the personal needs of its members and of "the world", but they also maintain the strength and integrity of the organization so that it can most effectively address its mission and goals.

The elements required for "**healthy decision-making**" include the elements described below. We use the term "healthy" for human-centric decision-making to mean decision-making that is likely to contribute to the vitality and sustainability of groups, their members, and the world (other possible descriptors, such as "effective," "powerful," or "successful, " nominally imply single-bottom lines such as wealth and power as the primary goals). Again, this list is oriented to decision-making in human-centric organizations, though it has significant applicability to decision-making in any group. We do not claim that the full realization of each of these elements is necessary for healthy or successful decisions making, but, for most non-trivial decisions some degree of each of these elements is present. The necessity of at least a modicum of these elements to healthy group decision-making can be illustrated by describing what is likely to happen when each is missing, which we do following each item.

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[1] These include the well known "bandwidth" problem wherein the communicative information of facial expression, tone of voice, and body language are lost in electronic communication. However, as the number of participants increases the disadvantages of on-line collaboration lessen in comparison to in-person meetings, because in-person meetings become less and less intimate and personally relevant as the size of the group increases.
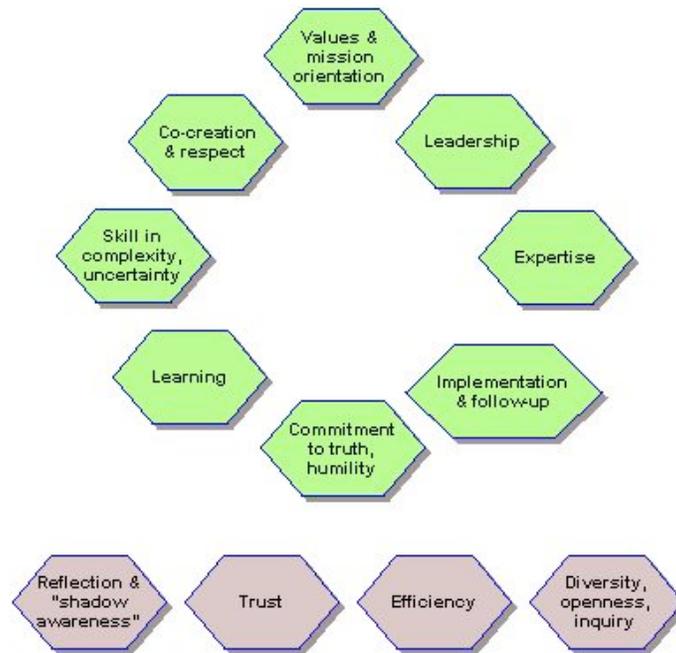
1. **Orientation around values, mission, vision, goals**. The group has a clear identity, "knows who/what it is," and has a clear statement of mission, vision, and/or goals. Dialog and discussion are appropriately focused on the goals of the meeting. ("Appropriately" brings attention to the fact that discussion may also need to be about personal needs or about changing the group's goals.) According to Senge, a strong and concrete vision sets the direction of an organization and provides clarity, focus, courage, and motivation. It fosters risk-taking and long term commitment. However, vision works best if it is created and owned collectively (see the next item).

> If a group's vision or mission is vague then it will flounder, meandering in many directions. If the
> vision is too mundane or easily reached, creative tension suffers and progress slows. Similar
> problems exist if the goals of a particular meeting or task are not clear.

2. **Co-creation, mutual understanding, respect**. The goals of the organization (mission, vision, rules, etc.) and the goals of a particular meeting are created through a non-coercive and inclusive process. High level mission/vision statements accurately reflect member's values, and members feel ownership in the organization. In dialog members make sincere attempts to put oneself in the shoes of others and develop mutual understanding. Inclusive processes are used such that even if the group's decisions are contrary to an individual's needs or opinions, she believes that her concerns were heard and that the decision-making process was fair. Inclusiveness, fairness, and alignment of values contributes to enthusiasm, solidarity, commitment, and synergy.

