

Material Vision

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ABSTRACT

How do designers identify substances as materials to be worked into artifacts? Understanding how designer-material collaborations are instantiated, and the effect of those relations on design expression, helps us understand how artifacts come to be as they are. In the digital environment, the relationship between designer and material is complicated by the ambiguous, abstract nature of digital “substances.” This conceptual essay uses case studies from a design project to trace the role of community values in the materialization of a particular abstraction: a deliberate positioning of the designer’s situated viewpoint. By comparing cases where designers materialize a situated position within the resulting artifact and where designers do not do so, this essay illustrates how community values mediate designer-material collaborations. These case studies also demonstrate the effect of designer-material relations on design expression. The designs that materialize a position structure a more reciprocal, dialogic relationship between designer and user.

Author Keywords

materiality; critical design; metadata; values in design

ACM Classification Keywords

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

INTRODUCTION: MATERIAL VISION

Furniture designer David Pye asserts that the apparently natural characteristics that make English walnut a worthy design material are more accurately described as the result of human activities. To the untrained eye, walnut appears as “rubbish,” and, Pye continues, before the wood has been cut, processed, and finished, it *is* “rubbish.” Indeed, Pye elaborates, *all* “raw material” is rubbish:

Material in the raw is nothing much. Only worked material has quality, and pieces of worked material are made to show their quality by men. [30, p. 2]

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Although walnut as a substance is of course present in the world absent human intervention, the walnut used, and prized, by a cabinetmaker can be said to exist only as the result of sociomaterial processes. The character of walnut is shaped as designers and makers manipulate the wood, and through these actions learn to see walnut as “good material.” This ability to see material and its associated qualities—material vision—is enmeshed with histories of craft traditions. As generations of woodworkers have found means to make English walnut reveal itself as excellent material, emphasizing its distinctive grain and other qualities, so its material capacities are made apparent for future use by future woodworkers.

Proficiency within a craft tradition makes it easier to see certain substances as “good” materials, sharpening material vision. But experience can also make us myopic. The community values that focus our material vision can likewise make it difficult to see new or uncommon substances as design material, or to devise transformative actions that might reveal new forms of potential within these “raw” substances. A popular culture example demonstrates this situation.

Seeing unfamiliar substances as materials

The American television show *Chopped*, on the Food Network, is a competition in which chef competitors are provided with mystery baskets of ingredients that are not typically used together. Under a time limit, chefs create a dish using the materials in the basket. The goal is to make something new and wonderful out of uncommon substances with unfamiliar relations to each other—to see material differently in order to produce an innovative product. Both competitors and audience are primed to approach the mystery basket with this framing.

The most fiendish mystery items on *Chopped* are finished products in themselves: stuffed grape leaves in a can, an entire grasshopper pie from a bakery (a pie with a creamy mint filling and a chocolate crust). I remember the pie well, because although I am an avid home cook, I could not wrap my mind around the idea of an entire pie as an ingredient. I could not *see* the pie as *material*, and I could not articulate its qualities as such, even though making this connection is the show’s foundational premise. I was flabbergasted when the winner of the episode tossed the pie into a blender and made it into ice cream.

Despite my considerable cooking expertise, why couldn’t I see the pie as material? What was clouding my material

vision? *Tradition* played a role. My cooking practice focuses around the transformation of ingredients designated by community norms as *proper* raw materials. In actuality, many of these so-called raw ingredients (oil, vinegar, flour, spices, butter) are, just like the cabinetmakers' walnut, highly processed. Nonetheless, these processed ingredients are the proper raw materials of cooking. Because of my familiarity with this tradition, I can see, for example, the buttermilk in my refrigerator and envision the biscuits or muffins or pancakes that I might make with it. Buttermilk, like walnut, is a design material, and I see it that way despite (or, more accurately, because of) the processing that has gone into making it so. But the pie, as a "finished product," is not a clear member of the community-organized category of raw ingredients.

Seeing abstract materials

How do designers see materials and their qualities, enrolling them as collaborators in the making process? What directs and focuses our material vision? As the *Chopped* example shows, this is a complex situation, even with everyday, mundane activities like cooking, and with physical substances like pies as potential materials. Our understanding of digital materials is comparatively unsettled. Although digital artifacts do have a physical presence as electrical signals, designers in HCI manipulate bits indirectly, working through many layers of interlocking abstractions [5]. As one example, if an interface designer is creating a pull-down menu for a traditional computer application, are the constituent materials the generic HCI constructs of menus and commands? Perhaps the materials are social abstractions—the tasks and actions that the menus and commands facilitate. Maybe the materials are the technical abstractions of data structures and algorithms to which the menus and commands provide input.

The example of creating a menu demonstrates how, in the digital environment, the idea of material is necessarily both fluid and abstract. But although the abstract, fluid nature of material is surfaced in the digital realm, material is a malleable concept in the physical world as well. One can, for example, productively think of tables being composed of surfaces (an abstract material) as well as thinking of tables being composed of walnut or oak (physical materials). If a cabinetmaker is thinking of table design as manipulating the qualities of surfaces, then the work process, the work product, and the designer's relationship with material may be different than if the cabinetmaker enacts design as manipulating the qualities of walnut.

The indeterminacy of material as an analytical construct is part of why it's useful and interesting for CSCW to consider how designers of digital artifacts come to see certain substances as proper materials. Understanding how, when, and to what effect a substance (even an abstract substance like a menu, a task, an algorithm, or a surface) functions as a design material helps us to understand the meshwork of relations in which digital artifacts come to be

as they are. Because the craft traditions of cabinetmakers emphasize certain qualities as being significant for furniture design, we employ certain materials more readily and create designs with those materials in mind. Tables made of bricks are unusual; tables made of walnut are not.

This paper examines the phenomenon of material vision by looking closely at contrasting cases from a design project where participants created speculative, critically focused designs. The foundational premise of the design project functioned similarly to the premise of the television show *Chopped*: designer participants were supposed to create provocative designs that challenged traditional conceptions.

Seeing a designer's situated position as abstract material

The unfamiliar material (the "pie in the blender") for the design project discussed in this paper was a particularly nebulous type of material abstraction: a deliberate positioning of the designer's situated viewpoint toward the artifact being created.

