
Collaborative Appropriation: How Couples, Teams, Groups and Communities Adapt and Adopt Technologies

Michael Muller

IBM Research
Cambridge, MA 02142 USA
michael_muller@us.ibm.com

Katja Neureiter

University of Salzburg
Salzburg, AT
Katja.Neureiter@sbg.ac.at

Nervo Verdezoto

Aarhus University
Aarhus, DK
nervo@cs.au.dk

Alina Krischkowsky

University of Salzburg
Salzburg, AT
Alina.Krischkowsky@sbg.ac.at

Anna Maria Al Zubaidi-Polli

U. Applied Science Upper Austria
Hagenberg, AT
Anna.polli@fh-hagenberg.at

Manfred Tscheligi

University of Salzburg
Salzburg, AT
manfred.tscheligi@sbg.ac.at

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the Owner/Author.

Copyright is held by the owner/author(s).
CSCW '16 Companion, February 27 - March 02, 2016, San Francisco, CA, USA
ACM 978-1-4503-3950-6/16/02.
<http://dx.doi.org/10.1145/2818052.2855508>

Abstract

Previous workshops and papers have examined how individual users adopt and adapt technologies to meet their own local needs, by “completing design through use.” However, there has been little systematic study of how groups of people engage collaboratively in these activities. This workshop opens a discussion for these under-studied forms of *collaborative appropriation*, using a broad range of perspectives including empirical data, design explorations, research, and critique.

Author Keywords

Appropriation; Adoption; Adaptation; Collaboration; CSCW.

ACM Classification Keywords

H.5.3. Group and Organizational Interfaces.

Introduction

Appropriation is “the process by which people adopt and adapt technologies, fitting them into their working practices” [13]. The adaptation may be semantic (i.e., change in meaning or significance of the technology in context), behavioral (novel usage patterns), or

technological (changes to the technology itself) [3, 22]. Previous workshops explored appropriation topics related to sustainability [20], communication [22, 36], and creativity [30].

Based on these successful workshops, we propose to focus on an emerging aspect of appropriation, namely appropriation by two or more users, or *collaborative appropriation*. While there have been a small number of papers on this aspect of appropriation [e.g., 14, 27], we hope to strengthen this tradition by bringing together researchers, designers, and practitioners, who share their experiences, and discuss and elaborate principles to better design for collaborative appropriation. This in turn can have a positive effect on group performance and collaborative processes in a variety of different contexts, e.g., in medical practice, sustainability, team performance, large-systems integration, study of invisible work, and collaborative innovation. In the following, we discuss appropriation as an important topic for CHI and CSCW and explain why *the time is right* to emphasize on collaborative appropriation.

Background and Related Work

In 2012, Belin and Prié wrote, “Appropriation of technology is a process by which users complete the work of designers by making interactive systems functional within the frame of their situated activities” [3]. In this workshop, we broaden the focus from “a user” (i.e., individual people, acting in isolation) to groups of people (i.e., couples, teams, groups, and communities) and highlight the challenges and opportunities for *collaborative appropriation*.

Much of the fascinating work of appropriation has dealt with how *individual* users respond to a technology.

Salovaara’s thesis, for example, emphasized novel, individual uses for a digital camera [29]. Dix’s influential paper on *designing for appropriation* was largely concerned with the case of the individual user [11]. Paradoxically, Birnbaum’s study of young adults’ use and non-use of instant messaging primarily focused on individual, independent use [5]. Similarly Bødker’s and Christiansen’s study of appropriation of smartphones was about individual, even solipsistic, purposes [9]. Even the museum devices design paper of Boehner et al. [6] and the digital panels in art galleries of Bødker and Polli [10], which put museum experiences into a social context, focused on activities by individual users, who might find out indirectly about similar activities by other unknown individuals [6]. Many of these papers emphasized the concept of “users complet[ing] the work of designers” [3] *through use*, and thus were concerned primarily with design – see, e.g., Gaver et al.’s work on how the experience of ambiguity may be used to compel a user to create new interpretations of artifacts [18].

