

Information Organization and Information Interaction in Social Tagging Sites: A Comparative Examination of Interface Features and Functionalities

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Abstract

The aim of this paper is to report on an investigation of information organization and information interaction issues in social tagging sites based on interface features and functionalities. The paper will provide a comparative examination of tag related features and functionalities in ten popular social tagging sites.

1. Introduction

Social tagging is one of several emerging technologies and associated activities that constitute Web 2.0, a term coined by O'Reilly and Battelle and discussed at O'Reilly's Web 2.0 conference in 2004 (No-tess, 2006). It is variously defined as an "emerging social environment that uses various tools to create, aggregate, and share dynamic content in ways that are more creative and interactive than transactions previously conducted on the Internet" (Connor, 2007). Social tagging, also commonly referred to as social bookmarking, is defined as

the classification of resources "by the use of informally assigned, user-defined keywords or tags" (Barnes, 2006; Barsky & Purdon, 2006).

There is a growing interest and enthusiasm in designing and developing socially enhanced systems and services on the web and the number of social tagging sites is increasing rapidly. These services offer an interesting opportunity for research. We are particularly interested in the two main aspects of social tagging sites, namely what type of user interaction model the designers of social tagging sites have in mind when develop these systems and how information is organized and presented to the user on the interface. Our particular focus is on the ways in which features and functionalities associated with tags have been designed.

The overarching objective of this research was to explore, identify and categorize interface features and functionalities that social tagging sites offer to allow users to create, contribute, explore and interact with content, particularly tags. The specific objectives of this research are:

- How do social tagging interface designers think of information organization as revealed by the analysis of user interfaces?
- What tag related features are implemented?
- What user information organization model do social tagging interface designers represent in their user interfaces?
- What features and facilities do the designers consider important or necessary to be on the site?

2. Methodology

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In a previous study of social tagging we identified a number of popular and widely used socially enhanced web services (Shiri, 2007). We selected 10 social bookmarking and social media sites for this study. Six of these sites are social bookmarking sites (Del.icio.us, Bakflip, Furl, Connotea, CitU-Like, Technocrati) and the other 4 are social media sites (Youtube, Flickr, MySpace TV, BubleShare). The selection of social tagging sites was based on the following criteria:

- they should be popular and widely used
- they should have social tagging features
- it was also decided that we should examine two types of social tagging sites, namely social bookmarking and social media to identify whether there are any specific tag related features for each type of the above social sites.

The data for this study was gathered in the Fall 2007. In order to examine, categorize and compare various tag related features and functionalities of the selected social sites we developed a general framework. Given the novelty and variety of social sites and the diversity of their approaches to design and implementation, we decided to take an evidence-based approach with a focus on tag related features. We were interested to investigate how the tag related features have been designed to allow users to contribute, interact with and explore content from an information organization perspective.

Four main categories were developed to examine the interface features and functionalities:

- User tagging features: this would include such features as the number of tags users are allowed to contribute, format of tags (multi-word etc.), tag notes, the ability to group similar tags etc.
- Exploration features: this will include such issues as to whether users can browse tags, browse the most popular or most recent tags, whether there are any system suggested tags, tag clouds or tag lists.
- Interface layout: How prevalently are tags displayed on the home page, How are different page views (tag pages, most recent, most popular, tag clouds, user account pages, posting history) organized for browsing
- Relation between type of content and tagging features provided: This includes such issues as how content type affects the tagging features offered and what are the recommended tagging features for certain types of content.
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3. Results

3.1 User tagging and tag browsing features

Table 1 shows the user tagging features found in the social tagging systems.

Table 2 shows tag browsing features such as tag clouds, RSS feeds etc.

3.2 Interface Design

Prevalence of Tags on the Home Page

The researchers were expecting that tags, as a valuable browsing and exploration tool, would be prominently displayed on

the home pages of most social software services. However, this was not always the case. Del.icio.us and Citeulike are clear winners in this category. Both homepages show a listing of recent content with all associated tags clearly displayed. In addition, Del.icio.us has featured tags while Citeulike displays a tag cloud of popular tags. In most cases, the home page echoes the priority of tagging functionality in the overall design of each service. Del.icio.us and Citeulike, which allow extensive browsing using tags, display them very prominently while YouTube, which focuses on categories over tags, makes them invisible.

Most sites devote a moderate level of homepage space to tag displays. Technorati has a small tag cloud nestled in the middle of the page. Backflip shows a few sample user directories (the closest equivalent to tags). MyspaceTV, although very close in design to Youtube, does show a few tags below each featured video on the home page. Bubbleshare displays photos from its "top tags" on the home page, but as mentioned earlier, these tags seem more like preset categories than user tagging.

