Collaboration personas: A framework for understanding & designing collaborative workplace tools

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ABSTRACT

The success of Web2.0 and social computing has generated a whole host of new workplace collaboration tools. However adoption of these tools by entire groups of collaborators is a major problem. Collaborative teams now face complex decisions about whether to use wikis, blogs, groups, tags, bookmarks, simple file stores or even email when they want to work together. Three sets of studies of different workplace collaborative tools show that the complexity of these decisions often leads teams to adopt tools that are not optimized for their particular type of collaboration. A possible reason for the adoption problem is the typical technology design processes used within companies that create these tools. Even when designing *collaboration* tools, designers often employ methods that focus on *individuals*. This leads to tools that are not well-targeted at the groups who will eventually use them. To solve this problem, we propose the notion of *collaboration personas*. Collaboration personas are empirically derived descriptions of hypothetical groups of people with specific qualities, goals, and needs. They are derived from a framework describing distinct types of collaborations. They are grounded in multiple empirical studies and the research literature on groups and computer-support cooperative work. Such personas can be used to (a) help users choose appropriate collaboration tools and (b) design new collaborative tools that better meet the needs of typical groups. We describe how collaboration personas might be applied to a core collaborative intelligence problem, namely supporting communities of practice.

Author Keywords

Office, Workplace, Collaborative work, User study, Design tools, Personas.

ACM Classification Keywords

H5.3. Group and Organization Interfaces.

INTRODUCTION

Recent years have seen the emergence of a multiplicity of workplace collaboration tools. These often originated as web-based consumer tools that have migrated into the workplace, e.g. corporations are now beginning to explore wikis, blogs, and social tagging. Such tools are starting to be used by workers to individually produce knowledge that when combined has broad uses across their company—a phenomenon known as *collective intelligence* (CI). While CI has initially been discussed in terms of bottom-up, non-scripted collections of people, an important opportunity also exists for leveraging CI in other corporate settings, e.g. where people regularly and more formally group together to produce knowledge.

However to design for these different types of CI, it is important to understand the characteristics and range of CI collaborations. There have been important initial success stories demonstrating how CI can be used in large corporations or for large scale collaboration [5,6,9,11,14]. With the exception of these demonstrations, however there are few empirical studies of how current CI tools are actually used in the workplace, and the specific types of collaboration they support.

This paper presents empirical findings on how multiple collaborative tools are currently used in organizations, both for core CI cases (such as communities of practice) and for more traditional team-focused uses of collaborative tools. Our research identifies an *adoption problem* related to the multiplicity of new tools. Workplace teams now have many options when choosing a tool: Facebook style social networking tools; tools for sharing files, bookmarks, and tags; wikis; community tools; team-space tools; and so on. As a result, teams find it difficult to agree on which tool to use, so adoption by entire groups of collaborators is a major problem. The adoption problem is further demonstrated by the continued use of email to share files, discuss projects, and coordinate tasks, instead of dedicated collaboration tools [4,13]. It is also evidenced by our finding that collaborative tools are used in ways that are different from their intended purposes. For example, tools that are intended to support communities of practice are used by small project teams, and vice versa.

To address these problems, we use our findings to motivate a new design framework based around *collaboration personas.* We show how this framework can address the tool adoption problem by providing guidelines for *end users* to decide the appropriate tool for their collaboration needs. The same framework can also be used by *tool builders* to design tools that meet the specific needs of different collaborating teams and communities. Designers of CI tools can improve their tools using personas that codify our research about CI collaborations like communities of practice

and task forces. In particular, CI tends to be defined as collaboration among many individuals with weak-tie relationships [7]. However, our data shows that large-scale collaborations (like communities of practice) often split into small-scale collaborations among individuals with strong-tie relationships (like small task teams) for particular activities. Thus, CI tools need to support both large scale and focused, small-scale collaborations.

STUDIES OF PRACTICES USING WORKPLACE COLLABORATION TOOLS

Collaboration tools are aimed at groups, so understanding why groups turn to tools and how they use tools is critical. Here we present brief overviews of three studies we have conducted of how new types of collaboration tools are used within a large, multi-national company.

