

*The way in which people work is not always apparent. Too often, assumptions are made as to how tasks are performed rather than **unearthing the underlying work practices**. By making the work visible, designers create a more intimate view of the workplace landscape.*

Making Work Visible

“How people work is one of the best kept secrets in America.”

This provocative statement by David Wellman, a sociologist of labor, can be read as a kind of challenge to work researchers. The sense in which it rings true is particularly remarkable given the large and growing body of literature dedicated to work-flow modeling, business process reengineering, and other methods aimed at representing work in the service of transforming it. At the same time that we take Wellman’s statement as a call to action, however, we need to reflect carefully on the kinds of secrecy that surround specific knowledges and experiences of working practice and the implications of making them visible. The notion of secrecy implies things known differentially among different actors, usually because those who hold the secret deliberately withhold it from others. Without taking over the connotations of collusion in this sense of secrecy, we can ask why it might be not only inevitable but also valuable that members of an organization know their own work in ways that others positioned differently in the organization do not. The premise that we have special authority in relation to our own fields of knowledge and experience suggests we should have the ability to shape not only how we work but how our work appears to others. Self-representation on this view is a form of empowerment.¹

¹It is on this premise, for example, that Brigitte Jordan and her colleagues have been developing what they call “workplace interaction analysis laboratories,” as a forum within which front-line workers themselves are able to reflect critically on the design of their own working practices and associated technologies. On interaction analysis, see [12].



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Alternatively, we can ask under what circumstances it might be in the interests of some organization members not to know in detail the activities of others differently placed. Among the recognized benefits of job specialization are the ways in which we are able effectively to “black box” the work of others, not worrying ourselves about just how their work gets done while at the same time being able to depend on and make use of the products of their labors. In the case of many forms of service work, we recognize that the better the work is done, the less visible it is to those who benefit from it.² What we acknowledge less frequently is that bringing such work forward and rendering it visible may call into question the grounds on which different forms of work are differentially rewarded, both symbolically and materially.

In what follows I adopt a view of representations of work—whether created from within the work practices represented or in the context of externally-based design initiatives—as interpretations in the service of particular interests and purposes, created by actors specifically positioned with respect to the work represented. On this view, I argue for the importance of deepening our resources for conceptualizing the intimate relations between work, representations, and the politics of organizations. More specifically for system design, this argument implies a reflexive engagement in our work as designers both with the images and accounts of working practices that are provided to us by organization members and with those that we ourselves create and use. The aim is a design practice in which representations of work are taken not as proxies for some independently existent organizational processes but as part of the fabric of meanings within and out of which all working practices—our own and others’—are made.

Representations Serve Interests

In *The Power of Maps*, Denis Wood explores the ways in which as he puts it “maps work by serving interests” [24, p. 4]. Obviously, they do so in all of the choices made, more and less explicitly, about how a particular territory will be represented. A map drawn for the purpose of asserting property boundaries will not generally indicate the presence of specific plants and animals within a given area. So, too, a representation of work activities created in the interest of introducing new information technologies is unlikely to include aspects of the work—questions of membership and identity, for example—considered beyond the reach of those technologies. Such acts of selection are inevitable accompaniments to the crafting of repre-

sentations relevant to particular purposes. The problem arises when, as Wood points out, such selections are presented not as matters of practical, political, and economic choice (“What’s the purpose to which these representations are to be put; in whose interests; what does it cost to go out and look, or otherwise assemble alternative views”) but as matters of *necessity* (p. 84–85). In the process, the interests involved in the work of map-making and map-using are effectively obscured, while what is depicted comes to be naturalized as an obvious and disinterested view.

Even the most seemingly unmediated, veridical representational forms like video recordings do not wear their meanings on their sleeves to be read definitively once and for all.³ Rather, the significance of recordings is contingent upon their reading in the context of particular moments of interpretation, informed by particular interests. Brun-Cottan and Wall [7] provide a clear example of this in the case of work and system design, where a recording of an expert user using an automatic feeder to scan document pages was initially read by software engineers as evidence of the worker’s failure to appreciate features of the system’s design. Specifically, on discovering that one page in a multi-page document had been placed in the feeder in the wrong orientation, the worker realigned that page in the set of originals and then proceeded to re-scan the entire document, rather than making use of the page realignment feature provided.

