Civic Hackathons as Deliberative Democracy: Reflections from Participation in the 2018 Delaware Open Data Challenge

Eli Turkel
University of Delaware

Elizabeth Suchanic
University of Delaware

Randy Neil
Squatch Creative

The "hackathon" is one of the primary events that civic technology groups organize. A civic hackathon is an event designed to improve a public service either through innovative software programming, data analysis, or graphic and web design. Hackathons are criticized for lack of productivity and sustainability. Due to such criticism, civic technology organizations have introduced reforms to the format of hackathons - stretching their length, incorporating human centered design and the influence of client direction. Open Data, Delaware's 2018 Open Data Challenge is an example of a hackathon that experimented with these different reforms. In this paper, the authors share their reflections on participation in the Open Data Challenge. The main question explored by the paper is, what is the value of the civic hackathon and what research questions should be asked about hackathons? The paper finds that the value of civic hacking events is that they provide an opportunity to engage citizens in a civic process. From this vantage point, civic hackathons should be studied as deliberative democratic events and evaluated on their design and their ability to increase participants' civic engagement.

Introduction

The term "hacking" often carries a malicious connotation associated with the willful destruction, theft, or manipulation of property or information through remotely accessing operating systems or private servers. Cybercrime such as ransomware or data stealing comes to mind as examples of such activity. This, however, is a narrow understanding of the term. Hacking, in broader terms, is an approach to problem-solving that can apply in a multitude of settings (Snook, 2014). In the realm of public affairs, Carl Malamud's work in the 1990s collecting government information without express authorization is an early example that inches closer to the type of activity this paper has in mind. Through the mid-1990s Malamud purchased access to government databases and then released the data to the public. He would build up a base of users and then close the database, creating an angry constituency now unable to access data. He did this with Security

and Exchange Commission data in 1995 (Brito, 2010). Then, in 1998 he wrote to Vice President Al Gore and told him that he planned to do the same with patent and trademark data, but the Vice President rectified the situation before Malamud followed through.

In the late 1990s and early 2000s, individuals started to use the technology to improve public services through unauthorized means. For example, in 2008, Harper Reed, Barack Obama's Chief Technology Officer on the 2012 Reelection campaign, built an unofficial Application Programming Interface for the Chicago Transit Authority. The difference, however, between Reed's work and Malamud's is that Reed did not apply pressure to an organization to take action that they otherwise would not have taken. The problem he solved was a lack of transparency in the Chicago Transit Authority's Bus Tracker data. Reed's work was unobtrusive; he figured out how to separate the data on the website from

the site itself. In doing so he opened the possibility for developers to build applications that are useful for themselves and others. This is the essence of civic hacking. It is not about conducting clever, yet dastardly deeds; nor is it about activism that pressures governmental actors into complying with specific demands (though this certainly has its place); civic hacking is a form of civic activism that uses technology to solve problems in mutually beneficial ways.

Civic hackathons attempt to bottle the type of energy Harper Reed demonstrated by holding formal events with financial incentives. The first civic hackathon -- Apps for Democracy -- was held in Washington, D.C. in 2007. The event was organized by then Washington D.C. Chief Technology Officer Vivek Kundra. Kundra asked iStrategyLabs -- a digital marketing firm with offices in D.C. and New York -- how the city could make use of the Data Catalog. The Data Catalog is a website that individuals can visit to view and download data made publicly available by the District of Columbia. The District of Columbia heralded the event as a tremendous success because it produced 47 applications and the equivalent of $2,300,000 worth of software for the city (Howard, 2011). Others have followed up on the success of Apps for Democracy and found that of the 47 applications developed during Apps for the Democracy, the District of Columbia did not adopt any of the applications after the event concluded (Howard, 2011). It would be easy to conclude based on this evidence that civic hackathons do not live up to the spirit of civic hacking - that they are ineffective ways of solving civic problems. That is the argument this paper evaluates.

