Activities, Bluemail, & CoScripter:
Sharing and Reusing Work in the Enterprise

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ABSTRACT

In our research, we seek to use Web 2.0 technologies to bolster the sharing and reuse of work in the workplace. To this end, we have developed, deployed, and studied three such applications among employees at IBM: Activities (an activity-centric collaboration space), CoScripter (an end-user-programming tool for creating and sharing procedural scripts), and bluemail (an email research prototype used to study new email features in the enterprise). In this paper, we present our current research related to studying the use of each application, including initial lessons learned for research on Web 2.0 technologies in the enterprise.

Author Keywords

Office, Workplace, Web 2.0, Collaboration, Knowledge sharing, Social networking, Tagging

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

The Internet has enabled researchers to quickly deploy and gather feedback on new technologies from huge numbers of people. Researchers in large companies have a relatively unique opportunity to study wide deployments of web-based technologies among their workplace populations. Furthermore, they have the opportunity to segment their user population along specialized dimensions of interest, like geography, job role, etc. to identify patterns specific to a particular dimension (e.g., segmenting email users by geography for a study [8]). This enables experimentation to understand whether the Web 2.0 technologies that are so successful among general Internet users can be useful and effective in the workplace. A number of studies of Web 2.0 technologies in the workplace have shown that they can help workers find and share expertise [1,4], resources [5], and knowledge [4]. In our research, we seek to use Web 2.0 technologies to bolster the sharing and reuse of work in the workplace. To this end, we have developed, deployed, and studied three such applications among employees at IBM: Activities (an activity-centric collaboration space), CoScripter (an end-user-programming tool for creating and sharing procedural scripts), and bluemail (an email research prototype used to study new email features in the enterprise). In this paper, we present our current research related to studying the use of each application, including initial lessons learned for research on Web 2.0 technologies in the enterprise.

ACTIVITIES

Activity-centric computing systems seek to address the fragmentation of office work across tools and documents by allowing users to organize work around their purposeful activities. Activities is a web-based application that uses the construct of an "activity" to aggregate the people, resources, and tools involved in achieving a particular goal. An activity in the system is described by a title, a set of tags, and an optional due date. Each activity has a list of members and contains entries, optionally organized into sections. Within an Activity, users can add various types of entries: basic text posts, to-dos, and threads of comments. Any entry can have attachments, links, and tags.

Activities has been widely deployed in IBM for over two years and used by 32,000 workers in multiple countries. A total of 38,719 Activities (containing at least one entry) have been created since 2006. We conducted a study of 15 knowledge workers who have appropriated *Activities* to organize, manage, and carry out their everyday work [11]. Our studies have revealed a surprisingly common pattern of use: reusing and sharing processes, organizational structures, and informational resources stored or encoded in system-activities. Reuse of system activities has saved time and effort for users, and sharing has enabled workers to educate others about particular business activities.

Activities enables reuse of any system activity by saving it as an activity template. In creating a new system activity, a user has the option to start from a template. This new activity will have the structure and content, but not the member list of the parent template.

We observed two patterns of use across multiple participants for reusing or sharing work: managing sets of identical *work units* created by templates and creating *tutorials* to teach others.

Managing Sets of Work Units

The most common reuse pattern was characterized by a set of identically-structured Activities for performing an aspect of work. A system activity of this pattern represented a *unit of work* for which the user is responsible (e.g., a customer account, a software version, a sales plan). It was used to track status and store content for each active unit. This was a common pattern for 12 out of 15 participants. Each user had multiple units of the *same type* active at once, and they structured each unit as a separate system activity.

The most common strategy users employed to create work units was to design a template to formalize the structure and process for a single unit. Because the work units were persistent structures to which users referred often, they were willing to spend more time organizing and tagging the information. Tags were a primary tool used for finding content and creating custom, filtered views of content.

Transferring process knowledge to others was a major advantage users cited for this unit of work pattern. Participants appreciated that Activities not only showed the final outcome to new members, but also the *process of doing the activity* by saving to-dos, intermediate drafts, and comments, as one noted:

> *I had to show her how to properly do the [customer report]... I just pointed her to the Activity... I didn't have to do a lot of explaining of the [customer report] process. It was all kind of self-explaining.*

Creating Tutorials

A second common pattern we observed focused on knowledge sharing: ten participants created tutorials, or system activities created explicitly to guide other users. We saw two types of tutorials: those intended to be read for educational purposes, and those intended to be copied to guide users through a process. The most common strategy for creating a new tutorial was copying a successful, completed Activity, a distinct advantage of using a tool aimed at supporting business activities for sharing. Another strategy was reproducing the steps in existing policy guides or paper checklists as a template.

Tutorials created as templates provided an advantage over static guides or paper checklists: they could be used to create an independent Activity and tailored to the needs of the user carrying it out, as noted by one participant:

> *I wanted to give people the freedom to change [their Activity]... and let people have more control over it. I've found in the past, working with other people's content, that I may want to radically re-do it.*

Authors publicized their tutorials by posting links to them on wikis, blogs, and other resources that were indexed for search across the enterprise. Email from thankful users is currently the only way authors know their tutorials are useful to others.

Transferring Web 2.0 into the Enterprise

Activities usage reveals a promising application of Web 2.0 technologies in the enterprise. System activities represent a record of *doing an activity* that can be educational for others. Activities lowered the overhead of creating sharable content, as it was created in the process of doing work. While users clearly wanted to reuse and share their work, our current set of features provided minimal support—Web 2.0 technologies to improve social networking, search, and incentives for authors to create content could be applied with great success.

