Casual Infovis in the Workplace: Supporting Worker Reflections and Conversations

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Abstract
Workers socialize and collaborate in the course of performing their workday duties. Imprint is a casual information visualization kiosk that supports workers in seeing, exploring, and reflecting upon their printing activity. The Imprint kiosk is a large touchscreen display that augments the existing social space around shared printer facilities. My hope is draw workgroup members in extended reflections and conversations around their consumption behaviors and the social data that is inherent in printed data. I suggest an evaluation metric to measure the innate curiosity of individuals and hypothesize that curiosity is a key determinant of the success of personal and group informatics systems.

Keywords
Case study, Casual Infovis, Printing, Sustainability, Reflection, Curiosity Instuments

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

Introduction
Technology intended for the workplace is often designed to improve productivity as workers go about their daily work tasks. Systems developers find a problem or breakdown in processes, communication, or information management, and designs a computer system to enable smoother, faster and more efficient work.

However, my work goes beyond efficiency to find other ways to augment daily life. I work on visualization systems for home and work that are concerned with negotiated meaning-making, instead of applying a communication-focused and task-focused design paradigm. My systems open new spaces for reflection and contemplation instead of 'solving' a particular task. These systems are examples of Casual Information Visualizations, a term I coined to describe systems that move away from task-focused and goal-directed activities [7].

Recently, I co-created Tableau Machine, an artistic kiosk for domestic space, which watches life in the home through a set of video cameras and creates a continuous stream of artistic visualizations which attempt to characterize the "mood" or vibe of the home at a given time [8]. Tableau Machine creates ambiguous depictions of home life -- householders need to invent stories to make sense of Tableau Machine's outputs.

In a longitudinal ethnographic evaluation [4], householders were puzzled (but curious) when the system was first installed, but became more and more engaged with Tableau Machine over time. One family because quite attached to the system, naming it, and printing a long stream of visualizations that they desired as keepsakes from their time with Tableau Machine. In the domestic arena, individuals and families used Tableau Machine to spark conversation and novel reflections of daily life. Will workgroup members have similar reactions?

Imprint

Imprint (see Figure 1) is a system intended for use in a workgroup setting that has shared printing resources. Imprint collects print jobs (and print job data) to produce visualizations that depict the social relationships of printed data as well as depictions of sustainability data for community conversation and potentially behavior change [5]. Imprint, since it visualizes printer data and the consumption habits of workers, also draws from persuasive technologies [2], addressing ways that technology can assist in reflection about resource consumption.

My goal is not to modify the behavior of members of the community in a simplistic manner; we do not want to build a system that bullies, badgers, cajoles or shames community members into changing their behaviors (such as printing fewer pages). This kind of intervention, even if it were achievable, might not cause long-lasting behavior change, but instead might cause workers to print more at home, routing around a technology they see as onerous or judgmental. Instead, we seek to engage community members in a data-driven discussion and contemplation, so that they can come to their own conclusions about printing practices and changes they may want to individually or collectively implement.

With Imprint, I seek new methods for designing systems to engage users over a long period of time (without a pre-existing efficiency-minded task), to to build systems that can become a fun part of daily activity, sparking conversation and reflection, but that does not become a chore or bother.

Figure 1: Imprint installed at Georgia Tech's GVU Center. Imprint runs on a 42" touch screen and cycles through a set of visualizations. Users can interact with Imprint to switch to the next or previous visualization, or scrub the dynamic query timeslider to select a timeframe from three days to three months.

Imprint's visualizations depict the following:

- Content and form of print jobs, such as a tag cloud of popular words printed, or the size and position of text boxes (indicative of 2 column, 3 column, or other layouts).
- Information about relative measures of worker popularity, since the printer data stream (especially in academic work groups) often includes the names of community members, and Imprint can determine the most-printed-about student as well as the most-printed-about faculty member.
- Resource consumption, highlighting the number of pages used by the community each day, as well as other consumption metrics such as the electricity consumed by the printers, and the toner needed to print the pages.
- Social relationships, with a visualization that makes pair-wise comparisons between the print activity of each community member and

maps their similarity, clustering like-minded (or at least like-acting) individuals. I also include a visualization that segments documents into "work" and "play" and "designer" and "engineer" since in the community I am studying has identity groups around engineering and design.

Imprint's back-end architecture is complete and the designs for a subset of Imprint's visualizations are complete [6]. Now that the design is finalized, the system can be deployed in a longitudinal evaluation, and I will collect both ethnographic and statistical data on its use and usefulness.

Evaluating Technologies for Reflection

Technology interventions that do not assist in efficiently accomplishing a tasks cannot, by necessity, have a simple binary success criterion. They require evaluations and measurements that accept degrees of relative success. I think that understanding the existing activities of work-life, so that it can be compared to the same or similar activities augmented by an intervention requires ethnographic work at the outset as well as longitudinal system evaluations. In a longer term evaluation (months and not weeks), researchers can track a trajectory of appreciation and use [ ], and watch how the system begins to work its way into daily activities.

Another evaluation method that I propose is the use of curiosity instruments as a way to better understand the community of users. Curiosity is closely tied to enjoyment, creativity, and to "flow" experiences [7], and so it can serve as a measure of engagement and fun [3]. My research lends itself very well to blending data collection in a mixed-methods approach: combining psychological metrics with user data (from the system) as well as deep ethnographic interviewing to come to a self-reinforcing conclusion.

A challenge in researching systems designed for reflection that I want to acknowledge and discuss at the workshop concerns generalizability. Researchers have proposed a host of means for ensuring generalizability of results for task-based HCI problems, while experiential, ludic, and non-task based problems are more difficult to apply from one situation to another. In my case studying the deployment of Imprint, different communities use print facilities in a host of different ways. And what printing means for the individuals in communities is also subject to negotiation and re-negotiation. So visualizations that work to spark reflection in one community could be taboo in another. Or, perhaps worse, just not interesting.

Biography

Zachary Pousman is a Ph.D. student in Human-Centered Computing at Georgia Tech. He is a member of the Information Interfaces laboratory headed by John Stasko. Zachary's research applies information visualization techniques to personal and workgroup data streams to provide novel views of everyday activity. I am not driven by a desire to optimize activities, but to open activities for inspection and personal meaning-making. My thesis explores issues of design and evaluation for systems whose usefulness lies in their ability to provoke new connections and conversations.

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