A few scholars have focused on appropriation as performed by people working, playing, loving or enjoying free time activities together. Dourish’s dual-use paper, while concerned with paradoxes of workflow technologies, described how groups of people created extensive work-arounds for applications that did not match their shared needs [12]. Muller et al. showed how a single software environment had been re-interpreted five different ways by different types of working groups [24]. Brown and Bell reported on creative redefinitions of a video game by groups of users [8]. Kaye’s work on couples was in some ways a classic application of appropriation as a design method, in which romantic partners would need to establish

their own, shared interpretation of a red dot on each of their computer screens [21].

Workshop Theme and Expected Benefits

These diverse examples, ranging from workflows to communities to gamers to couples, suggest that the time is right to refocus our attention on *collaborative appropriation*. There are six major reasons.

First, technologies are increasingly used and adapted to collaborative use in working groups performing life-sustaining tasks [2], including time-critical hospital and emergency procedures [26, 28]. For instance in self-care, how people appropriate technology can have positive or negative effects in people's everyday lives [34]. As such, designing for appropriation has important implications for the design of self-care technologies [25] to uncover and anticipate the possible dangers of using technology in unpredicted ways – or to overcome barriers to use the technology-as-designed. Furthermore, there is a need to recognize self-care as a collaborative endeavor between different heterogeneous actors (e.g., patient, relatives, clinicians) with different motivations [19, 25], rather than being performed in isolation. If we understand how to make technologies and designs easier and flexible to enable appropriation in the midst of, for example, time-critical medical-team procedures (i.e., updating [11] for the collaborative case), then more lives may be saved.

Second, while the notion of appropriation has been discussed in HCI/CSCW communities and plays an important role in system design, this aspect has been overlooked in the sustainability domain. Although there is a shift from understanding individual behaviors to

understanding everyday practices (e.g., [35]), few researchers have further investigated appropriation in Sustainable HCI (e.g., [20, 16]). As most research in this domain has taken a narrow focus on individual users, there is a need to uncover the participation of other users in appropriating technology (e.g., family members [31]) to support their collaborative sustainability intentions.

The third major reason is that systems research studies have begun to show not only that team performance can be affected by the degree of *fit* of tool to collaborative task, but also the degree of configurability of the tool (e.g., [17]). Becker et al. argue that the collaborative use of a technology will have an impact on how the technology is appropriated [4]. When the members' knowledge is shared with the group, collaborative technology adoption decisions are one of the outcomes.

Fourth, it is becoming clear that the integration of large systems may require detailed interstitial efforts, or "collaboration in-between," which requires greater flexibility and configurability from at least one and perhaps all of the systems to be integrated [7]. In this way, appropriation may become a system requirement for collaboration at the level of middleware. This tendency echoes earlier participatory design efforts in which communities of users reshape technology until it fits into their work [9].

Fifth, adoption and adaptation of technologies – even when focused on an individual use – often involve highly collaborative work, which may be invisible [14, 19, 27]. Like other forms of invisible work [32], the study of invisible aspects of appropriation work may

help us to see new patterns of collaboration, as well as helping us to revise our understanding of roles and context (e.g., [33]) in on-going work.

Finally, a deeper understanding of designing for appropriation is critical as it may leave more freedom to the users, and may support the users' creativity and therefore appropriation [30]. Through supporting appropriation by discussing the emergence of shared creative solutions, collaborative appropriation may intensify the renewal and maintenance of technologies for HCI, by prolonging their life and therefore sustaining their continued use. Users may repurpose or extend a technology, to create and identify their own novel functionalities, but the artifacts may not need to be changed [1].

