

Studying Appropriation of Mobile Technologies

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ABSTRACT

This paper attempts to describe a theoretical position for studies on appropriation within HCI. Through reflection of the goals of HCI, a definition for appropriation is sought and its methodological implications discussed. Finally, the paper provides a short description of an ongoing case study that addresses appropriation in a domain of mobile multimedia messaging applications.

Categories and Subject Descriptors

H.1.2 [Models and Principles]: User/Machine Systems - *Human factors*; J.7 [Computers in Other Systems]: Consumer products.

General Terms

Design, Experimentation, Human Factors, Theory.

Keywords

Appropriation, evolving use.

1. INTRODUCTION

When people start using a technology, they might invent ways of use that have not been anticipated by the designers. For instance, the phone book of a mobile phone in many people's phones not only serves as a phone number directory, but also as a cache for security codes that are hidden inside phone numbers of fake contacts. In the same way, phone's text messaging capability, calendar, reminders, possibilities to make fake phone calls and so on have all been repurposed as means to serve many unanticipated ends.

The process how technology or an artifact – such as a mobile phone – is adopted in use, and subsequently interpreted and made use of, is called *appropriation*. It is a process that can take place in many levels, and therefore research on appropriation has also been carried out in different disciplines. Sociologists have analyzed appropriation from the point of view of consumption and how artifacts achieve their significance through ownership (e.g., [7, 12]), how technology is shaped as a result of different societal forces (e.g., [9]), or how power relations between technology creators and their consumers are rendered visible in negotiations over the “proper” purpose of use of technology (e.g., [4]). In organization and management science, researchers have also paid

attention to manager's ideas of how production tools should be used, in comparison with the uses invented by workers (e.g. [2, 5, 6, 13]). Actually, appropriation need not be understood only as a technology-related learning process, but as any conceptual change that may take place when something new is learned. For instance, in developmental psychology appropriation has been seen as a kind of learning process where language and concepts are learned and internalized in situated activities (e.g. [11, 14]). In sum, appropriation has been studied in different levels, ranging from large societal changes to interpersonal and individual learning processes.

Whereas in social studies appropriation has been associated to power relations or large-scale economic, political or societal factors, and in developmental psychology the setting studied has been educational and analysis has focused on internalization, in HCI most relevance could be gained from *understanding the interpretive and perceptual processes involved in the use of the artifacts*. Humans are intentional, opportunistic and active, and consequently able to construct new meanings and uses to objects they encounter. This means that the interest lies on use patterns that arise in situated settings, in constructive sense-making processes. In order to better understand how this definition can serve as a starting point for influential HCI research, we first review briefly the ideals of HCI and then turn to propose a more precise definition for appropriation suitable for HCI's purposes.

2. HCI AND ITS IDEALS

HCI has its history in human factors and engineering psychology on one hand, and software engineering on the other hand. Therefore, most of the HCI research is conducted with an applied goal. Following this line of thinking, the knowledge produced must be presented in such a way that it is useful for design of new artifacts. Ultimately, work on HCI aims for technologies that are enjoyable and easy to use and fit well to the context of use. Because of the applied ideal, also findings on appropriation should be turned to design implications or similar outcomes that developers could apply in their work.

An aspect that has gained increasing emphasis in HCI research since the early 90's has been the importance of the social dimension in people's activity. The current state of thinking stresses that almost everything that people do with computers is also interpersonal: computers are used for communication and coordination, and to achieve shared goals. They are often used in some institutional setting. Even in cases when there is only the user and the computer, the reasons behind using the computer are usually socially motivated.

Therefore, studies of appropriation must take the “turn to social” into account. For instance, we may find that people show a frequent habit of borrowing ideas from each other, and that patterns and purposes of use are therefore a result of a joint

exploration. In that case, the studies on appropriation must address also the aspect of appropriation through imitation. Each individual may appropriate technology in a unique way, but when studying it, we need to explicate dialogical processes between people as well.

For HCI and its attempts to increase knowledge that facilitates design, understanding appropriation may point out how such artifacts can be designed that people find useful in more than one situation (which from economic point of view also increases the customer base and the markets). We may also increase our understanding of the issue of *disappropriation*: why certain people may not continue using certain technology after the initial period of exploration. On a more ideological level, it shows how letting people define tools' meanings and purposes can eventually be beneficial to all parties, compared to attempts to teach people to use artifacts in a "correct" way.

