Socio-Technical Influences on Virtual Research Environments

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ABSTRACT

A number of socio-technical aspects that influence interorganizational research collaboration are embedded in local work contexts. Thus, they should be a main concern for the design of virtual research environments. A review of forty papers from different research fields provided an understanding of the influence of eleven socio-technical aspects grouped according to the following categories: nature of work; common ground; collaboration readiness; management style and leadership; technology readiness. There are five main implications for the design of virtual research environments. Emphasis is placed on the importance of consulting the stakeholders so that they suggest solutions and ideas, and imbue the collaborative environment with the values required for it to be sustainable.

Keywords: *Collaborative Work, Information Sciences, Socio-Technical Paradigm, Values, Virtual Organization*

INTRODUCTION

This paper provides a selective review of peer-reviewed literature on interorganizational research collaboration with the aim of giving the reader an understanding of the socio-technical aspects[1] of work organization that encourage or inhibit initiation and sustainment of this type of collaboration. Some socio-technical aspects sitting at the heart of successful or unsuccessful collaboration are embedded in local work contexts. They are critical because when people start collaboration, they do so within an existing structure of practices that characterizes their organizations, and within a structure of purposes sustained by their organizations. Collaboration is not necessarily natural and straightforward but is likely to raise personal, political and professional challenges, and to put at stake identities and interests of some of the participants. Therefore, understanding how socio-technical aspects of work organization either generate positive effects on collaboration or resistance to it, is a main concern for the design of interorganizational virtual research environments. This paper examines two research questions:

- Which socio-technical aspects of work organization are more likely to influence the uptake and sustainment of research collaboration?
- What implications can be derived from the reviewed literature for the design of organizational processes that support virtual research environments?

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As the literature on research collaboration is diverse and voluminous, a review on this topic needs to be selective and set some limitations. When addressing the two questions, the focus was on interorganizational collaboration: (a) within university, and between university and public sector, with few incursions into business settings; (b) across geographic distances where information and communication technology (ICT) plays a role.

I sourced literature, including empirical and conceptual papers, mainly from the areas of collaborative work environments and virtual research environments, with incursions into other disciplines such as information systems, research policy, and social science disciplines concerned with the design and management of knowledge communities and social networks. Forty papers are included in the review. Given the qualitative nature of the majority of the included empirical studies, I chose a traditional narrative form for this integrative review.

The paper is organized as follows. It first defines the concept of research collaboration. It then concentrates on the analysis of the socio-technical aspects of work influencing collaboration. Some final remarks on some emerging implications for the design of virtual research environments conclude the paper.

DEFINITION OF RESEARCH COLLABORATION AND VIRTUAL RESEARCH ENVIRONMENT

The term "research collaboration" is so commonly used that it is apparent that its meaning is fairly understood. Katz and Martin (1997) pointed out that there is a tendency to think of collaboration as a single phenomenon, irrespective of the type of collaborators (e.g., individuals, groups, nations, etc.) and the setting in which it occurs. For the purpose of this paper, research collaboration is defined as a social process, taking place in a social context, in which participants interact to share meaning, develop understanding, and perform tasks to achieve a mutually shared superordinate goal, which generally produces knowledge (Sonnenwald, 2007).

Research collaboration is a complex process that requires intentional knowledge and information sharing and joint responsibility for accomplishing the common goals. It often occurs within long-term relationships between participants and follows a developmental trajectory that evolves over time. Research collaboration can be characterized in terms of the disciplines or fields involved, the organizational setting (e.g., intra and interorganizational), and the organizational focus (e.g., university – industry, Triple Helix, etc.). Collaboration can involve participants at different levels, from the micro-level of individuals (e.g., dyads, triads, etc.), to the meso-level of department/institutions, and the macro-level of countries (Sonnenwald, 2007).

To conduct research collaboration, virtual organizations can be created in the form of virtual research environments (VREs), or collaboratories as they are called in the United States (Borda et al., 2006). As defined in the Report of the Working Group on Virtual Research Communities (Borda et al., 2006), VREs are "a set of online tools, systems and processes interoperating to facilitate or enhance the research process within and without institutional boundaries" (p. 3). Their purpose is to provide researchers with the equipment and services they need to do any kind of research as efficiently and effectively as possible, and to enhance collaboration across disciplinary and national boundaries. The research processes that a VRE supports include resource discovery, data collection, data analysis, simulation, collaboration, communication, publishing, research administration, and project management (Borda et al., 2006).

FINDINGS

Eleven socio-technical aspects emerged from the review. I have grouped them together in Table 1 according to the categories identified by Olson et al. (2007).

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