> If members do not feel aligned with the group's goals and involved in creating those goals, they
> lose enthusiasm, focus, and even trust, and the power of collective action is lost.

3. **Commitment to truth - reality checking, humility and honesty**. Senge claims that the impetus toward learning and adaptation in an organization comes from the creative tension between the organization's vision and its assessment of the current reality. A commitment to truth/reality is to be open to new information, ongoing critique, inquiry, and reflection. To maintain creative tension an organization must maintain a healthy "stretch" between its vision and the facts of reality. In democratic organizations transparency is an essential element (perhaps for those outside, but especially among those within the group).

If perception of reality is inaccurate ("everything is OK," "don't bother to look there," "there is nothing we can do about it") then we are mislead into thinking reality is closer to the vision than it is, and we can make mistakes. Rigid mental models of "how things work," patterns of denial, attitudes based on blame or guilt, and unwarranted generalizations cloud our perceptions, limit our options, and hide potential solution paths. Also, the creative tension between vision and reality will weaken if the goal and the perceived reality are too close.

4. **Leadership**. Leadership is the ability to 1) consider and act based upon the needs of the group as a whole, and 2) minimize the unconscious influence of one's personal needs and biases. Thinking about the "group as a whole" involves keeping the group's mission and the meeting's goals in the forefront, and maintaining awareness of group "power dynamics" and "needs dynamics." It is not easy to gain perspective and emotional stability around one's own needs, feelings, and opinions in all situations. Also, it is not easy to maintain continuous attention on the goals of a group and on the health and efficiency of a group process, and to have clear insights about how to help the group achieve its goals. Leadership is both a skill and a role. A group needs at least one person who has these skills, chooses to use them, and whose leadership role is accepted by the group, for a group to run smoothly. In some groups all members have these skills, and leadership is shared fluidly. And of course, there are group characteristics all along this spectrum, such that leadership, facilitation, moderation, and taking a "big picture" perspective can be shared by those in a group who have skills in these areas. Finally members need to have enough trust in each other to allow leaders and others with specific roles to have autonomy in carrying out what they are charged to do.

Even a group of well-intentioned and capable people can become inefficient (harming the goals of the group) or detrimental (hurtful to participants or harmful to "the world") if no one takes a leadership perspective.

5. **Expertise.** In order to make effective decisions, groups need to contain or have access to specialized expertise in the areas in which they are concerned.

A group that does not bother to find someone with appropriate expertise in key areas will waste resources "reinventing the wheel" or will err out of ignorance. A group that contains members with the right expertise but can not efficiently identify these individuals will suffer a similar fate.

6. **Working with complexity, uncertainty**. As individuals and groups we are exposed to increasing diversity, complexity, and change in almost all aspects of life and work. Success often rests with an organization's ability to digest large amounts of information and make decisions in continuously changing environments. Scaling up small successes into large projects involves new levels of complexity and uncertainty. human-centric organizations in particular must be able to manage the uncertainty, ambiguity, and even paradox that can accompany "multiple bottom line" goals and diverse member perspectives.

Even if a group has a clear mission and strong sense of solidarity around the mission, they may not be able to realize the vision if they do not have the tools to negotiate complex situations and information.

7. **Learning**. As famously articulated by Senge (ref), healthy organizations are "learning organizations" that can continuously assimilate new information, improve their ability to reach their goals, and adapt flexibly and creatively to changes in the environment. Organizational learning is closely related to several items above. It requires an openness to reality checking, to diverse information, and to uncertain and contradictory information. Follow-up (below) and other forms of systemic feedback drive learning. Evolving a group's mission is a learning activity, as is developing the leadership skills of its members.

Groups not capable of ongoing improvement and positive transformation will have difficulty sustaining themselves.

