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CHAPTER

8

INDIVIDUAL AND COLLECTIVE ACTIVITIES IN EDUCATIONAL COMPUTER GAME PLAYING

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THE SOCIAL NATURE OF LEARNING: IMPLICATIONS FOR CSCL

There are two distinct (though not mutually exclusive) views on the role of social context in human learning and development. According to the first view, learning is an individual process, which can be facilitated or inhibited depending on how individuals interact with each other. For instance, the need to communicate an understanding of the problem at hand to other participants in a problem-solving session can force people to formulate their ideas more carefully and, thus, improve reflection and planning (cf. Blaye & Light, 1995).

The second view holds that social context cannot be reduced to a set of external "modifiers." It contends that individual learning and social interactions are different aspects of the same phenomenon. This view is often associated with Vygotskian notions of "inter-psychological" functions and the "Zone of Proximal Development" (or ZPD, Vygotsky, 1978), which are becoming more and more popular in the field of CSCL (e.g., Kaptelinin, 1999; Koschmann, 1996; O'Malley, 1995). Vygotsky claimed that there are always two steps in acquiring a new ability: First, the ability emerges as distributed between people (i.e., it exists as an "inter-psychological" function) and, second, it is mastered by individuals (i.e., it becomes an "intra-psychological" function) (Vygotsky, 1983).

Having acquired a new ability, the individual can contribute more to socially distributed processes. Therefore, intra-individual and inter-individual

functions mutually constitute each other. In other words, not only does collaboration between the learner and other people change some preexisting individual phenomenon, but it also directs and shapes both the general orientation and specific content of individual development. Participation in a collective activity lays the foundation for the next step in individual development or, according to Vygotsky, creates the Zone of Proximal Development, which is defined as "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978).

Undoubtedly, these ideas have profound implications for education, including those related to development and implementation of computer-based environments intended to support collaborative learning. The attempts to apply these ideas in the field of CSCL have revealed, however, the need for a more specific and concrete understanding of the mechanisms underlying learning within the Zone of Proximal Development (e.g., Cole & Engeström, 1993; Kaptelinin, 1999). Vygotsky's original definition of the ZPD allows for different interpretations, which imply different strategies for creating computer-based environments for collaborative learning (see Valsiner & van der Veer, 1991).

In an earlier paper entitled "The Zone of Proximal Development: Where culture and cognition create each other" Cole (1985) discussed the unique role of the Zone of Proximal Development as a mediator between individual and social phenomena. According to this analysis, the notion of ZPD can help to bridge the gap between the individual and the social by introducing a mechanism of their mutual determination. In the present chapter we elaborate on this idea by bringing in concepts from Activity Theory, developed by Vygotsky's disciple Leontiev (1978), as well as empirical data collected within the Fifth Dimension project. From our point of view, these data may indicate some specific ways that individual and social phenomena mutually determine each other.

The rest of the chapter is organized into four sections. The first two sections are brief overviews of, respectively, main concepts used in this paper and of the Fifth Dimension project. The third section introduces the "life cycle" of the individual/social dynamics in the Fifth Dimension and illustrates it with a number of examples. Finally, the fourth section focuses on the implications of the study for computer-supported collaborative learning.

INDIVIDUAL AND COLLECTIVE ACTIVITIES

According to Activity Theory (Leontiev, 1978), the human mind can only be understood within the context of interaction between individuals