



The Proper Care and Feeding of Hackerspaces: Care Ethics and Cultures of Making

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ABSTRACT

Communities of making have been at the center of attention in popular, business, political, and academic research circles in recent years. In HCI, they seem to carry the promise of new forms of computer use, education, innovation, and even ways of life. In the West in particular, the maker manifestos of these communities have shown strong elements of a neoliberal ethos, one that prizes self-determination, tech-savvy, independence, freedom from government, suspicion of authority, and so forth. Yet such communities, to function as communities, also require values of collaboration, cooperation, interpersonal support—in a word, *care*. In this ethnographic study, we studied and participated as members of a hackerspace for 19 months, focusing in particular not on their technical achievements, innovations, or for glimmers of a more sustainable future, but rather to make visible and to analyze the community maintenance labor that helps the hackerspace support the practices that its members, society, and HCI research are so interested in. We found that the maker ethic entails a complex negotiation of both a neoliberal libertarian ethos and a care ethos.

Author Keywords

Care; care ethics; ethnography; hackerspace; HCI

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

HCI—along with related fields such as Science and Technology Studies (STS) and Computer-Supported Cooperative Work (CSCW)—has shown an interest in understanding behaviors, identities, and communities of making [4]. This work has led to an understanding of cultures of making as able to revolutionize industries, teach people computa-

tional thinking, and help people live more sustainable lives. In HCI specifically, maker culture research has focused on the individual creativity and appropriation skills of makers [33,34,39,40]; maker communities as sites where people are taking up and working on visions of the future through HCI [22]; the expert-amateur and empowered statuses enjoyed by individual makers [2,12,18,29]; making as an educational initiative [7,9,24]; the sophistication of the material engagement required for making activities [6,15]; and the specific tools or methods used by makers [3,25,26]. Common throughout much of the work on making in HCI is an implicit focus on individual makers and their skills. While this focus is in line with the espoused neoliberal libertarian ideology of individualism and self-reliance often found in maker culture [23], which we discuss in a later section, it cannot explain the everyday, mundane labor required for a *community* of makers to persist.

We contribute to research on cultures of making by addressing this gap and demonstrating how an ethnographic analysis through the lens of care ethics can provide a fuller understanding of the sociality of hackerspaces. We begin this work here by describing the makers we studied both as individuals who practice care, and as members of a social community built around a productively negotiated ideology between a traditional “hacker ethic,” foregrounding autonomy, and care, foregrounding interdependence. We incorporate a discussion of care to make sense of this tension as well as to characterize the hackerspace as not merely a physical location where makers happen to work but as a representation of the sociality of their community, one that plays a vital role in its maintenance.

A focus on care has allowed researchers in HCI and analogous fields (e.g., STS [30]) to explore how people in communities relate to one another, and how care is a productive lens to develop a richer understanding about what is happening *on the ground* in those communities. In this paper, we present our findings from an ethnographic study of a hackerspace, a study that was conceptually informed by care ethics as developed in [17], and methodologically based on Carspecken’s critical ethnography [8]. Specifically, we will demonstrate that care is a productive research framing for accounting for the community maintenance work in making spaces. Broadly, we will show that investigating the ethics of care in technology-mediated social

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spaces can help HCI researchers and designers uncover how these communities are successfully maintained over time.

BACKGROUND

The research on making in HCI in recent years represents an agenda dedicated to developing an understanding of maker culture as a sociotechnical practice and user experience. These include the exploration of the process of becoming a “maker,” the expression of that subjectivity through interaction with materials and participation in a situated maker community, as well as the role of a more generalized maker ethic rooted in the movement’s history. We contribute to ongoing research in HCI on making culture by employing care and care ethics in a generative way to reveal the often-neglected care labor and maintenance work that is inextricably a part of what it means to participate in such a community. We begin by summarizing the state of the art of making research in HCI and then by introducing care ethics.

Making and HCI

The espoused ethic of so-called maker culture is one of a drive toward independence through self-empowerment. This culture is sometimes discussed as a monolithic entity that contains within it any act, identity, or community that can be loosely tied to any of a number of activities from hacking, tinkering, repair, construction, and sometimes even design. Scholarship on cultures of making is beginning to address concerns of the *actual* inclusivity of these cultures, as well as the plurality of maker subjectivities and participation [1]. Studies of many such local contexts have taken place in the past few years [1,3,12,15,22,33,36]. These pluralities supplement the generalized, national-level understanding we currently have about what it means to be a “maker” by providing an account of how making is performed by individuals in specific contexts.