Lotus Activities

Lotus Activities is a Web 2.0-style application that uses the construct of a work "activity" to organize people, resources, and tools to achieve a particular collaborative 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. At the time of our studies, Lotus Activities had been widely deployed in the company we studied for over two years and used by 32,000 workers in multiple countries. A total of 38,719 Activities (containing at least one entry) had been created between mid-year 2006 and the summer of 2008. For more information on Lotus Activities see http://www-01.ibm.com/software/lotus/products/connections/activities.html.

We conducted two studies of Lotus Activities usage. Our goal in the first study was to understand the most common uses for the tool among successful users. The study is reported fully in [14]. We conducted an interview study involving system walkthroughs with 15 knowledge workers who had appropriated Lotus Activities to organize, manage, and carry out their everyday work. We also analyzed the contents of 120 public Activities of which our participants were members.

In our analysis, we observed that Lotus Activities users developed specific structures and uses for the generic Activity construct. In particular, our interviews and content analysis revealed eight distinct patterns of collaborative work:

- managing a set of related work units (e.g., sales opportunities, work requests, customer tickets),
- creating a document,
- organizing an event,
- solving a problem,
- collecting information,
- exchanging formalized information (e.g., following a specific process or a work flow between multiple parties),
- maintaining a team space,
- and creating a tutorial.

The goal of our second study was to understand the adoption process by which users chose Lotus Activities in comparison to other tools. This study is reported fully in [1]. We interviewed and surveyed 22 participants (two people from each of 11 teams) who ranged in their usage frequency of Lotus Activities. We found that Lotus Activities was employed specifically for *bounded activities* – shorter-term efforts with clear end-points. For this type of activity, Lotus Activities served as a place to aggregate artifacts *as the work progressed*. However, teams reported still making heavy use of email for communication. Email made it difficult for groups to aggregate all activity artifacts, because there was no convenient way to get the large volume of email, which was intermixed in the inbox with emails about other activities, into Lotus Activities.

Most of these usage patterns observed in both studies describe work that was actively done by a small group working closely together over bounded time-periods. Most would best be described as shorter-term *tasks* rather than longer-term *projects*. Lotus Activities was used to collect together all the materials and discussion around the task. Extensive archival organization was not critical (and not offered by Lotus Activities), because Activities were not used to store materials for long-term consumption.

However, we also observed that the activities done by small groups were *reused* and knowledge was shared across the organization, indicating a high potential for CI. Lotus Activities enables reuse of any system activity by saving it as an activity template. When creating a new system activity, a user has the option to start from a template. This new activity will have the structure and content of the parent template. Users leveraged templates to clean up successfully completed system activities for others to use. This was particularly common in the *tutorial* pattern, where users translated a successful system activity into a template that taught others how to do the same activity successfully themselves. This pattern was particularly useful in a large company, where complicated process abound.

Another common reuse of system activities occurred for the *work unit* pattern. Here, users developed a successful structure for commonly repeated units of work (e.g., a customer account, a software version, a sales plan) and reused it over and over. Many users shared these structures with other workers who had the job role and also managed sets of the same work unit (e.g., one sales representative shared her customer account activity template with other sales representatives across the company). Overall, we observed that system activities represented a record of doing an activity or structuring work that was educational for others. Lotus

Activities lowered the overhead of creating sharable content, as it was created in the process of doing work. Both individuals and small teams used Lotus Activities to share their knowledge more widely with other individuals and small teams.

Some usage patterns we observed did not match the intended use of Activities: for example, project teams used Lotus Activities, as a *team space*, to unify content related to managing a team (e.g., meeting minutes, project timelines, accomplishments) and providing an overview across projects. This sort of aggregation of disparate information related to an ongoing team may be better supported by Quickr (a tool described next).

Quickr

Quickr is a "team space" tool, providing a shared, online space (called a "Place") for various types of content and collaboration: a content library with check-in/check-out, versioning features, and plug-ins to open and save documents directly from desktop applications; various shared resources like a calendar, blog, discussion forum, and wiki; limited task tracking; and customizable web pages. For more information see http://www-01.ibm.com/software/lotus/products/quickr/.

Our goal in studying Quickr usage was to understand the most common uses for the tool and how these related to the uses for other collaboration tools used in the company. We conducted an interview study with 15 knowledge workers. They had all created Quickr Places and used them with a team for periods of time ranging from 4 months to 5 years (with a median of 8 months). Eight participants were client or sales representatives or consultants, three were in client-focused technical services, three were in IT or development, and one was a learning specialist.

