

Working in the Open: lessons from open source on building innovation networks in education

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Abstract

Purpose – This article makes the case that the education community can learn from professional learning and innovation practices, collectively called “Working in the Open” (or “Working Open”), that have roots in the free/open source software (F/OSS) movement. These practices focus on values of transparency, collaboration and sharing within communities of experimentation. This paper aims to argue that Working Open offers a compelling approach to fostering distributed educational professional networks that focus on co-constructing new projects and best practices.

Design/methodology/approach – Insights presented here are based on three sources: expert perspectives on open source work practices gleaned through interviews and blog posts, a qualitative case analysis of a collaborative project enacted by a group of informal learning organizations within the Hive NYC Learning Network, a community of over 70 youth-facing organizations in New York City, as well as an overview of that network’s participation structures, and, finally, knowledge-building activities and discussions held within the Hive NYC community about the topic in situ. From these sources, the authors derived general principles to guide open work approaches.

Findings – The authors identify five practices deemed as central to Working Open: public storytelling and context setting, enabling community contribution, rapid prototyping “in the wild”, public reflection and documentation and, lastly, creating remixable work products. The authors describe these practices, show how they are enacted in situ, outline ways that Hive NYC stewards promote a Working Open organizational ecosystem and conclude with recommendations for utilizing a Working Open approach.

Originality/value – Drawing from the F/OSS movement, this article builds on standard practices of professional learning communities to provide an approach that focuses on pushing forward innovation and changes in practice as opposed to solely sharing reflections or observing practices.

Keywords Communities of practice, Professional development, Open innovation, Innovation networks, Peer production, Educational innovation, Free/open source software, Working Open, Open innovation, Innovation networks

Paper type Research paper

The field of education has long contemplated how to best foster professional communities that support the ongoing learning and development of educators. Perhaps, the most compelling metaphor that has been used has been the idea of communities of practice (Lave and Wenger, 1991), wherein individuals who share a common practice, in education’s case pedagogy and issues associated with it, actively learn from one another from the basis of their own embodied and situated experience. In this paper, we offer a vision of collective professional learning that we see as taking many of the core values of community of practice approaches, such as sharing knowledge and gradual participation in embodied practice, and extend them by drawing on learning and innovation practices from the free/open source software (F/OSS) movement (Coleman, 2013). Called “Working in the Open” (or “Working Open”), these practices value transparency, rapid cycles of testing, collaboration and sharing within communities explicitly oriented toward experimentation and collective accumulation of knowledge. We argue that Working in the Open offers a compelling approach to fostering distributed

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educational professional ecosystems that simultaneously co-construct new projects along with the best practices surrounding them.

Of course, ideas, practices and values from open source culture are not entirely new to education. Open educational resources (OER; Atkins *et al.*, 2007; Hylén, 2006; OECD, 2007) have a more established recent history as a means of producing and making accessible educational content through alternate copyright licenses. However, practices of “Working Open”, although they might share some “familial” resemblances to OER, are distinct in terms of how they build on open source culture within education, focusing more on a set of social practices around innovation rather than on a work’s legal status, something we explore in this study.

The ideas shared here are rooted in a real-world practice context – the Hive NYC Learning Network – and represent perspectives that come from practitioners and experts linked to that community that have actively sought to embody Working in the Open in their professional practice. Hive NYC is a collective of 70 out-of-school learning organizations, ranging from libraries and museums to afterschool and community-based groups. Stewarded by the Mozilla Foundation, creator of the well-known open source Web browser Firefox, this community holds as its tagline “Explore, Create, Share”, indexing the key goals of the network – exploring new ideas, practices and technologies, collaboratively engaging in the creation of new and experimental educational initiatives and actively sharing what’s being learned along the way, as well the products of this work. Hive members’ experimental work is diverse – from afterschool programs that bring together youth to design augmented reality games to digital badging systems that incentivize healthy behavior to video-editing tools that promote critical media literacy by supporting remix practices. Hive organizations aim to design new approaches to pedagogy through an ongoing process of community learning and collaboration among members. In this article, we present insights that resulted from knowledge-building activities and discussions with members of Hive NYC and qualitative data drawn from a larger three-year ethnographic study of the network. Analysis focuses on operationalizing emic understandings of “Working in the Open” and presentation of field data that shows how these practices were enacted *in situ*.

Through our discussions and analysis, we find that Working Open is characterized by five central, interwoven practices:

1. public storytelling and context setting;
2. enabling community contribution;
3. rapid prototyping “in the wild”;
4. public reflection and documentation; and
5. creating remixable work products.

In this paper, we define these practices, show how they are enacted and identify structures that the Hive NYC stewards utilize to promote a Working Open organizational ecosystem that may be drawn on by other educational leaders. Finally, we outline recommendations for others that are interested in engaging in Working Open practices or aim to foster professional communities based on these principles.

Free/open source software, commons-based peer production and open collaboration

Many in the educational world might be familiar with ideas and practices linked to open source culture via the open educational resources (OER) movement. Although Working in the Open indexes some similar commitments, its general orientation is much more focused on how work gets done, as opposed to the legal and intellectual property issues associated with produced work, which is where OER centers its attention. As a means of understanding how Working Open represents a distinctive intersection of open source

culture with education, in this section, we briefly discuss the F/OSS movement (Coleman, 2013; Kelty, 2006) with its associated commitments, values and practices.