In order to address this issue, this paper conducts a literature review on civic technology and civic hacking. Subsequently, this paper details the authors' involvement in a hackathon that took place in the spring of 2018. Then authors reflect on their experience and explain the importance of event design in conducting a hackathon. Finally, the authors conclude that effectiveness is not the optimal lens for studying civic hackathons. Rather, these events should be studied as deliberative democratic exercises and evaluated on their design and ability to increase civic engagement among participants.

There are tensions in studying hackathons as a deliberative democratic exercise, namely barriers to participation in the form of demographics and technology. Young white men sitting behind computers with desks stacked with coke cans and pizza boxes is the image that comes to mind when the word hacking is mentioned. Such an image is not unjustified, if stereotypical ("#MoreThanCode Full Report," 2018). A 2017 Pew survey reported that 80% percent of women and 66% of men responded that there is gender discrimination in the tech sector (Pew Research Center, 2018). The #MoreThanCode report, published in the summer of 2018, focuses on the non-profit tech sector. The report asked if there are gender disparities within the the non-profit tech field, to which respondents answered affirmatively. Neither the tech or non-profit tech sector are fully representative of the civic hackathon population, but they certainly suggest that there are gender, racial, and age imbalances in participation. Such issues are exactly what should be addressed in the design of civic hackathons. Evaluations of civic hackathons should focus on whether participants found the events to have non-representative design features and ask if participants feel a sense of increased civic engagement and capacity (Boulianne, Chen, & Kahane, 2018).

Survey research finds that similar disparities are present in the composition of hackathon participants. Briscoe reports on the findings of a survey of 150 hackathon participants from the United States. The survey finds that participants are overwhelmingly male, between the ages of 25 and 34, and attribute their attendance at a hackathon to learn and network. Finally, according to the survey, 70% of hackathon attendees were not attending their first hackathon. Based on this, Briscoe argues that there is a hackathon circuit in which attendees are interested in more than just the individual results of a single hackathon (Briscoe, 2014).

Literature Review

Civic Technology

This research focuses on hacking and hackathons, a dimension of civic technology advanced by McNutt and his colleagues (McNutt et al., 2016). The concept of civic technology includes the following: open civic data and transparency; civic and service apps; and organizational innovations such as civic hacking and hackathons, Code for America fellowships, and similar arrangements (McNutt et al., 2016). Civic hackathons organized or sponsored by local governments often use open government data and center on the creation of civic and service applications. Civic and service applications are applications that involve the use of government data and can streamline a government service, this could include a transit tracking application or a streamlined food-stamp enrollment form. While open government data and civic and service applications are aspects of civic hackathons, the authors of this paper choose to focus on the organizational innovation of civic hacking in relation to civic technology because the other aspects of civic technology are tangential to the present issues. It is interesting to note the relatedness of the various dimensions of McNutt's concept in a single instance of civic technology.

Civic Hacking

Civic hacking is a subset of hacking activity. Quite often civic technology applications are free and open source. Coleman argues that norms among hackers vary regarding what type of activity falls within the bounds of ethical behavior; a narrower bound is found within civic hacking related to which types of projects are undertaken and the way in which they are conducted (2013). While the boundary of definition is narrower for civic hacking, the ethics Coleman describes brings to mind the type of activism conducted by Harper Reed. Reed's work exposing the endpoints of Chicago's transit data perhaps caused frustration and a quick glance of Mr. Reed's website (https://harperreed.com/) conveys the sense

that he is a person who takes joy in what he does. His website states that a requirement for the projects he works on must be fun.

Civic hacking is a overlapping, but distinct activity from free and open sourcing hacking, as Stepasiuk's work demonstrates. Much of the work civic hackers conduct is to establish open data sets and write open source civic applications, such as sites that streamline government information for public use (Schrock, 2016). This is a way in which the activities overlap. One of the distinctions between these two activities is that not everyone involved in civic hacking considers themselves a hacker (Stepasiuk, 2014). Participants in civic hacking could consider themselves volunteers, activists, or hackers. Stepasink finds that participants have varied motivations based on the identity to which they bring to civic hacking (2014).

