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PEER-PRODUCTION FOR COLLABORATION BETWEEN ACADEMICS AND PRACTITIONERS

ABSTRACT

The purpose of this article is to suggest commons-based peer-production as a form of work that can help bridge the gap between research and practice in LIS. The research design is based on two in-depth and longitudinal qualitative case studies of collaborative projects involving LIS academics and practitioners in Italy. Analysis of interviews and texts was conducted to study the interplay between sociotechnical aspects of work organization and the activities of the actors. The results suggest similarities between the collaborative projects analyzed and peer-production activities. This study relies on two cases which cannot be considered either typical or representative of collaboration between LIS academics and practitioners in Italy. This paper offers the opportunity to stimulate a discussion on collaboration between researchers and practitioners in LIS, and on the potential applicability of peer-production to support new forms of collaboration in small-scale, distributed, and unfunded or underfunded projects.

1. INTRODUCTION

Library and information science (LIS) is a field in which a wide gap between academics and practitioners (e.g., librarians and information practitioners) seems to exist because knowledge sharing and collaboration between the two groups is limited (Ponti, 2008). There has been a long tradition of concern in librarianship that much of the research emanating from academia lacks relevance for day-to-day practitioners (Johnson, Williams, Wavell and Baxter, 2004; Booth, 2003). Practitioners do not seem to make good use of the available research as they find that it is either divorced from their areas of concern, or that the presentation impairs understanding and application (Haddow & Klobas, 2004). Although practitioners could enhance evidence-based practice and draw advantage on the value of prior research by participation in research efforts, they are more likely to rely on their practical experience and professional judgement than conducting and disseminating research themselves (Hall & Clapton, 2010; Hall, 2010). As Hall and Clapton (2010) assert, many librarians do not see research as part of their professional role. While they refer to English librarians, this statement is likely to reflect the sentiment of many librarians in other countries as well.

Collaborative research between LIS academics and practitioners can be considered a desirable strategy for bridging the gap between research and practice in LIS (Ponti,

2010a). It provides academics and non-academics with a research approach in which they both work together throughout the entire research process (Nyden, Figert, Shibley and Burrows, 1997: 3). This approach acknowledges diversity of perspectives, and values knowledge, experiences, and connections brought by all participants (op. cit.). It can increase research productivity and quality, whereas practitioners also benefit from a closer partnership and stronger link between theory and practice (Ospina, Godsoe and Schall, 2002:3). In fact, collaborating with practitioners can make research more immediately usable to professional practice (Nyden *et al.,* 1997).

However, despite the virtues of collaborative research, issues and problems arise, especially because of increasingly low levels of funding that characterize LIS. The squeeze on budgets and cost reductions resulting from the recent global economic crisis affects the work of libraries and universities in several countries. Doing more with fewer resources is increasingly a challenge for LIS researchers and practitioners who can be asked to set up a research agenda together (Kenna, 2010). For example, at the Library and Information Science Research Coalition conference held at the British Library on 28 June 2010, it was noted that the current economic situation places pressure on LIS researchers and practitioners in UK to produce research that justifies their existence (op. cit.). For instance, in Sweden, LIS is not represented by the Swedish Research Council, one of the main funding agencies, which does not include a decision-making body allocating resources to this field (Swedish Research Council, 2010)]. Time

is thus opportune for a discussion about different ways of facilitating collaborative research, as well as for suggesting ways to cooperate and use tools that might have not been considered in the past. Collaborative research might benefit from nurturing loose virtual communities of external contributors involving LIS academics and practitioners who share interest, when funds for research projects are scarce or non existent, and even in-kind matches of staff time for research project-related duties can be unavailable or discouraged It could be a way not only to provide the means for a project to start and develop, but also to provide an opportunity for participants to communicate, share ideas, and enable a new type of peer-to-peer networking. Grassroots collaborative research between LIS researchers and practitioners can especially benefit from decentralised cooperative projects. How can these projects be started and developed when funding is scarce or non existent? Peer-production may offer an opportunity for LIS academics and practitioners to conduct decentralised cooperative projects by means other than contracts and financial compensation.

The purpose of this article is to suggest commons-based peer-production (hereinafter peer-production) (Benkler, 2006) as a form of work that can help bridge the gap between research and practice in LIS. The nature of peer-production – in which individuals act in response to their own needs and interests in a decentralized and mainly voluntary manner – holds the potential to support forms of joint-research work that builds on the expertise and knowledge of both academics and practitioners, without

privileging one kind of group over the other. Furthermore, peer-production may offer a way for LIS academics and practitioners to engage in collaborative research when levels of funding are low or non-existent.

This article presents two case studies of small-scale, distributed and collaborative projects that were conducted in Italy and involved LIS academics, practitioners, and – in one case – graduate students. These two cases provide insights into the potential applicability of peer-production to collaborative research in LIS, and offer the opportunity to begin to uncover the sociotechnical[i] aspects that can lead LIS academics and practitioners to engage in this form of collaboration. In this study, collaboration was also conceptualized as a heterogeneous sociotechnical process in which people, artifacts, information, and technology mutually constitute and influence each other (Bijker, 1995).

This article is organised as follows. First, I give a brief description of the notion of peer-production and its potential to support collaborative research. Then, I address the theoretical assumptions and methods used in this study, followed a narrative summary of the two cases and the presentation of key findings. Finally, I discuss some implications of the findings for the applicability of peer-production to collaborative research in LIS.

