

## **Learning in Networks: Researching a community of collaborators**

Amir Lopatin Final Report  
March 2011

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## **Overview**

This report describes ongoing research and associated data coding activities that were funded by the 2010 Amir Lopatin Fellowship. I am investigating the learning and community development processes and outcomes at an “innovation camp,” where thirty-five young adults lived together and collaborated on projects inspired by imagining “the future of work.” More specifically, this study analyzes both the social networks and collaborative practices that emerged as well as the individual insights that participants took away from the experience. Data that inform this study are both self-report and behavioral, including observations, interviews, surveys, and photographs. Along with providing resources for the coding and analysis of interviews, the Amir Lopatin Fellowship helped fund the development of a tool to code thousands of photos that were taken in the camp co-working spaces. Social network data derived from these time-lapse photos as well as from survey data analyses are currently underway, and results will be published as part of my dissertation study.

## **Introduction**

Few would dispute the importance of innovation in modern society. Researchers and experts across disciplines are deeming creativity and innovation relevant not only to the arts and sciences, but also to the survival of our economy. As such, organizations and individuals are increasingly seeking ways to support and promote innovative work, just as educators are seeking ways to prepare children to become tomorrow's innovators. There has been a recent surge of experimentation with settings that are meant to spark and incubate innovation. For instance, NASA's Jet Propulsion Laboratory has put together short-term interdisciplinary teams of scientists and engineers to work in a context of "extreme collaboration" (Shaw, 2007); leading design firms engage in time-intensive collaboration as they host "deep dives" (Kelley & Littman, 2001); companies such as Google and Apple inhabit campuses that encourage extended work days, creating a context of "radical co-location" (Teasley et al, 2000); and, independent entrepreneurs are building their own networks of innovators and hosting "hack-a-thons" and other intensive brainstorming and prototyping sessions. Yet, there have been few studies that investigate these burgeoning innovation environments.

Beyond experimenting with new environments, another trend to support innovation involves organizations sharing resources, including team members who have increasingly specialized areas of expertise. This approach, often referred to as "open innovation" (Chesbrough, 2003), means that teams are becoming more short term and more diverse. As a result, challenges of social dynamics, which can already pose insurmountable obstacles to teamwork, are becoming more complex (Du Chatenier, 2009).

Current research presents sometimes contradictory evidence on what structures and settings are most conducive to effective team performance and innovation. The roles of social

cohesion and team diversity are still debatable and are dependent on the context. For instance, social cohesion, which is commonly viewed as beneficial to innovation and knowledge creation (e.g., Granovetter, 1983), can sometimes impair innovation (e.g., Janis, 1972); and, diversity of team members has been associated with positive outcomes, but only when teams are managed well (Cohen and Bailey, 1997; Shaw, 2007). The research described here is designed to advance our understanding of processes that underlie open innovation, challenges that are faced by diverse teams, and what collaborators learn from experiences working within innovation teams that might be transferred to new collaborative contexts.

### **General Description of the Study**

To contribute to our understanding of current environments designed to support innovation, I investigated the learning processes and outcomes of one intensive collaboration setting: a seven-week “innovation camp.” This study builds on the work of Lave and Wenger, who have researched workplace communities of practice (e.g., call centers and tailors) *in situ* to explore how people learn (Lave and Wenger, 1991; Wenger, 1998). In an effort to understand how collaborators *learn to become* innovation teams, this research will investigate the learning processes and outcomes of this nascent innovation community. My analysis, which draws from Rogoff’s *three foci of analysis* (1995), investigates group and individual learning from the perspective of the participants and from the observed practices in project teams and within the community. The primary research questions guiding the analysis are the following: *How do individuals articulate and embody their learning? How might learning and experience differ depending on how individuals choose to interact on project teams and in the community as a whole?*

### *Participants*

Participants were 28 camp residents and seven camp organizers who lived and worked together at an innovation camp in a European urban center for seven weeks. The seven camp organizers were German and Swiss, aged 23 to 30, with backgrounds in entrepreneurship, music business, social work, and cultural studies. Residents were young adults, aged 19 – 31, with diverse backgrounds and from 14 countries across four continents. Residents were selected from over 600 international applicants using informal selection criteria with the goal of creating a group loosely balanced in gender, age, nationality, and disciplinary background.

