

IBM Research Report

Multiple Users' Perspectives of Collaborative Activities in Complex Work

Michael J. Muller, Michael Wu
IBM Research Division
One Rogers Street
Cambridge, MA 02142



Research Division
Almaden - Austin - Beijing - Haifa - India - T. J. Watson - Tokyo - Zurich

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Michael J. Muller and Michael Wu*

IBM Research

One Rogers Street, Cambridge MA USA 02142

michael_muller@us.ibm.com and mchi@dgp.toronto.edu

+1 617 693 4235 and +1 416 946 8874

ABSTRACT

Earlier, we extended the concept of landmarks in complex collaborative work to include not only online documents, but also people, roles, events, and systems [12]. We used participatory analysis to obtain these insights into users' practices. In this position paper, we report on a further analysis of landmarks, with an enhanced form of participatory analysis. We focus on the diversity of individuals' perspectives on these "common" work items, and begin to investigate how well one collaborator understands the perspectives of the other collaborators.

INTRODUCTION

We have been engaged for several years in the study of how people plan, perform, refine, and re-use shared activities in complex working environments [8]. Our studies have taken the form of ethnographies [12], activity logging [9], interviews with knowledge workers [7], initial investigations of use [11], and examination of specific hypotheses regarding activities in use [6]. Our goal is to help groups or teams of collaborators manage their shared work more effectively, both through enhanced collaboration amongst themselves, and through improved integration with larger-scale corporate business processes.

Part of this work was ethnographic analyses of how complex work is actually accomplished. We began these studies with an investigation of how people collaborate in the organizational practices around receiving a Request For Proposals (RFP) and in Proposal Writing (PW) in response to that request, using the CARD method for participatory analysis and design [10]. These analyses produced accounts of propose writing as in Figure 1, which shows an example of a sequence of shared activities reported by an informant from one of the five sites that we visited.

We noticed that people tended to use certain entities to structure their narratives of their work. We used the concept of "landmarks" to describe these entities. In contrast to the more individualistic studies of navigation in online spaces (e.g., [1, 2, 3]), we found five categories of landmarks that were repeatedly mentioned in our informants' accounts of how they navigated the *shared* work environments in their collaboration to produce proposals in response to RFPs:

- **Documents** – Not only the RFP and the proposal itself, but also intermediary drafts, "boilerplate" text of old proposals that served as source text for the new proposal, and so on.

* Current address: University of Toronto, 40 St George St. BA5167, Toronto ON Canada M5S2E4, mchi@dgp.toronto.edu.



Figure 1. CARD poster of Proposal Writing process, overlaid with activity descriptions.

- **Dates and Calendars** – Not only the start date and end date of a project, but also internal working dates with suggestive relationships to formal, external dates.
- **Events** – Certain meetings became articulation points in the life of a project. The strongest example was the "kick-off" meeting (in these US organizations): Before the kick-off meeting, there was no project; after the kick-off meeting, members of the team knew who was on the team, and what each person's responsibilities were.
- **Roles and Persons** – Collaborators often oriented their work with respect to other people – either as named individuals, or as roles on teams or in the organization. Examples included named experts, officers of their organization (only officers had approval authority) or team leads proposal writers.
- **Systems and Databases** – Collaborators also oriented toward specific systems or databases at specific points in their shared work. Examples included content management systems (e.g., for storing the RFP and the drafts of the proposal), archival databases of previous proposals whose text could be re-used, but also customer relationship management repositories and similar work aids.

We described these five types of landmarks as aids in the collaborative navigation of the complex world of responding to an RFP with a written proposal. We note carefully that our use of the phrase "collaborative navigation" is intended more broadly and

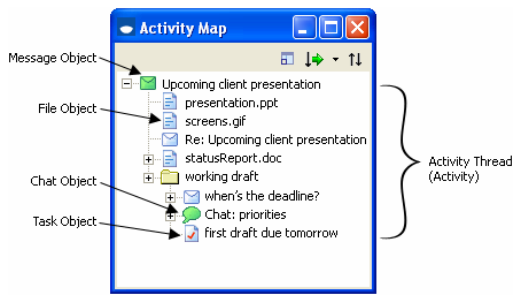


Figure 2. Activity Thread from ActivityExplorer.

more descriptively than the earlier usage of the phrase “social navigation,” which is generally interpreted to mean recommendations of objects or artifacts that are based on similarities among persons (e.g., [13]).

