

Evaluating the Benefits of Social Annotation for Collaborative Search

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ABSTRACT

In this paper we present the results of a user study on the usage of social annotation features – sharing, rating, commenting and tagging – in collaborative search processes. Making use of our resource sharing system, LearnWeb2.0, our participants collaboratively searched for resources on a specific theme. The findings show that there is an imbalance between what users share and what they search for. Surprisingly, tagging is less popular than commenting. Further, the results suggest that the content aspect of searching should remain separate from the collaborative aspect of searching.

Categories and Subject Descriptors

H.5.3 Group and Organization Interfaces: Computer-supported cooperative work

General Terms

Design, Human Factors

Keywords

Social Annotation, Collaborative Search

1. INTRODUCTION

Web 2.0 tools promote different types of communication: one-to-one, one-to-many, or many-to-many, synchronous and asynchronous, and can be used to search, share and create different media: from text (Blogs and Wikis) to images in Flickr, audio, podcasting and video in YouTube. Other tools help learners filter and manage information (social bookmarking and RSS feeds), and selectively propagate information through social networks (Facebook). The use of these services provides new means through which to share knowledge, exchange ideas and publish work.

Currently, the most popular resource sharing systems focus only on certain types of content, and are closed, i.e. they do not provide a means of collecting and syndicating resources from other systems that makes it possible to carry out a task requiring resources from more than one of these systems. Most of the available tools support people in their search activity and search items in different tools, but do not support joint searching and resource sharing in a group working on a common task.

To address this, we have built a prototype system which syndicates multimedia resources from several Web 2.0 systems and the Web, which also provides functionalities that support collaboration within a group during searching for these resources.

In this paper, we present an exploratory study on how users employ social annotation tools during a collaborative search process. The study is designed to identify a) the benefits of these tools, how they are used separately and together, and b) which elements of collaborative searching still require better support.

2. BACKGROUND

A recent survey at a large U.S. technology company conducted by Morris [6] shows that a large proportion of users engage in searches that include collaborative activities. The study also shows that many tasks in both professional and casual settings benefit from the ability to jointly search and share resources with others.

Evans and Chi [4,5] discussed a model for understanding social searching, which distinguishes between different phases of collaborative searching including foraging, sense making and organizing as important aspects of this activity. They proposed several design suggestions to enhance collaboration during search, which mainly involved enhanced means of communication via email or instant messaging and the integration of social navigation support into the search results.

“SearchTogether” [7] supports synchronous searching where all the members of a group search simultaneously as well as asynchronous collaborations like reusing the result history. The most highly rated social annotation features in the interface are query histories, ratings and comments. Where a search is performed by a group of people sharing a single computer, devices like mobile phones or additional mice alleviate the process as shown with the example of the “CoSearch” system [2].

Many contemporary websites, varying from online communities to online stores, offer implicit social annotations as additional information to items, categories and products. Traditionally, this support is visualized as (star) ratings and comments. More recently, tagging has gained popularity as well. In contrast to the collaborative systems mentioned above, in these systems no explicit messages are exchanged by the users; rather than sending an email or instant message, the feedback is incorporated into the result listings.

All this suggests that social annotations features are considered important for collaborative search. However, in most studies on collaborative searching, the emphasis is on direct means of communication, via email or instant messaging.

3. DESCRIPTION OF LEARNWEB 2.0

Our prototype resource sharing system LearnWeb2.0 [1] provides several features designed to support collaborative group search and syndication of resources from different sources from ten

different Web 2.0 services such as *YouTube*, *SlideShare*, and *Blogger*. Its functionalities include

- a personal space offering access to, and an overview of, the entire set of resources distributed across various Web 2.0 repositories;
- sharing of queries and results through standing queries, where users are notified whenever a new learning resource matches the query;
- collaborative aggregation of different resources via an intuitive drag-and-drop interface;
- integration of the user's social networks from different Web 2.0 services (*Facebook*, *Delicious*, *Last.fm*, and *Flickr*);
- provision of a (controlled) natural language interface, which enables users to control access to shared resources.

The LearnWeb2.0 Web platform provides a uniform interface to search for resources that are distributed across the ten integrated Web 2.0 services. Users can bookmark resources and collaboratively organize these bookmarks in groups as depicted in Fig. 1.a, which shows a group of educational resources relating to "MSAccess".

