Chapter 61
Representing Organizational Conservation of Information: A Review of Telemedicine and E-Health in Georgia

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ABSTRACT

The authors review a model of the conservation of information (COI) applied to organizations. Following this review, the authors briefly review the mathematics in support of this model and its implications for the development of theory. They apply the model to a review of the status of telemedicine and e-health in Georgia, which they had begun to study last year. After their reviews, the authors discuss future steps and draw conclusions about the model and its benefit to organizational attention and decision-making.

OVERVIEW

In this paper, we present the background of the problem as we first discovered it. The problem was organizational attention and its impact on decision-making for which both can range in an organization from fragmented to well-focused. We discovered the problem while studying the Department of Energy (DOE) nuclear waste management program. We review the mathematics behind our solution to the problem (conservation of information, or COI) as well as its implications for the development of theory. We review the status of its application to telemedicine and

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e-health in Georgia as part of a new project for us which we began late last year (Stachura et al., 2009). And we provide a review of future steps and our conclusions as they pertain to the problem, the mathematics, and the particular application to telemedicine and e-health.

BACKGROUND

We have been developing theory over the past decade for a computational model of organizations and decision-making, primarily centered around the idea of the physics of the conservation of information (Lawless et al., 2009). Our conservation of information (COI) model is based on a preliminary theory of a social-psychological harmonic oscillator (SPHO), in which Nash Equilibria act as points of conflict that drive a public's attention back and forth as a conflict is driven across time by self-interests. The oscillations from an SPHO generate fluctuations that produce information characteristic of an organization's stability response, which forms the central part of our model of the conservation of information (COI). Our theory of SPHOs is not yet complete, but the part that is complete appears to be well-grounded and with provocative implications for the advancement of social-psychological and organizational theory.

We began studies of this problem with studies of organizational attention and decision-making in DOE's nuclear waste management (Lawless et al., 2008; Lawless et al., 2005). Since then, the focus of the problem has become more general, shifting from field research with observations of citizen organizations advising the Department of Energy (DOE) on its environmental cleanup and laboratory simulations of DOE field results to analyzing stock market data and working on computational modeling (coupled differential equations, control theory, AI, Gaussian distributions, uncertainty models, Fourier transform pairs, continuous and discrete wavelets). The solutions and evidence we have collected indicate that the results apply to organizational models with agents of any type, including those composed of humans-robots-machines, the combination of which necessarily invokes mathematical models of organizations.

The problem is based on the type of information available to social deciders. It has often been assumed by scientists that this information is "complete" and representative of what a human agent believes at any one point in time (but below see the review by Baumeister et al., 2005 on the failure of self-esteem to predict academic or work behaviors; and Kelley, 1991, on the failure of preferences in game theory to predict the actual choices made by humans playing games against real opponents). However, we have concluded that the information collected from an individual agent is more or less meaningless, since human agents spend their time making decisions under the forces of interdependence.

Interdependence is both simple and complex. Sensory observation limits the field of action responses. As an agent acts on its environment, its sensory observations are impacted, changing future motor responses, and further changing observations with each iteration. More importantly, and disconcerting for social-psychological and organizational theorists, interdependence is a state that collapses during measurement (e.g., surveys, such as for self-esteem, game theory preferences, etc.). Moreover, the lack of a theory of measurement at the individual level is amplified at the group (Levine & Moreland, 1998), organization (Pfeffer & Fong, 2005), and virtual organization levels (Lawless et al., 2008b). How then to represent interdependence among agents and organizations? While this problem is ancient, with threads running from Aristotle on thoughts about objects to the perspective shifts of Copernicus in the study of planetary motion, the mind-body duality of Descartes, and the emotions-thoughts complementarity of William James, our interest is not historical but theoretical.

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