It probably seems strange to think of a situated position as a material, manipulated by a designer and embodied within a design. We are more likely to think of the designer's situated position as a mechanism for manipulating other materials. In presenting the idea of a deliberate positioning as material, I draw upon feminist philosopher of science Donna Haraway's articulation of situated knowledges [20]. Haraway argues that a universal position, or a "view from nowhere" obscures the conditions in which it arises, making its conclusions suspect. In contrast, Haraway asserts that valid knowledge is produced from a situated position, by an agent with a particular set of circumstances and motivations. A responsible knowledge producer must articulate that situated position and show how her observations are dependent upon a "view from somewhere." Haraway writes:

I am arguing for politics and epistemologies of location, positioning, and situating, where partiality and not universality is the condition of being heard to make rational knowledge claims. These are claims on people's lives. I am arguing for the view from a body, always a complex, contradictory, structuring, and structured body, versus the view from above, from nowhere, from simplicity.

In Haraway's text, the epistemological argument for situated knowledges is reinforced with a rhetorical strategy that clarifies Haraway's own situated position. Haraway doesn't just talk about the idea of situated knowledges: she embodies and enacts it—materializes it—through her text. Haraway shows the reader where she has traveled in coming to her current perspective. She shows the reader intellectually: Haraway takes us through evolving debates in the feminist philosophy of science and her own understanding of them. She shows the reader emotionally, by invoking the native American mythology of the coyote trickster to communicate the relationship that feminists

might negotiate with scientists. She shows the reader experientially, describing how she wondered about the world through her dogs' eyes, as she walked with them on the beach.

The case studies in this paper interrogate why few participants in the design study enacted a situated position like Haraway, although the design study presented a scenario, like the television show *Chopped*, that encouraged this form of materialization. The cases demonstrate how professional values associated with user-centered design and information access affected participant designers' material vision, much as my experience with cooking traditions made it difficult for me to see that pie as design material. Additionally, the case studies show how designs that enact a situated position exhibit different material qualities from designs that do not do so. While it might seem strange to consider deliberate positioning of the designer's situated viewpoint as a material, the designs that use it are demonstrably different from designs that don't.

This paper's contribution

In considering how an unusual form of abstraction such as a deliberately situated position can function as a design material, this paper contributes to our understanding of digital materials, how they come to be recognized as such and manipulated by designers, and the resulting effects of different designer-material relations upon the artifacts produced. The case studies demonstrate how designer-material relations are mediated by conflicts between values associated with the craft traditions that designers align themselves with and values associated with the situation designers are working within. Understanding how such designer-material collaborations are instantiated, and the effect of those relations on design expression, helps us to understand how artifacts come to be as they are. In the words of Daniela Rosner, investigations such as this one enable "us to recognize what might appear to be individual activity as constitutively collaborative, developing among materials, people, and workspaces" [33].

The specific example of a situated position as a material provides additional contributions. The values conflicts that complicate designers' materialization of their own positioning illustrate latent barriers to feminist HCI approaches. Moreover, this example promotes a new understanding of how designers negotiate their relationship to "data," a particularly salient topic as data collection, aggregation, and interpretation increasingly form the basis for software application design.

Although this paper explores these issues via discussion of empirical data, it is an essay, or argument paper, and not a traditional report of study findings. The design study that I introduce provides concrete, real examples to illustrate the conceptual discussion, but these examples are employed to develop an insightful conceptual argument, not to establish a scientific claim. By constructing a coherent account of the design cases, I suggest a way of understanding the

relationships between designers, community values, and materials that I suggest is productive for understanding other design situations in CSCW.

The paper proceeds as follows. First, I situate this project by reviewing work in digital materiality, values in design, and situated knowledges in CSCW. Next, I summarize the design project that serves as a case study for investigating these phenomena of material emergence. To return to the *Chopped* example, while all the participant designers made a dessert with their mystery baskets, only a few participants threw a pie in the blender. In the context of the design project, while all of the participants created "subjective" designs, only a few participants materialized their own situated position into their designs. Two sets of contrasting cases illustrate this distinction. I discuss how values associated with user-centered design practices for information systems, including notions of freedom from bias, contributed to the craft tradition that both enabled and constrained designers' abilities to identify, manipulate, and transform materials. Finally, I discuss the implications of these cases.

RELATED WORK

This section situates my argument by briefly summarizing related work in digital materiality, values in design, and situated knowledges in CSCW.

Digital materiality

CSCW has recognized the materiality of digital artifacts as an important consideration in understanding sociotechnical systems and practices. Digital materiality encompasses a wide range of complementary and intersecting perspectives on understanding and investigating the "thingness" of digital artifacts. One site of investigation focuses on the physical embodiment of digital media and the translation of logical formalisms into physical objects [5, 23]. Another involves the patterns of social activity that align themselves with particular material configurations, such as studies of mobile phone repairers in Bangladesh and studies of tinkering activities in repair clinics in California [21, 34].

Yet another perspective focuses on what digital humanist Johanna Drucker calls performative materiality, or how things come to be as they are manipulated in practice [11]. Redström suggests that designers can facilitate this "design after design," or emergence of properties and functions through use, by creating products that also function as flexible materials [32]. In a similar fashion, Paul Dourish, in conducting a material reading of relational and NoSQL database architectures, emphasizes "material properties as those aspects of the fabric of information systems that constrain, shape, guide, and resist patterns of engagement and use" [10]. While data objects stored in a NoSQL network structure with key-value attributes *can* be manipulated to sort in a manner similar to data objects stored according to the relational model, just as one *can* stain walnut black to appear like ebony, different data models emphasize different characteristics and associated

actions for application designers—just as, one might suggest, different artistic styles emphasize different characteristics and associated actions for cabinetmaking.

Rosner's ethnographic study of a bookbinding workshop illustrates the flow of relations between people, materials, and time as books are designed and made [33]. For the bookbinders, while their long experience informs how they see and can manipulate materials, these ongoing relationships evolve in each new project. The A. Telier group, along with Björgvinsson, Ehn, and Hillgren, have proposed that participatory design can be directed toward the production of "infrastructuring" for such continuous re-seeing, re-using, and re-making [3, 7]. Instead of orienting participatory design processes around the creation of an object (thing), [3, 9] suggest an older, Scandinavian sense of "thing" as a gathering place to resolve disputes. Design can produce not only object-things, but the infrastructure through which dialogue-things might be facilitated. LeDantec and DiSalvo use infrastructuring to describe how a set of design projects enabled groups of people to coalesce, and act, around common matters of concern [25]. Infrastructuring need not be restricted to activities that enable conversations between people, however; it can also be applied to situations that facilitate ongoing collaborative relationships between people and materials, or even between materials alone. Infrastructuring can shape an environment in which people might conduct ongoing dialogues with materials, performing the activities of "design after design" as conceived by Redström. In this paper, I draw from both performative materiality and infrastructuring perspectives to examine designer-material relations in the design case studies and explore how these relations lead to the emergence of different material qualities in the artifacts produced.