Related work in CSCW on community workspaces has also addressed how these cultures of making “shape collaboration and the social organization of work” [32] as well as how making infrastructures play a role in repair work [31]. There is also research on peer production, a body of work related to the study of making in HCI, which explores the process of becoming a maker as a member of a hackerspace [36], and the situatedness of individual maker communities [16]. HCI research benefits from this work through a deeper understanding of cultures of making, contributing to the discussion of the plurality of maker subjectivities as well as opening up the conversation to how maker communities and maker cultures are sustained.

Our work presented here continues this agenda by investigating the maintenance work needed to run and support such communities. Specifically, we argue that a care ethics perspective can augment ethnographic and other observational methodologies to render visible and to help us analyze community maintenance practices, which we define as

actions that are teleologically oriented toward the success of the hackerspace as a social group.

Care and Care Ethics

This work presents an analysis that was conducted in two stages. In the first stage, ethnographic data was categorized using Korth’s [17] three-part typology of care, which we introduce below. Once data was collected under each of these three types, we used concepts from care ethics, as developed in ethics and feminist philosophy, as an interpretative lens to explicate the actions within each type.

Care ethics engages with the ethical, moral, and value implications of care. Care ethics was introduced to the study of ethics through a series of debates now known as the Kohlberg-Gilligan controversy [27]. Kohlberg’s theory of moral development claimed to demonstrate a lower capacity of morality in women, which Gilligan instead attributed to a reliance on a male-biased perspective of ethical behavior. Gilligan regards care ethics as the alternative ethical standpoint toward which women are socialized, contrasted with the abstract and universalized principles of morality and justice toward which men are socialized. *She has since expanded on care ethics, along with other feminist care ethicists such as Nel Noddings, to describe an epistemological angle on ethics that focuses on empathy and the interrelatedness of people [11,28]. Fisher and Tronto, two prominent care ethicists, define care as:*

a species activity that includes everything that we do to maintain, continue, and repair our ‘world’ so that we can live in it as well as possible. That world includes our bodies, our selves, and our environment, all of which we seek to interweave in a complex, life-sustaining web [10].

Care for Fisher and Tronto is an important and universal part of everyday life. Tronto further expands the notion of care beyond its previous position as merely a social or private virtue to encompass important social and political implications [38]. Tronto does not position care as superior to—or a substitute for—traditional moral concerns, but instead claims that a commitment to care is an integral piece of a democratic ideal of citizenship [13]. This understanding of care helps us explore the broader impacts of the everyday care in the hackerspace and speculate more broadly on the roles of care in HCI design.

STS scholar Puig de la Bellacasa argues that engaging with care requires a speculative commitment to neglected things and encourages an ethos of care within the study of science and technology. To her, care is something we *do* and is ethically and politically charged [17,30,37]. Research on care ethics has also begun to filter into HCI. In a commentary on the work by feminist political theorist and philosopher Seyla Benhabib, Bardzell [5] argues for a care ethics-based, emancipatory, and utopian view of ubiquitous domestic computing, inspired by Benhabib’s notion of “discourse ethics,” which combines the strengths of both justice and care ethics. Similarly, Light and Akama discuss the politics

of care within the context of participatory design and the role of participatory designers as “custodians of care” [21]. They present interventions within participatory design as capable of social change and altering social relations (though not to be taken as far as social engineering).

In all of these cases, care is a responsibility of designers, who are increasingly creating the means through which we enact our sociality as interdependent beings in specific contexts. We further this line of research by studying care as it is empirically enacted using the typology of care developed by Barbara Korth [17], whose work is based on the social interactions between groups of friends and between educators and students. Many of Korth’s insights about care are directly relevant to our study on this particular hackerspace in that it serves both as a social group and as an educational space. Korth’s typology of care will be introduced as we use it in a later section.

RESEARCH APPROACH

This work reports the findings of a 19-month ethnography (10/2012-05/2014) of a Midwestern U.S. college town hackerspace (hereafter Null Alpha), analyzed through the lens of care and care ethics. This fieldwork includes approximately 250 total hours of direct contact with participants in Null Alpha, and over 15 hours of targeted interviews with members. The data this ethnography has generated are in the form of jottings, field notes, photos, and recordings of notable events. All participants’ names have been changed. Null Alpha was chosen based on several factors: 1) the community was relatively young and expanding its member base, allowing us to observe how new members learned how to become part of the community; 2) the members explicitly and consistently relied on a “flat hierarchy” as their primary means of governance, the success of which members attributed to the closeness of their community; and 3) its proximal convenience, which allowed the researchers to engage in a long-term immersion.

Null Alpha began in 2010 with a group of friends in a basement working on projects together, sharing their tools and know-how. As community interest in making grew, the group moved through several spaces, with each subsequent space making room for more members and more machines. For the majority of the duration of this study, the space has had approximately 30 dues-paying members (all Caucasian between 19 and 50 of age, including 2 females, one of whom is a founding member) and a handful of regular visitors sharing 1,400 square feet of space and various donated and/or purchased tools. The 19-month ethnography took place on site at Null Alpha and off-site during workshops or other events. One member of the research team hacked and tinkered alongside other members.

