

# Investigating the Potential Uptake of e-Research within a Social Science Discipline: Socio-technical Issues within Library & Information Science

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**Abstract.** We present preliminary findings from a case study of a social science collaborative project involving professionals, faculty members and graduate students. Employing actor-network theory to inform the use of interviews and text analysis, we studied the interplay between socio-technical aspects of work organization and the activities of the actors. Although the study is at an initial stage, we report three main findings: the low level of institutional support was compensated by high autonomy of action and expertise of project members; an artifact had consequences for collocated and remote collaboration; the lack of institutional intellectual property ownership provided flexibility. We conclude that the case shows how e-research and virtual research environments can benefit graduate students, professionals and non-elite researchers, who may have fewer opportunities to travel and engage in research work together.

## Introduction

The multidisciplinary social science field of Library and Information Science (LIS) focuses on the use of technology in information environments. These environments are socio-technical systems, involving technologies, people (e.g., end-users, researchers, information professionals, system developers), practices, data, ontologies and many other components, all interacting with and shaping each other (Van House, 2004). LIS has long played a valuable role in economic development and society in general. A recent study (British Library, 2004) calculates that, for every £1.00 spent in public support of public libraries, a return of £4.40 was seen in terms of gross regional product and time and money saved. A study in Norway showed that Norwegians are willing to pay 5 times what they now pay through taxes to support public libraries (Aabø, 2005.) It is estimated that one out of every six people worldwide is a registered library user (OCLC, 2003.) Furthermore, corporations lose between 2.5 and 36 million € per year (per 1000 employees) due to lost time employees spend searching for information ineffectively (BusinessWire, 2002; Buntine et al, 2004.) Clearly, LIS is an important discipline.

Despite its importance, it is still unclear what the potential of e-research is to advance both research and practice in LIS. Discussion regarding this has started only recently (e.g., Terras, 2006), and a number of practical and methodological challenges and barriers to the uptake and use of e-science in LIS emerged during a recent Library and Information Studies Expert

Seminar (Terras, 2006). Challenges are both practical, such as gaining access to technologies and understanding their use, and methodological, such as defining which research questions in LIS can e-research respond to. There is also the risk that the use of e-research would add to the numerous gaps between researchers and professional in LIS, including different professional motivations and different priorities and demands, among others (Haddow & Klobas, 2004). We ourselves have encountered a dearth of collaborative projects involving LIS researchers and professionals after looking for cases in three European countries through four professional mailing lists and other contacts. Indeed, we managed to find two cases and here we present one of them.

## Purpose of the study and theoretical perspective

We have conducted an exploratory case study (Yin, 1993) investigating collaboration among information practitioners, and LIS university faculty and students in Italy. Specific studies of collaborative projects can provide accounts of how heterogeneous networks of people, practices, technologies, materials and other aspects of work organization interact with and influence each other in the process of accomplishing work. They can highlight the contextual and disciplinary circumstances in which collaborations form and develop. Identifying discipline- and project-specific issues is relevant for investigating the potential uptake of e-research in LIS, as most existing virtual research environments (VREs) (Borta et al., 2006) are technology-intensive and concern large-scale experiments or developmental work in sciences and engineering (SoC, 2003; Sonnenwald, 2007). Specific prospects and challenges for a VRE in LIS may benefit from considering disciplinary, cultural and professional differences because every collaborative project is a contingent socio-technical process involving negotiations between people, artifacts and technologies, each bringing different interests to bear (Lin, Procter, Halfpenny, Voss & Baird, 2007). Thus our research question guiding this study is:

How do socio-technical aspects of work organization interplay with the heterogeneous interests of different actors in a collaborative project between LIS researchers and practitioners?

The research design, data collection and data analysis were informed by actor-network theory (ANT), in particular by Callon's (1986) model of translation of interests. We followed the actors and the networks involved in the project. In ANT's vocabulary, an actor is anything that is doing something, anything that is causing others to act (Callon, 1991). Actors can be people, but also sea scallops, as in Callon's study of a network of marine biologists (1986), or technology within a company, or data supporting a scientist's arguments. We used ANT to conceptualize collaborative work as a process of negotiation and construction of outcomes, which entails the continuous engagement of people, artifacts, practices, and organizational policies. We were interested in following the micro-level social processes by which collaboration started, ideas were accepted, and tools and methods were used. Socio-technical aspects were not conceptualized as external to collaboration but enacted through interactions with the local actors.

