Agencies in Technology Design:
Feminist Reconfigurations

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ABSTRACT

This talk considers how capacities for action are currently figured at the human-machine interface, and how they might be imaginatively and materially reconfigured. Drawing on recent scholarship in feminist science and technology studies, I argue for research aimed at tracing differences within specific sociomaterial arrangements, without resorting to essentialist divides. This requires expanding our unit of analysis, while recognizing the inevitable cuts or boundaries through which technological systems are made. Based on my own experience of the worlds of technology research and development, moreover, I argue that these reconceptualisations have both practical and political implications for technology design.

Keywords

Interface, feminist science and technology studies, design

INTRODUCTION

In this paper I consider some new resources for thinking about how capacities for action are configured at the human-machine interface, informed by developments in feminist science and technology studies. While not all of the authors and works cited would identify as feminist, they share with feminist research – in my reading at least – a commitment to critical, but also constructive engagement with received conceptions of the human, the technological and the relations between them. Based on my own experience of the worlds of technology research and development, I argue that these reconceptualisations have implications for everyday practices of technology design. Both reconceptualisations of the human-machine interface, moreover, and the practices of their realization are inflected by, and consequential for, gendered relations within technoscience and beyond.

One of the issues at stake here is the question of what counts as 'innovation' in science and engineering. This in itself, I will propose, is a gendered question insofar as it aligns with the longstanding feminist concern with the problem of who is recognized and who is not in prevailing discourses of science and technology [8, 14, 19]. Recent research on the actual work involved in putting technologies into use highlights the mundane forms of inventive yet taken for granted labor, hidden in the background, that are necessary to the success of complex sociotechnical arrangements. A necessary strategy in recognizing those labors is to decenter sites of innovation from singular persons, places and things to multiple acts of everyday activity, including the actions through which only certain actors and associated achievements come into public view. At the same time, we need to ask how projects to reclaim creativity, invention and the like might themselves be reproductive of a, specific, cultural and historical preoccupation with these particular values. Must those not presently identified as inventors be shown in fact to be that in order to be fully recognized? This question suggests that we need to pay close attention to the tensions and contradictions that arise when we adopt a strategy that distributes practices previously identified exclusively with certain people and places (for example, with privileged white men working in elite institutions of science and technology) across a wider landscape (one that includes women). In distributing those practices more widely, they are given correspondingly greater presence. A counter project, therefore, is to question the value placed on innovation itself. The aim is to understand how a fascination with change and transformation might not be universal, but rather specifically located and with particular political consequences for women, both in terms of the possibilities that are available to them, and the visibility of their already existing contributions.

Re-examining binary oppositions

Feminist research practices are distinguished by the joining of rigorous critique with a commitment to transformative engagement. STS scholars more broadly have traced the histories through which certain binary divisions emerged as foundational to modern science, including divisions of subject and object, human and nonhuman, nature and culture. Feminist scholars have drawn attention to the

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politics of ordering within such binary divisions, beginning with identifications of sex and gender. A starting observation is that in these pairings the first term typically acts as the privileged reference, against which the second is judged.

The question of difference outside of overly dichotomous and politically conservative oppositions is one that has been deeply and productively engaged within feminist and postcolonial scholarship [2, 7, 11] At least since Donna Haraway's famous intervention with respect to the figure of the 'cyborg' [12], feminist scholars have begun to embrace the inseparability of subjects and objects, 'natural' bodies and 'artificial' augmentations. The cyborg is a concept appearing first in the context of developments in cybernetics in the mid-twentieth century, materialized in their application to the U.S.-Soviet 'space race.' By the 1980s, due in no small measure to the popular imagery of film and science fiction, the cyborg had become an icon of masculinist and military projects. Haraway's contribution was to propose that rather than simply rejecting the cyborg figure, feminists might actually reclaim it and explore its different possibilities. Among other things, she argued that the cyborg could represent the life-affirming and enabling possibilities of close couplings between people and machines. For it to do so, however, she urged that the study of those connections include consistent attention to the labors that are inevitably required in order for human-machine interactions to succeed. To the extent that those labors are obscured, humans disappear and artifacts are mystified.

