Intranets

ENTERPRISE STRATEGIES AND SOLUTIONS

Complexity Theory and Intranets

TOM REAMY

The initial reaction of most readers, upon seeing these two ideas—complexity theory and intranets—conjoined, might be described as befuddlement, promptly followed by the question, "What does this have to do with my job and my intranet?" Well, I'll argue here that some very interesting implications result in both theory and practice when you consider them together.

Complexity theory is an interdisciplinary method that can be applied to a wide variety of subjects, including math, artificial intelligence, economics, ecology, and so on. The Santa Fe Institute is one focal point for a lot of new research. In addition, there is a growing field of complexity theory and social research, with David Byrne, senior lecturer in social policy at the University of Durham, as a leader.

In essence, complexity theory deals with complex systems, which are quite different from complicated systems or chaotic systems. In a complex system a large number of relatively independent and dumb elements interact according to a small set of rules. Then, if the system is set up correctly (by human designers or evolution), self-organizing behavior begins to emerge out of the simple interactions. All rules and interactions are local, but a global order emerges.

To get a basic understanding, let's look at two examples of complex systems taken from a good, popular book, *Emergence,* by Steven Johnson:

Ant Colonies: Ants exhibit amazingly complex behaviors without anyone in charge. They have a few local rules (if too many of your fellow ants are near you doing something, go somewhere else and do something else), and out of these simple rules arise very complex global actions, such as efficiently clearing an entire tunnel system without any ant having any idea whatsoever about how to clear a tunnel.

City Neighborhoods: Neighborhoods organize themselves in cities without a central planner telling them how to do it. Unlike the ants'actions, these are conscious choices. But like the ants, individual store owners have no idea how to structure a city neighborhood.

TWO KEY IDEAS

Two key ideas underlie the ability of complex systems to self-organize and have significant implications for intranets and complexity theory: the importance of the environment, including the design of the basic rules that govern how the individual agents will interact; and having an evolutionary or feedback mechanism that will ultimately drive the system.

Without an environment, nothing evolves. The structure of the environment is critical, determining not only who will survive, but what rules will evolve. In the example of neighborhoods ordering themselves spontaneously, there was an environment made up of zoning laws, streets, an information system that included telephones and newspapers, other infrastructure elements such as water and sewage, and so on.

Collaborative Taxonomies Revisited

JEAN GRAEF

The issue of corporate taxonomies—systems for naming and organizing things that share similar characteristics into groups—first appeared on Montague Institute members' radar back in 1999. At that time, we convened a roundtable to explore a collaborative development effort in which different companies, possibly in the same industry, would share the costs of creating taxonomies everyone could use.

As it turned out, a cooperative joint venture for corporate taxonomies was neither feasible nor necessary. In the first place, companies can license taxonomies from many sources including publishers, professional associations, and software vendors. In the second place, corporate information and the taxonomies used to organize it are viewed by most companies as key intellectual assets to be used for competitive advan-

Vital Stats

Vital Stats Head
secondary info

to come

Note:
Source:

tage (see "Your taxonomy is your future" www.montague.com/abstracts/future.html).

But the idea of collaborative taxonomy development is not dead. We are seeing it migrate from specialists at the enterprise core to generalists at the periphery, where local editors develop and share taxonomies within the context of specific business processes. We at the Montague Institute have developed a system of collaborative taxonomy building that illustrates the process and benefits of this system.

NEW KINDS OF QUESTIONS

We have noticed a shift in the kinds of questions our members are asking. Instead of questions about enterprise software or "selling" the taxonomy idea to business units, we now get inquiries about workgroup categorization tools, federated search, and taxonomy integration. While some members still want to learn the basics, others are more interested in how to integrate specialized organization schemes, help business unit managers prepare taxonomy budgets, incorporate taxonomies into applications, and improve the overall user experience.

This change in emphasis is a significant one. Instead of developing a corporate taxonomy and then trying to persuade authors and business unit managers to use it, it means helping departmental publishers refine, maintain, apply, and link their specialized organization schemes. In this context, "collaboration" means three different things:

- *A continuous improvement cycle through instructor/learner participation;*
- *A mentored learning process with collaborative problem solving; and*
- *Adding value through teamwork, both within workgroups and among business units.*

CONTINUOUS IMPROVEMENT CYCLE

At about the same time we began to notice this shift in emphasis, the Montague Institute switched from face-to-face taxonomy seminars to a distance learning format with a Web-based lab. As a result, learners moved from a passive absorption mode to an active problem-solving mode. What can be a dry, esoteric topic became compelling and even exciting for both instructor and learner. Not only were we teaching about collaborative taxonomy development, we were actually living it as we improved course content and tools based on participants' feedback.