In brief, we argue that F/OSS represents both an alternative intellectual property framework (a “content” orientation) and an alternative mode of production (a “process” orientation), and that although education has drawn off of alternative licensing of intellectual property through the OER movement, what we see in Hive NYC around “Working in the Open” more deeply indexes F/OSS’s alternative ways of work, specifically open collaboration (Forte and Lampe, 2013) and peer production (Benkler, 2002, 2006) in a way that has not been present in the education sector previously.

“Copyleft” and free/open source software’s “content orientation”

In terms of its “content orientation”, the non-proprietary legal nature of software artifacts within F/OSS is best characterized by what Richard Stallman, one of the movement’s foundational figures, calls “the four freedoms”. Software and code is denoted as “free” or “open source” if its recipients can “(0) use it, (1) modify it, (2) redistribute it in original and (3) redistribute it in modified forms” (GNU.org, retrieved August 2014). This status is achieved specifically through the application of non-proprietary, often referred to as “copyleft”, copyright licenses (Mustonen, 2003) to software and by providing easy access online to the source code of the software.

Peer production, open collaboration and free/open source software’s “process” orientation

Values around information freedom and openness are also indexed in the “process orientation”, the cultural practices of work, organization and collaboration, found in the F/OSS community. Two similar framings of such modes of organization linked with F/OSS are commons-based peer production (Benkler, 2002, 2006) and open collaboration (Forte and Lampe, 2013). Benkler defines commons-based peer production as a socioeconomic model of producing goods and services, aided through coordination mechanisms of the internet, whereby many distributed and often volunteer actors self-organize to contribute to larger projects in a relatively decentralized manner (Benkler, 2002). Forte and Lampe (2013, p. 536), in a similar vein, state that an “open collaboration system is an online environment that (a) supports the collective production of an artifact (b) through a technologically mediated collaboration platform (c) that presents a low barrier to entry and exit and (d) supports the emergence of persistent but malleable social structures”. We see these social practices associated with how work gets done and who is involved as being the core cultural touchstone of F/OSS that Working Open is centered on.

Circulation of free/open source software approaches beyond software

An increasing number of pursuits outside of the realm of software have engaged with these two cultural touchstones of F/OSS. Perhaps the most famous and well studied of these is Wikipedia, the user-generated encyclopedia, but a host of other domains, including science (Anderson *et al.*, 2002; Eiben *et al.*, 2012; Nielsen, 2012), journalism (Gillmor, 2004) and business (Chesbrough, 2006; Von Hippel, 2001; Von Hippel and Keogh, 2003), have all appropriated these values and practices, reshaping them in various ways according to the particularities of purpose and social organization found within those contexts.

These extensions into new domains index what Coleman (2013, pp. 190-191) has referred to as the “semiotic surplus and elasticity” of F/OSS’s values and practices, their ability to flexibly be “translated” into new contexts – a central concern of this study. In the next section, we will discuss some of the ways that F/OSS culture has already circulated into the domain of education through the OER movement.

Prior intersections between free/open source software culture and education: open educational resources

The case of “Working Open” that we describe and analyze in this study is not the first time that aspects of open source culture have been taken up within the world of education. Specifically, the well-established world of OER (Atkins *et al.*, 2007; Hylén, 2006; OECD, 2007) represents the central example of how the ethos of open source already has footholds within education. In this section, we review OER in terms of the ways it indexes open source culture and argue that the practices of “Working Open”, although they might share some “familial” resemblances to OER, are a distinct phenomenon in terms of how they appropriate and circulate aspects of open source culture within the education world.

OER, as evident from its title, is centrally concerned with opportunities to access, and repurpose, materials associated with education and the possibilities that networked technologies provide *vis-à-vis* this problem. “Resources” might include textbooks, courses, videos, assessments, software and a range of other “content” or “tools” used to support teaching and learning. This material orientation is evident in the regular usage of terms such as “learning objects” (Wiley, 2006, p. 1) as the defining noun of OER, along with “repositories and referatories” (Hart and Albrecht, 2004) that collect and make said objects broadly available.

These resources are most often deemed “open” through two criteria: no-cost availability via the internet and non-proprietary legal licensing when it comes to copyright (OECD, 2007). Proponents of OER look to “copyleft” licenses such as the GNU General Public License, the Open Publication License and Creative Commons licenses as the legal means through which educational resources, be they textbooks or software, could be repurposed, reconfigured and redistributed. As noted in an Organisation for Economic Co-operation and Development (OECD) meeting on OER, notions of “open content” popular within the OER community “popularize[ed] [. . .] the idea that the principles of the open source/free software movements can be productively applied to content” (Wiley, 2006, p. 1).

For the most part then, the OER movement has drawn more substantively from aspects of the F/OSS movement that are concerned with legal “content” orientations toward copyright and the technological mediation of access to content. There has been much less attention given within OER to the modes of organization, in the form of commons-based peer production and open collaboration, that characterize the ways that F/OSS communities engage in their work.

It is these processes and practices of open source culture that are the focal point for this article. In our analysis, we will build on this existing work to look at the “translation” of F/OSS culture into education by investigating the setting of the Hive NYC Learning Network, with its attendant stewards at the Mozilla Foundation and members in the form of 70 out-of-school educational organizations.

Methodology

This paper combines data from three primary sources. First, it looks at expert perspectives on what constitutes “Working in the Open”. Second, it draws on explicit community conversations that occurred within the network about the topic. Finally, it integrates qualitative field observation data about projects that enacted “Working in the Open” practices *in situ*. We use these data to answer the following research questions:

RQ1. What do experts from the free/open source software community as well as educational practitioners see as the central practices associated with “Working in the Open”?