The ethnography was conducted through the critical ethnographic approach developed by Carspecken [8], which includes a specialized set of empirically validated tools that enable the researcher to reconstruct qualitative data to ex-

plore meaning within illocutionary spaces. This approach has a metatheoretical basis in Habermas’ Theory of Communicative Action and a pragmatic modification of Mead’s intersubjectivity. Very briefly, this metatheoretical background situates *mutual understanding* as obtained through communicative acts and as possessing linguistic structures. The meanings behind these communicative acts are always intersubjective; that is, they can be thought of as a dialogue between the communicator and an external other, which can range from an actual interlocutor to an imagined potential other. By positioning these meaning making structures as inherently intersubjective, we can begin to reconstruct the meaning of an action through a pragmatic horizon. In other words, we can reconstruct different levels of meaning by exploring the bounded set of potential messages communicatively transmitted. Reconstructing the meaning of an act requires a deep level of familiarity with the interlocutors in question. In this case, that familiarity is built through long-term engagement in the field.

This metatheoretical framework allows us to enumerate the possible meanings behind intersubjective acts and, through those possible meanings, describe the care performed in this social group. Barbara Korth, a student of Carspecken’s, developed a typology of care that aligns specifically with the metatheoretical framework employed in Carspecken’s critical ethnographic approach, and represents one of the only operationalized frameworks available for an empirical study of care-in-action. *We rely on Korth’s typology of care-in-action to find patterns in the acts of care we reconstructed, enabling us to then uncover the normative system structures in place that make some acts of care possible, while preventing others [17]. Korth, discusses the relationship between care and her work in this way:*

A critical, qualitative approach to care is capable of articulating both the particularistic and the more general features of care-in-action precisely because the approach is about meaning and meaning often entails grasping, at least tacitly, both the particularistic and the general features of meaningful acts. Meaningful acts are always reconstructively understood from within their sociocultural milieu and not in isolation from that context. [17]

Care ethics thus shares critical ethnography’s methodological commitment to an on-the-ground understanding of participants in/and their contexts, shifting the “focus from abstract individuals and their actions to concrete, situated people with feelings, friends, and dreams—persons who can be cared about” [14]. For these reasons, we argue that a care ethics perspective is appropriate towards developing an account of hackerspace community maintenance, and that Korth’s care-in-action typology is a methodological fit for the critical ethnographic methodology we have deployed.

CARE IN THE HACKERSPACE

We now present and discuss the care work we have seen in Null Alpha. We identify intersubjectively valid acts (that is,

acts that are recognizable by members of this community) of care, guided by our experience as participants in this particular community of practice. We then analyze the data using a deductive approach [19] guided by Korth's typology of care: overt-explicit care-in-action, overt-implicit care-in-action, and covert-implicit care-in-action [17]. This 3-part typology of care helps to uncover the normative structures behind these enactments of care. The first qualifier, which distinguishes between "overt" and "covert" care, describes the extent to which participants recognize the communicative act as care in a direct sense. The second qualifier, "explicit" or "implicit," refers to the meaning-imparting strategies of the enacted care. The first, *Overt-Explicit Care*, is immediately recognized as care and responded to accordingly, such as when one holds the door open for someone whose hands are full, and that person then responds with a smile, nod, or a "thank you." The second, *Overt-Implicit Care*, describes caring actions where the fact that these are acts of care is not foregrounded in the interaction. An example of this is joking with a loved one after an argument, where the primary purpose of the joke might actually be to establish mutual forgiveness. Finally, *Covert-Implicit Care* is care that would be undermined if it were to be immediately recognizable as care by the care receiver. Letting a child win at a game is an example of this, where the actor and others recognize this action as one motivated by care for the child, but were the child to recognize this care, its intention would be undermined.

Overt-Explicit Care-In-Action

Overt-Explicit care is recognizable by the participants present for its enactment. The majority of the overt-explicit acts of care in Null Alpha involve donating personal resources (e.g., time, money, bodies, and skills, etc.), teaching others how to use a specific tool, or attempting to "reward" individuals for doing other kinds of care work. This hackerspace regularly organizes workshops that are open to the broader community. These workshops are primarily useful for Null Alpha in further promoting its image and encouraging more people to show up, get involved and interested, and hopefully sign up as dues-paying members. The more dues-paying members Null Alpha has, the more rent it can afford, with leftover money being used to purchase more equipment for the space. The workshops also sometimes have a cost associated with them, and when the cost covers more than the price of the materials consumed, the extra money goes directly into Null Alpha's account. When members volunteer to organize a workshop for the space or to help run a workshop organized by another member, they are donating their resources toward maintaining the space and helping it remain afloat.