In a study about free and open source software, "F/OSS", hackers critique contemporary liberalism's commitment to property rights, by arguing that individuals have a right to free speech (Coleman, 2013). In this case, hackers consider coding software to be speech, which Coleman terms "productive freedom." Coleman argues that hackers are committed to an idea of freedom and liberty; and derive pleasure from creating free software (Coleman, 2013; Snook, 2014). Coleman's argument is just as devoted to the idea that f/oss hackers conduct their work motivated by the idea that copyright law should not restrict the projects they wish to work. Coleman's work posits that eating junk food, drinking Red Bulls, and staying up all night to write computer software are all superficial stereotypes of a process that involves confronting a daunting technical task and overcoming frustrations that occur along the way. This stereotype, Coleman argues, provides an inaccurate picture of hackathons that could diminish involvement. Paired with a commitment to free software, Coleman illustrates that the hacking aesthetic is an expression of unalienated labor (Coleman, 2013). The concept of unalienated labor is derived from Marx's theory of alienation,

estrangement from individuals as a result of stratified social classes.

Andrew Schrock has crafted the term "data activism" (Schrock, 2016). By this, Schrock is referring to individuals who use open government data to reprogram or create government software in order to improve its effectiveness (Lessig, 2006; Schrock, 2016).

Building on Schrock's concept, this paper includes design work under the banner of data activism. Whether it is graphic design or web design, so many aspects of public programs are implemented by communication tools that it is vital to ensure those communication devices are effective.

Civic Hackathons

Research on civic hackathons disputes Coleman's notion that hacking constitutes unalienated labor. Traditionally, a hackathon is a two- to three-day contest in which participants attempt to solve a problem by writing computer software (Briscoe, 2014; Johnson & Robinson, 2014). Hackathons begin with a presentation to participants which discusses the details of the challenge as well as the prizes for winning. Participants are then given a fixed amount of time to work on the project. At the end of that time period, participants typically present their work to a panel of judges and a winner is chosen.

Hackathons are a phenomenon in the arenas of music, design, fashion, and open data, as stated by Briscoe. Briscoe, citing others, defines a hackathon as a "problem-focused computer programming event" (Briscoe, 2014, p. 1). Hackathons exert considerable cultural significance in technological innovation because many IT organizations, such as software development companies, host these events on an annual basis, invite the public to participate, and offer monetary rewards. Briscoe draws a helpful distinction between tech-centric hackathons and focus-centric hackathons. Intuitively, tech-centric events focus on improving a single application, platform, or the use of a specific language or framework. A tech-centric event could be a user-testing event for a new application targeting a community problem, while a focus-centric event could be a town hall meeting discussing a community challenge. Focus-centric events are much more issue-, demographic-, or organization- oriented.

Johnson and Robinson (2014) attempt to evaluate hackathons as citizen engagement and government procurement events. The authors argue that there is a need to track the outputs of hackathons over time to see if meaningful work is being done. If meaningful work is not being done, government sponsors risk the possibility of citizen fatigue and a lack of interest. The argument of civic hackathon advocates is that the benefits of these events are not found in any one event, but rather in the community and the knowledge gained in conducting these events (Headd, 2011). For instance, individuals participating in Apps for Democracy provided the Washington, D.C. municipal government with numerous hours of labor and only some of them received compensation, underscoring the authors' questions regarding whether participants feel exploited or impactful.

Gregg provides a broad overview of the rise of hacking as a mainstream societal phenomenon (2015). She distinguishes between "white" and "black" hat hackers, white meaning good and black meaning malicious, but does not distinguish between those who release government data without authorization and those that use authorized open government data. Gregg offers penetrating analysis of the societal events and rhetoric that emanate from hackathons. She argues that participation is characterized as a political good in order to distract from cuts to government services. Moreover, she argues that political rhetoric venerating governmental performance masks the inevitable downgrade in service that assuredly accompany such cuts (Gregg, 2015). Gregg has referred to hackathons as events which fuse "youthful energy of Obama-era digital participation with Silicon Valley's own Peter Pan triumphalism" (Gregg, 2015).

