



# Compensatory Adaptation to Media Obstacles: An Experimental Study of Process Redesign Dyads

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## ABSTRACT

*Past research on electronic communication media suggests that those media pose obstacles to communication in collaborative tasks when compared with the face-to-face medium. Yet, past research also points at mixed findings in connection with the quality of the outcomes of collaborative tasks, generally suggesting that the use of electronic communication media has no negative effect on those outcomes. A new theoretical framework building on human evolution theory, called compensatory adaptation theory, has been proposed to explain these contradictory findings. This study provides a review and test of compensatory adaptation theory. It investigates the impact of the use of an electronic communication medium on 20 business process redesign dyads involving managers and professionals at a large defense contractor, with a focus on cognitive effort, communication ambiguity, message preparation, fluency, and task outcome quality. The study suggests that even though the use of electronic communication media seemed to increase cognitive effort and communication ambiguity, it had a neutral impact on task outcome quality. These results appear to be an outcome of compensatory adaptation, whereby the members of the dyads interacting through the electronic communication medium modified their behavior in order to compensate for the obstacles posed by the medium, which is suggested by a decrease in fluency and an increase in message preparation. The results generally support predictions based on compensatory adaptation theory.*

*Keywords: biological influences; communication media; compensatory adaptation; computer-mediated communication; electronic communication; human factors*

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## INTRODUCTION

Research on the effects of technologies on people in business settings has a long history. Within that research tradition, few research topics have received so much sustained attention over such a long period

of time as “electronic communication” — that is, the study of communication through electronic media created by artifacts such as the telephone, fax, and computer. This area of inquiry has taken different forms and different names over the years, such as computer-supported cooperative work,

computer-mediated communication, groupware, group support systems, and more recently, a variety of “e” combinations (where “e” stands for “electronic”) such as e-collaboration and e-commerce (Grudin, 1994; Davenport, 2000; Dennis, Carte, & Kelly, 2003; Fingar, Aronica, & Maizlish, 2001; Kock, Hilmer, Standing, & Clark, 2000; Kock, Davison, Ocker, & Wazlawick, 2001; Standing & Benson, 2000). While these different varieties present unique characteristics that identify them as distinct “research schools,” they all share the same common interest in electronic communication tools and their effects on human behavior. The advent of the Internet, e-business, and the proliferation of low-cost computer networks and electronic communication tools have led to increased interest in research on how electronic communication media affect collaborative work in organizations.

The above interest is shared by the U.S. Department of Defense (DoD), where Internet-based computer networks have removed geographical and time constraints to collaboration among distributed process teams engaged in defense acquisition activities. With the growth of distributed acquisition process teams also comes the challenge of improving defense acquisition processes in a distributed manner, since new technologies, regulatory modifications, and other change drivers constantly push the DoD into rethinking and redesigning the way it procures, purchases, and internally distributes products and services. This can be accomplished through distributed and asynchronous process redesign groups supported by Internet-based electronic communication tools. Yet little is known about the effects of electronic communication media on process redesign groups, particularly in the defense sector. This study tries to fill this gap by conducting a preliminary

investigation of the effects of electronic communication media on process redesign dyads (i.e., pairs) targeting defense acquisition processes.

This article is organized as follows. It first reviews different theoretical perspectives that seem contradictory, and that pertain to the adequacy of electronic communication as a full or partial replacement to face-to-face communication in organizational settings. Next, it discusses a new theory that tries to address those contradictions, namely compensatory adaptation theory. The theory is discussed particularly in connection with its two main theoretical principles of *media naturalness* and *compensatory adaptation*. The article then develops a set of hypotheses that are empirically tested through a field study of 20 business process redesign dyads involving managers and professionals at a large defense contractor, with a focus on cognitive effort, communication ambiguity, message preparation, fluency, and task outcome quality. The article concludes with a discussion of the findings and implications for practitioners.

## RESEARCH BACKGROUND

It has long been theorized that the face-to-face communication medium possesses inherent characteristics that make it more appropriate for the conduct of a variety of collaborative tasks (Daft & Lengel, 1986; Graetz, Boyle, Kimble, Thompson, & Garloch, 1998; Sallnas, Rassmus-Grohn, & Sjostrom, 2000; Short, Williams, & Christie, 1976; Warkentin, Sayeed, & Hightower, 1997). This has led to the conclusion that the use of electronic communication media, which usually do not incorporate all of the elements present in the face-to-face communication medium (e.g., synchronicity, ability to convey tone

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