The organization of personal fabrication - Hackathons and makerspaces as semi-professional places for creative making

Sophie Landwehr Sydow
Södertörn University
Huddinge, 14189, Sweden
sophie.kuerth.landwehr@sh.se

Martin Jonsson
Södertörn University
Huddinge, 14189, Sweden
martin.jonsson@sh.se

Critical Alternatives, August 17 – 21, 2015, Aarhus, Denmark.
ACM XXX-X-XXXX-XXXX-X/XX/XX.

Abstract
Maker and DIY cultures, as well as the trend towards personal fabrication have gained recent visibility in HCI research. While first reflecting on makers as a new user and "social actor", current rhetoric has shifted towards the maker movement's potential for empowerment and democratization. By focusing on places and the organization of personal fabrication we are drawing lines between amateur vs. professional, and home vs. work settings as well as leisure vs. educational motivations. Here we discuss and map out the characteristics of semi-professional places for making in the light of a small study from a hackathon event.

Author Keywords
Maker movement, Personal fabrication, Hackathon, semi-professional, making, design

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous. K.4.0. Computer in Society: general.

Introduction

The maker movement depicts a comparably new phenomenon, where the notion of making, hacking and Do-it-yourself (DIY) culture has increasingly been in focus of attention. The western-based movement is currently leading a development, which has transformed a hobby pursuit of mainly individuals into a self-organized movement towards creating and co-creating. Mota introduces the term of personal fabrication, which promises the democratization of manufacturing, as "a growing number of individuals now has access to sophisticated production tools and the knowledge to manufacture objects for artistic, personal or commercial purposes" [7]. Numerous researchers have highlighted the possibilities of an increased participation and a democratization of technology [1,4,8, among others]. The notions of personal fabrication and DIY, highlights the role of the individual as shaping and being in control of the design and fabrication processes. But to what extent are these processes restricted and shaped by the various infrastructures and tools that the maker movement as well as personal fabrication builds upon? What defines those sites and places for personal fabrication? While relying on Harrison and Dourish's understanding of place instead of space in this context: "A place is generally a space with something added—social meaning, convention, cultural understandings about role, function and nature", [3] we try to get a better understanding of the places where makers practice occurs, their structure and the organizational support they provide. While the activity of making is often described as a technology-based extension of DIY combining software and hardware, activities that makers engage with physical artifacts as well as with combinations of physical and digital material come into play. Lindtner, Hertz and Dourish are reflecting on a "broader 'return to' and interest in physical materials" which is a development that extends DIY making "into product design, industrial development and manufacturing" [5].

In this paper we try and map out some questions around the organization of personal fabrication and are drawing from findings in a pilot study from a hackathon on computer games and board games. While not a spot on example of personal fabrication, the hackathon is still an interesting example of an organized setting where making and creating occurs that feed into a broader discussion about the places and organization of personal fabrication along the lines of for example amateur vs. professional, and home vs. work settings as well as leisure vs. educational motivations.

The organization of personal fabrication

The concepts of DIY and personal fabrication suggest a form of fabrication that is in the hands of a creative individual or group, free from the control posed by corporate structures. The existence of the DYI and maker movements thus also serves to define the opposite – the societal structures and forms of production that these movements challenge. This opposite form of production is typically to be understood as *industrial production* - a world of factories, big organization structures and high investment costs. It is however clear that personal fabrication and making still requires a certain amount of organization and infrastructure, and that a lot of the activities going on within so called fablabs and makerspaces are rather well structured and jointly organized. Here we want to outline a larger investigation of these organizational aspects of personal fabrication and maker spaces, and the relationships

between how activities and places are staged, and the actual creative maker practices actually taking place. Initially we want to unpack some aspects related to social and physical organization of work and also pose some questions around issues related to place, space, infrastructure and activities.

Places and spaces for personal fabrication

In order to approach that subject it is interesting to focus on the places where makers, hackers and fabricators are actually spending their time. Recent works in HCI have discussed different aspects of the growing maker culture and community, where also aspects of physical places and sites are put to the fore. Lindtner, Hertz and Dourish for example point out the "emerging sites of technical invention, where technological visions are crafted into tangible products and alternate models for industrial development and design" become visible [5]. Toombs, Bardzell and Bardzell are providing an overview of maker identity and the spaces makers are active in, [10] but reflect also the importance of care in maker communities connected to values of collaboration, cooperation and interpersonal support [11]. The question remains how to understand the places makers are active in. It can be said that there are two arenas makers are operating in, the first is the digital arena where makers have access to the digital infrastructure of tutorials, forums, ordering sites, social media platforms, crowdfunding sites and specially adapted services. The second and more visible arena is the one of physical places. Makerspaces, hackerspaces, fablabs, maker fair etc. are all terms, names and trademarks that claim to have definitions in its own rights [5,7,8], but distinguishing those is not part of this paper, instead we are focusing on what they have in common: they all represent physical places of the maker movement.