Another viewing, reframed by Brun-Cottan and her co-workers who had been present at the work site, showed the worker’s strategy in fact to be the more sensible in the context of his own working practice. While use of the machine’s page realignment feature would have obviated the need for re-scanning of the entire set, it would have required more of the worker’s time and attention. Dropping the entire document set in for re-scanning took more of the machine’s time, but it left him free to attend to other things. The same images—in this case, the assumed-to-be-impartial images recorded by a video camera—were subject to substantially different interpretations by actors differently positioned, with correspondingly different interests in relation to the activities viewed.

²For further discussion of invisible work see [8], [15] and [16].

³Of course, calling video recording unmediated ignores all of the choices involved in deciding such things as what to record and when, how to position the camera, whose camera it is and what that means to those recording and being recorded, and so forth.

Representation and Control

One central interest in representing work for purposes of system design is to create technologies aimed at the coordination and control of complex, distributed activities. Agre has developed an analysis of what he characterizes as the progressive (re)orientation of human activities to the requirements of designing and implementing such technologies. In this context, he argues that current wisdom in system design holds that the less of its user's behavior a system encodes, the less functionality it can provide [1, p. 113]. At the same time, the more behavior is encoded by technical systems, the more technologies may come to prescribe human activities. Consistent with Yates' history of corporate communications from the mid-19th century [25], technologies designed for the coordination of complex distributed activities are commonly used as well for reporting on those activities, as a basis for centralized assessments of the efficiency and correctness of the local operations in which the technologies are embedded. In this way technologies for the local coordination of work become incorporated into interests of global control.

Recent workplace studies document the interweaving of coordination and control in computer-based information systems in various sites (see [6] and Sachs, this issue). In looking at the work of airport ground operations, I became intrigued by the analogy between representational devices used by natural scientists in tracking and analyzing the behavior of animal populations (for example, as described in [13]) and representations used by airline workers to coordinate and report on the movement of planes [17]. A crucial difference, of course, is that representational artifacts used within airline operations are an intrinsic part of the same activity that they are designed to track.

Referencing and updating the airline schedule, for example, is a central activity of ground operations workers, at the same time that the schedule is taken at the end of the day as a spatial and temporal representation of what they have done. Moreover, looking closely at how online communications and reporting systems are actually used in airline operations underscores the double form of accountability involved in these technologies. That is, the systems designed to track planes are simultaneously used by workers as resources for communicating their own activities to co-workers, and by management as resources for evaluating how the operation is running. As currently constituted, the technologies of accountability in airline operations afford a kind of autonomous space or maneuvering

room that can be used by workers to maintain a reasonable relation between prescriptive representations like schedules and the actual contingencies of getting airplanes off the ground.⁴ New tracking devices (such as sensors on plane wheels that automatically record the time of "push back" of a plane from a gate) at least reconfigure, if not further close down, that space.

Representation as Stereotyping

Not only do representations of work involve perspectives and interests, but work has a tendency to disappear at a distance, such that the further removed we are from the work of others, the more simplified, often stereotyped, our view of their work becomes.

In a recent project to prototype new technologies in a law firm, for example, we discovered an ongoing struggle over the status of a form of work called document coding, done to support the litigation of large cases. In their distance from the work of document coding, attorneys at the firm held highly simplified views of what the work involved. Specifically, document coding was described to us as a form of unskilled, even "mindless," labor, representing a prime target for automation or outsourcing as part of a general cost-cutting initiative within the firm. When we looked at the work of document coding, however, we saw the interpretations and judgments that litigation support workers were required to bring to it. Thus, we found ourselves in the middle of a contest over professional identities and practices within the firm: a contest between one characterization of work, made possible by distance, and another held by those who did the work (and confirmed by our own observations of what it entailed).⁵

The relation between our own social location and our view of others is in part what sustains boundaries among organizational actors, including boundaries between professional designers of technology and technology users. The distance of professional designers from the sites and activities that are the subjects/objects of their work has given rise to a range of techniques aimed at representing relevant others in ways responsive to design concerns. An interest in bringing into view the lived experience of workers left out of standard representational forms motivates recent initiatives to invent new, less reductionist representational forms.⁶

Representing Practices

During the past 10 years or so, a collection of studies of work practice across a range of settings have been carried out under academic and industrial auspices,

⁴The phrase "prescriptive representation" is coined and developed in relation to the work of sales representatives in [3]. In a critique of the design rationale offered for systems like The CoordinatorTM, I have tried to underscore the increasingly complex interweaving of communication and control functions in networked communications systems [19, 21]. I argue that the current proliferation of systems aimed at the management of work flow represent at least in part a most recent attempt to encode prescriptive representations of work activities into information systems, as a device for the normative regulation of organizational behavior.