Values in design

Participatory design goals and processes are linked to a more general interest within CSCW regarding values in design. Value-sensitive design (VSD) is a methodology for examining how particular values are inscribed within sociotechnical assemblages [16]. VSD has helped researchers understand how, for example, configurations of public video cameras coupled with remote displays are perceived by different user groups, enabling the articulation of values at play in the system [16]. Value discovery extends the insights of VSD to emphasize how empirical probes can reveal local values present in sociotechnical contexts [25]. Through an ethnographic study of a research team working with participatory sensing technologies and mobile phones, Katie Shilton proposes "values levers," or specific activities to surface and generate conversation on social values in relation to technology design [37]. VSD, value discovery, and values levers are all mechanisms through which design teams can recognize and incorporate the role of social values into their processes and products. Although not addressed specifically within these frameworks, the situations described in such studies

demonstrate how the values associated with particular craft traditions suggest particular designer-material relations. For example, Shilton relates how participatory sensing researchers, as conditioned by typical practice in computer science, initially focused on abstract system components, such as algorithms, and not on qualities of the data (such as potentially sensitive personal information) being processed by the system. Put another way, the craft traditions of computer science encouraged the team to see their primary design materials as abstract algorithms, and not as the personal data being manipulated by these algorithms. In this paper, I explore how values associated with user-centered design and information access work against the materialization of subjectivity in the design case studies, even as the conceptual orientation of the project encouraged participants to enact a situated position in their designs.

Situated knowledges

In CSCW, Lucy Suchman's articulation of located accountabilities in technology production is directly inspired by Haraway's discussion of situated knowledges [39]. Suchman invokes Haraway to reflect upon her difficulties, as an anthropologist, in being asked to disconnect research findings from their contexts to provide generalized design advice. Suchman is particularly concerned with taking account of designers' own motivations when intervening in the work practices of others. In the context of technology production, Suchman characterizes the "view from somewhere" as

...identifying our participation in the various mediations that define the production and use of new technologies, and taking responsibility for them. [39, p. 26]

Moreover, this deliberate positioning should be reflected in the artifact itself:

At the same time that the technological project is one of freezing and objectifying human activities, it is one of animating and finding subjectivity in technical artifacts. [39, p. 22]

Suchman, like Haraway, makes the rhetorical expression of her own situated position an integral part of her text. To materialize her positioning, Suchman couples extended anecdotes of her research practice with brutally honest reflection to show the reader how she arrived at her current situated viewpoint. For a long time, Suchman writes, she thought her inability to provide design implications drawn from her work was due to her own inadequacy:

I dwelled uncomfortably for several years within this gap between my practice and that of my design co-workers, seeing it not as a systemic discontinuity but as a personal shortcoming. [39, p. 31]

This deliberate positioning of a situated viewpoint is not uncommon across a number of domains in modern scholarship. As with Haraway and Suchman, this orientation is frequently associated with feminist theory and

other conceptual approaches that seek to problematize the position of neutral objectivity in scientific and scholarly discourse [28]. Scholars aligned with critical race theory and queer theory, for example, also materialize their positioning as a means to situate and legitimate their perspectives [6, 35, 40]. Similar themes inform Shaowen Bardzell's proposal of pluralism and self-disclosure (amongst others) as qualities of feminist interaction [4]. As described in the following section, the design project from which the two case studies are drawn was likewise grounded in a conceptual framework that emphasized the materialization of situatedness as a feminist imperative.

THE DESIGN PROJECT

To explore the relationship between the values associated with professional craft traditions and perception of materials, this paper draws on case studies from a project where participants created speculative, critically focused designs. The design project forms an extreme, artificial situation—like the television show *Chopped*—against which the relationship between perception of materials, values, and design expression becomes exceptionally vivid and open to examination. The design project was not created for this purpose, however. As described in this section, it was only in reflecting upon the project findings retrospectively that I realized the study design *also* functioned similarly to the setup of *Chopped*.

Accordingly, this summary of the design project is targeted toward setting the context for this paper's arguments, and the project's initial motivations are kept to a minimum. I focus on how, although it was not created with these goals in mind, the design project was structured to inspire provocative uses of design materials—in particular, how it suggested the deliberate positioning of a situated viewpoint. [For a more complete discussion of the design project and its original goals, see 13, 14.]

Study design

The case studies are taken from two separate, sequential project episodes in which study participants responded to the same design situation. In each project episode, designer participants created digital video libraries to exploit the concept of residuality in information systems. Star and Bowker describe the state of being outside, in between, split among, or otherwise insufficiently categorized as being residual [38]. Traditional design practice for category systems operates as if the residual might be eliminated, even as classification researchers affirm that this is impossible [26]. Participants created designs to exploit residuality as a design resource, employing a form of critical design [12, 31, 36]. Project designs attempted to make the inherent ambiguity and insufficiency of category systems into a feature of the design, not a mistake.

To create their designs, participants altered separate copies of the same video library, which included 56 videos on the general theme of Sustainability. The original Sustainability library was created to align as closely as possible to

traditional design goals for descriptive metadata—to minimize the residual as much as possible. The project used Gary Geisler's Open Video Digital Library toolkit (OVDLT) as the design environment [18]. The OVDLT standardized interface features and visual design across projects. Participants created their designs solely by changing customizable metadata elements, such as titles and abstracts, browsing categories, and thematic playlists.

The design project constituted the focus of a graduate course in digital collection design. The first episode included 14 participants; the second episode included 12 participants. The selection of student designers as participants was strategic. The students invested 15 weeks of sustained intellectual engagement, including design work, extensive reading, and rigorous writing, into this project. Moreover, as graduate students, many had professional experience as designers, in fields including media design, taxonomy design, and HCI.

The course combined a design studio with a discussion seminar. Wide-ranging, interdisciplinary seminar readings, addressing themes in classification, design, HCI, and CSCW, prepared participants with deep conceptual background to inform their projects. (For an in-depth description of course details, see the online syllabus [15].) The class paired Star and Bowker's work on residuality with feminist theorist Gloria Anzaldúa's book *Borderlands*. Anzaldúa's notion of *mestiza* consciousness is a broader articulation of ideas related to residuality, and it is also related to situated knowledges (Haraway and Suchman both cite Anzaldúa).