Deliberative Democracy

Much of the criticism of civic hackathons accepts the frame provided by event organizers and evaluates hackathons based on performing

a social good. Event organizers submit that hackathons are a way for local governments to purchase information technology services. While critics accept this frame, they argue that hackathons are not an effective method to purchase IT services and point out the speculative labor issues involved. Another way to put this is that event organizers argue that hackathons are an instrumental mechanism to the production of government services. Critics disagree. This paper agrees that hackathons are not effective for producing government services, but that they are important events because they have the potential to increase civic engagement among those who participate.

In a recent journal article, Zandbergen questions the authenticity of the open-source collaborations due to concerns regarding corporation co-option of such arrangements (2017). Zandbergen attends Meetup events in Amsterdam organized around the creation of a Air Quality Egg, which is sponsored by a company that owns a platform used by participants in completion of the project. The author experiences conflicts within the group yet concludes that the event kept participants engaged in a project larger than themselves (Zandbergen, 2017). The argument presented here is similar; hackathons may not produce effective government services, but they can function to engage citizens. In this regard, they function as deliberative democratic events.

In Zandbergen's words, "prototyping, in this sense, is about the facilitation of horizontal social collaboration as an end goal in itself" (Zandbergen, 2017, p. 51). In hackathon events, participants work in collaboratively on an issue of community importance. In doing so, they learn about the experiences of their neighbors and brainstorm possible ways to improve the daily lives of those who live in close proximity to themselves. Therefore, they are engaged in community dialogues and quite possibly are improving their efficacy as citizens.

Deliberative democracy is a concept that states that well-structured events based on dialogue have the ability to produce a democratic legitimacy. As Fishkin and Luskin (2005) argue, there are five elements of deliberative democracy: informed, balanced, conscientious, substantive, and comprehensive. Research on deliberative democratic proceedings finds that, keeping in mind the design of the event, individuals who participate are more likely to be engaged in civic matters after the fact (Boulianne et al., 2018; Brady, Verba, & Schlozman, 1995; Nabatchi, 2012; Gilman, 2016). Panel survey research finds that deliberative democratic event participants who felt that an event had diverse viewpoints, fair treatment, and informed opinions increased their likelihood of civic engagement in the long run and increased perceived public speaking abilities, political attention, and knowledge in the short run (Boulianne et al., 2018). In this regard then, the design of civic hackathons is important to ensure participants increased perceptions of their engagement and efficacy are realized.

The difference between civic hackathons and what is traditionally thought of as deliberative democracy, is that civic hackathon participants are asked to build a product. In fact, the collaborative building of a product - whether it is a map, a search function, or a website - is exactly why proponents of civic technology prefer it to deliberation (Noveck, 2010). The aspect of deliberative democracy that civic hackathon event organizers need to consider is ensuring that participants have an experience that deepens their engagement with their community and teaches them skills that make them feel as if they can make a difference. Put another way, civic hackathon organizers should spend less time praising the cost savings of these events for governments and more time investing in recruiting diverse participants and community partners able to provide concrete problems for hackathons to work on.

Element	Description
Informed (and thus informative)	Arguments should be supported by appropriate and reasonably accurate factual claims
Balanced	Arguments should be met by contrary arguments
Conscientious	The participants should be willing to talk and listen, with civility and respect.
Substantive	Arguments should be considered sincerely on their merits, not how they are made or who is making them
Comprehensive	All points of view held by significant portions of the population should receive attention

Project

Given the criticisms of hackathons, reforms to hackathon events have been introduced in Pennsylvania and Delaware. The authors of this paper participated in a hackathon to explore whether the efficacy and exploitation frameworks are appropriate for understanding these events. The authors participated in the 2018 Open Data Challenge facilitated by Open Data Delaware. This statewide hackathon sought to address accessibility, in the sense of mobility, in Delaware, particularly as it relates to transportation and natural resources. The partner state agencies, who were the beneficiaries of the created products, were the Delaware Department of Transportation, DelDOT, and the Delaware Department of Natural Resources and Environmental Control, or DNREC. Participants leveraged open data and created technologies to address these accessibility challenges throughout the state. Teams selected with exceptional products shared $35,000 in grant funding for their contributions. The grant funding and program costs were covered by the participating state agencies, and all the code created for the event was published under open-access licenses. Teams were made up of two to six individuals

Adapted from Fishkin & Luskin, 2005

of varying backgrounds and ages, with diverse professional backgrounds encouraged.