⁵For more on this case see [4, 20].

⁶For an example of new forms, see [22].

An Equivocal Reflection on Making Work Visible

This table, created at the kitchen table of a colleague with whom I share interests in work studies and system design, inspired the accompanying article. I generated it as I read through a paper of hers, in which she and a coauthor present arguments for the importance of representing work practice, and new strategies for doing so (see [7]).

As I read I found myself embracing the proposals they put forward, while at the same time I heard other voices in my head speaking back to them, raising questions and concerns or reformulating their words in alternative, and somewhat contradictory, terms. I attempted to represent this unfolding, multi-vocal dialogue with their text in the form of a table.

Despite its two-column format, the table should be read not as a facing off between mutually exclusive and opposing positions but as a kind of responsive dialogue—more of the form “Yes, but”—that expresses the standing tension between a desired vision of representational practice on the left and various voices of suspicion, contradiction, or concern on the right. 

| | |
|--|---|
| Representation in the political/democratic sense is carrying the voice of a constituency into relevant venues of decision-making. Recognizing the conditions of professional design work, specifically its distance from workers as technology users, the aim in representing work is to provide workers/users with a richer presence or stronger voice in sites of professional design. | Representation is creating an image asserted to stand in place of or speak for an other; an imaging developed through engagement with the other but then taken off, to some distant site. In the case where representations are meant to serve the interests of developing new technologies, the other is cast only in terms relevant to professional design, not in her own. |
| The goal of making work visible for system design is to develop more appropriate technologies from the point of view of those who will be using them. | The goal of making work visible for system design is to find new ways to promote and sell technologies. |
| Workers define technology, as active creators. | Users are a source of relevant knowledge for designers, passive recipients of technology. |
| Workers' perspectives are made available, present through representations; they speak in their own voices. | Representations are manageable user surrogates; they speak for them to the interests of professional designers. |
| Representation involves the artful crafting of peoples' stories. | Representation involves the strategic manipulation of images. |
| With video records, workers/users speak with their own voices. The portability of video representations makes it possible for their voices to carry widely. | Video records open further possibilities of exposure/danger; their portability exacerbates this. |
| Video's openness to multiple viewings and interpretations enables unanticipated uses. | Researchers can't control readings that may be made when video is seen by others, in other contexts, with other interests. |
| Video records make evidence for claims open to contest. | Video records persuade, close down debate. |
| Video records maintain the animation, dynamics of lived experience. | Video records freeze activity, while affording a (mis)illusion of experience. |
| Working practice is lived experience, only partially representable. | Working practice can be revealed, "captured," analyzed into constituent parts and transformed into manipulable, objectified knowledge. |
| The aim of making work visible is to represent work's non-rationalizable, contingent, embodied structuring. | The aim of making work visible is to represent work as rationalizable, abstract functions/processes, enacted through specific behaviors/practices. |
| Representations may become resources for workers' own use in negotiations with management. | Making work explicit, visible increases workers' vulnerability to rationalizing agendas. |
| Representations work against automation based on simplified notions of work. | Representations make work available for further rationalization, automation. |

in dialogue with enterprises of system design.⁷ In these studies researchers have undertaken to look closely at the use of technologies in specific organizational settings and to bring their observations to bear on the design and implementation of innovative computer-based systems. While by no means in full agreement, practice-oriented approaches to the representation of work in relation to design share some basic assumptions and commitments, among them:

- At some moment, by some means, the specifics of how people work become crucial to the design of working systems;
- The explicit/tacit distinction in relation to what workers know identifies not only, or even primarily, a psychological dimension but also a social one. That is, the explicit/tacit is not only a difference between what we can see, talk, or even think about, but also between what our social milieu sanctions as legitimate to be seen, spoken or thought;
- Practice-oriented designing requires sites (times, places, and artifacts) through which shared understandings of work can be constructed across multiple, often conflicting, perspectives;
- The production and use of representational artifacts in system design is a form of work in its own right, to which the same analyses should be applicable as those we bring to the work represented.
- The validity of representations of work turns on the extent to which they are generated out of other ways of knowing the work they represent, and used in relation to those working knowledges.

