“Both R&D and Retail”:
HiveNYC as Infrastructure for Learning Innovations
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August 2012

i. Innovation and the HiveNYC Learning Network

It was mid-Summer of 2012, and I had just taken the subway up to the top of Central Park in New York City. I was heading to the newly constructed space of Cooper Hewitt Design Center, a location of the Smithsonian Cooper Hewitt National Design Museum. On arrival to the space, I was struck by the quirky interior. A collaborative design effort between a professional architect and a group of teens from the museum’s DesignPrep educational program, it was inspired by a tree house motif. Pillars in the space were encased in fake bark, Astroturf covered the floor in the back of the room, and cabinets lining the walls were covered with stencils of curtain-covered windows.

As I settled in, the room filled with about fifty people representing a spectrum of New York-based educational organizations. Forty in all, the organizations included museums, libraries, afterschool and community based organizations, educational non-profits and institutions of higher education from across the city – a group called the Hive Learning Network NYC. Chris Lawrence, a former network member from the New York Hall of Science and current director of the Hive, kicked off their monthly gathering with an icebreaker, asking attendees to form small groups that would respond to some opening prompts.

“Tell me three words to describe what innovation means to you.” I turned to those sitting around me, forming a small group with some familiar faces. One was a former colleague, Joliz, from the youth civic leadership organization Global Kids, a place I’d worked for many years prior to my doctoral studies. Another was a friend and collaborator from my time at Global Kids, Marc, who directed education for a non-profit called Mouse, which focuses on digital literacy and computer skills for inner city kids. The room was soon buzzing with the conversation of so many small groups as we sat and discussed the prompt.

After a couple of minutes, Chris clapped his hands, that way that teachers do with kids, “CLAP, CLAP, CLAP-CLAP-CLAP”. The group, with many diads still finishing their conversations, managed a tepid, “clap, clap, clap- clap- clap” in response.

“Let’s hear what you came up with.” Hands shot up, and people shared the associations they had with innovation.

“Disruptive.”
“Taking a risk.”
“Engaging.”
“Re-imagination.”
“Forward thinking.”
“Creative.”
“Scary.”
“Conundrum.”
[...]
“Overused.”
In the course of a half a year of fieldwork geared towards understanding the nature of innovation in HiveNYC, this self-conscious focus on innovation within the network emerged as a central theme time and again. Mark Surman, director of the Mozilla Foundation which stewards HiveNYC, described the network to me as “both R&D and retail”; that is, both a place where innovations are developed, and at the same time a place where they can come to scale and find application in a number of contexts. Sitting in on network level meetings, interviewing network members, observing affiliated youth programs and reviewing blogs, listserv postings and all manner of digital documentation of activity in the network gave me an insight into the ways that the network itself functions as what I call an *infrastructure for learning innovation*, an idea which is the primary focus of this paper.

As alluded to in responses I shared above, the idea of “innovation” can have powerful positive connotations as an oft sought after goal across so many professional and creative sectors, and, at the same time, has also achieved buzzword status, overused and lacking in consequential meaning, within those same fields. In the context of this analysis, when I refer to innovation I want to avoid both of these colloquial associations and appeal to a precise definition: innovation as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers, 1983). By that take, there’s nothing particularly special or magical about innovation, there’s not even necessarily anything good (or bad) about it. Innovation – and the process of diffusion, circulation and adaptation of innovation – in so many ways is just about how things change.

In studying the HiveNYC, I identified a range of innovations related to learning - some were formal and informal theories of learning, some were digital technologies, others were educational design principles, and still others represented mixtures of technologies and pedagogical practices. I will spend some time describing a number of these innovations in this paper. More importantly though, I plan to make clear how I came to see the network operating as context in which innovations were developed, iterated upon, spread, and transformed as they moved across a circuit of culture that included researchers, funders, network facilitators, educational practitioners, and, of course, young people themselves. My focus, then, is less on the innovations themselves and more on the infrastructures and cultures surrounding them.

This paper is broken down into five sections. In the current section, I introduced the general themes and context that the paper will address. In the second, I further outline the notion of infrastructures for innovation and their significance within the field of education. In the final three sections, I offer focused case studies – of regular daylong network organized events called pop-ups, of an interest driven youth program called Kickflip, and of a technology tool called Hackasaurus. Each of these cases illustrate different aspects of how HiveNYC might operate as an infrastructure for learning innovations - one with intentional opportunities, contexts and mechanisms geared towards the development, circulation and adaptation of these innovations.

### ii. An Infrastructure for Learning Innovation

In many senses, the “what” of innovation is often seen as more interesting than the “how.” That is, innovations themselves are often more attention grabbing than the ways these innovations come about. The iPhone dazzled consumers for years before the somewhat controversial processes associated with its manufacturing attracted any kind of
significant attention. Content, in short, is far sexier than process. In the course of my fieldwork, it would have been very easy for me to likewise be singularly fixated on the “what” of learning innovations – after all, one of the things that attracted me to the Hive is that there are many, to me, interesting ideas, activities and technologies around learning that can be found in the network. But questions of “how” - how those innovations were developed, how they evolved over time, how they spread, how they adapted and changed– felt more pressing in the long term.