Modified Hackathon Format

The primary difference between the hackathon format used for the 2018 Open Data Challenge and the more common format for hackathons, was the timeline. Most hackathon-style events are typically 24 to 48 hours in length, while teams in the Open Data Challenge had a month to develop a concept and a prototype. The month-long model was adapted from Code for Philly's Civic Engagement Launchpad event, which used this longer-term structure. Throughout the month-long challenge, events were held to support participants and provide structure, including an ideation session, launch event, workshops, and a culminating pitch event.

Ideation Session

The ideation session was held the month prior to the Open Data Challenge launch and provided participants a time to gather concepts and frame the challenge of "accessibility." Facilitated by University of Delaware's Horn Program for Entrepreneurship, the event involved groups brainstorming with DelDOT and DNREC representatives and community members on what accessibility challenges exist in Delaware, as well as what approaches could be helpful to address said challenges. The

ideation session concluded with a collection of team notes and informal concept pitches.

Launch Event

The launch event of the 2018 Open Data Challenge marked the first day of the actual hackathon challenge and built upon concepts introduced in the ideation session. The hackathon facilitators and Open Data Delaware founders, Ryan Harrington and David Ginzberg, worked with agency partners to create sets of fictional profiles of individuals with a variety of accessibility challenges which were distributed to participating teams. These individual profiles sought to showcase needs of a variety of residents, from a retired, disabled individual from southern Delaware, to a tourist vacationing at the Delaware beaches. With partner agencies present, teams were created, and across the eight-hour event, concepts emerged through a flurry of activity.

Educational Workshops

In order to support teams through the technical challenges and capture a wider array of technical skill levels, weekly workshops were offered. These workshops were not restricted to Open Data Challenge participants, but rather were open to anyone. The material covered in these workshops included mapping, web designing, and pitching ideas.

Facilitator Check-Ins

To further support teams and concept development, hackathon facilitators Harrington and Ginzberg maintained weekly contact with a core team member from each group, offering additional feedback on the challenge process and connecting them with resources as needed. This personal support, paired with the educational workshops, emphasized the hackathon event as not strictly a civic engagement event, but rather as an educational opportunity. Individuals that sought to design and contribute to community technology solutions would also be motivated by the desire to build technical skills through building applications.

Pitch Event

The culminating pitch event gave each competing team an opportunity to introduce their concepts and prototype to the judges through a formal, five-minute pitch. The judging panel included a representative from DelDOT, a representative from DNREC, and a community member from AAA Mid-Atlantic. The three judges heard all the pitches and had fifteen minutes for deliberation for the disbursement of grant funding. The final pitches represented the broad challenge of "accessibility" and referenced the user profiles provided at the launch event.