Identifying physical places

Characteristics of those physical places are that they provide tools, space and an environment for people to experiment with tools and materials, creating things and artifacts individually or fabricate objects in low quantities. In those settings there is a strong focus on using and learning practical skills and applying them creatively [2]. The physical places of the maker movement differ from the home and work settings, by reaching from providing an environment of exploration towards semi-professional places of making. As an active board member of a local makerspace states: "We usually say it's like a garage at home, where they can create things on their leisure time and immerse themselves in a hobby, but this is a garage for everyone or those who do not have their own garage". Makerspaces, fablabs and hackerspaces are relying on the work on individual projects, but at the same time profiting from a collaborative environment, where ideas can be exchanged, skills can be learned and progress can be achieved. A common idea of makerspaces is that anyone should be able to come and work on their or others' projects, share experiences and knowledge, collaborate or just bounce ideas off another. The premises and places are therefore shaped and changed by the people involved with the place. These characteristics as well as access to tools, equipment and material aren't provided in the home environment and could be reasons for people to get active in the maker movement. Toombs, Bardzell and Bardzell recent work focuses on the importance of care and "maintenance work needed to run and support such communities" [11] which are set against the notion of

self-steered consensus organizations. Their standpoint opens up a discussion on the role of organization, responsibility, planning and caring for the physical places of the maker movement.

Organized activities of making and fabrication

The existing makerspaces, hackerspaces, fablabs etc. are not only a set of places with shared tools and equipment. As Litts argues "makerspaces are not necessarily born out of a specific set of materials or spaces, but rather a mindset of community partnership, collaboration, and creation" [6]. In many cases there also exist a managing organization that also host a number of organized activities for their members. Those organized activities are typically centered around education and sharing of knowledge around specific tools or fabrication techniques, aiming equally at the semi-professional maker, the amateur expert or the curious noob. The activities are providing either an opening up for creativity by creating an environment or space where creation can be framed in (for example hackathons, co-creating events) or towards the agenda of sharing and spreading knowledge and gaining skills (such as through workshops, lectures, courses). Making and fabrication are based on practical skills and a confrontation with tools and material in order to understanding, repurpose as well of modifying existing materials are essential. Therefore a great emphasize in maker practice relies on gaining and spreading skills and practical knowledge. Local maker community spaces (hackerspaces, makerspace, fablabs, etc.) are providing possibilities to learn from both professionals, amateur experts and/or another by organizing activities around the physical space [12] in order to expand their skills on an individual basis as well as serving a greater purpose related to the maker movement agenda.

Between home and work – a hackathon

Here we discuss and present some findings from a small study following a hackathon event, which focused on digital and physical game creation. Hackathons can be seen as timely constrained coding events, originally limited to collaborative work in software development with possible hardware elements. Nowadays the hackathon format is used in various different contexts: as cultural maker events within art, music or theatre as well as connected to pop culture, the creation of games or video/TV, life sciences hackathons such as brainhack[1] and even as workshop formats during HCI conferences [9]. Organization-wise demand hackathons a structure and organizational setting which requires work intensely during the whole event, where both time constraints and location factors come into play. For this study we followed a non-competitive hackathon with 70 participants where the common goal was to build a computer game or a physical board game from scratch in 48-hours. The particularities hackathons provide are to be found in their structure and goal orientation. The combination of fixed time limits, the physical aspect of meeting in order to create and a united goal of what to create, make hackathons an interesting example where the organizational aspects become visible. Without accounting for the study in detail we want to highlight two aspects from the results; on the one hand how this event can be understood in terms of a *place for creative making* and secondly the *motivations and expectations* of the participants. With respect to how this event can be understood in terms of a place with specific characteristics, the participants statements outline a safe space or creative zone, that is different from both home and work settings and where the

[1] http://brainhack.org/ Accessed 19/05/15

participants repeatedly compare the process of creating at a Hackathon with the one creating at home or the workplace/school setting. According to the responses of several participants, the Hackathon provides both freedom to work with own ideas, but builds up constrains to get something done in the given time frame. While at home having experienced distractions and situation where "*things never get done*", others suffer from the tendency of "*just adding one more thing*". Additionally while reflecting about the process of creation at work or in school settings, while creating as a professional programmer or designer they seem to come to the conclusion that they have no or little freedom. One participant reasons that when taking part in a hackathon it is likely *"to end up in a flow of creation. Hackathons are always like living in a little bubble of creativity where we don't care about what happens in the world outside, because we are so into making games".* This flow of creation stands for what participants claim not to be able to achieve when creating games at home or while having creative projects at work. The second set of statements we want to highlight concerns the motivations for attending the hackathon. The majority of the participants were either students aiming at a career in the game industry or already employed there, but in positions where decisions of what to create are made at a different level. Hackathons therefore provide an arena for being creative, network and collaborations within a framed social setting. The main reason for participating in our non-competitive Hackathon which 22 (of 27) participants agreed upon was "*in order to have fun*". Another and maybe contradictory finding is however that around half of the participants (48%) states that they participate in the hackathon because they pursue a career in the game industry. 67% of the participants also state that they participate in the hackathon in order to gain skills and competence. Thus, even though the main motivation for participating seems to be leisure and fun, there are also clearly stated hopes that participation can also be instrumental in achieving career goals.

