

Social Bookmarking in the Enterprise Michael D. Braly (mbraly@u.washington.edu) and Geoffrey B. Froh (geofff@u.washington.edu)

1. Overview

Findability on enterprise intranets has become an increasingly critical issue with the growth in both size and complexity of these information environments. To date, most solutions have focused on the construction of rich, domain-specific taxonomies and the development of sophisticated full-text search algorithms. The bottom-up distributed classification – collaborative "tagging" – systems that have emerged from popular

web sites such as del.icio.us and flickr.com present a novel approach. These applications explicitly leverage user participation and social network effects to create intriguing semantic spaces.



In this project, we investigated some of the issues of introducing a collaborative bookmarking system into an enterprise. Some of the questions examined are:

- Could tagging and sharing bookmarks be used to complement existing findability approaches within an enterprise?
- How can these new concepts be made both understandable and attractive to corporate stakeholders?

Another central outcome of the project was to gain insight into different approaches to the design of complex information systems. Though we began with the intent of using a standard software development life cycle (SDLC) model to modify an existing prototype, the project environment led us to explore both new development methodologies and novel design tools.

2. User Research

Research Goal

The goal of the user research component was to confirm our initial analysis of the stated business problem with employees, and next to understand the participants' view of tagging and bookmarking.

Methodology

The user research was divided into two phases. During the first, we conducted 35 on-line surveys. The sample was self-selected from a pool of 110 users via an internal distribution email list. The survey consisted of 23 multiple choice and free response questions.

During the second phase, we gathered more detailed qualitative information through 4 one-hour, semi-structured telephone interviews conducted with users selected from the survey pool.

User Survey Key Findings

1. Internal search is not effective.

- Less than 15% (N=5) felt that internal search returned useful results for most or all of their queries
- About 65% (N=23) had to revise their query most or all of the time with intranet search
- Nearly 90% (N=31) felt that their Internet search engine was more effective than intranet search

"I can never find anything in the intranet search engine, and end up having to poke around various pages, or calling someone and asking them to send me a link." - From **User Survey Comment**

2. Bookmarking is an important but problematic refindability strategy.

- 74.3% (N=26) bookmark regularly, and use a folder hierarchy for organization
- 57% (N=20) move bookmarks from one browser or one machine to another
- 77.1% (N=27) are familiar with social bookmarking services; 57% (N=20) are users of social bookmarking services

User Interview Key Findings

The user interviews showed users engaging in a complex set of different bookmarking behaviors, but also revealed a fundamental gap in understanding of the potential of social bookmarking. Users were storing bookmarks on del.icio.us as a convenient central repository for their personal use. We also found respondents using bookmarking tools as reference mechanisms for pointing others to resources and as RSS publishing platforms.

However, we found that none of the users were effectively integrating all of the benefits of social bookmarking. For example, most had not thought about del.icio.us as a tool for finding users with similar interests. Those who were "publishing" rarely examined any of the other system users' tags or bookmarks. One respondent who was a del.icio.us user was not even aware that their data was public, or that they shared tags with all other users of the system.



Most of the time Always

The Internet They are The Internet search engine is a search engine is much better about equa little bette



3. Social Bookmarking and Tagging Concepts

Anatomy of An SBS

Social Bookmarking Systems (SBS) are collaborative applications that allow users to save, access, share and describe shortcuts to web resources. Initially conceived as personal information management tools, they were designed to function as centralized



ple shows that SBS users indicate a shared concept of what resources are important by bookmarking them, and likewise, may have agreement that some terms are valid as tags. However, the system

4. Design Methodology Social Software and the SDLC

Social bookmarking systems (SBS) fall into an emerging category of web-based applications that are platforms for social interaction rather than structured software. The value in an SBS is in the information – the relationships between tags and resources as users bookmark. The system is defined as a relatively simple set of rules for interaction, and then grows organically over time.

This presents substantial challenges in the use of a software development life cycle model (SDLC) such as the modified waterfall. Traditional linear methodologies are not suited to applications where the usage patterns are not easily predictable. Development projects for new social software platforms must be able to shift design decisions quickly and iteratively based on real system usage.

5. Comic Concepts Communication

The goal at the beginning of a project is to reach common understanding of key concepts. People can often have multiple interpretations of artifacts such as use cases. Comics help communicate concepts that are difficult to explain in writing.

