ISSUE-ORIENTED HACKATHONS AS AD-HOC DESIGN EVENTS

THOMAS JAMES LODATO
GEORGIA INSTITUTE OF TECHNOLOGY
THOMAS.LODATO@GATECH.EDU

CARL DISALVO
CARL DISALVO
GEORGIA INSTITUTE OF TECHNOLOGY
CARL.DISALVO@LMC.GATECH.EDU

ABSTRACT

Issue-oriented hackathons are events at which groups of people work together to address socially-oriented "challenges" through the development of technical interventions, usually in software or hardware. Drawing from ethnographic research of multiple hackathons, we argue that issue-oriented hackathons exemplify a mode of situated and contingent design-through-making, or, mode of *ad-hoc design*. In the context of issue-oriented hackathons, ad-hoc design enables participation in design things, specifically, it enables the construction of proto-publics: experiments in orienting people and resources toward issues.

INTRODUCTION

Hackathons are curious when considered in relation to participatory innovation. On one hand, hackathons certainly resemble participatory innovation. At these events, experts and novices collaborate to make technical systems and services. Growing increasingly professional, hackathons are sites where organizations and wider populations can envision new technologies together. On the other hand, hackathons emphasize technical production over thoughtful design, both rhetorically—through the trope of hacking and the hacker—and in practice. Hackathons are, then, between participatory innovation and open development.

First appearing in the late 1990s in the software industry, hackathons were originally focused on labor-intensive tasks, such as important software updates or critical bugs. In recent years, hackathons have expanded beyond the walls of software companies, becoming a niche activity with broader aspirations. In many US metropolitan areas, multiple open-registration hackathons take place each month. Like their corporate predecessors, these hackathons are short, usually lasting 12 to 48 hours. Attendees are presented with problems or opportunities, called "challenges," and groups form around these challenges for the duration of the event to create or modify technical systems.

The boom in hackathons is difficult to define. Often these events are often framed in terms of increasing participation in the production of technical systems. In this context, participation seems to mean that the events foster co-working on such systems. Participation, then, is a fairly weak concept as attendance seems to be its sole criteria. Even more, core concerns of participation, such as agency and ethics of inclusion, are absent from discussions. Beyond this narrow view of participation, our fieldwork reveals more substantive possibilities of participation at these events. Drawing from our ethnographic research, this paper connects the situated and contingent work at hackathons to a type of participation in design things (Telier, 2011) through what we call *ad-hoc design*. Ad-hoc design opens space to understand participation in new ways by rethinking the what valid participation means in emerging contexts.

WHAT ARE HACKATHONS?

Hackathons relate to broad trends in "making" in society (Agre, 1997; Kuznetsov and Paulos, 2010; Lindtner and Li, 2012) and they have two distinguishing characteristics: they are *technical* and they are *events*. When participating in a hackathon, attendees collaborate in developing technical systems, such as applications, software, or visualizations. Success or failure comes from how well a system addresses its intended objective, and a technical artifact is vital for a valid argument (Agre, 1997). When we say hackathons are events we mean that hackathons, despite occasionally focusing on local issues, are marked in time rather space. Hackathons are characterized less by their material composition and more by the their activities limited by time.

Beyond these general characteristics, hackathons vary greatly, yet two trends have emerged that give more shape to these events. The first is a move toward what we call *issue-oriented hackathons* (Lodato & DiSalvo forthcoming). These are events are organized around a social topic or context, such as environmental well-being, food systems, or citizenship, rather than being organized around a technical platform (e.g. smartphones). The second trend is a move towards the

professionalization of hackathons. Many hackathons today have corporate sponsorship, significant prizes, and in some cases, even venture capital for "winners."

PARTICIPATION, HACKATHONS, AND DESIGN

When considering hackathons, participation is vital. Language of inclusion in design and making often surround these event. In this way, hackathons compare to participatory innovation activities. In premise, hackathons invite participants, regardless of their technical skills, to conceptualize and develop systems and services. This premise is more problematic in practice, however. Attendees often self-declare and group themselves based upon technical skill; those without technical skill, or lacking a desired technical skill, we frequently found, are marginalized. Although hackathons purport to open the process of development and conceptualization, they tend to do so for an already complicit audience. Issues of participation are familiar to participatory design (Disalvo et al., 2012; Le Dantec, 2012; Le Dantec et al., 2010; Marres, 2012; Merkel et al., 2004; Winschiers-Theophilus et al., 2010) and participatory innovation (Björgvinsson et al., 2010; Buur and Matthews, 2008). As such, researching hackathons reflects on these issues.