Discussion

In this paper we try to map out some questions around the organization of personal fabrication and are drawing from findings in a pilot study from a hackathon on computer games and board games. The hackathon is an interesting example of an organized setting where making and creating occurs that feed into a broader discussion about the places and organization of personal fabrication along the lines of for example amateur vs. professional, and home vs. work settings as well as leisure vs. professional motivations.

The results point at the importance of places that are perceived neither as home nor work environments, and that the lack of structure in home environments as well as the too rigid structures in a work environment can both be impairing creative and joyful work. This type of organized non-home-non-work environments is also transferable to the various existing spaces for personal fabrication such as fab labs and makerspaces, which share much of the same characteristics. Regarding the motivations of participants, the main motivation is stated to be leisure and fun, which aligns with the common view of the maker movement as targeting amateur makers.

The results however also point out that even though the main driving force is leisure, the hackathon also serves instrumental career goal. Together these two

findings map out a concept that we choose to call semi-professional places for making. Residing in-between home and work environments as well as in-between hobby tinkering and a professional career, these semi-professional places for making may be a fruitful concept to further explores the organization of personal fabrication. Questions that we hope to explore further could be for example; How personal is personal fabrication when relying on a combination of infrastructure, organizational structures and a connection to physical places? When tending towards semi-professionalism - how different are the personal fabrication practices from contemporary small-scale industrial production?

References

1. Ames, M. G., Bardzell, J., Bardzell, S., Lindtner, S., Mellis, D. A., & Rosner, D. K. (2014). Making cultures: empowerment, participation, and democracy-or not?. In Proceedings of the extended abstracts of the 32nd annual ACM conference on Human factors in computing systems (pp. 1087-1092). ACM.
2. Buechley, L., Rosner, D. K., Paulos, E., & Williams, A. (2009, April). DIY for CHI: methods, communities, and values of reuse and customization. In CHI'09 Extended Abstracts on Human Factors in Computing Systems (pp. 4823-4826). ACM.
3. Harrison, S., & Dourish, P. (1996, November). Re-place-ing space: the roles of place and space in collaborative systems. In *Proceedings of the 1996 ACM conference on Computer supported cooperative work* (pp. 67-76). ACM.
4. Jenkins, T., & Bogost, I. (2015). Escaping the Sandbox: Making and Its Future. In Proceedings of the Ninth International Conference on Tangible, Embedded, and Embodied Interaction (pp. 29-32). ACM.
5. Lindtner, S., Hertz, G. D., & Dourish, P. (2014). Emerging sites of HCI innovation: hackerspaces, hardware startups & incubators. In Proceedings of the 32nd annual ACM conference on Human Factors in Computing Systems (pp. 439-448). ACM.
6. Litts, B. K. (2014). Making learning: Makerspaces as learning environments (Doctoral dissertation, University of Wisconsin-Madison).
7. Mota, C. (2011, November). The rise of personal fabrication. In *Proceedings of the 8th ACM conference on Creativity and cognition* (pp. 279-288). ACM.
8. Tanenbaum, J. G., Williams, A. M., Desjardins, A., & Tanenbaum, K. (2013, April). Democratizing technology: pleasure, utility and expressiveness in DIY and maker practice. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (pp. 2603-2612). ACM.
9. Tanenbaum, K. et.al. Critical Making Hackathon. Extended Abstracts CHI'14, (2014), 17–20
10. Toombs, A., Bardzell, S., & Bardzell, J. (2014). Becoming Makers: Hackerspace Member Habits, Values, and Identities. In Journal of Peer Production.
11. Toombs, A. L., Bardzell, S., & Bardzell, J. (2015). The Proper Care and Feeding of Hackerspaces: Care Ethics and Cultures of Making. In Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (pp. 629-638). ACM.
12. Rosner, D. K., Lindtner, S., Erickson, I., Forlano, L., Jackson, S. J., & Kolko, B. (2014, February). Making Cultures: Building things & building communities. In Proceedings of the companion publication of the 17th ACM conference on Computer supported cooperative work & social computing (pp. 113-116). ACM.