Furthermore, with the LearnWeb2.0 browser plug-in (Fig. 1.b) users can simply drag-and-drop images, videos, text snippets, etc. from their desktop or from a website on the plug-in's icon to upload the resource to their favorite, appropriate Web 2.0 service and add it to LearnWeb2.0.

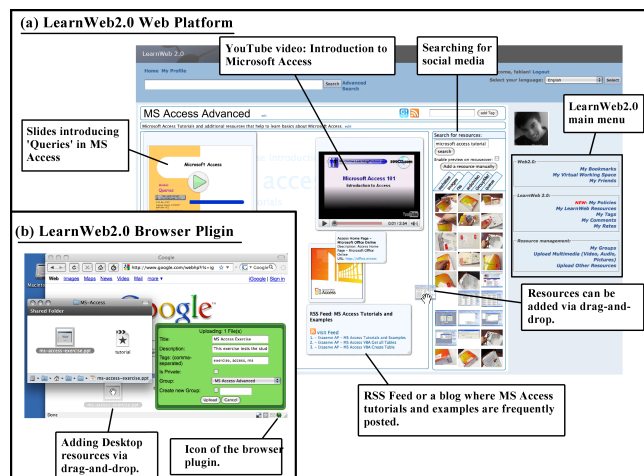


Figure 1 - (a) LearnWeb2.0 Web platform and (b) the LearnWeb2.0 browser plug-in, which allows resource upload via drag-and-drop.

4. EXPERIMENT AND EVALUATION

In our study we are specifically interested in the use of common social annotation tools for searching, syndicating and sharing resources, including media such as video, audio and images. Our goal is to identify typical interaction patterns, the way they use and benefit from user-added comments and ratings, and to what extent these elements contribute to social searching. In this section, we describe the research questions in more detail, together with the pool of participants, the procedure followed and the tasks used.

4.1 Research questions

Our study has addressed the following research questions:

1. In what situations is searching social media more useful than regular Web searching? We posit that social media are particularly useful for non-text material, such as videos, pictures and music. These resources are typically used for communication, presentation and learning rather than searching for information on personal matters.

2a. What group processes appear in collaborative searching? We expect to find evidence of foraging and sense-making processes, including selecting relevant results, discarding non-relevant results, evaluating results [4]. At this stage people may use rating and comments for foraging; grouping and tagging for sense-making.

2b. How important or prevalent are social notification services, including rating, grouping, tagging, comments. It would be interesting to know in what situations users choose meaningful but time-consuming methods (such as comments) and when they opt for less time-intensive methods such as rating.

3. How do people react to and take advantage of notifications of results and feedback from colleagues or collaborators? In other words, how does interaction change the classic search process and is it helpful?

4.2 Participants

For this preliminary study, we decided to recruit participants from our direct professional environment, so as not to exhaust resources for further experiments. The twenty-four participants come from two different institutions and have various backgrounds, all with an academic degree in areas varying from psychology to computer science. Most participants are technology-oriented and work in research. One group consisted of technical support staff. Nine participants are female.

In all probability, the results from this participant pool cannot be generalized to the current population of Web users. However, given the goal of our study, we think the participants' familiarity with Web 2.0 tools will provide better insights into the behavior of the 'generation of tomorrow'. Furthermore, given the design of the study, depth of analysis was deemed more important than quantity of data.

4.3 Procedure

As our aim is to observe interaction processes between people, we needed several people working together on a task. As LearnWeb2.0 is designed for collaborative tasks of longer duration, it does not explicitly support synchronous collaboration but rather asynchronous collaboration support by means of ratings, comments and tags. We designed our controlled study in such a way that group members took turns in using the system sequentially, so as to simulate asynchronous collaboration on a joint task over a longer period. Groups included three members each, and focused on a task interesting to them.

As an introduction to the platform, a short (4 minute) video introduction to LearnWeb2.0 was provided, and participants could also ask questions about the environment by email. The participants were told to use the platform for searching, storing and commenting/rating/etc resources, according to their information needs. As the purpose was to collaboratively create a

group of recommendations, they were encouraged to react to the search results and to the comments of the collaborating participants. The participants' interactions were logged server-side and participants were asked to fill out a questionnaire at the end of the study.

