Hacking Together Globally

An Analysis of the Norms Surrounding Technology

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Abstract

This paper examines events that occur synchronously around the globe at hackerspaces: during Global Synchronous Hackathons, participants use video streams to share experiences, work and interact in real time. This paper analyses synchronous hackathons through video repositories of these events. It aims at discerning what norms are enacted in presented hacking experiences and how those norms are communicated across the video streams. Hacking in these cases should be thought of as the creative activity of using technology to build something that solves a problem or challenge. Hackerspaces are social workshops and communities renting a physical space and usually interacting in digital spaces. In these environments, individuals are involved in hacking as combined social as well as solitary activities which, to some extent, embody certain norms. Individuals also create the "technological drama"; that is they create the discourse around the objects that inform their use and embed them in cultures. These cultures and their discourses possess norms which flow through them and exist around the objects. Members of hackerspaces commonly participate in the aforementioned "Synchronous Hackathons." By comparing videos of these hackathons, I stress the relevance of norms which are not usually listed in reflections on hacker ethics such as those of Steven Levy or Pekka Himmanen: the awareness of the global other or the awareness of what might be termed "the cosmopolitical." These norms seek to care for and attend to the people who exist at a distance. This transformation of local to global "hacker ethics" demonstrates the growth of the recognition, at least internally, that hackerspaces embody more than their local concerns: they are part of global movements with global interests and globalising norms. The video analysis is used to demonstrate the globalising norms of these communities as the norms surrounding cosmopolitics become more prevalent in their discourses.

Introduction

How do technological norms travel online? A norm is a governing principle of behaviour; that is to say, it is a witness-able tendency for people to do things a certain way (Merton 1942). Norms are not necessarily stable: they do flux and mutate, transfer and disappear. Nor are norms external to socio-technical relations, but are co-constructed in the mode of distributed cognition in a processual-relational ontology. However, sometimes norms stabilise for long periods of time. This research engages in an understanding of distributed cognition. It treats technological norms as learned behaviours participating in technologies which are known only in relation to technologies. As learned behaviours, norms are part of distributed cognition. In this model, technologies are part of the distributed subjective space in which our cognition exists and our perception of norms exists (Hutchins 1995; Orlikowski 2002, 2006). This research does not claim norms are universal or objective in relation to the technology, just that they tend to be witness-able. In this paper, they are witness-able in videos of hackerspaces: it examines events that occur synchronously around the globe at hackerspaces, during which participants use video streams to share their experiences and work in real time. Called "Synchronous Hackathons," these events were archived as publicly accessibly videos. This paper analyses synchronous hackathons through these video repositories and their documentation. In doing so, I aim at discerning what norms are being enacted in presented hacking experiences and how those norms are communicated across the video streams.

The notion of "hackerspaces" is meant to encapsulate a wide variety of new cultural institutions oriented toward hacking. We can think of hacking as the creative activity of using technology to build something to solve a problem (scratch an itch) or challenge (Raymond 2001). Hackerspaces are physical spaces, usually workshops, which people share and, in sharing, learn with each other. In these spaces, they "hack" – which is a combined social and solitary activity – and in this "hacking" they create and to some extent embody their norms in themselves and things, but they also create the *technological drama* (Pfaffenberger 1992). They create the discourse around the object, informing its use and embedding it within the cultures in which it exists (ibid). The spaces usually share tools and resources and have membership fees needed to pay bills and maintain tools and infrastructures. They usually host events and offer an ongoing programme of activities which keeps the members engaged. Hackerspaces have varying degrees of success, but institutionally many have lasted significant amounts of time. Given their continued existence, we should think of hackerspaces/makerspaces/hacklabs/fablabs and related groups as a growing segment of the Do-it-yourself/Do-it-together market likely to become a permanent cultural institution.

The videos and methods

This research analyses two sets of videos. The first set includes videos from the first five *Global Synchronous Hackathons*. I chose these because they have the most international participation. The second set of videos is from a later *Global Synchronous Hackathon Challenge*. The challenge centred on sending cupcakes from one hackerspace to another. This set is chosen because it demonstrates awareness of the global other in the context of its practice. These videos also frequently demonstrate international transactions amongst hackerspaces.

