

# Collaborative Information Behavior with Free Information Tools: The Case of an Interdisciplinary Charrette

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## ABSTRACT

We present early findings from an ethnographic study of the information behaviors of nine groups with three to eight members each, conducted during a ten day interdisciplinary design Charrette (period of intense, collaborative design activity). Information from the organizers is shared using a portal that includes a rich set of social awareness, social navigation and information production tools. Six of the groups select different, publicly available technologies to support information sharing and production during the Charrette. We present two interconnected findings. First, technology choice diffuses according to physical adjacency of the groups. Second, technology choice influences collaborative information behavior (CIB) within each group. We suggest potential implications for CIB theory and Human-Information Experience (HIE) design.

## Keywords

Human information experience, collaborative information behavior, design, CSCW

## INTRODUCTION

Human information behavior (HIB) is changing in surprising ways through the cornucopia of publicly available, free information sharing platforms. Drop Box, Google Groups, Google Docs, Zoho, Microsoft Office Web and similar tools make it easy for groups to produce, share and retrieve information. When a new group forms, members familiar with public tools take up and use them in practiced ways. Members unfamiliar with the chosen information tools become rapid adopters. These free information tools accelerate information sharing in the short term, but have unexplored future implications for the information behavior of individuals and for information behavior within groups.

Free information tools support collaboration around information artifacts implicitly; doing so requires a simple declaration of trusted others. When a shared information need becomes a site for collaboration, it is called

collaborative information behavior (CIB) (Foster, 2007; Reddy & Spence, 2008; Reddy & Jansen, 2008). The growth of CIB through free public tools is rapid. Google reports 1.75 million organizations currently use its Google Docs functionality, and the personal file sharing service DropBox just registered its 4 millionth user (Gralla, 2009; Wauters, 2010). Looking forward, 27.1% of business people in large and small companies report they are likely to use Google Docs for work during the next year (Acochito, 2009).

Prior studies of CIB do not examine information use by teams using free information tools. Research in related disciplines, like CSCW, does not focus on information behavior. In order to better understand how these tools are selected and subsequently influence collaborative information behavior, we conduct an in depth ethnographic study of 61 participants in an interdisciplinary architectural design Charrette at a major design and engineering university. With the remainder of this note, we present a description of the study context, followed by a review of relevant contrasts of collaborative information behavior with individual information behavior (IIB) (Reddy & Jansen, 2008). Next, we describe our research methods and preliminary results from our study. In the discussion section we describe the implications for CIB theory and human information experience (HIE) design.

## Context: An Architecture Charrette

An architectural Charrette is a period of intense, collaborative design activity. Site designs, architectural drawings, materials inventories, and physical models are produced by each of the nine teams we study. Each team's design artifacts center on one of nine distinct, neighborhood integrated public transportation shelters along a seven mile urban transit artery. Team members are graduate and undergraduate students from nine different colleges at the university; approximately  $\frac{1}{4}$  are students in architecture or interior design. The Charrette begins with team assignments, communicated through a secure web portal about a week before the Charrette begins. The portal is the center for information sharing from organizers to participants, and a place where most participants first introduce themselves to their teammates. Each team also has a private area in the portal, where it may access discussion boards, wikis, file sharing, social streams and other information sharing and collaboration tools.

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The information needs and uses in a Charrette are complex. Members must assess demographic, geographic and infrastructure information about a building site, and work together on a design while referencing and integrating this information. Members gather information individually, but must quickly share it with the group. The information behaviors in a Charrette set off all four of the triggers Reddy & Jansen (2008) identify as significant reasons IIB shifts to CIB: information complexity, fragmented information, lack of domain expertise and lack of immediately accessible information. For example, the nine teams in this study each spend several hours determining what information they need to gather from the field site. They then spend an entire day gathering and organizing it. All the while, members are assessing each other's capabilities and establishing group roles. A Charrette is an information intensive design activity.