In reading Anzaldúa, Star, and Bowker's work in each class, we paid particular attention to the deliberate positioning of a situated viewpoint within the text. In her book, Anzaldúa describes childhood memories, experiences of visionary, trance-like states, and wrenching feelings of dislocation, and her book includes an entire section of poetry. Star, meanwhile, describes her extended battle with chronic physical pain, along with her own visionary, trance-like states, which result in her carrying "pieces of writing" around in her pockets for days. Bowker relates a period of existential crisis. In each class, we discussed how these materializations of situated positions were not merely incidental stylistic choices but tightly integrated with the perspectives being advanced. There is no separate understanding of Anzaldúa's ideas apart from their embeddedness within her situated experience. Similarly to Haraway and Suchman, Anzaldúa needs to show how her ideas emerge from her own situated position as a lesbian feminist scholar and a Chicana from a family of agricultural workers in the Rio Grande valley of Texas—and from her identification with the Aztec goddess Coatlicue. Importantly, Anzaldúa materializes her positioning in a way that makes the shape of the text reinforce its meaning. *Borderlands* is mysterious, frustrating, and alienating. It includes large sections of untranslated Spanish dialect, it

switches from scholarly exegesis to poetry and dreams, it invokes goddesses. Reading it requires a particularly active mode of user engagement.

As further preparation for creating their own projects, students spent four weeks of the course discussing three sample designs that took different approaches to foregrounding the residual. In a culminating preparatory activity, participants wrote interpretive essays (approximately 3,000 words) about these samples. One of the three sample designs included deliberate positioning of a situated viewpoint; this sample used the video metadata to demonstrate the designer's ambiguous and conflicted understanding of the videos, as entwined within a personal narrative. Both classes noted this sample's use of similar rhetorical strategies to those enacted by Anzaldúa, Star, and Bowker.

For each of the two project episodes, study data included:

- Interpretive essays on the sample designs.
- Participants' designs, documented with a brief that explained how each OVDLT metadata element was used to accomplish design goals.
- Reflection essays (3,000 words), that examined the participants' design experience and their design projects in the context of exploiting residuality.

There was not a specific intention, in formulating the project episodes, that participants *should* materialize a situated position, and we were not trying to make this happen. The goal of the critical design project was to explore residuality, not to enact a situated position. Nonetheless, just like the show *Chopped*, the structure of the design scenario mandated that participants would use design materials in unconventional ways, to foreground, rather than minimize, residuality. But I only appreciated the strength of that alignment with the *Chopped* scenario later, as described in the following section.

Situating the case studies

After conducting the second project episode, I realized that very few participants had created designs that deliberately positioned the designer's situated viewpoint. Certainly participants across both episodes had adopted a subjective approach to their projects. They all created video collections that, because they emphasized indeterminacy and ambiguity, disclaimed a traditional objective stance on resource description. Most of the participants took one of two strategies for accomplishing this. The first strategy involved an omniscient "view from nowhere" that presented an unusual perspective without a sense of its source or motivation: for example, one design focused on where the videos came from (mostly northern California) while another surfaced smell and sound as distinguishing characteristics. The second strategy involved externalizing

the new perspective in the form of a fictional character or set of characters. One design featured thematic playlists in the perspective of a series of "types": hippie, hipster, researcher, and yuppie. Another design presented a dialogue between politically conservative and politically liberal voices, in conversation with the imagined voices of the video creators. In the second project episode, many participants didn't make up original characters but instead used a character based on some other text. One participant, for example, created a design based on Frank Herbert's *Dune* novels, and another created a medieval salvation narrative focused around the end of days.

Only three participants materialized the designer's situated position, following the strategies of Anzaldúa, Star, Bowker, and one of the three sample designs. These participants manipulated their situated position as a material in itself (like a slab of walnut). Participant P16's design, titled *Sustaining Something for Somebody*, illustrates what this means. *Sustaining Something for Somebody* revolved around P16's relationship between her past (as a member of a rural, conservative family) and present (as an urban, liberal information professional). P16 didn't just use a subjective approach to create metadata that adopted "someone's" perspective. Like Haraway, Suchman, and Anzaldúa, P16 used her personal narrative to convey the motivation behind her judgments for categorizing, describing, and grouping the videos in her collection, and to be accountable for those judgments. P16's collection was both overtly about herself and identified as such via such material expressions as first-person statements, stories, and even a family photograph. P16 was then able to use this materialized situated position as a means to explore issues of class, race, and location in sustainability.

But ultimately few designs across the episodes—only 3 out of 26, and none in the second episode—materialized a situated position into the resulting artifact. As I realized this, I also realized the extent to which the design project had reproduced a *Chopped*-type scenario. Given the design situation and its conceptual framing—a design project to envision materials (metadata elements) in new ways, and the centrality of situated positioning in both the conceptual source material and in one of the three examples systematically studied by all of the participants—upon reflection, it was quite strange that so few designers had incorporated their own positioning into their projects. Although we might not have intended to set up a *Chopped* sort of scenario, we had indeed done so. We had even given participants an explicit example of throwing the pie into the blender, as one of the three samples that all the participants had engaged with. (None of the samples adopted a view from "someone" with a fictional character; two had adopted the view from nowhere approach.) Moreover, we had systematically, in each class, articulated how, for Anzaldúa and Star and Bowker, materializing a situated position was

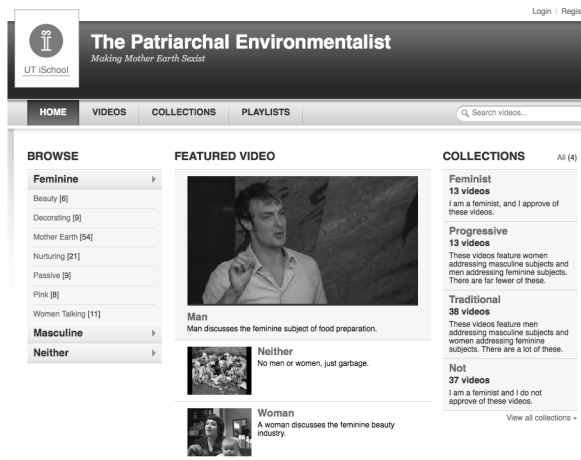
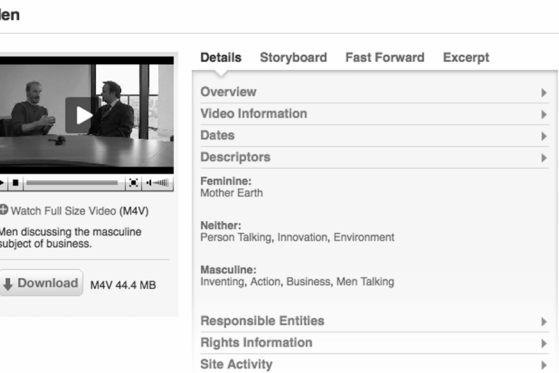


Figure 1: P11's The Patriarchal Environmentalist. The metadata record on the right shows P11's assessment of feminine, neutral (neither) and masculine themes in the videos. In this video, male speakers present primarily masculine topics.

a mechanism for enacting their theoretical commitments—the feminist commitments to situatedness and pluralism that the project goals of exploiting residuality were supposed to address. When I started thinking about the project like this, the outcomes seemed even more surprising. What was going on? The two case studies show my answer to this question.