This is because the education field tends to take a “silver bullet” approach to the process of advancing its work. Various camps stake out particular visions of how to solve the “problem” of education, pushing their well-defined ball forward and aiming to convince all others that, if only we fully put their vision of reform into place, all would be well in the (educational) world. The education historian Diane Ravitch calls this the “Big Idea”, and notes that none of these sorts of grand plans have ever left education particularly better off (Ravitch, 2010). Education, like any other field, will constantly have to change as the world around it changes. Social and political landscapes constantly evolve. Technologies inevitably take new forms. Change, as Heraclitus noted, is the only constant. And so key aspects of education, such as what it means to be literate, what constitutes knowledge that every young person should have, how educators can leverage emerging media and what constitutes good pedagogy are guaranteed to evolve - and this is something that should actually be sought after rather than shied away from. Understanding the nature of the field’s response to those changes – its innovation process – is of critical importance in order to ensure that it can and does, in fact, effectively respond to such changes. Indeed, much of the criticism of the education system in the US centers on how little pedagogical practice has evolved over the last century.

In terms of the innovation process of the Hive, I came to see that various features of the network served to act as an infrastructure for learning innovation— that is, the network provided reliable and regular contexts for (1) developing, testing, iterating and reinventing innovations, and (2) circulating and spreading innovations while building capacity around them in new contexts. Oftentimes, the same feature or context found within the network might serve several of these functions. A network funded partnership, for instance, might act as a context for innovation testing for one organization involved, and as a means to become exposed to and build capacity around that same innovation for another. The three cases I share each highlight different ways that the infrastructures in place in the Hive operated to support innovation.

**iii. Hack Jams, Pop Ups and Learning Parties - “Particle Accelerators” of Innovation**

On a sweltering Saturday in late June of 2012, I met my friend Asaf, a fellow graduate student, for lunch in New York City’s Chinatown. I’d promised to bring him by a network event dubbed the “HiveNYC Summer Code Party” where I was planning on doing fieldwork that afternoon. So, after finishing our Vietnamese sandwiches, we made our way further downtown.

We crossed a bustling Canal Street, looking for the address that I’d pulled up on my phone, and came to what looked like an old firehouse. A group of teens was congregated at the door, so I guessed that we were at the right place – the headquarters of Downtown Community Television, a youth media organization and member of the Hive. We made our way
way inside, up a short set of stairs and into a large, industrial space. A disco ball hung from the ceiling, colorful graffiti was scrawled over the walls, music filled the space, food and drinks (non-alcoholic, of course) were off in a corner, and various tables with laptops were set up as stations throughout the room. I felt more like I was entering a party than an educational workshop.

As I came in, Chris Lawrence, the Hive network director, greeted me at the welcome table as I put my name down on a sign-in sheet. Decked out in a Hive t-shirt that said “Explore. Create. Share.”, Chris handed me an activity guide that gave an outline of what I could find in different parts of the space (see figures 1 & 2). I let him know that my friend Asaf wasn’t staying, but just wanted to check things out. Chris said it was totally fine, and that he could hang out as long as he wanted to.

The two of us started to just explore the space a bit, and I was keeping an eye out for another friend, Matthew, that I’d told about the event. Matthew is a computer programmer, and since the event was oriented towards teaching kids to code and I knew they could always use extra adult mentors, he came by to lend a hand as a volunteer.

*Figure 1. The HiveNYC Summer Code Party Activity Guide*
There was plenty of activity going on as the various stations got themselves set-up and teens and some families streamed in. Within a couple of minutes, Chris started to make his way towards the mic at the front of the room, pulling a Mexican wrestling mask out of his pocket as he did. On his way, I asked him if he always wears it. “It’s becoming sort of a trademark”, he said with a smile.

With music lowered but lots of people still milling about, Chris, decked out in his shiny mask, welcomed and introduced everyone to the space, and highlighted the different stations around the room - one dedicated to making videos that integrated web content, another where people could learn HTML, one focused on game design, yet another where people could “trick out” tumblr blogs, and more. Most importantly, he let people know about the ethos of the event - to explore, find something you’re interested in learning how to do, and “jam” on it – tinker, create, ask for help, tinker some more, and hopefully make something that you’d be proud to share by the day’s end. Chris finished up his introduction, and the room looked like it was waiting for a cue.

“Any questions?” Pause. “Are you guys pumped?”
“Yeah!”
“You can do better than that! I said, are you guys PUMPED?!”
“YEAH!!!” the group responded.

With that, the music got turned back up, and the attendees, about 50 at this point ranging from kids of various ages to adults, made their way to the different stations.

I spent most of my time throughout the rest of the day taking notes and chatting with people working on their projects at different stations.

Visiting a station run by the Institute of Play (IOP), a non-profit and Hive member that focuses on games, learning and play, I encountered a father with his daughter and son who were working on a set of self-directed game design activities. One volunteer later called these sorts family groups “the Swiss Family Robinson of the 21st century” - an allusion to the industrious family of 19th century novel fame. When I went by, each family member had a
“design challenge” they were working on, outlined on handouts that IOP had developed. One challenge involved working in a 3D physics engine, another in the visual programming language Processing. Later in the day, Greg, the staffer from IOP running the table, led a group of kids in a collaborative design challenge to invent a new sport. All of these activities, I learned, were prototypes that were part of a larger project called GameKit that IOP was working on – a set of self-guided game design activities meant to be picked up by anyone for use with individuals or groups looking to develop game design skills.

Later I visited another table where I found Jess Klein, a colleague and friend. Jess was a former employee on the “HiveHQ” team that facilitates the network, but had recently moved to the software team in Mozilla’s Webmaker initiative, of which the HiveNYC project is also a part. Jess was helping kids go through HTML challenges - code-based puzzles - that were embedded in Thimble, a Mozilla software tool she helped develop. The tool’s beta version had just been publicly released the week prior, and the code party was a key place where Jess could see how it was working with kids.