4.4 Tasks

Participants were grouped into groups of three in a semi-random fashion. Each member of a group knew the experimenter in person. We asked each group to collaboratively create a list or group of about 20-30 resources to help them with a specific question, which was of personal interest to the experimenter. The tasks were cross-verified for clarity, broadness in scope and concreteness. Example tasks include planning a business trip, preparing a seminar and recommendations for German pop music.

5. RESULTS AND DISCUSSION

In the first part of this section we discuss the outcomes of the questionnaire, which indicate an imbalance between what people share and what they actually search for. It also became apparent that comments and ratings are only secondary indicators of the importance or relevance of a resource. Based on these findings, we analyzed LearnWeb2.0's log files. The results of the log analysis confirm these findings. In addition, the log shows that tagging was rarely used.

5.1 Questionnaire

Motivated by our research questions, the questionnaire included ten questions on the use of Web 2.0 tools as well as on the specific LearnWeb2.0 functionalities designed to support collaboration. The questions were multiple-choice with the possibility to provide additional comments. In this section we discuss the main findings and interpretations of the questionnaires.

5.1.1 What Web 2.0 tools are used on a regular basis and for what purposes?

Participants provided between one and four (average 2.3) Web 2.0 tools that they *use on a regular basis*. Of these tools, the video sharing site YouTube was mentioned by almost all participants, followed by the social networking site Facebook, which was listed in 57% of the cases. Media sharing sites, such as Flickr and Last.fm were mentioned by a quarter of the participants. Surprisingly, bookmarking sites, such as Delicious, were mentioned only once, which suggests a strong focus on media – in particular video and audio – and widespread interest in music.

By contrast, the *main purpose* of using Web 2.0 tools, as indicated by the participants, is 'connecting with friends' (61%), followed by 'watching videos' (42%). Several participants used the words 'entertainment' and 'just for fun' as the main reasons for using Web 2.0 tools; when they indicated that they were looking for information, typically terms like 'what's new' and 'cool stuff' were used.

Only a small subgroup of the participants (19%) mentioned 'sharing' as a reason for using Web 2.0 tools. When they did so, they explicitly said that it was pictures that they shared.

5.1.2 How do people interact with Web 2.0 tools and what is the role of user-added ratings and comments?

Half of the participants indicated that they exclusively used keyword searching to find resources. In addition, listings of new or recommended items were considered useful. Only one participant mentioned browsing as her main way of interacting – further analysis showed that she used Twitter to keep informed about events in her main area of interests.

We asked the participants which item (if any) recommended by others they found most interesting and how they were led to visit this item. Interestingly, the vast majority were encouraged to do so by the item title or description; comments or tags were only considered as a secondary trigger and ratings were not mentioned at all.

On the question of how they shared resources with their collaborators, 71% of the participants responded that they wrote a comment or just bookmarked it. Light-weight mechanisms such as *rating* and *tagging* were far less popular. This result is in keeping with the way our participants made use of resources recommended by others.

5.1.3 Interpretation of the results

The questionnaire reveals that Web 2.0 tools are mainly used for *using* (or rather *consuming*) media rather than sharing resources. In particular, users are primarily searching for videos and other popular media – *music* appeared to be the main category, together with resources that are *fun*, *cool* or *new*. In combination with the importance of *connecting with friends* it becomes clear that Web 2.0 is considered to be mainly a platform for entertainment. One comment was 'I used Facebook but it got boring' and a similar comment from another participant suggests that sharing and consuming resources without a concrete goal does not exploit Web 2.0's full potential.

Even though, in general, our participants do not search for images in social media, the main category of items they shared were images. This indicates an imbalance between what people need or want (videos, entertainment) and what they actually share (images) – somewhat similar to the imbalance between tagging and searching using different tag categories which we observed in [3]. Based on this result, we posit that most people mainly *share* resources related to their personal life (events such as birthday parties and holidays), but mainly *need* resources that are not personal in nature. This implies that Web 2.0 tools, as used now, do not explicitly support asynchronous collaborative social media searching, and that additional support is needed for these group processes.

In our experiment, the participants asynchronously shared resources by adding them to shared groups. Whereas they notified one another when they had gathered new resources, the majority ignored the resources recommended by others; and in the rare cases that they did visit these resources, they were mainly triggered by their titles or descriptions; user-added comments were only used as a secondary indicator, even though the participants in a group knew each other on a personal basis. This indicates that the means for collaborative search should put more emphasis on the item *content* (similar to regular Web search) rather than on the item *ratings and comments* – even though users prefer to write extensive comments rather than simply rating or tagging an item.

