Part II

Building a Concept

of

Collective Intelligence

In Part II, I try to build a concept of collective intelligence as a form of computer-mediated collaboration. In doing so, I consider the group and the computer system it is using to support its work as a single abstract *system*, synthesized from two subsystems — one human, one technological. It is the behavior of this composite system that I will address. The critical issues, then, are the factors that enable this system to function and, under some conditions, to produce work that is coherent, internally consistent, and has intellectual integrity.

The strategy I follow is to build up a description of this system piece by piece. Because I am working from an information processing perspective, those pieces are the primary components found in the IPS models and architectures discussed in chapter 4.

First, I consider *memory*. I examine constructs that function as a form of collective memory for the group. As might be expected, it includes provisions for the long-term storage and retrieval of information, analogous to human long-term memory, and it provides contexts in which that information can be activated and processed, analogous to working memory.

Second, I consider *processing*. The discussion focuses on the form and function of individual small-grained processes that operate in the contexts identified as the group's working memory. They are responsible for basic actions such as retrieving and defining concepts, identifying relationships, building conceptual structures, making changes to those structures, and storing results. Thus, they enable the group to function as an information processing system and to carry out its task.

Third, I consider *strategy*. The prior discussion of processes is limited to their basic, architectural forms, illustrated by specific processes found in collaborative groups. Thus, processes are considered as independent entities or sets of entities. In the discussion of strategy, they are considered in relation to one another. The focus is on patterns in the sequences of processes that occur in the behavior of a group. By engaging processes not as isolated actions but in coherent sequences, groups are able to function in purposeful ways and to accomplish goals. Thus, the discussion moves to issues of collaborative problem-solving and knowledge-construction.

Fourth, I consider two metacognitive issues — *awareness* and *control*. Awareness plays a large role in enabling an individual to produce intellectual products that are coherent, internally consistent, and, occasionally, elegant. How can a group produce work with

similar characteristics if its products are too large and too complex to be understood by any one person? To answer that question, I examine ways in which a group can piece together partial, but overlapping bodies of knowledge among its members to produce partial, but overlapping fields of awareness. The discussion also considers authority and administrative control within groups in relation to issues of self-control in individuals. A balance between delegated and centralized authority is needed to motivate groups and to enable them to produce work with intellectual integrity.

The discussion concludes by outlining a research agenda that could replace the *concept* of collective intelligence described here with a fully realized *theory*. Such a theory would enable detailed process models of collaboration that apply across multiple collaborative tasks in different social and organizational situations. Development of such models could lead to a number of practical benefits, including more effective training in collaboration skills, better support systems for distributed groups, and more productive organizational structures.