This motivation extends to other forms of voluntary work as well: cleaning the space when it gets cluttered or dirty; scouting for larger locations for the space; leading and assisting with the physical construction of walls when the new location is acquired; assisting with the transfer of thou-

sands of pounds of tools; etc. As with leading a workshop, members perform these tasks to maintain the community. Others recognize these acts as donations as well, and members endeavor to remind each other that such donations are not mandatory, and so are especially appreciated.

Attempts have even been made to establish tangible systems through which these acts of care can be "rewarded" through gamification strategies, such as virtual badges. One of the authors, for instance, earned the "event volunteer" and "support crew" badges for various efforts around the space. The "support crew" badge is particularly interesting because it tries to turn ownership of shared chores in the space into an achievement. Its description reads:

Awarded to people (both members and non-members) who regularly take ownership of chores in the space. From taking out the trash & recyclables, cleaning the toilet, to maintaining the RFID system, asset tagging system, and other technical infrastructure. Can also apply to people who maintain a shared tool like a 3D printer or the Mill or an 'area' like the ham radio table.

Awarding these badges is its own kind of overt-explicit care, and is meant to signify the appreciation of another's actions. However, these badges did not catch on and were eventually ignored. Had they continued, it would have been interesting to see how they affected the way Null Alpha members viewed the acts of care for which they were being rewarded. Would the badges eventually cheapen these activities by turning them into achievements? Would chores and other caring activities not included in the badge system, such as covert acts of care or care enacted implicitly, be left to the wayside?

Beyond actions motivated by the advancement of the hackerspace as a community, we also found instances of overt-explicit care-in-action directed toward individual members or visitors. As Null Alpha is a potentially dangerous environment, this sometimes takes the form of concern for bodily wellbeing, such as when one of the authors attempted to assist Greg (31, male, software developer, Caucasian) when he sliced his finger on a milling machine (to which he replied "I'll just put some superglue on it"). However, the majority of the overt-explicit care in this space takes the form of a member showing someone else how to use a specific tool. In previous work, we have shown how the use of a tool can become a part of hackerspace members' identities [3]. The members who are most closely identified with a particular tool are often designated as the instructors for its use. When a member or visitor asks for assistance with that tool, others delegate to the particular member "in charge" of that tool. That member often does not see taking on this instruction as a chore. By passing on their skills to another person, they are able to simultaneously perform care and reinforce their identity as both a benevolent person and as a person skilled with that particular tool. Andrew (mid-30s, male, system administrator, Caucasian), one of

the founding members of Null Alpha, said this about getting to help people:

I really like to see someone be able to work on their own after I've helped them, and so I'm still on the phase of trying to do that. I don't know, I mean, I think I'm just kind of a run-of-the-mill geek. I know a little bit about a lot of things but not a lot except my certain specialty areas. I'm very glad that I've been able to be helpful to a lot of people in a lot of different areas.

For Andrew, helping others become more independent falls in line with the ideals of what a hackerspace should be. Sharing their skills with others is one way that hackerspace members explicitly care for individuals, and thereby further the ethos of care in Null Alpha. In this space, overt care that is explicitly enacted is acceptable when it is motivated by a desire to teach, to learn, or to participate in activities that directly benefit the community. These caring acts demonstrate the responsibility of hackerspace members to care for each other and for visitors, and also highlight the difference in competence to enact care between members. It is less common to see overt care that explicitly addresses one's identity as a maker, or one's subjective state. These caring activities are more commonly enacted through implicit meaning structures.

Overt-Implicit Care-in-Action

Overt-implicit care-in-action refers to “the caring act that is clear and recognizable among participants, but the mechanism through which the care is enacted is implicit” [17]. In other words, the act is not directly pointed out as care, but others can recognize it as care. This type of care is most evident in how the members welcome visitors to the space, and in the community's political structure.

In welcoming visitors to the space, the act is recognizable as care by both parties, but the fact that this is a caring act is not foregrounded in the interaction. When people look unfamiliar, members will often go out of their way to welcome them and show them around, or will at least make sure the unfamiliar faces are directed toward someone who can give them a few minutes of their time to help them feel welcome. The space is open once a week to the public, but there is no formal way to schedule visits or tours, so it is up to the members to recognize when a tour is appropriate. Helping visitors feel welcome is important for Null Alpha for several reasons: first, because visitors can eventually become dues-paying members who help sustain the community financially; second, because visitors who feel comfortable will invite their friends, will stick around and hang out, and will open up and talk about their projects, skills, strengths, and weaknesses. These welcoming acts become especially apparent when visitors appear to be particularly uncomfortable or might feel out of place. Every member of this space is Caucasian, and all but a handful are male, middle-class, educated, and proud of their identities as “nerds.” Every once in a while, someone who does not fit

