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Working Paper No. 35

URL: www.dondena.unibocconi.it/wp35

November 2010

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ISSN 2035-2034

A wiki for social workers in a local health authority: An actor-network analysis and seed design

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Abstract

We use actor-network theory (ANT) to understand how social workers in a large Italian local health authority might interact with a wiki space to share resources, inform practice, and maintain their professional identity. At the time of study, the wiki was proposed as a replacement technology for an existing structured knowledge management system (KMS). We introduce the case organization, the social workers and the problem and then describe the key concepts of ANT and how they can be used to guide socio-technical analysis of the potential for a proposed new information technology. ANT was applied in two ways. Firstly, we analyzed how the social workers' existing KMS came about, using the processes of translation as defined in ANT to reconstruct the events leading to that choice and the subsequent idea of replacing the KMS with a wiki. We then used a due process model and drew the actor-network in order to consider the wiki as a potential replacement for the existing KMS. As part of this process, we present the design of a seed structure and participation process for a wiki that would both maintain the value of KMS work done to date and meet additional needs for informal learning and maintenance of professional identity among the social workers. The successful adoption and sustainability of the wiki will depend on strengthening its association with the other stakeholders participating in the project.

Keywords

wiki, social workers, health sector, actor-network theory, Italy, seed design

Introduction

Wiki technology is well known for its role in supporting public websites such as Wikipedia and is now widely used to support a variety of professional and special interest websites which enable contributors to add new content and edit existing content quickly and easily. Organizations also use wikis for internal purposes, ranging from maintenance of user manuals to providing a space for small groups to share content and ideas and jointly prepare documents (Jackson, 2010; Klobas, 2006). Wikipedia (2010) suggests that there may be more use of wikis behind organizational firewalls than in the public domain.

The potential value of wikis in health care and social services organizations has been recognized by several authors (e.g., Bastida, McGrath, & Maude, 2010; Rockinson-Szapkiw & Walker, 2009). There are few reports of actual implementations, but there is evidence that wikis can be used to support knowledge sharing and to support improvements in the quality of services, even in large, highly structured health care organizations (Fitch, 2007; Meenan, King, Toland, Daly, & Nagy, 2010; Wright, Bates, Middleton, Hongsermeier, Kashyap, Thomas, et al., 2009).

The potential value of a wiki goes, however, beyond that of supporting learning through structured knowledge sharing. A wiki is a collaborative website that any authorized user can easily create, modify, and update via a web browser. It can be used to support and record communication, for collaboration, and for content sharing and creation among people. It therefore has a powerful potential to enable informal learning in unplanned and unstructured ways. Each page of a wiki has an associated discussion page which allows discussion and reflection on any record of knowledge placed in, or considered for inclusion in, the wiki. The approach to knowledge sharing and creation – the so-called wiki way – embedded in wiki technology, which privileges democratic peer review over editorial control, ease of access and open editing over security and control, incremental growth over upfront design, and free form content over structured content not only has the potential to support formal and informal learning but also to support development of a wider sense of shared practice and community (Leuf & Cunningham, 2001).

In social work, wikis have been suggested as tools that might permit groups of busy professionals who are unfamiliar with formal knowledge management processes, and who often have poor access to technology resources and lack power to effect costly organizational changes, to support critical activities such as evidence-based practice and to collaborate in ways that would help them to meet the evolving and contextual requirements of their work (Stauss, Milford, & DeCoster, 2010). Success is not, however, guaranteed. In their review of experiences with a wiki-based knowledge management system in a school of social work (thus, better resourced than is typical among social workers in the field), Stauss, Milford, and DeCoster (2010) described the complexities and challenges associated with ongoing participation including understanding the purpose and role of the wiki, preference for familiar technology such as e-mail, and reluctance among some potential participants to participate in discussions.

Practitioners adopt technologies when they see sufficient advantage to do so and when they can integrate them into their work activities and routines (Goodhue & Thompson, 1995; Jasperson, Carter, & Zmud, 2005; Rogers, 2003). While wikis allow a great deal of freedom in content, structure and management, this freedom can also be a source of dismay for busy practitioners faced with the task of developing a collaborative resource from scratch (Jackson,

2010; Mader, 2007a; Mader, 2007b). We suggest that, if a wiki is to be of value to a group of practitioners, to be *seen* to be of value, and to fit well with the activities and routines of the practitioners, it is necessary to understand the relationships between the practitioners, the technology and the context within which they are situated.