8. **Implementation and follow-up**. This is a large subject summarized in one item, pointing to the fact that healthy decisions include or anticipate the concrete realities of implementation and such things as monitoring and tracking tools, milestones, assignment of responsibility, feedback mechanisms, and contingency plans, all of which link

decisions with actions. A group's **sustainability** is related to its success at implementation and follow-up, as well as to a number of other elements above.

> Group processes that do not tie decisions to actions through the assignment of specific roles, outcomes, milestones, and measurements, may lack the "teeth" and the reality grounding to be carried out.

Below are some related factors that are not in the list above because they are implied by the complete set above, but they are essential elements worth pulling out explicitly.

A. Diversity, openness and inquiry. A healthy sustainable organization will welcome a diversity of **perspectives** and find an appropriate balance between "advocacy" and "inquiry" in its dialog. The synergistic effects (or co-intelligence, see Atlee) of diverse perspectives working collaboratively can lead to powerful and innovative solutions. Also, when all members' views are heard and respected, the sense of fairness and commitment increases. "Diversity, openness to multiple viewpoints, and inquiry" is contained or implied by the combination of the above items "Goals are shared, co-created, respecting all members" and (#2) and "Commitment to truth - reality checking, humility and honesty" (#3). Co-creation and respect implies valuing the views of all members, and commitment to truth implies that diverse views will be sought to prevent myopic perspectives. An open, inquiring attitude is what allows creativity, insight, and "lateral thinking" to take place. It is also a skill for working with complexity (#6).

> Lack of diversity, openness, or inquiry can result in near sighted, one-sided, and often unethical decisions.

B. Trust. Trust is essential in deeply democratic organizations. Mutual trust is supported though **candor**, **transparency**, and **accountability**. That is, we trust each other more as we get to know each other and reveal what is "inside us;" we trust each other more when important things are not hidden from each other; and we trust each other more through observing how actions follow commitments. Trust and solidarity are *built* as members observe others taking risks, honestly revealing their ideas, needs, successes, and failures. Trust is supported in part through systems that promote transparency and frank discussion. Also, trust is supported through types of transparency that expose the loci of power in a group (there will always be power dynamics--the goal is not to eliminate them but to reveal them so that a group can reflect on them).

For some groups trust is high when the group forms, and for others trust must be built gradually. Trust is usually essential for people to engage in the sometimes vulnerable and confusing processes of reality checking (#3), voicing opinions that are unpopular or "outside of the box". Trust is important from both directions (leaders trusting members, and members trusting leaders) if leadership (#4) is to be effective. A leader who does not trust members may micro-manage, or may lose the confidence of members. A democratically-run group that does not have enough trust to delegate tasks and decisions to leaders and other members is doomed to the hopelessly ineffective strategy of making every single decision "by committee." Trust is an important element as a group collectively engages in the uncertain and vulnerable process of organizational learning (including a willingness to take risks and learn through mistakes) (#7).

> Lack of trust and "hidden agendas" can undermine fairness, leadership, diversity, and inquiry.

C. **Efficiency**. "Working" groups must balance the need for individuals to be heard and responded to with the need to make progress on behalf of the group. Concerns for the efficiency of a decision-making process become more acute as scale and complexity increase (#6). Inefficiencies result when there is ineffective organizational memory and learning (#7) when the wheel is constantly reinvented. Lack of leadership and clear roles (#4) and lack of clear vision or goals (#1) contribute to inefficiency. In fact, weaknesses or strength in *any* of the decision-making elements outlined here will have a direct effect on efficiency.

> The tradeoffs mentioned above are illustrated in the saying: "many voices, many opinions...many meetings, many hours, many months!" Efficiency is of course important for material and productivity-oriented values, but it is also important for people-centered values, as inefficient meetings and decision-making drain the scarce resources of human potential and enthusiasm.

