
Sustainable HCI and Reflective Practice: Making space for sustainability in research design

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Abstract

In this paper we propose reflective practice for sustainable HCI researchers be explicitly integrated into research activities and publication practice. We describe three possible contexts into which reflection could be introduced, and explore how one might examine SHCI research practices.

Author Keywords

Sustainable HCI; Reflective Practice; Research Ethics;

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

In the design of HCI research, sustainability is often overlooked at the level of the study design, including the researcher's practices and the participant protocols. While it is both reasonable and expected that the majority of HCI researchers might not be concerned with the sustainability of their research practices, there is often a striking discontinuity between those who identify their work under the sustainability umbrella and their research practices. We believe that by explicitly communicating the reflective practices our varied research entails, myriad improvements will emerge that bring us closer to the goals articulated in Silberman et al.'s *Next Steps for Sustainable HCI* [7]. Two possible avenues for encouraging this practice include amending local IRB processes to include a disclosure of sustainable practices and amending publication practices within our personal work, to suggest reflection and include a sustainability self-

assessment of a study's design across a relevant axis. These might include a personal water use report for the researchers conducting a study on a water-reduction persuasive app for the duration of the study, or disclosure of the full net-zero carbon offset method for the research study undertaken, or the ways in which researchers are managing greater wellbeing ratios for the unpaid research assistants during the study, or the impact of the research design on increasingly sustainable labor practices.

Our work is grounded in a perspective introduced by Silberman et al. [7] in their article outlining challenges for sustainable HCI. They argue that SCHI research needs to incorporate sustainability goals on a project-by-project basis, and that researchers need to draw on relevant community specific natural and social science research when designing and evaluating projects. [7] This might mean incorporating sustainable practices into the project's material and technological aspects, or could entail researchers carefully consider their impact on the local community, the health and welfare of research collaborators, advisors, unpaid research assistants, study participants, and paid contractors.

Silberman et al. draw our attention to an aspect of HCI research not traditionally considered within the umbrella of sustainability: labor practices. Much large scale HCI research involves large and varied human populations (ie. contributors, participants). These populations often volunteer time, effort, and energy to the cause of our research disproportionately to the compensation they can expect to receive. An extreme version is advocated by Egelman et al who frame Amazon's Mechanical Turk as a resource for micro-engagement in HCI research design. [4] While the

methods are described in this study as cost effective [58 participants paid an average of \$0.18 cents (USD) for their contributions]. We contend that when the population is scoped to include all potential research study participants, it comes at the cost of the broader health of the research labor pool by framing participants in a study as an infinitely disposable resource.

Workforce exploitation is very much a subject for sustainable HCI research, and one that has received relatively little attention within the field. For this reason, one of the first possible sites for intervention we considered was the IRB process, which is charged with the protection of human subjects in university research. We contend that including self-assessment reflections questions to the local IRB study submission process could address net material use, and material and labor practices. Questions could include: What model of sustainability is applicable in this study? How does this study rate within your model? Would participants 'do it over' after participating? After the study would participants be willing to take part in a future study by other researchers?

By applying sustainability by and through design [5] to ourselves as researchers, and reflecting on our sustainability identities, representations and narratives on a project-by-project basis we can more holistically embody sustainability. And as Elina Eriksson pointed out in 2014 "*We want to change things for real, not just write papers*"[3]. We contend that explicit local reflection around a project through the inclusion of a sustainability self-assessment could result in improved sustainability outcomes without limiting the diversity of applicable sustainability models within research groups.

Mazini's Organizing Concepts

1. 'The attitudes towards "care" (the care of what has to be done to get a result in a sustainable way) and toward the "user empowerment" (the way in which technology helps users in taking care of the process).

2. The attitudes towards the "social relationships" (the kind of relationships that has to exist to get that result) and towards the "community empowering potential" of the implied technological and organisational systems (the way in which these systems facilitate the development of collective actions).'

