

Working Smarter: An Applied Model for “Better Thinking” in Dynamic Information Organizations

Mary M. Somerville and Anita Mirijamdotter

Dynamic and even turbulent environmental conditions, driven by rapid technological change, aggravating financial uncertainty, and escalating community expectations, fuel widespread recognition that libraries must reinvent organizational processes, procedures, and services. Typically, however, workplace systems, structures, designs, practices, and cultures continue to be based on earlier industrial models.

In contrast, today’s fast-paced, rapidly changing workplace environment requires dynamic and flexible responsiveness with a focus on learning and innovation. To achieve these workplace ideals, we must change how we think and what we think about, as we ready ourselves for new roles in the academic enterprise.

In this paper, we present an applied model for cultivating ‘better thinking’ for ‘working smarter’ within dynamically changing information organizations. Based in systems thinking, it reflects ‘lessons learned’ from action research projects conducted in Sweden and the United States since 2002. For the past fifteen months, since September 2003, we have embedded this model

for deep organizational learning (Senge et al. 2004) at the university library at California Polytechnic State University (“Cal Poly”) in San Luis Obispo (SLO).

Both projects leverage thinking (ST) tools, enhanced by information literacy (IL) and knowledge management (KM) principles and practices, to advance ‘better thinking’ for ‘working smarter’. In this paper, we primarily focus on the systems thinking dimensions of these workplace innovations. We conclude with discussion of interactive assessment results which corroborate the usefulness of systems thinking to frame real world inquiries, inform information exchange, and guide purposeful dialogue in the workplace. Within this context, information literacy and knowledge management shape and sustain purposeful enabling relationships.

Systems Thinking Assumptions

Increasingly, members of information organizations find themselves in dynamically changing, oftentimes tumultuous environments. Concurrently, individuals seek to make sense of increasingly complex workplace

Mary M. Somerville is Assistant Dean, Information and Instructional Services at California State Polytechnic University, email: msomerovi@calpoly.edu. Anita Mirijamdotter is Head, Research Division, Social Informatics and Systems Science at Luleå University of Technology, Luleå, Sweden, email: anita.mirijamdotter@ies.luth.se.

circumstances. To meet these challenges, we co-designed a learning environment populated by systems thinking tools to enable more successful individual and group sense-making and decision-taking. For an overview of systems thinking, history, development and examples of applications, see, e.g., Olsson and Sjöstedt (2004).

We use systems thinking to inform organizational design/redesign activities because this approach encourages viewing the organization as a system within systems made up of systems. The appreciative viewpoints which result enable holistic visualization of interdependent relationships with customers, supplies, and other stakeholders as well as analysis of influential internal and external environmental factors. Additionally, the notion of systems thinking boundaries requires reflection on organizational culture, systems, and structures, all of which benefit from negotiation/renegotiation through dialogue and debate.

Our inquiry methodology, named Dialogue-Driven Dynamic System, presupposes that contemporary organizations exist amidst constant changes and “vaguely graspable futures” (Holst et al. 2004, 13). It follows, then, that organizational sustainability depends on growing persistent capabilities to collectively and continuously adapt, i.e., to act dynamically. For this, we depend on intentional collegial information exchange that animates dialogue, a concept derived from Sir Geoffrey Vickers’ notion of appreciation (1983a, 1983b). In our model, dialogue is the ultimate level of appreciative communication in which people “reason together” (Bohm 1996) for the purpose of developing agreed upon norms, values, and standards for cooperative and collaborative work.

Dialogue grounded in systems thinking encourages contextualization of issues in terms of how the interactions of the parts, and the parts within the whole and its environment, create the properties of the whole. A variety of methodologies exist (Jackson 2003). In our work, we use Soft Systems Methodology, in development for over thirty years by Dr. Peter B. Checkland and his associates at the University of Lancaster in the United Kingdom (Checkland 1999).

Finally, within this appreciative framework of dialogue-driven relationships and interrelationships, we apply knowledge management principles in which robust information exchange promotes knowledge creation and use. In the process, relational informa-

tion literacy is furthered (Somerville 2004). Below we outline our applied systems thinking model, followed by practical examples of its efficacy.

Systems Thinking Methodology

Our work both as internal and external consultants and also organizational leaders led us to explore the possibility of integrating systems thinking into the daily workings of information organizations. We asked the question: can systems thinking become the lens through which individuals conduct ongoing inquiry sufficient to accommodate—and even anticipate—needed organizational changes? This question frames systems thinking as a learned response to ‘making sense’ of new information, rather than a process orchestrated by someone external to the organization. In our research over three years and two continents, we used action learning to investigate if, when internalised within individuals and embedded within teamwork, systems thinking can produce dialogue-driven inquiry sufficient to inform improved organizational responsiveness.