After chatting with Jess for a bit and looking over the shoulder of one of the kids working on a Thimble puzzle, I popped over to another table dedicated teaching people how to create what are called “web made movies” with a tool called Popcorn Maker, also developed by Mozilla. Popcorn allows users to take existing movies and insert various sorts of visual pop-ups within them that are connected to other parts of the web, say a google map of the location being shown in a video, a Wikipedia page for a topic being discussed, or even just a small text annotation (“pop-up”) that’s displayed at a certain point in the video.

The facilitator team at the table was actually made up of teens themselves, and they were working with a bunch of other teens on their web-infused videos. They all wore t-shirts with “POP-SQUAD” emblazoned on the front, and I learned that they were teens from a Hive-member organization called the People’s Production House (since renamed Rev-), which is focused on youth media arts. The “Pop Squad” crew was apparently well versed at teaching kids to use the Popcorn tool at this point – they’d already tabled at a number similar Hive events where they’d trained their peers.

At a certain point later in the day, the wifi in the room had started to falter. I turned to Leah Gilliam, a recently hired HiveHQ staffer formerly of the Institute of Play, and asked if there was something I could do to help. “Yeah – would you be able to run some sort of activity that’s just totally offline? We have a bunch of kids that are sort of just hanging out.” Leah knew that I had youth development experience, and I was happy to help. I thought for a bit about it, and remembered that there was a digital literacy activity I’d written up oriented towards providing kids opportunities to reconfigure everyday technologies, in the process questioning the assumptions baked into digital media. Thinking I could probably pull off something fun and interesting, I told Leah that I’d be up for it, I just needed to get a table together. Within a couple of minutes, I was up at the front of the room on the mic, announcing a new “Remix Facebook” activity, where we’d brainstorm ways we’d redesign Facebook if we had the power. Soon I had a table of teens and adults who were drawing up various new design ideas on chart paper.

Throughout the day I also encountered many Hive members that were not running stations and had either come on their own or with youth from their organization. Sharon, an employee of The Point, a youth community center in the Bronx, had come with a group of teens, and while they were working on projects, she was absorbed with setting up a youth blog for her organization at the Tumblr station. John, the director of Reel Works, a youth film organization, had come with his wife and 8 year old son, and chatted with me about some of his organization’s Summer projects as his son went off and explored. Ariam, from
the Museum of Natural History, had a group of youth from the museum with her, all working on Thimble projects that were teaching them basics of HTML, and she mentioned to me that she was working to figure out ways to work with Jess Klein (of Mozilla) to have the Museum create Thimble-based design challenges around their science content.

At the end of the day, Chris facilitated a public share-out where people could display what they’d been working on over the course of the day. One teen, involved with the Tribeca Film Institute (another Hive member), shared how he had enhanced a video he had worked on at the Institute by adding various annotations using Popcorn Maker. The group that had gone off with Greg of the Institute of Play presented a new sport they had designed, “Dollyball”, that was a riff on soccer, but involved using a dolly, or handtruck. The group presented it and did a small demo, enthusiastically riding the dolly across the room to hit a ball towards a goal. Finally, a woman who was part of a coalition of people of color that create “zines”, grassroots handmade magazines, shared a Tumblr blog that she had created for her coalition (which was not affiliated with the Hive). When she presented, she said that she had wanted to make a blog for her group for a long time but only today had finally gotten the push and support to do it.

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In a post on the HiveNYC blog later that evening, Chris Lawrence shared his take on these sorts of events. “Pop-Ups can quickly be described as free-flowing, interest-driven festivals where people and organizations highlight and share their tools, projects and ideas, with a diverse audience.” In a comment on an older blog post Chris had written that described this particular approach to learning events, network member Barry Joseph, another Hive member, wrote that “The pop-up is a distillation of the Hive[…] as well as a praxis. […] When I think of a distillation of the Hive, and pop-ups, I think about particle accelerators, in which interesting things slam together at fast speeds, for a VERY VERY short amount of time, release lots of energy and new particles.”

Hack Jams, Pop-Ups and Learning Parties are all names for what I came to see as a regular part of the innovation infrastructure in the Hive - one or multiday public educational events centered around a core theme and characterized by various ideas and practices around learning that are central to the Hive – what Barry referred to as “a distillation of the Hive”.

From the perspective of youth experience, these ideas and practices include production-centered pedagogies, interest-driven learning, multi-generational engagement, youth leadership, public sharing of personal creations, and use of technologies to create engaging and authentic learning experiences. From the perspective of Hive members, these events modeled both the kind of youth pedagogies I just mentioned as well as how member organizations should engage as members of the Hive - these events focused on the collaborative, participatory, and, notably, experimental spirit of the Hive as a professional network. Participating members all brought experimental pedagogies and technologies to the table in a collaborative effort to serve youth.

As part of an innovation infrastructure, these events are of central importance since they serve numerous functions in relation to questions of innovation. To begin with, they are a context in which member organizations themselves, along with other interested parties, learn what it is that the Hive “is about”. In many ways, the network acts as a community of practice (Lave & Wenger, 1991), with a set of evolving ideas and practices that are central to the community, and with modes of engaging “newcomers” through interaction with “oldtimers” in order to expose them to these ideas and practices. Popups act as a conduit for
spreading certain ideas and practices on both the pedagogical (e.g., interest-driven learning) and professional (e.g., experimentation and collaboration) level that are central to the Hive.

There were many network members that were at the Summer Code Party I described above that were simply there “soaking it in”, or engaging in “legitimate peripheral participation”, as Lave and Wenger (1991) would call it. Leah Gilliam, HiveHQ employee, shared with me that she saw these spaces and the experience of participating in producing them as key moments when new members of the Hive “get it” – that is, when core ideas of both the ethos and practices of the Hive are made transparent through participation for network members.