### *Setting*

The camp invited 28 young adults to live together and collaboratively develop projects that explored “the future of work.” Other less explicit, yet equally central, goals at the camp were to develop ways of working together, have an experience of personal growth, and build a lasting community of collaborators. Camp residents were free to explore different project topics, team roles, and ways of working together. Unlike formal work and educational settings in the “real world,” projects were not constrained by assigned topics, teams, roles, or extrinsic rewards, such as grades or income. Like educational environments, this camp was meant to be a place for learning and exploring; a primary goal was individual development, achieved through engaging in activities within the community.

### *Materials*

**Surveys.** Twenty-seven paper surveys were administered, one per day, on most weekdays across the two months of the camp. Surveys contained six to seven questions, two Likert scale questions and three open-ended questions, pertaining to the individuals’ motivational-emotional experience and one or two additional questions that varied based on the

emerging experiences at the camp. These additional questions addressed collaboration, projects, and camp practices. A one-year follow-up survey was also administered online to assess the social networks and community building present at the camp

**Interviews.** I interviewed participants after the camp using an unstructured interview protocol. In the resident interviews, questions asked individuals about their motivations for attending the camp, how their projects developed, challenges they faced, their individual learning, and their sense of belonging. There were four additional mid-camp interviews with residents regarding the progress of their projects. The organizers were also interviewed after the camp using an unstructured interview protocol with questions pertaining to resident selection, impressions of camp projects, how they supported projects, and their sense of resident belonging.

**Camp documentation.** I collected videos, photos, and Internet articles created by camp participants, organizers, and outside journalists for the creation of case narratives. Quantitative data regarding participation in co-working spaces will be extracted from an analysis of over 36,000 time-lapse photographs captured over 21 days at the camp. [See Table 1.]

### *Design*

My role as an embedded participant-observer allowed me to follow the practices, idea development, and social dynamics of project teams as they emerged and developed across time. Researchers of creativity concur that tracking where ideas come from and how they develop is challenging. People are not good at identifying what influences their ideas or at remembering how ideas evolved, and they do not recognize these gaps in their understanding (Dunbar, 1999; Sawyer, 2007). Acknowledging the limitations of various forms of data collection, my approach was comprehensive, including interviews, field notes, audio and video recordings, participant-generated artifacts, and surveys, and I triangulated data whenever possible. For instance, my

deep immersion in the field may have threatened the subjectivity of my field notes.

Consequently, I developed interview and survey questions to test themes and emergent hypotheses, and I video-recorded community meetings. I also collected audio recordings of some team project meetings.

### *Procedure*

Living and participating as a camp resident, I spent approximately 850 hours observing over 48 days. During this time, I took 120 single-spaced typed pages of field notes supplemented by hand-written notes jotted down during the day. Also during the camp, I administered very brief paper surveys on most weekdays and, as noted above, collected video and audio recordings of community and team meetings. After the camp, I conducted 32 interviews with residents and organizers that ranged in duration from 30-90 minutes. In addition, I collected digital and Internet artifacts, such as pages of the camp website, articles about the camp, and participants' personal websites and photographs, including 36,000 time-lapse photographs of the co-working spaces at the camp (see Figure 1). Finally, as a one-year follow-up, I conducted an online survey to explore the social network that formed at the camp. [See Table 1.]

**Table 1. Data Collection Methods**

<b>Data</b>	<b>Focus</b>
Interviews	Project idea evolution, team dynamics, learning about creativity, teamwork, and self (“ <i>What is a challenge your team faced?</i> ” “ <i>What did you learn about yourself and how you collaborate?</i> ”)
Field Notes	Practices, idea development, and team dynamics of projects and within the community as a whole
Surveys T1	Individuals’ frustration, inspiration, and enjoyment on Likert and open-ended questions (“ <i>To what extent did you feel frustrated yesterday?</i> ” “ <i>What most inspired you yesterday?</i> ”)
Artifact Collection	Photographs of camp, including 36,000 time lapse photos, articles and blogs about the camp
Video/ Audio	Community meetings video-recorded, team meetings audio-recorded
Survey T2	Social Network Analysis – idea network, project building network, and friendship network

**Figure 1. Co-working space captured from six viewpoints using time-lapse photography. One of approximately 6,000 time points.**



(Retrieved from <http://vimeo.com/11753039>, May 17, 2010.)

