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Interactivity and Thought

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Introduction

A shared tenet of embodied, embedded, situated and distributed cognition is that people make sense of things interactively. They run a simulation, they exchange words, often taking turns to change and steer the flow of interaction; they gesture, they handle or manipulate things, they write, sketch or model. Because the concept of interaction seems intuitive, and the phenomena so pervasive, researchers tend to use the term to do more work than they have time to explain. This symposium explores different ideas about the way interactivity is understood, and how it figures in thought processes.

Some Questions

When you watch TV, are you interacting with it or not? For some people you do interact. You may express disgust or surprise, you may shout or ask someone to clarify something. Yet because the television itself never changes its behavior in response, because the signal is the same regardless of who is watching, it might seem that there is no interaction – there is only one-way dependence.

Do we interact with our own projections? When a chess player projects possible moves on a chessboard is he or she interacting with a virtual structure? Such projections are ephemeral, and have no physical presence. But both projection and agent are changed during the process of projecting and evaluating. Does interaction require the physical presence of the thing interacted with? Or can we interact with projections, imagined objects, attributes or linguistically specified elements not present?

Another example of interaction is found in the everyday process of following instructions. Instructions offer a paradigm case of interactive sense making and thinking. If you train a video camera on people struggling to make sense of origami instructions, for instance, you see a constellation of movements that are not mentioned in the instruction set but which facilitate comprehension. Subjects rotate the paper displaying the folding illustration, they point from

instruction to origami paper, they gesture over the illustration or the sheet without executing a fold. None of these actions brings an origami sheet closer to its final form. They are done to expedite comprehension. The same is true of following cooking recipes in the kitchen, using a map to get from A to B, or chatting with a friend to clarify a thought. These interactions serve many functions. They help subjects explore an idea, they help them situate the instructions in the immediate context of action, they may even serve as an external form of thought. Gestures, object manipulations and even self–talk may be part of a distributed process of thinking, one that can feed back and influence individual thought. Are there times when interacting with things or people is literally part of the thinking process?

The paradigm example of interactivity, of course, is communication and the joint activities it coordinates. In conversation, the participants exploit all of these actions – speaking, gesturing, manipulating objects, talking to oneself, and more. One obvious goal of communication is to coordinate thoughts with others – to establish a commonality of thinking. The problem is that theorists tend to work with different intuitive notions of interaction in the various circumstances in which it arises.

In the field of human computer interaction (HCI) new technologies are facilitating new modes of multi-modal interaction, tightening the coupling between humans, devices and environments. HCI explores some of the new interaction styles afforded by new forms of digital supports. This research is not confined to understanding the impact of handhelds, where touch and gesture already play an important role; it is centrally concerned with how more multi-modal interaction - voice, kinesthetic (e.g. shaking, moving), can be supported to enhance cognition and performance. Will new technology revise our notion of interactivity? Might it change what we mean to think?

During the symposium the participants will present central cases of interaction, as they understand it, and explain why taking an interactive approach to cognition is necessary and leads to insight. The theme is how such forms of interaction constitute thinking, or are constituents of thinking: how people recruit interaction with structures or

ephemeral processes to extend thought, to make sense of things or make sense of instructions, to create interpersonal thought, and, simply, to communicate.

Participants

David Kirsh: moderator and participant. He has been working on situated, distributed and embedded cognition, documenting and analyzing how much of cognition is an interactive process. The phenomena he will present are drawn from studies of origami, cooking, dance, map following and using external representations.

Herbert Clark has a long advanced the thesis that discourse is fundamentally interactive, and that communication is required for all joint activities. He has presented seminal work on how to understand the dynamics of conversation and its use in such joint activities.

Susan Goldin-Meadow has advanced the field of gesture understanding through her work on the role of gestures in learning. She has presented accounts of how ideas expressed in gesture presage the expression of those ideas in speech, and has suggested that gesture does more than reflect changing knowledge and actually plays a role in facilitating that change.

Yvonne Rogers has been working on distributed cognition, external cognition and embodied interaction in the fields of human-computer interaction and ubiquitous computing. Her work focuses on how best to augment everyday, learning and collaborative work activities with interactive technologies.

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