In some cases, like the employee from The Point using the event to build a blog for her youth, these events act as very concrete opportunities for developing capacity around and adopting technologies that embodied certain values central to the Hive, in that case using new media to promote public youth voice. In others, Hive members were simply there observing, coming to understand some of the ethos and practices valued in the network. In these ways, pop-ups and their ilk act as contexts for circulation and spread of innovations to and from network members.

At the same time, pop-ups also serve as a space where organizations can develop, test, and refine innovations. Jess Klein’s work with the newly released Thimble software at the Code Party event was representative of the way that the Mozilla software team engaged with these events – youth have opportunities to learn with emerging tools, and the software development teams have opportunities to see how well their pedagogical software is working and use that as the basis of an iterative design process. The Institute of Play’s testing of their Gamekit activities is also paradigmatic of how member organizations use these events as places to refine their tools and practices, often running “mini” versions of approaches that are usually used within the context of more extended educational projects such as camps or afterschool programs. And while I am no longer a Hive member, in the “Facebook Remix” activity I was able to put into practice an idea for a learning activity that up to that point I hadn’t had the opportunity to formalize, with the Code Party acting as a context for experimentation with a new pedagogical approach.

iv. Kickflip – Organizational Program Partnerships as Sites of Innovation

If Hive Pop-Ups function in the eyes of some network members as “particle accelerators” with regards to innovation – operating on extremely short time-scales on the order of hours with a multitude of Hive organizations coming together and “colliding” – then Hive-funded organizational partnerships provide a long form contrast to this. Usually involving two or three member organizations, they take place over the course of weeks and months and provide another important, and more sustained, context for innovation development and diffusion within the network.

In many ways, these organizational partnerships are the “bread and butter” of participation in the Hive for network members. On a base level, the funding associated with them, which comes every six months through an open request for proposals (RFP) put out by the Hive Digital Media and Learning Fund, could be considered a clear draw for organizations regardless of their orientation towards the broader goals of the Hive network. Most, though not all, organizations regularly apply to the RFPs, and project funding is contingent on some degree of collaboration amongst network members. More importantly
from the perspective of innovation, funded programs are meant to speak to some aspect of the Hive’s broader vision around learning and as such are a context where that vision is often iterated and expanded upon.

In this section I share a case of how KickFlip, a Hive-funded program developed by network members CityLore and Reel Works, operated as a space where innovations from the broader field of Digital Media and Learning were taken up and extended, with insights into existing pedagogical design principles being generated over the course of Kickflip’s implementation.

Enacting Principles from and Generating Insights for the Digital Media and Learning Field

In late 2009 and early 2010, a number of individuals involved in the Digital Media and Learning (DML) field, largely associated with the John D. and Catherine T. MacArthur Foundation’s initiative of the same name, began to synthesize lessons from the Initiative’s early research and design projects (cf. Jenkins et al. 2006; Ito et al. 2009; Gee, 2003; Pinkard & Austin 2010, Salen et al. 2011). The outcome of this synthesis was a set of learning and design principles called “Connected Learning” (connectedlearning.tv/connected-learning-principles, n.d.), aimed at guiding the development of learning interventions in the field.

While discussion of the full set of principles and their history is beyond the scope of this paper, one particular Connected Learning principle is of note when looking at Kickflip – the notion that learning should be “interest-powered”, or “interest driven”. This principle states that learning should be linked to youth passions, hobbies and pre-existing identities in such a way that young people are driven to develop expertise and mastery connected to areas they care deeply about. As much of the early research in DML looked at youth interest-driven activity in participatory online and offline communities such as those associated with fan and gaming subcultures (cf. Gee & Hayes 2009; Ito, 2010; Steinkuehler & Duncan, 2008), it is not surprising that this principle was made central in the Connected Learning framework.

As a project initiated and heavily funded by the MacArthur DML Initiative, the Hive is often positioned by its leadership (and, to varying degrees, by members themselves) as a space where these Connected Learning principles can be put into practice. In a very explicit way, funded projects are encouraged to use the framework principles to inform the design of their projects. Kickflip can be seen as a particularly unique instantiation of the principle of “interest-powered” learning in that it not only utilized it in its development, but actively extended the principle’s articulation through its implementation, a process I will describe here.

Rooted in the skateboarding sub-culture of New York City, Kickflip involves teen filmmakers working with teen skaters to teach them how to create films about the skating community. The premise of the program design is to take an interest driven activity, skateboarding, one rarely if ever connected in adult minds to learning outcomes, and leverage it to provide educational experiences that foster narrative development and digital production skills that have academic and professional relevance.

While this core idea at the heart of the program’s design could be seen as an instantiation of the Connected Learning principle of “interest-powered” learning, in observing the program and speaking with its facilitators I came to see how the program was generating important insights that could be “fed back” into the broader DML field to strengthen and extend its conceptions of what it means to be creating educational programming that is interest driven. In doing so, it enacted a key function that Hive network
facilitators and funders spoke about when they discussed the goals of the network – that of “putting meat on the bones” of the Connected Learning framework.

Establishing Legitimacy in an Interest-Driven Community – Insiders as Partners

At the Summer Code Party described in the previous section, I had the opportunity to speak with John Williams, the executive director of Reel Works, about some of what he was learning from running the Kickflip program. As I was conducting my fieldwork in the Summer of 2012, Kickflip was in its second program iteration, having conducted a pilot in the winter of 2011/2012. The Summer program hadn’t yet started at the time of the Code Party, and John was sharing a bit about how he was thinking about this second round.

“We’re going to do things a bit differently this time. When filmmakers show up and say, ‘we’re here to make a movie with you’, skaters don’t exactly know how to take that yet. […] Because skaters are there to skate.”