Hackathons, particularly issue-oriented hackathons, share with participatory innovation a recognition of the social qualities of making and posit that broadened participation can create new and innovative systems and services. With issue-oriented hackathons, the activities of making are explicitly cast as a way to be involved in and contribute to social causes. However, most hackathons stop short of directly engaging in politics. Where politics motivate much participatory design and ground participatory innovation (especially reflections on the distribution of power in innovation activities), hackathons, even when they engage contentious issues, often displace politics.

What was particularly curious was how design occurs in hackathons. The primary activities of hackathons is the creation of technical prototypes. These prototypes develop out of challenges. Although the challenges provide a brief of sorts, challenges do not account for the availability of specific skills or resources. As such, the prototypes are not created by rote—that is, groups do not work as technicians that carry out work. Rather participants engage in processes strikingly similar to those found in participatory design, such as collective envisioning (DiSalvo, 2009; Kolko, 2010; Kuznetsov and Paulos, 2010; Seravalli, 2012) and, hobbyist software and service development (Hess et al., 2008; Wang and Kaye, 2011). These design activities exist with and in the technical work rather than being separate from it. In total, these activities constitute a practice of situated and contingent design-through-making; we call this *ad-hoc design*. We use the term *ad-hoc* because the practice oscillates between improvisation and specificity with regards to both the technical artifact and process of designing itself. Unlike explicit relations of innovation and design (Chakravarthy and Krishnamoorthi, 2013; den Ouden, 2012; Norman and Verganti, 2014), ad-hoc design is limited, circumstantial, and organic by nature.

Ad-hoc design, we argue, contributes to and expands our understanding of participation in design things. As A. Telier explain, participation in design things involves the ongoing assemblage of people and resources that take action on matters-of-concern (Latour, 2004; Telier, 2011). At issue-oriented hackathons, participation in design things occurs as participants work together to imagine and give form to prototypes envisioned to address the conditions and consequences of an issue. As such, designing is improvised through making rather than forethought. Through ad-hoc design, issue-oriented hackathons produce proto-publics, or experiments in the organization of people and resources toward issues. These ephemeral groupings experiment with modes of participation, and offer insights into how participation might occur in relation to participatory innovation without necessarily committing time and resources.

The following is an ethnographic account of two hackathons. These accounts are representative of our ad-hoc design, and come from broader sets of observations. Through the description of these two events we call attention to the situated and contingent character of design and the activities of design-through-making. While the focus is designing—i.e. planning and negotiating workable ideas—designing offers a glimpse into innovation activities by exploring the materiality and sociality of envisioning and making, both vital to produce as well as sustain participation in innovation.

METHODS

Our research into hackathons has been ethnographic, informed specifically by work in science and technology studies (Latour, 1987; Law, 2002; Mol, 2002; Suchman, 2006). This approach includes semi-structured interviews with attendees and organizers, the collection and analysis of media relating to hackathons, including organization websites, planning documents, internal and external communications, post-event news stories and reports, and the collection and analysis of various artifacts created for and at the events, from handouts to code repositories. Multi-sited participation-observation frames all of this data.

Our participation in hackathons was multifaceted. In most cases we worked as team members by developing concepts, writing code, or designing icons for applications. In this way, our ethnographic engagement was very "hands-on" and, at times, designerly. We were enrolled as direct participants in the practices and conditions of design that we were studying. In one case, we also participated in the planning of a hackathon. This allowed us to begin to develop a more comprehensive understanding of the orchestration of hackathon events. Finally, in multiple cases we have continued to follow the ongoing development of applications from the

hackathons, which provides insight into how concepts and code circulate after the event.

TALES FROM TWO HACKATHONS

Between 2012 and 2013, we attended nine hackathons and directly participated in seven events. All of these were issue-oriented hackathons: each was organized around a social issue, including ecological well-being, food systems, and government and citizenship. These hackathons took place in three cities: San Francisco, New York, and Atlanta. As such, we admit our insights are limited to US cities—hackathons elsewhere may, in fact, be quite different events. The hackathons described herein are then representative of current trends in issue-oriented hackathons in the United States.

HACK//MEAT

Hack//Meat (HM) occurred over three-days in Manhattan (New York, USA) in early December 2012. HM focused on the US meat industry and was the third in a series of food-related hackathons organized by Food+Tech Connect (FTC). FTC is an organization that reports on the intersection between food and modern technology. GRACE Communications, an organization that raises awareness about food and water issues, co-organized the event. One of the authors attended the event as a participant-observer, and participated in the working group for the Food and Water Watch (FWW).