Our transformation strategy depends on Soft Systems Methodology (SSM), a four-stage process—finding out, modeling, comparison, and taking action—which structures the process for making tacit stakeholder information explicit. Disclosure includes clarifying participants’ relationship to other present and potential participants’ perspectives. These insights emerge quite naturally through the application of ‘multiperspectival’ SSM tools. Furthermore, by its very nature, Soft Systems Methodology creates relational context that encourages information exchange. This methodology also embodies constructivist, hermeneutic, interpretative, and phenomenological elements that recognize the role of individuals’ ‘constructed images’ and historical background on their experience and interpretation of ‘reality’.

In formulating our epistemological framework, we depend especially on Checkland’s ideas about human activity systems (Checkland 1988, Checkland and Scholes 1999). This representation system for visualizing reality supports organizational learning that encourages holistic thinking and, ultimately, cultivates its continuance. In our work, we leverage SSM’s explicit recognition that workplace activities must be sufficiently linked to permit integrated, synergistic achievement of the organizational purpose, as expression through functional outcomes in enabling systems.

Our work also recognizes deeply situated forces urging workplace participants to attain and maintain deep and abiding relationships (Vickers 1983a, 1983b). We share a conviction that human beings aspire to connect with other individuals and their ideas and, furthermore, assume that they aspire to positively impact society in doing so. This belief prompted our adoption of Scandinavian style participatory and democratic workplace processes that inform the team building dimensions of our current research collaboration at Cal Poly. Having drawn from a rich multicultural and transdisciplinary 'palette', we apply these rich theoretical constructs to development of a textured, shared context for information exchange, knowledge integration, and workplace learning.

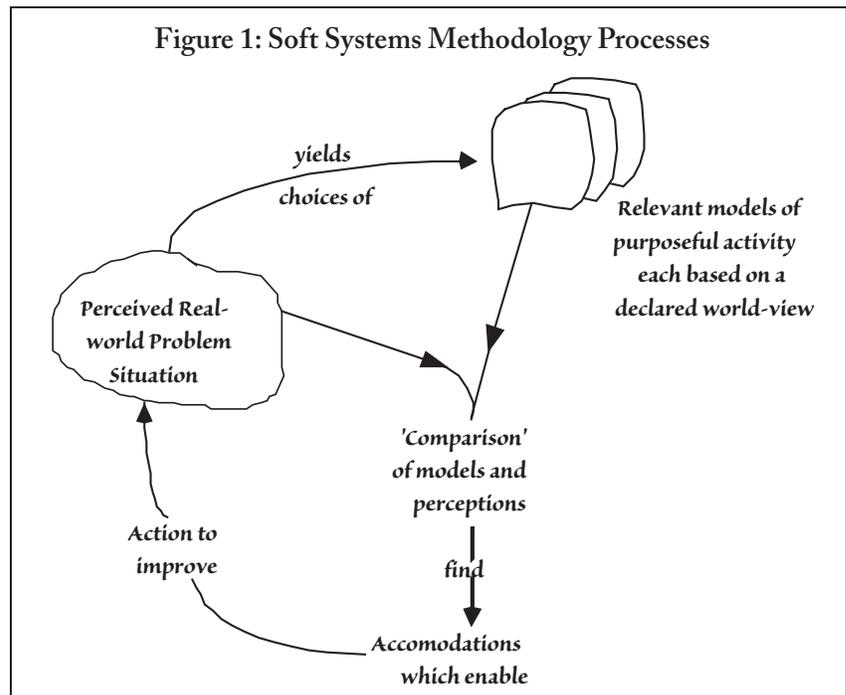
Systemic Organizational Implications

Our current applied research at California Polytechnic State University ("Cal Poly") in San Luis Obispo (SLO) has its origins in our earlier consulting service in the Luleå University of Technology (Ltu) academic library in the north of Sweden. Workers there were experiencing a vague but pervasive discomfort as they observed diminishing usage of their systems and services. They requested tools to explore their situation.