## **Analytic Approach**

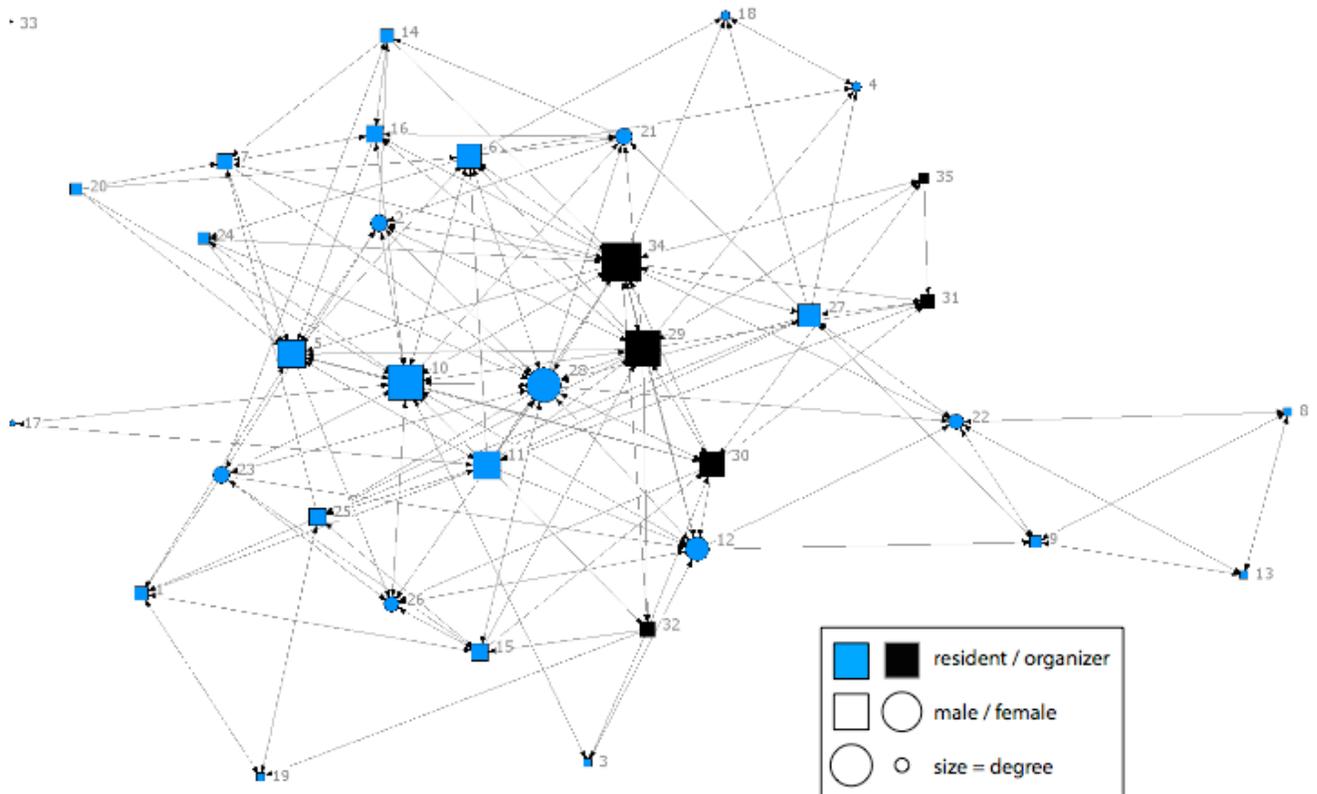
As noted above, I adopt *three foci of analysis* (Rogoff, 1995) to investigate what individuals learned and how team and community dynamics may be associated with this learning. Below I describe my approach to developing measures and my analytical approach.