Starting with a basic course in 2003, we added four more courses to accommodate new topics such as tagging and preparing content, topic maps, metadata architecture, and taxonomy integration. The lab, which began with basic contact management, content repository, and thesaurus functions, evolved even faster. One of the major software upgrades allowed participants to create two independent taxonomies and link them through cross references.

Learners are not the only beneficiaries. We include many of the additional features in our own internal systems and public Web sites. For example:

- *A Web log data extraction and import process to update our Top 20 Pages list;*
- *New attributes to extract specific information, such as a current listing of all our Digest items and Member Q&A articles;*
- *A semi-automated process to use search engine results to edit our controlled vocabularies;*
- *XML export of cross references from our thesaurus to make our search engine "smarter;" and*
- *Name authorities and topic map relationships to allow us to track who makes what and who works for whom.*

These innovations not only free our staff to do more creative work, but also make it easy to launch new services, such as our "Knowledge Base Editor's Digest."

MENTORED LEARNING PROCESS

In its current form, each course includes background reading, paper-and-pencil activities, and a hands-on lab project. We help participants develop a learning strategy appropriate to their schedule and objectives. Most people opt to jump right into a project, picking up the necessary concepts as they go along.

We find that participants spend most of their time defining needs and setting taxonomy boundaries. This phase often involves a period of "unlearning," especially if the person has some experience in indexing or library cataloging. Traditionally, indexing and cataloging are arms-length activities that begin with the content and occur long after the author completes the work.

Most business taxonomies, on the other hand, begin with a process, activity, or problem and focus on the user. Compare the two lists of human resources topics below:

[Insert two column list here. It needs to appear exactly here.]

START WITH THE USER

In the definition phase, we encourage

Content-oriented HR topics	Activity-oriented HR to
Benefits	New employee informatio
Forms	How to plan and report ness trip
Policies	Information for new paren
Training	How to plan for retiremen

course participants to put themselves in the user's shoes and imagine what events initiate the information retrieval process. Sometimes it takes several worksheet iterations and conference calls to get to a clear description of domain boundaries— i.e., the intersection of user needs, business context, and content.

The taxonomy that emerges from this exercise is often quite different from conventional organization schemes already in use, such as the Dewey Decimal System or a list of corporate departments. It reflects how people talk on the job, contains relatively few top categories or levels of detail, and is rich in cross references. Often, the new taxonomy reveals gaps in content— topics for which documents have not yet been written or areas that fall between the cracks in an organization chart.

Figure 1: Learning Lab data entry screen

MONTAGUE INSTITUTE REVIEW

[FIND]

[A] [B] [C] [D - E] [F - G - H] [I] [J - K] [L - M - N] [O - P - Q] [R - S] [T - Z]
[Subjects] [By date] [Organizations] [People] [Products/Services] [Member Q&A] [Home]

Subjects

applications
..... case studies
.... product companies
.... service companies
..... research and development
..... sales and marketing
knowledge base publishing
..... access & dissemination
..... authoring and editing
..... content management
..... organizing information
.... indexes
.... taxonomies
..... usability and user behavior
management tools and
techniques
..... knowledge management
..... information services
..... learning, education, and people
..... Member Q&A
..... personal knowledge management
..... reviews and surveys
..... trends and strategies
Montague Institute
research and searching
..... information sources
..... company information
..... competitive intelligence
..... research techniques
..... research tools

Index detail

product companies *see also* [case studies]

Documents for this term:

Taxonomies in action at Unilever Research
In this point-counterpoint article, Adrian Dale (formerly of Unilever) describes the company's approach to taxonomy development -- its tools, techniques, rationale, and results -- while Jean Graef of the Montague Institute offers her insights and comments. *Montague Institute Review* 3/7/2001

Re-deploying intellectual capital at Raytheon Texas Instruments
How Raytheon/Texas Instruments is fighting the not-invented-here syndrome with a special award and other incentives that encourage employees to share what they know. *Montague Institute Review* 3/1/1998