Using Soft Systems Methodology (SSM), we coached Ltu library workers through the process of revisiting their organizational context, including their assumptions about the boundaries of 'the problem' (Mirijamdotter and Somerville 2003). SSM can best be described as a process involving four phases of systems thinking (ST): finding out, modeling, comparing, and action (Mirijamdotter 1998) (see Figure 1). In the finding out phase, exploratory investigation is intentionally broad, covering structures, processes and culture. The outcome of this phase is the creation of 'rich pictures' that provide insights into the situation, its history and plausible futures (Bergvall-Kåreborn and Grahn 1996a, Mirijamdotter and Bergvall-Kåreborn 2005). 'Finding out' can be accomplished through consideration of either qualitative or quantitative data. 'Soft' data sources

include focus groups, phenomenological studies, intentional conversations, and participatory observations. On the 'harder' end of the continuum is library circulation or lending transaction counts or college entrance examination scores. Oftentimes, it is most enriching to consider a combination of hard and soft data, for the purpose of identifying relevant issues to be further explored in the next phase.

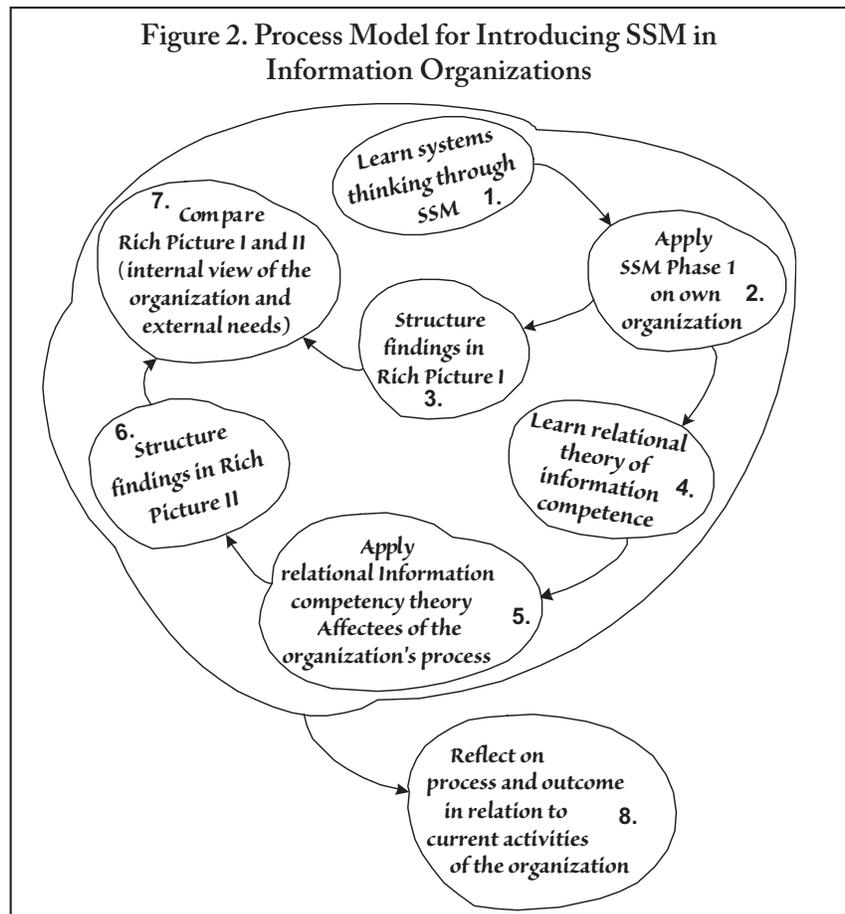
In modeling, participants consider techniques for building conceptual models. As illustrated below, the techniques elucidate various perspectives and presuppositions. They can also be used to visually represent different scenarios of plausible futures. The comparing phase involves assessing and evaluating various possibilities by identifying likely implications and selecting leading indicators of changing internal and external circumstances (Bergvall-Kåreborn and Grahn 1996b, Mirijamdotter and Bergvall-Kåreborn 2005). In the final phase, actions are identified which will change the situation. This culminating step applies the cumulative learning of the previous phases in conceptualizing a prototype 'knowledge making' system reflective of the inclusive participation necessary to initiate, maintain, and sustain the robust learning processes which must be embodied in learning organization culture. This dynamic process is presented in Figure 1 below.



SSM practice provided Luleå University of Technology workers with a new appreciation of their work within the larger context of the increasingly digital information landscape. It poised them for readiness to proactively participate in the opportunities and challenges of the university’s new “Creative University” mission. This transdisciplinary initiative intentionally promotes information exchange among faculty and student participants in theme-based projects for the purpose of supporting knowledge creation of applied benefit to society. The recently reported “lessons learned” from these “arenas” (Holst 2004) have strengthened our interest since 2003 in explicitly connecting systems thinking (ST) with both knowledge creation and management (KM) and also information literacy (IL).