SHARED LANDMARKS IN DIVERSE COLLABORATIVE ACTIVITIES

Shared landmarks appeared to be a powerful concept. But would that concept generalize from the domain of RFPs and proposal-writing, to other domains? Would the landmarks that we had discovered in our original domain be stable in other domains? And would all collaborators agree on the same set of landmarks? We conducted a second series of investigations to answer these questions.

Refining the Participatory Analysis

We modified the participatory analysis process from [10, 12] to focus more closely on the types of collaborative objects that had proved useful in our research into the ActivityExplorer (AE) prototype [11], which has been included as a feature in the IBM®

Workplace™ Collaboration Services product (Figure 2) [5]. We replaced the card-like representations of actions and artifacts, with single-line representations of the six types of objects, similar to the UI components in the ActivityExplorer environment (Figure 3).

We began with the six object types in the AE research prototype, namely messages, files, persistent chats, shared screens, tasks, and folders. We asked our informants to create a tree-structured collection of these objects to represent the work that they were describing (Figure 3A). Informants and researchers together chose the objects and wrote descriptive information on each object. When the informant was satisfied with the activity description, we asked her/him to indicate which objects might be landmarks for the informant and for other collaborators (Figure 3B). In analysis, we transcribed and coded these descriptions (Figure 4).

Choosing New Sites

We wanted to test the generality of the landmarks concept in sites and activities outside of the original RFP and proposal-writing tasks and organizations of our 2004 research. We therefore sampled a broader range of activities in a greater diversity of sites, including the following: IBM product groups, IBM consultants, IBM researchers, and external non-profit organizations. In general, we looked for a mix of formal and informal work, and we focused on sequences of actions that were *recurrent with variation*. The *recurrence* was important, because it suggested that some online support might help with these activities – either to make them easier to do again and again, or to preserve and transmit knowledge from an expert to a new practitioner. The *variation* was important because there are already many workflow solutions for routine, repeatable action sequences (see, e.g., Dourish’s discussion of workflow as a problem for CSCW [4]), and we wanted to look at situations in which there was too much

