Critical Materiality: Creating Toolkits and Methods for Engaging Materiality in HCI

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Abstract

The miniaturization of electronic technologies, as well as advances in organic and material science, have contributed to the development of composite, smart, and computational materials that create promising narratives for the future of ubiquitous computing. The goal of this one-day studio is to develop tools to acquire a deeper conceptual and critical understanding of materiality in HCI. The studio will draw on strategies from a broad range of sources including critical making, speculative design, experiential prototyping, and indigenous ontologies, in order to map out key questions and concerns. The studio will give the participants the opportunity to discuss the concept of Critical Materiality as a framework for developing tangible, embedded, and embodied interfaces, by brainstorming narratives around the past lives, current uses, and the future imaginaries of materials. Participants will co-develop a shared vocabulary and theoretical framework for Critical Materiality as a strategy to be deployed in conceiving and implementing HCI artifacts and experiences. The studio will culminate in the design and production of a deck of cards that propose keywords, questions, concerns, and opportunities for Hybrid Materials within this Critical Materiality framework. The deck of cards will be made available during the conference and distributed online.

Author Keywords

Hybrid Materials; Materiality; Critical Frameworks; Design Toolkits; Design Methods

CCS Concepts

• Human-centered computing~Interaction design theory, concepts and paradigms   • Human-centered computing~Systems and tools for interaction design

Introduction

The past decade has generated a broad range of research that considers the materials of interaction as increasingly important to the field of HCI [14]. The miniaturization of electronic technologies, as well as advances in organic and material science, have contributed to the development of composite, smart, and computational materials that create promising narratives for the future of ubiquitous computing. The future vision of Hybrid Materials allows for truly seamless flow between physical and digital. Earlier work in transitive materials [7], programming materiality [6], organic user interfaces [7], and Radical Atoms [9] can benefit from approaches emanating from the fields of Critical Making [11], Material Studies [12], Critical Craft, and Art and Design, to allow space for critical thinking.

Building on previous work that considered "material studies in theorizing digital culture, in developing digital media and information technologies" [12], we propose the concept of Critical Materiality as a useful framework for mapping out this theoretical space. The goal of this one-day studio is to develop tools and strategies to acquire a deeper conceptual and critical understanding of materiality in HCI.

Studio Proposal

The Hybrid Material vision imagines that the very materials of our physical world can increasingly be augmented, mechanized, actuated, deformed, and animated, so as to fulfill the vision of a truly programmable material world. Our future materials and our material futures will be smart, active, responsive, and perhaps even disobedient [1]. The studio will give the participants the opportunity to discuss the concept of Critical Materiality as a framework for developing tangible, embedded, and embodied interfaces, by brainstorming narratives around the past lives, current uses, and the future imaginaries of materials.

Participants will co-develop a shared vocabulary and theoretical framework for "Critical Materiality" as a strategy to be deployed in conceiving and implementing HCI artifacts and experiences. The participants will begin by using some popular design method toolkits and card-decks as "objects to think with" [13] in exploring their own perceptions about the design process and the act of making. Toolkit examples include IDEO Method Cards, The Thing from the Future from Situationlab, Design with Intent by Dan Lockton, and Nesta's Designing for Public Service.

The participants will be provided with a number of suggested interrogative lenses to critique the toolkits with respect to themes and concepts such as material expressivity, ecological footprints, or indigenous ontologies. The goal of this inductive exercise is to identify opportunity spaces for expanding the perceived affordances of the toolkits and the activities and behaviors they support with respect to materials and materiality. The outcomes of this exercise will help direct the generative components of the studio, where

the convenors and participants will work on making their own individual and collective toolkits to fill the gaps identified earlier.

The studio structure involves brainstorming, sketching, hands-on experimentation, drawing, and collage as a means for the development of a deck of method cards. The studio participants will decide on 3 or 4 categories or themes and split into groups to develop them. The process will give the participants the opportunity to discuss the role of Critical Materiality as a framework for developing tangible embedded and embodied interfaces.

Theoretical Influences

Our workshop activities begin with a shared commitment to interrogate our materials as part of wider historical, political, and industrial forces— foregrounding legacies of practice and oppression that live in the shadows of industrial capitalism. These theoretical commitments take the form of analytic frameworks and methodological reworkings at the interface of HCI and critical technoscience [2, 3, 5]. Whether through disability activism [8, 10] or feminist theorizing [4], these literatures interrogate the micro interactions implicated in the macro worlds of financial capital, transactional politics, and care regimes. We explore the forms and interactions our materials produce as sites to not resolve or solve technological problems, but rather to complicate and extend our understanding of design's possibilities, foreclosures and consequences beyond the individual user or device-level engagement.

Studio Topics to be Covered

The studio will give the participants the opportunity to discuss the concept of Critical Materiality as a framework for developing tangible, embedded, and embodied interfaces, by brainstorming narratives around the past lives, current uses, and the future imaginaries of materials. Questions and topics to be covered include:

- Provenance of materials (ecological footprints, ethical considerations, cultural appropriation, decolonizing materials, etc…)
- Ways of describing materiality.
- The expressive qualities of materials.
- Indigenous Ontologies and how do materials become "animated"?
- Composite/Hybrid materials and Future Imaginaries.
- How do our ways of performing HCI perpetuate erasure?
- Materiality and embodiment.
- Sustainability and material practices.
- Political, historical, and social contexts of material practice.
- How do we animate materials as we use them, shape them, misuse them, and transform them?
- How can we embed critical thinking in working with the materials of interaction?

Studio Learning Goals/Discussion Objectives

Participants will co-develop a shared vocabulary and theoretical framework for "Critical Materiality" as a strategy to be deployed in conceiving and implementing HCI artifacts and experiences. The studio will culminate in the design and production of a deck of cards that

propose keywords, questions, issues, and opportunities for Hybrid Materials within this Critical Materiality framework. The deck of cards will be made available during the conference and distributed online on the studio website. Studio submissions will remain on the workshop site and shared with TEI attendees. The studio website will be maintained, allowing for participants to continue discussions and collaborations and support future research.

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