that description will show up, and in those instances members will go above and beyond to show them around the space and make sure someone is talking to them at all times. In one particular instance Frank (mid 40s, male, electrical engineer, Caucasian) devoted an entire Wednesday public meeting night, which he usually spends catching up with his friends, chaperoning a middle-aged PhD student from Taiwan and making sure that she became familiar with the space and was introduced to all of the other members. In regular meetings at Null Alpha, members address their lack of diversity and always come to the same solution: to try to treat everyone equally, and to be especially welcoming to new faces. This is problematic in its own ways, but it shows that the members recognize their diversity problem, and actively take steps to address it.

Overt-implicit care-in-action is an important part of helping members feel like they fit in with the community. This sometimes comes in the form of complimenting or legitimating another's projects, usually by calling it “badass” or “a proper hack.” This is especially apparent for projects created for the space, like when Dennis (mid-30s, male, web developer, Caucasian) made badges with functioning gears with the laser cutter to improve on the marketing of the space during a maker conference they organized, or when Andrew hacked a network cable to connect two projects in the space that greeted members as they came in. These encouragements help support maker identities, and encourage members to believe in the legitimacy of their projects. Without even these bland encouragements, it would be easy to become self-critical of one's projects and start to disconnect with the maker community.

These acts of care do not necessarily center on activities specific to Null Alpha. Other examples include helping members feel like they are funny by laughing at their jokes or participating in sharing funny stories; being playful with each other, such as calling each other deliberately by the wrong name (which has become a running inside joke in this space); and discussing issues from work or home that do not directly relate to Null Alpha or the activities taking place there. These types of activities help people feel like they fit in with a social group that just so happens to build, tinker, and hack things.

The political and organizational structures of Null Alpha also work to help members feel a legitimate stake in the social group. Politically, Null Alpha has a flat hierarchical structure and is emphatically a consensus organization. Members of the board are quick to note that board duties are more of a chore, and that they do not have—and do not want—more power over how the space is used than anyone else. In the espoused organizational philosophy of the space, all dues-paying members have an equal say in how the space is used. Although it is not hard to find instances when some members really do have more power than others, they do work to sustain an egalitarian atmosphere. When a topic for discussion is large enough to impact how

the space is run, such as when searching for a new location, the members are called in for a vote. Each time a vote is held, members are reminded that this hackerspace is not a democracy but is a consensus organization, and all members must agree before the space can move forward with a decision. Just after one such meeting, Karen (mid-30s, female, system administrator, Caucasian), Mike (early-40s, male, software developer, Caucasian), and Ben (late-20s, male, freelance programmer, Caucasian) were discussing just how hard it is to keep a group going this long as a consensus organization without falling back on other political structures:

Karen [to Ben]: you don't realize how hard it is to run a consensus organization, and we do it so well. So many [other consensus organizations] fail early.

Mike [to Ben]: And we've had a couple of tough votes too, [we] haven't just been coasting!

The focus on consensus in this social group creates a systematically enforced level of respect and care among members and between members and Null Alpha as an institution. To reach consensus, as opposed to unanimity or majority agreement, the members have to be willing to put aside selfish motivations they might have in order to benefit the collective.

The physical organization of the space also systemizes care. The way the tools in the space are made available to members helps promote a feeling of collectivity. In this hackerspace, very few tools are actually owned by the space itself. Instead, members donate their tools, which are organized through Null Alpha's asset tracking system. In hackerspaces where the organization owns the majority of the tools, becoming a member can feel like buying into a service. With this hackerspace's collection of tools that belong to individual members, it feels more like buying into a community of sharing.

These overt-implicit acts of care are often used to solidify a feeling of belonging or a welcoming atmosphere. They are recognizable as caring situations, but if they were made more explicit they would be less effective. It would feel insincere, or even creepy, if a member approached a visitor and told them "I am going to show you around the space so that you will feel comfortable here." But the action itself is recognizable by others as an implicit form of care. To recognize when these acts are most appropriate requires at least some level of attentiveness. In the next section, we discuss care-in-action that is backgrounded even further.

Covert-Implicit Care-In-Action

With covert-implicit care, caring acts "must hide in the discourse in order to avoid undermining [their] own caring potential. Covert Care-in-Action works off the same pragmatic structures as Overt-Implicit Care-in-Action, but its caring interpretation is masked or left unsaid" [17]. These acts of care are only known to the care-giver, and not by the

care-receiver. If the care-receiver were to recognize such an act, it would diminish its effectiveness. In this social group, these forms of care were evident in interpersonal communication among members, and in the physical environment.