## Case Study

Semantic OPACs (SemOP) is a distributed and collaborative project that was conducted in Italy. Human actors included a core group of coordinators consisting of three information professionals and one LIS faculty member each working at different institutions and in different geographical locations. Other human actors included 13 graduate students and

several volunteer information professionals, all of whom were enrolled as research assistants. Non-human actors included a LIS graduate course on electronic documentation, a sample of Italian open public access catalogs (OPACs), subject indexing, and an evaluation checklist. SemOP was initiated because the coordinators thought it was important to evaluate semantic access and search functionality in web OPAC interfaces. Therefore, they developed an evaluation checklist of possible semantic search features. Understanding this checklist became the obligatory point of passage (Callon, 1986) for all research assistants, that is, it was necessary for them to use this checklist to participate in the project. In fact, the checklist was an artifact inscribing principles of subject indexing and classification, which the coordinators believed had to be applied during the evaluation. The checklist embedded rules about what a good OPAC interface should be. Together, all the actors (people, OPACs, checklist and subject indexing) were expected to form and sustain a network to evaluate a non-random sample of 25% of all OPACs registered in Italy. Except for course lectures and one kick-off meeting, communication among project team members was expected to occur entirely via email and a project listserv. However, this did not happen, that is, additional face-to-face meetings were needed.

## Method

Research data include transcripts of recorded semi-structured interviews with project team members and a variety of texts, or literary inscriptions (Callon, 1991). Interviews were conducted with two project coordinators (one librarian and one faculty member), four students and two volunteer information professionals. Additional interviews are underway. The average length of the interviews is 50 minutes. Texts included messages distributed through the project listserv over 13 months, the project web site, internal project documents, and several papers written by the project participants at the end of the project.

Analysis involved close study of data sets extracted from all data sources, to highlight processes of translation and socio-technical aspects of work. We focused our attention on the associations between such processes and aspects. Socio-technical aspects used in the analysis were those emerged from a literature review that we conducted drawing from previous studies of inter-institutional research collaboration in academia and between academia and community-based organizations. In these studies, we identified a number of distinct socio-technical aspects that influence research collaboration. These include, among others: nature of work (Olson & Olson, 2000); incentives and rewards (Olson & Olson, 2000; Arzberger & Finholt, 2002); current work practices (Sonnenwald, 2007); formal management structures and organizational policies (Cleal, Andersen, & Albrechtsen, 2004). Findings from interview data were triangulated with findings from the analysis of texts.

## Discussion of initial findings

In this short paper, we concentrate on three main findings. One, the low level of institutional support in this case was compensated by high autonomy of action and expertise of project members. Two, the evaluation checklist had consequences for collocated and virtual work. Three, the lack of institutional intellectual property ownership provided flexibility needed for project enrollment and success.

### Low level of institutional support

SemOP was not granted external funding, had no budget, nor expenditures. Participation was on a volunteer basis, except for the students who received course credit for their participation. Project coordinators (except the faculty member) and collaborators worked mostly outside

regular working hours and used software and hardware either from work at the different employers' locations or from home. There were no support staff, no contract or other legal agreement tying either individuals or their institutions to the project.

SemOP was a distributed project based on interactions among participants (Luhmann, 1995) rather than on a permanent arrangement of elements and predetermined governance mechanisms. Interview participants described SemOP as an informal, non-hierarchical group, whose working relationships remained spontaneous and largely unmanaged, arising from their collaboration within the project. SemOP did not have strong institutional affiliations. The coordinators decided autonomously to set up the project in an institutional environment characterized by lack of clear funding criteria and supporting structures. In the words of one of the coordinators:

If I were to change university, if T. was to change university, and more so, if J. was to change the company she works for, our collaboration within the project would not change at all, because we are in it as individuals and not as representatives of an institution.

SemOP achieved a temporary stability because the coordinators were successful in aligning the interests of the network and making the project work. This approach "black-boxed" the employing institutions and their non-acting in relation to the project. That is, institutions were macro-actors (Callon, 1991), which neither resisted nor encouraged the project explicitly. Their non-acting was made invisible by the ability of the coordinators to set it up despite little institutional help (there was some help from local IT staff), and by the relative success of the project. The freedom that the project coordinators enjoyed to set up and work with the project is linked to this low level of support from their institutions. For example, academic practices including standards about co-authorship and publication venues did not influence the choices of the participating faculty member. He chose the collaborators and the subject to work with, as well as where and how to publish his work with little concern for academic standards regarding scientific publications.