The primary site for my own exploration of these questions has been research and development at the human-computer interface. More specifically, my work since the 1980s has been concerned with the question of what understandings of the human, and more particularly of human action, are realized in initiatives in the fields of artificial intelligence and robotics [18]. Immersed in studies of symbolic interactionism and ethnomethodology, I came to the question of machine intelligence with an orientation to the primacy of communication, or interaction, to the emergence of those particular capacities that have come to define the human. This emphasis on sociality stood in strong contrast to prevailing models of the individual cognizer as the origin point for rational action. A growing engagement with anthropology and with STS expanded the grounds for my critique and underscored the value of close empirical investigations into the mundane ordering of sociomaterial practices. Initiatives in the participatory or cooperative design of information systems opened up a further space for pro-active experiments, during the 1990s, in the development of an ethnographically informed and politically engaged design practice [16, 17]. Most recently, my frame of reference has been further expanded through the generative theorizing and innovative research practices of feminist scholarship. Within this feminist frame, the universal human cognizer is progressively displaced by attention to the specificities of knowing subjects, multiply and differentially positioned, and variously engaged in reiterative and transformative activities of collective world-making.

Agencies

A rich body of empirical studies have specified, elaborated, and deepened the senses in which human agency is always inextricably tied to the specific sociomaterial arrangements of which we are part. These studies provide compelling empirical demonstration of how capacities for action can be reconceived on foundations quite different from those of an Enlightenment, humanist preoccupation with the individual actor living in a world of separate things. Insofar as we see the politics of technology to be based in fundamental assumptions about where agency is located, and whose agencies matter, these approaches have at least the potential to work as powerful allies to feminist projects. In particular, these scholars align with feminist theorizing in their emphasis on the always relational character of our capacities for action; the constructed nature of subjects and objects, resemblances and differences; and the corporeal grounds of knowing and action.

As one illustrative case in point, Dawn Goodwin [10] mobilizes actor network tropes in a close study of the practices through which patients in surgery are 'transitioned' through anaesthetic states, a process involving the radical and progressive reconfiguration of their capacity for action – specifically, for the sustenance of their own life support – through complex arrangements of medical practitioners, machines, routines and other devices. She argues that questions of agency are crucial both to assess policy with respect to medical practice, and to deepen our understanding of the complex sociotechnical arrangements that comprise much of contemporary medical activities and institutions. Through a series of cases she demonstrates how the technologies of anaesthesia are joined to the patient's body, in ways that render the latter highly dependent and vulnerable, but nonetheless intensely (albeit sometimes ambiguously) communicative. This joining is analyzed as a delicate choreography involving patients, medical practitioners and machines.[1] Over the course of an anesthesia, agencies involved in the sustenance of vital bodily functions are progressively delegated from 'the patient' as an autonomously embodied entity, to an intricately interconnected sociomaterial assemblage, and then back again. The particular expertise of the anesthetic practitioner on this account is to manage the often unruly contingencies of the unfolding course of anesthesia, through a combination of skillfully embodied techniques, reading of signs, professional judgments and legitimating accounts, which together provide the grounds for practical action. Normative prescriptions of correct

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[1] The phrase 'ontological choreography' was coined by Charis Cussins Thompson [9].

procedure and power-differentiated divisions of labour complicate the process in ways that can work to undermine the legitimacy of other forms of 'evidence', thereby jeopardizing rather than ensuring safe and effective practice.

The trope of configuration animates another study of surgical practices by Margun Aanestad [1], who focuses on the labors (carried out predominately by women) involved in aligning a complex sociotechnical environment for the conduct of so-called 'minimally invasive' or 'keyhole' surgery. The latter requires, among other things, displacing the direct gaze of the surgeon and attendant practitioners from the interior of the patient's body – formerly achieved only through a correspondingly large incision – to a view mediated through camera and video monitors. Aanestad's analysis follows the course of shifting interdependencies in the assemblage, as changes to existing arrangements necessitate further changes through what she names the *in situ* work of "design in configuration" [1:2]. She emphasizes that, in contrast to views of technology design as the province of (predominately male) 'inventors' located in research and development labs, the ongoing work of design takes place in the worksite, and is accomplished by actors rarely recognized as designers. Moreover, her analysis makes clear again how in such a setting the capacity for action is relational, dynamic and collective rather than inherent in specific network elements, and how the extension of the network in turn intensifies network dependencies. Her analysis has directly gendered implications as well, as the work of nurses, overwhelmingly women, is literally as well as figuratively marginalized in the views of the operating theatre, at the same time that their role in the theatre's configuration becomes more central.

Reconceptualising agencies at the human-machine interface

Feminist re-theorizing of the body has been concerned to restore the dynamism emptied out of bodies by the mind/body split, by moving through that split to some new terrain. In a similar way, I suggest, we might find other grounds for understanding our relations to the material than the operations of a transcendental intelligence over inert, mechanistically animated matter. Judith Butler's argument that sexed and gendered bodies are materialized over time through the reiteration of norms is suggestive for a view of technology construction as a process of materialization through a reiteration of forms [6]. Butler argues that 'sex' is a dynamic materialization of always-contested gender norms: similarly, we might understand 'technologies' as materializations of more and less contested sociotechnical configurations.