2. PEER-PRODUCTION: PRINCIPLES AND AREAS OF USE

Commons-based peer production is a sociotechnical form of production, in which individuals decide autonomously to cooperate in group collectives – large and small – to contribute towards a common and significant goal, in a more-or-less informal and loosely structured way, and produce a shared outcome (Benkler, 2006). Most participants are volunteers and work in their spare time. They act in response to their own needs and interests, are neither bound by contracts, nor attracted by monetary compensation, and participate out of the joy of doing so, or for other internal or external motivation (Benkler and Nissenbaum, 2006). Benkler and Nissenbaum explain that two main features characterize peer-production. One is decentralization. Individual participants have authority to participate and act, without being imposed actions by a central organizer, such a project coordinator. The other is the presence of social motivations, instead of prices or hierarchical commands, to drive participation of participants. Peer production shows three recurring attributes. First, activities involved in this form of production must be broken down into small units, or modules, to facilitate incremental and asynchronous contributions of different people, with different capabilities and available at different times. Second, these modules should be at different levels of granularity to allow people to make small or large contributions, depending on their levels of motivation and availability. Finally, integration of

individual modules must include quality controls of the modules and low-cost mechanisms for integration into the final collective product (op. cit.).

Peer production stems from the growth of digital networks and represents one of the increasingly diversified forms of information and knowledge production (Benkler, 2006). Benkler identified two main reasons for the emergence of peer-production. One is the access to a basic physical capital (e.g., computers, network connections, and software) necessary to create digital materials and communicate and cooperate with others at distance. The other is the possibility to tap into a huge pool of human talent, interest, knowledge, and experience, which many people are willing to contribute and share for a cause they are interested in.

The development of free and open source software (e.g., GNU/Linux and Apache) is the most salient example of peer production. Other significant projects exist in other areas, such as distributed computing (Benkler and Nissenbaum, 2006). Peer production in distributed computing has given rise to instances of citizen science, in which thousands of "volunteers partner with scientists to answer real-world questions" by performing or managing research-related tasks such as observation, measurement, or computation in relatively small increments (Cornell Lab of Ornithology, 2007). Three examples of these citizen science projects are SETI@home, Clickworkers, and eBird. In SETI@home (http://setiathome.berkeley.edu/), a scientific experiment that uses Internet-connected computers in the Search for Extraterrestrial Intelligence (SETI),

millions of volunteers from around the world use their own computers to run programs and contribute the results to the project. In the NASA, Clickworkers experiment, thousands of amateur astronomers collaborated to analyse images from Mars, performing tasks that usually require full time PhDs working for months on end, at a level of quality indistinguishable from that of professional scientists. In eBird, a project coordinated by the Cornell Lab of ornithology, thousands of amateur ornithologists collect data about birds and are providing an unprecedented look at the distribution and migratory patterns of many birds.

Benkler and Nissenbaum (2006) noted that these three projects indeed expand opportunities for scientific data collection and provide access to scientific information for community members, and involve relatively mundane and small-scale contributions. Other projects exist in which peer production has taken richer forms, and where contributions are larger and require more of the knowledge of participants and their willingness to participate in a cohesive social process (op. cit.). The online encyclopaedia Wikipedia is probably the most well-known example of these richer forms of peer production.

As far as LIS is concerned, Holley (2010) noted that libraries have not attempted to use peer-production on any significant scale so far, although they might benefit from conducting projects for the common good and from harnessing digital volunteers[ii]. One successful attempt to use such an approach is the digitization of newspapers and

correction of OCR errors undertaken by the National Library of Australia. This remarkable newspaper service is not a research project though.

In peer production the role of technology is critical and not simply instrumental. For example, in Wikipedia the use of wiki as collaborative authorship tool that allows any user to create, modify, and update content via web browser and records and renders all the individual interventions in a common project, supports an open discourse, which is "inherently democratic", because every user has exactly the same capabilities as any other (Leuf and Cunningham, 2001), and relies on the self-discipline of participants.

3. EXPLORING COLLABORATIVE RESEARCH IN LIS: RESEARCH DESIGN

Although librarians and information practitioners participate in various forms of inter-institutional collaboration, as reported in a vast literature, both academic and professional, there is an apparent lack of documented cases of collaborative research involving LIS academics and practitioners. The two qualitative case study projects reported in this article aimed to look closely at this type of collaboration by examining how and why collaboration between LIS academics and practitioners initiated and developed over time.

3.1 Literature Review

A selective review of scholarly literature on inter-organizational research collaboration in academia and between academia and community-based organizations was conducted before starting the field work (Ponti, 2010b)[iii]. The literature on collaboration is diverse

and voluminous, thus any review of this topic needs to be selective and set some limitations. As the primary interest was in the development of collaboration between a social science discipline (LIS) and a professional practice that is traditionally nonprofit/public, the main focus was on collaboration between individuals and groups: (a) within university, and between university and public sector; and (b) across geographic distances where information and communication technology (ICT) plays a role. Literature was sourced primarily from the area of scientific collaboration, with incursions into information systems, research policy, and social science disciplines concerned with the design and management of knowledge communities and social networks. As for the LIS field, a vast literature – both academic and professional – exists on various forms of inter-institutional collaboration, including interlibrary consortia, federating systems, information communities and twinning relationships. Information practitioners participate in a broad array of partnerships at all levels of practice (Webster, 2006). However, there is an apparent lack of documented cases of collaborative research involving practitioners and academics in LIS.

Eleven sociotechnical aspects influencing collaboration were identified and grouped together in Table 1 according to the factors described by Olson *et al.* (2008). These factors include the nature of work, the amount of common ground among participants, participants' readiness to collaborate, participants' management style and leadership, and technology readiness. In this study, these aspects were not seen as causes that allow

deducing success or failure of collaboration, but as opportunities, constraints, circumstances, and antecedents for collaboration.

Nature of Work	Common Ground	Collaboration Readiness	Management Style and Leadership	Technology Readiness
Nature of work	Common ground	Incentives and rewards	Management structures	Integrated use of ICT
	Tacit knowledge and transactive knowledge	Collaboration goals and the need to collaborate		
		Current work practices		
	History of collaboration among participants	Shared collaborative culture		
		Mutual trust		

Table 1. Sociotechnical Aspects Influencing Collaboration

Nature of work relates to the level of coupling of work and refers to the amount and frequency of communication needed to complete a task (Olson & Olson, 2000; Birnholtz, 2007). Tightly coupled work is non-routine, can be ambiguous, and requires greater interdependence. On the contrary, a loosely coupled work has fewer dependencies, is more routine, and tasks and procedures are clear. As a result, less amount and frequency of communication is needed to complete the task.