Workshop Goals

The topic of *collaborative appropriation* has been addressed in specific domains, as summarized above. However, we are in need of a more holistic perspective that spans domains. In this workshop, we hope to work with participants to survey recent research focusing on collaborative appropriation, preferably analyzed in a broader or multi-domain context beyond individual use. We invite position papers that address (one or more) of the following questions:

- What can we learn from practical experiences to design for collaborative appropriation?
- In what way does flexible, open design and tailorability support collaborative appropriation?
- What are new ways, goals, guidelines, or principles for designing for collaborative appropriation?
- What are major drivers to design for collaborative appropriation?

- What roles emerge in or due to new forms of collaborative appropriation practices?
- What characterizes or differentiates collaborative appropriation between couples, teams, groups, or communities?
- What are the theories and methods for studying collaborative appropriation?
- What can we learn from other emergent design movements and research domains (e.g., hacker spaces) to better understand how to design for collaborative appropriation?

Our goals for this workshop are to build and cross-fertilize, from experimental design examples and theories concentrating on collaborative appropriation, how these users appropriate technologies; and from this point, which approaches may be taken for designing for collaborative appropriation. Through roundtable discussions we are systematically aiming to share the knowledge among the participants of possible collaborative appropriation outcomes. We will discuss how we (as designers and as researchers) can better understand and design for collaborative appropriation and how this appropriation can be affected by certain design choices.

Through this knowledge transfer we would balance the consensus and tensions, as revealed by workshop participants to write a journal paper summarizing the studies and theories of collaborative appropriation. We may consider collecting longer versions of submissions into a special issue of a journal. We hope to provide awareness for the research community about the importance to look beyond individual appropriation, highlighting the importance of collaborative appropriation for future design of CSCW systems.

Participation

We encourage researchers, designers, and practitioners to contribute to a better understanding of collaborative appropriation by sharing their experiences and knowledge. We invite contributions that address design, theory, and critique, as well as empirical data collection from diverse collaborative settings.

Working with participants

We plan to design or redesign our workshop format, depending on the number of participants. If there is a small number of participants, we will construct a morning agenda similar to a symposium. If there is a larger number of participants, we will construct a morning agenda closer to an unconference. In each case, we will assign a discussant participant to each submission by another participant, to begin the interweaving of ideas in advance of the actual workshop. We believe it is crucial to “protect” the afternoon sessions as times for creative combination of perspectives and understandings. Therefore, we will limit the presentation of position papers to the morning session, and we will adapt our afternoon plans to support well-sized discussion break-out groups on topics that we would plan in advance, drawn from the submissions, or (better) topics that emerge from participants’ discussions of their research and ideas.

Detailed Workshop Plan

Before the Workshop

The call for participation will be distributed via HCI, CSCW, and ECSCW related mailing lists and will be promoted via social media, e.g., Facebook and Twitter. Moreover, we will set up a website, where participants can retrieve all relevant information about the

workshop, e.g., the goals, submission modality, or links to related materials to prepare for the workshop.

Workshop Structure

This will be a one-day workshop constituted by individual presentations and group discussions. In the first half of the workshop we will first start with a brief introduction to the topic, followed by brief individual presentations by our workshop participants. In the second half of the workshop, we aim to identify and discuss the challenges and opportunities to design for collaborative appropriation. We will encourage active participation and peer feedback from our participants.

Equipment and supplies needed

We request large “butcher” paper or newsprint pads, markers, and post-it notes.

Post-Workshop Activities (Dissemination)

A brief summary about the most important points of discussion will be provided on the workshop website. Moreover, based on the workshop results the organizers will write an article and/or journal paper on emergent concepts and relationships in collaborative appropriation.

Organizers

The organizers conducted a related workshop at ECSCW 2015 that focused on unanticipated users, usage, circumstances, and design [22].

Anna Maria Al Zubaidi-Polli works as a research fellow at the Department of Human-Centered-Computing at the University of Applied Science, Austria. Her research interests lie in the appropriation of IT since the past years.

Alina Krischkowsky is a research fellow at the Center for HCI at the Department of Computer Science at the University of Salzburg, Austria. She is mainly interested in appropriation practices in corporate social media and in understanding the drivers of appropriation.