MobiliDE: Delaware's Paratransit Portal

The authors of this paper participated in the hackathon by conceptualizing, building a working prototype, and pitching a paratransit portal for the State of Delaware, MobiliDE. The state of Delaware's universal paratransit service, offering service beyond federal ADA (Americans with Disabilities Act) requirements, has resulted in high demand and costs (Institute for Public Administration, University of Delaware, 2013; Scott & Tuttle, 2007; Turkel, 2015; Tuttle & Falcon, 2003). MobiliDE sought to reduce paratransit costs by streamlining ride reservations and providing ride alternatives. From the Delaware Open Data Portal, datasets were used on bus routes, bus stops, and bus schedules. Additional sources provided an inventory of third-party service providers for inclusion by county. The completed prototype presented at the pitch night showcased a working website which allowed users to create a user profile, reserve or cancel rides, and view ride history. The website also provided advanced mapping services, reserving a ride would showcase alternate routes that were available. Figure 1 provides a visual sample of the desktop version of the prototype, which was also available in a mobile format. MobiliDE was awarded an Open Data Challenge Ideation Award and a $1,000 award.
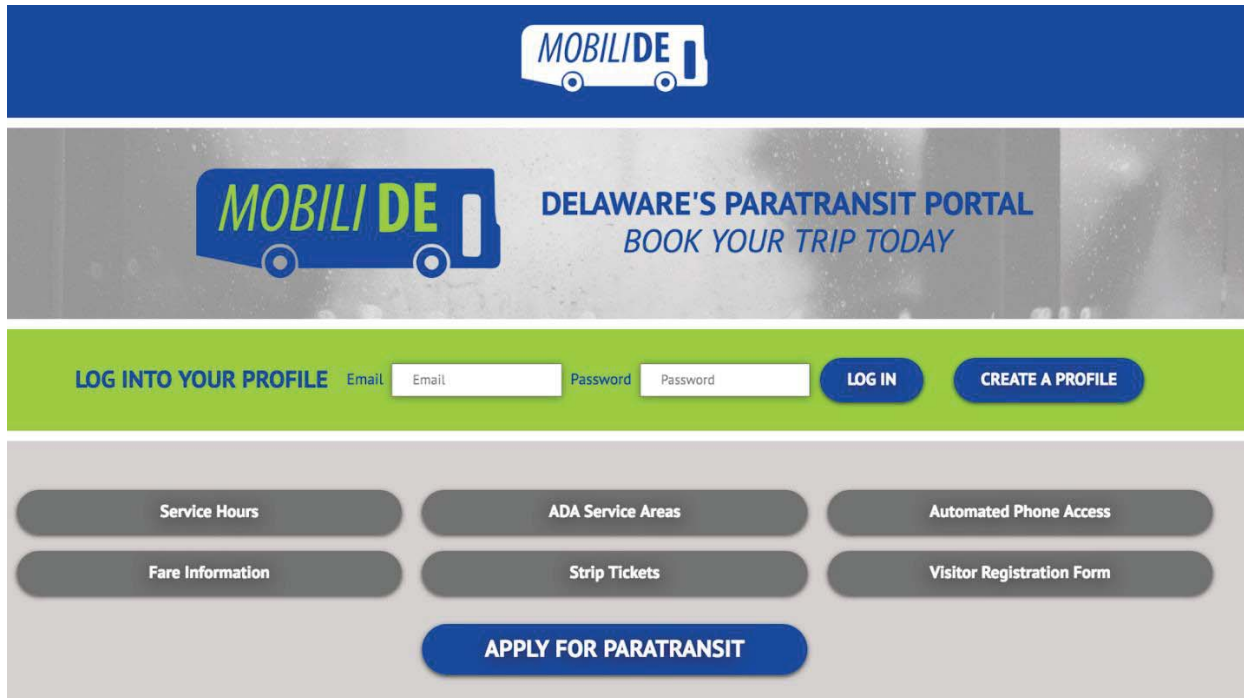
Figure 1: MobiliDE Launch Page

Reflections

Based on participant observation research, as well as the authors' participation in such processes, findings include design, participants, and timeline. These observations respond to many concerns and criticism of hackathon purpose, impact, and sustainability. These findings seek to identify structures in the hackathon format that could integrate user-centered design, needs for long-term involvement of participants, and timeline extensions.

User Centered Design

The hackathon exemplifies the increased effort to integrate user-centered design in the provision of public services (Goldsmith & Kleiman, 2018; Saksa, 2017). User-centered design is the term used to discuss Internet-based products that are themselves engaging to clients. For instance, the City of Pittsburgh built a product called Burgs Eye View that allowed citizens to view data visualizations of crime and other city statistics. Whether it is graphic design or web design, public programs are often implemented by using communication tools. This makes it vital to ensure those communication devices are effective. Pittsburgh's service was designed with a penguin who changed hats as users navigated the website signaling that the website was for everyone to use (Goldsmith & Kleiman, 2018).