Collaboration requires effective communication which relies on people having a certain degree of common ground consisting of shared mutual knowledge, beliefs and

assumptions (Olson & Olson, 2000). History of collaboration among participants can contribute significantly to the development of common ground. (Olson, Teasley, Bietz, & Cogburn, 2002; Mattessich, Murray-Close, & Monsey, 2000). Through shared past experiences and personal relationships, participants also develop mutual trust and understanding, and transactive knowledge about each other's knowledge, expertise, methods, working styles, and available time and commitment (Olson & Olson, 2000; Haythornthwaite, Lunsford, Bowker, & Bruce, 2006). As Widén-Wulff and Ginman (2004) pointed out, joint-efforts allow developing a social capital that enable people to work together more effectively to pursue shared objectives.

An appropriate system of rewards and incentives – both internal and external – is positively related to collaboration readiness, because it helps develop a positive attitude towards knowledge sharing and collaboration. (Corley, Boardman, & Bozeman, 2006; Barrett, Cappleman, Shoib, & Walsham, 2004; Hara, Solomon, Kim, & Sonnenwald, 2003; Olson & Olson, 2000). Collaboration – especially when it occurs at distance – must be worth the effort. People must feel the need to collaborate (Karsten, 1999) and must have clear goals that expound the reasons for collaboration (Olson et al., 2002b; Barrett et al., 2004). Therefore, people must perceive it as bringing benefits over their current work practices, and as complementary or compatible with existing institutional policies and norms (Sonnenwald, 2003; 2007).

Management structures such as formal mechanisms of communication and coordination can be necessary to organize and conduct activities in remote locations, because people are used to doing things in collocation. Clear formal management plans are considered necessary to organize and run activities in large scale, remote and diverse scientific collaborations (Olson *et al.*, 2008). In relation to collaboration technology readiness, a number of qualitative empirical studies of the use of technology in collaborative work indicate that the successful use of collaborative technology, as well as the ease and readiness with which it is acquired, depends on its fit with people's patterns of everyday activities and/or their willingness to change work practices to adapt them to technology, and on the existence of a culture of sharing and collaboration (Allen-Meares, Hudgins, Engberg, & Lessnau, 2005; Ruhleder, Jordan, & Elmes, 1996; Olson & Olson, 2000).

3.2 Theoretical Perspective

In this study, the two collaborative projects were conceptualised as sociotechnical processes in which people, artifacts and tools negotiated with and influenced each other. Following actor-network theory (ANT), an approach founded by Bruno Latour, Michel Callon, and John Law in Science and Technology Studies to describe and explain the entanglement of the social and the technological, these projects were considered emerging rather than stable entities. Instead of viewing these project as "end products" and looking at how contextual sociotechnical aspects influence them, ANT suggests that the researcher changes the temporal point of departure and studies collaboration "in the

making", as a process of construction (Latour, 1987). Furthermore, ANT can help uncover the negotiation of goals and plans, which are not seen as independently generated foundations from which collaborative activities can spring. Therefore, a collaborative project is developed and revised *in itinere* by the participants involved, who negotiate interests and needs, overcome resistance, settle conflicts, and try to figure out if the existing resources allow doing the work.

This theoretical choice implies that the researcher follows the actors involved in the process and reconstructs the associations of events, decisions, practices, artifacts, tools, and institutions surrounding the construction of collaboration.

The following section describes the research design used in this study, including discussion of the methods, the characteristics of the study participants, and data collection and analysis. Then, the two cases are introduced briefly.

3.3 Methods and Study Participants

This article presents two case studies describing how two collaborative projects involving LIS academics and practitioners had developed from the start to their completion. The two case studies were:

- Retrospective: Semantic OPACs (SemOP1), 2003-2006, 21 participants: one academic, seven practitioners, and 13 LIS graduate students.

- Real-time: Semantic OPACs (SemOP2), 2007-2008, 17 participants: one academic and 16 practitioners.

The case study method was chosen for three reasons. First, this study focused mostly on "how" questions about distributed projects between LIS academics and practitioners. Apparently, this type collaboration has not been thoroughly researched yet, thus a case study is a proper method to use. Second, the complex ecological circumstances in which collaborative projects occurred required a method that attempts to generate a holistic understanding of the processes of inception, development, and completion. Third, case studies can contribute to theory development (Eisenhardt, 1989). Although Eisenhardt refers to multiple and iterative cases driven by *a priori* testable hypotheses and to the development of theory generalizable across settings, she also appreciates the ability of this method to build novel and empirically valid theory.

Data were gathered through semi-structured interviews and texts. Collaboration can be seen to be connected to material forms of representation, such as literary inscriptions or texts (Callon, 1991). The metaphor of the "inscription" points to the idea that the processes of collaboration can be seen as being "written" and "read" (e.g., Martin and Veel, 1998). These processes are historically and socially situated so that one can speak of inscriptions as representations being inscribed into a certain practice of collaboration, which, in turn, can be described through the inscriptions pertinent to that specific practice. Collecting relevant texts provide the opportunity to map and examine multiple

social aspects, since they inscribe social practices and decisions and speak for the values and interests of the actors involved at points in time.

All the participants in the two projects were invited for an interview. Most of the interviews took place on the phone, because participants were distributed across Italy. After an interview, when needed, follow-up emails were used to clarify points, or to ask questions that were not asked previously. In a few cases participants also volunteered or requested to read the interview transcriptions and suggested changes/additions. In the case of SemOP1, it was not possible to gain access to all members, in particular to the graduate students. As four years have passed since the completion of their Master's program, all their contact details were no longer available. Of the 13 student in SemOP1, four were interviewed. Although a higher number of interviews would have generated a more comprehensive view of the students' perspective, it must be noted that the class was a relatively homogeneous population with narrow objectives. The small group of students shared a common experience and a number of characteristics (e.g., previous educational background, region of origin, age range, and degree of knowledge about the topic of the project). Given this particular cultural setting, it can be assumed that even four individuals can give information that can provide insights into the degree to which this information can be extended to the rest of the class (Guest, Bunce and Johnson, 2006)[iv].

