The Social Workshop as PLE: Lessons from Hacklabs

Jeremy Hunsinger, Virginia Tech, USA –jhuns@vt.edu

Hacklabs and Hackerspaces are a global, transnational, perhaps social-movement in which people come together and pool resources to create workshops and labs in which they pursue their own interests in science and technology. These 'social workshops' have both a physical and internet locations through which the members collaborate.

In this paper, I present an analysis of hacklab websites, wikis, and blogs including their multimodal content such as video and pictures as a way of understanding the ways that people who want to learn together and collaborate construct and manage their shared learning environments. Basing this analysis on 220 archived websites that I have been working with and analyzing for several years, I review the tools and techniques these groups use and argue that the 'social workshop' is intrinsic to their personal learning environment, which is necessarily social. In understanding the social interactions of their personal learning environments through the way they represent them on the web, I hope to show that not only is the personal learning environment social, but it is also for this group transnational, and perhaps even cosmopolitan in its outlook and its norms. In considering how learning may modulate between these valences, from personal, to social, to transnational, to cosmopolitan, I then argue that we might be able to reconsider how we understand the embeddedness of personal learning environments generally conceived.

Keywords:

1. Introduction

The fundamental process of our lives is learning, whether we are consciously aware of it or not. As social animals in the Aristotelian sense, we learn within our social groups, which inform our everyday lives and provide us with grounds of understanding. This paper considers one form of social group that very few people around the world belong to, but this group is exemplary as a learning environment. Hackerspaces and hacklabs are social laboratories or workshops that people join in order to learn and share knowledge. They are generally spaces where people are oriented toward the practical and pragmatic side of learning, where you learn how to do things and why to do them a certain way. While these workshops center on the practical, by necessity, the practical requires infrastructures one part of establishing infrastructures is the establishment of norms, standards and practices (Star and Lampland 2009; Thévenot 1984; Hunsinger 2009). These social workshops have both online and offline infrastructures and through those infrastructures, members and guests share physical and digital spaces; paying for their upkeep, collaborating and organizing through these infrastructures comprising their environments and contributing to their learning ecologies.

For their members, these environments are very clearly part of their personal learning environment. For the purposes of this paper, a personal learning environment is the ecology of relations, which surround an individual that enables their learning. This ecology of relations exists across the learners mental, social, and environmental ecologies with relations cutting transversals and lines of flight that the learners modulate in relation to the ecology to develop and direct their own learning experiences (Downes 2007; Genosko 2002; Guattari 2000; Guattari 1984). These ecologies are aggregations that are in motion that relate to each other and to the subjects they contain in a plurality of relations and relations to systems that the ecologies contain. As we choose what to learn, we modulate those ecologies and through the modulation, the ecologies change in relation to the learner. Understanding this situatedness helps us understand why and how hacklabs and hackerspaces relate to their users, grow and change over time and how their members form and are formed by them through their engagement as personal learning environments.

I noted above that there are not many people involved with these social workshops, but honestly that is only if we think on a global scale in comparison to the approximately seven billion people the world contains. These social workshops exist around the world; in almost every major city in the developed world and in many cities in the developing world. Large cities such as New York City and London will have several social workshops, whereas small cities like Kitchener, Ontario, Canada only have one, or none. But it is a global movement, there are hacklabs in Australia, Africa, Asia, North America, South America, and Europe, with each continent having between several tens and upwards of one hundred hacklabs. However, even if they are widely available, hacklabs are not ubiquitous, nor necessarily easy to access to join. They are membership-oriented groups, usually the city they are in has at least one university within reasonable distance, which entails to some extent a population of youth with basic income. As indicated in their photographs on the internet and listings of members on their websites, an estimate of the demographics of these workshops is possible, though they vary individually and to some extent by country, but as a whole they tend toward male with a bimodal split between college age individuals and individuals in their 30s-40s. In some workshops as noted, they will be less gendered or even gendered toward female. Demographics of individual workshops are obviously path dependent on the history, founders, current members, and past members of the workshop.

I should also note briefly that these social workshops are not isolated on the web, they form a interwoven set of websites that link to each other and link to specific other websites. One might think of them as being one particular form of cosmopolitan community, where most of the members of the community are aware of and pursuing goals similar to other members of the community, where the community is dispersed globally, but also interactive locally in a specific space and specific time. Many of the members have an imagination of being part of a larger whole, though they primarily work in their local workshop. The members of the community also use video chat and other real-time collaboration tools to pursue projects in their own workshop in conjunction with members in other workshops.