John here was pointing to part of the irony of the program, and a key tension involved in creating certain forms of “interest-powered” education – in the same moment as the program aimed to leverage youths’ interest in skateboarding, it was in essence also disrupting the sub-culture and activities associated with that interest by introducing into it new practices (in this case related to organized film making), not to mention bringing in outsiders to the community with their own agenda. As he so succinctly put it, skaters were not there to make films, there were there to skate.

This general tension between the educational program and the subculture it was aiming to engage and leverage for educational purposes was something I saw in moments I was observing program. On one occasion in the middle of an early meeting where some teens were learning about some of the program logistics, the broader idea behind the program and their role within it, one teen skater a question: “Will I still get to skate?” He directly articulated the heart of this tension: concern that involvement in the program might result in less actual involvement in his core interest – skateboarding.

On a basic level, this concern was valid. Teens involved in the program would be engaging in additional activities that, while tied to their passion, could potentially result in less direct engagement with it, at least in the manner they were familiar with. As such, those running Kickflip needed to establish trust and legitimacy with the youth they were trying to reach in order for the youth to be willing to re-conceptualize and reconfigure their engagement with their hobby. A key part of doing so was through engaging insiders within the skateboarding subculture of New York City, in the form of both adult and youth skaters.

Tal Bar-Zemer, the key program lead from Citylore, described to me the essential role that adult skaters played. “They're really instrumental, […] this would not be possible without them, absolutely not. I just don't know anything about this”, signaling her own status as an outsider to the community. “They're sort of why I am not like a crazy person who's offering candy in a van.” She shared that she had established relationships with adult skaters well known in the New York skating community, who in turn helped bring in kids to the program, shared strategies for engagement, and generally acted as a bridge into the community.

The involvement of these adults resulted in further inroads with teen skaters in the community. In a meeting I attended prior to the program “officially” starting, Tal met with a small group of teens that had agreed to be “skater wranglers” - program participants that would help to organize the sometimes “random” (ie – disorganized and somewhat unreliable) teens involved in the skater community by reminding them about when the
program met and modeling active participation. During the meeting, Tal shared with the teens that she had actually gotten in touch with them through Billy Rohan, a well-known professional skater in the community. At mention of his name, one of the teens exclaimed “Billy’s going to be here? He’s the homie…” Though Billy was not going to attend that specific meeting, his involvement signaled that Tal was “not a crazy person offering candy in a van”, as she’d expressed to me privately, but rather someone connected to a known and trusted figure within their community.

The involvement of such adults not only generally legitimized Tal as an individual that could be trusted, but also lent legitimacy to the filmmaking activities at the core of the program. During the same meeting, Tal shared with the teens that Billy Rohan and Rodney Torres (another well known adult professional skater) “[have] been really great, and they’re so interested and invested in making sure that skaters, especially in New York City, get a place to grow up, and get lots of spots and get understood and don’t get treated like criminals, so they’re really interested in having you guys tell stories to show all of the many sides of what skateboarders are and what they do and how they contribute to our society.” In positioning the core activities of program - sharing about and advocating for the skateboarding community publicly through storytelling - as ones of interest to these adult role models, Tal worked to legitimize involvement in an activity orthogonal to their interests that some teen skaters may have otherwise not seen value in.

The meeting with the “skater wranglers” prior to the “official” start of the program was also indicative of an innovation on a tried and true model found in the youth development world – that of establishing leadership opportunities within youth programs as a means to further learning. Tal’s introduction to the meeting indicates how the “skater wranglers” added an important angle to this classic youth development practice that’s relevant to the enactment of interest-driven learning environments:

“It’s kind of weird that I’m running this program because I am not a skater, and I don’t know very much about skating. In fact, if I stood on a skateboard, you would probably all laugh at me and I’d fall and hurt myself. So it’s a little silly that I should be the “instructor” of this, which is why I’ve pulled in a lot of people to help me run the project. […] It’s probably more effective for [the teen skaters] to get a phone call from you than a phone call from me. Because again, you guys are skaters… you guys are knowledgeable about your subject, you guys are passionate about it, and I’m just a boring old grown up who’s filling out paperwork.”

Tal here publicly acknowledges to these kids her status as an outsider and non-expert in the world of skating, and her resultant needs for assistance and desire for youth leadership in the program. This stands somewhat in contrast to many youth development practices of elevating a subset of teens to leadership roles – generally, this practice is done out of desire for growth on the part of teens, rather than out of needs that the program facilitators have. In this case, Tal is expressing that this is arising out of a real need that she has – that of having a project that is co-led with community insiders that have important forms of expertise and legitimacy that she lacks as an outsider. This can both be seen as an important strategy for creating a successful interest-driven program as well as one that creates youth leadership roles that are authentic and needed, as opposed to token-esque.
Re-conceptualizing Facilitation: Matching Interest-driven Communicative Norms

In late July 2012, I visit the Kickflip program at Reelwork’s office in the Gowanus neighborhood of Brooklyn. The program is already underway as I arrive, but few notice my entry into the spacious room the office consists of. Most of the teens are clustered in groups, engaging in conversation. Staff members are at open-air desks or circulate around the space visiting the groups. Other individual teens are at computers dotting the back wall of the space. I quietly join the edge of a group gathered around a coffee table, sitting on the well-worn couches that surround it. I place myself on a chair slightly outside of the natural circle created by the furniture.

The energy in the room is informal – Tal is perched on an arm of one of the couches, asking pointed questions every once in a while but mostly listening as this group hashes out various ideas about what the topic of their film will be. This being my first visit to the active program and only knowing Tal and a couple of the other teens I’d met at the “skater wranglers” meeting, I’m not exactly sure who the facilitators are and who the program participants are. One kid, who looks older than the rest with a scruffy beard, makes a comment about how every film or documentary is driven by a question, and this prompt drives the conversation for a bit – the group focuses in on what their question could be. One teen looks like he’s taking notes on the discussion.