RQ2. How do these Working Open practices manifest within a network of informal educational organizations? What structures were used to support the enactment of these practices?

RQ3. What principles should organizations and communities interested in Working Open keep in mind as they engage in this mode of production?

For *RQ1*, we analyze two data sources. The first is six 1-h interviews with Mozilla employees that we deemed as experts on Working Open, based on their extensive writing on the subject and/or their active attempts to promulgate principles of Working Open in the Hive community, as well as blog posts that these individuals wrote on the subject. The second is discussions and knowledge sharing activities that our research team facilitated with members of the Hive NYC Learning Network. Specifically, we analyzed transcripts from a day-and-a-half-long design meeting where members discussed issues and challenges associated with a number of key network goals: circulating knowledge, capturing best practices, identifying experts and accumulating collective understandings around pedagogy. Within that meeting, the idea of Working in the Open as a key practice to focus on and discuss further became apparent. To answer *RQ1*, we identified “Working Open” practices through a thematic open-ended coding process, and these practices were then used in subsequent analyses as the conceptual basis for answering *RQ2* and *RQ3*.

To answer *RQ2*, concerning how these practices get enacted *in situ* and what structures support them, we draw on two data sources. First, we focused on a collaborative project implemented by seven Hive NYC member organizations called the Hive Moveable Game Jam (HMGJ). These organizations collaboratively implemented a series of day-long events in 2014 and 2015 where young people could learn game design by engaging in activities at a range of “stations” run by participating organizations. Data for this example come from four 0.5-h interviews with Hive NYC members participating in the initiative, 9 h of field observation of both game jams themselves and contexts where project leaders shared about the initiative with other professionals and, finally, project documentation including blog posts, public and private e-mails and online collaborative documents used to organize the initiative. Second, we focused on over 50 h of ethnographic observation of activities that Hive network stewards at Mozilla engaged to identify the structures that supported Working Open within the community.

For our final question concerning recommendations and design principles for others that are interested in engaged in open work or fostering communities that embody these norms, we look across all of the forms of data mentioned so far – expert interviews, project case studies and community knowledge-building activities that we facilitated related to Working Open. We synthesize from all of these sources general principles that were either explicitly stated or implicitly enacted when it came to effectively Working in the Open.

The core practices of “Working in the Open”

To begin the analysis, we focus on making sense of how our respondents talked about what constitutes Working in the Open. We identified five distinct yet interconnected practices that were shared as being central to Working Open:

1. public storytelling and context setting;
2. enabling community contribution;
3. rapid prototyping “in the wild”;
4. public reflection and documentation; and
5. creating remixable work products.

In this section, we describe each of these practices in turn.

Public storytelling and context setting

Creating a shared narrative and broader context was seen as fundamental to Working Open. It was heavily associated with having a mission that inspired a range of actors from

beyond your organization to join in and contribute to a larger vision. As Jason[1], a Mozilla employee, put it:

Ultimately, that mission and that story that inspires is basically what sparks the magic resource or force multiplier of open which is the passion of other people to want to contribute and build that thing with you.

Practices around public storytelling and context setting emphasize on the importance of both having and articulating a problem that a much larger group of actors would be interested in putting time into solving.

Enabling community contribution

Once someone is interested in a larger idea, there then has to be a way for them to contribute to an associated project. Enabling this kind of participation was often put in terms of “on-ramping” or creating “avenues for participation” that were clear and easily engaged with for those contributing. Contributions themselves might be small, such as asking people to give feedback on an idea via e-mail or seeing if another organization can provide a space where an organization might test out an early prototype, or larger, such as bringing someone in to actively build part of a tool or curriculum in a way that leverages their expertise. The view of Working Open emphasizes on designing projects in ways that not only engage a range of stakeholders but also build clear opportunities for these stakeholders to contribute meaningfully to the development of a project.

Enabling community contribution is both about what Jason referred to in a blog post as “getting greater bang from limited resources. punching above our weight”, as well as testing out whether the ideas you’re working with are powerful and resonant. If people are not interested in contributing, it may be a sign that a project’s ideas should change in some way.

Rapid prototyping “in the wild”

Part of “openness” that respondents spoke about was a commitment to quickly prototyping, testing out and iterating small ideas in real contexts before they “go big”. Then, as they develop, continually engaging in public testing is used as a means of getting feedback on and strengthening the work. This might mean something as simple as gathering some co-workers around a table to engage in an activity or play with a prototype or, on a larger scale, holding a day-long workshop that pilots an idea before implementing a full curriculum. Jason talked about the practice in this way: “because you are releasing those prototypes earlier and more often, you’re constantly getting feedback from the real world on what is actually working versus what you thought was going to work and that instills a kind of humility and resilience and a greater likelihood of success in your project”.

Public reflection and documentation

The role of documentation and reflection was seen as central to open work. As a project develops and pilots happen, recapping the work and reflecting on it publicly in places such as forums, meet-ups and blogs allows for better iteration by those leading the project, but is also linked to the storytelling function that provides context for different stakeholders to get involved as the work is unfolding. Individuals that are already and yet to be involved are able to use such documentation as a basis for making sense of what is happening in a project, learn from it and potentially contribute to it. As one Hive steward put it in a blog post:

Our hope is that this steady piloting helps us advance solutions toward old problems in education. However, we face a challenge. This generation of knowledge, process and work cannot serve the collective Network without a way to capture, catalog and make it visible.