A large part of being a member in this hackerspace involves listening to other members "geek out" about their pet projects or favorite topics. This type of listening, even when interlocutors offer nothing more than bland encouragements and feigned interest, helps validate one's interests and hobbies. This legitimization of interests then establishes a sense of belonging and fitting in to Null Alpha, and sets it up as a worthwhile social endeavor. The style of active listening we have observed in Null Alpha seems to be uncharacteristic of what one would expect in such an environment so steeped in "geek" culture. When discussing what it is like to be a new member to the space who is still feeling out the social interactions there, Justin (mid-30s, male, stay at home dad, Caucasian) shared a few thoughts on what makes the space feel surprisingly welcoming:

I've been impressed, and this has come to mind a couple times, [with] how many questions I'm able to ask, and some of them seem very very simple, and I've yet to have someone look at me, like 'you don't know what that is?' ...Everyone has been so willing to share what they know or help me figure out how to find the answer that I'm looking for without going 'oh, you don't know that?' or 'you have never done that?' it's so, I do see it as it's a support and it's also kind of inspiring.

This same subject came up in a separate interview with Mike, one of the founding members:

It can be a little intimidating because, you know, geeks aren't always socially sensitive. So you might occasionally have a situation [...] where people don't mean to offend you, and be like 'oh you don't know that?' but I haven't really seen that much here, I think people are pretty nice.

It is important to create an atmosphere where members can feel safe being vulnerable and exposing their weaknesses and the gaps in their knowledge. Covert-implicit acts of care enable this kind of vulnerability among members by being accommodating and helpful without calling attention to that vulnerability.

A related example of covert-implicit care-in-action we recognized was in how the members often downplayed their own expertise or their own achieved levels of skill by presenting almost any activity as one that "anybody can do." This typical interaction seems to be in conflict with a desire to show off one's skills and abilities, which would be more appropriate for a social situation actually governed through a libertarian ideology. Central to this tension is a desire to care for one's interlocutors, students, and co-hackers. On the one hand, hacking should be impressive because for some individuals that is what makes it an endeavor worth pursuing. On the other hand, hacking cannot seem too difficult or one risks alienating potential members. Andrew and

Karen, two of the founding members, are constantly downplaying their own expertise. This helps make them more approachable and inspires visitors and new members to take on more challenging projects, while also feeling like they are not surrounded by a group of people who are elite.

The physical atmosphere of Null Alpha also contributes to this sense of community through covert-implicit acts of care on the system level. The space has few doors that lock, other than the front door and the donation boxes. The refrigerator, which is often stocked with soda, beer, and bottled water, as well as a stash of chips and candy, are left unattended and subject to the “honor system,” where members are asked to donate a nominal amount of money to help keep the refreshments stocked. This assumption that visitors can be trusted in the space helps people *feel* trusted, and helps further establish to members the collective ownership of the space. This does not even begin to cover the expensive computers, tools, and parts in the space that could potentially be taken, and that can be used freely and without supervision except when safety is a concern.

These covert-implicit acts of care are often employed to reassert and establish the maker identity claims of other members, even when it might require downplaying one’s own identity claims as a skilled hacker. By actively listening to other members when they share their interests, and by cultivating an atmosphere where nobody has to feel less intelligent for not knowing a particular fact or for not understanding something, members lower the bar to the maker identity and encourage others to adopt it. Covert-implicit care-in-action requires a more sophisticated internalization of attentiveness for the caregivers, and ability to recognize the responsiveness of the care-receivers.

Throughout this section we have discussed the care that we have observed in Null Alpha. We do not simply claim that the members care about each other and about the hackerspace as an institution. Rather, what we hope to have demonstrated is how their caring acts show a deeper relationship between their specific hacker community, cultures of making more generally, the broader community in which they are situated, and their ability to identify as participants in these contexts. Their relationships with each context rely heavily on the interdependence and caring relationships developed among participants, which appears paradoxical for a community whose espoused ideal participant is one who is self-sufficient and independent.

DISCUSSION

We have shown a range of caring actions that we observed in this particular hackerspace. In this section, we first discuss how these caring actions exist in tension with one of the dominant underlying ideologies of this and many other hackerspaces: libertarian egalitarianism. We then deconstruct several context-specific examples that demonstrate this tension.

Hacker Libertarianism and ... Care?

Existing literature on hackerspaces, hacking, and making culture reveals much about the ideology and ethical stance behind the maker cultures. Hacker ethics have been described in various accounts ranging from radical hacker activists with a mistrust of authority, a need to free all information, and a devotion to self-reliance [20] to communities of interest seeking to democratize technological practice in more peaceful ways [35].