Tal heads off for a bit to another part of the room as the conversation continues. One teen’s cell phone rings and he pops off the couch and heads out of sight to answer it. A teen from one of the other groups rolls by on his skateboard and listens in for a couple of minutes before rolling back across the room to his group. The older teen that had made the earlier comment about how every film is driven by a question had left and is returning just as the group came to consensus on their topic - the role of gender in the skateboarding community - and asks “how are you going to tell that visually?”, which the group chews on for a while.

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Throughout the observation, my own facilitator alarm bells are going off in my head. Being a youth development worker for many years and an admitted “Type A” when it comes to meetings, much of what I saw that day felt like chaos from a youth program facilitation perspective. In debriefing with Tal after the program ended, I found out that she was having the same experience as me as the groups were hashing out their film ideas. “It took a lot for me not to jump in, to just trust the process.” It was only at this point that I realized that when I walked in I wasn’t seeing how Tal normally runs programs. Rather, the freewheeling nature of the various teen sub-groups was entirely by design and meant to better match the communicative norms of the teen skating community, even though these went against the grain of how she normally saw her role as a program facilitator.

In a certain sense, the facilitation style reflected and even matched the interest-driven ethos of the program. This wasn’t “Capitol ‘F’ Facilitation” for a “Capitol ‘P’ Program”, one centered on heavy adult coordination and the traditional hub and spoke model often found in classrooms and many afterschool programs (including ones I’ve run myself), but rather reflected a more distributed and nodal communicative structure with generally equal weight given to all participants to bring the conversation in different directions. There were of course some exceptions to this - staff facilitators had clear differences in expertise that were relevant to the project at hand, such as the older teen who pointed out that every film needs
a driving question. I later found out that he was a Reel Works “graduate” currently in college and working with the organization part time.

Generally, these conversations felt more akin to the ways that friends working on a hobby project might mix “shooting the shit” with making headway on their shared endeavor. As both an educator and learning scientist, I see this shift in facilitation to match communicative norms of an interest-driven group as a key insight and innovation on what it means to effectively design interest-driven learning environments within the context of educational organizations.

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The case of Kickflip is significant because it demonstrates the capacity for organizational partnerships to act as part of an infrastructure that supports innovation. In this case, it acted as a context where educators could augment and extend an existing innovation: the principle of designing learning environments that are interest-driven. But one can also imagine organizational partnerships like the one described here taking on a number of different roles within an innovation infrastructure, such as acting as sites for diffusion of learning innovations from one organization to another or as sites where entirely new learning innovations are developed and tested.

It is also important to note that even though it’s possible to consider Kickflip a “successful” case of generating new insights around an existing design principle for learning, what is not yet known are the ways that those insights will get formalized and shared, if at all, within the HiveNYC network and the DML field more broadly. This raises key questions around how to structure sites of innovation development or augmentation, like Hive organizational partnerships or pop ups, to ensure that what is learned or developed in those contexts becomes shared, refined, or even rejected outside of the context of their development as opposed to siloed and lost before being taken up.

v. Hackasaurus – Network-wide Innovation Development

If the cases of the Summer Code Party and Kickflip illustrate how single day events and organizational collaborations, respectively, can act as sites of innovation, the final case I share, Hackasaurus, illustrates how multiple sites of innovation can be assembled across the network to support innovation development and diffusion that is spread out over a broader timescale and a more extended social geography. In addition, it also highlights how an infrastructure for innovation intersected with specific and intentional processes around innovation, in this case open source software development practices.

In this section, I will share a necessarily incomplete history of the development of Hackasaurus, a learning technology collaboratively spearheaded by Mozilla and the Hive “HQ” leadership with goals oriented towards teaching young people HTML, specifically, and “web literacy” (Belshaw, n.d.), more broadly.

I call this a “necessarily incomplete history” because my goal here is specifically to shed light on the ways that the project intersected and interacted with the Hive network in order to elucidate the network’s role in the development of Hackasaurus. This means I will necessarily not actively discuss contributions of numerous other stakeholders including many leaders and staff at Mozilla, the Mozilla volunteer community and various other educators and designers. The extensive contributions of these stakeholders are incredibly important to acknowledge - credit should go where credit is due especially in collaborative efforts such as
this one that are intentionally engaging people across many networks through an open innovation process. What I will share is also an “incomplete history” in that it does not tell the entire story of the project’s evolution (even within the Hive network), but rather aims to highlight the infrastructural touch points of the network in relation to the project.

In brief, Hackasaurus is a browser-based learning tool that allows its users to reveal and then remix particular HTML elements on a web page. Below I share screen captures of the interface for remixing a web page (figure 3) and a page after it has been remixed with the tool (figure 4). By pressing a “remix” button while mousing over a particular element, such as a picture, a user can change the HTML code associated with that element in isolation of the rest of the page’s code and preview changes in real-time before “committing” to them. All changes to web pages are local to the user’s computer, so are not permanent nor visible to anyone else visiting the same website from a different computer, though these “hacks” can be shared via screenshots such as the ones I share here.