They went on to speak more specifically to what such documentation should speak to and reflect on:

The challenges faced, the micro lessons learned along the way, the in-the-moment course corrections, the things that worked well that helped shape the ultimate direction. This information is crucial to know if someone is to repeat the process with fidelity or learn from it for their own context.

Creating remixable work products

Finally, creating work, whether it be technology, curriculum or program models, that others could easily and legally modify and re-use for their own purposes was seen as central to Working Open. If the practice of public reflection and documentation discussed above emphasizes sharing work in progress, the creation of remixable work products was about sharing the thing being worked on itself in ways that others can take up and build on. Going back to its roots in open source software where the source code of a project remains legally accessible, similarly Working Open in education was seen as valuing the development of “OER” that are remixable, transparent and extensible. On a legal level, this might mean using “copyleft” licensing such as Creative Commons, Open Publication License and GNU General Public License. Beyond being legally remixable though, it might mean thinking about how actors can create resources that are more easily appropriated by others by privileging modularity and extensibility. This practice was seen as linking to other practices, such as enabling community contribution, in that having work that is legally remixable lowers the barriers for others to contribute their knowledge and add meaningfully to projects. As Jason shared in an interview, “by using things like open licenses or allowing people to freely build on or remix or localize your work, it is more of an empowerment model than that traditional production and consumption model”.

Having outlined in this section the ways that Working Open was seen as a method of producing of new work and operationalizing what specific practices experts saw as constituting this mode of work, the next section will focus on what participation structures Hive NYC staff enacted to support organizational engagement in these practices.

Building Working Open ecosystems in education: Hive NYC as a model for collective innovation

The Mozilla Foundation staff that stewarded the Hive NYC Network aimed to norm open practice through specific participation structures that could support a strong ecosystem for collective innovation on the part of its members. In this section, we share some of the practical routines and structures put in place by Hive NYC stewards as examples of tools that can be appropriated by other educational leaders looking to promote professional communities that not only share but build innovations together.

Stewards from Mozilla actively spoke about how they saw Working Open practices as a way for member organizations to improve their projects and overall work. As a foundation to this culture, they shared how they positioned members as “not just educators but also designers”, professionals that come up with new forms of pedagogical practice. Kara, a network steward, put it this way:

We’re aware that the members of the Hive are not just educators but also designers, and some of them have a sense of themselves as people who are creating systems and negotiating relationships between people and might think of themselves as higher-level designers. [. . .] I’ll use the word “design” as a way to have people understand what their role is in the process, and so increasingly we’ll try to make sure that people are thinking about themselves as people who are designers.

Hive stewards actively developed and implemented a variety of channels through which members could openly work as a means of advancing their organization’s projects – community calls that were documented on public and collaborative etherpads [digital notepads similar to Google Documents (Docs)]; community meet-ups with associated re-caps on the Hive NYC blog; “cohort” calls where active projects shared work; an online

portfolio on the Hive NYC website where members could document and share resources around projects; an online e-mail listserv where members could ask questions, post information and, on occasion, solicit collaborators; and others. See [Table I](#) for the range of participation structures facilitated by Hive NYC stewards.

Across all of these, members of the network were regularly given the opportunity to learn more about each other's work (as in community meetings), prototype and test new learning approaches (in places such as network run "Pop-Ups"), give feedback to one another about ongoing projects (in contexts such as "cohort" calls) and generally find out who was expert in what area in ways that promoted collaborations leveraging distinctive skills that were distributed across the network. Speaking about these structures, Kara shared:

Table I Hive NYC participation structures intended to support Working Open

<i>Participation structure</i>	<i>Description</i>	<i>Frequency and mode of engagement</i>
Meet-ups	Regular community gatherings that serve a variety of purposes and activities; members sometimes shared projects, gave feedback to each other, engaged in discussion and debate around common issues and socialized and networked in ways that might result in new collaborative projects	Face-to-face; monthly; very often Hive members facilitated activities or discussions; more often Hive "HQ" designs activities
"Pop-up" learning events	Youth facing half, full or multiday events with a range of organizations running "stations" where youth are engaged in digital and production-centered learning activities	Face-to-face; irregular frequency
Specialized professional development	Curated talks or trainings around common areas of interest, such as engaging with a new learning technology or discussing issues around partnerships, spread and scale, etc.	Face-to-face and irregular frequency
Community calls	Regular group conference calls, mediated by collaborative online notepads, that served a variety of purposes and activities; members and Hive HQ often give updates about projects and opportunities and broader discussions about issues were held	Monthly; voice-based, multimodal synchronous engagement (presentations and digital notepads)
Cohort calls	Regular group conference calls explicitly oriented toward members sharing about ongoing collaborative projects, speaking to challenges encountered, how they solved them and opening up to feedback and advice from other Hive members	Every six weeks; voice-based; multimodal synchronous engagement (presentations and etherpad)
Online project portfolio	Documentation space on the Hive NYC website where members created entries that include descriptions of their youth-facing projects, including a range of documentation such as curricular resources, logic models, photos, videos and links to online documentation such as blogs and reports	Online; with members creating entries for their projects
Network blog	Curated by Hive "HQ", with regular "guest posts" by network members and stakeholders where shared issues were discussed, projects were documented and new opportunities were shared	Online; asynchronous writing and reading of posts
Community listserv	E-mail-based community listserv where Hive HQ and networks members posted new youth-facing opportunities, open jobs at their or other organizations, sought advice and responded to queries, etc.	Online; asynchronous via e-mail and Web portal
Member directory	Online database with information about each member organization, and associated individuals, that were members of the Hive NYC network, including contact and professional specializations	Online; asynchronous; each member updates his or her own information

[It's] really about circulating discovery and challenges. It's a way to identify problems and to take the larger problems and bring them forward to funders, to the field, to the rest of the Hive. [. . .] To me that kind of leadership part is also about sharing those kinds of discoveries.