In thinking about these communities in their workshops, interacting with their

infrastructures and tools, it helps to keep in mind that they come together specifically to share the space, to share knowledge, and to share tool/infrastructures. These things all have costs that they share also. This communality requires that they be organized and have modes of governing themselves that are recognizable to new members. Therefore it is important to realize that these organizations tend to fairly normal operating procedures. What I am in part addressing in this paper is how do these norms relate to the individual personal learning environments, and how does the social aspects of the lab and its organization affect those environments.

2. Data and Methods

In this study, I used two datasets as the basis for my analysis. The primary dataset, which is developed from my current research project, is comprised of archived websites of hacklabs and hackerspaces. These websites are multimodal media comprised of text, sound, video, and images composed in a variety of designs. They were collected during two periods during 2009 and 2010. The whole website and all of its external links were captured using a tool that makes a mirror or a copy of the website and spiders the links of the website in order to find the linked materials. A spider is an automated script that finds all links in the current webpage and follows them to the next page, we can imagine it creating a network or web of pages that exist within relation to the current page. In this current dataset, the linked materials have been scrubbed from the data, and only the primary website and any websites with the same domain were included. The original list of primary webspaces was derived from the spidering the hackerspaces.org website and the Wikipedia pages on hacklabs and hackerspaces. By spidering the initial list of websites, I was able to compile a clean list of 220 websites. There were several thousand related websites, but these 220 were easily identifiable as being the primary websites of a hacklab or of a hackerspace. These websites comprise around 40000 documents, primarily html files, but they also have pdfs, plain text, and their related materials. It has over 20 million words, and just over 889,000 unique words. The majority of the corpus is in English, but a variety of other languages are also present. In this paper, this dataset is primarily used to discover 'learning events' in hackerspaces and hacklabs.

The second dataset is derived from creative commons licensed photographs tagged with the words hacklab or hackerspace on Flickr™. This dataset was primarily used to provide a visual and spatial reference for the learning events described in the multimodal website analysis above.

The research methodological framework used in this analysis is primarily interpretive social science informed by semiotics. Specifically I am using multimodal social semiotic analysis to discover and describe similarities and differences in the websites, and to discover the discourses evident in these websites(Leeuwen 2004; Hodge and Kress 1988; Kress and Van Leeuwen 2001; Law 2007). Normally, I would tend toward textual analysis and discourse analysis, but the multimodal content prevents that simpler mode of analysis because the relations between the texts and other modes of meaningful representation of the learning events are significant and references between the many modes are common, thus I generalized to the next level of generalization from text to signs. Multimodal semiotic analysis analyses the signs represented in a multimodal

document in order to provide interpretable evidence of subjective actions, in this case in relation to social construction of personal learning environments. It looks toward the system of signs and their relations in order to discern that evidence. The discourse analysis is built on top of the semiotic analysis as the semiotic analysis provides the 'text', which in this case is multimodal, upon which the discourse exists(Fairclough and Longman 1995; Fairclough 1992).

Because of the size of the corpus, and the limited space of this paper, it is not possible to analyze each of the 4333 uses of the words learn and learning in these documents, nor consider how each use exists in the corpus. As such, it is necessary to subsample the corpus on these topics in order to save time and space. The subsample was generated of 100 examples of substantive writing. Substantive writing was operationalized as samples that contained two or more sentences directly addressing learning and what was learned. The method for generating the sample was by random seed. I first ordered the sample by size of data. Then from the list of numbers I used a seed to generate 100, then I read the samples, kept the substantive samples, and generated more choices until I had 100 random choices. By limiting the content to substantive samples, I was able to discard things like lists of links and similarly materials, that while containing meaning, were of sufficiently different form that they would have required a different form of analysis, which is being done in another paper, which analyzes linking in these social workshops. Also when a particular discourse became manifest below, or a topic became manifest, I would search the corpus for more interpretable meanings of these events in order to get a more comprehensive understanding to convey in this paper. Granted, a larger sample would have been more representative of this data set if I was going to operationalize and test variables, but I am not. I am reading and analyzing collected evidence in order to convey understanding based in the interpretable meanings generated from the data available.