In analyzing our study results, it became clear that different types of groups used Quickr and their needs were different. A typical use was for small project teams working very closely together who wanted rich awareness and detail about each others' daily work. Another very different usage of Quickr was in very large project teams which were typically comprised of multiple smaller teams. These larger teams wanted much less detailed information about particular sub-groups' status since there were fewer topics of shared interest to the large group. They also needed a way to visualize their many members and the ability to get new team members on board quickly. In contrast, small intact teams did not need these large scale tools because they usually knew each other well and changes in team membership were infrequent.

We also observed the same phenomenon with Quickr as in our Lotus Activities study: the different types of groups did not always match the intended users of the tool (i.e., those designed for by the product designers). There were multiple instances of communities of practice (participants with a

common job skill who interacted to share expertise and experiences relevant to their job type) using Quickr when their needs might have been better met by Lotus Communities (a tool described next). Also, we saw a similar continued dependence on email that Lotus Activities users reported. In the case of Quickr, participants reported that emailing attachments detracted from their ability to get all team members to consistently use Quickr for document sharing.

Lotus Communities

Lotus Communities is a Web 2.0-style application that is aimed at helping people with similar interests or job responsibilities share information. It includes features like a blog, discussion forum, member list, activities, home page, wiki, files, and bookmarks. The Community owner customizes the application, deciding which components are included. For more information see http://www-01.ibm.com/software/lotus/products/connections/communities.html.

We analyzed a survey of 160 internal Community owners. The survey probed the main uses of the tool, properties of the collaborative community, and how well it met their needs. Based on owner responses, we identified the *types of groups* using Lotus Communities and their evaluations of how well their goals are being met by the tool. Respondents indicated the name and purpose of their Community which was coded by whether it was a *Community of Interest/Practice* or a *Project Team/other Work Team*. The former is a group of people with a shared interest or similar job roles, who came together to share related information. The latter is a group of people working together toward a common goal. The majority of uses were Communities of Interest/Practice (66%), a significant number were Project/Work Teams (21%), and the few remaining were too ambiguous to be coded (13%). Communities of Interest/Practice also tended to be larger with 72% over 100 in size, while Project/Work Teams were smaller with 69% less than 100 in size. Respondents also reported their qualitative impression of how well Lotus Communities met their groups' goals. In general, the two categories of groups responded similarly to the question of how well the tool met their goals: for Communities of Interest/Practice, 23% responded yes, 22% somewhat, 30% no and 25% were unsure; for Project/Work Teams, 32% responded yes, 12% somewhat, 40% no, and 16% were unsure. To improve their satisfaction, the two types requested different features: Communities of Interest/Practice wanted features related to improving communication with members and presenting information within the Community, whereas Project/Work Teams wanted the ability to post new types of content, better search, and quicker start-up features.

These results again show that people often use collaborative tools for purposes different from those they were designed for. In addition different types of groups have different qualities and needs. In particular, we learned that Communities of Interest/Practice had specific requirements, fo-

cused on communication and information presentation, that inform the design of CI tools.

Discussion

Collectively, our studies give us an initial understanding of the types of groups that turn to collaboration tools (like Lotus Activities, Quickr, and Lotus Communities) and the qualities that make those groups distinct. We learned that tools supporting strong-tie collaborations, like small project teams, also support CI uses. For example, Lotus Activities supported reuse of the processes and knowledge encapsulated in a system activity by allowing users to create templates from prior successful system activities and easily share those with others. However, we did not observe such reuse and sharing across project teams with Quickr, indicating that distinct features are required for CI uses to emerge. Overall, this indicates the importance of considering the interaction between strong-tie collaborations (like a single project team) and weak-tie collaborations (like multiple project teams learning from one another's experiences), and understanding which features support this interaction.

Our observations also point to a larger problem: when many collaboration tools are available, groups have a hard time determining which tool will best support their needs. As a result, they sometimes make unexpected or sub-optimal decisions, choosing a tool that does not fit well with the collaborative characteristics of their team. For example, small project teams used Activities when they would have benefited from Quickr's support for team awareness, calendaring and task tracking. And communities of practice used Quickr when they might have better exploited functions of Lotus Communities such as forums and participant lists. Finally we found small teams using Lotus Communities which lacked the dedicated team tools that Quickr provides.