THE RECEPTION

Presentations began around 7:30pm. The organizers introduced the event and six challenge presentations followed, each lasting 10-15 minutes with an additional 10 minutes for questions. Presentations came from noteworthy organizations related to food and agriculture. For example, Applegate Farms, a national (USA) organic and naturally-raised meat company, presented a challenge related to customer awareness. Common amongst these challenges was the consumer focus: raising awareness, influencing purchases, or impacting diet.

THE CHALLENGE: PIG FARMING

The challenge I participated in came from the FWW, a non-profit research organization based in Washington D.C. (USA). The presenter, Marcy, explained that the FWW recently produced an extensive research report tracing the effects of farm consolidation within different agricultural areas, including pig, soy, and corn farming. The report contained technical statistics and detailed jargon. Marcy asked for help in making the report accessible to a wider audience; she suggested a website or visualization for the pig farming data. Regardless of the outcome, she wanted the result to be a "call-to-action." By call-to-action, she wanted to engage the audience beyond providing clear information.

DECIDING ON WHAT TO MAKE

On Saturday morning, the venue murmured with active discussion of the challenges. After breakfast, the organizers gathered the entire group of close to 60 people for a presentation from a group, DG, to guide design thinking. The DG presenters explained that the compressed development timeline at hackathons often neglects early design phases of exploration and ideation, and sacrificing these steps results in shallow outcomes. The presenters explained methods of externalizing ideas on sticky notes, sorting these notes, and generating personas to flesh out ideas. As these are common design methods, their explanation presumed the attendees were non-designers. Furthermore, after the presentation, a member of DG accompanies each challenge to guide discussion for the next several hours.

When the presentation ended, a group of 15 assembled around Marcy's table. Patrick from DG gave detailed instructions on how to progress in five ideation phases. In phase one, Marcy should recap her challenge presentation. In phase two, the group should ask Marcy questions to probe the challenge. In phase three, the group should break into two smaller groups and discuss the opportunities for intervention. During phase three, the groups should sort sticky notes to generate themes. In phase four, the groups should finally formulate technical proposals from the themes. In phase five, the groups should present these proposals back to Marcy.

In execution, exploration and ideation occurred very differently. The group responded to the prescribed and deliberate phases with contingent tactics. As early as the second phase, participants began suggesting concrete outcomes. To address Marcy's desire for a call-to-action, participants suggested an interactive infographic, an informational HTML5 website, and a simulation game. Patrick asked participants to put these ideas aside and "stay broad." Participants wrote these ideas on sticky notes, but did not place them on the wall. When phase four arrived, participants reintroduced these ideas as outcomes. Now placed amongst the thematic notes, these ideas aligned the outcome with the existing skills of participants.

In phase five, Marcy expressed hesitation about the suggested infographics. They required a significant amount of extrapolation, which was a liability for FWW. Her hesitation caused a rift within the challenge group. Disregarding Marcy's feedback, about half of the group pursued these original ideas alone or in pairs. The group that remained took Marcy's feedback and formed a single group of 7 people. Marcy liked a proposal for a website that to allowed direct contact (Twitter @-reply) of political representatives. This group incorporated direct contact into their provisional proposal for a website based on the report. Building on their proposal, they proposed making a webpage that presented a polemic account of the various sections of the report. In each section, a widget generated topical Tweets and location-aware @-replies to local representatives.

WORKING: WITH INTERESTS, IN A TIME CRUNCH

I joined the main group after these presentations. We began by discussing Marcy's feedback in a workroom with a large whiteboard. Without much discussion, the

participants began volunteering and dividing tasks based their skills. Willingness to do certain tasks, more than deliberation, gave the project shape. One member, Vicky, sketched a webpage on the board with numbered sections and task lists; members self-assigned tasks and sections. Oscar, a professional developer, wanted to work on the Twitter widget as he was already familiar with what it might entail. Another professional developer, Greg, decided to make an animated video as he typically "did not get to do such things." Vicky, a food blogger, elected to manage the project as she did not feel skilled enough to code in the company of so many developers.

This in-the-moment assignment and resource allocation partially defines ad-hoc design. Generally speaking, assessing conditions, including the availability resources, is core to design. This assessment is planful and deliberate, and often is couched as the feasibility of an idea. At HM, however, allocation occurred during, rather than before, making. For example, Vicky annotated and updated the sketch as the group worked. She added subtasks to sections, amended what was unfinished, and further detailed what was being made. The sketch and lists became vital to coordinating, tracking, and shaping the final outcome. Likewise, as representative of the outcome, the sketch mirrored the webpage, and constructed an in-the-moment plan.

