Chapter VII
Collaborative Technology Impacts in Distributed Learning Environments

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ABSTRACT

Many studies have examined the impact of collaborative technology in distributed learning environments. Few of those studies involved new collaborative technologies such as mobile computing, and few were empirically tested. This chapter addresses the need to empirically examine the impacts of new collaborative technologies including mobile, wearable, embedded, and ubiquitous technologies, on distributed learners. The chapter introduces a technology-independent framework for considering collaborative technologies, including mobile technology; it relates expected technology impacts to user preferences using a generalizable research framework rooted in the social science, communication and technology acceptance literature. The framework is updated to include the lens of contextualization richness, and the results of an empirical test of the framework are presented. The results show user preferences for technologies with a high range of design features to support cognitive learning, while showing preference for technologies with a low range of design features to support perceived learning. Next steps and implications for future work conclude the chapter.
INTRODUCTION

Academic and business professionals are increasingly tethered to their mobile, wearable, and collaborative computing devices, yet we have few empirical studies examining the impact of such technologies on their users (Althaus, 1997; Benbunan-Fich & Hiltz, 1999; Cisco, 2003; Johanson & Torlind, 2004; Mark, Fisher & Poltrock, 2002). Increasingly, these technologies are found in distributed learning environments, where users are offered the possibility of distributed information exchange, knowledge management and enhanced learning (Hiltz & Wellmann, 1997; Kim & Bonk, 2002; Roschelle, 2003).

These technologies have been traditionally described as differing in media richness (Daft & Lengel, 1986; DeSanctis & Gallupe, 1987), as well as in synchronicity—the degree to which information is exchanged instantaneously—and the extent to which the technologies enable distributed collaboration. Of late, these technologies have also been described as differing in degrees of contextualization richness; the degree to which the technologies provide information about a situation, intentions, and feelings about information, as represented by members using the technologies (Majchrzak, Malholtra, & John, 2005).

No matter how these technologies are distinguished from one another, however, our understanding of the impacts of newer collaborative technologies such as mobile devices on distributed users is incomplete. Thus, although some studies evaluating the impact of traditional collaborative technologies on distributed learners have been undertaken (e.g., Alavi, Marakis & Yoo, 2002), little empirical research has been undertaken assessing the impact of newer forms of collaborative technology on distributed international learners.

Our research addresses this need by presenting the results of an empirical analysis evaluating the impacts of newer and traditional collaborative technologies on users in a distributed learning setting. We begin with an overview of previous work, and then outline our research framework. The results of an assessment of different technologies in the setting using the framework are presented. We conclude by discussing implications of the research.

BACKGROUND

Collaborative technologies are traditionally defined as tools that enable individuals to jointly engage in the active production of shared knowledge. New collaborative technologies are rooted in this heritage, and are defined as those technologies such as wearable, ubiquitous, and mobile computing that offer their users the benefits of any-time, any-space, any-distance communication and collaboration. When first introduced, new collaborative technologies were described as differing from existing audio and video systems in terms of media richness, or the degree to which a technology offers multiple cues, immediate feedback, natural language interfaces, and message personalization (Daft & Lengel, 1986; Galegher & Kraut, 1992). Media richness theory proposes that communication effectiveness improves if the technology used by participants matches the information processing requirements of the tasks to be performed, and suggests that rich media is appropriate for equivocal communication activities, such as negotiation, belief monitoring, analysis, decision-making and reflective interaction. Similarly, media richness theory suggests that leaner media is appropriate for unequivocal activities, such as message passing, identifying information, or storing text, data, or messages. When technology capabilities are matched appropriately to task and environmental requirements, media richness theory suggests that user performance and processes will be enhanced.

Many studies have been undertaken to study the impact of conventional technologies on users. Unfortunately, few of these studies have examined
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