Hackathon Team Leadership: Supporting Innovation through Teaming at Time-bounded Events

Eureka Foong

Northwestern University

Evanston, IL 60208, USA

eureka@u.northwestern.edu

Elizabeth Gerber

Northwestern University

Evanston, IL 60208, USA

egerber@northwestern.edu

Abstract

Organizers of time-bounded events bring together professionals to form interdisciplinary teams and generate breakthrough technological solutions. While such teams need support to innovate, event organizers invest more effort managing logistics rather than supporting individual team processes critical to innovation. Through a six-week participant observation of a weekly civic hackathon in Chicago, we analyzed the extent to which individual team leaders follow Edmondson's Framework for Effective Teaming. While team leaders had opportunities to define meaningful goals, they faced challenges encouraging diverse perspectives, seeking rapid feedback, and organizing knowledge gained. Event organizers can support individual teaming by modeling behaviors that foster psychological safety, coordinating community partnerships, providing alternatives for recording team progress, and setting success criteria around project iteration. Our work fills an important gap in extant research that describes the goals, outcomes, and operations of time-bounded events, rather than individual team leadership processes that lead to innovation.

Author Keywords

Hackathons, civic, leadership, teams, collaboration, feedback, community, innovation

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction and Background

Corporate, non-profit, and government organizations increasingly turn to time-bounded events to solve challenging, ill-defined business and societal problems [10]. Each year, Microsoft hosts one of the largest private hackathons, inviting employees across 75 countries to develop novel technology [12]. Internet of Elephants, a social enterprise based out of Kenya and the U.S., hosts hackathons to support the conservation of endangered animals [16]. In 2016, more than 3000 people participated in GovHack, a hackathon using open government data sponsored by the Australian government [17]. While the goals [2], duration, and frequency [6] of these events vary, event leaders share the belief that collocating talented professionals with diverse ideas and skills will produce creative products, solutions, and business ideas.

Although exposure to diverse ideas and skills is certainly essential to individual team innovation, alone it is insufficient [7]. In a study of innovation teams, leaders actively encouraged capturing and testing diverse ideas to learn more deeply about team members' skills [7]. Based on 30 years of empirical research, teams researcher Amy Edmondson [4] finds that individual teams that produce innovative solutions have leaders and teams that prioritize the following five processes:

- **Aiming high:** Leaders set challenging, meaningful goals that spur and sustain action, such as building an energy efficient, symbolic stadium for the Beijing Olympics in 2008.

- **Teaming up:** Leaders prevent communication breakdowns in interdisciplinary groups by being genuinely curious about others and creating a space of psychological safety [5]. For example, web developers working with designers should feel comfortable clarifying website functionality instead of assuming the designer's intent.

- **Failing well:** Innovative teams maximize the number of "intelligent" failures (p. 87) by continuously experimenting, such as testing the demand for an upcoming product with a small group of users.

- **Learning fast:** Leaders learn fast by fostering psychological safety so that teams can easily diagnose problems, generate and test solutions, and reflect on knowledge gained from testing. For example, product design teams at IDEO used multiple observations of people sleeping to generate quick prototypes for an innovative mattress [3].

- **Repeating the process:** Innovative teams form habits around failing and learning to improve on their ideas, such as by applauding intelligent failures and holding brief meetings to reflect on what the team has learned.

While these leadership behaviors are critical in teaming for innovation, hackathon event organizers currently

pay little attention to these individual team processes because they are busy addressing other aspects of the event. In our personal experience leading five hackathons in the last 10 years, we spent the majority of time identifying venues, purchasing food, recruiting participants and partners, and scoping projects, instead of managing effective team leadership behaviors and team interactions. The lack of attention to these activities is echoed in the accounts of other event organizers (i.e., [15]). Time constraints that limit the ability to form social ties [13] make it even more crucial for event organizers to facilitate effective leadership. To date, scholars and practitioners have described the goals and outcomes [1,8,10,11] and knowledge-sharing processes [9] of time-bounded events without critically examining the individual team processes that lead to innovation.

