Chapter 7.13
Social and Distributed Cognition in Collaborative Learning Contexts

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ABSTRACT

Technological artifacts such as computers and mobile electronic devices have dramatically increased our learning interactions with machines. Coupled with the increasingly different forms of collaborative learning situations, our contemporary learning environments have become more complex and interconnected in today's information age. How do we understand the learning and collaborative processes in such environments? How do members receive, analyze, synthesize, and propagate information in crowded systems? How do we investigate the collaborative processes in an increasingly sophisticated learning environment? What is collaboration in the current technological age? This chapter, using the conceptual framework of distributed and social cognition, will seek to answer these questions. It will describe the current perspectives on social and distributed cognition in the context of learning, and examine how these theories can inform the processes of collaborative learning with computers. The chapter will conclude with implications to our learning environments today.

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INTRODUCTION

At the heart of educational psychology, is the search for a deeper and broader understanding on how learners acquire knowledge that is realistic and ecologically valid. The pervasiveness of, and increasing reliance on, electronic devices is challenging and transforming the way learners obtain, store and share information. Collaborative learning has also taken new levels of meaning and practice with these ubiquitous digital devices. Snapshots of typical learning situations see a learner accessing a personal digital assistant while listening to a lecture; another sees a learner sending text messages or surfing the Internet while talking to a peer. Collaborative learning is no longer content with just face-to-face group discussion confined within four walls or supported by the computer only. Contemporary collaborative learning environments are becoming more complex.

Evidently, today's collaborative learning environments are vastly different from the past and there is a need to understand them for classroom design, as well as to enrich educational psychology. How do we understand the learning processes and cognitive activity in such environments? How do learners collaborate in an ever crowded cognitive system? Is there a theoretical framework where we can begin to appreciate and study this increasingly sophisticated learning environment? How do the current perspectives on social cognition and educational psychology inform us in our understanding of this phenomenon? This chapter will attempt to answer these questions by discussing the current perspectives on social cognition, describing distributed cognition as a framework and drawing some implications for studying today's learning environments.

WHAT ARE LEARNING ENVIRONMENTS LIKE TODAY?

The continuing emergence of more sophisticated technology is radically challenging and changing the way students think and learn. The reliance on increasingly powerful computational artifacts has made technology ubiquitous in most classrooms and student life. This sophistication has also been taken to higher levels with the increasing availability of all types of digital information and the myriad of networked and integrated infrastructures. Our Internet and information age has given us tools and resources for engaging in learning that we never had before.

Take any typical learning situation in developed countries. In classrooms or outside schools, you will invariably see students using handheld electronic devices to enter data or check information. They can text message, surf the Internet and "google" what the teacher is saying in class. In study rooms, cafeteria, or homes, students engaging in learning will be seen using cell phones, laptops and other electronic devices. An example of today's (and tomorrow's) learning environments is the Technology Enabled Active Learning (TEAL) project at MIT (Dori, Belcher, Bessette, Danziger, McKinney, & Hult, 2003), where a studio-based learning session takes place with students engaging in and solving projects. The classroom scene is full of students discussing in groups, consulting their computer laptops, running tests with electronic equipment and communicating through electronic devices. The teacher roves from table to table, offering feedback and asking questions. Increasingly integral to these learning environments are collaborative activities involving synchronous (occurring at the same time) and asynchronous (not occurring at the same time) communication to mediate learning and knowledge building. We see students consulting each other in class groups, through e-mails, forums, and blog discussions. Learning projects and papers are written with feedback and proofreading from others. More sophisticated learning environments such as online learning, virtual learning and learning with artificial intelligence (AI) are enabling different forms of collaboration. The Internet and digital age have made our generation characteristic of sharing and learning from one another. Solo learning is increasingly difficult to accomplish in today's commonplace tasks.

WHAT ARE THE EDUCATIONAL ISSUES FACING OUR DIGITAL AGE?

Several issues confront our current understanding of learning environments. First, the multiple interactions of human and electronic devices are posing challenges to the traditional scientific method of investigation. These interactions are raising questions about the reductionist approach and ecological validity. They are also questioning how we analyze, identify and exclude variables in this complex learning process. Most empirical studies deal with the unit of analysis comprising of a single discrete task analysis without external aids