22 interviews were conducted with 22 study participants in the two projects. Interviewees included librarians and information practitioners from various institutions across the country, one LIS academic, and LIS graduate students. Five were male and 17 female. The majority had a master's degree in areas related to information studies. Additional background information on study participants appears in Table 2.

ROLE OF STUDY PARTICIPANT PER PROJECT	INSTITUTION	JOB ACTIVITIES
SemOP1		
Associate Professor of Library and Information Science	University of Venice	Teaching, research
Library Professional	University	Library management, research in classification theory, teaching
Library Professional	University	Collection management
School librarian (Former Master's Student)	Upper secondary school	Library management
Ph.D. Student (Former Master's Student)	University	Thesis on history of book
Archivist (Former Master's Student)	Free-lance	Archiving
Library Professional (Former Master's Student)	City museum	Archiving

ROLE OF STUDY PARTICIPANT PER PROJECT	INSTITUTION	JOB ACTIVITIES
Information Architect (External Collaborator)	Environmental regional agency	Portal information design
SemOP2		
Associate Professor of Library and Information Science	University	Teaching, research
Library Professional	University	Library management, research in classification theory, teaching
Library Professional	University	Collection management
Assistant Librarian	University	Administrative work
Library Professional	University	Cataloguing
Officer in the Citizen Information Service	Regional Authority	Back-office, front-desk
B.A. student in Digital Communication		
Library Informatics Expert	Interuniversity consortium	Library automation
Head Library Professional	University	Library management
Head Library Professional	University	Library management
Officer in the Citizen Information Service	Regional Authority	Database management
Lecturer/Information	University	Academic teaching/

ROLE OF STUDY PARTICIPANT PER PROJECT	INSTITUTION	JOB ACTIVITIES
Professional		information retrieval, cataloguing of ancient books
Library Professional	University	Database management
SemOP2 (Drop-out)		
Library Professional	Public library	Library management

Table 2. Background of Study Participants.

Interviews lasted an average of 40 minutes, with a range of 21 minutes to one hour and 20 minutes, depending upon the extent of the interviewee's participation in the project, and his or her time constraints. Texts collected included all the available documents produced during the projects, and other texts related to the context of the projects. Texts included journal papers, spreadsheets, web materials, and all the messages posted in two mailing lists

3.3 Data Analysis

The data were analyzed using the 11 sociotechnical aspects identified in the literature as sensitizing devices (Bowen, 2006). Analysis occurred in three steps. During the first step, thick narratives of each case were produced, which described the participants, their competences, their activities, and how they formed and developed each project by aligning their interests (Ponti, 2010a). The second step was event-structure analysis

(ESA), a qualitative method for analyzing and understanding the logical sequence of events through which social activities unfold (Heise and Durig, 1997). ESA has been used mainly to analyze historical processes, individual motivational processes, and organizational change (Hager, 1998). ESA deploys temporal order, connectedness and unfolding of events in a narrative, helps infer causal links among actions constituting events, and identifies their contingencies and consequences (Griffin, 1993). ESA was used to examine the interplay between sociotechnical aspects and actors' decisions and actions through the processes of inception, development, and completion of each project. The third step was the search for cross-case patterns.

3.5 The Two Cases: SemOP1 and SemOP2

SemOP1 and SemOP2 were two collaborative projects conducted in Italy. SemOP1 and its follow-on SemOP2 were both conceived because the project coordinators (hereinafter coordinators) thought it was important to evaluate semantic access and search functionality in web OPAC interfaces provided by Italian libraries.

Participants included a core group of coordinators consisting of practitioners and one LIS academic, each working at different institutions and in different geographical locations. In SemOP1, the other participants included 13 LIS graduate students and several volunteer practitioners, all of whom were enrolled as research assistants. In SemOP2 the other participants included 17 volunteer practitioners who were recruited as evaluators through national mailing lists for librarians and information practitioners.

Artifacts and tools participating in the projects included a LIS graduate course on electronic documentation (SemOP1 only), a sample of Italian open public access catalogs (OPACs), subject indexing, and an evaluation checklist. To evaluate semantic access and search functionality in web OPAC interfaces, the coordinators developed a checklist of possible semantic search features. Understanding this checklist became the obligatory point of passage (Callon, 1986) for project participants, that is, it was necessary for them to use this checklist to evaluate web OPAC interfaces. 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 participants (people, OPACs, course on electronic documentation, checklist, and subject indexing) were expected to form and sustain a network to evaluate a non-random sample of OPACs registered in Italy.

In SemOP1, communication and collaboration between the students and the academic were mainly collocated, whereas communication between the students and the remote coordinators occurred primarily via a mailing list. In SemOP2, communication among project participants occurred primarily via email and a mailing list.

In both SemOP1 and SemOP2, the coordinators made most of the projects' outputs, including their data collection instruments, the spreadsheet with the findings, and the publications, openly accessible to increase the impact of the projects and encourage

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. Project outcomes included a paper published in an Italian-language journal that disseminates articles of interest to both information practitioners and academics and presentations of results at two conferences.

4. RESULTS

The following sections present the findings related to the aspects of the two projects that reveal attributes and principles of peer-production. The sociotechnical aspects that led LIS academics and practitioners to engage in this form of collaboration are highlighted. The findings are related to the results of previous studies in the reviewed literature.

4.1 Lack of Resources and Institutional Support

The initiation and development of the two projects arose from the alliance of LIS practitioners driven by a clear professional interest, and a LIS academic driven by teaching and learning concerns (in SemOP1) and intellectual interest (in SemOP2). What caused this alliance to occur were the practitioners' lack of human and financial resources on one side, and the need of the LIS academic to find a suitable topic for his course on electronic documentation on the other side.