We believe that these results demonstrate gaps in current design methods for collaboration tools. Designers currently lack a framework for considering collaboration in the design process for these tools. We present here a new framework for describing these collaboration types and their distinct qualities that can be used in design, as well as helping with the adoption problem.

COLLABORATION FRAMEWORK AND PERSONAS

One factor contributing to the adoption problem for collaboration tools is the technology design processes being used within companies that create these tools. Even when designing collaboration tools, designers often employ methods that focus on *individuals*. For example, personas are a commonly used design tool [1], but they sketch the qualities and goals of an individual rather than a team. Lab studies and interviews typically involve a researcher talking to one target user. Surveys are filled out by one person. Though techniques exist for understanding collaboration among multiple people, such as ethnography or other observational methods, these are time consuming and unlikely to be performed for every product development effort. Furthermore, there few common design tools or frameworks for translating the understanding gained through participant observation or other methods into reusable design tools for collaboration. In short, current design processes for collaboration tools that focus on the needs, goals, actions, and opinions of *individuals* lead to tools that are not well-targeted

Lifespan of the group is (i.e., time to accomplish objective)…	short-lived ←——————→ long-lived	
	lightweight to setup limited structure, simple access controls	customizable organization, advanced features for finding content, ways to share knowledge / history of work
For long-lived teams, what stays **constant** is…	team ←——————→ objective	
	ability to manage multiple projects over time	ability to on-board new team members
Created because of a **shared**…	interest ←——————→ objective	
	discussion, info sharing	task tracking, scheduling, meeting support, info sharing
Size of the team is…	small (3) ←——————→ large (100s)	
	can share more detail about daily work, more likely to collaborate in shared space (e.g., writing docs v. just storing docs)	visualize team, create sub-groups, fewer topics of interest to large group may want to partition members' work
Management of the team is…	self-managed ←——————→ designated leader	
	equal access/privileges	manager may want to track members' status, manager likely to be in charge of maintaining team space
Degree of **dependency** among members…	interdependent ←——————→ independent	
	sharing detailed daily work is likely useful	sharing general info, lessons learned, best practices
Existence of **sub-groups**…	no sub-groups ←——————→ many sub-groups	
	all info visible to all members	ability to partition sub-groups' work, hide content from other sub-groups report status & outcomes to larger group

Figure 1. List of Qualities of collaborations (main line of each row) and how they can affect tool design (small text beneath each quality).

at the groups who will eventually try to use them.

To solve this problem, we propose the notion of *collaboration personas*. Collaboration personas are empirically derived descriptions of hypothetical groups of people with specific qualities, goals, and needs. They are derived from a framework describing distinct types of collaborations and their components. If *groups of collaborators* are the intended users of collaboration tools, we should be designing our tools for specific *types of collaborations*.

Collaboration Framework

Collaborating groups have *roles* for individuals, collaboration phases, and dynamics that should be considered in design [8,10]. They also have distinct goals and needs. We seek to make these explicit in our framework. Designing to support the goals and needs of various roles during the different phases of collaboration should improve tool adoption and retention.

Roles are the common functions performed in a group as part of their collaboration. Roles may differ in different types of collaborations, but some common roles are leaders, members, and stakeholders. Discretionary roles could include administrative assistants, sub-group leaders, quiet versus active members, and so on.

Collaborations have *phases* during which needs differ [10]:

- *Starting* involves forming the team, setting the goals for the collaboration, agreeing upon conventions (e.g., which tools to use and how), and setting up any tools.

- *Planning* involves setting the agenda or work plan for the collaboration. This can include brainstorming, forming sub-groups, assigning tasks, scheduling, and so on.

- *Executing* involves doing the work necessary to accom-

plish the goals.

- *Reporting* involves sharing intermediate status and final outcomes with stakeholders, handing off any deliverables, and continuing the education of stakeholders about any deliverables.

Collaborations also have a number of *qualities* that affect the ways people will work together and hence, the tool support they will need. While there are many qualities that could be considered, we focus on a set that distinguish the teams observed in our research and have some impact on design: these qualities are listed in Figure 1. (Note that the distributed nature of the group (local ←→ remote) is another important factor, but does not depend on collaboration type as much as it does on other factors (e.g., organizational), so we do not consider it as part of this general framework.)