Broadly, we see the kind of designed ecosystem outlined in this section as a means to foster a culture of Working Open across a distributed set of educational actors and potentially one that can be looked to as inspiration by other leaders of educational communities that have similar goals around supporting educators to collaboratively advance their work and engage in innovation. No single structure within the ecosystem supported this kind of approach alone – activities happening in one context might be documented and circulated in another, where they could be encountered and built upon in new ways by others in the network. Together, they formed an interwoven tapestry of supports for Working Open.

Having taken a high-level view of how Hive NYC stewards aimed to support a Working Open ecosystem in this section, next, we look more closely at the way these practices were instantiated *in situ* by educational organizations that were members of the Hive within a collaborative, open project.

Hive Movable Game Jams: Working Open practices in an educator-led project

As an example of what Working Open looks like in practice within an educational community, we focus on a collaborative project, the HMGJ initiative, that was collaboratively developed and implemented by over a half a dozen Hive NYC member organizations. The game jam model involved organizations regularly coming together to organize 3-h events, hosted at different participating organizations' locations across the city, where each organization would set up a "station" with an associated set of activities that supported youth engagement in game production and associated design thinking practices. Youth would arrive, participate in an icebreaker that involved some short form game design activity and then for the majority of the event would rotate across the stations, closing with a presentation of the games produced during the jam. HMGJ is distinctive as an example in that the initiative explicitly utilized Working Open frames and practices as a mode of its development, but no actors from Mozilla were directly involved in the project's approach to development and implementation. We will describe here how the HMGJ project used Working Open practices in its development and implementation and also speak to how Hive members participating in the initiative reframed Working Open practices through the lens of learning as a way of making sense of this mode of work.

Hive Movable Game Jam's instantiation of Working Open practices

Perhaps, the most central Working Open practices the participating organizations engaged in were those related to enabling community contribution and public reflection and documentation. These practices were centrally supported by the mechanism of the "Game Jam Guide", a collaborative Google Doc that Michael, the central coordinator of the initiative who was an employee of a non-profit that promoted science and engineering learning, maintained and that participating organizations contributed to. Michael saw the guide as an "online space" related to the initiative where knowledge could "sit" and activities could be coordinated. The other Working Open practices of public storytelling, rapid prototyping and creation of remixable work were all present in the project, though less emphasized by participating organizations and less visible and salient in the data. In this section, we outline the ways in which these practices manifested within the HMGJ initiative.

A collaborative and semi-public Google Doc, the "Game Jam Guide" acted as a central organizing mechanism of the initiative. We describe it as semi-public in that Michael set up access to the guide in a way that those that came to it through public contexts such as various blog posts and Hive NYC listserv e-mails could view it, but only those that were actively participants in the initiative, as determined by Michael, could edit its content. Michael described the guide as having several purposes. First, it acted as an

asynchronous digital context where those actively participating in the initiative could organize upcoming Game Jams. In one section of the guide dedicated to this function, logistics related to upcoming events could be outlined, including when the Jam was happening, which organizations were participating in running stations, who was hosting the event and where it would happen, what activities would be run and by whom and what outreach efforts were being conducted. Second, it acted as a context for public documentation and reflection. In terms of documentation, organizations provided details on activities they had run at Jams including learning objectives, materials needed and how to enact the activities – in essence, they shared their curricular approach. Following the event, below the outline of an activity, reflections were captured in terms of how the activity went including tips about how to improve it.

In addition to using the Game Jam Guide as a context that enabled community contribution to the initiative, Michael described a variety of less and more intensive ways that organizations and individual educators could become involved in the project, all facilitated and supported in one way or another by the Game Jam Guide. They could run a station and associated activity at upcoming events that the initiative was organizing in New York City, either providing a new activity or adopting an existing activity that was documented in the guide. They could then contribute new activities they would run and/or reflections on existing activities in the guide. Most intensively, they could organize and run their own Game Jams using the model and activities described in the guide. These various modes of participation provided multiple avenues for interested parties to get involved and for those already involved to deepen their participation.

The project engaged in context setting and storytelling in a number of different ways, all geared toward bringing new actors into the initiative. Michael worked to craft public blog posts on the Hive NYC blog, posted e-mails to the Hive NYC listserv and shared out the Game Jam model, often alongside other participating organizations, at a variety of education conferences. In a blog post with a clear invitation to participate titled “Join the Movable Game Jam Initiative”, Michael shared context on why organizations might get involved, stating that:

Collaborative game jams are a great way to teach youth about game design and to give them hands-on experience making and hacking games for themselves, but they’re also a great way for the adults hosting the event to get to know other interested organizations, educators, people and parties – to start developing or strengthening a network. [. . .] The organizers share back to the initiative by adding to the live document for other organizers to read and use and comment on, and the learning and the sharing never end.