After self-assigning tasks, participants individually worked on their sections. The group was not silent and uncoordinated, however. As subtasks were completed, participants announced updates to the shared GitHub code repository and Vicky documented the updates on the whiteboard. For example, the group needed to reach a stopping point Saturday evening for presentations. As these presentations approached, Oscar announced which features of the widget were completed, such as postal code look-up. He then announced that he was about "push" (add) changes to the shared repository and told the group to "pull" (synchronize) these changes. This required everyone to momentarily pause to synchronize. Meanwhile, Vicky updated the whiteboard and task list.

On Sunday, the group prepared for final presentations. At mid-afternoon, Vicky used the sketch and list to coordinate. The hard deadline of final presentations meant tasks needed triage. At this time, Harry realized he would be unable to complete his section. Members of the group discussed whether they would be able to finish their tasks in time to take on Harry's. After a short talk, the group decided rushing to finish tasks risked undermining the look and feel of the webpage. Vicky erased the section from the sketch and removed the tasks. Another participant removed placeholder code from the repository, asking the group to pull this change. This triage allowed the group to meet its goal of having a completed webpage with an integrated Twitter widget by the conclusion of HM.

NATIONAL DAY OF CIVIC HACKING (ATLANTA)

The National Day of Civic Hacking (NDoCH) was a two-day event initiated through the Office of The White House of the United States of America. NDoCH took place in early June, 2013 and aimed to "bring together citizens, software developers, and entrepreneurs across the nation to collaboratively create, build, and invent, using publicly released data, code, and technology, to solve challenges relevant to our neighborhoods, our cities, our states, and our country." ("National Day of Civic Hacking," 2015) Intel, Edelman (a public relations firm), SecondMuse (an innovation consultancy) and Socrata (a civic software company) co-sponsored NDoCH. Several civic-oriented organizations, including Code for America, Random Hacks of Kindness (RHoK), and Innovation Endeavors, coordinated the local sites. One of the authors took part in NDoCH in multiple ways, from presenting a challenge to participating in local, regional, national organizing. The event described occurred in Atlanta, GA in June 2013.

THE EVENT

I arrived at the site for the NDoCH early on Saturday morning to assist help set up. The NDoCH Atlanta was housed on the 7th floor of a Midtown office building. Midtown was a relatively well-to-do neighborhood, triangulated by three universities. The office building housed multiple tech startups and offices for technology and economic development advocacy groups.

Participants began arriving around 8:30am, and talked over bagels and coffee. At 9am, challenge presenters spoke. The challenges varied widely in scope—from official government challenges to those of local organizations. For instance, representatives from the U.S. Census Bureau focused on a series of new APIs for census data. The representative asked for teams to produce prototypes that would demonstrate the value of Census data. A Peace Corps representative, who had previously attended a RHoK event and chose to come back for NDoCH, presented five challenges, each of which had been prepared by a Peace Corps officer currently in the field. His purpose for attending NDoCH was likewise to have prototypes built, but not for demonstration purposes alone—these prototypes would serve as the basis for software deployable in the field.

THE CHALLENGE: FOOD SYSTEM VS. FOOD SYSTEMS

I presented a challenge that had been developed by local food advocates at a previous hackathon. The challenge called for a mapping application to document local food resources. The map would compare access to food with other data (such as federal income bracket) in an attempt to begin to document food issues and opportunities in the region. *Metro Food and Farm LLC,* a local group committed to food access and sustainability, proposed a similar challenge. To address common concerns and shared opportunities, the two food system projects decided to initially work together.

After the presentations, the combined group convened to brainstorm. One of the participants was a "visual

facilitator" and explained that her professional duties included facilitating and documenting brainstorming sessions. Given this experience, the group agreed she should lead the brainstorming session. The conversation focused on shared technical skills, desired outcomes, discussing the local food system, and sharing known resources for data, mapping, and visualization. The outcome of the brainstorming session was an agreement to work as two affiliated groups—one group would concentrate on developing a map of local food issues/opportunities, and the other would design a website to explain the *Metro Food and Farm LLC* initiative. Later, the map would be integrated into the website to document the need for such an initiative and, more generally, provide an example of how open data and maps can support a more robust local food system.

WORKING: WRANGLING OUR WAY TO A MAP

The map team was lead by Jeb, a geographic information systems (GIS) professional. Since Jeb spent his days working with large datasets and integrating them into professional mapping software to produce maps used as part of public health research, he was well-suited to this challenge. Jeb initially suggested using the ARC GIS platform (a standard for professional mapping), but group members felt ARC GIS did not match their commitment to openness and accessibility.