At the time this study is published, the first five videos are offline, but many of the cupcake videos are present. The offline videos were online for several years, and I took notes on them at the time. Some archived videos are still online, but none are available from their original links.[1] Most of the original videos used live video feeds lasting anywhere from a few hours to the longest which is three days. The primary technology used for these videos was *Ustream*; it is based on open source technologies and was quite popular at the time. Some of the participating groups never used video at all, just posted comments on their blogs and in the hackerspace listserv. However, when the videos were online, they were watched and analysed for several categories of norms. These categories were *technological norms*, *shop floor norms* and *hacker norms*. I specifically looked for these three in what was going on and described what I saw when I thought they were occurring.

Describing the general aspects of the videos from the first five *GSH* allows for some insight into basic features: mostly they are webcam type videos; most seemed to be shot at VGA at 320×200 while some were 640×400. The videos were either shot looking down at an angle toward a series of tables or workbenches as if the webcam was connected from the ceiling, or they were shot looking across the workbenches as if from the top of a laptop. None of the videos were appreciably high production value, but maintaining high production value was clearly not their purpose. Most of the videos seemed to be oriented toward sharing what is going on in the space. Some of the locations sharing video had more than one live stream and those live streamed tended to give a different perspective on the same area. Most of the longer videos had periods of little activity, and most of the shorter videos had slightly more activity. The videos rarely displayed long terms of many people being active; on average most videos involved two to three people, with occasional shots of five and rare shots of more than five persons. Mostly what you see when you watch the video is one person or up to three people working on a project, and sometimes the project has nothing to do with the topic of the synchronous hackathon. When more people are around, then people start noticing and addressing the camera; when there are merely one or two people working, they rarely address the camera.

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1   See https://wiki.hackerspaces.org/Synchronous_Hackathon.

The videos from the *GSH* cupcake challenge are of higher quality. They are stored on *YouTube*. They show groups of several people, though a few are just individuals on video. They are much shorter on average than the first five *GSH* video set is. They are comprised of videos of people opening packages sent from another hackerspace.

The method used in this paper is critical analysis in the interpretive tradition. In regard to the specific method of watching the videos, I watched one video at a time, in order of the list from top to bottom. Thirty-three videos were watched over the period of a week. I watched them at 2× and 4× speed scanning for activity and slowed to normal speed through the activities and watched sections more than once to understand and take notes about what was happening. This watching produced a set of notes which grounds the research. Not every video had audio, and many had audio with long sections of silence and poor quality when things could be heard. As such this exercise was deeply hermeneutic, requiring at times a critical intersubjective positionality to interpret the material from the point of view of the people in the video.

Technological norms, shop floor norms and hacker norms

As I noted earlier, three types of norms were initially examined in the research. Each one played a part in what occurs in the mediation of norms online. *Technological norms* are the set of norms arising around specific technologies. For instance, when there is a sidewalk, a road and a walk signal, individuals at some places in the world stand on the sidewalk and wait for the signal, and at some places in the world they walk off the sidewalk into the road and start before the signal and after the light has changed. Those norms are not necessarily stable, nor universal, but in Toronto, Canada, they tend to do it the first way, and in New York City, they tend to do it the latter. These norms are also social/cultural norms, as is almost every norm as they are intersubjectively and distributedly constructed and experienced.

Shop floor norms are a significant aspect of the analysis of shared hobbyist environment, because they are the norms of working around the objects of labour (Sil 2002; Morrill 2008). Normally, they are examined regarding the shared work environment. Shared working spaces require norms allowing people to work together; we build workshops and working places to encourage some norms and discourage others. The co-construction of these norms involves a fair amount of negotiation. In the workplaces, they would also be negotiated with supervisors and in relation to management ideology. In hackerspaces, though, they are collaboratively co-constructed, managed and developed within the historically contingent milieu of the particular hackerspace, its people and its things. Shop floor norms are also different from the general technological norms because they usually pertain to the proper functioning of the shop floor, such as safety concerns. For