In writing the post, he aimed to provide context for why others might want to join (“to get to know other [. . .] organizations” and “to strengthen a network”) and provided a clear view into what it looked like to participate (“teach youth game design”, “add to the live document” and “share back to the initiative”). Throughout the post, he described what Jams looked like and pointed to practical ways that interested parties could get involved, including signing up for the initiative which would provide access to the Game Jam Guide. In interviews, he talked about how the Guide itself would be the core mechanism by which interested parties gained deeper context about the initiative and what it would look like to participate, stating that it acted as a “promotional shareable resource” and that “we want people to know about it” as a means of understanding “what we’re doing”.

Looking across these three practices of enabling contribution, public documentation and reflection and public context setting, one notable phenomenon is the way that that the initiative utilized a single, though multi-faceted, digital resource – the Game Jam Guide – as a means of intertwining and connecting these practices. It embodied the ways these practices often work in concert and reinforce one another, pointing to the cohesive, rather than discrete, nature of Working Open practices.

Although it was less central in the discourse, the practice of rapid prototyping was inherent in the HMGJ program model on two levels – both the overall structure of the Game Jams was something that was actively iterated on, with Michael collecting data at each event and integrating changes to the game jam structure before the next event, and within the stations themselves, where organizations spoke about using the stations as contexts to test out new educational activities and technologies. One participating Hive member, Shirin, spoke about how running stations at Game Jams supported her organization’s broader efforts to advance one of their core programs:

Doing it there helped think about how that Wearable Gaming workshop translates to another space and a shorter amount of time and different ages of youth. It was good testing for us.

She went on to talk about how her organization was engaged in work to figure out how this particular program could be brought to greater scale and how participating in the Game Jams allowed learning opportunities for her with regards to that goal:

I think with these workshops, there’s an opportunity to spread them out and to reach more people and opening up those ideas and these opportunities to different people. [. . .] The Game Jam is connected to that because, even though it’s a more condensed version of that two-day workshop, it’s the same opportunity and it’s the same way we can figure out how to better hold this workshop and what works best and what’s effective.

Jared, another participant in the initiative, spoke about the Game Jams as a context for iterating on existing activities that were used by his organization in contexts outside of the Jams in a similar way, pointing to how the Jams allowed his organization to learn more about how to adapt activities in a new context:

The other benefit of participating in these sorts of jams is that there’s always a chance to say like, “Okay, do we need to create different cards and are there more resources that we can build out that will make this particular activity more successful with youth?”

Jared points to how running activities at a Jam allowed reflection on existing activities and how they could be improved.

In addition to the opportunity for iteration on particular organization’s curricular activities, the structure of the Game Jams, most notably their frequency, allowed the Jam model itself to be the subject of rapid iteration. Occurring just once a month at most during the project’s most active periods, data and reflections collected at one Jam were reflected on in the interim period by organizations involved with the initiative and used to make changes to the design of the overall activity structure prior to the next Jam.

The final Working Open practice identified, created remixable work products and was also present in the HMJG initiative. Though participants rarely used this frame explicitly, the general model indexed this objective. This was enacted predominantly in the method of open documentation and contribution in the Game Jam Guide, which went alongside Michael’s active encouragement of a range of other stakeholders that might join the initiative to utilize, adapt and contribute to activities in the guide. Although we did not find evidence that the initiative actively engaged in using open or “copyleft” licensing to create the formal legal conditions for remixing the activities that participants contributed to the Game Jam Guide, the discourse within the initiative indicates that parties involved expected and welcomed others to utilize, remix and add to the activities within the guide, aligning with Working Open practices around remixability. Functionally, with each new contribution to the guide, participants were reshaping what the resource looked like in a way that was based on their own expertise and practices.

Reformulating Working Open within a learning frame

A final consideration regarding Working Open practices in the context of the HMGJ initiative concerns the ways that participating organizations made sense of engagement in such an approach to project development and how this sense-making

might point to the mechanisms at play as practices such as these are viably appropriated into the culture of educational organizations. Specifically, we heard from multiple participants that they saw the open organizational model as indexing values they held around learning, and the ways that this value around learning reflected their core commitments both for young people and their views on organizational and professional development. In asking Michael about what he saw as the purposes and benefits of taking a Working Open approach, Michael said:

The Game Jam has two values. One is to youth because it's a great thing for them to do games. The other thing is to organizations as a mutual professional development. Everyone learns by participating and seeing everyone else. So, this is a way to formalize that value a little more and make it a little more apparent rather than something that just happened very informally in the pilot test. There's a very formal way we learn and share with each other.

Values around learning were made explicit not just internally to the project participants but also in their justification to funders and were framed in terms of "mutual professional development". Similar to the approach found with the National Writing Project of "teachers teaching teachers" (Lieberman and Wood, 2003), it can be seen as a counterpoint to approaches to professional learning in educational organizations that often frame a single group of professional development facilitators as the experts in a given area and participants as lacking in this expertise. Michael points to the transparent nature of the project as contributing to this – "Everyone learns by participating and seeing everyone else" – and that the Working Open approach acts as "a way to formalize that value a little more". He points here to the idea that these practices can be seen as a general approach to engaging in professional learning activities. Michael spoke to the fact that this value around learning associated with practices such as public reflection and documentation was only something he came to realize after some of the initial pilot work done on the Game Jam model. He stated this about the Jams implemented during that pilot:

We did a little recap at the end that was just like, "Hey, let's do something before everyone leaves". It wasn't like, "Oh, we're going to share". And then I asked everyone to write things up afterwards just so I could document it for a Hive blog and then it was like "You know, this actually should be compiled and shared probably". And so it just seemed to make sense. There was no forethought. There's no idea that this would be a good thing for the [organizational] partners. I was only really thinking about documenting to share out to the Hive. I wasn't thinking about this being of value to all of the staff that attended, but after we ran the second one, what was clear to everyone is whenever the other staff left, they were super-energized by the experience. They really enjoyed it and got something out of it that they could bring back to their organizations.