One of the co-sponsoring organizations at NDoCH was Socrata, a company that developed open government platforms and software for municipalities. Although Atlanta had yet to purchase the Socrata platform, a trial platform had been set-up and was available for the hackathon. Six Socrata engineers were on site and offered assistance to teams. Within a few hours, Jeb constructed an interactive map using the Socrata software. The map combined two datasets: one of local farmer's markets and another of public transit stops. The map aimed to illustrate how accessible and inaccessible farmer's markets were to public transit riders.

Producing this map provides another example of the ad-hoc character of design at hackathons. The map team was comprised of Jeb, two Socrata engineers, one of the authors, and a graduate student with experience in both public policy and GIS. Once we determined Socrata was the platform, the Socrata engineers joined the team to discuss our goals and what datasets we had and needed. We had brought the farmer's market dataset with us, and we provided a copy of it as an Excel spreadsheet to the Socrata engineers. Another Socrata engineer located the public transportation dataset and loaded both datasets into the Socrata system. Over several hours Jeb and the Socrata engineers worked on the map from opposite ends of the table and the system. As Jeb customized and configured the front-end display, he requested that the back-end datasets be reformatted and permissions be changed—both of which were done on-the-fly by the Socrata engineers. With some regularity Jeb stopped to ask "is this is what the group wanted?" and we provided feedback. In the early stages, we probed the availability of certain specifics of data; later, as the data was fixed, we suggested tweaks to the look and feel of the map.

At the end of the first day, the two teams gathered to discuss their progress and plan the next day. The map was completed and ready to be added to the website. On day two, Jeb was going to develop a manual for using the mapping system. The web team was set to complete the content development by the morning, after which the website and map would be integrated.

The second day began slowly. Jeb began by creating a manual for using the Socrata mapping platform. The web team hustled to install WordPress. Once set-up, a problem arose: the map and WordPress were incompatible. In the rush to complete a demo for the afternoon presentations, a workaround was suggested—the map data was exported from Socrata and imported into Ushahidi, another mapping platform. This map was then pulled into the website. While this sacrificed some interactivity and aesthetics, the group was satisfied.

Other members the web team worked on completing RHoK's documentation required as part of the NDoCH. This process turned out to be a challenge. The format of the documentation was unfamiliar to the team and they struggled to articulate the problem and solution in the manner requested. Still, by mid-afternoon, the team finished their tasks.

Around 3:00pm on the second day the teams presented to a panel of judges that included RHoK staff, members of the City of Atlanta Innovation Service Delivery team, and members of local web agencies. The map team presented first, followed by the web team. Later in the afternoon the winners were announced in an awards ceremony. The web team won second place.

DISCUSSION: AD-HOC DESIGN

Although these two hackathons engaged different issues, and did so under different circumstances, the *ad-hoc* character of these events was common. Design is often considered an intentional activity (Büscher et al., 2001; Le Dantec, 2012). Upon initial reflection, ad-hoc and design seem antithetical. But, we argue, what we witness at issue-oriented hackathons is a mode of ad-hoc design, and that such a practice has value to participatory design and innovation, especially in relation to notions of design things and publics.

The value of the ad-hoc within design is not new. In 1972, Charles Jencks and Nathan Silver produced and exhibition and accompanying book titled *Adhocism: The Case for Improvisation* (Jencks and Silver, 2013). Notably, the book has recently been re-released, with a new introduction discussing the role of the ad-hoc in contemporary architecture, design, and social and civic life. Key to adhocism was the use of at-hand materials to solve problems in the moment. The ad-hoc character

of design that we witnessed at hackathons is akin to this, with a change in the materials at hand.

What we mean by ad-hoc design is both a structure and process that is highly dynamic and not generalizable. Ad-hoc labels a flexible strategy to emerging conditions. Neither the activities nor their outcome are necessarily extensible in any context other than those at hand. As such, ad-hoc design is an activity of design that emerges as what is being made changes, shifts, and develops.

For example, consider the contingent and provisional design of the FWW website at HM. Over the various phases of deliberating what to make, the website took shape through the amassed (and later dispersed) skills, tools, and knowledge within the FWW group. As much as these resources, skills, and desires attended to Marcy's challenge, they depended on the attendance and compliance the working group. The website created, then, was not representative of the initial design brief (the challenge), but rather expressive of the constitution of the group and its collective capacities and desires.