It is important to note that I do not consider the absence of a situated position to constitute a deficiency of the project designs, and my goal is not to wonder why the project failed. Indeed, the project was quite successful in helping us think about our original motivating questions, and all the designs across the project episodes were equally productive from that standpoint. Nonetheless, something unanticipated seemed to be affecting designer-material relations—something unrelated to the original project goals.

In the next two sections, I describe two sets of contrasting cases from the project episodes that both illustrate and help to explain this puzzling situation. These two cases show how values associated with user-centered design practice of information systems interacted with participants' ability to see and manipulate a situated position as design material. The cases also illustrate the effect of a situated position on the resulting artifacts—an effect more closely involved with expression rather than function (in the case of this project, the difference manifests in how the designs make rhetorical arguments, but not in the substance of those arguments). Similarly, a table made of bricks functions like a table, just like a table made of walnut. Nonetheless, I suggest that this difference in expression structures a different kind of relationship between designer, user, and artifact. For the table example, we might position ourselves differently in our interactions with a brick table than with a walnut one—we might, for example, avoid accidental contact with the sharp edges of that brick table. The designs that incorporate a situated viewpoint, I propose, likewise structure a more active user position than the less accountable (but equally subjective) designs.



CASE 1: SIMILAR GOALS, DIFFERENT STRATEGIES

This case looks at two designs, one from each project episode, that had similar motivating goals—to note the predominance of men, and male discourse, in the sustainability videos. Both designers reflected extensively on the difficulties they experienced in attempting to express these judgments in their designs. Both designers initially adopted strategies that materialized a situated position. However, the designer in the second episode abandoned this strategy and created a character based on a secondary text instead.

Participant P11's design from the first project episode, The Patriarchal Environmentalist, examined whether the videos in the collection were feminine, masculine, or neither in their subject matter and rhetorical approach, and whether the primary speaker in the videos was male, female, or neither (Figure 1). P11 described her project goals this way:

The goal of the Patriarchal Environmentalist is to emphasize the binary nature of societies operating as a patriarchy... The videos in this collection began together because they are about sustainability. After viewing the videos, I began to notice that many of the videos featured women discussing traditionally feminine subjects such as beauty and fashion, and men discussing traditionally masculine subjects such as business and beer. My goal was to foreground this residual aspect of the collection by stripping away the original subject of the videos.

P11 enacted a situated position by materializing her judgments into the structure and content of the design, making this positioning a material that she manipulated along with the metadata titles and descriptors. One way enacting this situated position was through two playlists, titled Feminist and Not. P11 explains:

The Feminist playlist features the description "I am a feminist, and I approve these videos," and the Not playlist features the description "I am a feminist, and I do not approve these videos." The purpose of these playlists is to

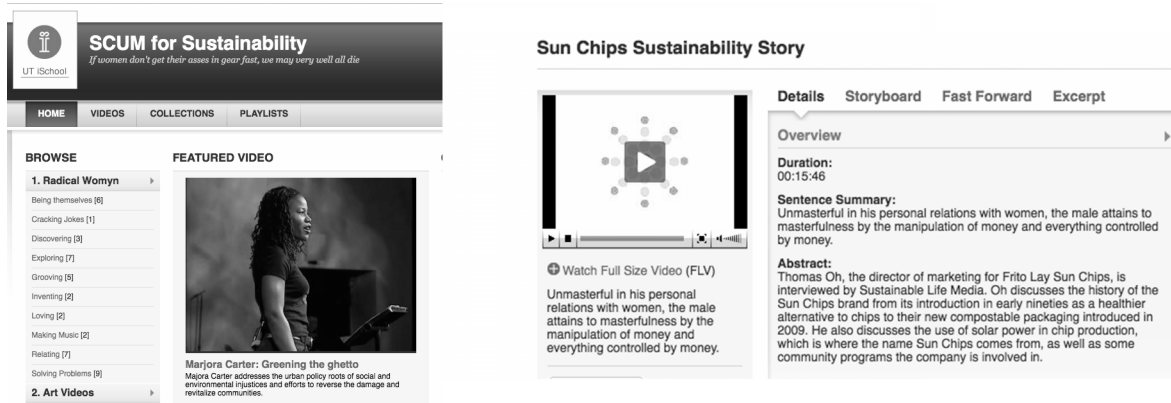


Figure 2: Case 1 design SCUM for Sustainability. In the voice of Valerie Solanas, videos featuring men are not given descriptors and have sentence summaries that illustrate the evils of patriarchy.

tell the user my identity as an author and reiterate that my personal opinion as a feminist was used to categorize these videos.

P11 initially had difficulties with her design because she kept seeing it with the material vision of traditional, user-centered information systems. P11 describes her early design attempts this way:

I spent many hours trying to rationalize all my choices in terms of the hypothetical user I was trying to address...it occurred to me that the best way to make my point was to simply name each video based on the gender of the primary actor on screen. However, I could not stop thinking that doing this would basically render the videos impossible to search for specifically...I spent hours looking at the collection and wondering how I could strip away everything that once defined it yet still feel comfortable about the outcome. I finally had to let go of all my conceptions about what a collection should be...

The key to this letting go, for P11, was materializing her situated position as the designer:

My lack of success made me realize that foregrounding the residual is a deeply personal endeavor that depends heavily on the goals of the author...in order to create a collection that foregrounds the residual effectively, the author must embrace their individual interpretation of what the residual is in the particular collection they approach...in the case of my collection...I tried to fully explain my purpose. In fact, if I had to name my collection's biggest failure, I think that its purpose could never be clear enough...

This is what Haraway is arguing for: a new form of understanding rooted in “location, positioning, and situating.” But in order to adjust her material vision, P11 had to explicitly reject conventional values of user-centered design for information systems.

In the second project episode, participant P25 initially had similar goals to P11: to emphasize the gendered nature of society by making determinations as to the predominant gender performance enacted in each video. However, P25

felt increasingly uncomfortable in materializing these judgments as descriptors in the design. In particular, P25 felt burdened by taking responsibility for a biased system, even though it was precisely this subjectivity in gender assignment that she intended her judgments to question. To P25, it felt especially problematic not to have the people in the videos “speak about their gender themselves.”