Judith Sayrs: Knowledge Consultant
At A. O. Smith, Judy Sayrs is developing such knowledge base building blocks as communities of practice, training for information gatekeepers, an intranet-based virtual library, and a knowledge map. *Montague Institute Review* 2/1/1998

Organizing information services for R&D
This article summarizes findings on research to see if new forms of organization can improve the quality of information services for R&D. *Montague Institute Review* 1/1/1998

Monsanto's knowledge editor
Like many companies involved in knowledge management, Monsanto is finding that it needs to define new roles. Here's the background on a new position called knowledge editor. *Montague Institute Review* 10/1/1997

Figure 2: Learning Lab navigation tools.

Digest Term Detail
Home | Search | Show All | Add | Go to Digest Documents | Go to Names

Created: 12/10/2004 **Updated:** 12/21/2004

ID: 5600

Term: taxonomies

UseID:

AuthID:

ClassCode: 2.4.2   Type:

Definition: Systems for naming and organizing things into groups that share similar characteristics.

ScopeNote:

[EDIT]   [DELETE]

Documents: Assign document Edit/Delete

Selling taxonomy: a blind alley?
NASA taxonomy: what is it and how do we use it?
Card sorting: a definitive guide

Related terms: Assign related term Edit/Delete
categorization
classification
faceted classification

Broader terms: Assign broader term Edit/Delete
organizing information

Narrower terms: Assign narrower term Edit/Delete
folk taxonomies

External queries: Create external query Edit/Delete

External terms: Assign external term Edit/Delete

Teamwork is easier when people get instant feedback. Changes made on the lab data entry screen (left) are immediately reflected in navigation tools (right).

Next, we show participants how to link conventional taxonomies to the new ones through a variety of methods. Cross-reference links to related topics ("Andersen Consulting" *see* "Accenture" or "blueprints" *see also* "architecture"); cross-cutting themes that reveal categories used in multiple contexts (gender issues, health and safety); and facets (geographic region, content type, industry) are attributes that help refine searches.

At some point during this process, the learner experiences a wonderful "aha" moment when it becomes clear that focusing taxonomy on their actual job makes that job easier; it isn't necessary to jettison the old to get the benefits of the new; it's possible to share terms, themes, and facets with other departments; and taxonomies can actually serve a strategic function, not just a one of productivity.

ADD VALUE THROUGH TEAMWORK

Collaborative taxonomy development can add value by increasing the productivity of both human and intellectual assets. Authors will take a little extra time to enter good metadata when they see how it minimizes research efforts and increases their visibility in the corporate community. Editors will suggest new terms and relationships when they see that finding illustrations, preparing glossaries, and compiling sidebar material takes less time.

Teamwork is easier when people get instant feedback, so we designed the system so that changes made on the lab data entry screen are immediately reflected in navigation tools. In addition, we include instructional modules on using search engines to edit vocabularies, importing categories into authoring programs, and capturing document metadata in personal libraries. We also recommend that groups consisting of a taxonomist, technologist, editor, and researcher take the courses as a team exercise.

LEVERAGING TAXONOMY DEVELOPMENT

But the big payoff comes when taxonomists collaborate to create synergies between departments or agencies. One of our course participants began her work with the intention of redesigning a Web site aimed at historians, museum directors, and other professional conservationists. As she worked through the definition process, she realized that much of the content on the conservationists' Web site also would appeal to teachers looking for field trip ideas and tourists planning itineraries. Her "aha" moment came when she realized that her work for a limited group of professionals could be leveraged to drive additional traffic to Web sites aimed at educators and tourists. In another case, a participant realized that she could circumvent the problem of a single, mandated topic hierarchy by using cross-cutting themes to unify taxonomies

targeted to two different groups of users.

The focus in corporate taxonomy development is shifting from a back-room, centralized activity which must be "sold" to reluctant managers to a decentralized collaborative effort focused on workgroup productivity. As this happens, information professionals have three important roles to play. The first is teaching and mentoring departmental editors in a continuous improvement cycle, either by developing their own training programs or licensing courses like the Montague Institute's hands-on lab. The second is working closely with IT to integrate taxonomy data into applications, through metadata repositories, application program interfaces (API's), and XML. The third focus is more strategic: filling in the gaps between business units by mapping or cross-referencing specialized taxonomies and showing the need for new kinds of content.

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