Ad-hoc design is characterized by adjustments to the scope and outcome of a prototype *during making*. Rather than assessing feasibility before development (i.e. the availability of skills, resources, and time), design and development are conjoined. Ad-hoc design constitutes a mode of continual, rather than iterative, assessment, on-the-fly adjustments, and emerging goals.

Examples of this continual assessment and adjustment in design-through-making run throughout hackathons: the last-minute change of mapping platforms at the NDoCH and the removal of a deliverable at HM. Both of these instances came from *in situ* decisions. Such adjustments are not limited to the outcomes; the groups are also subject to continual reassessment. At NDoCH, while the map group had a distinct task, members needed to set aside the map to properly submit their project to RHoK. Ad-hoc design, then, requires in-the-moment problem-setting and problem-solving, such as resource management and allocation during prototyping.

Ad-hoc design is characterized as both opportunistic and deeply formal. Ad-hoc design is opportunistic since it depends on what is available—e.g. datasets, people, and time. A given instance of ad-hoc design is shaped by availability. Ad-hoc design is deeply formal since it focuses primarily on a process of making and form-giving. While making implies many forms, from the conceptual to the physical, ad-hoc design relies upon what exists *at a given event* rather than what will, or might, exist at some future in development. Combined, ad-hoc design is characterizes a continual, responsive, and contextual form-giving practice.

In this way, ad-hoc design provides a means to discuss design logistics and execution as part of design work. Rather than attempting to label development work as design, ad-hoc design offers a frame to rethink the temporal discreteness found inherent in definitions of iterative design. These definitions assume design is a precondition or plan for development, and development either abides or deviates from said plan. Ad-hoc design offers a different view: some development decisions are not just impactful on design, but are design themselves as they can align and envision more than just the technical aspects of an outcome. Ad-hoc design is, then, not a category of design, but an approach and frame for design practice that reconciles design and development.

One might argue that design is always responsive and situated (Suchman, 2006). Although concepts like design placements (Buchanan, 1995) and abductive sensemaking (Kolko, 2010) speak to design being responsive, these notions focus on responding to conditions and constraints at design time—that is, before making—through considerations of the complex overlays of needs, wants, and constraints. These notions privilege design by splitting knowing from making, and in turn strip design practice from what might be called the realities of execution: availability, budget, time, resources, engineering, and so forth. These concepts, then, may be quite correct for most design practice, but they do not adequately convey the character of design we witnessed at hackathons, foremost because as they tend to bracket making as separate from designing.

The ad-hoc character of design at hackathons also resonates with practices of everyday design (Wakkary and Maestri, 2007) and DIY (Kuznetsov and Paulos, 2010; Tanenbaum et al., 2013; Wang and Kaye, 2011). All of these modes of design share a quality of resourcefulness and improvisation. Yet, importantly, many, if not most, of the participants in hackathons are experts, or at least professionals in related fields. As such, how they approach the work of technical conceptualization and development differs from amateurs—the improvisation and resourcefulness of most participants at hackathons is skilled. As such, ad-hoc designing is perhaps closest in character to bricolage (Büscher et al., 2001). Ad-hoc design is characterized by the diverse activities of making and materialities as well as by the context of the design work: the tenuous and transitory commitments that constitute the hackathon as an event.

HACKATHONS, PARTICIPATION IN DESIGN THINGS AND PROTO-PUBLICS

The continual, rather than iterative, notion of design that characterizes ad-hoc design aligns with concepts like design-in-use and design-by-doing, and builds on the notion of entangled design games (Telier, 2011). One of the ways that A. Telier describe participation in design things is as a shift away from projects as clearly delineated design endeavors, and a shift toward an ongoing engagement with "matters-of-concern." (Latour, 2004; Telier, 2011)

Hackathons, particularly issue-oriented hackathons, are another site for the participation in design things. At these events humans and non-humans align toward some matter-of-concern through technical invention.

Moreover, the issue takes precedence over any notion of a discrete project. In the described cases, consider how the terms of the challenge shifted over and again in ongoing attempts to address the goals of the challenge. The ad-hoc character of design at hackathons brings alignment to the fore—groups, ideas, and prototypes provisionally aligned to an issue, all contingent and bounded by the timeline of the event.

One of the paradoxes of issue-oriented hackathons is their attempt to create alignments that are temporary, and thus weak, with regards to long-standing issues. Indeed, if we accept the partialness of this engagement we might consider hackathons as prototypes for more substantive engagements. In other words, the temporariness need not be problematic—we might consider hackathons as prototypes of publics.