instance, most shops are dangerous in many aspects, and to lower risk, they have a norm of "no running." There is a myriad of other safety oriented norms such as wearing gloves when you use certain machines, keeping your hair up when you are using a drill press or lathe, etc. These are "safety rules" but they are also inter-subjective practices and as such shop floor norms. You rarely see people running in hackerspaces either, because of the same reasons. These sorts of norms are found throughout the institutionalisation of shop floors, which have been around much longer than hackerspaces. It is important to consider these in the inter-pretation of norms becoming more global and/or more cosmopolitical, because while shop floor norms are sometimes very specific to their milieu, others are globally shared already. Methodologically when considering evidence then, shop floor norms would not necessarily be the basis of the strongest argument in which hackerspaces are developing global norms, because shop floor norms are already developed and recognisable globally.

Hacker norms are already somewhat global, though variations parallel other aspects of ethos following regional and national ideologies (Blankwater 2011). Hacker norms centre on access to knowledge, coming to know, and the pursuit of knowledge. In those hackerspaces emphasising developing and learning about/with technologies, shared learning is at the centre (Hunsinger 2011). In this research, hacker norms are related to hacker ethics as developed and understood by Levy, Himmanen Jordan and Coleman (Jordan and Taylor 1998; Himanen 2001; Levy 2001; Coleman 2012). The hacker ethic is a list of normative goals which entail norms as "access to computers," "the hands-on imperative," "all infor-mation should be free," "mistrust authority promote decentralization," "hackers should be judged by their hacking" (internally consistent merit), "you can create art and beauty on a computer," "computers can change your life for the better" and "computers work for you" (Levy 2001). These norms are already prevalent in hackerspaces and are some of the norms accepted by people who call them-selves hackers in the global arena. Because of this, evidence of these norms, while present in the videos, does not prove the case that norms are becoming more global or perhaps cosmopolitical.

Glocal, global and cosmopolitical constructions of norms

Most norms are local phenomena because they rely on the distributed cognition of a population existing within a local geographic space. Norms travel when parts of that population travel and translate those norms into new spaces; or when the space of distributed cognition is extended in other ways, such as through media-tion.

Glocal norms are the globally/local norms, which is mostly the form of shop floor norms, but both technological norms and hacker norms can be glocal. To be glocal, many locations around the globe would have the same norms, but those

locations would not be part of a global system directly. We cannot say that the *Apple Store* norms are glocal phenomena because they are centrally generated and distributed globally to global locations constructed to be similar enough to carry those norms. Glocal norms are not the norms analysed in this research, but they need to be considered for interpretation because if a hackerspace norm is just a norm appearing in many hackerspaces, such as membership fee payment norms, which is a global phenomenon developed locally by most hackerspaces, then that solution and its norms is not pushing toward a global solution, it is just a local solution or local norm, to a problem used by many hackerspaces.

On the other hand, there are global norms aimed to solve global challenges across a global group arguably sharing a globally distributed cognition. Either the group must be well travelled and well mediated, or frequently it is both. Hackerspaces are a global phenomenon with some members who are globally mobile, but almost all members are also heavily mediated: taking advantage of their technological hobbies to enable global interconnections and to build the shared awareness of each other necessary for sharing norms. Ruling out global norms derived from local issues, shop floor norms and hacker norms, we then have the space of possibility for norms that are globally distributed in the *Global Synchronous Hackathons*.

The question of the possibility of these norms refers to a greater *cosmopolitical proposal*: Isabell Stengers defines this notion as a proposal derived from a plurality of practitioners who seek to develop a general theory or explanation so their practice becomes an exemplification of the theory (Stengers 2005: 994). The proposal occurs when they recognise something more important (ibid: 995). For her, "cosmos" relates to the idea of a "good common world," we can see how this fits into the paradigm of distributed cognition to generate norms and could create something "more important" than global norms (ibid: 995). For Stengers this cannot be individualised or even recognised deeply as an individual but requires collectives with their practices to recognise it, construct legitimate reasons for it and present those reasons to those who cannot or will not hear it without mass (ibid: 996). The hackerspace movement has all the attributes necessary for a cosmopolitical proposal, but the question is whether they can see the possibility and make the statement in the world.