D. **Reflection and "shadow-awareness".** The ability to step back and reflect is an important personal and organizational skill in much of the above. Reflecting on our own goals, needs, strengths and weaknesses, those of the group, and shifting to a "systems" or bigger picture view of what constitutes "reality" are implied skills here (and see Subject/Object Theory in Kegan 19xx) . These metacognitive skills support visioning, inclusively, leadership, and learning (related to #1, #2, #4, #7). "Dialectical thinking" (ref) is the term given to a related important skill, that of reflectively considering and allowing seemingly opposing ideas. The "meta-dialogic" skill of reflecting on and talking about the strengths and weaknesses of a particular discussion or decision-making process are likewise important. Kegan & Lahey's book (ref) notes that there are many hidden forces, both personal and collective, that work to prevent us from moving toward our explicit goals and values. They describe reflective processes for exposing and working with invisible patterns and non-conscious needs and drives (what some would call "shadow" material) that resists change. Trust and leadership are necessary for a group to engage collectively in these processes.

> Groups that do not support a culture of self-reflection and organizational reflection have stunted learning curves. Also, as indicated in the saying "what we resist persists", people's unconscious or unexamined motives, beliefs, fears, etc. can negatively effect our intentions related to all of the positive values mentioned above.

There are other elements of effective group decision-making and action related to **characteristics of the individuals** who comprise the group, such as **commitment, exuberance, patience, caring, humor, tenacity**, etc. that we will not bother to highlight, but which are implied by or supported by the complete set above.

As is clear form the discussion above, the "healthy decision-making" elements and principles are highly interdependent and at times even at odds with each other (e.g. the values of efficiency and co-creating can pull in opposite directions in some contexts). If any one of these elements is too weak, or is focused on too strongly to the detriment of others, then the whole process can suffer. Finding the right balance for a group involves making tradeoffs among the elements.

The list of decision-making elements serves several purposes. First, the list itself may help groups diagnose, articulate, and respond to problems in their decision-making processes. Secondly, it provides a model for building software that naturally supports healthy decision-making (*without* the participants even having to reflect on their process). Third, to the extent that the software interface provides an explicit visual implementation of the principles, the **software can support participants in reflecting** about the quality of their process and it can support them in improving their decision-making structure.

3. Decision-Making Process Support

Facilitating group processes such as dialog, brainstorming, critique, conflict resolution, or decision making involves not only a moment-to-moment consciousness of important "elements" such as those mentioned in the previous section, but usually also involves using a specific process or model. There are a wide variety of such models, and our goal is not to support or promote a particular model, but to provide a framework within which any such model can be supported in on-line collaboration.

Such models have two elements: temporal processes and conceptual structures. Processes articulate steps, phases, or rules that help orchestrate "what comes next." Conceptual structures suggest ways to organize ideas (into categories, lists, tables, Venn diagrams, concept maps, etc.). Software can help support both processes and structures. Our software will allow facilitators to create arbitrary group processes and structures based on the needs of the group. However, from our list of elements for healthy decision making above, we specifically want to support the following characteristics of group decision making processes:

- Transparency and inclusiveness in "behind the scenes" work such as setting meeting agendas.

- An organic flow between convergent (focusing) and divergent (brainstorming, generative) problem solving phases.
- Decision making follow-through; including clear roles and responsibilities.
- Individual and whole-group reflection and awareness ("big picturing", regular checks on progress and focus, "points of order" and other meta-comments, post-meeting evaluations).
- Multi-directional flow of information and flow of control.

(In the Perspegrity Project Addendum we illustrate a specific model for a "spiral decision structure" that includes all of these elements.)

4. Software Design

Here we will outline how collaborative software can support each of the "elements of healthy decision-making" described above. Our goals is to explicitly build support for each element into the software. We have begun to implement some of these ideas using the **Plone open-source development environment**, at **www.onlinecommunity.coop**. The initial list of software features below makes use of simple mechanisms. Our initial innovations are not in sophisticated or "intelligent" software devices, but in designing a system that comprehensively addresses the elements needed for healthy group decision-making.