Michael Muller works as a research staff member at IBM Research, USA. His work has involved the study of how groups of employees make use of technologies.

Katja Neureiter is a research fellow at the Center for HCI at the Department of Computer Science at the University of Salzburg, Austria. She is mainly interested in older adults' technology appropriation.

Nervo Verdezoto is a postdoctoral researcher at the Department of Computer Science at Aarhus University, Denmark. His work combines fieldwork with user-centered design methods to further understand people's everyday practices, different stakeholder's needs, and how people appropriate technology. He has been working in various projects related to healthcare, physical computing and sustainable HCI.

Manfred Tscheligi is a Professor for HCI & Usability at the University of Salzburg, directing the Center for HCI. Over the years he was involved on range of conference activities including a variety of workshops.

Website

<https://projects.hci.sbg.ac.at/cscw2016/>

References

1. Arman Arakelyan and David Lamas (2013). Facilitation of sustainability through appropriation-enabling-design. *MIDI 2013*, 5:1-5:9.
2. Ellen Balka and Ina Wagner (2006). Making things work: Dimensions of configurability as appropriation work. *Proc CSCW 2006*, 229-238.
3. Amaury Belin and Yannick Prié (2012). DIAM: Towards a model for describing appropriation processes through the evolution of digital artifacts. *Proc. DIS 2012*, 645-654.
4. Aaron Becker, Traci Carte, and Laku Chidambaram (2008). The effects of collaborative technology appropriation on group outcomes. *Proc. DIGIT 2008*, 1-14.
5. Jeremy Birnbaum (2010). Adopt, adapt, abandon: Understanding why some young adults start, and then stop, using instant messaging. *Comp. Hum.Beh.* 26(6), 1427-1433.
6. Kirsten Boehner, Jennifer Thom-Santelli, Angela Zoss, Geri Gay, Justin S. Hall, and Tucker Barrett (2005). Imprints of place: Creative expressions of the museum experience. *Proc. CHI EA 2005*, 1220-1223.
7. Claus Bossen and Erik Grönvall (2015). Collaboration in-between: The care hotel and designing for flexible use. *Proc CSCW 2015*, 1289-1301
8. Barry Brown and Marek Bell (2004). CSCW at play: 'There' as a collaborative virtual environment. *Proc. CSCW 2004*, 350-359.
9. Susanne Bødker and Ellen Christiansen (2012). Poetry in motion: Appropriation of the world of apps. *Proc. ECCE 2012*, 78-84.
10. Susanne Bødker and Anna Maria Polli (2014). Between initial familiarity and future use: A case of collocated collaborative writing. *Proc. COOP 2014*, Springer (2014), 137-154.
11. Alan Dix (2007). Designing for appropriation. *Proc. BCS-HCI 2007*, 27-30.