SemOP1 and SemOP2 originated from informal and spontaneous exchanges of emails among the coordinators, and developed as open and autonomous projects, without

formal institutional ties and no external funding. Being projects without institutional affiliations, the coordinators thought it was unnecessary to inform their employers about their participation and, in return, the employers were indifferent to the projects. This comment from the LIS academic sheds insights into the lack of institutional support surrounding SemOP1:

If I were to change university, if the other coordinators were to change employers, our collaboration within the project would not change at all, because we are in it as individuals and not as representatives of our organizations… the fact that we mention these affiliations with our organizations has, for the most part, only a nominal value … As for my university, well... I do not even think they know what's going on. I actually think that they do know what's going on, only because these things are available to the public via the web. I have never discussed with them or asked them for any funding...because in reality I do not use any university facility per se, and I wouldn't even know who to ask to.

The two projects had neither budget nor expenditures. Participation was on a volunteer basis, except for the students who were obliged to take part and received course credits for their participation. Project participants 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

agreements tying either individuals or their institutions to the projects, and no reporting operations and obligations that would arise had the projects been funded.

Both the projects achieved a temporary stability because the coordinators were successful in integrating the interests of all the participants and in making the projects work. The institutions employing the coordinators acted "neutrally"[v], in the sense that they did not exert pressures and expectations on them. Thus, they did not respond to the coordinators' idea with an "antiprogram of action" (Latour, 1991). The coordinators did not ask their employers to take part in the projects, because they knew that they were not interested. The freedom enjoyed by the coordinators to set up and work with the projects was linked to this lack of institutional support, which provided them with an opportunity to use their social ties and aggregate many small and distributed resources. Project participants were able to leverage upon this institutional "indifference" to their advantage. For example, academic practices, including standards about co-authorship and publication venues, did not influence the choices of the participating LIS academic. 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.

If, contrary to what actually happened, the coordinators had sought financial support – in the form of departmental grants, for example – might they have been successful in the Italian context of library and information science? The accounts of the coordinators

provided a clear perspective on this crucial point. In Italy, LIS is a low status discipline receiving little or no grant funding and, given the focus of the LIS academic's department on subjects such as ancient books and history of libraries, the probability of success for obtaining funding for the two projects would have been minimal. As the academic made clear, preparing a proposal is time-consuming and the expected return on labor (e.g., a departmental grant amounts to 2000 Euros) does not compensate for the time involved. It is a disincentive to him. The constraining role of academic institutions seems to be clear in this respect. Universities constrained the coordinators' choices by restraining resource allocation through cumbersome mechanisms that discourage people from applying for funding, because the transaction costs that they should incur (e.g., the time and effort required to understand the rules, to find suitable partners, and to write the proposal) far exceed the gains that they would obtain. If we add to this aspect the fact that SemOP1 and SemOP2 did not touch interests perceived as important by universities, the result is the establishment of unaffiliated projects which were not embedded in a network of interdependence among institutions. The projects remained stand-alone, not being part of a broader organizational or national strategy.

4.2 The Opportunity for External Expertise

Lack of institutional support can be seen either as an element of risk for a project's sustainability, or as an element of freedom. Participants in SemOP1 and SemOP2 did not have to conform to rules or institutional requirements, but they did not either receive

support or legitimacy. However, although all organizations, including projects, are shaped within environments that pose technical and institutional constraints, we should not downplay the role of individual agency. The two projects show that individuals can make choices even when the technical and institutional environment does not offer incentives or support. For example, in SemOP2 none of the interviewed participants informed the employers – mainly university libraries – about their participation. One evaluator explained eloquently:

When I decided to participate, it was a time when I had a big conflict, a big friction, so to speak, because of some projects that we were carrying out at the university, and I told myself "well, my university does not deserve anything, better to wait for external projects. At least I do interesting things". I had no particular expectations, but to learn new things, to broaden my network a bit, to broaden horizons and, most of all, to visit environments that are not like this narrow mindedness of our universities. I do not think I am the only one in this situation (laughs).

The coordinated activity of individual participants sustained the two projects. A possible explanation for this is twofold. On one hand, the lack of institutional support limited the organizational capacity of the projects and underscored a process of bottom-up mobilization of heterogeneous "things", e.g., from students' enrolment to the use of a coordinator's 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 could be an ongoing problem for its initiation and development, but this very feature also encouraged the coordinators to create space for other part-time participants who brought their professional expertise to the projects and quickly became much needed hands. The very fact that the projects were unaffiliated and lacked full-time staff created opportunities for other part-timers, allowing the projects to make use of the professional expertise of several collaborators, and to enable novices, e.g., the LIS graduate students, to develop such expertise.

4.3 Lack of Institutional Intellectual Property

Both the projects showed the characteristics of commons-based peer-to-peer productions, in which the right to distribute over the right of ownership is a key element (Benkler, 2006). By sharing their outputs, the project has become no longer fixed and closed but open to follow-on collaborations with other LIS academics and practitioners. The open outputs allow anyone with an interest in the project to read, and perhaps participate - and this may increase the projects' impact, whether it is librarians seeking to improve the search capabilities of their OPACs, or looking at the details of a method that can enable them to carry out their own evaluation, or software developers wishing to provide better software for OPACs. As one coordinator pointed out, '*we did this kind of work, anyone can take the findings and do something else'.* Therefore, the projects'

outputs can act at distance to enable others to ask new questions of extant data, to advance the state of the work, and to replicate the study (Borgman, 2010).

The lack of institutional intellectual property ownership provided flexibility in this regard, because it made ownership of data and documentation less complicated. 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 copyright, 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.

The lack of institutional intellectual property ownership also appeared to encourage an "ethos of sharing". Data were produced in unaffiliated projects without grant funding. Therefore, data ownership only had to be decided among the project participants. The coordinators decided that all the project participants owned the data, and that all the data and findings should be released to all, because they thought it was beneficial to the projects and to the Italian community of library and information practitioners. There was no concern for "free riders" because the coordinators did not spend efforts to obtain grant funding and the investment of resources was limited (Borgman, 2007). For them it was the most logical choice to release the data and all the other documents in the public domain. As one SemOP2 evaluator said:

{Making all the project materials openly available} is essential, otherwise the project would be restricted to the few that worked in it and not a tool that can be useful to all.