The software will include these common on-line tools and features:

- **Web pages** (including "portals" and "portlets" to each side of the screen) that contain text, **multimedia**, and hyperlinks.
- Document sharing (uploading and downloading) and directory (folder) organization of documents (i.e. a "**content management** system").
- Full-featured threaded discussion **forums** (or "bulletin boards").
- **Synchronous communication** tools such as chat, instant message, and whiteboard.
- **Member informational pages,** and **personal document storage**. Member informational pages will have pictures and other information about members. Members will be able to upload documents to public directories, and will also have their own private document storage area. The system will also have User Preferences to allow each user to personalize some aspects of the system.
- **Groups/teams**. Members can be organized into groups, each of which have their own space for documents and dialog.
- **Security and authenticity** management. I.E. login and the ability to limit the read and write permission on all system items according to user, group, or role.
- **Wiki-style collaborative** editing, and version management. It will be possible to have multiple authors of a document, and to track the revision history of a document.
- **Facilitator/moderator tools**. Special tools will be available for discussion facilitators and group leaders to monitor and manage activity and documents. Along these lines, there will be role-based permissions for moderators (facilitators), document reviewers, managers, etc.
- **Activity reporting tools**. These will allow facilitators or others to see summary statistics related to site usage, amount of dialog on specific topics, who is making the most posts, etc.
- **Polling, survey, voting, and brainstorming** tools.
- **Keyword**-based categorization and filtering of content.
- Information organized around familiar categories such as: Recent News and Announcements, Reference Items, Featured articles, etc.
- Misc. specialized tools including: calendar maintenance and event planning, RSS syndication, site-wide search tool.

Some of our more unique software features include the following:

Task-orientation. One unusual feature of the software will be its organization around Teams and Tasks, rather than around tools or collaboration modalities. Most on line collaboration portals orient the user primarily around tool types, where at the top level users select from categories such as "forums", "documents", "polls", etc. Our software is oriented around Teams (group) and Tasks (or activities) at the top level, because an organization's work is

typically broken down into autonomous tasks with particular people assigned to them. You select from the list of tasks, and within that task you will see the list of tools or collaboration modalities. For example, the task of "identifying a new office location" may include an in-person meeting, then an on-line brainstorm, followed by a discussion forum, followed by a vote, and then a follow-up discussion. Each task will have its members, assigned roles if needed, associated documents, and task state (in progress, postponed, completed, etc.).

Hierarchies and summaries. The system allows hierarchies of tasks, document folders, discussions, and groups (i.e. sub-folders within folders, sub-discussion within discussions, sub-groups within groups, sub-tasks within tasks). This allows complex problems to be broken into smaller bits and assigned to the right people, while hiding unnecessary levels of detail from those who do not need to see it.

Folders, tasks, and dialogs have "summary" and/or "status" fields that allow one to get a quick overview of a set of documents, or to catch up on a discussion, or to see the end result or progress of a set of activities.

Ubiquitous commenting. Users can attach a comment (critique, question, reply, etc.) to almost any object in the system, including documents, tasks, and news postings.

Meeting structures. The features mentioned above allow us to organize on-line "meetings" efficiently and flexibly into steps that support effective and efficient processes. Some of our ideas include: 1) transparent agenda-setting steps, 2) beginning with a goals, values, and evaluation criterion clarification process, 3) orienting dialog and decision-making around values, goals, and criteria, 3) iterating through cycles of divergent brainstorming and convergent critiquing/ranking/pruning, 4) allowing meta-comments (meeting evaluation, process questions, points of order, efficiency checks), 5) supporting clear roles and responsibilities, 6) meeting decisions highlighted and archived, 7) supporting follow-up and evaluation, 8) integration of on-line and off-in meetings. (See the Perspegrity Project Addendum document for a diagram and further explanation of our "spiral decision structure".)