Michael's initial approaches during the pilot did involve engagement in Working Open practices, particularly those relating to public documentation, but "there was no forethought" in terms of the kinds of learning benefits these kinds of practices could bring to those organizations involved in the initiative. His coming to see such practices as something that could be framed in terms of promoting learning was one that only came through direct engagement.

Other participating organizations used similar frames to describe how this approach connected to values around learning. Shirin stated that:

Being part of the Hive and this other active way is really great, to be working with other organizations that are doing different programming but in similar concepts and how we can learn from each other. I think it's great to have that.

She does not explicitly talk about "Working Open", but rather points to a somewhat ambiguous, but to her, distinct, "active way" of working with other organizations in a way that allows them to "learn from each other". She used other common terms within education, in particular, the generation of "best practices" that are related to professional learning as part of what she saw the project's approach being able to support:

I think there are two types of things I'm really seeing being generated. One is the activities themselves that really nail it and really do deep engagement with a bunch of kids in a short time. And the other thing is like best practices for how they invent this whole, or the activities as whole should be structured.

We interpret this framing of Working Open practices with the value of “learning”, broadly conceived, as one mechanism used by those participating in them to make sense of ways of work that were distinctive as beneficial and, importantly, aligned with core commitments around learning that were held by these informal educational organizations.

The Hive Movable Game Jam initiative is consequential in that it provides an example of how Working Opening practices were manifest in the work of organizations within Hive NYC Learning Network in ways that were not directly facilitated by actors coming from the Open source world and Mozilla itself, but rather organizations that were taking inspiration from that broader cultural context in ways that made sense for their work. In enacting these practices, certain ones were somewhat emphasized over others to advance the project and achieve its particular goals. Finally, the perspectives of the participants pointed to ways that existing commitments around learning were used as a means of making sense of engagement in Working Open practices.

Recommendations for Working Open in education

In talking about Working Open, Hive NYC members and Mozilla Foundation experts identified a number of benefits to this approach to work; it can result in improved projects, promote greater efficiency, increase the discoverability of projects that people can get involved in, help identify who in the community has what expertise and generally create a stronger “commons” of knowledge and relationships within a community. But achieving these goals is not straightforward, so in this section, we reflect on what we have observed in the Hive community and what kinds of things people recommended for both organizations that want to Work Open and for leaders of educational communities who want to foster ecosystems based on these values.

Enable meaningful participation

One expert from Mozilla saw this as the overriding principle that should guide both individuals who want to adopt an open approach in their projects and leaders who want to foster open ecosystems. Considerations of how people sharing and contributing to projects should be led by a fundamental orientation toward how that participation can be meaningful to the contributor. Specifically, this means how participation might allow contributors to, for example, learn new skills, build valued relationships, have their own work and expertise become better recognized or help them to achieve their own organizational priorities.

Share both process and product

Sharing was conceptualized as happening in open work both on the level of reflections and meaning-making around projects in places such as blog posts, wikis and presentations and on the level of the work product itself – the curricula, approaches or technologies that are being produced. Reflective sharing might include documentation about how a curriculum or educational program is unfolding as it is being implemented, perspectives of students involved in a project, early prototypes or sketches, thought pieces or opinions and the results of a pilot or experiment. Sharing the work itself, be it a curriculum, digital tool or youth-created artifacts, was seen as serving linked but distinct purposes. Coupled with reflections, it allows others to clearly understand what the “embodied” work looks like in ways that are concrete – what previously might have seemed abstract and unclear within reflective documentation can become grounded when paired with actual objects of work. Finally, sharing the objects of work itself allows others to directly build on and adapt them within their own contexts.

Know “what gear” of “Open” you are in

Jason, the staffer at Mozilla mentioned earlier, wrote about the importance of knowing “what gear of open” you’re in, laying out four different levels: “0) Closed, 1) Not yet, 2) Open and 3) Shout it from the Rooftops”. He acknowledged that at different stages, a project might share in different ways, and that certain things are simply never shared, such as sensitive student data.

Consider the audience of worked shared

Another way Hive members spoke about audience was through the lens of considering different stakeholder groups that were relevant in different moments and in different ways. Core project teams and collaborative partners could be seen as having the most access to and context around the work as it unfolds. But beyond that, “openness” might extend to a range of different groups – this might mean broader teams within a project’s home organization, individuals external to the project that might be useful to consult along the way and trusted youth and students who might play a role in the design process itself through testing and giving feedback on a new lesson or tool.

When thinking about issues of audience, educators shared the importance of being intentional about when, with whom and for what purposes something gets shared. They spoke about how their organizations can proactively put systems and plans in place from the beginning of a project so that open work does not just become an afterthought, but part of a thoughtful strategy of engagement and community collaboration.

Watch out for tensions

Working in an open way inevitably invites some new risks and challenges, some particular to the context of education, that should be attended to as an organization or community engaged in these practices. Concerns may arise related to reputation when it comes to sharing in-progress work that is not polished, issues of project “ownership” that become somewhat blurred in open work, concerns over involving youth in open practices in ways that ensure their safety and privacy or just the general challenge of navigating prolific amounts of information that are produced and can make people feel like they are “drinking from a firehose”, as one Hive member put it. Tensions will of course be specific to a given context, but the ones mentioned here were surfaced in the Hive communities’ conversations and found in some of the projects we studied.

