MIND, CULTURE, AND ACTIVITY, 5(1), 73–75

Context and Consciousness: Activity Theory and Human–Computer Interaction, by B. A. Nardi (Ed.), Cambridge, MA: MIT Press, 1996, 400 pp., $42.00 (hardcover).

Reviewed by
Charles Bazerman
University of California, Santa Barbara

CYBORGS IN ACTION

As useful and ubiquitous as computers have become in human activity and as innovative as people have been in inventing new uses for computers, it is not easy to think in principled ways about how new computer systems can be made more useful for human purposes. Much is left to the marketplace, user adaptations, and the flowering of ad hoc bright ideas. Analyses of how computer systems may be integrated into activity are often found wanting, and when sophisticated ethnographic or sociocultural analyses of user practices are available, they are not easily integrated into design thought and practice. The original essays published in *Context and Consciousness: Activity Theory and Human–Computer Interaction* offer activity theory (AT) as a principled and coherent yet flexible and growing set of analytic tools to aid human–computer interaction (HCI) designers in their task of bringing machines and humans together in humanly meaningful activity.

Traditionally, HCI has defined a sharp boundary between human and computer, a boundary marked by the interface, which has therefore become the focus of design challenges. Humans, for some task or problem, turn to the computer. Input is put in at the interface.

The computer carries out its tasks, and the output is put out at the interface. Computation is calculative and occurs within the tool between input and output. Some things may be said about the relation of human and computer thought, insofar as computation emulates apparent human processes of cognition or carries out tasks similar to those accomplished by humans; however, only in the minimal sense could you say humans and machines interact or think together, or even that the machine extends humans' ability to think. Even less might you say that machines have consciousness, despite their incorporating many self-monitoring calculations.

Similarly, under traditional models of cognition, the computer operates within its own box, oblivious to context, as long as the right temperature and humidity are maintained. Context is just another input or another representation contained in the database. It is not a fluid and complex unfolding that the machine reacts to and helps reconstruct dialectically through its contributions. But AT dissolves the boundary between the agent and the tool, making both a part of a consciousness that extends beyond the boundaries of a single mind and is realized in emergent socially and culturally located activity. The interface is a mediator within activity and not a boundary.

This volume begins to explore what AT might offer to the design of computer systems. These essays point to limitations of existing approaches to HCI design; considers how these limitations

Requests for reprints should be sent to Charles Bazerman, English Department, University of California, Santa Barbara, Santa Barbara, CA 93106. E-mail: bazerman@humanitas.ucsb.edu

might be overcome by AT; and offers new AT-inspired insights, approaches, and system designs. The volume chapters explore AT in its variations, show how AT explains various cases of success and failure in electronic tool design, and use AT to illuminate dimensions of HCI design.

To argue for the value of AT as the theory of choice for the design of tools, several chapters position AT not only against traditional cognitive approaches (for examples, see Kaari Kuuti's chapter, "Activity Theory as a Potential Framework for Human–Computer Interaction Research" and Victor Kaptelinin's two chapters, "Computer-Mediated Activity: Functional Organs in Social and Developmental Contexts" and "Activity Theory: Implications for Human–Computer Interaction"), but also against alternative sociocognitive approaches (see Bonnie Nardi's chapter, "Studying Context: A Comparison of Activity Theory, Situated Action Models, and Distributed Cognition") and actant-network theory (see Yrjö Engeström and Virginia Escalante's chapter, "Mundane Tool or Object of Affection? The Rise and Fall of the Postal Buddy").

Even though the volume's primary audience is HCI researchers, for whom it introduces AT, anyone interested in the theory should find these chapters illuminating, for these chapters reveal and highlight aspects of AT that are not so clearly visible under more traditional expositions, usually framed in psychological terms describing attention in pursuit of objects. Kuuti, for example, considers the user's sense-making of information produced and circulated electronically in the course of an activity; Kuuti also uses AT as a heuristic to recognize specific elements of activities that can be supported by electronic tools. Likewise, Kaptelinin considers how computers mediate individuals' and groups' perceptions of and interaction with an external world, serving as an extension of the internal plane of actions; that is, the computer is considered concretely as a mental tool to be incorporated into perception, cognition, and action. Activity theory becomes a way to theorize and understand the cyborg potential of HCI. Nardi notes that AT points to the stability and durability of activity structures, a feature of activity that is lost in other theories of context and situation.

The second and third sections explore applications to practical design problems and cases. The issues raised in these particular accounts again should be of interest to all people who think about AT as well as to HCI designers. Ellen Christiansen ("Tamed by a Rose: Computers as Tools in Human Activity"), in examining how a police records tool was integrated into or remained marginal to the work of different investigative teams, makes visible some of the factors of work style and ideology that influence tool use and then points to the affect that develops toward the tool depending on the success of the integration. Engeström and Escalante similarly look at the hopes (and enduring belief despite evidence to the contrary) of designers for an affective bond between users and a postal sales kiosk compared with the frustration and dislike of the actual users who find that it is not easy to get the kiosk to do what they want to get done. Suzanne Bødker ("Applying Activity Theory to Video Analysis: How to Make Sense of Video Data in Human–Computer Interaction") examines shifts in user attention in carrying out activities to find out how activity-oriented design can avoid frustrations and breakdowns as well as to facilitate the users turning actions into operations as they become more expert. Arne Raeithel and Boris Velichkovsky ("Joint Attention and Co-Construction: New Ways to Foster User–Designer Collaboration") similarly propose means for tracking user attention and perception so as to coordinate distributed work of multiple participants interacting through a computerized system.

The volume also includes a long, speculative AT contemplation by Vladimir Zinchenko on personal, cultural, and spiritual growth ("Developing Activity Theory: The Zone of Proximal Development and Beyond"). Although this chapter is curiously teleological; embeds a number of

assumptions all might not agree with; and has little overt connection to HCI, computing, or design, it does work through a number of intriguing turns on AT that might inspire readers' own contemplations on human development perceived through an AT lens.

This book may be perceived as a series of forays into AT through the concerns and problems of the practical work of HCI design. As such, the chapters start making visible new aspects and potentials of AT. The challenge of building and implementing systems indeed puts the question to AT as to precisely what it may be good for. In doing so, the book stretches AT into new places and moves toward a specification of the activities within which computers are embedded as tools and of the cognitive processes that are extended through the use of such tools. Activity theory looks like it may become a very good tool for designing cyborgs, for it helps us think through what cyborgs do, how they do it, how the flesh and electronic components coordinate, and how cyborgs can work together. And as we start seeing AT as a theory of cyborgs, we may then start to see how we have always been cyborgs—which may have been what AT was trying to tell us all along.