Although an open discussion among all the project participants on making project materials openly accessible did not occur, the interviewed study participants agreed with this decision and thought that the projects could reach a larger audience and make the work more visible than they could have been by appearing in a subscription journal only.

4.4 Leadership and Coordination Mechanism

The findings of this study indicate that the two Italian projects were organized more as "knots" (Engeström, 2008), that is, as distributed and partially improvised arrangements of collaborative activities bringing together loosely connected actors and activities. In these voluntary projects, the organizational structure (members, tasks, roles, and tools) consisted of a set of relations based on the actions of participants as responses to the practical necessities of the situation at that time.

In contrast to the results of previous studies (Corley *et al.*, 2006; Chompalov, Genuth and Shrum, 2002), which argued that formal management structures (e.g., established norms, routines, and procedures) are needed when the level of epistemic development in a domain is low[vi], this study found a lack of such formal mechanisms. In both the projects the coordinators reached a verbal agreement and never wrote anything down even informally. There were not predetermined governance mechanisms. Participants

described the projects as informal and non-hierarchical groups whose working relationships remained spontaneous and largely self-managed, as they emerged from collaboration within the projects, and/or previous relationships. This SemOp2 evaluator considered spontaneity a strength of the project:

The strength of these {voluntary} working groups is a shared desired of examining thoroughly {a topic} of interest. The challenge, in my opinion, is trying to structure this shared desire which is very spontaneous. I do not know if I explain myself well, but the strength of this project is the spontaneity and the desire of each evaluator to participate in the project without a strong organizational structure. If we take away this spontaneity, I am afraid that things might change, in the sense that the conditions for doing the work might no longer exist.

The organization of the two projects seems to indicate that people can achieve coordination and mutual understanding through social interactions without the need for formal management mechanisms, in concurrence with the situated view of Cleal, Andersen and Albrechtsen (2004). This finding also confirms evidence from previous studies of collectivist organizations, showing that informal, peer-based coordination and decision-making mechanisms work well when groups are small and fairly homogeneous (Walsh and Maloney, 2007). Therefore, the small size of the projects, their relatively homogeneous culture, and participants' compatible expectations can be associated to the lack of need for formal management mechanisms.

Leadership was present in different ways in the two projects. In SemOP1, the LIS academic was formally acknowledged as the leader by the students who had to complete the evaluation to pass the course, and the other coordinators played the role of central organizers. In SemOP2, there were no students but only volunteer individuals, and the coordinators were not the "heads" of the projects, the ones that made things happen, although they still played the role of central organizers. One of the coordinators put it this way "*there is no role at the top that, let's say, gives orders or strong directions*". In SemOP2 the coordinators were not at the centre of all action, and the project did not unfold around them but rather around the artifacts, namely the OPACs and the evaluation checklist. Therefore, the coordinators enjoyed the contribution of the evaluators without exerting control on the ways in which they carried out the evaluation. The work of the evaluators remained largely unscripted, because each of them worked independently and did not have a specific method to follow when conducting the evaluation. The evaluators chose when, where, and how to carry out the task. They could do as little or as much as they like. They could withdraw at any time (and five did because of personal and professional reasons, such as starting a new job or moving to another city, which changed their time allocation and impeded participation in the project); they could complete the evaluation of all the assigned OPACs, or evaluate only few of them. If they could not finish the job because of their personal circumstances, it was without consequences for themselves.

In SemOP2, a high drop-out rate could have brought the project to a halt, because the coordinators could not oblige the evaluators to complete their task. To a certain extent, it could be argued that the coordinators exercised a form of integrative power (Boulding, 1989), because they neither coerced the evaluators nor promised to reward them monetarily for completing the task. However, following Latour's (1986) antiessentialist view of power, this integrative power should not be seen as a trait solely possessed by the coordinators. In ANT power is understood as a verb and not as noun, and refers to what an actor can do because of its associations. Therefore, it was the number of participants who decided to be involved in SemOP2 who indicated the power the coordinators could exert. The evaluators decided autonomously to participate, and they contributed to the project in an intentional and deliberate manner. The development of SemOP2 was the result of the convergence of interests of all the participants involved, and the degree of control that the coordinators could exercise over this process was limited because turning the coordinators' interests into something agreed upon by all the other participants "entailed metamorphosis and loss of sovereignty" (McMaster, Vidgen and Wastell, 1997: 4).

4.5 The Role of Previous Ties

In line with previous studies (e.g., Thune, 2007; Olson and Olson, 2000; Sonnenwald, 2007), the findings indicate that previously established ties and a history of collaboration were a prerequisite for initiating the projects. The coordinators shared a

history of joint-work in the Italian Library Association, a voluntary professional association. Working together in these joint-efforts allowed the coordinators to establish deeper relationships with one another in terms of mutual trust and understanding. These relationships constituted a social capital that they could access at the time of starting the projects (Widén-Wulff and Ginman, 2004). This finding suggests that social capital may be even more important when the collaborative effort is on a volunteer basis.

When human and economic resources are scarce the question becomes how to do the job economically and efficiently, while making the best use of the limited resources. In this situation previously established ties and existing common ground influenced positively the achievement of a relatively stable alignment of interests throughout the projects, facilitating communication and understanding and supporting faster and smoother decision-making.

4.6 Nature of Work and Collocated and Remote Collaboration

Both the projects involved relatively mundane and small-contributions. The tasks assigned to the participants were independent, not tightly coupled, small in size, and required relatively little of participants in terms of time and knowledge. This level of granularity was critical to capture contributions from participants (except for the LIS students) whose motivation level could sustain only quite small efforts towards the project (Benkler and Nissenbaum, 2006).