This interpretation must be informed by context though. The context of the learning event informs the interpretation by allowing us to understand what actually occurred through pictures, video, and related evidence. Almost all of the 100 cases also had imagery other signs to consider beyond just the text at hand, if not native to the websites, then on Flickr™. By looking at the images of people doing things in the physical spaces of the hacklab, I attempted to understand and interpret questions about how they were constructing their personal learning environments within the social workshop.

3 Analysis

As I first limited my corpus to only objects that contain the word 'learn' and its variations, from which I took a subsample, I started fundamentally with a textual sign of learning. In general across the 100 pages I subsampled, this strategy was fairly successful as it led me to several possibilities for further investigation.

The use of the words learning and learn in these texts are primarily invitational and descriptive. The topics of the invitations varied, but there were several events involving machine learning in which certainly people learned, but the topic 'machine learning' invaded the sample a bit. I do not want to focus on the machine learning examples,

because while there are projects involved, they generally do not seem to be of universal interest as they arose primarily within very few labs overall, though they do certainly have merit for those specifically interested in how these workshops are using machine learning. Some exemplary other events are making sauerkraut, etching wood and steel, building robots, building electronics, building mini-catapults, learning to use Linux, and there Ire many more. If I discount the machine-learning question, the majority of the events and invitations are related to objects and processes of creation or making things. Though also occasionally they deal with topics of toy weapons, security issues, and informational events about the workshop itself. The texts of the events only provide part of the story and they only brought me into the analysis of the personal learning environments that these members were creating.

For the parts of the sampled corpus that does not involve invitations or machine learning, I found several dominant discourses and counter discourses to be present. From those discourse, below I discuss some of their possible implications for learning environments.

3.1 Methods and Scientism

These texts about social workshops demonstrate a tendency toward scientific or at least methodological process. This is not surprising of course, between scientific and design norms and anti-norms, and the fact that the workshops frequently contain dangerous and sometimes deadly equipment, there should tend to be a fairly rigorous atmosphere for safety and process that permeates their creativity and learning. Yet it is still somewhat surprising to me, that they do describe their activities in a way that can be interpreted as systemic design methodologies and hypothesis testing processes. Though these are not common in all cases that mention learning, when the members of a lab are trying to build something to solve some problem, or something to compete in one of the 'global hack challenges'. A global hack challenge is an invitation for anyone in a lab or otherwise to build some object for which there is either no standard design, or where the standard design does not meet the design brief. An example from hackerspaces.org is the Global Hackerspace Cupcake Challenge, where labs had to mail a pristine cupcake to another lab. These are not unlike other scientific and engineering challenges that universities pose to students in science and engineering classes and labs, but here they are being performed outside of formal learning institutions, but within transnational group of social workspaces. It should not be surprising that they describe and participate in these challenges and describe them with terms related to learning, science, and engineering. Many of the members participating in these challenges are vocationally scientists and engineers, or have similar vocations in information technology, biotechnology, or related matters.

That the participants in hack challenges perform according to what I would perceive as normal scientific and design methodologies is not that surprising, as the migration of norms across similar arenas/actions is fairly common in society. However, what is somewhat surprising is that they seem to do it so universally when confronted with a challenge. It is not that a single workshop is performing this way when confronted, and

while there is some variation in how they describe their actions, it very much looks like they are all acting very much similarly, though given different backgrounds and experiences they are coming to different conclusions.

Arguably, one could describe their hypothesis testing and design/critique processes as merely generalizations of trial and error, but I think the language they use indicates that most of the community has moved beyond trial and error and imported formalized procedures and formalized languages for describing those procedures into their work. The use of technical languages indicates their 'professionalism' and their tendency toward formalization. They do tend to use technical language extensively, but that language is tied to the their technical objects, and not necessarily to their social arrangements, nor to their learning environments.

The language around learning that they use is less formalized; it brings in relations to fun and play. The language of fun and play stands in opposition to the scientism and seriousness demonstrated in the challenges and their methodological practices. The language though doe snot always reflect the reality. It is very clear that when you look at the pictures, that they are engaged in labor and learning, and thus the fun and play is constructed in relation to that learning. This dynamic assemblage of interactions and norms in the group transform throughout the migrations of people through groups and discussions, going off to perform tasks, and returning. There is in the texts and videos available much of what appears to be discussion using technical languages to refer to things, but when they discuss the work itself, much of that technical language becomes less technical and more simple and descriptive. For instance, one might say 'grind this edge down' instead of 'bevel this edge'. This language shift changes as one would see in the intermixing between professional and laypersons/hobbyists language. This indicates that the formalism, professionalism, and scientism, while present in some of the practices of the lab, actually in some cases is more of a façade of a loose understanding than a founding principle of norms.