Freedom from bias is a pervasive value in user-centered design, and it holds an even stronger position for information studies [17, 27]. Intellectual freedom figures significantly in the code of ethics for the American Library Association (ALA), and an archivist’s objectivity is conceived as a means to historical truth [1, 19]. One way that this value is operationalized in the professional practice of librarians and archivists is to “let” resources “speak for themselves.” For example, Anglo-American cataloging rules dictate that description is transcription: that is, a book’s metadata mimics how it portrays itself on its title page [8]. Although P25 wanted to create a design that emphasized the situated nature of gender, the professional value of neutrality made it difficult for her to identify, manipulate, and integrate her own situated position, as the designer, into the project.

P25 abandoned her original plan and instead enacted a character-oriented strategy, adopting similar goals for content and argument but changing the means through which that argument was generated. P25’s ultimate design presented the sustainability videos as an extension of the Society for Cutting Up Men (SCUM) Manifesto written by radical 1970s feminist Valerie Solanas (Figure 2). (Solanas is probably best known as the woman who shot Andy Warhol.) P25 describes her approach this way:

Instead of using my voice as the authorial voice, I chose to take on the persona of Valerie Solanas...The SCUM Manifesto is brash, crude, and messy, and because of this, I was freed to make brash and crude selections when deciding who would be included in the female videos selected for browsing categories. While I was still making assumptions about the gender of the people in the videos, as

I did in my first attempt, assuming the role of Solanas gave me more agency to do so.... I felt relieved that I could point to Solanas as the voice of the transformation.

P25's experience was especially noteworthy because P25's essay about the sample designs focused on the one that materialized a situated position, noting its effectiveness. In referring to this sample, P25 remarked upon the situated position as a mechanism for both designer accountability and user empowerment:

It suddenly seems less important that the videos are easy to find, and more important to understand the perspective of the author when looking at the collection. The reader begins to be drawn into the narrative of the author's journey of making sense of the new cultural landscape that s/he has found him/herself in. It is through this juxtaposition that the residual is discovered.

As designs, the Patriarchal Environmentalist and SCUM for Sustainability are very similar in terms of *what* they mean: they present similar content and similar arguments about that content. They attempt to highlight residuality in similar ways, and in so doing, to demonstrate, through a feminist lens, the work of gender categories in a patriarchal society. Accordingly, they manipulate many of the metadata elements in similar ways, for example by providing a gender-based assessment of the primary actors in each video and by making judgments about a video's worth based on that assessment. However, the two designs differ in the expression of their arguments: in *how* they mean, and, accordingly, in the shape of the interactive experience that they structure. The Patriarchal Environmentalist, by materializing a situated position, reveals in P25's words, "the author's journey of making sense." By making the designer accountable for her judgments, this positioning sets up the possibility for more active user dialogue.

SCUM for Sustainability is also subjective, of course, but its subjectivity is indirect. P25 might be making the decisions, but the accountability for those decisions, and their rationale, is transferred to the character of Valerie Solanas—this is a variation of a view from nowhere. With the Patriarchal Environmentalist, the user engages with the designer's position directly. This engagement is indirect and muted in SCUM for Sustainability.

P25's view from nowhere structures a different relationship between designer, user, and artifact than P11's incorporation of a situated position into the metadata material. The judgments of "Valerie Solanas" in SCUM for Sustainability are presented as something to observe—a passive relationship. The judgments of P11 in *The Patriarchal Environmentalist* are presented as something to respond to—a more active, dialogic relationship.

In their written reflections, both P11 and P25 reference community values commonly associated with user-centered design of information systems: user needs, freedom from bias, and the neutrality of designers. Given the scenario of the design project and the goals of their own designs, it is striking that neither designer mentions feminist values and the ways in which feminist values might necessitate reconsideration of community norms (although this is the position that P11 ultimately came to, she does not conceptualize it that way). Indeed, P25 writes of gaining more "agency" by adopting a stance of neutral objectivity toward a character, as opposed to inhabiting a situated position, as feminist theory would suggest. This case illustrates how values conflicts complicate the uptake of feminist approaches to information systems design specifically, and HCI more generally. Although P11 and P25 may have expressed notions of user-centered design that some scholars might criticize as simplistic, such objections miss the point: this is how two emerging professionals in the midst of obtaining master's degrees articulated their experience. I take their struggles seriously.

CASE 2: SAME STRATEGY, DIFFERENT MATERIAL

This case looks at a design that takes the perspective of its author but does not materialize a situated position, and compares this design with one that does so.

Shown in Figure 3, the first design, participant P22's *Accessing Sustainability (Man Vs. Machine)*, expresses the perspective of its author, but not as the deliberate positioning of a situated viewpoint. *Accessing Sustainability* functions as a dialogue between human-generated and computer-generated descriptors. The browsing categories for *Accessing Sustainability* include three sets devised by P22 and three sets created via automated taxonomy-creation software that P22 had run over the video metadata for the original Sustainability library. All three computer-generated browsing categories, labeled Categories, Facets, and Themes, involved subject-oriented terms. Categories includes general subject terms such as Architecture, Food, and Renewable Energy. Facets combines two terms to suggest their intersection, with examples such as practices-sustain and waste-toxic. Themes features more specific, compound terms such as permaculture expert and human impact. The human-generated categories referenced Emotions (such as Fear and Passion), Time (Past, Present, Future), and Method (actions that people Should Do and actions that people Should Not Do). The human-generated category titles were preceded by a hyphen (-Emotions) so that they were both grouped together in the browsing category list and typographically distinct from the other three categories.

When interacting with the design, a reader is unlikely to realize that one set of categories in *Accessing Sustainability* was created by machine, and another by

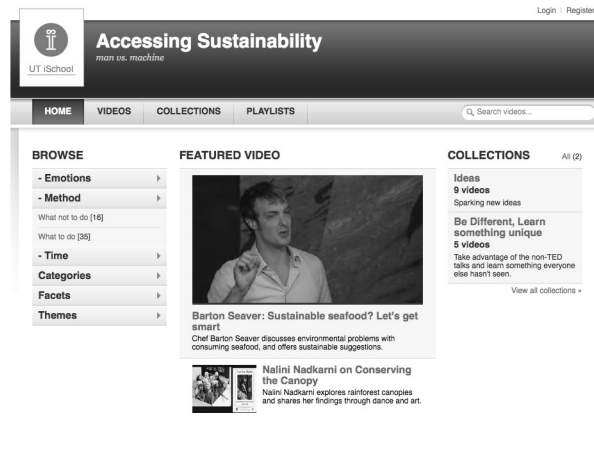
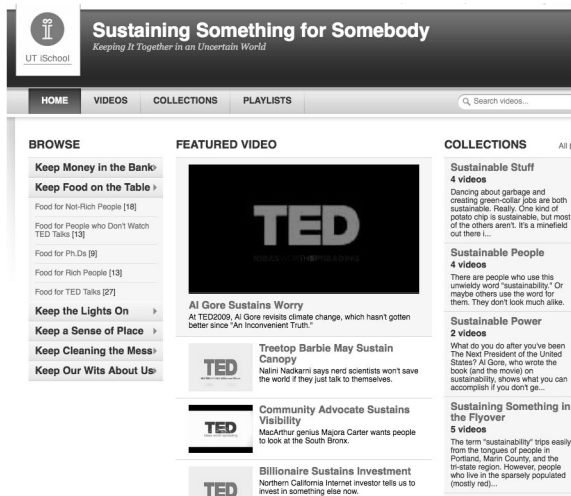