Our study made it apparent that users had come to expect Web 2.0 technologies in our company's Web applications. They made heavy use of tags to help them find and filter the content in their system activities. To compensate for the lack of discoverability in Activities, they used other Web 2.0 technologies to advertise their tutorials. In future work, we plan to incorporate such technologies and study their use. Better search is a first priority. Social networking features could also be used to promote reusable or educational content; e.g., a user might see content created or used by others with their job role, with the same manager, or whom they had "friended" using other company social networking tools. Furthermore, creators need incentives to share their reusable or educational content. This can be done by providing usage statistics to and rewarding the efforts of contributors (e.g., points have been shown to be effective incentives for enterprise social networking activities [1]).

COSCRIPTER

CoScripter is an end-user-programming tool for automating web processes [5]. Processes can be recorded on any website using the CoScripter Firefox sidebar plugin, and saved and shared on the CoScripter wiki. Scripts can then be run many times by any users via the CoScripter sidebar. A script could automate any web-based process, e.g., completing a company-mandated reimbursement form or entering an IT helpdesk ticket. CoScripter has been used to create 307 scripts. Of the 1200 users who registered, 601 went on to try out the system. A smaller subset of those became regular users, either recently or in the past. Bolstering adoption of inactive users is one of our main goals moving forward.

One of CoScripter's main purposes is to support sharing of how-to knowledge. Our usage logs imply that sharing is already relatively common: 24% of 307 user-created scripts were run by two or more different users, and 5% were run by six or more users. Twelve scripts were run by more than ten different users, and an initial examination of these scripts reveals that they all automate common business processes within our company (e.g., updating emergency

contact info). People often run scripts created by others: 465 (78%) of the user population ran scripts they did not create, running 2.3 scripts created by others on average.

In our current research, we hope to improve adoption by implementing various Web 2.0 collaborative features. Several features have already been implemented—editing others' scripts, end-user rating of scripts, tagging of scripts, and free-form comments added to scripts. However, our logs reveal surprisingly little use of these collaborative features: fewer than 10% of the scripts were edited by others, rated, tagged, or commented on. Learning from our currently deployed features and interviews with users, we are exploring the use of social network activity to recommend scripts with the goal of bolstering script sharing. We hope to report soon on whether our additional social networking features increase knowledge sharing with CoScripter.

BLUEMAIL

Email continues to be a widely used computer tool, especially in the workplace, where it has long been a mission critical application. In over twenty years of studying email [6], researchers have documented the "email pain" of keeping up with email and identified design implications for easing these pain-points. Though new features, such as message flagging and threading, have been introduced, managing email continues to be a time consuming, challenging task for users.

Bluemail is an email research prototype for studying new email features in the enterprise. It currently offers a combination of conversation threading, message foldering, and message tagging. We deployed bluemail within IBM for over eight months, and used it to collect data from 10,890 users in 64 countries on current email practice. We also evaluated how people used bluemail's threading, foldering, and tagging features by collecting more detailed data from over 2100 users and interviewing 32 early adopters [10].

Our study revealed that most users liked threading and continued to use email folders, but only a small percentage began using tagging. A number of our interviewees said they simply had not gotten around to trying it yet. But what if it were easier or even effortless to add tags to messages?

We are currently exploring new ways to incorporate tagging into enterprise email. Our first features included surfacing tagging features in Lotus Notes (the company's email client) as well as in bluemail; and enabling users to add tags as they composed a message and propagating those tags to all replies to the message.

These two tagging features were deployed in June 2008 and we have been able to collect two months of usage data. Our data logging has shown that while these changes may have enabled more users to discover tagging, it has resulted in only a small growth in the use of tagging. While these minor changes were relatively easy to implement, they did not stimulate more widespread tagging usage, leading us to explore further experimentation with tagging.

We have developed an interface for suggesting tags for a message to make it easier for users to apply tags. We are experimenting with a few different tag suggestion sources:

- Suggestions based on analyzing the text of the message for semantic categories.
- Social suggestions based on tags that the sender and other recipients of the message have applied to it.

We are in the process of deploying these auto- and social-tagging features and look forward to monitoring its usage to see if it stimulates more tagging. Social-tagging is particularly interesting to us since it could enable users to share the load of managing email.

CONCLUSION

In our research, we have learned that workers have a need for work reuse and sharing and are interested in using web-based applications to do so. Activities users exhibited this desire most strongly, reusing "work unit" templates and sharing knowledge through tutorials. CoScripter users created scripts that were often shared and expressed a desire for more widespread sharing; thus, we are experimenting with social networking features to support this. Though simple tagging has not been adopted by bluemail users, we are experimenting with social-tagging in bluemail, which has the potential for easing email pain by enabling users to share the load of managing email.

Another observation made in the course of our work is that workers have come to expect Web 2.0 technologies in corporate web applications, such as quick and easy sharing, social organization mechanisms like tags, and excellent search. For example, Activities users, missing technologies for finding and sharing content, have developed work-arounds (like using a blog to promote tutorials).

In the future, we are excited to continue experimenting with new features that will better enable users of Activities, CoScripter, and bluemail to reuse and share work. We also hope to utilize a unique advantage the enterprise offers for studying web-based technologies: standard information is available about each user and research can focus on specific attributes of interest (e.g., specific job roles, geographies, etc.). This can be much harder in the consumer realm, where researchers have little to no info about the users. We have begun to investigate usage differences among different user populations [9], and plan to expand this line of exploration in the future.

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