Our decision to combine ST with KM and IL occurred over the past two years, as we refined our initial approach through design and delivery of training courses for information workers in a variety of industries. These individuals, by definition, apply productive work ideas, concepts and information rather than manual skills. By way of explicating the relationship between ‘big picture’ thinking, information competence, and knowledge creation, we increasingly rely on the relational information literacy insights presented in the ANZIIL, the *Australian and New Zealand Information Literacy Framework: Principles, Standards, and Practice*, 2nd ed. (Bundy 2004). Reflective of a national lifelong learning agenda, this document identifies learning outcomes for contextual information and communication and technology capabilities of relevance to both academic and workplace environments. Within the enabling framework of ‘soft’ systems concepts and tools, the ANZIIL insights anticipate emergent capabilities from practice with our Dialogue-Driven Dynamic System model for workplace learning—i.e., these precepts guide the substance of interactive assessment strategies which both serve to evaluate and educate workplace participants.

Among the immediate outcomes of our work-to-date is a systems thinking model for embedding intentional learning in contemporary information organizations. As embodied below, the processes captured in Figure 2 are rooted in teaching and learning. Activity 1, at the top of the model, corresponds to our introduction of library staff members to systems thinking and Soft Systems Methodology. They then apply the SSM finding out phase to their own situation, activity 2, and represent their findings in a ‘rich picture’ (activity 3). The process continues through discussion of ANZIIL-derived relational information literacy, as illustrated in activity 4. Individuals then apply SSM, toward the end of advancing both workplace and lifelong learning capabilities, as they query organizational affectees about their use of information and their experience of effective use (activity 5). Their findings are captured in a second rich picture, activity 6, which is then compared to the first rich picture (activity 7). The process concludes with activity 8, reflections on the discrepancies



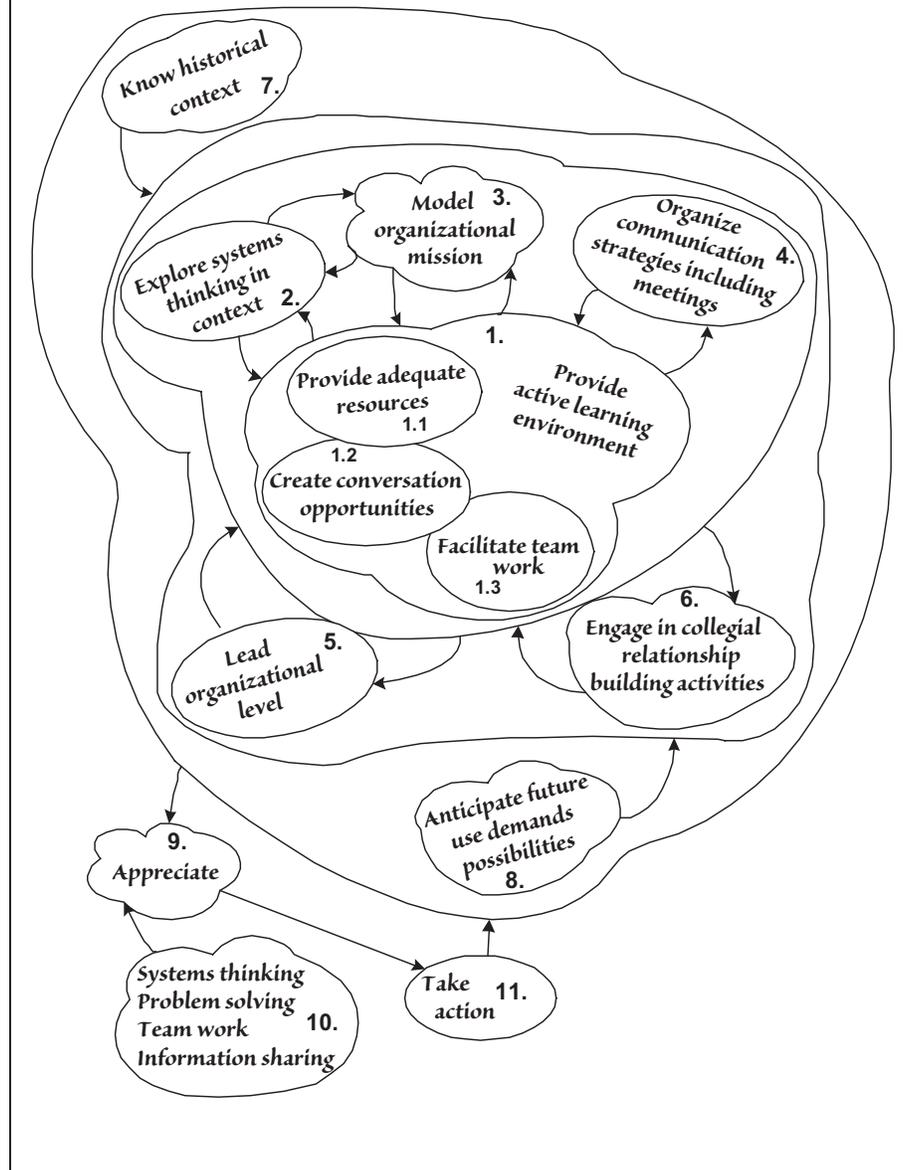
between the two rich pictures, ideas for how to accommodate the external needs of the organization (as illustrated in the second rich picture described above), and appreciation of appropriate tools of systems thinking relevant to the re-thinking activities.