Independence from institutional practices can be seen as either an element of risk for sustainability for a project or an element of freedom. On one hand, the low institutional support limited the organizational capacity of the project and underscored a process of bottom-up mobilization of heterogeneous "things", e.g., from students' enrollment to the use of the departmental server to host the project web site. On the other hand, this lack of support also afforded the coordinators autonomy from their institutions. Similarly, a lack of people who can dedicate time to a project can be an ongoing problem for its sustainability, but this very feature also encouraged the core group to create a space for other part-time actors who brought their professional expertise to the project and quickly became much needed hands. As a collaborating information professional made clear, it was the emerging and self-organizing nature of the project that opened the door to her. The very fact that the project was not institutionalized and lacked full-time staff created opportunities for other part-timers, allowing the project to make use of the professional expertise of some collaborators and to enable novices. i.e., the students, to develop such expertise.

## Collocated and remote collaboration

The checklist, which identified all possible important OPAC features and was used to evaluate OPACs, introduced unplanned complications. When the students approached it, they found it difficult to understand and use. However, it was possible to discuss the checklist and re-negotiate it. The checklist became a tool that instigated collaborative practice and open discussion – rather than something handed down. As a student put it "*Had they given us a*

*fixed list, completely fixed, we would have not had all the collaboration we had*". The checklist raised doubts and questions and induced the students to take an active role in the clarification of OPAC features.

In addition, the checklist enabled collaborative knowledge creation: students talked, examined OPACs using the checklist, and compared experiences to improve their understanding and the checklist. The need for clarification induced a process of collocated collaboration between individual students and between the whole class and the faculty member. It also induced a process of remote collaboration between the students and the coordinators. As interviewed students recounted, collocated collaboration and remote collaboration via the listserv with their respective verbal and written communication modes, enacted distinct modes of knowing. Synchronous verbal communication allowed far easier understanding and coordination than asynchronous communication and made it easier to discuss complex problems. For example, participants preferred to show and see OPACs and point to problems directly and immediately. Remote communication enabled a better theorization of a problem, by allowing participants time to think about what they wanted to say and how to formulate their thoughts. This finding confirms the difficulty of dealing with complexity and ambiguities at distance (Olson & Olson, 2000) and shows how collocated work plays a crucial role for understanding and accomplishing work. The listserv also supported information sharing: it enabled all the participants to be aware of what others were talking about at every point in time. The listserv provided an additional meeting space for the class and enabled all the projects participants to concentrate their attention on specific issues, when they emerged.

## Lack of institutional intellectual property

SemOP coordinators created most of the project texts or inscriptions, including their data collection instruments, results summary and publications, openly accessible to increase the impact of the project by encouraging sharing and use. The project web site has become a simple repository where anyone can read, download, copy, and use documents, provided that the authors are properly acknowledged and cited. By sharing these inscriptions, the project is no longer fixed and closed but open to follow-on collaborations. The lack of institutional intellectual property ownership has provided flexibility in this regard. Italy is one of the few countries in the world enacting a "professor's privilege" system, in which university employees are generally sole owners of their intellectual property and are not pressured by the university to protect intellectual property through restrictive copyrights, licenses, patents, or other agreements. Professor's privilege allows flexibility for individuals to greatly determine the creation and fate of their intellectual property, which can be important in collaborative projects. Professor's privilege also allows universities flexibility to reward efforts that bring small benefits to departments, which can be important in projects with no external funding.

## Implications for e-social science and conclusion

The findings in this short paper are based on the analysis of collaboration across distances between researchers and practitioners in LIS in Italy. The results highlight some key socio-technical aspects influencing e-research. Lack of external funding and lack of intellectual property regulations did not hinder the project, and do not appear to be the most critical issue for future sustainability because a subsequent follow-up project is underway. On the contrary, these issues enabled the participation of qualified professionals. Similar to open-source projects (Markus, Manville, & Agres, 2000), the availability of qualified professionals to volunteer appears to be very beneficial for VREs in the social sciences. Like other social science projects (Barjak et al., 2007), SemOP did not need high performance computing or very innovative scientific tools, but used inexpensive and simple technology for collaboration

and data distribution. Despite the critical importance of collocated work for some of the students, SemOP was Internet-based because task accomplishment always rested on the use of web artifacts and on technology-based processes (e.g., communication via listserv, querying OPACs to collect data, submitting spreadsheets with data results). SemOP is a case that encourages us to think in terms of e-research, rather than e-science, since, as the British Academy (2005) affirmed, “e-science is envisaged as more than larger scale e-based science” (p. 63). This way of thinking may have positive repercussions in terms of broadening opportunities for the humanities and social sciences. It may encourage the development of a new generation of e-social science projects and VREs involving students, professionals, researchers and perhaps other groups largely excluded thus far, as they may have fewer opportunities to travel and meet other scientists (Finholt, 2002).

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