Each of these qualities affect design: Figure 1 lists likely tool-needs for collaborations at different ends of each quality spectrum. For example, short-lived collaborations will need a tool that is lightweight to start-up, imposes limited structure, and has simple access controls. On the other hand, longer-lived collaborations will gather much more content over a long period and thus will need customizable organization, advanced features for finding content, bringing new members onboard and ways to share knowledge and a history of work.

Finally, different *collaboration types* exist and have been studied both in our research and in prior literature [7,9]. These different types will have sets of qualities falling at different points on the spectra shown in Figure 1. Though a complete taxonomy of collaboration types relevant to modern enterprises is beyond the scope of this position paper, we plan to develop such a taxonomy through further research. Our initial studies have enabled us to identify the
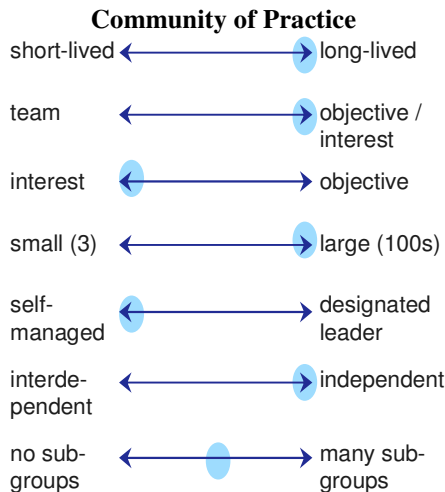
Community of Practice

Figure 2. Community of Practice tends to be long-lived, focused on an interest which stays constant, large, self-managed, members are independent, and they may have sub-groups. Gray-blue ellipses indicate the properties of the COP.
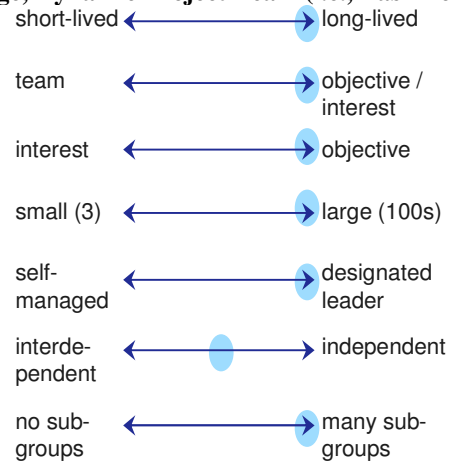
Large, Dynamic Project Team (i.e., Task Force)

Figure 3. Large, dynamic project teams tend to be long-lived, focused on an objective which stays constant, have a designated leader, members working both independently and interdependently, and many sub-groups. Gray-blue ellipses indicate these properties**.**

collaboration types that are most common to the set of tools we studied: Lotus Communities, Quickr, and Lotus Activities. These are the *community of practice*, the *project team*, and the *task team* and we use these examples to illustrate our approach.

Community of Practice

A *community of practice* (CoP) is a group of people with similar job functions, who come together to share best practices, knowledge, information, and possibly to spark new collaborations [12]. For example, a community of sales representatives specializing on the needs of a specific industry segment is a CoP. CoPs tend to be large with an open-ended lifespan. Members tend to work independently, though the community may initiate sub-groups to accomplish goals like organizing meetings to share best practices, managing the community's shared knowledge base, organizing community-related events, and so on. Typically participation is optional (i.e., not a job requirement) and there are no formal deliverables. CoPs often have an informal leader but are fairly self-managed and do not report to any stakeholders. Figure 2 shows the CoP's qualities.

Project Team

A *project team* is a group of people working together toward a common goal on work that is part of their primary job function. For example, a project team could be comprised of several programmers, designers, architects, and a project manager, all working on the next release of their software product. In our observations, project teams can be small or large and stable or dynamic, and these qualities greatly affect their needs. Here we focus on *large, dynamic project teams* (also sometimes referred to as *task forces*) because they are of particular interest for CI applications.

Large, dynamic project teams are comprised of sub-groups that accomplish different aspects of the overall goal. Membership is constantly in-flux, depending on the expertise

Task Team

Figure 4. Task teams tend to have a short lifespan, focus on an objective, no sub-groups, and few members who are self-managed and work interdependently.

needed for the current phase of the project. For example, we talked with members of a large client account team that focuses on identifying and winning sales opportunities. There are hundreds of employees comprising the team who are available to work on this particular client account. Certain sub-groups identify new sales opportunities with the client. They then draw in domain and technical experts who help flesh out the solution the client needs. Next, developers who can build proof-of-concept demos are called upon. As the project continues, different sub-groups are pulled together to complete the next step needed to win the sales opportunity. Figure 3 shows the large, dynamic team's qualities.