Through this discovery process, information workers develop a shared vision for a repurposed organization. In addition, workers' enriched appreciation of their workplace knowledge in the larger context of the organization produces new understanding of their role(s). This is a direct outcome of the SSM rich picture exercises, in which stakeholders learn to make their tacit knowledge explicit. This process requires consideration of others' points of view, which leads quite naturally to a synthetic 'big picture' of all the pieces of the situated organizational 'puzzle'.

Coincidental with valuing tacit knowledge made explicit, participants consider how to use systems thinking to further the organizational purpose. This leads to recognition that organizational knowledge creation depends on an enabling workplace context that infuses systems thinking practice into sustainable organizational behaviors. It naturally follows that leaders are responsible for designing workplace environments rich in relational information experiences that facilitate ongoing exploration of knowledge creation by workers (Mirijamdotter and Somerville 2004).

As illustrated in Figure 3, we visualize the leader's role as creator of conversations and contexts that reveal relationships among the information held by workplace participants. Figure 3 illustrates our systems thinking-

Figure 3. Systems Thinking-Based Organizational Leadership Model



based organizational leadership model. It represents layers of activities that interact with each other. At the very center of the figure, activity 1 represents the activities that are involved in providing an active learning environment.

Its placement at the very heart of the model conveys our belief that traditional management techniques are no longer adequate. Rather, organizational leaders must provide conditions for co-workers to actively and dynamically engage in information exchange and, by

that, learn from each other. For the purpose of clarity, we have therefore included some of activity 1's main sub activities, 1.1–1.3. Besides adequate resources to accomplish work outcomes (activity 1.1), opportunities for conversations (activity 1.2) in and among work teams (activity 1.3) are critically important in a learning environment. These activities can further recognition of competence at the individual and group level, even as they fuel heightened insights at the collection vision level.

The figure next presents our assumption that active learning environments are based in systems thinking, activity 2. We propose that leaders utilize systems thinking within appropriate organizational contexts to further understanding of parts and interrelations, as embedded in figure 1 above. Linked to systems thinking—and also team success—is shared vision, as represented in activity 3 which represents modeling the organizational mission within the wider system. This visualization is best shared and furthered in conversation with staff. The final activity on this level, activity 4, illustrates that physical and virtual meetings are vital for facilitating active and dynamic engagement in information exchange. To create adequate physical, virtual, and mental shared context, we utilize SSM to define organizational purpose(s) according to the 'PAWDAC' technique (our refinement for teaching purposes of the original SSM 'CATWOE' technique) which convenes stakeholders for structured discussion about processes, affectees, weltanschauung (worldviews), decision makers, actors and constraints (Bergvall-Kåreborn, Mirijamdotter, and Basden 2004). Dialogue outcomes also elucidate learning environment design attributes necessary to realize revisited—and possibly realigned—organizational purposes.

For the sake of model completeness, we add activity 5, leading operational level work, and its counterpart outside the organizational boundary, activity 6, engaging in collegial relationship building activities. Historical context, activity 7, represents understanding how and why the present situation has come into being. This perspective offers relational context for envisioning the future, activity 8, including anticipated service demands, service use, and unanticipated possibilities.

Finally, the processes and outcomes necessary to organizational mission, activities 9–11 focus leaders' attention on systems thinking, problem solving, teamwork, and information sharing. Evaluation involves

assessing how well these factors are represented in the emerging learning environment and how well the activities support the sustained development of continuous learning. As mentioned above, we use the Australian and New Zealand standards for these assessment and evaluation activities, as advanced by contextualized appreciation for librarians' emerging roles in knowledge integration. Organizational knowledge creation theory (Nonaka and Konno 1998) explains how information exchange and capture processes feed contemporary organizations' knowledge production requirements.