Our goal is to bring awareness to individual team processes that influence innovation and offer ways that event organizers can plan for more effective individual teaming. We use a six-week participant observation of a recurring civic hackathon to understand the extent to which a team and its leader follow Edmondson's Framework for Effective teaming. While the event provides opportunities to create personal and challenging goals, an individual team leader can still face difficulties encouraging participation from new members, seeking rapid feedback, and organizing the knowledge gained across meetings. To produce more innovative solutions within individual teams, we recommend that event organizers model behaviors that promote psychological safety, help individual team leaders connect with community partners, offer alternative solutions for recording team progress, and incentivize teams to iterate on their solutions.

Description of the Field Site

Our analysis is based on the first author's six-week participant observation of a weekly civic hackathon in Chicago from January to April 2016. The event, which is held from 6:00 p.m. to 10:00 p.m., is part of a network of hackathons in the U.S. focused on engaging citizens to help solve civic issues such as improving government transparency and preventing bacterial outbreaks. In this paper, we define event organizer as a person who plans the larger hackathon event and team leader as a person who leads a project team within the hackathon. All names used in this paper are pseudonyms for actual participants in our study.

Every week, 40-150 working professionals, freelancers, and students in the technology industry attend the event, at least half of whom are return visitors. The event begins with an hour-long lecture from a guest speaker who has worked with government data. Next, individual team leaders from previous weeks invite attendees to join project "breakout" groups. Any attendee of the hackathon can propose a project and become a team leader; the event organizers, Peter and John, do not instruct teams to follow a work process or set specific goals. The first author joined Justice in the City, a project team led by a nonprofit attorney named Kelly. Each week, the team worked to reduce the rate of recidivism by providing information that would prevent parolees from violating parole. Because attendees are free to join and leave teams at any time during the hackathon, the size of the team varied between three to seven people each week. At the end of the six weeks, team members had developed a deep understanding of the design problem but had just started creating content for one solution.

After each hackathon, the first author wrote field notes and memos, drawing themes through continuous reflection on the data as well as academic literature [14]. The first author attended project meetings for the same Justice in the City team and observed chats in the team's online communication channel, *Slack*, with permission. The first author also attended one leadership council meeting that included John, an event co-organizer, and four men who had previously attended the hackathon. All attendees were welcome to join the meeting, which occurred during the hackathon. Neither the co-organizers nor the attendees of the hackathon were paid; however, Peter, an event co-organizer with formal training in public administration, was paid for his work managing the larger network of civic hackathons. As part of his role, Peter prepared leadership guidelines for other hackathon event organizers. The author also interviewed Peter about his motivations for joining the civic hacking movement.

Results

While we found evidence of activities that supported processes Edmondson's framework [4], we also found significant challenges for team leaders to balance multiple roles while producing a testable solution. In spite of this, participants at the leadership council meeting spent little time discussing the progress of individual teams, discussing instead issues of event funding, creating promotional materials to attract sponsors, and connecting with local political officials. Below we discuss the extent to which one team's experience followed Edmondson's [4] framework.

Aiming high refers to setting challenging and meaningful goals that unite and drive teams to action. The event organizers excelled in showing individual team leaders examples of challenging goals presented by charismatic guest speakers. For example, one guest speaker rallied attendees to help the government update its technology, making "a 45-year journey in four years." The structure of the hackathon, which allowed any attendee to pitch or join a project team, gave individual team leaders the freedom to create personally meaningful goals. For example, one team leader's goal was to "stop people from getting sick" by helping predict levels of bacteria in the water. The structure of the event provided many examples of and opportunities to present challenging goals, yet the goals themselves were largely dependent on the presentation skills of individual team leaders.

Teaming up refers to managing team interactions so that members feel safe to share ideas and failures and prevent miscommunication. Kelly modeled leadership behaviors that promote psychological safety, such as acknowledging when she lacked understanding about the parolee community and asking follow-up questions when team members shared ideas. Nevertheless, new members contributed little to the discussion because they were unfamiliar with the team's work history. At the first meeting, the author felt useless because returning members referenced tasks for a different project. Only when she asked how she could help did the leader ask about her interest in typing notes.

Failing well refers to incrementally improving team processes by testing the team's assumptions. Kelly tested the team's assumptions about challenges parolees face by inviting people who have worked with parolees to meetings. During one meeting, team members learned that finding employment with a criminal history is one of the most difficult components

of reentering society. This prompted the team to design a more complete guide on reentry, instead of an application that merely alerts users of possible parole violations. However, because Kelly coordinated these meetings, the team did not test their assumptions about parolees' needs when guests could not attend.