While not formally constituted as communities of practice (CoPs), social workers typically work in professional groups that share many characteristics of CoPs, groups whose members mutually engage with each other in a shared work practice and develop a sense of joint enterprise and identity from mutual interactions and relationship (Wenger, 1998). It is inherent in the nature of expertise that much knowledge is tacit and embedded and not easily represented in documents (Alavi & Leidner, 2001; Polanyi, 1966). For example, while the address and names of key staff in a certain residential care home can be recorded in a structured database, the knowledge of a social worker about the suitability or risks of using that home as a placement for young people of different types is often tacit, variable over even short periods of time, and more difficult to record in a pre-determined format. Such knowledge is learnt from practice and usually shared through social interactions that allow interpretation of the context and sense-making.

A tool to support and sustain a community of practitioners must therefore: support knowledge sharing related to practice and professional identity; enable communication and collaboration in ways that are useful for the members of the community; allow the practitioners to understand, represent, enrich, and share expertise; include document management features such as creation, modification, publication, search and retrieval; all of them on a collaborative basis (Esnault, Zeilinger, & Vermeulin, 2006). A wiki is a tool that has the potential to meet this set of needs.

In this chapter, we use actor-network theory (ANT) to understand how social workers might interact with a wiki space to share resources, inform practice, and maintain their professional identity. Our case is situated in a large, Italian local health authority. One important difference from other similar cases is that a wiki is considered not as the first system to support learning among these social workers but as a potential replacement technology for an existing structured knowledge management system (KMS). We begin by introducing the health authority, the role the social workers play within it, and the situation at the time the researchers became involved in the case. We then describe the concepts of ANT and the model that we use to analyze the situation, present the analysis – including a prototype of a wiki that might replace the existing KMS – and use the theory and the analysis to project future considerations about the success or failure of the wiki.

A wiki for social workers in a local health authority?

We provide a brief outline of the organization of the principal global actor, the local health authority, before proceeding. In Italy, health services are provided by a healthcare system based on publicly funded *Aziende Sanitarie Locali-ASL* (local health authorities), as well as a wide range of both publicly and privately funded hospitals. The local health authorities are organized on a territorial basis. Depending on the size of the areas they serve, they often have a provincial jurisdiction, or they can have a jurisdiction serving large cities and urban areas. The Italian healthcare system is differentiated at the regional level, because the regional authorities govern the rules on financing and organization of the healthcare system.

The organizational structures of the local health authorities are characterized by job specialization and area of service (e.g., hospital services, prevention, and primary care), and by the delivery of services on a territorial basis. Coordination among professionals working in distant places is very difficult. Indeed, it is common that colleagues working in the same organisational unit do not meet in person more than once or twice a year.

The local health authority in which the social workers of this study work, like many of Italy's health authorities, serves both a large city and a surrounding region which includes towns of varying sizes and remote mountain villages. It is responsible for delivering health and social services and making it sure that the needs of vulnerable or dependent people are taken care of. The range of services delivered include, among others: (a) social care for people with alcohol/drug dependency; (b) social care for individuals and families with relatives with physical disabilities; (c) economic assistance to families experiencing financial problems; (d) support and specialist services to children and adolescents at home and in residential care; (e); support for foster carers and prospective adoptive parents, and (f) residential care placement for people with physical disabilities.

The role of social workers (hereinafter also SWs) is critical for the delivery of these services. They are trained to understand psychological and social needs and difficulties of individuals and groups, and plan and evaluate programmes of care based on the services available at the local health authority and other external social care organizations in order to meet those needs and solve those difficulties. To deliver social care, social workers work closely with their clients and need to coordinate with:

- The other services of the local health authority;
- People responsible for administration of the districts they respond to;
- Their own colleagues to share and discuss professional decisions;
- Their own colleagues to share information about the organizations (e.g., residential care homes) to select for their clients.

The health authority's more than 60 social workers work alone or in groups of up to three across the whole territory covered by the authority. Organizationally, they report to the head of the functional unit (e.g., mental health, substance abuse) that is most critical in the locality in which they work, but in most districts they also have some formal responsibility to the local area coordinator and often also to the municipality. Thus, there is no formal organizational unit for social workers, but they have a formally recognized coordinator and their strong sense of professional identity results their identifying themselves as a community of social work practitioners. The status of social workers in health authorities in Italy is quite low relative to other countries. They are not considered health professionals, but technicians, and this limits their political power within health authorities. At the time of the case, social workers were not required – like acknowledge health professionals – to participate in formal continuing education, and as a result, the health authority provided very little training support for them.