The rhythm of information intensive activities has been shown to influence information behavior, and we observed this in the Charrette (Reddy & Dourish, 2002). The design problems for the Charrette (shelter sites and design goals) are released on a Thursday morning and due on Monday afternoon; the Charrette lasts about 100 hours. On Thursday and Friday the teams gather site information by physically visiting their individual sites, taking pictures, recording video and interviewing people in the neighborhoods (see Results for a discussion of related information behaviors). There are presentations from city representatives, transit planners and local architects on Friday evening. On Saturday at lunchtime local architects and designers field questions from the students. These activities are focused on the accumulation and organization of information to inform design, with occasional episodes of collaborative information integration.

The next phase combines the iterative application of accumulated information with design sketches and early design artifacts. During the Charrette teams are all located in separate, physical spaces that altogether take up an entire floor of a campus building. Sketching takes place here, with members referencing individual information acquired from field site research in the development of the design. At the conclusion of the design period, electronic design artifacts are submitted through the portal while physical models remain in team workspaces. Design Critiques take place on Tuesday evening.

#### **RELATED WORK**

Reddy & Jansen (2008) review decades of research on concepts, technologies and information seeking models. They discern that most information behavior research takes place at the individual unit of analysis, which they describe as individual information behavior (IIB). Perhaps more controversially, Reddy & Jansen critique Dervin (1992) for ambiguous references to "collectives" and Brown (1991) for ambiguity about information behavior "among" others. Here the distinction Reddy & Jansen make is between the identification of the collaborative aspects of information

behavior, and the active pursuit of CIB-centered empirical research. CIB is not a group situated form of IIB; it is a phenomena warranting focused research.

A small number of studies have focused on understanding CIB from different perspectives (Poltrock et al., 2003; Fidel, Pejtersen, Cleal, & Bruce, 2004; Twidale, 2005; Foster, 2007; Reddy & Spence, 2008; Reddy & Jansen, 2008; Goggins & Erdelez, 2010). Sonnewald (2000) explicates interwoven situational awareness, which includes information about the work situation, the work process and dynamic situational knowledge in a study of a military command center. Reddy & Jansen (2008) explicate a model for understanding the triggers for CIB instead of individual information behavior, which we previously noted. In Reddy & Jansen's study of collaboration in two medical environments, social interactions still occur with individual information behavior, but they take the form of question-answer exchanges. These latter two studies share characteristics with the Charrette, including the complex, dynamic and time critical nature of the activities. Clearly battle planning and critical care in hospitals are more significant life and death examples of CIB. The unique perspective our study of the Charrette adds to this work is an understanding of how technology selection proceeds when members have a choice; and how these choices influence CIB.

#### **METHODS**

We research CIB in this naturalistic setting by observation and contextualized questioning of members as they go about their activities of seeking and using information. We use ethnographic techniques for observing and interviewing people during our intensive study of the Charrette (Strauss & Corbin, 1998; Charmaz, 2003). We triangulate our field notes, memos and interviews from the ethnographic study with email interviews before and after the Charrette with 24 of 61 participants, usage logs and all information resources from the Charrette Portal, 142 photographs of collaborative information spaces for the groups, 212 non-portal collaboration files from seven of the nine groups and an extensive videotape record (8 hours) from one group.

Our study of the Charrette occurred in early 2010, with human subjects approval from our university. We spent over 60 hours in the field during the Charrette, gathering 122 pages of transcribed interviews and field notes so far. For this study, we have scrutinized each interview, field note, artifact and photograph at the paragraph and artifact level of analysis. We have also compared field notes and interviews from different teams, along with interaction traces from the Charrette Portal to develop a clear understanding of how CIB emerged in different ways on each team. This note presents a brief synopsis of what we have learned so far.

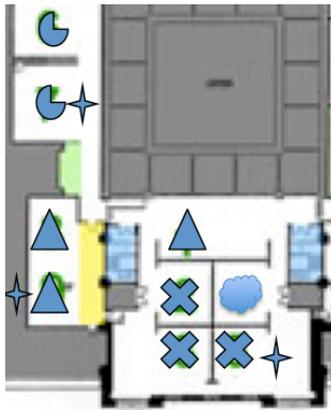
#### **RESULTS**

There are two main findings presented here. First, technology choice diffuses according to physical adjacency of the groups. Second, technology choice influences

collaborative information behavior (CIB) within each group.