Information Literacy Application

In rethinking the library information literacy programming, we have applied these process models for introducing (Figure 2) and embedding (Figure 3) systems thinking into workplace learning activities that utilize the SSM process (Figure 1) to solve real world problems. Through a process of generating and comparing rich pictures of ideal, faculty, and student information access and usage behaviors, we stimulated librarians' formal consideration of comparative information literacy (IL) capabilities among various campus constituencies when compared with an ideal constellation, as reflected in the ANZIIL document. This reflective exercise provided a common platform upon which to discuss strategies for generating learning outcome-driven instructional approaches that embed information literacy education seamlessly in the academic curriculum.

More precisely, librarians worked in teams reflective of the campus community—first year experience, professional schools, polytechnic studies, and liberal arts—so as to focus on the common question: how can we create learning opportunities and advance student learning? This question appreciably stretched the traditional instructional approach—i.e., a stand-alone fifty-minute lecture. Practice reflecting together, guided by systems thinking frameworks and enabled by systems thinking tools, opened up new possibilities. Librarians now imagine forging partnerships with academic faculty, including collaborative design of assignments that place the librarian in the role of research coach, consultant, or co-teacher. In contrast to earlier thinking, librarians now see their work as embedded in a system of purposeful inquiry, reflection, and, ultimately, learning, as expressed through instruction and research

activities furthered by dialogue with colleagues inside and outside the library walls.

The new vision proactively integrates information literacy concepts, tools, and instructional strategies wherever teaching and learning is shared and valued at Cal Poly—i.e., information literacy learning is no longer assumed to occur only in the library classroom or at the reference desk. Rather, it is expressed in a wide range of library staff activities that promote information fluency, embedded in College curricula and increasingly accessible 'anytime, anyplace' (Vuotto 2004, Somerville and Vuotto 2005).

As librarians and their academic partners reconsider how best to enrich students' conceptions of information and its use, they are guided by an appreciation for what students know—as captured in data-driven visual representations of students' information conceptions. This SSM assessment of students' 'everyday information seeking' capabilities provide a baseline, upon which—in a 'scaffolding' fashion—librarians and faculty are co-designing constructivist learning outcomes and instructional strategies that cultivate the transferable higher level thinking processes required of disciplinary competence. ANZIIL capabilities, placed within the context of college and department learning goals, provide rich context for these new conversations.

In addition to planning and implementation, SSM thinking tools are transferable to co-designing learning assessment measures. The four constitutive parts—finding out, modeling, comparing, and taking action—guide those discussions in terms of: What do students need to know? What do they know now? What else do they need to know? How can we best achieve that? It is an iterative process in which, having implemented a 'taking action' step, teams cycle back to the 'finding out' phase and reconsider how to further extend learning. This contrasts with an all-too-frequent organizational habit of 'planning' but not 'doing'—or 'doing' without the requisite data-driven inquiry processes that align 'taking action' with outcome and assessment measures. Rather, integrated 'thinking and doing' through ongoing structured reflection has advanced collaborative deliberation and learning capacity.

Librarians' usage of systems thinking has produced shared understanding of the larger context in which they work. They now have an expanded awareness of academic data sources useful for service and system customization—i.e., regional accreditation standards,

internal and external review documents, college strategic plans, and department curriculum goals. By 'renegotiating the boundaries of the library' and entering the terrain of academic faculty, librarians share common points of reference that expedite the dialogue around co-design of systems and services. This framework also supports improved in-house alignment among library colleagues (Somerville and Vazquez 2004).

Interactive Evaluation

Interactive evaluation is now embedded routinely in library work processes (Somerville, Huston, and Mirijamdotter 2005) to ensure continuous interactive systems thinking and doing. This user-centered evaluation approach focuses on evolving on-going processes that apply SSM results to improvement of specific situations. Strong participatory involvement in both the definition of evaluation criteria and the interpretation of findings assures group learning.

This contrasts with more traditional methodologies in which researchers assume that evaluation is conducted objectively, independent of social and political context. Typically, it is the evaluator who defines what is to be evaluated and how. Moreover, the evaluation results are oftentimes assumed to be an accurate representation of the actual situation.

In contrast, the evaluative results of a systems thinking approach are not viewed as synonymous with objective reality. Rather, the result is viewed as "meaningful constructions"—meaningful to the people involved in the situation—and the purpose is to make the situation of which people are a part more intelligible to them. Some important characteristics of interactive evaluation include:

1. Evaluation is a social-political process. We see social, cultural, and political factors as integrated and meaningful components in the process—i.e., "meaning creators", not "annoying inconveniences" that threatens research validity. Without them, the evaluation would become sterile and meaningless.
2. Evaluation is a process to create shared reality and meaning. Re-construction and re-presentation create shared understanding that, through dialogue, informs corrective action(s).
3. Evaluation is a collaborative learning process. Participants serve as both student and teacher. As the evaluation proceeds, individuals learn from others'

interpretations and simultaneously clarify their own conceptions.

