By Terry Winograd

Designing *a* New Foundation *for* Design

The book in which Fernando Flores and I introduced our version of the language-action perspective had an ambitious and provocative subtitle: *Understanding Computers and Cognition: A New Foundation for Design* [8]. This special section of *Communications* offers the opportunity to apply the hindsight of nearly two decades to the implicit claim in that phrase, asking how the perspective has been successful as a foundation and promises to be so in the future.

As a first observation, we need to recognize, as Dumay et al. [1] point out, "Despite offering several promising concepts, the language-action perspective (LAP) is still not in the mainstream of information systems development." The theory has been effectively applied in workflow-oriented products, as described in some of the articles in this section and in a series of products from Action Technologies, which was founded in conjunction with the development of the theory. There has been much valuable discussion and development in the academic literature, as reflected in the decade-long series of LAP conferences. But the perspective is not a standard part of "Information Systems 101." This gap raises the question of what it means for a theory to be a foundation for design.

Design is a complex activity that calls for a challenging discipline of design thinking. On one hand, the designer works with available materials (in our case, the hardware and software of information systems) to create artifacts with desired behavior and appropriate use of resources. On the other hand, the designer takes the perspective of the people who live with and alongside the system, with primary concern for their action and experience. This balancing act is vital to all kinds of design, from architecture and urban design to the design of consumer devices.

The design process offers many moments and roles

for theoretical perspectives. Some theories are predictive and structural, supporting the material side of design. For example, a designer creating a bridge or a disk drive applies theories of Newtonian mechanics to predict the behavior of physical structures. The materials from which information systems are built exhibit subtle complexities of resource use and efficiency. Two networking schemes or database architectures that support the same high-level interaction may differ by orders of magnitude in speed and resource use. Much of computer science theory plays the role that structural mechanics plays in bridge building—it allows the designer to predict system behavior and resource demands and to design effectively for these factors.

Alternative guidance is not offered by LAP in this area, which has been the traditional core of computer science. Instead, it deals with a different domain. Its value is as an orienting theory, not applied as a set of calculations, but shaping the background of interpretation a designer brings to understanding and envisioning the human situation.

The language-action perspective, as its name suggests, rests on two key orienting principles. The first is its focus on linguistic communication as the basis for understanding what occurs in information systems. Ultimately *all information is communication*: not an abstract system of bits and bytes but a means by which people interact. The second principle is that *language is action*. Through their linguistic acts people effect change in the world. In imposing a language-action framework on information technology, we emphasize the action dimension over the more traditional dimension of information content. As an orienting theory, this perspective reveals the underlying structure that drives and gives meaning to the activities of people using an information system. It offers the possibility of making that structure visible to the participants in a way that enables them to act more effectively when effective coordination is a necessity and cannot be taken for granted.

But however valuable a theoretical perspective may be, it is never the whole story. A theory is by its nature a partial account of reality—a set of blinders through which some aspects of the world are highlighted and others become invisible. Design is by nature both holistic and ruthlessly simplifying. A designed artifact, whether it is a piece of communications software or a city park, must address the complex mixture of human needs, embodied in a weave of physical and social interaction. But the design itself cannot embody all of these complexities if it is to be constructible and understandable. The design must embody a simplification, leaving room for the texture of the world to be filled in by the interpretation and practices of those who use it.

Suchman's critique of LAP applied to computer-supported work [5] was not that the theory was false, but that it was incomplete. She argued that the benefits of the theory's focusing on simplification came at the cost of ignoring essential complexities of human language interaction, having to do with power, ambiguity, and tacit communication.

As with all technologies, the key is in the social context. The practical successes of LAP have been in settings where the critical breakdowns arise from failures of clarity of commitment, transparency, and accountability. The theory has been highly applicable in Business Process Management (BPM), Customer Relationship Management (CRM), and similar areas with a central focus on managing the primary coordination of action. It is not, for example, the primary perspective for designing casual messaging systems such as IM and Chat, which thrive in unstructured, informal conversational settings. The theory has also been the basis for understanding and supporting processes of innovation, as described by Denning and Dunham in their article in this section and developed in organizational consulting practices and management teaching by Flores and others [3, 4].

So what is the future of LAP for systems design? We should not expect it to displace the theoretical perspectives that now populate information systems and computer science courses. They will always be crucial for the structural design of all kinds of information systems. On the other hand, as our power to build large information systems increases and the underlying computing structure becomes a commodity, there is an ongoing shift in where to seek innovations.

In a 50th-anniversary essay for ACM in 1997, I wrote:

> *"In the next 50 years, the increasing importance of designing spaces for human communication and interaction will lead to expansion in those aspects of computing that are focused on people, rather than machinery. The methods, skills, and techniques concerning these human aspects are generally foreign to those of mainstream computer science, and it is likely that they will detach (at least partially) from their historical roots to create a new field of 'interaction design'."* [6]

As part of developing a new interdisciplinary Institute of Design (the "d.school") at Stanford [2], we have been engaged in a dialogue with designers from diverse disciplines: from architecture to product design, organizational design, and interaction design. This dialogue began years ago as described in [7], and has revealed both fundamental similarities and deep

differences among the design disciplines. Teaching in many design fields includes the presentation and discussion of orienting theories that give perspective to the practical questions. One finds in the architectural literature, for example, deep discussions of phenomenology as it applies to living in designed worlds.

The field of interaction design is still in its infancy, and we are still struggling with finding the appropriate foundational questions and concerns for new kinds of interactions. As an example, the rapidly developing area of social computing is exploring how ubiquitous networking and mobile devices create new openings for the design of massively multi-user shared participation in education, entertainment, and commerce. Some of the central concerns in these applications are precisely those addressed by LAP: trust, commitment, and bridging differences of background and interpretation. A perspective provides a standpoint for raising questions, for anticipating breakdowns, and for inventing opportunities.

By shining its spotlight on essential qualities of language and information, LAP can introduce simplicity to a design—not by reducing the human phenomena to simplicity, but by providing a uniform and understandable structure that can support human activity in all of its richness. The challenge as we further develop the perspective is to clarify its application and better integrate it into the process of user-centered interaction design. In that way it can become "a new foundation for design." C

References

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