PROTO-PUBLICS

Publics is a term drawn from the work of American pragmatist John Dewey (Dewey, 2012) and refers the formation of groups concerned by an issue. This concept of publics has been used in a range of work across the fields of HCI and participatory design (Björgvinsson et al., 2010; Disalvo et al., 2012; Le Dantec, 2012; Le Dantec et al., 2010; Lindtner et al., 2011; Telier, 2011), design studies (DiSalvo, 2009), cultural studies (Warner, 2001) and science and technology studies (Marres, 2012). Within design, publics are a useful analytical frame for understanding and describing how and why groups form (or don't) to take action (Björgvinsson et al., 2010; Le Dantec, 2012; Le Dantec et al., 2010).

Given the issue-orientation of these hackathons, one might be assume the events contribute to the formation of publics or that the events invite an extant public. We found that, by and large, the formation of publics does *not* occur through hackathons, at least not completely. Likewise, the attendees are not drawn necessarily by their extant involvement with an issue. Instead what we witnessed was the formation of prototyped publics, or proto-publics: contained experiments in the organization of people and materialities toward issues.

For example, at the NDoCH, a group organized around developing basic web services for the *Food and Farm LLC.* The temporary commitment to the organization and its mission cohered the group more than a deep understanding of the issues of local food systems and a desire to engage those issues. Similarly, at HM, the FWW group organized around the surface of the issue, that is, through the FWW report rather than a deep knowledge of farm consolidation. The group focused on making the report clearer and so bracketed the issue. In both cases, the groups aligned to the aims of these organizations and thereby made *partial* contributions to the underlying issue. We characterize these groups as proto-publics, then, because they *suggest* constellations of required elements to form an operational public. As much as publics may be disinterested in technical solutions, proto-publics at these technical events point to potential constellations related to intervention and articulation. These constellations are composed of human and nonhuman elements as well as objects and processes, ranging APIs and text content to design and development skills to project management and WiFi.

This development of proto-publics might be quite useful if intentionally pursued. Like any prototype, these proto-publics provide insight into useful, usable, and desirable features of a public. Usually, this insight is directed toward the application or service under development, but this insight could also be directed to the constitution of the public itself. That is, if we see design as a way of contributing to the construction of publics (DiSalvo, 2009), then issue-oriented hackathons could provide insight toward that goal. Specifically, these proto-publics could provide means to to arrange and align different skills, capacities, interests, material resources, and activities toward articulating and addressing issues in future endeavors. Proto-publics serve as test sites to understand the character of participating with regards to a particular circumstance or issue.

CONCLUSION

As participatory design and innovation continues to expand, new sites and practices of design emerge. Often these share some features of what we commonly think of as design, and yet also have features that are unfamiliar, thereby challenging us to understand their possibilities and limitations. Interpreting and analyzing hackathons as ad-hoc design events expands the sites and practices of participatory innovation, potentially also broadening participation in the conceptualization and making of the technical systems that contribute to our social and civic lives. This latter goal is particularly true of issue-oriented hackathons. As ad-hoc design events, hackathons provide an opportunity to explore new socio-technical relations as they unfold through participation in design things. Specifically, we can use issue-oriented hackathons to examine proto-publics, or how various constellations of skills, capacities, interests, material resources, and activities work together, or do not, to engage an issue through processes of design.

ACKNOWLEDGMENTS

Thank you to the numerous hackathon hosts and participants that we have worked with, including those responsible for the National Day of Civic Hacking and Hack//Meat. Thank you also to the following colleagues who have provided valuable feedback as we work through this topic: Melissa Gregg, ken anderson, Chris Le Dantec, Tom Jenkins, and Hronn Holmer.

REFERENCES

Agre, P., 1997. Toward a Critical Technical Practice : Lessons Learned in Trying to Reform AI, in: Bridging the Great Divide: Social Science, Technical Systems, and Cooperative Work. Erlbaum, Mahwah N.J., pp. 131–157.

Björgvinsson, E., Ehn, P., Hillgren, P., 2010. Participatory design and "democratizing innovation," in: PDC 2010. pp. 41–50.

Buchanan, R., 1995. Wicked Problems in Design Thinking, in: Margolin, V., Buchanan, R. (Eds.), The Idea of Design: A Design Issues Reader. MIT Press, Cambridge, pp. 3–20.

Büscher, M., Gill, S., Mogensen, P., Shapiro, D., 2001. Landscapes of practice: Bricolage as a method for situated design, in: Computer Supported Cooperative Work. pp. 1–28.

Buur, J., Matthews, B., 2008. Participatory innovation: a research agenda, in: PDC 2008. pp. 189–192.