Transparency. Transparency is supported in several ways. The system supports transparency in who participated in discussions and decision-making, how decisions were made, and who and how agendas and meeting guidelines were formed. The task follow-up features also encourage the open posting of results. The ubiquitous commenting ability helps encourage accurate and open postings, as others can comment on inaccuracies.

Dialog tags. We provide a customizable set of descriptors for postings and replies:

(Note: the vocabulary is of our design, while the icons will differ in the final product as the ones shown here were designed by Communispace Inc.)

Multi-method voting. Our voting tool will include many alternative voting methods, including majority rule, quasi-consensus, instant-runoff, etc.

Template-based group processes and discussion structures. There are many rubric-like guidelines for structuring dialog or other group processes. In our system we will make it easy for facilitators to implement arbitrary templates for group processes. The basic idea is that, rather than the usual single "box" that users type their comments into when they post something to a dialog, they will be presented with more than one box. The facilitator can define several templates. For each dialog topic the facilitator chooses one or more templates allowed for that discussion. When a user posts a response they first choose from among the allowed templates. For example, a teacher may want students to post comments to each other's work in a "strengths" and "weaknesses" format. A brainstorming dialog might be structured using a "pros" "cons" and "questions" format for critiquing ideas. The Non-violent Communication model developed by Marshall Rosenberg encourages clearer communicating by differentiating observations, feelings, needs, and requests in conflict-laden situations.

Aliases and internal content links. Every document, dialog, poll, news item, etc. "lives" in a particular "place" (folder) in the system, which in a sense categorizes it. But often items are related to many others and have multiple categories (for example, a posting can be "current news," "a dialog," relevant to a particular group, and subsumed by a particular topic). "Aliases" or "internal links" allow an item to show up in many folders or locations, and make it easy for one item to point another, such as a dialog referencing a reference document.

[Note: these features are the furthest from completely implemented at this time:
- Tools for facilitators tools: activity reports, "observation deck," etc.
- White board
- multi-method voting
- Brainstorming tool
- Template-based discussion forums]

5. Software Features vs. Decision-making Elements

The tools described herein are only expected to "work" within in a social and leadership environment that promotes the related values. The important collaboration qualities of trust, respectfulness, enthusiasm, dedication, curiosity, etc, can be supported by tools but are more strongly effected by how members, and especially facilitators and leaders, set the tone through the way that they contribute and comment. Tools support those with the right intentions to realize their vision.   Tools will not create healthy decision-making where groups or leaders do not have intentions aligned with the human-centric values described above.

A. **Diversity, openness and inquiry**.
> On-line environments can help level the playing field for some power dynamics and support more voices and more diversity of opinion. The ubiquitous commenting will assist in critical and creative inquiry. Brainstorming processes support considering a diversity of ideas or needs in looking for an optimal solution. The Task & Activities system will support cyclical convergent-to-divergent problem solving dialogs, and thus allow deeper collective inquiry. The ability for members to create polls, brainstorms and surveys also supports inquiry.

B. **Trust**.
> Dialog tags help users label postings as "appreciation," "question," "opinion," etc. which can help the degree of *candor* in a dialog. The system supports *transparency* to the degree that it makes the responsible parties and the reasons for all decisions available for all to see and comment on. *Accountability* is supported by having clear role assignments and a clear system for reporting on the progress and results of work.

C. **Efficiency**.
> Efficiency is supported by clear graphical and interface design, in addition to all of the features mentioned below under "working with complexity".

D. **Reflection and "shadow"**.
> Our software prompts users to reflect on the nature or quality of their contributions in several ways. Many comments are reflective in nature, and templates can be created to increase their reflectivity. Dialog tagging requires reflection on the nature of a posting. (The Perspegrity Introduction document includes more examples of features that could support metacognition and reflective thinking.) We will include "social awareness tools" that give participants feedback on communication patterns of the group and of themselves. One example would be an indication of who has not "spoken" yet and who has "spoken" the most.