An important conclusion that can be drawn from the above is that the indirect feedback (ratings, comments, tags) of social media does not sufficiently stimulate and support group processes, even though, in principle, they are a more suitable means than exchanging lists of emails with links and comments.

5.2 Log Based Analysis

The analysis of the LearnWeb2.0 data set revealed further interesting results. Overall, the participants bookmarked 146 resources, which they organized within their groups. Four teams added all their resources into a single group while the other teams used 2-7 groups to structure them.

As depicted in Figure 2, the teams mainly gathered multimedia resources: 51% of the bookmarked resources were video or audio resources (including slides from SlideShare), followed by Web sites (33%), images (12%) and other documents (4%) such as PDF and PPT files. This finding supports the results from the questionnaire, from which the prevalence of video and audio has become apparent.

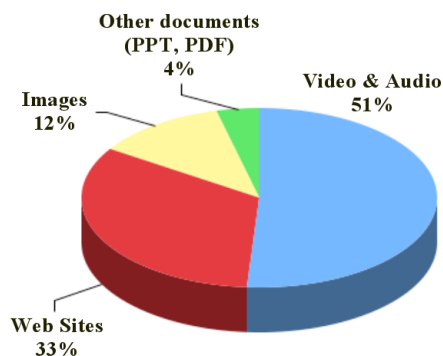


Figure 2 - Media types of the discovered resources.

All teams took advantage of LearnWeb2.0's search functionality, which bundles different types of search results (videos, images, etc.) from the social media services, as well as the grouping feature, which enables users to group together resources relating to different media types. Based on these features, the participants collaboratively created multimedia-based resource collections related to their tasks.

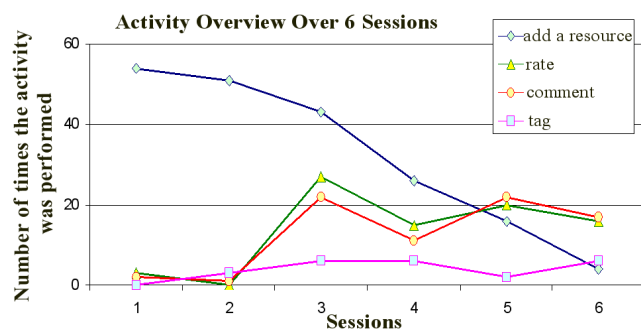


Figure 3 - Collaborative Search: Number of resources added /rated/commented/tagged per search session (search sessions 1/4, 2/5, and 3/6 were performed by the same user).

Figure 3 gives some insights on how the participants collaborated to search for resources relevant to their themes. As explained in the previous section, there were two rounds in which team members searched in turn. Whereas the number of activities per

session is more or less constant, the distribution of the actions is different. In the second half of the session, commenting and rating actions were more prevalent, but less new resources were added to the collection. As the numbers of ratings and comments follow the same pattern, it appears that the participants often provided both a rating and a comment to a resource.

A further observation from Figure 3 is that in the second round of the study (after Search Session 3) the participants were more active in giving feedback to the resources that had already been added to the collection. For example, around 60% of the ratings and comments were added in the second round. By contrast, tagging was only rarely used.

6. CONCLUSIONS AND FUTURE WORK

In this paper we have presented the results of an exploratory controlled study on the use of social annotation features for collaborative search, based on a combined analysis of survey results and log data.

A first finding is that there is an imbalance between what users search for and what they actually share: users typically share files, often images, that are important for them personally; but usually search for media, video and audio, that is of common interest.

A second finding is that social annotations are only considered as secondary relevance indicators for search results: title and description are viewed as more important. When sharing, users preferred writing comments to light-weight mechanisms such as tagging. As tags are known to be useful for enhancing keyword-based searching, means for automatically tagging need to be devised.

In general, our results indicate that collaborative search requires direct communication to be integrated into the system. Current social annotation techniques *do* enhance result listings, but do not support interaction between group members *sufficiently*. Moreover, as users mainly focus on the contents of the search results, it would be better if group communication were presented separately from the search results.

7. REFERENCES

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