Part I

Foundation Concepts

In Part I, I lay the foundation on which a concept of collective intelligence is built in Part II. Because the form of collaboration being considered is both intellectual and computer-assisted, essential concerns include the types of information groups produce, the tools they use, and their social and conceptual behavior as it relates to knowledge-construction. Each of these concerns is addressed in Part I.

First, I look at behaviors found in typical collaborative projects that range from several weeks to several years in duration. A common thread that runs through them is their processing of different types of information and their transforming of one type of information into another. Thus, viewing collaborative work from an information processing perspective seems natural and straightforward. To aid in characterizing collaborative behavior from this perspective, a model of information types and flow is described.

Second, I discuss computer and communications tools for collaboration that help groups produce the types of information identified in chapter 2. The discussion includes systems that support the independent, asynchronous work of a group's individual members as well as their synchronous, collective work. One particular system that provides both forms of support is described in more detail and serves as the example system in Part II.

Third, I review major information processing system (IPS) models and architectures for cognition. The discussion begins with general models, including Newell and Simon's original IPS model, Anderson's ACT*, and Newell's SOAR architecture. It also includes situated models, including an IPS model of human-computer interaction and specialized models for specific tasks, such as writing. A set of basic architectural components is identified, including long-term memory, working memory, processing operations, and problem-solving and knowledge-construction strategies. Each of these components or functions is examined in Part II with respect to collaboration.

The materials discussed in these three chapters provide a basis from which to consider collaboration as a form of computer-supported information processing behavior.