

---

# Rethinking and Envisioning Sustainable HCI and the Role of Interaction Design

**Sabrina Hauser**

School of Interactive Arts &  
Technology  
Simon Fraser University  
British Columbia, Canada  
shauser@sfu.ca

**Audrey Desjardins**

School of Interactive Arts &  
Technology  
Simon Fraser University  
British Columbia, Canada  
adesjard@sfu.ca

**Ron Wakkary**

School of Interactive Arts &  
Technology  
Simon Fraser University  
British Columbia, Canada  
rwakkary@sfu.ca

**Abstract**

In this position paper we present our perspective on future developments in sustainable HCI, how our own research projects inform our viewpoints and how this relates to the agenda of the CHI 2013 workshop on 'Post-Sustainability'. Our research focuses on finding ways to envision a more sustainable future, on clarifying the role of interaction design and HCI in this sustainable future.

**Author Keywords**

Sustainability; Sustainable HCI; Sustainable Interaction Design; Design Activism; Economic and Social Sustainability; Design Fiction; Envisioning; Practice Theory.

**Our position**

We think that sustainability encompasses the three spheres of environmental, social and economic sustainability. It is clear to us that sustainability in HCI and interaction design is already more than persuasion and awareness projects [8]. Through the different projects presented in this paper, we propose that designers and researchers need to rethink values, directions and positions with regards to sustainable HCI. We are at a point where we need to reflect on the

---

Copyright is held by the author/owner(s).

CHI'13, April 27 – May 2, 2013, Paris, France.

ACM 978-1-XXXX-XXXX-X/XX/XX.

past, the future and what our roles are. We believe that designers have the potential and the ability to envision and help others to envision what our sustainable future can be. Designers and researchers can become activists and work towards a more sustainable future. Lastly, we see a potential in exploring the design of interactive technologies in challenging environments offering insight into design for collapse situations.

### **Reflecting on the meaning of sustainable HCI and the role of designers as activists**

In two of our research projects, we observed the need for a re-evaluation of values and directions in sustainable HCI.

#### *Socially and Economically Unsustainable HCI*

In an ongoing research project we are looking at HCI literature, investigating and reflecting upon the values of sustainable HCI. We are currently examining the gap of research addressing social and economic aspects of sustainability [6]. Research in sustainable HCI has mainly been focusing environmental aspects of sustainability, leaving out two of the three equally important pillars of sustainable developments [7]. We started articulating suggestions for future directions of sustainable HCI, including potential new research agendas and new approaches for future developments. A discussion on a research agenda on social sustainability has recently been started in the CHI community [1], however there is a lack of addressing economic sustainability in HCI research. As another direction, we introduce an approach for future HCI research informed by sustainable visions of key stakeholders. For example, Charles Eisenstein envisions a new more sustainable economy [4] that could guide sustainable HCI projects.

In this paper, we support the idea that researchers have to evaluate current values in sustainable HCI and discuss the future of our research agendas, only maintaining the need for a workshop on 'post-sustainability'.

#### *Design Activism*

Although design activism has been practiced in HCI, the field has not been well discussed or articulated. In HCI, as a research field that strongly incorporates design and sustainability, this can be seen as a lack. We have looked at design activism in the classroom to illustrate themes and observations for an articulation and practice of design activism in future research in HCI and in HCI education [5].

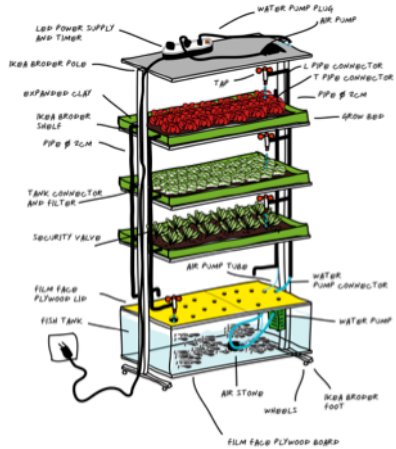
Design is a key factor, when thinking about fields such as sustainable futures and innovation. Activism is a key factor when thinking about encouraging and promoting change and action. Design activism, combining those two key factors, will play a major role in future developments and should therefore be included in discussion about the future of sustainable HCI ('post-sustainability').