Frame Open practices within values around learning

As noted at the end of the Movable Game Jams case, one way that Hive members made sense of Working Open was seeing it through the lens of an alternative mode of professional learning, one that promoted agency, experimentation and collaboration. Understanding these practices as being about a collective approach to learning in a professional community speaks to the commitments that are already present in educational communities and can guide how Working Open gets enacted in a way that is rooted in a core value, as opposed to being about procedurally following some pre-determined recipe.

Conclusion

We see Hive NYC as a context that includes two key elements that make Working Open possible: a *collective* of educators developing pedagogical innovations and an *infrastructure* that supports creating this work in the open. Seen as a *collective*, the network includes a range of talent and specialization among members, a strong sense of trust between them and a general norm and understanding that experimentation and failure is part of what the network does. Seen as an *infrastructure*, the network provides a set of existing and malleable contexts in which open work can occur, from online spaces such as the Hive NYC listserv, blog and portfolio to offline spaces such as meet-ups, pop-ups and more formal collaborations. These two assets – a strong community and a range of

infrastructure that can act as connective tissue – create a firm ground on which organizations can develop and share their work in an open way.

Hive NYC itself represents an experiment in how a new kind of educational ecosystem and community of professionals and organizations might be built. As a collective, it shows how the field of education might draw on innovation practices, such as Working Open, that originate in other sectors, but think through what these mean in the context of doing educational work, contending and co-existing with existing organizational norms and routines and changing in ways that are suited to the problems educators face as they attempt to benefit youth.

As other educational communities look to this mode of work as a means to promote more innovative, flexible and effective learning opportunities for young people, we imagine that Working Open might take different shapes, utilize different supports and engage with different types of problems. As open practices continue to circulate in the educational world, we see it critical to continue research on how such processes are adapted, what challenges educators face as they enact them and what structures best support an open approach.

Note

1. All names that appear are pseudonyms.

References

- Anderson, D.P., Cobb, J., Korpela, E., Lebofsky, M. and Werthimer, D. (2002), "SETI@ home: an experiment in public-resource computing", *Communications of the ACM*, Vol. 45 No. 11, pp. 56-61.
- Atkins, D.E., Brown, J.S. and Hammond, A.L. (2007), *A Review of the Open Educational Resources (OER) Movement: Achievements, Challenges, and New Opportunities*, Creative Commons, Mountain View, CA, pp. 1-84.
- Benkler, Y. (2002), "Coase's Penguin, or, Linux and the nature of the firm", *Yale Law Journal*, Vol. 112, No. 3, pp. 369-446.
- Benkler, Y. (2006), *The Wealth of Networks*, Yale University Press, New Haven, CT.
- Chesbrough, H.W. (2006), *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Harvard Business Press, Brighton, MA.
- Coleman, E.G. (2013), *Coding Freedom: The Ethics and Aesthetics of Hacking*, Princeton University Press, Princeton, NJ.
- Eiben, C.B., Siegel, J.B., Bale, J.B., Cooper, S., Khatib, F., Shen, B.W. and Baker, D. (2012), "Increased Diels-Alderase activity through backbone remodeling guided by Foldit players", *Nature Biotechnology*, Vol. 30 No. 2, pp. 190-192.
- Forte, A. and Lampe, C. (2013), "Defining, understanding, and supporting open collaboration lessons from the literature", *American Behavioral Scientist*, Vol. 57 No. 5, pp. 535-547.
- Gillmor, D. (2004), "We the media: grassroots journalism, by the people, for the people", available at: www.authorama.com/we-the-media-1.html
- Hart, J. and Albrecht, B. (2004), "Instructional repositories and referatories", *ECAR Research Bulletin*, Vol. 5 No. 2.
- Hylén, J. (2006), "Open educational resources: opportunities and challenges", *Proceedings of Open Education*, Paris, pp. 49-63.
- Kelty, C.M. (2008), *Two Bits: The Cultural Significance of Free Software*, Duke University Press, Duke.
- Lave, J. and Wenger, E. (1991), *Situated Learning: Legitimate Peripheral Participation*, Cambridge University Press, Cambridge, MA.
- Lieberman, A. and Wood, D.R. (2003), *Inside the National Writing Project: Connecting Network Learning and Classroom Teaching*, Teachers College Press, New York, NY, Vol. 35.
- Mustonen, M. (2003), "Copyleft – the economics of Linux and other open source software", *Information Economics and Policy*, Vol. 15 No. 1, pp. 99-121.

Nielsen, M. (2012), *Reinventing Discovery: The New Era of Networked Science*, Princeton University Press, Princeton, NJ.

OECD (2007), *Giving Knowledge for Free: The Emergence of Open Educational Resources*, OECD, Paris, available at: <http://213.253.134.43/oecd/pdfs/browseit/9607041E.pdf> (accessed 25 May 2007).

Von Hippel, E. (2001), "Learning from open-source software", *MIT Sloan Management Review*, Vol. 42 No. 4, pp. 82-86.

Von Hippel, E. and Krogh, G.V. (2003), "Open source software and the 'private-collective' innovation model: issues for organization science", *Organization Science*, Vol. 14 No. 2, pp. 209-223.

Wiley, D. (2006), "The current state of open educational resources", *Paper for Expert Meeting on Open Educational Resources*.

Further reading

Home – Hive NYC (2013), available at: <http://hivenyc.org/> (accessed 21 July 2014).

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