Task Team

A *task team* is a small group of people working together toward a common goal that is very short-lived in nature, to do work that is part of a larger goal. For example, a CoP might ask a few people to volunteer to find speakers for and plan their monthly meeting. The task team's work is highly interdependent and so they are likely to want awareness of others' progress, but because of the short-term nature of the task they are unlikely to want formal task tracking or scheduling. Task teams likely have frequent meetings but these may be ad hoc. Task teams may have an informal leader by are fairly self-managed and ultimately report to a larger group (e.g., a project team or CoP). Figure 4 shows the qualities of the task team.

Collaboration Personas

From our framework, we have derived a set of *collaboration personas*, which are precise descriptions of hypothetical groups with specific qualities, roles, goals, and needs. Each persona represents a concrete expression of our empirical observations of different collaboration types. These are based on the idea of personas introduced by Alan Cooper [1], though prior work has focused on personas of *individuals*. Collaboration personas *include* individual personas (playing the roles), who enact scenarios at different phases of the collaboration. In this section, we present portions of a CoP persona to illustrate the concept.

Community of Practice Persona

Roles and people (all are User Experience professionals for the EfficientWorker brand of software at Global Corp.):
- Leader: Jeremy Banks
- Members: Diane Stallman, Brian Worther, Eilene Madison, and many others
- Sub-group (task team) members: Jeremy, Diane, Eilene

Goals:
- To learn from other EfficientWorker UX professionals: share and discuss lessons learned, best practices, interesting outcomes of their work.
- Increase networking between EfficientWorker UX professionals to improve potential for collaboration.
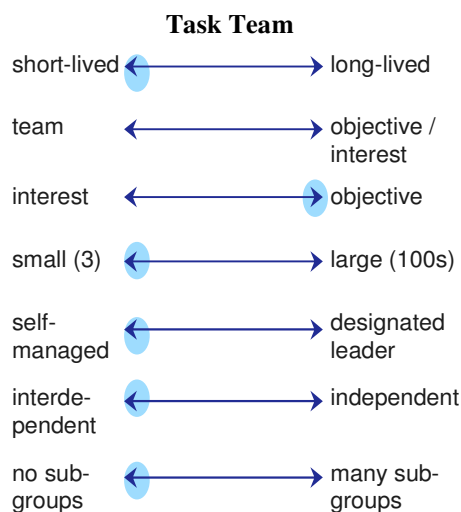
Needs:
- Support for a monthly meeting: scheduling, to-dos, reminders.
- Save a history of the information shared during meetings.
- Share relevant materials (e.g., white papers or presentations about projects discussed, demos, screenshots, etc.).
- Facilitate ongoing discussion and Q&A.

The collaboration needs of a Community of Practice change over time as the community moves through different collaboration phases. Here we describe the nature of the starting, planning, executing, and reporting phases concretized through the collaboration persona.

Starting phase
Jeremy is a User Experience (UX) professional for the EfficientWorker brand of software at Global Corp. He saw a need within the community of all EfficientWorker brand UX professionals for sharing and discussing lessons learned, best practices, interesting outcomes of their work, and so on. To help facilitate this, Jeremy initiated a monthly meeting where one member of the community could share something about their work that would help others in the community learn.

In a meeting, the whole community discussed their goals to share best practices and knowledge and how they could best accomplish this. They decided they needed a way to capture a history of the information shared during meetings, share complementary materials (e.g., white papers or presentation slides about projects discussed, demos, screenshots, etc.), and facilitate ongoing discussion and Q&A.

Jeremy also wanted a way to coordinate the schedule with speakers and ensure that speakers shared materials before their meeting. He wanted to advertise meeting topics to community members, without having to maintain a new calendar or to-do list. Likewise, community members and speakers also did not want to check a new calendar or to-do list, but needed reminders of the tasks and meetings coming up for the community.

After some research, Jeremy decided the community should use Lotus Communities. He set up a file library to share content relevant to their practice & meetings, a wiki to collect information shared in meetings, and a forum for members to discuss topics and questions outside of meetings.