### **Envisioning a more sustainable future**

We work on several projects that aim to reflect on what a sustainable future can be and how to envision this future.

#### *Design Fictions, SID and Sustainable Practices*

In order to inform sustainable interaction design, we have looked at environmentally sustainable practices of everyday people who are engaged in either repair or green DIY (do-it-yourself) through a lens informed by practice theory [8]. We studied how the aspects of



**Figure 1** A designer's translation of a hydroponic system created with accessible materials and presented with clear graphics for everyday people.

meaning (aspirations, goals and motivations of practitioners), materials (tools and objects) and competences (skills and know-how) are interrelated in the green practices of each group. In different practices, different aspects can take a leading role shaping the composition and direction of that practice. For example, in everyday repair, simple, tacit, everyday competences, like bending or tying, were found to influence how people define what is repairable and what is not. In green DIY, the aspiration of being sustainable overpowers challenges in finding materials and learning skills. We further investigated the role of design fiction and envisioning within those existing practices. We found that amateurs are inspired by visions of the future they come across. We see the possibility for interaction designers to become co-designers with enthusiasts, in the creation of future visions (for example, see figure 1). Rooted in observations of existing green practices, this research presents a new practice-oriented approach in SID and explores the use of design fictions. It highlights communities of makers that share projects and ideas online, which demonstrates creativity, adaptation and transformation of systems and objects, and a potential for resilience. By investigating these practices, we can shape how we create visions of a sustainable future.

#### *Envisioning a Sustainable Campus*

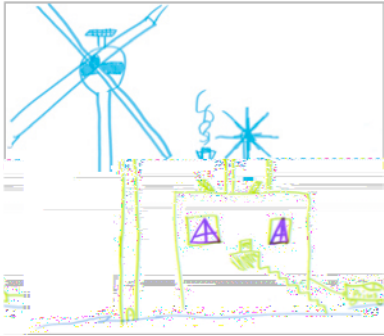
During the semesters of Fall 2012 and Spring 2013, as participant observers, two of the authors are attending an interdisciplinary, experiential, senior undergraduate class called *Change Lab*. The focus of this class is to help students in their development towards becoming change agents in the field of sustainability [2]. Team projects are implemented in the second semester with the goal of finding sustainable solutions to challenges

observed on the campuses of Simon Fraser University, a major university in BC, Canada.

The team of four we (two of the authors) are part of aims at creating visions of a future sustainable campus. The goal is to project ourselves in 50 to 100 years and imagine how the three spheres of sustainability could be intertwined. We are looking at aspects of transportation, energy use and production, the curriculum, economic alternatives such as a campus currency, and the social life on campus. The goal of the project is to show the community and the decision-makers of the university what a sustainable future could look like and enable them to take actions today or at least reflect on current and future developments. This project allows the creation of a positive and optimistic view of what the future can be in sustainable terms and steps away from the doom and gloom discourses so often related to the future and sustainability.

#### *How Do Children Envision Sustainable Homes?*

This research project aimed at understanding how children represent sustainability in the home [3]. As our research method, we asked children (9 to 13 years old) to draw the most sustainable house they can imagine. Through this visioning technique, we were able to see what children thought sustainability encompasses, and we were able to use the drawing as a starting point for further questions about their vision of sustainability. Beyond the immediate concern of children's perspectives on sustainability, the implicit value of this type of study on children's view is to catch a glimpse of the ongoing understanding and future emergence of the needs and desires of sustainable actions. The results show how the participants



**Figure 2** Technological approach to behavioral change for environmental sustainability



**Figure 3** Living like a caveman representing the natural approach to sustainable behavior.

understand sustainability and how they represent it as part of the social and evolutionary context of a house.