4. Evaluation is also a continuously on-going process. It forms the base for future actions and activities, even as it advances organizational learning capabilities (Guba and Lincoln 1989).

In using an interactive approach, we honor the mental constructs that people generate to understand (or obtain an improved understanding) of a situation. We recognize that these mental constructs are largely formed by individual worldviews, perceptions, and values. These conceptions are, in turn, based on individual background and previous experience. If everyone shares the same valuing system, there is “no problem”. But most modern societies are “value-pluralistic”. The question then becomes: which values should be considered and how can values differences be reconciled? In response, systems thinkers intentionally consider diverse points of view.

Soft Systems Methodology manages the negotiation of different perspectives on one and the same situation (Checkland et al. 1990). The perspectives are valued by making explicit the underlying standards and worldviews (*Weltanschauung*) on which they are based. By conducting evaluations in this way, participants actively learn to understand the inner workings of interrelations and develop a shared ability to anticipate the consequences of new choices. This means that, through continuous workplace dialogue, both processes and results promote understanding of how reality reveals itself (Lundahl and Öqvist 2002), thereby both improving current operations and building inclusive futures.

Results

Since 2003, systems thinking practice has guided library staff members’ reflective reconsideration of core purposes for library information and instructional services. As we ‘learn our way’ to envisioning and implementing desirable and feasible changes, we are aided by Soft Systems Methodology tools. SSM offers relationship-maintaining processes for exchanging perceptions, negotiating differences, and reaching agreements. These practices structure the transformative conversations necessary to develop and sustain the shared contexts which enable organizational innovation.

Our results illustrate the efficacy of applying a systems approach to repurpose and retool a workplace environment. Teams now proactively leverage the stra-

tegic advantages of powerful inquiry tools and reflective practices that develop organizational capacity to ‘learn the way’ to sustainability. In this context, ‘better thinking’ refers to leveraging systems thinking capabilities to build interactive processes that fuel dynamic information sharing and knowledge creation. Our particular framework, Dialogue-Driven Dynamic System, enriches work place relationships, produces insightful learning, and generates organizational transformation through dialogue that advances ‘working smarter’ through ‘better thinking about thinking’.

References

- Bergvall-Kåreborn, Birgitta, and Anita Grahn. 1996a. “Multi-Modal Thinking in Soft Systems Methodology’s Rich Pictures.” *World Future* 47: 79–92.
- . 1996b. “Expanding the Framework for Monitor and Control in Soft Systems Methodology.” *Systems Practice* 9 (5): 469–95.
- Bergvall-Kåreborn, Birgitta, Anita Mirijamdotter, and Andrew Basden. 2004. “Basic Principles of SSM Modeling: An Examination of CATWOE from a Soft Perspective.” *Systemic Practice and Action Research* 17 (2): 55–73.
- Bohm, David. 1996. *On Dialogue*. London: Routledge. In Richard Varey, “Appreciative systems: A summary of the work of Sir Geoffrey Vickers.” <http://www.isi.salford.ac.uk/staff/rv/research/Documents/APPRECIATIVE%20SYSTEMS.doc> (accessed December 21, 2004).
- Bundy, Alan, ed. 2004. *Australian and New Zealand Information Literacy Framework: Principles, Standards, and Practice*. 2nd ed. Adelaide, Australia: Australian and New Zealand Institute for Information Literacy and Council of Australian University Librarians. <http://www.caul.edu.au/info-literacy/InfoLiteracyFramework.pdf> (accessed June 20, 2004).
- Checkland, Peter B. 1988. “The Case for ‘Holon’.” *Systems Practice* 1: 235–38.
- . 1999. *Systems Thinking, Systems Practice: Includes a 30-Year Retrospective*. Chichester, West Sussex, England: John Wiley and Sons.
- Checkland, Peter B., Paul Forbes, and Sophia Martin. 1990. “Techniques in Soft Systems Practice. Part 3: Monitoring and Control in Conceptual Models and in Evaluation Studies.” *Journal of Applied Systems Analysis* 17: 29–37.
- Checkland, Peter, and Jim Scholes. 1999. *Soft Systems*