To make this last proposal more concrete, I turn to several examples of what we might characterize as configurations of agency at the human-machine interface, but conceptualized in a very different way. The first, and most mundane, case is drawn from a study in the area of computer-supported work, in particular, a civil engineer working at a computer-aided design (CAD) workstation [15]. In her analysis of computer-based work, Susanne Bødker [5] has discussed the shifting movement of the interface from object to connective medium. She observes that when unfamiliar, or at times of trouble, the interface itself becomes the work's object. At other times persons work as she puts it 'through the interface', enacted as a transparent means of engagement with other objects of interest (for example, a text, or an interchange with colleagues). While CAD might be held up as an exemplar of the abstract representation of concrete things, for the practicing engineer the story is more complex. Rather than stand in place of the specific locales – roadways, natural features, built environments, people and politics – of a project, the CAD system connects the experienced engineer sitting at her worktable to those things, at the same time that they exceed the system's representational capacities. The engineer knows the project through a multiplicity of documents, discussions, extended excursions to the project site, embodied labors and accountabilities, and the textual, graphical and symbolic inscriptions of the interface are read in relation to these heterogeneous forms of embodied knowing. Immersed in her work, the CAD interface becomes for the engineer a simulacrum of the site, not in the sense of a substitute for it, but rather of a place in which to work, with its own specific materialities, constraints and possibilities. This suggests a figure of technological agency not in the form of machinic operations conducted independently of the human, but in the form of a particular configuration, a specifically enacted site of extended, heterogeneously constituted human/nonhuman capacities for thought and action.

New media artist Heidi Tikka, in her work titled 'Mother, Child', provides a further example. This work, which I had the opportunity to experience during its exhibition at the Art Gallery of Ontario in Toronto, Canada in 2001, employs the shifting dynamics of installation, viewer/user, and onlookers, as well as the ambient environment of the exhibition space to invoke, and affectively evoke, an encounter between caregiver and infant. The piece does this not 'in general', but always specifically: the caregiver is one, particular person who enters the space of the installation and sits on a chair, the infant is one, particular infant (Tikka's son, recorded on digital video). A distinguishing aspect of the piece is the heterogeneity of its forms: real bodies and objects combine with projected images to comprise a hybrid of social and material elements. Together these elements create an interactive space characterized by a mix of predictability and contingency – a fragile stability – that affords the installation its affective kinship to the 'real world' encounter that it simulates. The three-dimensional image of a child that is 'projected' – both technically and psychically – onto the soft cloth diaper that the viewer/user holds in her lap can be affected through her motions and orientation to it, but dissolves as she stands and places the cloth back

onto the chair. In this and other ways, the installation continually reminds us of, rather than conceals, its artifice. As Tikka herself comments, the piece is actually simpler, less reactive in its composition than we experience it to be. The effects are created through the particular possibilities provided by an artful integration of persons, objects, spaces, fantasies, remembered experiences and technologies to evoke and explore an emblematically human encounter, but not to replicate it.

Expanding frames and accountable cuts

I take an identifying commitment of feminist research to be a deepened appreciation of the relational foundations not only of social worlds but also of material realities. While this is an interest shared by others within STS and contemporary social, feminist research further contributes a critical orientation of the politics of difference, combined with forms of constructive engagement aimed at more just distributions of symbolic and economic reward. In 'Getting Real,' Karen Barad proposes that "reality is sedimented out of the process of making the world intelligible through certain practices and not others …" [3: 105]. If, as Barad and other feminist researchers suggest, we are responsible for what exists, what is the reality that current discourses and practices regarding new technologies make intelligible, and what is excluded? To answer this question Barad argues that we need a simultaneous account of the relations of humans and nonhumans *and* of their asymmetries and differences. This requires remembering that boundaries between humans and machines are not naturally given but constructed, in particular historical ways and with particular social and material consequences. As Barad points out, boundaries are necessary for the creation of meaning, and, for that very reason, are never innocent. Because the cuts implied in boundary making are always agentially positioned rather than naturally occurring, and because boundaries have real consequences, she argues, "accountability is mandatory" [4:187]. The accountability involved is a problem of understanding the effects of particular assemblages, and assessing the distributions, for better and worse, that they engender. Responsibility on this view is met neither through control nor abdication, but in ongoing practical, critical, and generative acts of engagement.

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