12. Paul Dourish (2001). Process descriptions as organizational accounting devices: The dual use of workflow technologies. *Proc. GROUP 2001*, 52-60.
13. Paul Dourish (2003). The appropriation of interactive technologies: Some lessons from placeless documents. *JCSCW 12(4)*, 465-490.
14. Sebastian Draxler and Gunnar Stevens (2011). Supporting the collaborative appropriation of an open software ecosystem. *JCSCW 20(4-5)*, 403-448.
15. Sebastian Draxler, Gunnar Stevens, Martin Stein, Alexander Boden, and David Randall (2012). Supporting the social context of technology appropriation: On a synthesis of sharing tools and tool knowledge. *Proc. CHI 2012*, 2835-2844.
16. Myriam Frejus and Dominique Martini (2015). Taking into account user appropriation and development to design energy consumption feedback. *CHI EA 2015*, 2193-2198.
17. Robert M. Fuller and Alan R. Dennis (2009). Does fit matter? The impact of task-technology fit and appropriation in team performance in repeated tasks. *Info. Sys. Res. 20(1)*, 2-17.
18. William W. Gaver, Jacob Beaver, and Steve Benford (2003). Ambiguity as a resource for design. *Proc CHI 2003*, 233-240.
19. Erik Grönvall and Nervo Verdezoto (2013). Beyond self-monitoring: Understanding non-functional aspects of home-based healthcare technology. *Proc. UbiComp 2013*, 587-596.
20. Jina Huh, Lisa P. Nathan, Six Silberman, Eli Blevis, Bill Tomlinson, Phoebe Sengers, and Daniela Busse (2010). Examining appropriation, re-use, and maintenance for sustainability. *CHI 2010 EA*, 4457-4460.
21. Joseph 'Jofish' Kaye (2006). I just clicked to say I love you: Rich evaluations of minimal communication. *CHI EA 2006*, 363-368.
22. Alina Krischkowsky, Manfred Tscheligi, Katja Neureiter, Michael Muller, Anna Maria Polli, and Nervo Verdezoto (2015). Workshop: Experiences of technology appropriation: Unanticipated users, usage, circumstances, and design. Workshop at ECSCW 2015.
23. Jennifer Mankoff (2012). HCI and sustainability: A tale of two motivations. *Interactions 19(3)*, 16-19.
24. Michael Muller, Kate Ehrlich, Tara Matthews, Adam Perer, Inbal Ronen, and Ido Guy (2012). Diversity among enterprise online communities: Collaborating, teaming, and innovating through social media. *Proc CHI 2012*, 2815-2824.
25. Francisco Nunes, Nervo Verdezoto, Geraldine Fitzpatrick, Morten Kyng, Erik Grönvall, and Cristiano Storni (2015). Self-care technologies in HCI: Trends, tensions, and opportunities. *TOCHI (In Press)*.
26. Sun Young Park, Yunan Chen, and Scott Rudkin (2015). Technological and organizational adaptation of EMR implementation in an emergency department. *ACM TOCHI 22(1)*, Article 1.
27. Pablo-Alejandro Quinones. 2014. Cultivating practice & shepherding technology use: supporting appropriation among unanticipated users. *Proc. CSCW 2014*, 305-318.
28. Aleksandra Sarcevic, Leysia A. Palen, and Randall S. Burd (2011). Coordinating time-critical work with role-tagging. *Proc. CSCW 2011*, 465-474.
29. Antti Salovaara (2012). *Repurposive appropriation and creative technology use in human-computer interaction*. PhD thesis, University of Helsinki.
30. Antti Salovaara, Kristina Höök, Keith Cheverst, Michael Twidale, Matthew Chalmers, and Corina Sas (2011). Appropriation and creative use: Linking user studies and design. *CHI 2011 EA*, 37-40.

31. Stephen Snow, Dhaval Vyas, and Margot Brereton (2015). When an eco-feedback system joins the family. *Pers.and Ubiq. Comp.* 19(5), 1-12.
32. Susan Leigh Star and Anselm Strauss (1999). Layers of silence, arenas of voice: The ecology of visible and invisible work. *JCSCW* 8(1-2), 9-30.
33. Allan Stisen, Nervo Verdezoto, Henrik Blunck, Mikkel Baun Kjærgaard, and Kaj Grønbæk (2016). Accounting for the invisible work of hospital orderlies: Designing for local and global coordination. *Proc. CSCW 2016*. ACM (In press).
34. Cristiano Storni (2010). Multiple forms of appropriation in self-monitoring technology: Reflections on the role of evaluation in future self-care. *IJHCI* 26(5), 537-561.
35. Yolande A.A. Strengers (2011). Designing eco-feedback systems for everyday life. *Proc. CHI 2011*, 2135-2144.
36. Manfred Tscheligi, Alina Krischkowsky, Katja Neueiter, Kori Inkpen, Michael Muller, and Gunnar Stevens (2014). Potentials of the "unexpected:" Technology appropriation practices and communication needs. *Proc. GROUP 2014*, 313-316.
37. Volker Wulf, Volkmar Pipek, and Markus Won (2008). Component-based tailorability: Enabling highly flexible software applications. *IJHCS* 66(1), 1-22.