Figure 3: Case 2 designs: P16's Sustaining Something for Somebody and P22's Accessing Sustainability (Man Vs. Machine)

human intervention, but the differences between the two sets are both distinct and subtle enough that they can be productively compared. The categories without hyphens (Categories, Facets, and Themes), all represent different ways of describing aboutness. Although they vary in specificity, their semantic overlap is confusing, and the selection and representation of terms seems awkwardly idiosyncratic—why *practices-sustain* instead of *sustainable practices*? In contrast, the categories with hyphens (Emotions, Time, and Method) follow established classificatory principles more clearly: Method, for example, is cleanly split into What to Do and What Not to Do. There is no semantic overlap between these three categories. Each category in this set, moreover, requires assessment of the video content (the emotions that a video generates, the methods it suggests, temporal orientation) and not just an inventory of included content, as the first set does. Both sets of categories appear subjective, but the set with hyphens seems more systematic, and its greater structural integrity makes it appear more purposeful than the second category set. (Indeed, the closer one looks at the second set of categories and their application to the videos, the more these seem arbitrary and confusing.)

Although Accessing Sustainability does invite these generative comparisons, it does not materialize a situated position. There is nothing in the design itself to explain the structure as a depiction of the author's situation. However, P22's design brief reveals that the design did emerge as a meditation on her own experience. P22 was both a graduate student and a working professional taxonomist, creating controlled vocabularies for Web sites. In her design, the computer took over her job as a taxonomist, creating subject-focused descriptors. The human-generated descriptors that she created encapsulated perspectives on the content (affective, temporal, imperative) that were outside the purview of her job duties. With this revelation, the subtitle of Man Vs.

Machine delivers a strikingly different idea. P22 is exploring her own replacement by computer, and the devaluing of her skills, as well as the generic differences in what machines and people can do. The superficially useful computer-generated descriptors become more sinister; without close inspection and actual use of these terms, they initially seem reasonable. One can imagine these categories being acceptable to "management," to the detriment of the human worker (and, ultimately, the human user). But no user will perceive this story. While this personal experience might be the strategic rationale of P22's design, P22 did not materialize this situated position.

P22, like P25, noted the effectiveness of a situated position in the sample design that incorporated it. In describing her reaction to the sample design, P22 explains how understanding a designer's intentions in relation to design features mitigates the confusion of using an unfamiliar system:

It seems this aggravation, for me, comes directly from not knowing the author's intentions behind their choices....In cases of feeling aggravation, the source is from not knowing the other's intentions or perspective.

In this statement, P22 articulates an argument similar to Haraway: it is aggravating when an information system is designed as a "view from nowhere," because there is no way to understand how design choices came to be.

And yet, when P22 created her project, she saw it with the material vision of traditional user-centered design values. In the context of her own design, P22 talks about using the human-generated descriptors to connect with a naive user who lacks subject expertise, the kind of general usability goals that P22 employs as a professional taxonomist:

In traditional usability, the objective is to relate directly to the user. She will find the product at hand more

“intuitive” if she relates and recognizes herself within the product.

Despite the strategic motivation for the design as emanating from P22’s professional experience, to compare how a computer might perform her job against how she might improve her job, she does not materialize her own situated position into the design, because the “user” is supposed to be there.

P22’s material vision is contrasted with P16. P16’s design, *Sustaining Something for Somebody*, is concerned with representations of race, gender, class, and geographic location in the sustainability videos. Initially, P16 was struck by the high representation of TED talks in the video collection, and with the prevailing TED perspective as white, politically liberal, well educated, wealthy, male, and urban. Many of P16’s design choices are aimed at identifying these stereotypical TED characteristics.

In the process of creating the design, however, P16 realized that a cause of her reaction against the TED stereotypes was her background in a rural, politically conservative community whose residents would be skeptical of TED talks but who share longstanding, deep interests in sustainability. P16 explains:

TED talks make invisible the space where I most closely see engagement with sustainability: a ranching environment in which people sustain a grasslands habitat as well as a fragile rural community. Videos that define sustainability in terms of investing in Walmart, practicing permaculture in Marin County, or singing to Al Gore do not speak to my experience of sustainability. To me, reducing sustainability to these parameters omits a huge audience that includes members of my tiny hometown and other Plains communities.

As instantiated into P16’s design, the playlist *Sustaining Something in the Flyover* presents intricate stories of sustainability from Hennessey, Oklahoma as video annotations, one means of materializing a situated position. For example, a video about organic farming is annotated with a lengthy anecdote about family farms in Hennessey, hard times, and the introduction of “mega-pigs” by large-scale agribusiness in the area. This positioning shows (literally) where P16 is coming from; it makes her accountable for her design decisions.

Like the designs of P11 and P25, the content in P16’s and P22’s designs is independent of design strategy and motivation. P22’s design is still “about” human-generated and computer-generated metadata, even though the reader has no sense of how P22’s personal experience informed the design goals and structure. P16’s design would function as a critique of TED without experiences of rural communities woven through the design. However, as with P25’s and P11’s designs, the integration of a situated position leads to a different expression of these arguments, and the structuring of a different sort of

relationship between designer, artifact, and user. The knowledge that P22’s design enacts a potential future as automation encroaches on her expertise provides for a different connection point than a general appeal to a “user” perspective. The stories of Hennessey, Oklahoma, in P16’s design don’t merely note the homogeneity of TED demographics, they *locate* her as a designer, implying a more intimate and reciprocal relationship between designer and user. Unlike P22’s user, P16’s user is invited to respond to the intentions behind her choices.

As with P25’s invocation of freedom from bias, values associated with user-centered design play a role in P22’s decision to keep “herself” out of her design. As a user, when interpreting a sample design, P22 asserted that a situated position was helpful in understanding how a system works. As a designer, however, P22 states that “human-generated” descriptors are valuable only as an approximation of a naive user’s voice, not as an expression of the designer’s situated position. “User-centered design,” as P22 understands it, involves the user “seeing herself” in the design, not seeing P22 there.