> The software does not directly support reflection on the nature of individual or group shadow material, but could be used for this propose with appropriate content and prompts from a facilitator. (For example, many aspects of the Kegan & Lahey book mentioned above are illustrated in a template-compatible format.)

1. **Orientation around values, mission, vision, goals**.

   The mission, values, or vision of an organization, and the goals of any particular meeting or task, will be easily accessed. Decision-making processes will include steps that ground the decision in shared values and criterion. There will be visual reminders to orient discussion around shared goals (including mission, values, etc.). Dialog postings and documents will be easily able to reference the mission statement and specific goals or values.

2. **Goals are shared, co-created**, **respecting all members**.

   The overarching purpose of these software tools is to support collaboration and democratically-oriented decision-making. Discussion forums, comments to documents, polls, and votes support collaboration. Respecting all members is supported in part through supporting Diversity and Trust (items A and B above).

3. **Commitment to truth - reality checking, humility and honesty**.

   Reality checking is closely related to "transparency" and "accountability," mentioned above. Humility and honesty are related to "candor" above.

4. **Leadership**.

   The role-based permission features, moderator/facilitator tools, and activity reporting tools will support leaders in getting accessing a "big picture" view of the activities and opinions of members or particular groups. Also, leaders or facilitators will be able to highlight or prioritize comments, documents, etc.

5. **Expertise.**

   Member information pages will include a list of areas of expertise, which can be searched. Also, a resource page of known experts and their contact information can be created.

6. **Working with complexity, uncertainty**.

   > (Note: Our first implementations of the software will not include sophisticated tools like pattern or trend analysis; multi-dimensional-data visualization tools; expert system inferencing, etc., that can be used to manage complexity.)

   The features mentioned in "Hierarchies and Summaries," and "Aliases" above support collaborating in more complex contexts. The Dialog Tags make on-line communication clearer, and thus help to reduce the inherent uncertainty and complexity of on-line communication. Users can also filter out certain types of dialog postings (e.g. "appreciations" "questions" "tangents") if they want to focus in on the core of a discussion. The wiki-style revision-history and tracking features help manage the complexity inherent in collaborative authoring of documents. The keyword-based categorization and filtering of content also helps deal with the complexity of many documents and other objects.

7. **Learning**.

   The content management features of the system support a "learning community" orientation, as lessons learned can be archived as an "organizational memory". In addition, supporting dialog, inquiry, and trust (above) are important elements in supporting collective learning.

8. **Implementation and follow-up**.

   These are supported through task summaries, follow-up activity types, the template features, and the events and deadlines calendar.

6. Community-based software customization

Our software will support efficient multi-directional **flow of information** and **flow of control** in organizations. The roles and permissions software features allow a fine-grained customization of who can create, view, modify, and review to accept/reject various elements in the system. The survey, voting, and brainstorming tools allow members to participate in decision-making, and the transparency and summary features help maintain accountability of those in positions of power. Highly democratic organizations may want to engage in dialog to define and create policy and internal culture. Universal access to see and change all information is usually not effective or practical.

Similarly, making every organizational decision via a full consensus process is very inefficient. Each organization will be able to customize the flow of information and control according to its organizational needs and "personality" (internal culture). Decisions that balance these factors can be worked into the software customization steps.

Many of the features mentioned above will be customizable on a per-community basis. For example, the dialog tags, templates, and user roles and permissions. We plan to add an easy-to-use customization layer that allows a facilitator or manager to make global customizations based on the "personality" of a group. In particular we identify three primary factors that limit an organization's ability to support the types of processes and values mentioned above: level of trust, tolerance for complexity/ambiguity, and will to invest.