![Figure 3. The Hackasaurus “X-Ray Goggles Remixer” activated on The New York Times website.](image-url)
It’s November of 2010, and a group of about a dozen people is gathered in a corner of the courtyard of Barcelona’s Museum of Contemporary Art, the location of Mozilla’s “Learning, Freedom and the Web” festival. The festival is Mozilla’s first public exploration of its place within the educational landscape, and the workshop I’m in is focused on how to “make an open learning web widget” that teaches kids HTML. The group includes a number of folks I’m already familiar with – Akili Lee of Chicago-based Digital Youth Network, Jess Klein and Ingrid Erickson of the HiveNYC “HQ”, Jack Martin of the New York Public Library – some others that are affiliated with organizations I know - Atul Varma of Mozilla, Taylor Bayless of the Chicago-based Youmedia library - as well as plenty of folks that just came to the session to brainstorm and develop ideas about teaching web literacies.

Throughout the session the group floats various proposals on what it could look like to teach kids to “hack” the web. The conversation dips into a number of areas. One is the specific idea of creating some sort of tool that could let kids “look under the hood” of a website and replace different parts of the page. As Atul (of Mozilla) and Jess (of HiveNYC “HQ”) both having coding and design backgrounds (respectively), they contribute many thoughts about feasibility and possible features. The discussion also touches on various ideas for associated curricular activities, like having kids “rewrite the news” through remixing web pages of major news outlets as part of a combined media literacy and web literacy activity. Hive members from libraries and those in the group with more direct youth development experience, including myself, share expertise to think through possible activities.

One older gentlemen, who seems skeptical of the endeavor, openly voices questions why we should even bother to spend time on a project like this, and why it’s important for
kids to understand the web, with people responding and articulating numerous values that were underlying the project, like the idea of positioning kids as empowered actors in relation to technology that they use everyday.

The workshop was a contrast to so many conference sessions I’d attended over the years, namely in that it focused neither on presenting work nor abstractly debating or discussing ideas, but rather on creating something tangible and moving a project forward. This general practice, regularly voiced by Chris Lawrence when he talks about what he wants the Hive to be, can be summed up in the quip “Less Yak, More Hack!” It’s a turn of phrase I’ve regularly heard in the broader Mozilla community as well. At the end of the festival, the still unnamed project was one of a handful generated over the three days that was shared with all of the attendees. It was positioned both as something that anyone could get involved with and as an effort that Mozilla was committed to moving forward.

That workshop, along with many conversations in Barcelona that week between Mozillians and Hive members and administrators that occurred in the interstitial spaces of the festival like hallways, lunches, and evening outings, was representative of the kind of intersections that regularly occurred in the Hackasaurus project between educators in the Hive and technology developers at Mozilla, with each bringing particular material, social and professional resources to bear on the project’s development.

In figure 5, I sketch a timeline with selected events that occurred over the course of the Hackasaurus project from its inception in the Summer of 2010 at a meeting at the MacArthur Foundation in Chicago to its uptake within a half a dozen New York City schools in the Spring of 2012. From the beginning, the vision of the collaboration between Mozilla and the Hive networks was for the tool and curriculum to be collaboratively developed, with Mozilla focusing on the technical development of the tool and the Hive-affiliated libraries contributing to curriculum development, and, importantly, exist as spaces where early prototypes of both the tool and the associated curriculum could be user-tested. In this way, the Hive networks, initially including Chicago but eventually focusing efforts in New York, acted as an infrastructure for the development of the project – a space to test and iterate both technology and pedagogy.
Figure 5. Timeline of Hackasaurus and HiveNYC interactions.
The earliest user-tests took place in the Winter of 2011 in both New York and Chicago Hive-affiliated libraries shortly after the festival in Barcelona. These events served as key learning opportunities for the development team around initial prototypes of the Hackasaurus tool, but they also ended up refining the broader practice of running one-day “Hack Jams” which I described at length in section iii. In this way, the innovation development process involved in developing Hackasaurus gave rise to another innovation that eventually became distinct as both a core educational practice in the Hive as well as itself a key part of the Hive’s innovation infrastructure, as discussed earlier. The “Youth Design Jam 101” toolkit written up by Jess Klein was the first of numerous formalized pieces of documentation of this process (Klein, 2011).

As Hackasaurus project unfolded, additional member organizations from HiveNYC became involved. In the Summer of 2011, both the New York Hall of Science and Eyebeam co-hosted hack jams at their spaces, with youth associated with those organizations as well as those affiliated with Hive members Mouse and the Institute of Play attending. In the course of these events, both the circulation as well as development of Hackasaurus was further distributed across the network. Youth and staff of Hive member organizations simultaneously had the opportunity to engage with the learning practices the project promoted and engage in a collective effort around the iteration of the technology and pedagogy central to it, giving feedback and making suggestions that contributed to its development.

As the project unfolded, key values and practices from the youth development community, specifically those of youth leadership, became more central as Mouse, Mozilla and Hive “HQ” began to work on the “Mozilla Youth Ambassador” project. In this project, teens associated with Mouse not only learned to use Hackasaurus, but also learned to run their own hack jams to teach their peers, something they did in the Winter of 2012.

This practice was taken one step further in the Spring of 2012, when the “MoYo Ambassadors” trained a cadre of afterschool educators associated with Hive partner (though not member) The After School Corporation (TASC). In “Tascasaurus”, as the project was dubbed, these newly trained afterschool educators co-facilitated workshops in schools across New York City in collaboration with the MoYo Ambassadors and Mozilla staffers working at HiveHQ.

Over the course of the first of half of 2012, the practices around webmaking that the Hackasaurus tool promoted in effect spread from Mozillians at Hive HQ and Mouse staffers to the youth that became the MoYo Ambassadors, from the MoYo Ambassadors and Hive HQ staffers to the TASC-affiliated afterschool coordinators, and then from all three of those groups to youth in New York City public schools. This circulation process which leveraged Hive network resources in the form of youth and organizational partnerships can be seen as one that met Mozilla goals around spread of the tools and practices associated with Hackasaurus as well as the priorities of a Hive member organization to promote youth leadership development.