- Methodology in Action: Includes a 30-Year Retrospective. Chichester, West Sussex, England: John Wiley and Sons.
- Guba, Egon G., and Yvonna S. Lincoln. 1989. *Fourth Generation Evaluation*. Newbury Park, Calif.: Sage.
- Holst, Marita. 2004. "Knowledge Work Across Boundaries—Inquiring into the Processes of Creating a Shared Context." Licentiate thesis, Luleå University of Technology, Sweden. <http://epubl.luth.se/1402-1757/2004/66/index.html> (accessed January 4, 2005).
- Holst, Marita, Anita Mirijamdotter, Birgitta Bergvall-Kåreborn, and Helena Oskarsson. 2004. "Information and Communication Technology in Dynamic Organisations." In Proceedings of the 27th Information Systems Research Seminars in Scandinavia, IRIS 27. Falkenberg, Sweden. <http://w3.msi.vxu.se/users/per/IRIS27/iris27-1046.pdf> (abstract accessed January 7, 2005).
- Jackson, Michael C. 2003. *Systems Thinking: Creative Holism for Managers*. Chichester, West Sussex, England: John Wiley and Sons.
- Lundahl, Christian, and Oscar Öqvist. 2002. *Idén om en Helhet—Utvärdering på Systemteoretisk Grund*. Lund, Sweden: Studentlitteratur.
- Mirijamdotter, Anita. 1998. "A Multi-Modal Systems Extension to Soft Systems Methodology." Ph.D. diss., Luleå University of Technology, Sweden. <http://epubl.luth.se/1402-1544/1998/06/LTU-DT-9806-SE.pdf> (accessed January 9, 2005).
- Mirijamdotter, Anita, and Birgitta Bergvall-Kåreborn. 2005. "An Appreciative Critique and Refinement of Checkland's Soft Systems Methodology." In *In Search of an Integrative Vision of Technology*, eds. Sytse Strijbos and Andrew Basden. The Netherlands: Kluwer Academic Publishers (forthcoming).
- Mirijamdotter, Anita, and Mary M. Somerville. 2003. "Toward Creative Systemic Thinking Processes: An Information Competency Based Transformation Model for Organizational Leadership." Presented paper, Information Technology, Transnational Democracy and Gender Conference, Luleå, Sweden, November 14–16, 2003.
- Mirijamdotter, Anita, and Mary M. Somerville. 2004. "Systems Thinking in the Workplace: Implications for Organizational Leadership." Presented paper, Third International Conference on Systems Thinking in Management, Philadelphia, Penn., May 19–21, 2004.
- Nonaka, Ikujiro, and Noboru Konno. 1998. "The Concept of 'Ba': Building a Foundation for Knowledge Creation." *California Management Review* 40 (3): 40–54.
- Olsson, Mats-Olov and Gunnar Sjöstedt., eds. 2004. *Systems Approaches and their Application. Examples from Sweden*. Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Senge, Peter, C. Otto Scharmer, Joseph Jaworski, and Betty Sue Flowers. 2004. *Presence: Human Purpose and the Field of the Future*. Cambridge, Mass.: Society for Organizational Learning.
- Somerville, Mary M. 2004. "Knowledge Integration Work Across Boundaries: Inquiry into Shared Context for Information Exchange and Knowledge Creation." Invited lecture, Research Colloquium Series, Swedish School of Library and Information Science, University College of Borås, Sweden, December 13, 2004.
- Somerville, Mary M., Malia E. Huston, and Anita Mirijamdotter. 2005. "Building on What We Know: Staff Development in the Digital Age." *The Electronic Library* 23 (forthcoming).
- Somerville, Mary M., and Fernando Vazques. 2004. "Constructivist Workplace Learning: An Idealized Design Project." In *Proceedings of the 3rd International Lifelong Learning Conference*, eds. Patrick A. Danaher, Colin Macpherson, Fons Nouwens, and Debbie Orr, 300–5 (plus errata page). Rockhampton, Queensland, Australia: Central Queensland University, June 13–16, 2004.
- Somerville, Mary M., and Frank Vuotto. 2005. "If You Build It With Them, They Will Come: Digital Research Portal Design and Development Strategies." *Internet Reference Services Quarterly* 10 (1): 77–94.
- Vickers, Geoffrey. 1983a. *Human Systems are Different*. London, England: Harper & Row Ltd.
- Vickers, Geoffrey. 1983b. *The Art of Judgment. A Study of Policy Making*. London, England: Harper & Row Ltd.
- Vuotto, Frank. 2004. "Information Competence as a Value-Added Product: Applying the Business Model to Academia." *Reference Services Review* 32 (3): 234–48.