In organizations with a high **level of trust** members can speak candidly. They can admit failure (and learn from it), ask for help, and risk voicing personal needs and feelings. Trust is can be low in newly formed groups, or in meetings of stakeholders with competing agendas. As an example of how this factor is used in our software design, consider how peer pressure and anonymity have different effects in low vs. high trust groups. Our software will include tools that allow the facilitator to set the level of organizational trust as high, medium, or low. For lower levels of trust the default is for brainstorming ideas and critiques to be posted anonymously. Anonymity can provide the added safety that enables disempowered individuals to contribute. Also, more consensus-like voting methods may be used in groups with higher trust.

The second limiting factor is **tolerance for complexity/ambiguity** (or "tolerance" for short). The creative tension between vision and reality can lead to cognitive dissonance and emotional tension. Groups with high tolerance can better process diverse viewpoints, work productively with conflicting goals and values, and maintain perspective. In more complex or ambiguous situations any group may have a harder time seeing the forest for the trees, may focus more on immediate local solutions, or trust and the ability to put the group's needs before ones own may degrade. Our software will account for this factor by allowing the facilitator to customize (before the group process starts) the amount and complexity of information that software tools make available.

The final element is **will to invest**, which refers to the amount of resources and commitment that membership and leadership are willing to invest in learning to use the software and in setting up ongoing on-line processes. Some of our software features are easy to use and require no training or conceptual shift of the users. Other features will not work very well if users do not agree to certain basic principles or assumptions (because features can be easily ignored or misused). And still other features require a certain amount of planning and ongoing facilitation.

Facilitators will be trained in how to adjust or turn on/off certain features based on their estimation of group personality factors such as level of trust, tolerance for complexity, and will to invest.

7. Conclusions

We have described a vision of how software can be designed to facilitate healthy decision-making in human-centered ("people centered multiple bottom line") organizations. On-line software can display and facilitate processes and models that support "elements of healthy decision making" such as mission-orientation, trust, reflection, diversity, and follow-up. We have begun to implement and use software to test and improve this vision.

Though our model has many components (there are 12 "elements of healthy decision-making" and numerous software features mentioned) it need not be daunting. For groups that have minimal ability to invest extra time in new ways of doing things, the "out of the box" software will support healthy decision making to some degree. Groups with more "will to invest" can use more features. Both the software features and the decision making model itself are offered "a-la-carte." Readers/users are encouraged to pick and choose those elements that provide a balanced and satisfying "meal" according to their particular diet and circumstances.

The full picture we paint may seem somewhat idealistic--since "real" groups have real people with messy interactions, hidden agendas, limited group skills, and widely varying commitments to values such as inclusion, authenticity, and learning discussed above. But our vision is not to see groups fully embody the full set of these ideas (this would be impossible), but to have tools to move just a bit closer to whichever of these values the group desires. Some of these values, especially those related to reflection, transparency, and humility may be impractical or even unproductive in some situations. Groups that have enough trust and solidarity to enable members and leadership to be completely open about their biases, failures, and strategic intentions, are extremely rare. In most groups there is a level of personal disclosure beyond which information can not be safely or productively shared and

assimilated. In a similar way, the values of "inquiry" and "diversity of opinion" can be over-emphasized, resulting in meetings that are all talk and no agreement or action. So, again, each group will find its balance among competing values.

In the end, we believe that the most important values are related to reflection. If a group is open to questioning its goals, methods, and assumptions, then much else of benefit can follow. In customizing an on-line environment to a group, or in setting a group's guidelines for using these collaborative tools, one asks questions such as "How much do we trust each other and do we need to allow anonymous critiques?"; "How much to we value openness and what does this say about who can view or edit the documents produced by sub-committees?"; "How committed do we expect our members to be to engaging in this process and what does this say about the number of community-building on-line activities they are expected to engage in every week?" We would consider it a success if our software merely engages groups in openly reflecting upon their values, regardless of what decisions result from that reflection. Open and honest reflection may be the most important step in any group transformational process.

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[Bibliography at www.perspegrity.org]