Figure 1: From Mazini's *Scenarios of sustainable wellbeing* [7]

Possible Axes for Self-Assessment

SHCI researchers might consider a range of practices within their self-reflection, including but not limited to:

Labor Axes – ethics and/or well being

Amy Bruckman explores ethical human participation in HCI in her chapter "Research Ethics in HCI" where she greatly expands the Belmont Report's human participation principle to "Treat people as ends in themselves, not an means to an end." [3] We consider ethical interaction as one possible interpretation of sustainable human interaction. While the depth of reflection Bruckman invites may be more overhead than some researchers are able to devote to improving the sustainability of their human participant practices, her assumption that human resources warrant more nuanced consideration within HCI suggests they can be better sustained with more ethical practices.

Wellbeing is another possible metric applied to all the humans in a given project, direct and indirect stakeholders and their relationships. During this year's SCHI workshop we hope to consider a mashup of Mazini's wellbeing concepts [6](Figure 1) and HCI's Participatory Action Research methods to create a simple human interaction rubric for reflection similar to Eli Blevis's more materially focused rubric [2].

Material Axes

Environmental sustainability metrics are noted in popular culture through many parts of the world with carbon footprint and water consumption calculators widely available. In the US post-consumer recycled paper content is often printed on cardboard boxes and paper for printers and copy machines. Many institutions in the US now report on landfill diversion rates for solid

material. UC Irvine for example is remarkable in the US in it's current 83% diversion rate for the entirety of it's campus.[8] In Denmark, the Lego corporation has a substantive R&D program targeting the total replacement of fossil fuel plastics with a renewable material. For SCHI, materiality is succinctly framed for HCI researchers in Eli Blevis' rubric thoughtfully arranged by potential magnitude of impact. [2] See Figure 2.

Energy Axes

While not as varied as material sustainability, energy practices, from use to sourcing, are widely available. In the US local power companies maintain renewable generation details on publicly available websites. For example, our local utility utilized a bit more than 20% renewable sources as of 2014. [9] Considerations within the HCI context can be found in metrics like CPU demands via Green Tracker.[1]

Challenges and Discussion

In this paper we have argued that it is important for SHCI researchers to "walk-the-walk", as it were, by highlighting the potential environmental and ethical impacts of our research designs. We have proposed two possible contexts where reflective practice might be employed to increase researcher awareness and accountability around these issues, and we have suggested several areas where researchers might take a closer look at their own work. In writing this, we have become aware of one clear complication to this idea that we believe warrants discussion. Increased accountability is rarely a popular suggestion and has often been responsible for increased community conflict. Interventions aren't free – they come with a front loaded cost to people's time and productivity, and

1. **Disposal:** disposal of physical material.
2. **Salvage:** the recovery of previously discarded physical material.
3. **Recycling:** recycled physical materials or provide for the future recycling of physical materials.
4. **Remanufacturing for Reuse:** renewal of physical material for reuse or updated use.
5. **Reuse as is:** transfer of ownership.
6. **Achieving longevity of use:** long term use of physical materials by a single owner without transfer of ownership.
7. **Sharing for maximal use:** use of physical materials by many people as a construct of dynamic ownership.
8. **Achieving heirloom status:** preservation such that transfer of ownership preserves quality of experience.
9. **Finding wholesome alternatives to use:** the use of physical resources, while still preserving or even ameliorating qualities of life in a manner that is sensitive to and scaffolds human motivations and desires.
10. **Active repair of misuse:** repairing the harmful effects of unsustainable use, substituting sustainable use in its place. [2]

Figure 2: Blevis' 2007 rubric [2]

can conceivably stall or even halt research before it gets started. Additionally, locating our primary intervention in the IRB process both complicates an already bloated process and excludes non IRB research contexts. We must ask a few questions about whether efforts to increase sustainability and accountability are *themselves* sustainable. How do the benefits of additional oversight weigh against the costs of new bureaucracy? Are these added oversights themselves a sustainable practice? Further, if we confront bureaucratic overhead as a significant source of waste within the current academic system (and it often seems that the costs of oversight meaningfully outweigh their benefits) then can we, in good faith, argue for additional oversight in the face of a problem like sustainability in research design? As we move to put well-intentioned systems into practice, have we considered the full implications of those systems?

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Self-Assessment

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