About two years before the idea of using a wiki was floated, the social workers, supported by the health authority's information systems group, developed and implemented a KMS which became part of the local health authority's intranet. When the research team was first put in contact with the local health authority, wikis were in the news and the Director of Information Systems and the former Coordinator of Social Workers who had recently been transferred to a new role were wondering if a wiki might improve knowledge sharing, communication, practice and professional identity among the social workers.

Several conversations followed, and all had a common theme, which we express here in research questions: Would a wiki be a useful replacement for the existing KMS? If so, how could it build on the existing information resource, and how should it be introduced to obtain benefits including informal learning and maintenance of professional identity that went beyond simple sharing of content and resources?

Actor-network theory

In practice, the actors involved in establishing a wiki to serve a specific group within a larger organisation can form a complex web of roles and individuals with different contextual backgrounds, needs, desires and constraints (Poole & Grudin, 2010). Given this complex intertwining of context, technology, people, purposes and institutional pressures that might inform introduction of a wiki for a distributed community of practitioners working within an already complex organisation, we sought a framework that would provide a guide to how these elements might work together. ANT was developed specifically to cope with the entanglement of the social and the technological (Callon, 1999) and has been quite widely used to analyse information systems implementations since introduced to the field by Walsham (1997).

In this section, we summarize key concepts of ANT before describing how ANT is used to explain the uptake of new technology and how this approach might be applied to understanding the role of a wiki in informal learning.

Key concepts of ANT

ANT was developed by Bruno Latour, Michel Callon, and John Law to describe and explain the entanglement of the social and the technological (Callon, 1999). The unit of analysis is the *actor-network*, an ordered network of human and nonhuman actors, including people, organizations, things or animals. An actor can literally be anything as long as it is a source of action and influences other entities (Latour, 1998). The heterogeneity implied by this notion allows the participation and influence of nonhuman actors in organizational activities to be observed and understood. This is important when considering the potential role and influence of a new technology (i.e., a new actor) such as a wiki on an existing network, in imagining the design of the new technology, and in considering whether the new technology is likely to succeed. In Table 1, we briefly introduce some of the core concepts of ANT.¹

All the actors, both human and nonhuman, can affect, and be affected by, the activities of other actors (Vidgen & McMaster, 1996). Actors' interests can either converge or conflict, and it is the convergence of interests allows the network to stabilize and run smoothly. On the other hand, order begins to break down and conflicts arise when interests diverge and some actors leave the network, are removed from it, or pursue particular interests that clash with the goals of the network (Law, 1992). For example, the removal of telephones, banks, the chairman of the board, or an existing knowledge management system may all result in significant break-downs in social order. ANT is concerned with the ways in which an actor-network achieves and sustains a stable order, i.e., how the interests of all the relevant actors in a network converge.

¹ The elements of ANT have been revised over the years (Walsham, 1997). We focus on concepts that have remained relatively stable and can be considered relevant for understanding how an existing network might evaluate the potential for inclusion of a new technology such as a wiki.

Table 1. Summary of key concepts in actor-network theory (adapted from Lamb, 2006; Latour, 2004; Walsham, 1997)

Concept	Description
Actor (also called actant)	Hybrid category including both human beings and nonhuman entities, such as technological artefacts.
Actor-network	Heterogeneous network of aligned interests, including, for example: individuals, organizations, technology, artefacts, documents, practices, and standards.
Translation	Process by which actors' disparate interests are defined and aligned in a network. In this process, allies for a particular argument are identified and enrolled in the network. Translation occurs through four stages: (a) problematization; (b) <i>interessement</i> ; (c) enrolment; (d) mobilization.
Due process	A set of rules that can be applied to understand whether translation will occur, e.g., to understand if a new technology might be included in an actor-network. The rules address: (a) perplexity; (b) consultation; (c) hierarchy; (d) institutionalization.
Obligatory point of passage (OPP)	Actor(s) acting as a necessary point of interaction with other actors in the network. A strong OPP contributes to alignment and translation, and thus to the stability of the network.
Delegates	Delegates are actors who 'stand in and speak for' particular viewpoints and interests that have been inscribed in them.
Inscriptions	Inscriptions are artefacts that represent the network and its interests in a durable or material form.
Black Box	A simplified entity in the network. A black box is typically an actor-network in its own right.