These ethics, in their various forms, are visible in mainstream writings on maker culture. The *Hackerspace Design Patterns* presented on hackerspaces.org are meant to describe what it takes to create and successfully run a hackerspace. The initial construction of these patterns can be traced back to the 24th Chaos Communication Congress, also known as “the European Hacker Conference.” Their descriptions are geared toward maximizing individual anti-authoritarian interests, with only small nods—focusing primarily on infrastructure or collecting strong personalities—toward serious discussion of what it takes to build and maintain a community. Instead they prescribe simplistic methods for resolving conflict, such as commanding others to take care of certain actions like taking out the trash, or throwing away other’s belongings that are in the way, and they diminish the concerns of others by calling out what is or is not “pointless discussion.” Another mainstream publication on maker culture, *Fab*, is a book by Neil Gershenfeld on the emergence of FabLabs and the role he played in helping to democratize the manufacturing process for individuals in select communities around the world. *Fab* has also been criticized for focusing too heavily on the tools and materials of these FabLabs, and not enough on the nature of the community involvement required for them to be successful [16].

Taken together, these accounts and others like them portray an ideology in hacker culture closely associated with libertarian autonomy. This ideology was visible to us throughout this ethnography, such as when members discussed issues of diversity and equality. When asked about the poor representation of women in Null Alpha, leaders Karen and Andrew typically responded as follows: “our door is always open to anyone who wants to come.” When the topic was discussed in a members’ meeting, the consensus was that “all we can do is make sure everyone feels equally welcome here. If you hear of anyone feeling unwelcomed please bring it up so we can address it.” In this hackerspace, making sure everyone felt welcomed meant treating everyone the same. This is demonstrative of a libertarian stance toward equality, which involves assuming a universalized position toward such social and systemic issues, concomitant with an espoused blindness toward gender, race, sexuality, and other differences.

But one of the core contributions of this research is that even though there are clear signs of this libertarian influence, we have seen that the members do not, and cannot,

enact this espoused ideology completely; the actual enacted philosophy of the hackerspace relies much more heavily on interdependence of members, on social connections, and on caring about and for each other than their explicitly embraced ideology would seem to allow. On a micro-interactive level, community members depend on each other for support, both in their projects and emotionally as fellow human beings. On a larger scale, Null Alpha has very strong ties with the surrounding city, both in receiving and in generating support.

In their article on MIT-Fablab Norway, Kohtala and Bosqué discuss the individuality of a particular space in the FabLab network, and explain, “it is the people and their individual strengths and curiosities that have formed the Fab Lab movement and will continue its trajectory” [16]. We take this insight a step further and add that the member’s abilities to *care* for one another is also a crucial aspect of the continued success of these communities. Many of their actions are not covered in the hackerspace design patterns, are ignored in Gershenfeld’s Fab, and are often also neglected in the current literature surrounding maker culture and hackerspaces more specifically.

We are concerned that some HCI research on making inadequately explores the nature and significances of maintenance work, focusing on the hacking, making, repairing and other forms of collaborative work, but complicitly following the hackerspaces themselves in obfuscating the ways that interpersonal care is as constitutive of the maker identity as other key components (e.g., forms of labor and practice; attitudes towards authority, information, and materials). Our exploration of this maintenance work has begun to reveal the ethic in place at this particular hackerspace—and likely others—as a *negotiated* ethic. This ethic complexly includes both the espoused libertarian ideals of individualism and independence that underlies hackers’ self-image and the hidden-yet-enacted care ethic ideals of interdependence, support, and community.

Caring—But Still a Hacker

Obviously, care is common in any community of practice. However, what makes the study of care in maker communities particularly interesting is how the tension between the espoused libertarian hacker ideology and the need for community maintenance and interdependent care plays out on an everyday basis. A few examples serve to highlight the roles that this tension plays.

Earlier, we referenced the failed digital badge implementation to reward members for doing chores around Null Alpha, such as cleaning the bathroom, tidying up, and taking out the trash. This project seemed like a good idea: by providing extrinsic motivation in the form of hacker-made badges signifying the social capital that one has accrued as a result of doing chores, the plan seemed to capture the libertarian hacker ethos, with its notions of making (a self-made currency, no less), individualism, competition, and

the entrepreneurial spirit of accruing capital. Yet as we saw, the experiment failed. Hackerspace members did indeed do chores around the space, but no one seemed interested in collecting the badges. Care ethics theorists note that care is built into our bodies, our natures, and our social mores. Perhaps the desire to keep the space clean for oneself and everyone else is, in the collective consciousness of the hackerspace, sufficiently deep and automatic that it does not need the extrinsic motivation of a gamified system to set it into motion.