### *Measurement*

**Learning about innovation teamwork.** Using the qualitative data analysis package NVivo, I coded individual interviews for participants' articulation of insights about working on innovation teams. I developed the coding scheme using a grounded theory approach but also built on the existing literature on innovative teams. Initial broad themes include insights about process, insights about self in relation to team, and insights about outcomes. Within each of these themes, subcategories are being developed. I will compare types and breadth of insights articulated for individuals who differed in the depth of their engagement in the broader innovation community. Subsequent analyses of field notes, videos, and artifacts will elucidate how the community embodied learning in practices that emerged.

**Centrality of participation in community.** Results from the follow-up survey's Social Network Analysis [SNA] data reveal that there is variability in individuals' centrality, as measured by "degrees," or number of ties in the network, and "betweenness," or number of shortest paths between individuals, in both teamwork-based and friendship-based social networks. Some individuals were "butterflies," connected to many different individuals and projects, others were moderately connected, and still others were fairly isolated. [See Figure 2.]

**Figure 2. Graph of the project implementation network based on initial self-report social network analyses.**



In addition to the SNA from self-report data, I will also conduct analyses using behavioral data coded from a subset of the 36,000 time-lapse photographs of the camp co-working spaces. To capture social interaction during the second half of the camp, organizers mounted six still photo cameras that took digital photographs at five-minute increments. Coding of these photos offers dynamic behavioral data that will elucidate how the social network

evolved. This time-lapse SNA will contribute to my analysis on community development as well as the analysis on roles within the camp.

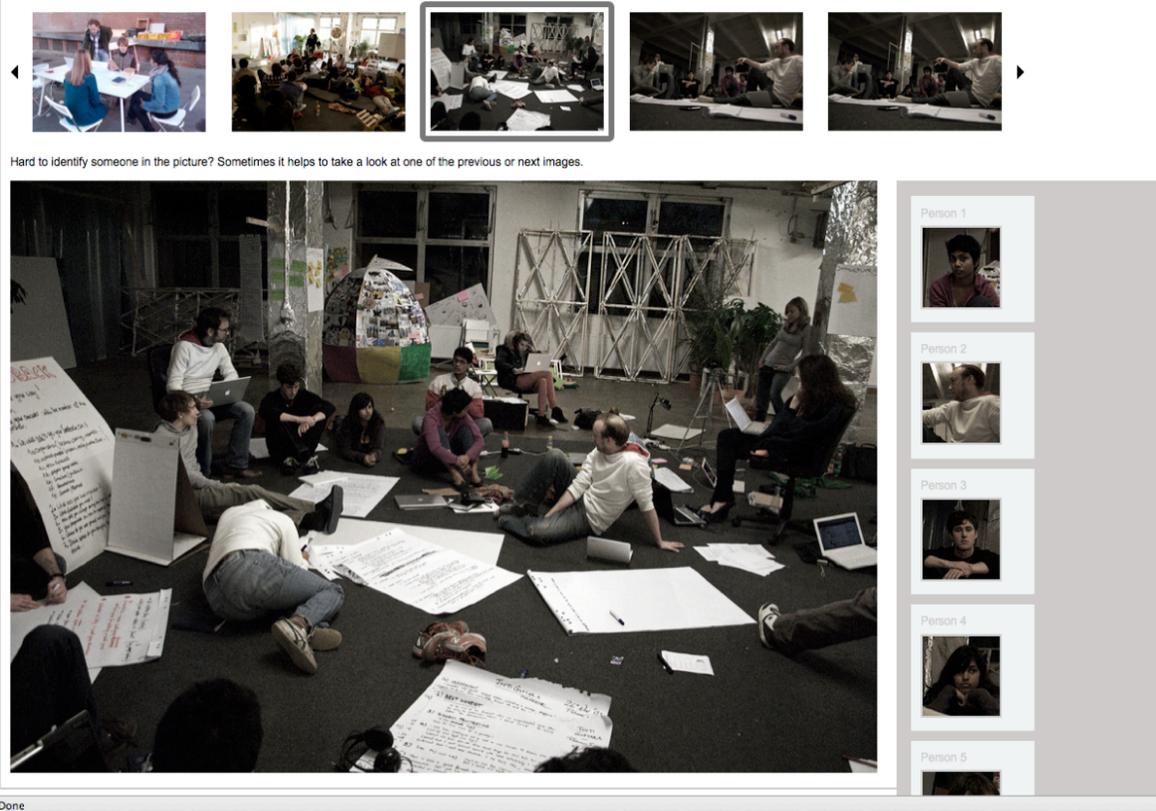
Coding such a large database of photographs was not feasible as a singular researcher. Therefore, I set out to develop a tool that would allow crowdsourcing of the task via Mechanical Turk. With funding from the Amir Lopatin Fellowship, during the summer of 2010, I collaborated with a designer and programmer to 1) prototype a system for coding social interactions visible in the photographs, 2) develop a plan for coding on Mechanical Turk, and 3) design graphic visualizations that illustrate team social interactions over time. [See Figures 3-5 for illustrations of prototypes.] I am currently using the alpha version of the tool to apply for grants towards the development of a beta version that may be packaged and streamlined for other researchers' use. This step of my analysis will not only serve to validate the self-reported SNA findings, but it will also contribute to SNA methods for studying work teams.