An actor-network is built and “performed” by the actors out of which it is constituted. This occurs through *translation*, a process of transformation, organization, re-location, or re-configuration of elements, by which actors try to overcome differences, misunderstandings, incoherence and resistance and to stabilize the network (Callon, 1986). Callon identified four moments of translation in the creation of a network: problematization, *interessement*, enrolment and mobilization. During *problematization*, actors define a relevant problem and identify who the critical actors are; during *interessement*, the critical actors try to persuade others to invest in or follow their program; during *enrolment*, the critical actors bestow qualities and motivations on actors and establish roles; during *mobilization*, the formed network gains wider acceptance by making durable and potentially irreversible translations.

Translation involves constant negotiations among human actors and delegates of nonhuman actors to establish a common set of definitions and meaning to allow dialogue and understanding of the phenomenon with which the network is concerned. The process of negotiation is marked by the identification of the *obligatory point of passage*, an actor which acts as a gatekeeper through which all the other actors have to move (e.g., to accept a new technology).

The outcome of successful negotiations is an actor-network characterized by aligned interests. which can then be inscribed into something durable that represents the network or its achievements – such as, for example, programs, specification documents, and physical artefacts (Callon, 1986; Latour, 1987; Law, 1992; Law & Callon, 1992).

ANT and new information technology

ANT provides us with a way of viewing a wiki as an actor in a heterogeneous network spanning humans and nonhumans, e.g., people, practices, skills, artefacts, institutional arrangements, texts, and contracts. The actor-network in which a functioning wiki is embedded will have evolved from a process of translation which will have established the role of the wiki, e.g., as an evolving space for informal learning, or just a more passive place to store inscriptions in the form of records. When using ANT to guide technology design, there is no top-down control over what is included in the design (Monteiro, 2000). Rather, ANT assumes there is an open-ended array of entities that need to be aligned, including work-routines, incentives, organisational roles, and technological features and functions (Esnault, Zeilinger, & Vermeulin, 2006), and this concept fits the open nature of a wiki.

The necessary events for inclusion of a new technology in an actor network can be represented using a due process model (Latour, 1998; McMaster, Vidgen, & Wastell, 1998). Figure 1, from McMaster, Vidgen, & Wastell (1998), identify four phases of due process, the first three of which – perplexity, consultation and hierarchy – do not occur in a strict sequence but interactively throughout the process. If successful from the point of view of the candidate technology, these three phases translate the technology for inclusion in the network in the fourth phase, institutionalization. We provide an overview of these phases below.

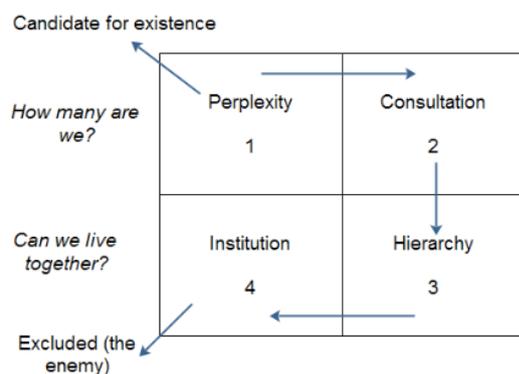


Figure 1. Due process, after Latour, 1998b (Source: McMaster, Vidgen, & Wastell, 1998)

Phase 1, *Perplexity*: The new technology is a candidate for existence in a network of other actors (e.g., social workers, information service providers, senior management, the technology it is to replace) which can be impacted by it. Being new, it may not be an accepted fact² yet, and it can be seen as an element of uncertainty and confusion.