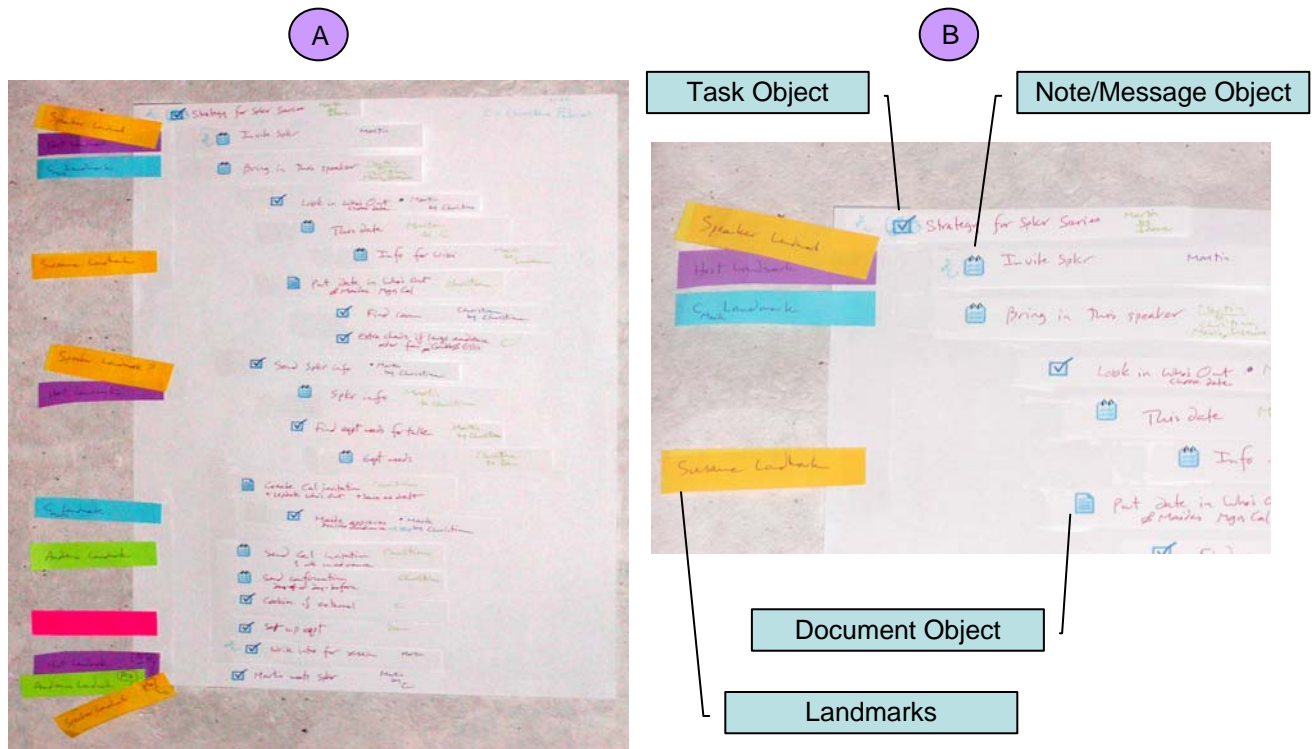


Figure 3. Example of participatory analysis from one collaborator. A. A page-long description of a collaborative process. B. Detail of analytic categories and materials. Note particularly the colored flags on the left side of the page: These represent landmarks, and each color is associated with a different collaborator.

variation for conventional workflow solutions to be of use.

PRELIMINARY RESULTS AND INTERPRETATIONS

This research is in progress. So far, we have interviewed 15 people at nine sites, with multiple perspectives gathered at three of those sites. In this brief report, we will focus on what we have learned about landmarks. We will defer until a subsequent paper a discussion of the new objects and new relationships among objects that our participants and we have found.

In the brief space of this position paper, we will focus on a single, representative case. Figure 4 shows our coding of two views of the same activity, namely the activity of inviting a speaker to make a presentation.¹ The principal events as narrated and inscribed by each informant appear in the Title column, with explanatory notes to the left. Each event was characterized, during the session, as one of the six types of AE objects (messages, files, persistent chats, shared screens, tasks, and folders). At the conclusion of the narration, we asked each informant to indicate which events had special significance (landmarks), and for whom.

What is a Landmark?

In [12], we proposed five types of landmarks: Documents, dates, events, persons/roles, and systems. In the case of inviting a speaker, the landmark label was applied mostly to messages or emails (Indices 1.1, 1.2.1.1.1, 1.5, 2.3.5), tasks (Indices 1, 1.2.4, 1.3.1, 1.8, 1.10, 2.1, 2.2, 2.3), with one task also involving a calendar document (Index 2.2), and of course the event itself (Index 2.5). Interesting, the event itself does not appear in the Administrative Assistant's account, because that work sequence was completed (from that person's perspective) before the actual event. By contrast, the Manager attended each presentation, so the Manager's account does include the event as a landmark.

Other cases (not presented in this position paper) largely contained the same types of landmarks, in some cases with a greater emphasis on documents and some accesses to simple shared databases (systems). Together, these results support four of the five categories of landmarks that we described in our previous paper [12]. What happened to the category of persons/roles? The AE environment and materials does not provide a user interface component that represents a person as such. We asked about landmark status only for the objects in our analysis, and we therefore did not support a discussion of persons or roles as landmarks. In later phases of this research, we may change our methodology to include a discussion of persons and roles as implied by their indirect relationships with landmark objects. Or we may create a post-narrative summary of persons and roles that were mentioned in the narrative, and analyze in that context.

"Sharableness" of Landmarks

We also wanted to know whether each landmark was shared by all members of an activity – i.e., for a "common" activity, are the landmarks also "common," or do they depend upon perspective? We have already noted the absence of the event in the account of Administrative Assistant. Numerous lesser examples of different views were also found – e.g., Ad did not consider the selection of a date for the event to be a landmark (Indices 1.2.1.1 et seq.), but Mg did (Index 2.2). More substantively, Mg described the preparation of the announcement of the talk as a single task (Index

2.3.6), whereas Ad's account of how this work gets done involves multiple steps (Indices 1.2.4-1.3). Further analysis of this and other cases will help us to know how significant these differences in perspective are.

Other Observations

We also noted that the assignment of tasks did not map to rank in the organization. Ad was lowest ranked member of this activity, yet, of the YY tasks that were not self-assigned (e.g., "order cookies", $n=8$), 5 (83%) were assignments by Ad to people who had a higher position. We found similar rank-independent assignments in other cases.