This last premise is perhaps the most crucial. Representations of work are not only the purview of researchers and analysts. To a large extent, representing work is the stuff of which organizations are made. In particular, a central concern for practitioners and analysts alike is the relation between normative accounts of how work gets done and specific working practices. The problem is not that normative accounts are incomplete, or that actual practice fails to realize them, but that by definition normative accounts represent idealizations or typifications. As such, they depend for their writing on the deletion of contingencies and differences. As long as such representations remain embedded in the doing of the work, they serve as a useful tool for organization members in their practical reasoning about and action within the organization. Problems arise, however, when normative representations are either generated at a distance from the sites at which the work they represent goes on or taken away from those sites and used in place of working knowledges.

Wood's analysis with respect to maps is again relevant here. He argues that the notion that maps are representations that stand on behalf of the terrain mapped actually limits their possibilities, and suggests:

Freed from a pretense of objectivity that reduced it to the passivity of observation, the map can be restored to the instrumentality of the body as a whole [24, p. 183].

Similarly, freed from the notion that normative representations are a flawed approximation of working practice, we can begin to build representations that are, in Watson-Verran's [23] terms, aimed at working disparate knowledges together. The power of such representations lies in the extent to which they acknowledge the often power-differentiated dialogues in which design gets done and resist the appropriation of different voices and interests into one dominant logic or single representational form.

Lessons from Ethnography

Amid ongoing discussion of the relation of ethnographic interests to those of design, recent workplace ethnographies provide both general frameworks and specific analyses of relations among work, technology, and organization.⁸ Workplace ethnographies have identified new orientations for design: for example, the creation and use of shared artifacts and the structuring of communicative practices. At the same time, the agenda of imagining possibilities for new technologies has led ethnographers to look more deeply into the material bases of working practice.

With the turn to ethnography comes as well a rich resource of critical reflections on what anthropologists Clifford and Marcus [9] have named the "poetics and politics" of ethnography as representational practice. Representational practices, including those of ethnography, are shaped historically, materially, rhetorically, institutionally, and politically:

Power and history work through them, in ways their authors cannot fully control... Ethnographic truths are thus inherently partial—committed and incomplete.

Critical ethnography rejects the notion that we can somehow innocently write descriptions of others, whether in the service of understanding or of intervention. Instead, both the terms "we" and "other" are opened up to question.⁹ For traditional ethnography, "we" implies some community of observers and their audience—a community that is assumed but left outside the story. "Other" implies those who are the subjects of ethnographic observations and accounts but are not themselves full participants in the ethnographic enterprise. Rendered into our representational forms, their diverse stories and experiences become texts for which we are the expert readers.

⁷These studies are too numerous to cite here, but many are referenced in the articles cited in footnote 8.

⁸For discussion/debate on ethnographies of work in the interest of design, see [2] and [5] and [11].

⁹Recognizing the assignment of technology users to the position of "other" within system design makes available critical resources from recent anthropology and feminist research. See for example [9] and [23]. For efforts to reflect on these relations where "we" are system designers and the "others" system users, see, for example [8], [10], and [18].

In place of this objectivist stance, recent anthropology proposes a view of ethnography as an encounter between actors differently embedded within particular social/cultural milieus. On this view, culture is always relational. Rather than describing attributes of a population from some neutral position outside the field of view, accounts of cultural meanings and practices are inevitably created from particular standpoints that set up the lines of comparison and contrast between the speaker/writer and the persons and practices described. The representations ethnographers create, accordingly, are as much a reflection of their own cultural positioning as they are descriptions of the positioning of others.¹⁰ This is not a problem or limitation to be overcome; it is a fundamental aspect of representational work, to be understood and incorporated into our practices and into what we produce. Making sense and use of representations of some aspect of the social world involves our own positioning in relation to what we are seeing as much as any meaning inherent in the images themselves. This means the goal of representing work should be not simply to create images that can be appropriated to the interests of design but to understand our relationship, as work researchers, designers, and other practitioners, to those images and to the practices of representing that create them. In that way the images and associated practices might become a basis for dialogue among us rather than reinforcing the boundaries between us.