***Consultation* (Phase 2)** involves assessing the suitability of the new actor to be part of the network. This might occur through formal meetings or workshops. Consultation will be better informed if more is known about the new technology, but because it is still in many ways

² Saying that technology is not a fact at this stage means that its role is not fixed and predefined, but it does not imply in any way that it does not exist. Reducing technology to social construction of meaning would deny its capacity of making resistance. ANT's position on realism has been a subject of controversy between those who criticized it for leading to an extreme form of constructivism and those who see a commitment to some sort of realism (Sismondo, 2004). We agree with the latter. Latour (1993) defines a technology as a quasi-object. As he puts it, a quasi-object is "much more social, much more fabricated, much more collective than the "hard" parts of nature, but they are in no way the arbitrary receptacles of a full-fledged society. On the other hand, they are much more real, nonhuman and objective than those shapeless screens on which society – for unknown reasons – needed to be "projected" (p. 55).

unformed, there will be some imprecision. A prototype design can help identify the possible role of the technology and what it can and cannot contribute to the network (its interests). The human actors can compare it with existing technology and other candidates, and assess it against other technological and social issues that they would like to be settled.

In Phase 3, *Hierarchy*, a system of values emerges and the new technology is positioned within the network and evaluated for its acceptability (under the current circumstances). Hierarchy is the product of dialogue, during which different interests and perspectives are translated by exchanges of opinion, clarification, negotiation, mutual understanding, and persuasion. Through this interpretive process, actors can suggest solutions and ideas, align their interests, and imbue the tool with the values required for it to be accepted in the network (Hepsø, 2000). For example, a group of social workers might decide that it is more important for them to adopt a technology that supports informal learning through online discussion than a tool that favours sharing of formally structured knowledge, or vice versa.

Once the place of the technology in the hierarchy of values is understood, a decision is made to include or exclude the new technology from the actor-network. If it is to be included, the technology is enrolled in the (now transformed) network (*Institution*, Phase 4). Only then does the new technology become integrated into the work practices and organizational routines of the network.

Methodology

In seeking to understand the potential for a wiki for the social workers in this case, we used data gathered from the local health authority. The main source of data was oral accounts audio recorded during the first meeting with the local health authority's director of information systems (DIS), the former coordinator of the social workers (fCSW), one social worker, the technical specialist responsible for intranet management, the training manager, and the manager of external and internal communication at the health authority. This meeting lasted a full working day. Research data also included minutes taken during a previous meeting with these actors and other documents, such as the organization chart of the health authority, and a list of the social workers and their organizational unit, role and geographical location. Our interpretation of the data is also influenced by subsequent conversations about specific aspects of implementation of the chosen wiki technology and options for enrolling the social workers in training and development of a wiki.

Because they acted both as researchers and as designers of the prototype of the wiki space, the research team needed to protect their autonomy of questioning as researchers against the obligation of telling the participants in the local health authority what they might want to hear, or what they might consider to be the easiest and quickest solution. A number of techniques were adopted to maintain a research perspective. The researchers were not consultants³, and their involvement was clearly defined in an agreement as research. They used ANT as an analytical framework, and discussion and argumentation among members of the research team to reach an understanding of the actor-network and its interests and to agree on a prototype design for the wiki. The research team, consisting of four researchers with inter-

³ All direct costs of the research were borne by the research team's institution, while the health authority contributed the time of staff involved in conversations and meetings.

locking but different research backgrounds, engaged in formal and informal discussion over more than one year.⁴

Forming and re-forming the social workers' actor-network

We are interested in the actor-network that is forming around the social workers and a wiki to support them. This network has not yet been stabilized and a number of interests need to converge before the existing actor-network formed around the social workers and their existing intranet-based KMS can be transformed into the new network. We therefore begin our report with analysis of the process of translation that gave rise to the current actor-network in which the social workers and their existing Intranet-based knowledge management system are embedded. We then use the phases of due process to characterize the current situation, the potential for inclusion of a wiki in a transformed network, and the additional processes that need to be followed before the wiki can become institutionalized in the social workers' network.

Translation

In the following sections, we describe the process of translation that formed the existing actor-network made up of the social workers' KMS and associated actors. Following Callon (1986), we describe the process of translation through the fCSW's reconstruction⁵ of events leading to the development of the existing KMS and the subsequent idea of introducing a wiki. Our focal point is the fCSW, because she sponsored the construction of the social workers' KMS and championed the idea of replacing the KMS with a wiki, before moving to her new post.

Framing the problem from the social workers' perspective (Problematization)

The idea of the intranet-based KMS originated with the fCSW, who was very familiar with how social workers operate "in the trenches" and was aware of the problems they encountered every day. One problem was the difficulty of communicating with one other and finding a common time and place to meet. The social workers were highly distributed across sites and some functional area supervisors had set rules that limited possibilities for meeting (one meeting per month). Added to this constraint was the cost that the social workers had to incur to attend face-to-face meetings.