**Diffusion of CIB Technology**

One of the first CIB events for each team involves establishing the field site dimensions. This requires members to gather individual notes from the field site visit and Google Maps information. Most participants, though not all, have site dimension information contained in their personal notes. Members collaborate around this information, comparing notes to identify common ranges of size and then validating those dimensions with an estimate from Google Maps. On Saturday, the collaborative information behavior of the groups follows this identifiable rhythm of felt information need, information resource identification, organization and collaboration.



**Figure 1 - Layout of Teams and CIB Technology Choices**

As members began to collaborate with their laptops around a table, share information and sketch preliminary site designs, the need for a location to share individually assembled electronic artifacts became clear. These choices occurred fluidly, and without fanfare in each case. The first three teams to reach for a CIB tool (five, seven and nine) each elected a different collaboration technology: The private team area in the Charrette Portal, a USB thumb drive and a public file sharing and replication system available from DropBox. In the hours after these first three groups made their selections, other, physically adjacent groups followed their lead. In figure one, the groups who used DropBox are represented using an “X”, the USB drive groups are represented using a ¾ circle, and the Charrette portal groups are represented by triangles. One group uses email, and is represented with a cloud. The first groups to select each technology are indicated with a four pointed star. All groups identified the need for technologies to support CIB between Saturday morning and early Sunday afternoon. Our observations and interviews show that follower groups learn of the technology choices of first-mover groups during trips to the lavatory, and walks to eat the free food provided by Charrette sponsors. Figure one illustrates that this diffusion of CIB technology follows a pattern of physical adjacency.

**Influence of Technology Choice on CIB**

The relatively uniform observations about each of the nine group’s CIB, which emerged during early discussions of how to determine site dimensions, gave way to increasingly distinct CIBs by Sunday morning. Three patterns of collaborative information behavior emerged on the final full

day of the Charrette, as each team worked toward completion of its design. Groups who shared information using the Charrette Portal or a USB device primarily coordinated their activities in two ways. First, with individual assignments, followed by periods of CIB where information was reassembled and integrated with the group. Second, by sectioning off dyads or triads from the whole group, resulting in instances of CIB within the sub-groups and information dissemination back to the large group.

Groups who shared information using DropBox also coordinated their activities in two main ways. First, following the dyad & triad pattern described above. Second, working as a large group and collaborating on joint design tasks. In these cases, we observed CIB involving all members on five occasions. In one instance, Group Two was completing the design of a mural to place on their shelter. Members assembled pictures of the neighborhood surrounding the shelter, as they worked to determine the points of view in each photograph, and identify themes from the scene to inform mural design. Members questioned each other and worked toward a ground truth understanding of the data.

A summary of the relationship between dominant CIB patterns and CIB tool choice is shown in table one.

**Table 1 - Group Structure for CIB by CIB Technology Choice**

	Individual	Small Group	Entire Team
Dropbox		x	x
Charrette Portal	x	x	
USB Drive	x	x	

While this represents a sample of only 61 people divided among nine groups, our data show a clear pattern of differences that warrant further analysis and investigation. These findings are interesting, but limited.

**DISCUSSION**

We identify patterns of free information tool adoption, followed by discernable differences in CIB associated with those choices. Prior studies examine CIB in cases where the tools used are predetermined, and suggest design guidelines for collaborative information retrieval (CIR) tools that support CIB. In CIB, IR is the first step, not the last. For the groups we study, sharing and organizing information using free tools is sufficient. They conduct CIR in the physical world, and side by side using IIB-centric IR tools. How free information tools diffuse among the teams, and how that diffusion influences CIB are important questions emerging from our work. There are implications for the development of a theory of collaborative information behavior, as well as implications for the design of Human-Information Experiences.

Reddy & Jansen (2008) connect CIB to information science research on IR, and prescribe the development of collaborative IR (CIR) tools. Free tools that permit new, small groups to construct their own information spaces push the boundaries of CIB beyond what Reddy & Jansen have

described to date. There are two theoretical implications. First, theories of CIB that emerge from empirical research within the boundaries of traditional organizations (hospitals and the military) may not explain CIB in newly formed, highly virtual or networked information contexts. Second, CIB in organizationally dynamic environments is an important area for empirical study and the development of theory because these easily planted free information tool gardens make CIB easy, but could easily become the information Kudzu<sup>1</sup> of the 21<sup>st</sup> Century.