There are a couple of exceptions. Furl's homepage has a concise page layout featuring the most popular content, but does not list the tags associated with that content, nor does it display a sidebar of popular tags (although most other pageviews on the site have this sidebar tag list). Similarly, Connotea has been designed to make extensive use of tags for browsing, but the home page shows very little evidence these features. The links to browsing features are relatively hidden away at the bottom of the page. Instead, the home page focuses more on being a promotional tool for gaining new users.

Flickr has a very attractive homepage that displays a recent photo determined to

have "interestingness", as well as a link to more recent photos, a featured tag associated with that photo, a link to the geotagging map, and a prominent Explore link at the bottom of the page leading to more tag browsing options. Although it does not display tags as prominently as Del.icio.us or Citeulike, it offers a clean interface while still retaining a reasonable amount of functionality for tag browsing.

Page View Organization and Ease of Browsing

One thing that the researchers initially noticed was the extreme complexity of these services in comparison to more traditional web sites. In some ways, social software breaks the hierarchical model on which many traditional information architecture principles are based, by flattening organizational structures to single, interconnected tags. Unlike the top-down "Favourite Links" pages and bookmarking systems of the past, content is no longer discretely placed in one category. Instead, social software services are dynamic systems that depend on user contribution and link sharing. Yet, they still need to maintain a balance between complexity and usability, something that is not easily done.

One of the most important factors to consider, then, in designing tagging systems is how to make effective use of page space, while still providing options for customizing or expanding browsing options. Fortunately, in the short time that social software has been around, some conventions have emerged regarding how to organize tag information on the page. The most common page layout is based on established information architecture and web usability principles: the main content citations are in the middle of the page, with browsing options in a sidebar on the left or right-hand side of the

page. Many tag lists tend to be placed on the right-hand side of the page, especially in the services that rely heavily on tags in their page design, like Del.icio.us, Furl, and Citeulike. Other sites like Technorati, Bubbleshare, Youtube, and MyspaceTV, when tags are available, often only list them in the citation of the item with which they were associated.

One difficult decision for social software designers is choosing the number of tags to display on a page. Offering tags is great for browsing, but offering too many tags may be overwhelming and cumbersome, especially for newer, less-experienced users. At the same time, however, very active browsers might prefer having more tags rather than less, and in that case, a lack of browsing choice would be just as detrimental. In general, the number of tags available on any given page varies widely among services. Del.icio.us's home page, as one positive example, is fairly easy to browse because it follows a rule of five: it lists five tags per item of content, as well as five "tags to watch", while still offering options for further browsing, either by viewing more popular or recently used tags or visiting the posting history for each item. This rule, however, is not applied consistently throughout the site. The "Most Popular" page has 45 tags listed on the right-hand side of the page and no tags in the main content citations, while the page display for single tags differs again, offering 11 related tags on the right hand side and several tags in the main content section.

Interestingly, although information architecture principles would suggest that displaying long lists of tags would be unmanageable and confusing, this organizational model was reflected in most social bookmarking sites. Furl and Connotea both used long tag lists on most page views, while Ci-

teulike, which is very close in design to Del.icio.us, arguably uses the available screen space more effectively by organizing its tags into a tag cloud, allowing for organization alphabetically as well as by popularity.

The researchers actually found that having more tags available for browsing is more valuable than less, and that, overall, tag clouds were the most useful tools for exploring content. In fact, the most troublesome problem found in most sites on the survey was the lack of consistency in page design. Often, the page organization and layout differed from one page to the next, leading to a jarring browsing experience. For example, many of Connotea's pages are quite different in terms of which tag lists are available on a particular page view as well as where they are located. As mentioned previously, Del.icio.us's home page actually differs quite significantly from the rest of the site in appearance, although the actual content remains very similar. Technorati, although very dynamic in terms of content, featuring tags, videos, music, comments and, of course, blog postings, is extremely inconsistent from page to page, being filled with disparate types of information that seem to change positions with each new page view. Overall, this kind of variance in design could end up being very confusing to any newcomer to the site. The most comfortable sites to browse were those like Citeulike that unfailingly followed the page layout conventions discussed above.

In a similar vein, the private views for personal account pages (when the user was logged in) were also the easiest to navigate when design was consistent with the public view of these account pages, as well as with the rest of the site. In Citeulike, for example, the private view of an account is identical to the public view, and clicking on the

title of an article brings up the additional editing features associated with private accounts. In Furl, however, the private and public account views are quite different, and surprisingly, the researchers found that the public view was actually easier to browse than the private view because of the hyper-linked topic names.