Planning phase
The community decided a sub-group should be formed to determine how to save the UX best practices and tools they identify in a way that promotes reuse. Jeremy, Diane, and Eilene volunteered.

Jeremy, Diane, and Eilene created an Activity within the Community to collect their brainstorms, plans, and decisions. After several meetings and much discussion, they designed new front pages for the Community's wiki that educate readers about the community's collected knowledge and provide an organizational structure for finding content with links to the actual documents, discussion threads, and other wiki pages.

Executing phase
After the Community was initially set up, community members seemed hesitant to get involved online. So, Jeremy seeded the shared space with documents from past meetings and a few thought-provoking forum posts, and regularly tried to motivate members to use the shared space in meetings.

Brian, a community member, had been struggling with a design problem he had run into while creating online documents that allow synchronous collaboration. After hearing Jeremy evangelizing the shared space, he saw the potential for getting advice from the wider UX community and posted several questions to the forum, notifying community members by email. Multiple people respond and a discussion emerges that Brian finds incredibly helpful.

Eilene is organizing a customer education event she thinks other UX professionals will be interested in: either to learn more about the new features her team has been working on for EfficientWorker, or to organize their own similar events. She posts an announcement within the Community and adds it to their shared calendar. Several members attend the event and encourage Eilene to add her education event planning materials to the Community for reuse.

Comparison with Individual Personas
The collaboration personas presented here differ from individual personas [1] in multiple ways. Collaboration personas can be seen as a super-structure that includes individual personas and describes their actions in the context of a collaboration. A key difference is the persona description itself. Individual personas focus on relatively static persona details like attributes and goals. These personas can enact scenarios, which are narratives describing specific interactions, actions, and decisions. However, collaboration personas are inherently about interactions, and the existence of an interaction requires at least some actions and decisions to be described. Thus unlike individual personas, collaboration personas cannot be totally separated from scenarios. We believe it is appropriate to focus collaboration persona details on describing typical interactions and the norms and past decisions that have led to these stable interactions.

Using the Collaboration Personas
Having developed the personas these can now be used in two distinct ways. First they can be used as a check to determine how well different tools currently meet collaboration requirements. For example our CoP persona suggests that tools such as Quickr do not match the needs of very large, mostly independent groups. Specifically, Places are too heavy-weight to set up and provide richer awareness information than is needed for CoP operations.

Second collaboration personas can be used by teams to select the most appropriate tool for their collaboration needs. For example, a team leader when choosing between different collaborative tools can be presented with different collaborative personas and asked to choose which of these best fits her team. This profiling will then be used to recommend which tool will best serve her teams collaborative goals. For example, choosing the persona for a task team would lead to tools such as Lotus Activities being recommended.

Finally, collaboration personas can be used by designers to create new tools or new versions of existing tools targeted at particular types of collaborations. CI is one type of collaboration that we can model in a persona. Though more research is needed to understand CI uses within companies, collaboration personas are a way to codify the knowledge we will be gathering so that designers can use it to create new tools that will reap the benefits of knowledge sharing and work reuse.

CONCLUSION

We document two problems with collaborative tools: the adoption problem and the use of inappropriate tools for collaboration. To address this, we developed a new, empirically motivated framework for designing collaboration tools. Our work creating the framework and details for collaboration personas made it apparent that we do not have a strong understanding of how groups select among and use the many new collaboration tools available in the workplace. A major part of this ongoing research effort is to conduct additional studies to understand this better.

We believe the collaboration framework and personas can transform the design process for collaboration tools. It may also help during other parts of a product's life: e.g., it could be used by marketing specialists and sales representatives to target tools at specific types of teams, by client relationship specialists as a framework for getting customer feedback into the design process, and by users themselves to determine which tools are best for their group's needs.

To be an effective design tool, significant work is needed to develop a more complete taxonomy of collaboration types common to global companies, to determine the central collaboration personas for each product design process, and to ground those personas in comprehensive empirical data from multiple studies and expand their detail and precision. Once these efforts are complete, we expect that team personas could become an integral design tool for future conception, design, and development of CI tools.

In the CI context, we saw that explicit design for reuse promoted effective appropriation of work practices, across teams. We also saw how communities of practice and task forces often broke down into smaller tasks teams during parts of their life cycle. In both cases the collaboration per-

sonas framework provides improved guidance for designing tools to better support CI practice.

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