Collocated and remote work played critical roles in different respects and showed complementarity. In SemOP1, synchronous verbal communication allowed far easier understanding and coordination than asynchronous communication and made it easier to discuss complex problems. For example, the LIS students preferred to show and see OPACs and point to problems directly and immediately in the computer lab. This comment from a student expresses the importance of these collocated meetings:

I had started to analyze some OPACs, I think I did it at home or by myself in the computer lab at the university, but because of my difficulties and those of the other course participants, in the end we all met for entire mornings, maybe when there were lectures with the professor, we all together gathered in the computer lab and did these evaluations, helping each other when we needed it.

Conversely, asynchronous communication enabled further conceptualization of problems by allowing the students 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 and Olson, 2000), and indicates how collocated work plays a crucial role for understanding and accomplishing work. Similarly, in SemOP2, where a mailing list was the main medium of communication and interaction, all the evaluators said that a collocated meeting would have helped disentangle emerging issues and explore concepts. Given most evaluators did not know each other, the asynchronicity of the mailing list made it difficult for some of them to

"take risks", share ideas and resolve differences, because the delays disrupted the conversation. Furthermore, not all the evaluators shared the same level of collaboration technology readiness (Olson and Olson, 2000).

Despite these drawbacks, the use of ICT was crucial in SemOP2, because the participants were all distributed and dependence on physical proximity would have hindered the possibility of initiating the project at all.

4.7 Incentives, Rewards, and Voluntary Participation

Both SemOP1 and SemOP2 relied on willed voluntary participation (except for the LIS students who were obliged to participate to pass the course), because of the lack of financial resources. In particular, SemOP2 drew people with different educational and professional background, level of expertise in subject indexing and online catalogues, and professional interests. In both the projects the participants were mainly driven by their own values and interests, as it is typical of peer-production. For example, they took the opportunity to learn more about subject indexing; to gain experience in a subject they did not normally work with, or which they intended to work with in the near future; to network with other people; to broaden their horizons, and to gain credentials to be used in public competitions in the public sector. They embraced the possibility to develop abilities that seem to be stifled in their workplaces. Indeed, the evaluators working at university libraries often reported their frustration with bureaucratic workplaces that offered limited career advancement (and did not reward merit but

seniority), stifled initiatives, and provided few opportunities for interesting and challenging work. As this evaluator reported:

I wanted to learn something new, to look at things from a perspective a bit deeper than that I use in my daily professional practice, because you take a very quick look at things in your daily professional practice, you need to do things very quickly, or in a repetitive manner. This project helped me look at certain things more carefully.

Despite the predominance of intrinsic motivations, different forms of extrinsic motivations played a role as well (Ryan and Deci, 2000). Participants wanted to hone skills to be applied in a future job, add skills and experience to their CVs, demonstrate to a future employer the willingness to dedicate themselves to projects aside of their daily work, and obtain a credential for public competitions to land jobs in the public sector. In this respect, it was useful for them to be acknowledged by the coordinators when they presented the results of the projects to conferences and in papers.

What matters here is the realization that members of the community of Italian library and information practitioners are willing to perform activities not for money but for generosity, fun, interest, social relations, and, ultimately, instrumental value which they can pursue only when they perform such activities through social interactions.

5. Study Limitations

Perhaps the most notable limitation of this study was the reliance on only two cases to shed insights into the applicability of peer-production to collaborative research in LIS. These two cases cannot be considered either typical or representative of collaborations between LIS academics and practitioners in Italy. They were included because they were the only cases available[vii]. Thus, the uniqueness and the context of the selected cases may restrict understanding of other cases. However, this study was not meant to provide a statistical representation of the study population and allow generalizability to a population of cases as other research designs (Stake, 1995). Furthermore, atypical cases may be the richest in information, because they allow studying actors and what they do more closely (Flyvbjerg, 2006). This study was conducted to make the two cases understandable (op. cit.), and to allow generalizations in the form of specific implications and rich insights (Walsham, 2006). Therefore, a main concern was to establish credibility of the results through the construction of thick accounts of collaboration provided by multiple data sources, including literary inscriptions and interviews (Lincoln and Guba, 1985).

A second potential weakness in this study may be considered its reliance on documentary sources and interviews to understand how collaboration occurred in the two projects. When analysts rely on accounts of interactions from study participants, they cannot not presume that these accounts are "objective" descriptions of original interactions, but participants' constructions. Thus, the epistemological position

underpinning this work is that the analyst's duty is not recording bare facts through accurate and unbiased statements in order to uncover universal laws. Analysts cannot attempt to achieve fidelity and reproduction of reality, simply because they cannot avoid interpreting – and constructing – the phenomena they study (Latour, 2004).

Several aspects may have influenced, consciously or unconsciously, study participants' constructions, including how people felt that situations were to be described, the desire to present themselves in a particular light, the reluctance to reveal some type of information, and the type of questions asked. Additionally, in SemOP1, interviewees were asked to recall events as far back as four years since the project took place. With regard to texts, they are unobtrusive, stable, and can be reviewed repeatedly, but their use can be biased both through selection and through reporting. The possibility of self-selection and self-reporting biases may have affected what study participants reported in interviews as well.

6. DISCUSSION AND CONCLUSION

This study claims that there are similarities between the analyzed collaborative projects and peer-production activities (Benkler, 2006). Indeed, the same bottom-up, community-driven processes which, for example, grow open sources software applications and maintain the online encyclopaedia Wikipedia, have also led to the setup of the projects included in this study, although on a very smaller scale. Similarly to open source projects aimed at creating sustainable software, the analyzed projects

face the difficulties of surviving between one project and the next. They are provisional, unstable, and need effort in order to keep them going. However, access to funding is difficult and there is no longer-term infrastructure to support collaboration and achieve better visibility. The project outcomes including the evaluation checklist, the project web site, one journal article and the presentation of the results at two conferences can help increase the visibility of the projects and stimulate other interested Italian information practitioners to embrace the opportunity to improve their catalogues. These outcomes can be seen as immutable mobiles (Latour, 1987), because they are supposed to remain stable for some time and applicable across library settings in Italy. What makes these immutable mobiles powerful is that they can mobilize other information practitioners around the topic of the projects. However, the role of these project outcomes in sustaining future initiatives is hindered by the difficulties that many Italian information practitioners are likely to encounter in their workplaces to enact the practice encouraged by SemOP1 and SemOP2. As interviewed participants reported, had librarians decided to improve their OPACs and do subject indexing, they would be unlikely to market their efforts and demonstrate the impact of this activity to leaders of city councils and local politicians responsible for library policies.