Additionally, Code for America has entire user-centered design projects. In 2015, Jake Solomon gave a presentation at the Code for America Summit on the GetCalFresh initiative launched by Code for America. Solomon noted that at that time, there were 2 million California residents eligible for food assistance, also known as SNAP, who were not receiving the benefit (Code for America, n.d.). Arguing that "implementation is a process, rather than a phase defined by user needs. Solomon defined delivery as a process of understanding and resolving user-needs (Code for America, n.d.). The GetCalFresh initiative team-built tools to help people check their SNAP account balance more easily, found no-charge ATMs and mapped them, built a new homepage that clearly stated that page was for SNAP and built an "apply" button. Then the team simplified the application process, significantly reducing the number of questions

applicants needed to answer to receive benefits.

In order for hackathons to provide long-term, effective solutions, end users of the application must be integrated from the ideation stages to the judging stages. Often hackathons are driven by the technologists who are competing, and who are often separate from the end user populations. End users may include residents in need of services, including the elderly, the disabled, or other at-risk groups. If hackathon participants do not have first-hand understanding of the challenges end users face, problematic conclusions may be drawn during the ideation phase about what these disadvantaged groups confront and how they would prefer to address them. If users are not considered at each stage of the process, from ideation to prototype creation, then the created product or prototype may be rendered useless because it does not address the actual needs of the user. Uninformed assumptions about the needs of end users frequently plague civic technologies. This points to a clear need for user-centered design and outreach during the ideation phase. For hackathons, end users should play a central role by being on teams and even judging completed prototypes.

The need for embedded, user-centered design was illustrated in the 2018 Open Data Challenge since the challenge of "accessibility" was not something most of the challenge participants faced themselves. Most participants were able-bodied and had their own vehicles; most did not have accessibility challenges themselves. While participants did seek feedback from individuals with these challenges after an idea had been generated, had users with accessibility challenges been consulted prior to the idea generation, concepts may have been designed differently. Open Data Delaware sought to integrate user-centered design through the creation of user-profiles to showcase a variety of accessibility challenges across the state. The inclusion of these user-profiles provided more context for the types of accessibility challenges that exist in the state but partnering and having actual users present could have provided a deeper understanding of the problem for teams.

Challenge Selection

Hackathons with broad goals may result a wide variety of new ideas, while a hackathon with a very specific objective may yield tailored applications that can be more immediately integrated. The challenge of "accessibility within Delaware" for the 2018 Open Data Challenge was the wide breadth of the topic when seeking to integrate both transportation and natural resources (Open Data Delaware, 2017). The broad interpretation of the challenge was obvious through the prototypes pitched, which all varied greatly. Projects ranged from a bicycle-commuting application to a tourism application for individuals with disabilities (Quinn, 2018). This broad challenge resulted in a variety of new ideas for the state agencies participating that could be further built upon but are so broad that they do not address one specific population or problem that is experienced in Delaware. A broad goal for a hackathon may be valuable to an agency or organization seeking to stimulate ideas of technological integration to create solutions or serve residents. However, a more specific goal, is beneficial because it produces much more tailored solutions to a specific problem, rather than a host of broader ideas.

Timeline

Hackathons are often known for their tight timelines and short duration, typically a sprint of activity across 24 to 48 hours with a culminating pitch. However, most projects do not see any follow-up after this sprint. This trend has resulted in concerns regarding the long-term impact of hackathon-style events. As discussed previously, the 2018 Open Data Challenge modeled its hackathon timeline on Code for Philly's Civic Engagement Launchpad with a month-long timeline (Long, 2017). This extended timeline sought to respond to some timeliness concerns by extending the amount of time that teams would have to create their applications and conduct user-research. Ultimately, the projects presented at the 2018 Open Data Challenge reflected far more robust applications and concepts, in line with the

extended timeline. In a hackathon with a reduced timeline, opportunities to ideate and pivot to other concepts are reduced. While ideas may emerge, the resulting products may not be well developed and clear. The longer timeline of the 2018 Open Data Challenge allowed for more comprehensive concepts and prototypes.