If the failed badge experiment suggested an instance of care winning out over libertarian ideals, evidence of the opposite also presented itself. We refer to the ethos of empowerment so central to the rhetoric of hacking, in hackerspaces themselves, mainstream journalism, and many academic research papers alike. In our hackerspace, this was expressed in the ubiquitous refrain “anyone can be a maker.” This ethos is, in turn, backed up by a number of tactics to support it, as we saw. These include the willingness to help others, the nearly infinite patience in the face of “stupid” questions, and leaders’ habit of playing down their own expertise to build up the confidence of less experienced members. In many ways, these are all tactics of care.

Yet for several reasons they can also be read as a libertarian ethos “colonizing” care. One reason is that these acts of care are instrumentally understood to contribute to the health of Null Alpha, an institution—and egalitarian co-op legally incorporated as a non-profit—that its (non-)leaders are eager to build. These care tactics are good for business: they encourage prospective visitors to visit; one-time visitors to become regular visitors; and regular visitors to become dues-paying members.

More deeply, the ethos that “anyone can be a maker” obscures the fact that *not* everyone can be a maker. A single mother with three part-time jobs and no car probably cannot be a maker—not, at least, in the sense that “being a maker” is specifically understood in this and other hackerspaces. Such an individual becomes literally invisible in the maker ethos, thus redefining “everybody” down to a certain social class; it is presumably not a coincidence that the majority of dues-paying members are men in their thirties with professional careers, many of which are in IT. Likewise, the well-intentioned blindness to gender, race, social class and so forth has no traction to take on *structural* problems that affect Null Alpha, such as gender inequality. We saw in our data that the hackers clearly hope that they can *individually* woo women and other non-traditional participants who self-select their way into Null Alpha—certainly a laudable intention. But for every such participant who does wind up in the space, how many others don’t show up at all? The open-door policy and special attention to special visitors tactic cannot reach these prospective participants. For these reasons, we argue that in some ways care can be seen to be subordinated to and in service of the more traditional neoliberal values of the hackerspace.

On the more micro-scale of interpersonal interactions, the tension between the care ethos and the libertarian is expressed in subtle ways. We saw earlier that most of the overt or direct care deals with working on projects together or using each other's tools, while more implicit forms of care tend to be the care that supports identity formation and feelings of inclusion. One reason these are implicit is because if they were explicit the participants would have to engage directly with how these moments of support conflict with the espoused hacker ethic and ideals of self-sufficiency and independence. This points to a tension in the participants' identities as hackerspace members: one where they have to choose between being "real" hackers and being supportive community participants. Many of the members have found ways to negotiate this tension: Greg often acts as though he is not excited about a project, acting instead through a veil of detachment, but he is often the quickest to provide support; similarly, Karen uses sarcasm and irony to ease the tension of a situation or to help outsiders feel included and familiar; and several members, notably Andrew and Dennis, rely on constructing instructional scenarios that demonstrate care in a maker-sanctioned mode of expression. Members might not feel like they have the space to explicitly address each others' subjective states, but are instead more comfortable enacting care through these more covert means.

CONCLUSION

Ultimately this hackerspace relies heavily on care and on community involvement and engagement, which care ethics literature and care theory can help us understand. Extending more broadly, current literature on making cultures often discusses how the barrier of entry to these communities and practices can be lowered. It is easy to conceive of this barrier as comprising knowledge or skill requirements, or difficulty *understanding* or figuring out how to physically get started. It is more difficult, but perhaps more accurate, to conceive of these barriers as sociological; who is or is not able to participate in these activities might have less to do with their skills and more to do with their ability to fit in with these communities of interest. An analysis of the care and care ethics involved in these communities can help uncover how they actually operate on the ground.

As making and hacking become boundary objects around which communities form, their underlying norms and ethics have to adapt to accommodate the inherent everyday sociality of what it means to become part of a community. This adoption can lead to tensions between the old and new ethics. By critically engaging with care theory and care ethics, we are able to see where those types of tensions reside and can discuss how the mundane interactions in these social situations are playing out. In the case of this hackerspace, critically investigating the care enacted in these social situations reveals certain vulnerabilities that accompany the adoption of a maker identity, such as the tension between being a "real" maker and being a good community member,

or the confusion associated with acknowledging or rewarding explicit acts of care.

We see at least two ways to think about care in future HCI research: as an analytical lens to inform ethnographic and other studies of such communities and their practices (which is what we have done here); and as means of influencing interventions that might bring about changes that are beneficial both in ethical terms (e.g., evening out gender imbalances) and in more entrepreneurial terms (e.g., establishing and maintaining a community sufficient to support a hackerspace durably). As hacking continues to become increasingly politically active—with civic forms of hacking, White House-sponsored National Days of Civic Hacking, and notions of hacking as a mode of citizenship—it would be constructive to develop a clearer delineation of the relationships between the hacker, understood as a practitioner of information and both physical and digital materials, and the hacker understood as a citizen who contributes to the social good and who thereby embodies hacker-care.

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