These norms require practitioners and notably the practitioners are not developing a general theory from their work. Perhaps through global interaction they will recognise something greater to act upon. What will this be? It is hard to say, but as they seem to locate most of their work in shared spaces of cognition, I suspect they will develop ideas around knowledge which counter industrial knowledge production and their modes of knowledge production and distribution may be the point of resistance.

Example and discussion

From the videos, we can identify *shop floor norms* and *hacker norms* more easily, while identifying other norms than those is difficult. But interestingly we have a few additional tools which are not usually found in shop floors which give us a new hermeneutic horizon to generate findings. Beyond the videos as such, there were secondary tools which allowed people to view each other on the videos online: this was called the matrix (see Figure 1). The matrix pictured here is a screen showing several of the other video links on one screen. The matrix can be seen in some of the videos. It is a *web-based display* to display web-based video and sound. The matrix provides singular point of viewing for the many videos. People could see what was happening around the world at various *Global Synchronous Hackathon* locations. This ability to see and to somewhat hear the other groups transforms the experience from an experience of my group to your group, to my group to all of those groups and all of those groups to my groups. This manifestly multiplies the channels available for communication as everyone could see almost every other feed. So they could see what they were doing and who was doing it. This technology and the norms constructed in relation to it such as talking to other groups change the dynamics of the *GSH* dramatically because technologies had to be developed to first solve the problem of watching and then to solve the problem of addressing other groups, because if one does not manage who is talking then all you would hear is the perpetual buzz of anything said repeatedly due to the global lag in the system of transmission between various places and the *UStream* provider. Thus we have a whole set of possibilities of norms arising from the videos and the matrix trying to solve the global problem of communication. Many of the norms are people turning off microphones and turning on microphones, watching for indicators of other people turning them on or off. These may seem like simple gestures, but they are norms required for complex communication. The matrix provides an illustrative example of a growing global norm requiring the recognition of the global other. The global other is represented on the screen of the matrix, and the relation to the other is demonstrated through the norms developed in using the matrix.
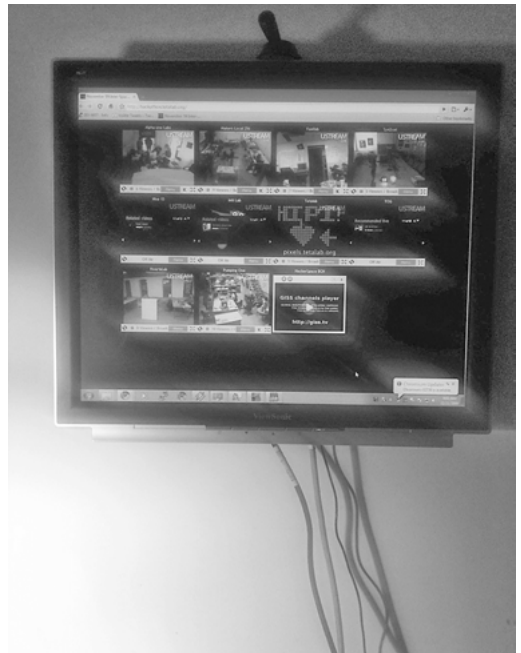

Figure 1: Matrix picture from Alphaonelabs.com (used with permission)

Other norms are witness-able from the original videos. These norms are not shop floor norms or necessarily hacker norms but are norms relating to the plurality of projects shown and made. There is rarely good sound from the videos, so the projects usually were seen to be demonstrated by one person to groups of between one and four people. Individuals and groups working during the hackathons are a common occurrence, but having people being shown a project via video is less common, though it usually happens several times on screen during a hackathon. Some of the activities pursued during *GSHs* could be described as open house–type activities, but even then the explicit sharing of enthusiasms about projects and the depth of knowledge about projects (as inferred from the time in the discussion looking at some of the objects) is something to note: while some hobbyists communities are like this, not many activities in life are based on actively sharing knowledge and enthusiasm like the hackerspace members were doing. Sometimes they did the same presentations in front of the camera. This indicates a distinct expectation that someone on the other side was watching, because mostly this was a live-stream event and while there were temporary archives, mostly you had to be there to see.