Learning fast refers to rapidly creating and testing prototypes to better understand problem constraints. Because it was important to generate buy-in from local organizations, Kelly focused the team's initial efforts on need finding rather than on the creation of rapid prototypes. For example, the team learned that a hotline for employment assistance was unreliable after a team member called the hotline during the meeting. Only in the last two weeks did team members begin writing content for a guidebook for recent parolees. The team may have had more opportunities to develop their prototype with more frequent meetings and additional support from event organizers to gather information about the parolee community.

Repeating the process refers to the team forming habits around the four previous activities. Because the hackathon was held weekly, team leaders had opportunities to repeat this learning process. Yet, it was difficult for Kelly to document the work and research done *outside* of meetings. Because the team was focused on need finding and creating written content for a guidebook, they could not rely on GitHub code repositories to document their progress as other teams did. The first author introduced the team to *Trello*, a program for creating visual task boards; however, few members had updated the *Trello* task board during the week and valuable time was spent updating online documents at the hackathon.

Recommendations for Supporting Individual Team Leaders at Hackathons

Given the range of responsibilities of individual team leaders at civic hackathons, we highly encourage event organizers to support them in conducting effective teaming. Within teams, leaders can choose to prioritize support in areas they are most lacking; for example, if a team often receives new members, the team leader may need to be reminded more frequently to invite these members to participate. Our study suggests the following as opportunities for improvement:

- **Encourage psychological safety in teams, particularly for new members:** Team leaders may not be aware of the need to invite new members to participate in discussion. Hackathon event organizers should consider modeling this behavior from the beginning, for example by presenting a brief video of team leaders inviting new members to share ideas.

- **Help team leaders form and maintain connections with community partners:** To generate solutions with a high chance of being adopted by the community, civic projects must consider the needs of existing community organizations. Hackathon event organizers can help individual team leaders connect with community partners and coordinate transport of partners to the event.

- **Provide alternatives for documenting team progress beyond code repositories:** To iterate on solutions, teams that gather knowledge of a user community must be able to document their progress outside of code

repositories. Event organizers can support team leaders by providing alternative tools for organizing their knowledge.

- **Set criteria for success around team processes:** To incentivize teams to seek feedback and iterate, event organizers should ask teams to describe how their solution has evolved in light of user feedback.

Limitations

Edmondson's framework assumes that teams can develop over time. Although we observed a recurring hackathon, the team may not have had the time to practice these leadership processes because team members were free to join and leave during the hackathon. Another limitation of this research is the focus on one team's experience at a recurring hackathon, which may not generalize to other hackathon models. For example, at a one-time hackathon, team leaders may not face as many difficulties integrating new members as all members will have the same work history.

Future Work

In future work, we will test the effectiveness of these recommendations by conducting additional interviews with event organizers. Together with organizers, we will develop materials and activities that address these recommendations. We will use surveys and participant observation to assess how these activities influence the frequency of participation of new members, the involvement of community partners, a team's ability to iterate using previously acquired knowledge, and the effectiveness of solutions produced by teams.

Conclusion

Exposure to diverse perspectives is necessary but not sufficient for innovation. By analyzing one hackathon team's experience using Edmondson's Framework for Effective Teaming, we find several opportunities for event organizers to support individual teaming: helping team leaders encourage participation from new members, seek rapid feedback, and organize their team's knowledge. Even if event organizers recognize the importance of team processes to innovation, producing appropriate interventions may be challenging due to time and attention constraints at hackathons. We hope to gain valuable feedback about the feasibility of our recommendations in the context of time-bounded hackathons so that we may support innovation.

About the Authors

Eureka Foong is a PhD student and a Segal Design Cluster Senior Fellow at Northwestern University studying crowdsourcing applications that support design education. She has spoken at TEDx about user research and problem solving at civic hackathons.

Elizabeth Gerber, PhD, is the Charles McCormick Professor of Design at Northwestern University and Faculty Founder of Design for America, a nationwide network of student design teams. Her current research focuses on understanding the work of social innovators in online and offline communities.

Acknowledgements

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