Team Skill Cohesion

As users should be incorporated in the ideation of products in the hackathon process, teams should have a wide array of perspectives, including policymakers and direct-service providers. In the team formation stage, where individuals form groups to compete, technological skill and expertise is the primary driver to ensure that a well-rounded team can create both the back-end and front-end of the prototype. The authors' team for the 2018 Open Data Challenge included individuals who had conducted research for the Delaware Department of Transportation and could speak to the need for paratransit technologies and services. Experiences in the 2018 Open Data Challenge showed that teams need more than just technological skill. By including individuals facing the challenges they are trying to address and individuals who understand the systems of the agencies, teams can create a prototype that more deeply addresses actual needs. These diverse team members are critical at the ideation stage and in considering the many functions and uses of the application.

Sustainability

As previously mentioned, the short timeline of the typical hackathon has received criticism for its lack of long-term results and sustainability. Hackathons are structured with a hard finish line, the pitch, after which teams wash their hands of the project. However, most projects have not yet fulfilled their potential at this stage. Creating further incentives to maintain contact with participants and build the prototype to a turn-key stage for organizations and agencies to invest in would address some of the long-term sustainability concerns. The 2018 Open Data Challenge resulted in numerous ideas and prototypes for the two Delaware state

agencies that participated. Nine months after the event, however, the public has not seen full implementation of any of the proposed solutions. The remaining issue is how to implement the application.

Reflections and Recommendations

To further build upon the findings of the participant observation research, recommendations have been suggested to cultivate greater effectiveness and long-term sustainability in the hackathon format.

User Integration

Our recommendation for future hackathon-style events is to embed end-users within each stage of the hackathon event. End-users for government services should represent the communities they serve. There should also be consideration for special-need populations including the elderly, individuals with disabilities, and low-income individuals. These end-users should be present at all events and involved as "subject-matter experts" in the challenge. These users are particularly critical during the ideation stage and should be among the judges for the presented prototypes to ensure that selected projects will serve their needs. In order to reach these users, outreach to community organizations and neighborhoods will be required and will provide the tertiary benefit of raising awareness of government services and open data beyond a niche technology community.

Specification of Challenge

Our recommendation for future hackathon-style events is for hackathon organizers to be deliberate in their goals between ideation and application creation. On one hand, a broad challenge and shorter timeline is more likely to provide an agency or organization with many concepts and starting points for future exploration. On the other hand, a clear, narrow challenge with a longer timeframe will result in more comprehensive concepts with near-complete technological prototypes. Hackathons are vehicles for creating ideas and creating technological tools, therefore

it is critical for hackathon organizers, partner agencies, and organizations to have clear objectives to generate the desired results.

Sustainability

Our recommendation for future hackathon-style events to address sustainability concerns is to create sets of incentives throughout a longer-term process to encourage participants' continued involvement. Rather than a culture that is working towards a single end-point, partner agencies, users, and working teams should be encouraged to continue collaborating on projects. Additionally, putting in place group reflection gatherings and building "alumni" networks will maintain and enhance the excitement and projects generated through a hackathon event.

Conclusion and Future Research

The hackathon reforms taken by Open Data Delaware and other civic tech groups are appropriate measures that reduce unnecessary time frame requirements on participants and make events more relevant to local communities. More work needs to be done to design these events in ways that increase community involvement.

The authors' participation in these events demonstrated that single hackathon events are not necessarily going to generate promising policy proposals or public service design strategies. Yet, just as this may not be the actual outcome, promising policy proposals should not be the sole expectation of event organizers and researchers. Rather than expecting individual civic hackathons to fix community problems, civic hackathons should be held to the standard of contributing to the reinvigoration of civic life in local communities. One individual civic hackathon cannot accomplish this, but a series of well-designed events held on a regular basis will certainly contribute to the reenergizing of civic life.

This paper finds that in conjunction with the design elements of civic hackathons, an important research question moving forward is whether hackathon participants report increased levels of perceived civic engagement and efficacy. Through survey research it should be tested whether civic hackathons are a promising new form of civic engagement or just a Silicon Valley fad. In order to adequately answer this question however, it is anticipated that the design of these events is important. Just as with deliberative democratic events, inclusion and information should be hypothesized as crucial drivers of participants' sense of engagement and efficacy. Subsequent research that examines civic hackathons as deliberative democratic events will need to explore how the elements of deliberative democracy translate to this new forum.

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