Representation as Craftwork

For some time researchers and system developers committed to a more participatory or cooperative design practice have been interested in the possibilities of making work visible in the context of ongoing dialogues among work researchers, system designers, and those “others” whose work is the subject of our own (see, for example, [14]). The goal is to develop our representational practices in ways that maintain the connections among representations, their authors, their interests, and other knowledge and images that might be relevant. As Harley (quoted by Wood [24]) puts it with respect to maps, on such a view:

Maps cease to be understood primarily as inert records of morphological landscapes or passive reflections of the world of objects, but are regarded as refracted images contributing to dialogue in a socially constructed world. We thus move the reading of maps away from the canons of traditional cartographic criticism with its string of binary oppositions between maps that are ‘true and false,’ ‘accurate and inaccurate,’ ‘objective and subjective,’ ‘literal and symbolic’ or that are based on

¹⁰In fact, many critical ethnographers reject the notion of ethnography as representation altogether, insofar as that implies some kind of correspondence between ethnographic accounts, read as authoritative texts, and the practices they recount. As an alternative, Stephen Tyler proposes the notion of “evocation” ([9, p. 130]. For the purposes of this article, however, I will retain the term “representation,” using it just as a general term for artifacts intended to depict aspects of the social world for particular purposes.

‘scientific integrity’ as opposed to ‘ideological distortion.’ Maps are never value-free images ... Both in the selectivity of their content and in their signs and styles of representation, maps are a way of conceiving, articulating and structuring the human world which is biased toward, promoted by, and exerts influence upon particular sets of social relations (p. 78).

A map or other representational device is a piece of craftwork, crafted in the interest of making something visible. Things are made visible so that they can be seen, talked about, and potentially, manipulated. It is the last that constitutes the power, for better and worse, of the construction of representations of work. With agendas of intervention come questions of interests, questions that need to remain central and lively elements of research and design. Once we recognize that representations are artifacts constructed from particular social locations and within specific forms of practice, we can expand our concern with the adequacy of representational forms to include ongoing dialogue and debate regarding the various places of representations in work and system design.

Acknowledgments

My thanks to Jeanette Blomberg, Keld Bødker, Andrew Clement, Scott Cook, David Levy, Ted Metcalfe, John Muse, Susan Newman, Julian Orr, Toni Robertson, and Randy Trigg for their contributions to this article. I am also indebted to the exceptionally constructive commentaries provided by three anonymous reviewers. ■

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Ethnocritical Questions for Working with Translations, Interpretation and their Stakeholders

Michael J. Muller

Translation and interpretation are at the core of software professionals' analyses of the work of end users [11]. (Throughout this article, I will use the word "users" to mean "end users.") Analysis of users' work is a major activity for understanding whether a software system might be useful, what that system should do, and how that system should be made usable. The job of an analyst is to develop a series of translations between the users' work domain(s) and knowledge(s), and the various software professionals' work domains and knowledges. Interpretation is inevitably part of this process, because translation necessarily involves choices of what to include, what to highlight, how to match one domain to another, and how to present the outcome to one or more stakeholder constituencies (such as developers, marketers, users, and so forth).

In this brief article, I consider how insights from ethnocriticism [7]—an anthropologically informed approach to cultural criticism—can help us to improve our practices in representing users' work, especially under circumstances in which there are large differences in power between the analysts and the users (for a longer treatment, see [8]).

Translation is much more than the mapping of one symbol system onto another [2]: Translation also involves the mutual interpretation of systems of meaning. In the literary traditions addressed by ethnocriticism, translations are made for a variety of reasons, including, for example, "literal" translations, "literary" translations, "orthographic" translations, "free" translations, and so on [4].

Ethnocriticism stresses the collaborative discovery and co-creation of meaning in intercultural translation. Within the domains of human-computer interactions (HCI), translations may also be made for a variety of reasons, and may take a variety of forms or representations, including an object-oriented analysis or model, a work-oriented representation accessible to the workforce, a principled ethnographic record, or a variety of hybrid representations that attempt to connect some of these diverse purposes and