3.3 Relation between Type of Content and Tagging Features Provided

Importance of Tags to the Overall Design of the Service

From examining these services, it is quite clear that some sites have integrated tags into their services as browsing tools, while other sites use them to provide meta-data for searching content. This difference in implementation is obviously a conscious decision on the part of the designers. Some services like Del.icio.us, Citeulike, and Flickr have made tags visible for browsing on every single page, while others like Bubbleshare and Youtube almost never display them, instead using them primarily for searching and relying on other methods for browsing. Either implementation is fine, as long as there is coherence of purpose. If tags are used for browsing, make them available consistently throughout all parts of the site.

Relationship Between Type of Content and Tagging Features Offered

Although the number of sites covered in this survey is too small to infer solid relationships between type of content and tagging features offered, the researchers did notice that certain features do conceptually lend themselves to tagging certain types of content. The most obvious difference in functionality was between broad and narrow tagging. As mentioned in the first section,

broad tagging was uniformly offered among all social bookmarking sites (as well as Technorati) and narrow tagging was available the photo and video sites. The main difference between the two is that users of the former are tagging content that already exists (i.e. URLs and blog postings) and users of the latter are posting new content in addition to tagging it (digital photos and videos).

Beyond the broad/narrow distinction, another dichotomy emerged from the findings. Generally speaking, services whose primary goal was to allow users to organize their own material offered much more in terms of tagging features than sites whose main purpose was to allow users to make their own creations available to other users. Del.icio.us, as a bookmark manager, is primarily a personal tool to organize URLs, and as a result it requires advanced features to create and organize tags that are relevant to the user in order to be functional. Youtube, on the other hand, is primarily a tool for publishing new content, and not an organization tool. Therefore, tags (which by their nature are very subjective and personal) are required only for browsing and searching, and minimally at that.

The two photo services, Flickr and Bubbleshare, are exceptions and do not fit neatly into either category, because they tend to function as both a personal content organizer and as a method of publishing new content. Flickr, in particular, excels in not only allowing users to catalogue their personal photographs, but also in exposing those photographs to a wider audience. Although Bubbleshare's main objective seems to be to allow people to share photographs, it does have some organizational tools, which the researchers suspect were tacked on as an afterthought. Overall its

tagging and browsing features were ineffectual in comparison.

4. Discussion

This study investigated a select number of social tagging sites to explore how provisions for information organization and information interaction are incorporated into the interface design. Our general observation is that there is an emerging interface design paradigm with respect to social tagging sites which reflects a particular focus on exploratory search and browsing features and services. White et al. (2007) note that exploratory search systems capitalize on new technological capabilities and interface paradigms that facilitate an increased level of interaction with information. The social tagging sites examined encourage an increased level of personal and collaborative interaction which influences the way people create, organize, share, tag, and use resources on these sites. These sites offer users a rich environment for exploring tags, resources, groups, and communities. A closer examination of the interface features and facilities demonstrates that the evaluated social tagging services incorporate information organization as part of the user general interaction experience.

Information organization

The information organization model adopted by many social media and book marking sites is multidimensional, focusing on personal, collaborative and exploratory information creation and organization practices. Information organization in social tagging sites can be generally categorized as personal and collaborative along with a range of factors and features affecting the process.

Personal

The following categories of information provide a context for creating, organizing, using and sharing information.

- Tags
- Resources (e.g. photos, bookmarks, videos etc.)
- Notes, comments, recommendation

Collaborative

- Groups
- Communities

The following list summarizes some of the major factors affecting personal and collaborative information organization practices as revealed by the analysis of social tagging interface features.

- Popularity
- Frequency
- Credibility and authority
- Recency
- Relevance
- Similarity
- Rating
- Interestingness
- Co-occurrence

Users create, organize and share their information in a variety of ways using tags, notes, comments, recommendations and ratings. The factors listed above may affect users' understanding, judgment, use, sharing and organization of resources at various stages of their interaction with the service. For instance, for certain materials of interest users may find recency more important than other factors and as a result tend to create a tag and organize or reorganize a

resource immediately. Depending on the participation in a particular group or community, a user may well be interested in an exploratory search experience where there is no immediate information need. The user may be interested in similar or related items or the most popular items. This will lead to a different information organization practice where the user relies on the collaborative information resources and as a result her tagging experience will be greatly influenced by such factors as popularity or frequency. Another aspect of information organization relates to the tagging process. There are users who create or contribute resources and tag them for the first time. Other users may use previously assigned tags to inform their own tagging. Therefore, first timer taggers may influence the tagging behavior of later taggers.