Although P22’s intention in *Accessing Sustainability* was to “relate directly to the user,” a feminist perspective would read the design differently. In obscuring the source of the subjective approach enacted in *Accessing Sustainability*, the design’s relationship to the user becomes indirect and passive, the opposite of P22’s intention. Without clear authorship, the metadata attempts assume a neutral, God’s-eye position, one that resists, rather than inspires, dialogic interaction. As with P25, the way that P22 formulates user-centered design values conflicts with values associated with a feminist approach.

DISCUSSION

These case studies provide two kinds of insight:

- On a general level, they illustrate the effect of community design values on designer-material relations, and how those relations, in turn, affect expression of a design’s meaning.
- They suggest how a kind of abstract material, the deliberate positioning of a designer’s situated viewpoint, structures a more active, dialogic relationship between users and information systems. A situated position is associated with a feminist approach to interaction design, but is contrary to common formulations of user-centered design values.

This section discusses each of these implications.

Community values, designer-material relations, and design expression

These two cases illustrate differences in material vision for a particular, exceptional situation: designs of metadata infrastructure that exploit the phenomenon of residuality. Because the design scenario is unusual and extreme, it serves to draw out design processes—identifying and

manipulating materials—that would otherwise seem unremarkable and thus invisible. These processes of material vision are important for CSCW because they contribute to our understanding of how digital artifacts come to be as they are. In both case studies, the role of community design values in mediating designer-material relations was made noticeable and salient. Additionally, these case studies demonstrate how variations in material vision affect design expression.

Like the setup of the television show *Chopped*, the project that provided the design situation for these cases produced a scenario that encouraged and guided participants to see and manipulate materials in innovative and unusual ways. Participants were directed to transgress traditional design goals for metadata infrastructure and exploit residuality; moreover, although participants were not directed to manipulate their positioning as a design material, pre-design activities presented this strategy as closely aligned with the conceptual goals of the design project, and a sample design that incorporated a situated position into its metadata was introduced. Nonetheless, very few designers “threw the pie in the blender” and materialized a situated position. The two cases demonstrate the role of community values—that designers should adopt a neutral perspective, and that designers should produce artifacts that reflect existing user needs and concerns—in creating the conditions in which designer-material collaborations might take shape. P25’s experience is illuminating: P25 attempted to materialize a situated position but abandoned this approach because it felt wrong. P25 was able to proceed only when taking the stance of a neutral designer objectively implementing the subjective approach of “someone else” (Valerie Solanas). By obscuring the source of her own perspective behind the facade of Valerie Solanas, P25 was able to align herself with proper community design values and become “free.” To object, as one might, that P25 oversimplifies or mischaracterizes user-centered design values for information systems, or that P25 is not a “real” designer embarked on “real” activities is beside the point. This is how P25 herself described her experience, as the case study shows. Moreover, the identification of neutrality with user-centeredness is increasingly becoming a matter of public concern. In May, 2016, Facebook received widespread media attention in the United States for polluting its “objective” algorithm to identify and rank trending news stories with the editorial subjectivity of human curators—as if the algorithm itself was *not* encoding some form of subjectivity. Tellingly, Facebook’s response was not to contest neutrality as possible and desirable but to defend the position that a (secret, uninspectable) “objective algorithm” could serve user needs better than human editors. (The editors, in Facebook’s account, were merely tuning the algorithmic processes.)

The case studies also show how variation in designer-material relations, as mediated by community values,

affect design expression. P11’s and P25’s designs make similar rhetorical points about the video content and use metadata elements in similar ways. P22’s design makes a similar argument about human-generated and computer-generated content even without the back story revealed through the design documentation. All the designs are equally—and obviously—subjective in their arguments. But the designs that materialize a situated position structure a different kind of relationship between designer and user. With the motivations behind designer judgments more transparently revealed, P11’s and P16’s designs invite a more reciprocal relationship, in which users are better able to understand the specificity of the designer’s perspective and respond to it. In declaring that *she* is making the judgment of what is “feminist” and what is “not,” P11 is inviting a user to interrogate those assessments and understand the basis upon which they are made. By assuming the character of Valerie Solanas, on the other hand, P25 positions her design as a neutral transcription of Valerie’s (subjective) viewpoint. Although “Valerie’s” position might be “messy” and “crude,” the indirect relationship between user and designer promotes use-as-observation more than use-as-interrogation. “Valerie” might say some wild stuff, but I trust, as the user, that P25 is faithfully and objectively documenting those extreme opinions.

A designer’s situated position as abstract material

The specific material at issue in these case studies—the designer’s situated position—also seems strange and exceptional, like the design scenario in which it is enmeshed. Although a range of abstractions—interface elements like radio buttons, data structures like lists, functional representations like tasks—might be productively viewed as digital materials, the materialization of a designer’s situated position seems especially amorphous. But this weird-seeming material serves several useful functions. It shows how we really can examine how abstractions function as digital materials; the case studies here demonstrate how the designs that manipulate a situated position are different from the designs that don’t incorporate this material (the difference is in expression, not function). Additionally, the designer participants’ struggles with materializing a situated position illustrate how perceived value conflicts between user-centered and feminist perspectives complicate the uptake of feminist approaches within HCI.

Moreover, as digital artifacts are increasingly entwined with “data”—as a user action made in one app on a smartphone informs the behavior of other apps, as content “from the cloud” is distributed across systems, as the activities of other people in our “networks” affect the information we see and how we see it—the materialization of a designer’s situated position, and the conditions under which this materialization can more readily occur, becomes a welcome corrective to the dangerous obfuscations enabled through the aggregation

of data from who knows where according to the “algorithms” developed by who knows whom. The narrative strategies that inspired the design project, and their basis in feminist theory, emphasize that where something comes from and how it gets to be there are necessary components for responsible knowledge production. When it comes to “data” and its aggregation, understanding the context and motivation in which information is generated is, I would argue, a vital and often missing element of decision making. Accuracy alone is insufficient. For example, in electronic health records, one clinical practice might use a Diagnosis element to record codes from the International Classification of Diseases (ICD) that best facilitate smooth billing procedures with the patient’s insurer. Another clinical practice may use the Diagnosis element to record ICD codes that represent the clinician’s best understanding of the patient’s condition. Both records are equally accurate, and yet naively aggregating them may lead to misleading inferences and poor decisions. Where the data comes from and how it comes to be there—and the positioning by which data users might be encouraged to interrogate its underlying assumptions—constitute important elements of data use.

Material vision, and the materialization of a designer’s situated position, becomes important here. By thinking about a situated position as material, designers can consciously reckon with situatedness—and put it to use.

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