Values Levers in Design

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Abstract
This position paper summarizes findings from an ethnographic study of an engineering laboratory that built software to track users' locations, habits, and behaviors using mobile phones. This design work raised a number of ethical and human values challenges, particularly in the areas of data use and surveillance. The study suggested activities within design that help engineers discuss and agree upon particular human values. It characterizes these activities as *values levers*: practices that open new conversations about social values, and encourage consensus around those values as design criteria. Laboratory leaders and advocates within design can enable and strengthen these levers to encourage social values as an explicit part of design practice.

Keywords
Values in design, ethics, ethnography of design, critical technical practice

ACM Classification Keywords
K.7.4 Professional Ethics

General Terms
Design, Human Factors.

Introduction

Cross-disciplinary investigations into the politics of information technologies, including the social values embedded in those technologies, are appearing in engineering ethics [5], values-sensitive design [3], critical technical practice [1], and values in design [4]. This position paper bridges these fields with HCI by investigating how politics are inscribed in technologies at the point of design. It draws upon three years of work as an ethnographer within a computer science laboratory: the Center for Embedded Networked Sensing (CENS), a science and technology research center based at the University of California, Los Angeles (UCLA). It draws upon interviews, document analysis, and participant observation to describe how values intersected with design work in this lab.

CENS designers were engaged in projects to collect new kinds of data about people, using an increasingly pervasive technology: the mobile phone. Widespread data collection using phones as sensors is referred to as *participatory* or *urban sensing* [2]. To undertake this new kind of data collection, participatory sensing laboratories collect very granular and sometimes sensitive personal data, including location, health information, habits, behaviors, and routines. This study investigated how social values such as privacy, consent, equity and forgetting, were raised as topics in design and transformed into concrete technological features. This process relied upon *values levers*: practices that pried open discussions about values in design and helped the team build consensus around social values as design criteria.

Values Levers: Surfacing Social Values

Coding ethnographic data from the CENS lab revealed that values tended to surface during a variety of design activities. These activities, which I have called values levers, raised new conversations about ethics and values. Four design practices in particular – 1) participating in prototype testing, 2) participating in interdisciplinary teams, 3) internalizing advocacy from a team member dedicated to values issues, and 4) gaining funding – proved effective at surfacing, generating consensus around, and encouraging technological features based on, social values. One other lever, navigating institutional ethical mandates (enforced at UCLA by the Institutional Review Board) holds promise, but needs adjustment to be a truly powerful values lever.

Participating in prototype testing

The common HCI design practice of internal prototype testing impacted designers' consideration of social values. Lab members reported discovering privacy, consent and equity concerns while testing prototypes of their applications and those of their colleagues. Prototype testing fostered a focus on personal data that was distinctive within the design process. When CENS students ran their colleagues' location-tracking programs over the weekend, or answered sensitive survey questions, they gained new respect for privacy and equity as design criteria. A practice meant to check new products for usability and bugs had the unanticipated result of making values personal, and encouraging researchers to reflect on the sensitivity of the data in their systems.

Participating in interdisciplinary teams
Working alongside colleagues from other disciplines was another design practice that encouraged a focus on personal data, leading to discussions of privacy, consent, equity and forgetting. The majority of CENS participatory sensing designers had undergraduate degrees in computer science (CS) or electrical engineering (EE). However, a small but vocal number of the design team hailed from statistics, design/media arts, and information studies. Statisticians, for example, attended weekly meetings and were a regular part of design. Statisticians' comments and interests during design meetings frequently referred designers back to issues inherent in the data. This refocusing on project data allowed for not only statistical discussions, but also ethical debate about data representation, sharing, and security. The unusually interdisciplinary nature of CENS design positioned the data collected by participatory sensing as a bridge between computer science, statistics, design/media arts, and information studies. Being forced to talk across disciplinary boundaries helped the design team articulate social values of importance.

Internalizing team member advocacy
I was hired by CENS to consider values issues in design, and my resulting engagement served as a values lever. I raised issues of privacy, consent, equity and forgetting in group meetings, where the large, interdisciplinary groups meant systems were discussed at the relatively high level. I also worked with students one-on-one to wrestle with system implementations. My presence seemed to normalize the discussion of anti-surveillance values, but it also helped move responsibility for those design decisions away from engineers. Further longitudinal study will be necessary to determine if CENS designers engage anti-surveillance values in future research.

Gaining funding
Resources and funding were also values levers. Larger, better funded projects had correspondingly large development teams, requiring weekly meetings and clear lines of communication. Anti-surveillance values tended to come up in these meetings, due to a variety of factors. CENS leaders were often in these meetings, as was I. In addition, the discussions fostered by a larger group of people tended to reveal social worries and opinions, which could then be articulated as design concerns. This contrasted with smaller projects, which had little or no initial funding and only two or three students focused on development part-time. Design meetings for these projects were informal, and leaders and team members communicated about these projects largely over email. These less complex systems were perceived to need less planning in advance. Fewer ethical concerns surfaced in the discussions of the small working teams.

Navigating institutional mandates
CENS designers were also influenced by actors farther from design, including UCLA's Internal Review Board (IRB): administrators tasked with overseeing the responsible conduct of research at UCLA. CENS leaders were proactive about approaching the IRB. The IRB was, in turn, flexible and accommodating of CENS timelines and internal procedures. But though it was an infrequent requirement, designers considered seeking IRB approval to be undesirable or even painful, because it required paperwork, could take quite a bit of time, and therefore slowed down the pace of testing and implementation. The focus on paperwork made IRB

discussions into administrative tasks, rather than central to design decision-making. The IRB served as a hurdle to be cleared, and students offloaded much of the required writing to a staff member hired to interface with the IRB. In this way, the IRB functioned very differently than other values levers, which brought values discussions into design meetings. It is unclear how much impact this lever had on design. The combination of outsider status and perceived lack of understanding frustrated the IRB's effectiveness.

Future Work

The concept of values levers suggests that the daily mechanisms of design practice are important to encouraging discussion of, and consensus on, human values. The levers found in design at CENS now need comparison and evaluation in other design settings. I have begun a new project to validate, extend, and challenge these levers in a multi-laboratory project focused on networking and internet architecture.

Citations

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Conclusion

This study asked what factors encourage engineers – consciously or not – to prioritize human values in their work. This study illustrates that the routinized practices of design work shape these choices and priorities, and therefore the values incorporated into new technologies. These findings contrast to current approaches to building values into design, which focus on classroom education for engineers, or bringing outside ethics experts onto design teams. While both of these approaches are complimentary to this work, this study suggests that a method for fostering social values within design is to pay attention to the structure of design labs. Laboratory practices can create values levers. By encouraging these levers, we can encourage attention to human values within design.

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