This sort of "showing the camera" activity also indicates that there was a relationship being developed to encourage people to show objects and practices to the camera. Showing the camera was not often done from all streams, because sometimes the camera was mounted in a way preventing it. The camera in this case only showed the broad view of the room, but even here you could see a set of norms being constructed where some people stopped what they were doing on their workbench and watched the screen for a little while. Yet you could not always see that they were watching the matrix view or a particular stream or even watching what was shown at all times, but the concurrence of events indicates a tendency to occasionally watch the other screens intentionally.

The *GSHs* were not the only events or the most popular video activity occurring amongst globally distributed hackerspaces. Significantly though, we can see some norms begin to develop in the first five *GSHs*. However, what happened is that slowly these hackathons faded away from the global form and went more local. The various *UStreams* are all mostly disused now, and most hackerspaces only have private video feeds.

To support the argument that global norms were beginning to form, I include evidence of global norm formation in hackerspaces from other sources in related projects. The two most significant sources of this information are their websites, with text/image/video, and *YouTube* with the video material of various global hackathons. The norms found in these institutes and information systems are plural too and have to be considered in their interpretive context, but we can infer a few things from the references groups made on their websites and *YouTube*.

In regards to websites, the most frequent posters of synchronous hackathons are the ones participating most often, but the one standing out as the chief announcer in the first five hackathons is the Dublin (Ireland) group *TOG* (see

http://www.tog.ie). *TOG* posts for almost every *GSH* in which they participate. Other groups primarily posted the first one. Only a few groups announce plans about what is to be done during these hackathons; most hackerspaces are allowing people to do whatever they want. For a few groups, one could read the enthusiasm around the *GSH* as a way of public recruitment as they are having open houses at the same time as the *GSH*; for other groups, it seems as if they are members-only events. While the disparity between modes of presentation is present, their posts indicate more than merely the hacker or shop floor norms, especially since only a few hackerspaces were participating. Their promotion of the event locally with an open house is an attempt to appeal to local people interested in the global and interested in other locations. It is an attempt to ally their centre with the "coolness" of the global movement, which is somewhat related to the "newness" of the movement but illustrates another valence of valuation. Using the *GSH* to appeal to people who might think global events are cool or appreciate new experiences also might be an appeal to people who are seeking those sorts of experiences through the hackerspace. However, as noted earlier, the extent of the global is limited in both its participation and its mediation, which may be again limited by this recruitment strategy.

Paralleling the argument of the *GSH*, the "cupcake challenge videos" – which are shared and exchanged by hackerspaces – likewise show elements of globally constructed norms. Cupcakes are small cakes, usually with icing that are roughly the shape of small cups. The *GSH* and the *Global Hackerspace Cupcake Challenge (GHCC)* are part of the same group of hackerspaces event schedules, and both indicate strongly what sorts of norms can be globally mediated via video (Hunsinger 2011; "Global Hackerspace Cupcake Challenge" 2012). Most of the videos are available still on *YouTube* and can be found by searching for "hackerspace cupcake challenge." As noted on the webpage,[2] this event took place in 2012 and the goal of it was to send cupcakes to a series of other hackerspaces according to certain rules. The cupcake challenge is a rather traditional practice, resembling the "mail an egg" practice/experiment performed mainly in primary and secondary science classrooms. As such, the *GHCC* is already embedded in systems of educational norms with experiences, but as argued earlier the standards and norms of the various countries participating vary. This indicates that the building and design of the cupcake carriers vary somewhat and also do demonstrate the development of possible norms and understandings. As seen in the videos, various practices around design come into play when the cupcake shipment containers are built. Some of these practices with their norms are already globalised, but quite a bit of local knowledge and materials come into play.