3. APPROPRIATION AND HCI: A DEFINITION

Based on the presentation of appropriation and ideals of HCI above, appropriation as a phenomenon relevant especially to HCI can be defined to comprise the following aspects:

- Appropriation concerns the artifact and its interpretation by its user.
- Appropriation process is started when a user perceives an opportunity for using the artifact in a new, meaningful way in a certain situation. Here, "new" means that the perception needs to be new for this particular user. The perception can be a result of e.g. playful exploration of artifact's capabilities, conscious attempts to learn to master the artifact, an insight gained through noticing a mapping to something in the environment, and so on. "Meaningful" means that the perception reveals something about the artifact that the user finds potentially helpful in his or her activities.
- The new meaningful opportunity for using the artifact is realized in action.
- As a result of new usage, new perceptions become possible.

The definition requires that appropriation is not only a change in mental constructs, but that it also has some implications for action. In particular, because it does not take a stance on the correct way of using the artifact, it does not require a comparison between the observed use and the intended use by a designer. This saves the research from a potential analytical trap of postulating hypothetical designers' intentions of artifacts proper use – concepts that may have actually never been explicated. It also gives a possibility to see users themselves as designers as well. In addition, it leaves open the following questions:

- *Who drives appropriation.* The definition covers individual learning (when new uses are discovered independently) and aspects of social learning aspects (e.g., when a person is taught the new use).
- *The pace of change.* Appropriation can be a momentary change, or a gradual transformation that may take a lot of time.

This kind of a definition makes it possible to study appropriation empirically and draw from the body of knowledge in cognitive science in analyzing the observations.

4. METHODOLOGICAL IMPLICATIONS

For the methodology, the definition means that at least part of the research should be carried in real settings, where people, artifacts and the environment are in continuous interaction. This fits well to the methods used within mobile HCI, especially to the tradition of setting up *field trials*: small case studies of which results are often obtained through exploration rather than hypothesis testing.

The definition poses also methodological challenges, among others. Often the field trials in HCI are not extensively longitudinal but may last only a few weeks, or even less. In order to study appropriation with field trials, the trial period must be extended in order to let the use mature and undergo changes. A suitable time span is difficult to estimate in advance, since it is very difficult to predict the conditions for a matured appropriation process. In principle, the process may never mature fully.

Analysis of findings must balance between individual cognitive processes (perception, problem solving, learning, creativity, goal-directed action) and changes in group practices (cooperation, coordination, shared experiences, learning from others). This demarcation must most likely be decided case by case. In addition, in order to see beyond particularities of each field trial and use situation, appropriation studies should try to explain observations related to use patterns, emerging practices, or dialogical structures between user, artifact and the environment in the meaning-giving process.

Mobile HCI (and HCI in general) has an additional methodological advantage in its stock: that of being able to run studies with technological interventions. Being a tradition that tries to point out new opportunities for developing user-friendly technology, the technology to be studied should be novel enough to be able to provide a glimpse to a possible future. Being able to build prototypes and let people use them allows for efficient data collection during the trial, and thus increased preciseness during the analysis.

5. STUDYING APPROPRIATION IN MOBILE HCI

Up to now, research on appropriation within HCI and CSCW has been acknowledged mostly in writings that have drawn inspiration from phenomenology [1, 3, 15], activity theory [8] and adaptive structuration theory [2, 6, 13]. However, these papers have concentrated either been laying the theoretical foundations or on non-mobile technologies installed in work settings. Because appropriation studies have been scarce in mobile HCI, I have approached the task with a focus on analyzing situated interpersonal interaction within small groups of people. The attempt is to evaluate the theoretical underpinnings proposed in the previous chapter, as well as to contrast the empirical findings to existing theoretical frameworks. This work is currently ongoing in an analysis of a field trial that was carried out in early 2006.

The application studied in a field trial was *Comeks*¹, a comic story creation program that runs in smart phones and extends the

¹ See www.bulbon.com



Figure 1. A comic strip created with Comeks and sent by a participant in a field trial.

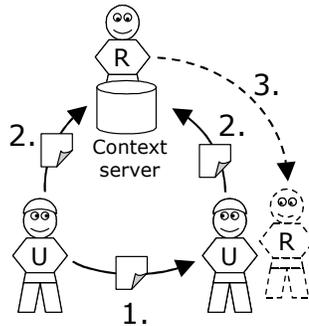


Figure 2. The data collection method used in the trial: 1. User (U) sends a message; 2. Both sending and receiving is logged in the server; 3. Researcher (R) reads the messages and interviews the user(s).

capabilities of MMS with annotations in a speech bubble style, comic-style icons and other accessories (see Figure 1). The messages were sent as standard MMS.

7 high school students participated in the field trial for 8 weeks. Their MMS communication was logged with ContextLogger [10] and transmitted to a server. Researchers could view the messages and have bi-weekly interviews individually with each user (see Figure 2). Interview questions were prepared based on the logged messaging content.

Currently, the interviews and the logged content are being analyzed qualitatively, starting with open coding and being sensitive to situational factors. The study will continue with temporal analysis to understand and describe patterns of use in the level of individual users and their potential influences on each other.

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