In a more immediate way, this study suggests that the Human-Information Experience (HIE) can be designed for, even as so-called digital natives emerge from universities. In the 21<sup>st</sup> century, our most advanced ICT's diffuse among the most technologically embedded generation ever based mostly on their physical proximity to each other. More significantly, the somewhat accidental choices made by some of the groups we study have real implications for their CIB, and information behavior more generally. Human computer interaction – upon which the CIB tools described here and elsewhere depend – focuses on factors that are too often inconsiderate of the HIE. Considering what it means to design for the HIE could possibly be an antidote to the unexpected constraints of non-deliberately selected free information tools.

We plan to continue our analysis, expand and refine the findings and discussion presented here in future work.

#### REFERENCES

- Acochito, B. (2009). Microsoft takes notice as more people use free Google Docs. Retrieved May 20, 2010, from [http://www.usatoday.com/tech/news/2009-09-21-google-docs-microsoft\\_N.htm](http://www.usatoday.com/tech/news/2009-09-21-google-docs-microsoft_N.htm).
- Brown, M. E. (1991). *A General Model of Information-Seeking Behavior*. Proceedings from Proceedings of the ASIS Annual Meeting.
- Dervin, B. (1992). The Sense-Making Qualitative-Quantitative Methodology. In J. D. Glazier & R. R. Powell (Eds.), *Qualitative Research in Information Management* (pp. 61-84). Englewood, CO: Libraries Unlimited.
- Fidel, R., Pejtersen, A. M., Cleal, B., & Bruce, H. (2004). A multidimensional approach to the study of human-information interaction: a case study of collaborative information retrieval. *Journal of the American Society for Information Science and Technology*, 55(11), 939-953.
- Foster, J. (2007). Collaborative information seeking and retrieval. *Annual Rev. Info. Sci and Technol*, 40(1), 329-356.
- Goggins, S., & Erdelez, S. (2010). Collaborative Information Behavior in Completely Online Groups. In J. Foster (Ed.), *Collaborative Information Behavior: User Engagement and Communication Sharing*. Hershey, PA: ISI Global.
- Gralla, P. (2009). Google Docs Vs Microsoft Office: A Matter of Trust. Retrieved May 20, 2010, from [http://www.cio.com/article/502918/Google\\_Docs\\_Vs\\_Microsoft\\_Office\\_A\\_Matter\\_of\\_Trust](http://www.cio.com/article/502918/Google_Docs_Vs_Microsoft_Office_A_Matter_of_Trust).
- Poltrock, S., Grudin, J., Dumais, S., Fidel, R., Bruce, H., & Pejtersen, A. M. (2003). *Information seeking and sharing in design teams*. Proceedings from Proceedings of the 2003 international ACM SIGGROUP conference on Supporting group work.
- Reddy, M., & Dourish, P. (2002). *A finger on the pulse: temporal rhythms and information seeking in medical work*. Proceedings from Proceedings of the 2002 ACM conference on Computer supported cooperative work.
- Reddy, M., & Spence, P. (2008). Collaborative Information Seeking: A Field Study of a Multidisciplinary Patient Care Team. *Information Processing and Management*, 44, 242-255.
- Reddy, M. C., & Jansen, B. J. (2008). A model for understanding collaborative information behavior in context: A study of two healthcare teams. *Information Processing & Management*, 44(1), 256-273.
- Sonnenwald, D. H., & Pierce, L. G. (2000). Information Behavior in Dynamic Group Work Contexts: Interwoven Situational Awareness, Dense Social Networks and Contested Collaboration in Command and Control. *Information Processing and Management*, 36, 461-479.
- Twidale, M. B. (2005). Over the shoulder learning: supporting brief informal learning. *Computer supported cooperative work (CSCW)*, 14(6), 505-547.
- Wauters, R. (2010). Dropbox Announces Four Million Users. Retrieved May 20, 2010, from <http://techcrunch.com/2010/01/20/dropbox-4-million-user/>.

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<sup>1</sup> Kudzu was planted in the Southeastern United States in the early 20<sup>th</sup> century for erosion control. It worked; but the plant grew out of control through the region.