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## An integrative semiotic framework for information systems: The social, personal and material worlds



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### ABSTRACT

The paper argues that semiotics, the theory of signs and symbols, is at the heart of the representation and transmission of information and meaning, and is thus central to communication and information systems, but especially in their contemporary, more virtualized forms. The paper is distinctive in eschewing post-structuralist uses of Saussurian semiotics, and recent theorizations of sociomateriality, instead developing an integrative framework grounded in Habermasian concepts, Peircean semiotics and an underlying, integrating critical realist philosophy. We develop a semiotic framework to help analyze the complex interactions between three different worlds – the personal, the social and the material. Here semiosis relates to the personal world through the generation and interpretation of signs and messages. It relates to the material world in that all signs must have some form of physical embodiment in order to be signs, and must also be transmitted through some form of physical media. Semiosis relates to the social world in that the connotive aspects of sign systems are social rather than individual – they exist before and beyond the individual's use of signs. The personal, social and material worlds between them bear relationships of sociation, sociomateriality and embodiment. The framework draws on fundamental concepts of information, meaning and embodied cognition. The paper examines critically the implications of this formulation for studying information systems. It discusses commonalities with and departures from other studies, illustrates points with empirical examples, and details how the integrative framework can be utilized.

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## 1. Introduction

The two most distinctive characteristics that distinguish human beings from other animals are their advanced ability to use language to co-ordinate their actions (Goldkuhl & Lyytinen, 1982; Hirschheim, Klein, & Lyytinen, 1996; K. Lyytinen, 1985; Maturana, 1978; Mead, 1934) and the ability to develop and use tools to shape their environment (Habermas, 1978). Language and communication are based fundamentally on meaning and signification which is essentially cognitive, while tools and technology are primarily realized in a physical form. Information systems, or more generally information and communication technology (ICT), cut across this divide in that they concern language and signification embodied and transmitted through technology. This is nothing new but undoubtedly, with mobile technologies and social networking, it is more so than ever before.

We can see, therefore, that ICT inevitably involves an inter-twining of two worlds – the social and the technical – and this relationship has been extensively debated. We can distinguish three primary positions regarding this relationship. First, are those who emphasize the dominance of one system over the other. Within this category are the technological “determinists” such as Woodward (1958) and Perrow (1970) who argue that the nature of the technology imposes major constraints on individuals and organizations. More recent work is highly varied in scope and level but generally treats technology as an independent variable within the research (Orlikowski & Scott, 2008, p. 439–446). Perhaps in reaction to this view, there developed a focus on the social aspects of technology – the ways in which people organized around or shaped technology (Howcroft, Mitev, & Wilson, 2004) – which includes the social shaping of technology (SST) and the social construction of technology (SCOT) (Pinch & Bijker, 1984) perspectives. These could be seen as social “determinists”.

Second, there are those who conceptualize two ontologically distinct systems that interact and mutually influence each other (Orlikowski & Scott, 2008, p. 446–454). Examples are the original socio-technical studies of Trist and colleagues (Trist & Murray, 1993), Zuboff's (1988) study of the process of informing, and Zammuto, Griffith, Majchrzak, Dougherty, and Faraj's (2007) work drawing on Gibson's theory of ecological perception and affordances. Third, and most recent, we find theorists who argue that the two systems are so inextricably inter-twined that they cannot in fact be separated, for example, actor–network theory (ANT) (Callon, 1991; Latour, 1987), object-centered sociality (Knorr-Cetina, 1997), agential realism (Barad, 2003) and relational materiality (Law, 2004). Within IS, this position has been called “sociomateriality” to emphasize the inseparability of the social and the material (Leonardi & Barley, 2008; W. Orlikowski, 2000, 2007; Orlikowski & Scott, 2008) and is, in part, the subject of this paper.

Sociomateriality, taken in a strong form, has profound implications for it argues that the social and the material are so deeply inter-related and mutually constituting that it is not in fact possible, even analytically, to separate them. We follow Mutch (2013) in arguing against that position and instead maintain the critical realist view that they are actually two, ontologically independent but interacting structures. Mutch's paper concerns the work of Barad (2003), who is a philosopher of natural science, whose work has been drawn on Orlikowski et al. as an underpinning for sociomateriality. Barad is mainly considering quantum physics but generalizes her ideas to encompass social systems as well. Barad's primary contention is that we cannot consider that there is some independent object world (for her at a quantum level) and then separately an observer who conceptualizes it. Rather, she maintains what she calls agential realism. She argues that there are real phenomena but that they only come about in the entangled interaction of a multiplicity of elements, including the observer and their observing apparatuses, and that this happens in such a way that it is impossible to separate out the two. Any partial resolution of this indeterminacy is brought about by what she calls an “agential cut” which “enacts a local resolution within the phenomenon of the inherent ontological indeterminacy” (Barad, 2003, p 815).

Mutch raises a number of criticisms of Barad's work, and hence of sociomateriality more generally. In brief: i) that her interpretation of quantum theory is itself contentious (Norris, 2000) and her generalization of this to non-physical realms such as the social world even more so; ii) that the focus on the actuality of practice loses the temporal dimension of analysis, ignoring the fact that social structures already pre-exist those acting at a particular point in time; iii) that empirical studies have found it difficult to actually operationalize this approach, particularly (and ironically) finding it hard to conceptualize the

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