Fifteen different hackerspaces were involved in the *GHCC*, each one sending one to three boxes of cupcakes to up to three other hackerspaces ("Global Hacker-space Cupcake Challenge" 2012). The cupcakes package had to be approximately a

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2   See https://wiki.hackerspaces.org/Global_Hackerspace_Cupcake_Challenge_2012.

1 ft/3 cm cube and weigh no more than 2 kg or ~ 4 lb (ibid). These and other limits in the judging were all posted online. The judging criteria including creativity of packaging, creativity of cupcake design, taste and success of delivery/condition of the cupcake are all available online (ibid). This example also reflects Coleman's deliberations on the relevance of humour for hacker cultures (2012: 100 ff.) At the same time, the *GHCC* created a structural system that controls and encourages the identification of a global problem and its resolution. Granted the participants are not truly global as they are mostly U. S. and European hackerspaces with the rest of the world notably absent. However, also non-English-speaking hackerspaces are involved.

The difference between the *GHCC* and the *GSH* project is that the *GHCC* videos are still available. One of the requirements of the *GHCC* project was to upload videos of the opening to *YouTube*. What we see in these videos are two things: a technological object and the norms of opening the package in a technologised environment. The unwrapping videos are videos of several people enthusiastically unboxing/wrapping cupcakes and negotiating the scoring system on screen. These various people take varying degrees of care in the process, but you can see the same sort of organisational awareness and norms in many of the videos. There is one person taking the official video, several other people taking pictures, some people hanging back, some people only coming in when the work is done and some other people working on other projects. It is a relatively common undertaking in most videos; however, in each video they are confronted with different technological/design problems due to the plurality of design possibilities in shipping a cupcake. In some videos, there is only one person and a stationary camera. In almost all videos it is very clearly in a hackerspace with storage, machines and workbenches. In these videos you can see some shop floor norms appearing, such as one does not cut food with the same knife as one opens the box, one isolates the food from the other mess before eating it, proper knife skills and similar issues. There is also a prevalence of multi-tool type devices used in the videos, that is being used for a wide variety of purposes.

These are all important sets of norms and technologies, but the key is how the various labs use the videos to represent the hackerspace on video. While there is variety in the representation, almost all of them used video to capture the whole unboxing and tasting of the cupcake, using various tools from an angle grinder to box-cutters. However, what they also did is try to represent themselves to the other group in what appears to be an authentic fashion. Some of the unboxings seem to be more professional, some more comedic and some more chaotic; they all seem to be comfortable with what is occurring, and they are using the video to capture the event. They are not overplaying or overproducing the videos. Each group also seems quite capable of recognising and preserving the privacy of group members who did not want to be on video. The explicit management of public face and private interests is well managed enough to recognise their shared cause with the other people in the room. They also tend to enjoy reading messages and reasonably

following instructions provided from the other labs to varying degrees of success, but everyone video shot had enthusiasm upon finding instructions. This might fit into hacker norms or educational norms, but as you watch there is more joy from receiving a message from the other parties. This excitement is repeated across labs opening boxes and discovering messages or instructions and should be thought of a relatively normal global norm already. The final norm noted is the eating of the cupcakes. Only in one video did one person just eat the cupcake, in all the other videos the cupcake/s is/are shared amongst all participants in the opening, usually between two to six sharers. In only one video is the cupcake not eaten, and the reason is because the packaging contaminated it. The shooting of the video of the sharing and enjoying of the cupcake is also not perfectly universal, but in a few videos, it was usually indicated that they would share the cupcake.

The unboxings were normed; they did not have to be done in any specific way, but they mostly all did it the same way, in a group of people, some people wanting to be filmed, some people off camera, some participating very actively, some very little, the unboxing performed by one or two people, with associated people around. Privacy and public face were an apparent concern of the groups. Finally they tended to share the cupcakes with everyone involved. Granted, some of these norms likely derive from elsewhere, but they did converge here around a specific event the *GHCC* and provided a moment of insight into how norms come together and travel amongst groups on video.