From the literature and user research, we defined a set of core concepts which we then translated into the initial series of three comics.







storage repositories to simplify the collection of bookmarks for users who browse the Internet with more than one machine in different locations. Later, systems such as the now archetypical del.icio.us added two key features: 1) description of bookmarks with arbitrary free keywords ("tagging"), and 2) sharing of bookmarks and tags across

In the diagram, we can see that User A and User B both share the tag "javascript" to describe Document 1 on the right. User A has also tagged Document 1 with "scripting." User B does not tag Document 1 with "scripting" but uses the term to tag Document 2. This simple examalso permits them to hold divergent views about semantic relationships between tags and bookmarks. Where these differences may exist, we can observe patterns emerging where there is agreement across users, tags and bookmarks.

The three central concepts in an SBS are resources, tags and users. The relationships between the elements create highly articulated network graph structures. By navigating ("pivoting") on any of the three axes, users can quickly discover affinities between tags, resources and other users.

Why Do Users Tag?

Researchers such as Rashmi Sinha (2005) have investigated the relative success of tagging over traditional user-driven indexing backed by controlled vocabularies. In Sinha's models of the two processes, the user's cognitive load is much less and the connection to their underlying mental model is much greater with tagging than with categorization.





1. Jane tags the vacation form

to find the 'Paid Time Off' form that is used to report vacation time used. Jane thinks about the form at a base level categories of "form" and "vacation."

2. Jane finds the vacation form

Jane, many months later, takes another vacation. She finds the 'Paid Time Off' form that she tagged after her last vacation months ago under the "vacation" tag.

3. Jane shares the vacation form

Jane's co-worker, Dick, returns from his vacation. Jane shares her "forms" tag URL with Dick so he can easily find the 'Paid Time Off' form to report his absence.



Jane returns from her vacation and attempts





This focus on the needs of a single user creates a framework for natural, simple participation that promotes adoption. Users may observe the tagging behavior of others, but are not constrained in their own behavior. The social value emerges from the network effects of aggregating individually motivated choices.

SBS Inside the Firewall

User identity - The current generation of Internet-based tagging systems employ an extremely simple identity model – a person is either a user or not a user. However, inside an enterprise it is possible to leverage identity services like LDAP and Active Directory to determine a user's role, physical location and project responsibilities. This creates an opportunity for much richer applications including expertise discovery and organic communities of practice.

Findability infrastructure - Enterprise information environments often contain sophisticated findability mechanisms such as taxonomies and full-text retrieval systems. Analysis of SBS data can reveal patterns of tag use that may suggest novel terms, semantic relationships that could augment existing controlled vocabularies, and heavily bookmarked resources.

Over the last year, several experiments with social bookmarking have been initiated in corporate intranets, most notably IBM's dogear system.

Taking A Step Back

(Adapted from Arrington, et al. 2006)

At the beginning of our project, we had an existing pre-prototype bookmarking system. Our task was to develop a set of recommendations for improving the user interface and functionality of the existing system. We laid out a simple project plan that included requirements gathering and analysis phases. We intended to model use cases, task flows, functional requirements, and wireframes of system interfaces.

However, as we began to modify our SDLC approach to fit the project we faced a dilemma. Our design process required meaningful user interaction with the system, but the user surveys and interviews revealed that there was a deficiency in understanding the three main concepts of tagging that needed to be addressed. Our users lacked even the most basic context to give us feedback on the design of the system. Kevin Cheng and Jane Jao's presentation entitled Communicating Con*cepts Through Comics* made us realize that we needed to take a step back from the system design and instead work towards communicating some of these key concepts to the users.

6. Next Steps

Short Term

- Launch end-user communication plan to develop critical mass
- Create Easy Tag Firefox Plug-in
- Revise prototype application UI
- Define and create additional comic concepts
- Continue to refine

Medium Term

- Begin manual integration of tag data into internal search tool
- Deploy workbench for statistical analysis
- Launch internal developer program
- Continue to refine

Long Term

- Enable automated integration of tag data into search
- Incorporate clustering and automated hierarchy algorithms
- Continue to refine

7. References

Arrington, Michael, et al. Rethinking IA. ASIS&T SIG-IA Information Architecture Summit 2006. 26 March 2006. Cheng, Kevin and Jane Jao. Communicating Concepts Through Comics. ASIS&T Information Architecture Summit 2006. Hyatt Regency, Vancouver, BC. 26 March 2006.

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Millen, David, et al. "Social bookmarking in the enterprise." ACM Queue. 3.9 (2005): 28-35.

Sinha, Rashimi. "A cognitive analysis of tagging." Retrieved 8 October 2005 from http://www.uzanto.com/2005/10/15/a- cognitive-analysis-of-tagging/>

Most of the references and resources we used for this project are available on the web through <http://del.icio.us/tag/imt595> and <http://www.citeulike.org/tag/imt595>