Sustainable HCI Meets Third Wave HCI: 4 Themes

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Introduction

It is widely acknowledged by scientists and, increasingly, the broader public that our way of living is leading to serious environmental problems. Engineers have recognized the necessity to consider environmental sustainability in technology design, leading to the development of alternative power sources, bio-degradable and low-energy products, and other forms of 'green' technologies. But the environmental crisis is as much a cultural problem as a technical one. As Cronon has documented, attitudes and values in American culture that have been implicated in environmental problems - such as use of natural resources as though they are never-ending, a view of nature as a storehouse of commodities to be extracted for human use, and the belief that nature can and should be controlled and tamed in a civilized nation - predate the Industrial Revolution [6]. While advances in technology have accelerated the rate at which we can alter the environment, environmental problems are just as rooted in the cultural attitudes, beliefs, values, and habits which influence technology's design and use. As Stegall has argued, “An axe... can easily be made from recycled steel, but it will still have a negative environmental impact if used to clear-cut a forest” [27, p. 56].

Technology is therefore neither simply a cause of environmental damage, nor a straightforward solution to environmental problems, but a bearer of a complex set of cultural values that help shape our society's relationship to the environment. Fully addressing environmental sustainability will likely require not only engineering advances to improve technology's material impact but also technology design practices addressing the complex cultural, social, and lifestyle factors implicated in technology use and its effects.

In this paper, we explore how to orient such a technocultural approach to sustainable HCI by drawing on third-wave HCI [4], a recent movement in HCI to design for complex, difficult to formalize, lived experiences, integrating technology design with social and cultural analysis. This movement, also termed third-paradigm [16] or experience-focused HCI [18], has several key characteristics. First, interaction in context is seen as the key locus of meaning making [9]. This dictates that interventions will be designed for and evaluated in specific, local contexts. Second, third wave HCI emphasizes the intermingling of newly designed systems with existing systems and practices [4]. Any designs created, for example, are evaluated not as stand alone systems but in a wider context of use, including sociocultural dimensions. Third, this movement in HCI shifts away from positioning human-computer interaction as a task-oriented information exchange to be optimized towards a holistic understanding of users as thinking, feeling, sensing, and relating [e.g. 22]. Finally, third wave HCI raises critical questions about whether and to what extent designers can and should control users' experiences, issues involving dimensions of politics and values [13,26]. Here, we present 4 themes from third-wave HCI which provide handholds for how to approach sustainable HCI technoculturally.

1. Reflect on sociocultural contexts

Third-wave HCI analyzes and designs systems with respect to complex sociocultural contexts, a stance that may be particularly appropriate to handle the systemic nature of environmental problems. It suggests that common eco-IT designs such as counters for measuring carbon impact may be inadequate if they function at the level of implying individuals are personally responsible for large-scale environmental problems rather than also taking into account the complex sociocultural factors such as infrastructure and social and economic requirements that simultaneously condition our environmental behavior. A third-wave approach to sustainable HCI suggests that we should **encourage reflection by both users and designers not just on solutions at an individual or technological level but also on the bigger cultural drivers of environmental problems.**

In the process, along the lines of McDonough and Braungart's argument that environmental awareness should lead not to a simple abandonment of industry as cause of environmental damage but to a refiguration of the relationship between environment and industry [23], we need to recognize that technology and technology design practices may be simultaneously part of the problem and part of the solution. As Blevis et al. have argued [3] in line with considerations in eco-design [14, 27,28], we need to analyze the values typical technology design practices implicitly promote and to consider the need for changes not just at the level of technology solutions but at the level of the overall methodologies and orientations of our field. This builds on Stegall's argument that sustainable design requires attention to the "artifact rhetoric" by which designs tacitly promote potentially unsustainable values and a design process focused on promoting environmentally positive action [27]. It extends it by recognizing that the values designers intend to build into products are not necessarily those which users find, requiring not just positive design intent but also user studies of how technologies are appropriated [24].

2. Act locally

Third-wave HCI concerns itself with cultural and values issues around technology in the local, situated contexts of everyday life in which those issues are enacted on a day-by-day basis [e.g. 2,10, 25]. This approach may form a useful lens for environmental problems, whose pervasive scale can lead to a sense of paralysis for users and designers alike, but which is enacted and therefore potentially alterable at a human scale of life. Micro-decisions we all make on a day-to-day level, influenced by an array of cultural forces - which products to buy, whether to drive our cars, which electrical appliances to use and how - add up to environmental problems down the road in ways we did not necessarily anticipate at the time. This suggests that there could be value in IT applications that **deal with environmental issues at an everyday, personally meaningful level** where they could make a difference in these micro-decisions. Although this may appear to contradict our prior criticism of individualizing environmental issues, the point here is to design for localized everyday experiences with an eye to illuminating more systemic issues at a manageable and personally meaningful level - or to put it in environmental terms, "think globally, act locally."

3. Stay open to interpretation

One of the prime characteristics of third-wave HCI is a shift from a model of designer-as-expert and technology-as-arbiter-of-use to opening up spaces for multiple interpretations, allowing users to appropriate technologies and information in ways that make sense to them in local contexts [1,15,20,26]. In the environmental domain, this would correspond to a shift from relying on experts to tell us a single truth about the environment to

encouraging people to make their own decisions about how to value and balance the many conflicting factors involved with environmental issues. As Edwards has argued [11], a belief that science provides single, determinant truths has led to the serious misunderstanding in public discussion of global climate change that policy action could and should wait for a final, authoritative answer from the experts. Edwards argues that this must be replaced with the realization that scientific experts provide extremely useful but somewhat conflicting information and models about the environment which all of us in a democratic society must evaluate and debate to derive both personal and policy decisions.

The resulting emphasis on experts, individuals, and communities engaging in debate and discussion about how environmental data ties to HCI projects exploring community engagement [e.g. 5,7,8, 17,21]. It suggests a move in third-wave approaches to the environment from a model of IT artifacts as communicating a single objective truth about the environment or environmental behavior to using subjective and objective data as instigators for open-ended personal and community interpretation and discussion, in the process allowing for information to be made personally meaningful in the context of people's everyday lives, their own experiences and values. This orientation that, in the end, it is up to the end-users to develop their own stance on the issues raised differentiates such work from environmental technology whose primary aim is to persuade users to hold a particular stance [12].

4. Break out of moralism

Perhaps the most defining characteristic of third-wave HCI is a shift from a task orientation to a concern with increasing the quality of everyday experiences that occur around technologies. A common reaction to raising awareness of environmental problems and their connections to our everyday American lifestyle is an experience of guilt, which is both unpleasant and somewhat counterproductive to positive environmental action [19]. Instead, third-wave HCI suggests a need to **support engagement with the environment through enchantment and personal interest, rather than through guilt**. The goal becomes simultaneously to support positive experiences and to create a more effective motivator for environmentally positive behavior.

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