3.2 Workshop as classroom

However, as above, when I look at the contexts and multimodal media on their blogs, such as the photos, the videos, and related matters in relation to their work, I see the structures of these workshops as similar to classroom experiences. There are small groups of people standing around listening or watching a demonstration. Only in a few pictures do I see many people actually performing the tasks as of the workshop, mostly they are participating in a very traditional manner. I suspect that this is because they associate the concept of learning with formal learning environments. It is as such clear that there are other norms coming into play in these learning environments. The learners are very much structuring their 'learning' environments to have formalized aspects.

They use the same set of classroom tools in these images as most classrooms have ten years ago. They use projectors and PowerPoint with a computer. They do not seem to be using any further interactive devices like clickers, nor do the PowerPoint type presentations seem to be advanced or highly graphic, they evidence points toward primarily textual slides(which could indicate they are using an open source presentation

tool). The pictures also do not indicate rapt attention but they do indicate several people talking, some paying close attention to the screen, and others less so. In short, it looks very much like a classroom.

This indicates that people tend to recreate the 'learning' environment where they've been told they learn best, instead of perhaps the learning environment where they would learn best. In the workshops, there are tensions between the acts of doing things and the acts of listening to things. The social aspects also create tension with the presenter - listener model of presenting, as the images and videos indicate. There is also sometimes what I would interpret as frustration on the part of the speaker in these workshops.

However, even with the frustration and other tensions, the workshop members reproduce the classroom and try to enact it in their hacklab or hackerspace. This is not worrisome, but it does indicate a problem with the re-traditionalization of personal learning spaces, where people tend to recreate the trusted environments, or at least the environments they were told were trusted.

3.3 Informational tools

Hacklabs and Hackerspaces tend to use two types of informational tools that they link to in relation to their web presence.. They use self- installed open source systems such was mediawiki which is the wiki software developed in conjunction with wikipedia, Drupal, which is content management and group management software, or Wordpress, which is blog engine software. They also use web-based services such as Wikipedia, Flickr, Facebook, Ustream, and similar project.

These social workshops are significantly interlinked between the installations they used. They link most frequently to two categories of sites, Wikipedia and other hacklab and hackerspaces websites. These information tools indicate to some extent the interests and relationships these social workshops have in non-online life. That is to say, there non-online life interactions feed significantly back into their online interactions and beyond that they build systems on top of their online life interactions that give them information in their everyday non-online life. One of the projects many hacklabs engage in, for instance, is the development and design of electronic entry and key systems for the lab. Most of these systems are networked to their online tools. Similarly many hacklabs have video cams and other transmitting material that allow them to transmit what is happening in their lab to remote viewers.

While I cannot speculate on the day-to-day use of these informational tools, it is clear that on special events like Hack-a-thons they do interconnect remote labs from around the world in order to communicate and co-develop projects. The other informational tool use depends significantly on their users. Large hacklabs with engaged members for instance might have a very large presence on the web using many tools. They might have well defined websites for their own governance, communicating with each other, and related matters. Some of the large hacklabs and hackerspaces have thousands of pages of material online. Smaller and new hacklabs usually have fewer than one hundred.

In terms of personal learning environments, the tools they use form a significant part of the social workshop that they participate in. The use of Wikipedia for instance specifically for reference and definition on their home pages indicates that they are trying to ground their language perhaps (though in all likelihood it also means they are using a plug-in that automatically connects technical terms to their wiki pages). But in other cases, when they are linking to services that provide them commonly shared resources like Flickr, which is an image sharing site, they are very clearly sharing resources and examples from which they can learn the norms and practices of the workshops.

By having shared information pools, they create commonplaces where their community can come together and inform each other on the nature of their own organization. This grounds the hackerspace as a learning environment and allows them to extent their personal learning spaces by modulating their lines of flight and transforming their personal information sphere through the interaction of online and offline information provision in relation to the community that comprises their social workshops.