Furthermore, the main stakeholders are individuals and not their institutions, because the projects are "standalone" and do not take place under a parent organization. Uncoordinated efforts among standalone projects may hinder further collaborative

development and new forms of scholarship and innovation. For these reasons, it is difficult for these projects to "grow". Moreover, it is difficult to stabilize these projects because the participants are not linked in a durable way. The coordinators in the two projects have no contractual force, and they can act primarily upon the intrinsic motivations of potential collaborators to attract them into collaboration. For this reason, academics and practitioners should think strategically about the development of initiatives aimed at coordinating and aggregating isolated efforts. There are examples of aggregation and federation of resources and services in LIS. One of them is dLIST, a cross-institutional, disciplinary and open access archive established in 2002 to connect LIS educators, researchers, and practice communities by means of a digital library that includes both research materials and practice (pathfinders, information literacy) materials (Coleman and Roback, 2005). The authors reported that another reason for creating dLIST was the relatively small size and location of many academic LIS units in the United States and globally, which meant that they might not be able to afford their own institutional repositories.

Grassroots projects can especially benefit from peer-production. However, the grassroots approach may be insufficient to support a longer-term view of collaborative research. Options need to be investigated for sustainability so that these small projects do not rely exclusively on their original coordinators and can turn into larger efforts and important modalities of practice-research collaboration. The experience of software

sustainability (OSS Watch, 2007) can shed insights into sustainability models and provide ideas for projects like those included in this study. For example, when individuals are unable to push the discourse forward and surmount institutional indifference, social capital could be leveraged for enabling communities of practitioners and academics that keep sustaining projects. Indeed, it could be a way not only to provide the means for the work to be continued, but also to provide an opportunity for participants held together by a shared interest to communicate, share ideas, and foster a new type of peer-to-peer networking. Although LIS communities of academics and practitioners are far smaller than open source software communities, an open and community-based approach could encourage long run involvement and provide resources, such as skills and time of participants, either volunteers or paid.

Peer-production can open windows onto collaborative research for practitioners, academics, and students. It can create stronger academic-practice networks. Even after a project is completed, interpersonal relationships remain and constitute a social capital from which to draw to initiate new projects. Economic slowdowns and budget cuts in universities and libraries may produce the need for more collaboration between practitioners and LIS academics, as a way of using limited resources more efficiently and equipping libraries to understand better the present and identify the problems of the future. This article contends that it would be important to support collaborative models that walk the thin line between planning and flexibility in relation to research design so

that collaboration can be carried out efficiently without stifling ideas that emerge in the process, but ensuring the possibility to change relationships as the work progresses. Following the lesson of open source, although on a much smaller scale, these models should help the projects to "grow organically" by letting them react to the needs of the participants and avoiding putting structures into place proactively (OSS Watch, 2007). Preserving flexibility is crucial to support bottom-up collaborative projects, and ensure that they meet both rigorous academic standards and professional needs for applied outcomes. Striking balance between planning and flexibility can be also a new consideration for scholars, who are used to have sole responsibility for the research design in more traditional research (Ospina *et al*., 2002).

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[i] In this study the use of the term "sociotechnical" refers to Bijker's (1995, p.12) conception of technology and society as heterogeneous "socio-technological ensembles" which mutually constitute each other.

[ii] Holley (2010) used the term 'crowdsourcing' which, at times, is used to refer to a form of production similar to peer-production.

[iii] This article is not intended to cover in depth the fi dings of the review which is published in Ponti (2010b).

[iv] While arguing against assuming that a small number of interviews (six to 12) can always be enough to achieve a desired research objective, Guest, Bunce, and Johnson (2006, p. 75) affirmed that "with respect to instrument content, the more widely distributed a particular experience or domain of knowledge, the fewer the number of participants required to provide an understanding of the phenomenon of interest" (p. 75).

[v] Obviously, these institutions are not neutral. Even when we do not see them, they have inertia and tend to persist. Moreover, they have effects. The choice of treating institutions as punctualized actors (Law, 1992) here, that is, of concealing their heterogeneity and complexity, does not mean that I took them as naturally given or abstract entities, according to a Weberian model of bureaucracy. I saw them instead as contested organizations, as products of an ensemble of forces leading to the construction of their structures, their rules, and their dynamics. These organizations can be studied to understand how different actors construct a social order and enact the practices that make them going, but this is out of the scope of this work. The apparent neutrality of institutions may be interpreted as a way of masking resistance in the form of departmental values, regulations, and organizational structures that contribute to, and are sustained by, regulations and organizational structures in the university at large that often fail to reward academic productivity and foster a meritocratic environment. These regulations and structures distribute resources on the basis of presumably unfavorable criteria to faculty members, and affect actors' chances of developing university funded initiatives.

[vi] For a critique of the lack of a shared set of normative and principled beliefs guiding LIS research, see Dervin (2003). She lamented the fragmentation of user studies research in LIS and communication studies. She made several good points because LIS suffers from a low level epistemological development – researchers work in different disciplinary areas and do not share epistemic norms and analytical tools. Bottom-up collaboration seems unlikely to emerge and be successful in these circumstances.

[vii] Initially I sought cases in three countries, Italy, Sweden, and another European country. This choice reflected both practical and purposive reasons. The main practical reason was linguistic and cultural. In fact, it was necessary for me to choose countries whose language and culture I understood, or in which it

was possible to use English as a lingua franca in the interactions with study participants if the local language was a barrier. This constraint reduced the options. The purposive reason refers to the need to study cases in countries where projects that include both academics and practitioners may be likely to occur. For example, countries in which there are LIS departments or schools, and where academic staff may be conducting collaborative research.