By doing this study with children we can further and deepen our understanding of sustainability. Most children drew much more than eco-efficient light bulbs and solar panels. Technological views of the future were present (for example figure 2), but pushed further with projects like the 'main switch button' that controls all electricity appliances in the house. Some children added a garden for locally produced food; others added bicycles for replacing cars; and some simply created a house that is remote from the city, where the shelter is made out of grass, heat comes from a fire and water from a waterfall (figure 3). As these examples show, children are aware of what sustainability is and their vision encompasses multifaceted, complex and diverse issues of contemporary living.

### HCI in challenging environments

We are also in the midst of starting a new research project about how to approach the design of interactive technologies for challenging environments. For example, pro skiers and snowboarders as well as recreationists use avalanche rescue technology (transceivers) while skiing or traveling in non-controlled areas outside of ski area resorts. These tools are used to locate other skiers if they are buried in an avalanche while skiing. The research we are conducting aims at evaluating the challenges of designing for these extreme, life-threatening and remote situations where cellphone reception and internet access are rarely available.

We see in this research a link to the 'IT in a Resource Constrained World' theme of the 'post-sustainability'

workshop. By understanding how technological tools are used and designed for challenging environments, we can use this knowledge to reflect on how we could or should design for changing and more threatening environments. Preliminary research has also indicated that rescue in avalanche terrain often brings out resourcefulness, adaptation and creativity in the users of technology, demonstrating that constrained and extreme conditions create a space for exploring various uses of the same products or technologies.

### Discussion

Based on the projects presented in this paper, we see multiple alignments with the four themes offered in the workshop on 'post-sustainability'. We are interested in discussing the possibilities and the need for opening our understanding of sustainability in HCI with other members of the community. With our views on sustainability, including the three pillars of social, economic and environmental aspects [7] and the role of designers and design activism, we want to promote reflection and evaluation of current values of sustainability in interaction design and HCI. Moreover, we present different approaches on envisioning, which is a crucial part of sustainable HCI.

With our previous experiences and our current research projects, we provide strong starting points for the diverse themes presented by the organizers of the 'post-sustainability' workshop.

### References

- [1] Busse, D., Blevis, E., Beckwith, R., Bardzell, S., Sengers, P., Tomlinson, B., Nathan, L. and Mann, S. Social sustainability: an HCI agenda. In *Proc. CHI EA 2012*. ACM Press, 1151-1154.

- [2] **Desjardins, A., Hauser, S.,** McRae, J.A., Ormond, C.G.A., Rogers, D. and Zandvliet, D.B. (2013). Harnessing youth activism with/in undergraduate education – Case study of the 'Change Lab'. In Mueller, M.P. & Tippins, D. (Eds.) *Ecojustice, citizen science and youth activism: Situated tensions for science education*. New York: Springer. (to appear).
- [3] **Desjardins, A. and Wakkary, R.** (2011) How Children Represent Sustainability in the Home. In *Proc IDC'11*, ACM Press, New York, NY, USA, 37-45.
- [4] Eisenstein, C. (2011). *Sacred Economics. Money, Gift & Society in the Age of Transition*. Evolver Editions.

- [5] **Hauser, S., Desjardins, A. and Wakkary, R.** (2013). Design Activism in the HCI Classroom. In *Proc. CHI EA 2013*. (to appear).
- [6] **Hauser, S., Wakkary, R.** and Schiphorst, T. (2013). Sustainable Enough? Initializing a Research Agenda including Economic & Social Aspects in Sustainable HCI. Submitted as a WIP to CHI'13.
- [7] United Nations. Resolution adopted by the General Assembly. 60/1. 2005 World Summit Outcome, (2005).
- [8] **Wakkary, R., Desjardins, A., Hauser, S.** and Maestri, L. (2013). A Sustainable Design Fiction: Green Practices. ACM TOCHI (To appear).