3.4 Globalism and cosmopolitanism

The final point of the analysis of their webpages and related media that I have found in my analysis has been mentioned several times in this paper. Hackerspaces and hacklabs are on the one hand independent local entities; they are tied closely to their geography and membership. They are also loosely connected to what one might think of as a global movement or perhaps a cosmopolitan movement that cuts across their hacklabs and unites them. As I have discussed, these growing institutions are online, highly networked, and they compete with each other in competitions, yet they also cooperate with each other to hold shared events. They also cooperate regionally to purchase and share equipment, to share information. Workshop members from one workshop will visit another workshop and see what they are doing.

My argument here is that beyond the norms described above they are building an awareness of the similarities and differences amongst and between hacklabs on an international scale. This may not be occurring for all hacklabs or workshop members, but certainly some exhibit an interest in the affairs of other hacklabs around the world and they tend to promote hacklabs locally and internationally both in their social group and across the internet.

The websites clearly indicate these members are interpreting and distributing norms and practices across hacklabs, but are they also producing a feeling of a common humanity or a shared responsibility. From the pages and content that I have reviewed, it is hard to say that yes, they are, but it is also very clear that some are in some cases. Various global concerns are very apparent in hacklabs and hackerspace websites in relation to learning. A few websites are very clearly engaged in issues of sustainability and environmental preservation, their projects to some extent reflect that. Other websites are very interested in the open knowledge movement, open source software, and the Creative Commons copyright regime. I suspect that overall that these social workshops move beyond the model of 'learning to do' and actually engage in a more interesting 'learning to become' and I would argue that as they progress and become

more reflexive with their engagement with issues and the economy; they are not only becoming aware of their local context, but also the global contexts, and perhaps even they are learning cosmopolitan norms.

4. Conclusion

In this paper, I have introduced the concept of the social workshop as personal learning environment. I have specifically highlighted the elements of my research on these workshops where they contribute to the foundations of personal learning environments, where informal learning and formal learning environments mix with the online and offline everyday lives of workshop members. I have sought to illustrate that the semiotic and discourse analyses of their websites on the topic of learning leads me to understand and interpret certain things occurring in relation to the norms within and outside of these social workshops that we can learn from these norms how norms work for personal learning environments.

In short, we should look toward the formations and normalizations of environments surrounding personal learning environments, looking explicitly for where norms travel from one set of traditions to a new set of traditions. We should look where norms travel across personal learning environments, from one workshop to another around the globe. We should look toward tool choices and how they reflect the operationalization of principles and politics in these groups. And finally, we should question how social spaces allow us to co-construct the social aspects of our personal learning environments.

References:

Downes, Stephen. 2007. *Learning Networks in Practice*. In *Emerging Technologies for Learning,* edited by David Ley. London: Becta.

Fairclough, Norman. 1992. *Discourse and Social Change.:* Polity Press.

Fairclough, Norman, and Longman. 1995. *Critical Discourse Analysis: The Critical Study of Language (Language in Social Life).:* Addison Wesley Publishing Company.

Genosko, Gary. 2002. *Felix Guattari: an Aberrant Introduction*. London: Continuum.

Guattari, Felix. 1984. *Molecular Revolution: Psychiatry and Politics (Peregrines).:* Penguin USA (P).

Guattari, Felix. 2000. *The Three Ecologies*. Translated by Genosko, Gary. London: Athlone Press.

Hodge, Robert, and Gunther Kress. 1988. *Social Semiotics.:* Cornell University Press.

Hunsinger, J. 2009. Introducing Learning Infrastructures: Invisibility, Context, and Governance. *Learning Inquiry* 3 (3): 111-14.

Kress, Gunther, and Theo Van Leeuwen. 2001. *Multimodal Discourse: The Modes and Media of Contemporary Communication.:* Arnold Publishers.

Law, John. 2007. Actor Network Theory and Material Semiotics,' Version of 25. *heterogeneities.net*

Leeuwen, T. Van. 2004. *Introducing Social Semiotics.:* Routledge.

Star, Susan Leigh, and Martha Lampland. 2009. *Reckoning With Standards*. In *Standards and Their Stories: How Quantifying, Classifying, and Formalizing Practices Shape Everyday Life*, edited by Martha Lampland, and Susan Leigh Star. Cornell University

Press.

Thévenot, Laurent. 1984. Rules and Implements: Investment in Forms. *Social Science Information* 23 (1): 1-45.