There are also some contextual factors that may exert influence on the ways in which people organize their tags and resources. For instance, such contextual factors as time, location, types of user, emotional and affective aspects along with system generated context, for instance high level categories offered by the service may have an effect on users' information organization behavior.

Information Interaction

Information interaction in social tagging systems can be examined from a variety of perspectives. One perspective may be labeled as single vs. multiple interactions where one user interacts only with tags or interacts with tag groupings and the associated resources. Another perspective is to examine the extent to which users tap into the power of 'collaborative intelligence' and interact with similar, popular and co-occurring tags.

Some services offer separate interaction styles or interface features for each of these activities, while others provide a more seamless and integrated approach and provide the user with an opportunity to seamlessly interact with tags, tag groupings, resources, recommendations and ratings at the same time on the same interface.

Two general types of interaction style can be identified in social tagging sites, namely conceptual and visual. Conceptual interaction refers to users' interaction with and analysis and understanding of concepts inherent in tags, resources, comments and notes. Visual interaction implies the use of visual cues such as colour, size and layout of tags and tag grouping features. For instance, users tagging and tag reading is an example of conceptual interaction, whereas their interaction with a tag cloud or different tag sizes can be construed as visual interaction.

5. Conclusion

This study investigated ten social tagging systems from the perspectives of interface features, information organization and information interaction. The findings from this study indicate that social tagging systems provide a highly interactive and exploratory environment for users to experience personal and collaborative information interaction and information organization activities. Features that provide users with an opportunity to organize information are varied across the services. Some of these features include tag creation, tag grouping, personal tag listing, collaborative tag listing, assigning tags based on system provided hierarchies or categories. Conceptual and visual interaction styles were defined to provide an analy-

sis of social tagging interactive features. Future research will focus on the ways in which such contextual factors as popularity, recency, frequency and credibility may have an effect on users' personal information organization practices and activities. The results of this research contribute to number of areas: first of all to the design of new social tagging and bookmarking sites as it provides a comprehensive picture of the features and facilities used in different social tagging sites. Second, it provides a basis for designing information organization features in collaborative information spaces. Third, it provides a basis for research into contextual factors that affect information organization practices within the context of such emerging technologies as social tagging systems.

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APPENDIX

	Social Bookmarking Services						Photo & Video Sharing			
	Del.icio.us	Furl	Backflip	Connotea	Citeulike	Technorati	Flickr	Bubbleshare	Youtube	Myspace TV
a. Tagging Type	B	B	B	B	B	B	N	N	N	N
b. Number of Tags	>20	>20	1	>20	>20	>20	>20	>20	120 char.	64 char.
c. Multi-word Tags		Y	Y	Y		Y	Y			
d. Recommended Tags Offered	Y			Y	Y		Y		Y	Y
e. Tag Notes			Y	Y						
f. Search/Filter personal tags	Y	Y		Y	Y		Y			
g. Organize personal tags	Y		Lim.							
h. Batch editing of personal tags	Y		Y				Y	Lim.		
i. Preset categories						Y	Y	Y	Y	Y
j. Geotagging	Lim.			Lim.			Y			
k. Privacy Settings	Item	Tag	Tag	Item	Item	No	Item	Item	Item	Item

Table 1 – User Tagging Features

Table 1. User tagging features

	Social Bookmarking Services						Photo & Video Posting			
	Del.icio.us	Furl	Backflip*	Connotea	Citeulike	Technorati	Flickr	Bubbleshare	Youtube	Myspace TV
a. Browse by Tag	Y	Y	Lim.	Y	Y	Y	Y	Y	Lim.	Y
b. Browse Popular Tags	Y	Y		Y	Y	Y	Y	Y		
c. Browse Recent Tags	Y	Y		Y		Y	Y			
d. Browse Related Tags	Y			Y	Y	Y	Y			
e. Automatic grouping						?	Y	?		
f. Browse Featured Tags	Y		Lim.				Y			
g. Browse Users' tags	Y	Y	Y	Y	Y	Y	Y			
h. Tag clouds	Y			Y	Y	Y	Y			
i. Browse Posting History	Y	Lim.		Y	Lim.	Lim.	N/A	N/A	N/A	N/A
j. RSS feeds for tags	Y	Y		Y	Y	Y	Y			

Table 2 – Tag Browsing Features

Table 2. Tag browsing features