Thus we can see the global norms slowly being generated in the *GHCC* videos, only this time less in relation to the technical object, the matrix, then the technical mediation and the video. The norms co-constructed and mediated were global norms generated from the problems shared in the *GHCC*.

Conclusions

This research is fundamentally about how technological norms travel online via video and in it several norms being shared via video and with respect to video. It discusses in depth the relationships of technological norms travelling in video and finds that new norms are being co-constructed in relation to video mediation and new technologies. It also recognised the plurality of norms that already exist. This research indicates a wide variety of norms in hackerspaces. It also shows that they derive from a wide variety of sources but that in some specific cases technological norms arise in relation to the video and technologies involved during specific events. In the case of this research, the events are the *Global Synchronous Hackathon(s)*, and the paper focuses on the technological norms found in the first five videos. It also examined the *Global Hackathon Cupcake Challenge* in which global norms are co-constructed around the opening of packages.

The awareness of the global other in these videos becomes clear through the way the users change their practices on video in relation to their audience.

As noted, once the video technology changes, they have to recognise the other people watching much more significantly, because they have to interact with them through the mediation of technologies. Similarly, the hackerspace members seem to be very aware of their audience in the *Cupcake Challenge*, as they should be, because the audience is why they performed the challenge. This demonstrates a global set of "awarenesses" present in these groups.

Throughout the question of the cosmopolitical proposal is present and engaged as a question to be answered. With regard to the cosmopolitical proposal, the groups that share online in the *GSH/GHCC* have the requisite qualifications to develop a cosmopolitical proposal, but the two primary examples centring this research – which are the matrix video system and the cupcake challenge – do not rise to the level of cosmopolitical realisation. Though they do, at times, engage in a horizon of possibilities that could end up in a cosmopolitan proposal. However, what they do not do is travel far enough toward the horizon to recognise the possibility of mutual action generating those politics. Instead, the videos analysed tend to hover in the global social sphere without engaging any necessary "good for the world" though inarguably they have the possibility of doing so.

Hackerspaces are structurally embedded deeply in neoliberal market-driven systems, providing sustaining technological development for the spaces and their outcomes that frames and limits possibility (Hunsinger 2016). Hacking together globally should allow the co-construction of a cosmopolitical set of norms in these institutions. It is important to recognise that the norms that are being shared might also relate to other broader systems and thus be constrained by them. This engagement does not defeat the argument or evidence provided, but it does suggest that technological norms have manifold mediations that normalise them in neoliberal market-driven system. As I have argued elsewhere, two of the institutions that provide normalising systems in relation to hackerspaces have been global capitalism and learning environments (Hunsinger 2011, 2016).

Learning environments are a broad category entailing almost every normalising system in human life. There are the clearly demarcated institutions of learning, such as primary, secondary and tertiary schooling, but there are also lifelong learning systems, informal learning systems, workplace learning systems and many others. Norms are co-constructed, exist in and are mediated through these learning systems. In prior research, I argued that the hackerspaces/makerspaces were learning environments that participate in and rely on the norms of various existing learning environments (Hunsinger 2011). This paper recognises that learning environments construct a variety of norms that hackerspaces share. They also have shared knowledge beyond the values and norms found in learning environments. As such, there is a significant part of human activity in hackerspaces that derive from the ways people have learned to be amongst other people while learning.

However, even keeping in mind the norms of global capitalism and the norms of learning environments as possible influences of the travelling of technolog-

ical norms as global or cosmopolitical norms, by investigating a series of events, we can see shared norms being developed online. Two elements help to control for the above issues somewhat and let us make arguments about why these are technological norms travelling globally, with perhaps even cosmopolitical norms developing. The first is the oddness of some of the challenges involved in the events considered; that is to say, they are sometimes simple things like building something electronics which can be learned formally or sometimes through the study of manuals. Other times they did things normal and informally taught such as making and shipping cupcakes. This plurality of possible technologies around which norms exist then is happening in different countries. Different countries have different norms and practices around different technologies, different rates of technology adoption, various educational systems and different norms in those systems. The significant plurality of possible differences allows us to speculate on the shared norms as becoming global or perhaps cosmopolitical.

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