Chakravarthy, B.K., Krishnamoorthi, J., 2013. Innovation By Design. Springer India, India.

Den Ouden, E., 2012. Innovation Design: Creating Value for People, Organizations and Society. Springer-Verlag, New York.

Dewey, J., 2012. The Public and its Problems: An essay in political inquiry. Penn States Press, Philadelphia.

DiSalvo, C., 2009. Design and the Construction of Publics. Des. Issues 25, 48–63.

Disalvo, C., Louw, M., Holstius, D., Nourbakhsh, I., Akin., A., 2012. Towards a Public Rhetoric through Participatory Design: Critical Engagements and Creative Expression in the Neighborhood Networks Project. Des. Issues 28, 48–61.

Hess, J., Offenberg, S., Pipek, V., 2008. Community driven development as participation?: involving user communities in a software design process, in: PDC 2008. pp. 31–40.

Jencks, C., Silver, N., 2013. Adhocism: The Case for Improvisation. The MIT Press, Cambridge.

Kolko, J., 2010. Abductive Thinking and Sensemaking: The Drivers of Design Synthesis. Des. Issues 26, 15–28.

Kuznetsov, S., Paulos, E., 2010. Rise of the expert amateur: DIY projects, communities, and cultures, in: Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries. pp. 295–304.

Latour, B., 1987. Science In Action: How to Follow Scientists and Engineers Through Society. Harvard University Press, Cambridge.

Latour, B., 2004. Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern. Crit. Inq. 30, 225–248.

Law, J., 2002. Aircraft Stories: Decentering the Object in Technoscience. Duke University Press, Durham.

Le Dantec, C., 2012. Participation and Publics: Supporting community engagement, in: CHI '12. pp. 1351–1360.

Le Dantec, C.A., Christensen, J.E., Bailey, M., Farrell, R.G., Ellis, J.B., Danis, C.M., Kellogg, W.A., Edwards, W.K., 2010. A Tale of Two Publics: Democratizing design at the margins, in: DIS 2010. pp. 11–20.

Lindtner, S., Chen, J., Hayes R., G., Dourish, P., 2011. Towards a framework of publics: Re-encountering media sharing and its user. ACM Trans. Comput. Interact. 18, 1–23.

Lindtner, S., Li, D., 2012. Created in China: The Makings of China's Hackerspace Community. Interactions 19, 18–22.

Lodato, T.J., DiSalvo, C., n.d. Issue-Oriented Hackathons as Material Participation. New Media Soc.

Marres, N., 2012. Material Participation: Technology, the Environment and Everyday Publics. Palgrave Macmillan, Basingstoke.

Merkel, C., Xiao, L., Farooq, U., Ganoe, C., Lee, R., Carroll, J., Rosson, M.B., 2004. Participatory Design in Community Computing Contexts: Tales from the field, in: PDC 2004. pp. 1–10.

Mol, A., 2002. The Body Multiple: Ontology in Medical Practice, Science and cultural theory. Duke University Press.

National Day of Civic Hacking [WWW Document], 2015. URL http://hackforchange.org/ (accessed 1.15.15).

Norman, D.A., Verganti, R., 2014. Incremental and Radical Innovation: Design Research vs. Technology and Meaning Change. Des. Issues 30, 78–96.

Seravalli, A., 2012. Infrastructuring for opening production, from participatory design to participatory making? PDC 2012 53–56.

Suchman, L., 2006. Human-Machine Reconfigurations: Plans and Situated Actions, 2nd ed. Cambridge University Press, Cambridge.

Tanenbaum, J.J.G., Williams, A.M., Desjardins, A., Tanenbaum, K., 2013. Democratizing technology: pleasure, utility and expressiveness in DIY and maker practice, in: CHI 2013. pp. 2603–2612.

Telier, A., 2011. Design Things. The MIT Press, Cambridge.

Wakkary, R., Maestri, L., 2007. The resourcefulness of everyday design, in: Creativity & Cognition 2007. pp. 163–172.

Wang, T., Kaye, J. "Jofish," 2011. Inventive Leisure Practices : Understanding hacking communities as sites of sharing and innovation, in: CHI'11 Extended Abstracts on Human Factors in Computing Systems. ACM.

Warner, M., 2001. Publics and Counterpublics. Zone Books, Cambridge.

Winschiers-Theophilus, H., Chivuno-Kuria, S., Kapuire, G.K., Bidwell, N.J., Blake, E., 2010. Being Participated—A Community Approach, in: PDC 2010. pp. 1–10.