**Figure 3. Low-resolution mock-up of photo coding interface.**

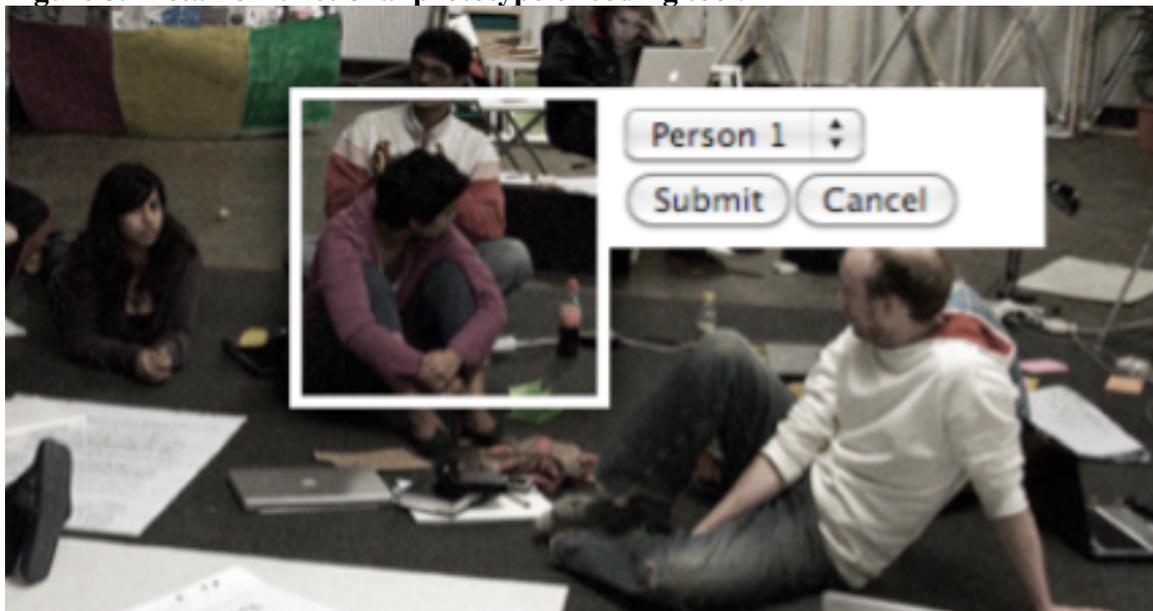


**Figure 4. Functional prototype of coding tool.**

step 1/3



**Figure 5. Detail of functional prototype of coding tool.**



### *Analysis*

Although all participants came away with strong convictions as to the best practices of creative collaboration, there were variations in their insights. In order to understand whether the degree of community participation was associated with learning outcomes, I will contrast groups that differ in their "centrality," as determined by the self-report and time-lapse SNAs. Types and breadth of insights articulated will be compared for individuals who differed in the type and depth of their engagement in project teams and within the broader innovation community. This analysis is currently underway, and results will be published as part of my dissertation to be defended during the summer of 2011.

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