It should be noted that the process of locating various priorities within specific organizational stakeholders as Hackasaurus unfolded is a somewhat imperfect one. To begin with, one of the reasons that this collaborative development and diffusion process was able to occur across the Hive network was because it aligned with priorities held by multiple stakeholders, such as the desire to engage youth in positive learning experiences writ large, and specifically ones that leveraged emerging media.

Another reason it is hard to parse where exactly organizational priorities lie is that the lines between many of the organizations and individuals involved is quite blurry,
especially when taken over the course of a two year timeframe like the one covered here. For instance, when the project began in 2010, Jess Klein worked at HiveHQ and was technically an employee of the Social Science Research Council (SSRC) that housed the HiveNYC project. When NySci hosted a hack jam where Hackasaurus was user-tested in the Summer of 2011, Chris Lawrence was a NySci staff member, whereas at the point when Eyebeam hosted one later that Summer, Chris had just become director of the Hive network. At that time the Hive network had also just come under the stewardship of Mozilla, moving hands from SSRC. By the end of the period I described here, Jess Klein was no longer on the HiveHQ team within Mozilla, but rather worked in the broader Webmaker initiative that the Hive project is a part of, though still shared an office with the HiveHQ team. Likewise, Leah Gilliam, a staffer at the Institute of Play who played a role in the Eyebeam hack jam, joined the HiveHQ team in the Summer of 2012. As such, the movement of innovations and the priorities associated with them must also be understood within the context of shifting affiliations and locations of individuals within a given network.

The Intersections of Open Innovation Processes and Innovation Infrastructures

A key aspect of the distributed development of Hackasaurus that is largely backgrounded in the account I share above is the role of free and open source software development practices. These practices, core to the ways Mozilla developers and project managers associated with the project worked, highly value “innovating in the open”. That is, actively working to involve a broader public community outside of the core team in the development of Hackasaurus. In the context of the project, this took the form of establishing numerous pieces of communication and participation infrastructure, including a public email listserv, weekly community telephone calls, regular documentation of project ideas on public wikis and notepads and extensive blog posts that documented milestones, events, and ruminations from the project’s developers over the course of its development. As Jess Klein wrote in one such post in February 2011, “The goal for us is to be transparent about our process so that we can engage whoever from the community is interested in collaborating.”

More important than open communication and documentation was the way that this “open ethos” (Booth, 2010; Hilliger, n.d.) played a central role in process of public collaboration with the project beginning with the workshop at the festival in Barcelona all the way through the project’s various intersections within the Hive network. At the same time, the very existence of the Hive network as a context for the development process was central to the ability of the project’s leaders to engage effectively using an open development approach. While the network was certainly not the only context in which the project was able to develop, iterate and spread, it was certainly the most robust and persistent, providing an unparalleled context for both innovation development and diffusion around Hackasaurus. When Mark Surman shared with me his perspective that Hive acts as “both R&D and retail” he referenced Hackasaurus as the prime example of this in practice.

The case of Hackasaurus raises important questions about the relationship between innovation processes, such as those associated with the open ethos, and the nature of the innovation infrastructure that develops and who it most effectively serves. As shown here, the development process around Hackasaurus itself introduced another piece of innovation infrastructure to the network in the form of the one-day hack jams or pop-ups described in section iii. In this sense, innovation processes led to the establishment of a specific form of innovation infrastructure, one that was instantiated regularly for the iteration of Mozilla
projects, among many other reasons. As such it might be said that innovation process and infrastructure structure worked to bootstrap one another into existence. The Hackasaurus project, largely driven by individuals familiar with the open source software development, helped establish and then leverage an infrastructure within the Hive network that led to a project that in its eyes was successful. A key question moving forward is whether Hive members themselves, especially those that do not come from professional contexts that engage in similar innovation development practices, have the same opportunity to leverage different parts of the innovation infrastructure of the Hive, and, if not, what supports need to be in place in order for them to do so.

iv. Conclusion

In this paper, I aimed to illustrate cases of how the Hive NYC Learning Network has acted as an infrastructure for innovation – a context that provided reliable and regular contexts for (1) developing, testing, iterating and reinventing innovations, and (2) circulating innovations and building capacity around them in new contexts. One day pop-ups and hack jams served as moments where activities, learning principles and technologies could be prototyped and circulated. An organizational partnership, KickFlip, acted as a site of innovation augmentation by generating insights around the principle of interest-driven learning. And the development of a learning technology, Hackasaurus, assembled and leveraged multiple sites of innovation across the network to the ends of its own development and diffusion within and beyond the network as part of an innovation process that embodied values from the open source software community.

I share each of these cases as proof of concept not that the HiveNYC is definitely an infrastructure for innovation, but rather that it has the capacity for such activity. What I’ve shared is a small slice of all the activities in the network. There are dozens of other stories and cases that have occurred over the history of the network that might shed light on innovation processes and practices or provide additional lessons (and cautionary tails), and in future work I aim to further develop a portfolio of cases that can build a more complete picture of innovation in the HiveNYC.

In particular, I believe it will be important to ask a number of questions that were not addressed in this initial analysis. In particular, what role do youth play in the innovation process in the network, given that they are the intended recipients of innovations? How are innovations sustained, or not, within organizations that adopt them? When does the innovation process fail? And, importantly, how does the network’s self-consciousness around innovation manifest in decisions made by network members, administrators and funders, and how do these effect the development of such networks? It’s my hope that through continuing this work I can unearth greater understandings of what it means to create regional hubs for learning innovation based in the everyday practice of educators.
References