CONCLUSION

These participatory analyses are helping us to understand issues of theory (landmarks and other representations) and practice (product features). Our next steps with activity-centric collaboration will be to combine these representational understandings with more traditional ethnographic investigations (currently under way) into collaborative activity management.

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¹ In the case in Figure 4, we collected a total of five different views on the shared activity. For brevity, we show portions of only two accounts in Figure 4.

Ad's View

Index	Landmark	Object type	Title	Notes
1	Sp, Ho	Task	Strategy for Speaker Series	Ho to self <i>Invisible to Ad</i>
1.1	Ad, Mg	Email	Invite Speaker	Ho & Sp <i>Invisible to Ad</i>
1.2		Email	Bring in this Speaker	Ho to Ad, Mg, Te
1.2.1		Doc/DBI	Look in DB to choose date	Ad assigns to Ho
1.2.1.1		Email	I chose this date	Ho
1.2.1.1.1	Te	Email	Information for the Wiki	Ad to Te
1.2.2		Doc	Put date into Schedule	Ad
1.2.3		Doc	Put date into Manager's Calendar	Mg
1.2.3.1		Task	Find a room for the talk	Ad to self
1.2.3.2		Task	Order extra chairs if large audience expected	Ad to self
1.2.4	Ho, Sp?	Task	Send Speaker information	Ad assigns to Ho
1.2.4.1		Email	Speaker information	Ho to Ad
1.2.4.2		Task	Find out equipment needs for speaker	Ad assigns to Ho
1.2.4.2.1		Email	Equipment needs	Ho to Ad
1.3		Doc	Create calendar invitation; save as DRAFT	Ad
1.3.1	Ad	Task	Obtain approval of invitation	Ad to Mg
1.4		Doc	Update Schedule	Ad
1.5	Au	Email	Send invitation one week in advance	Ad
1.6		Email	Send confirmation one day in advance	Ad
1.7		Task	Order cookies if external speaker	Ad to self
1.8	Ts	Task	Set up equipment	Ad to Ts
1.9		Task	Prepare introductory remarks	Ho to self
1.10	Ho, Sp	Task	Host meets Speaker and brings to presentation room	Ho to self

Mg's View

Index	Landmark	Object type	Title	Notes
2.1	Ho, Sp, Mg	Task	Agree to have person as speaker	Shared
2.2	Mg, Ad, Sp, Ho, Ts	[Task] [Doc]	[Finding a date in a Calendar]	Mg, Ho to selves
2.2.1		Email	Tell inviter to reserve slot in DB	Mg, Ho
2.2.2		Doc/DB	Inviter reserves date in DB	Ho
2.2.3		Task	Inviter confirms date after checking with Sp	Ho to self, Sp
2.2.4		Doc	Ad enters into Managers' Planning Calendar	Ad
2.2.5		[Email]	[Mg mentions to Managers – confirm OK]	Mg
2.3	Ho, Sp, Mg, Ad	Task	Publicity – Host/Admin gets info from Speaker (bio, abstract)	[Ad to] Ho, Sp
2.3.1		[Mental note]	Mg explores other avenues of publicity	Mg
2.3.2		Task	IF inviter not here for talk, need to find substitute Ho	Mg [to Ho]
2.3.3		[Task]	Ho/Mg announces at CUE meeting	Ho/Mg to selves
2.3.4		[Mental note]	Ho/Mg decide audience for talk	Ho/Mg
2.3.5	Ts	Email	Mg/Ad lets Distribution List know + negotiates	Mg/Ad
2.3.5.1		Task	Check checklist for doing video to Other Location	Mg to self
2.3.6		Email	Ad writes announcement standard template with bio/abstract	Ad
2.3.7		Email	Mg proofreads announcement before it's sent	Mg
2.3.8		Email	Ad sends announcement to mailing list week before	Ad
2.3.9		Email	Ad sends reminder email day before	Ad
...			[7 objects omitted for brevity]	
2.5	Au, Ho, Sp	[Event]	Speaker presents [3 daughter objects omitted for brevity]	Sp, Ho

Figure 4. Sample codings of two perspectives (out of five perspectives analyzed) on the shared activity of Inviting a Speaker. Ad=Administrative Assistant. Mg=Manager. Ho=Host. Sp=Speaker. Te=Technologist/Recorder. Ts=Technical Support. Au=Audience.