Looking for allies (Interessement)

The fCSW presented the idea of the Intranet to the DIS, who was supportive. The DIS and the fCSW were considered leaders in their respective areas; they respected and trusted each other, and thus they decided to start a project which both of them looked on as a challenge.

From the beginning, the DIS attributed ownership of the project to the social workers, but at the same time he was its champion. He liked the idea because

⁴ One member of the team prepared an analysis which was circulated, critically reviewed, and revised several times as the result of oral and written argumentation among members of the research team. A similar process was followed to design a prototype wiki environment for consultation with and among the social workers. This approach, known as argumentative subjectivity based on a methodological discourse (Smaling, 1992), works to improve the quality and credibility of the results.

⁵ The actor's narrative is treated as a construction of events and not as a necessary truthful account of what happened. It was prepared using techniques of narrative analysis (Riessman Kohler, 1993).

it started from them, from those who do the work, thus they could provide the kind of content that we technical people often have difficulties suggesting.

The DIS accepted responsibility for promoting the KMS because he had more power and influence within the health authority. In this capacity, he showed his commitment to the project by seeking financial support from other senior decision makers within the institution, but his application was turned down for internal political reasons. Within an apparently uninterested health authority, the DIS became the obligatory point of passage (OPP) for information technology for the social workers because he was the only champion at the very senior level, and his active support is necessary for success.

The social workers' KMS was created soon after, as part of the health authority's intranet. It was a website created, organized, and managed by the same external organization responsible for the whole corporate intranet. From the beginning, the KMS was predicated on shared ownership and participatory management, and was meant to be "for the social workers". Its purpose was to support the current work of the social workers and to re-shape their work practices. The fCSW wanted to engage the social workers in construction of the new space for the sake of populating the KMS, but also as an opportunity to strengthen their professional identity. However, not all of the then 69 social workers had the same interests, or sufficient access to technology, and there were varying degrees of engagement in the project. To ensure their "interessement", the fCSW did not attempt to impose involvement on the social workers, but used another device: she created two main roles: *fruitori* (users) and *gestori* (managers), each bearing different responsibilities and each granted authorization to different levels of access to the system.

Defining the roles (Enrolment)

The two roles were based on the degree of interest and motivation shown by individual social workers. *Fruitori* were expected to simply read the contents of the KMS. *Gestori*, a small group of about ten people, were expected to be administrators. The set up of these two new groups provided the fCSW with the opportunity to align her promotion of the KMS with creation of groups of social workers that cut across functional areas. This was a first step in creating an alliance between technology and work organization. This move aimed at breaking the rigid compartmentalization of each functional area and at building pathways that would also enable cross-functional informal learning among to resolve work-related problems encountered within a specific area.

Both the groups were introduced to the KMS in the course of a much appreciated training course during which they also got acquainted with general purpose information and communication technologies (ICTs), including email clients, the Internet, word processors, spreadsheets, and so on. This training session was important for two reasons: firstly, it increased the technology readiness (Olson & Olson, 2000) of the social workers; secondly, it aroused the curiosity of even the most reluctant of them and contributed to an increase in the acceptance and use of the new tool. In this way, the moment of formal learning also developed openness to informal learning.

At the beginning of the project, the *gestori* received a small financial incentive in recognition of their contribution. When this incentive came to an end, some *gestori* lost motivation. The distinction between *fruitori* and *gestori* also came to an end, and all the social workers were granted the same rights when it became clear that this enlargement would not create serious problems. Nonetheless, a mixed group of seven *gestori* still met for coordination and

continued to encourage their colleagues to use the KMS, and the KMS was appreciated for the information that it contained, all of which had been identified for inclusion by the social workers.

The precariousness of the KMS (Mobilization)

The actor-network formed up to this moment is precarious. The development of the KMS had its own conditions that conflicted with the institutional conditions. Among the constraints were: (a) several social workers did not have their own computers and had to share a single machine, while others had slow and old PCs; (b) there was no monetary incentive for the "extra work" of maintaining a KMS; (c) the project was not a priority for everyone. There were also two recurring problems with the KMS: the searching and browsing functions were not intuitive, and some parts of the system could only be updated by sending information to a third party, which did not match the goal of devolving the responsibility for creating content to the social workers within their operational units. Some critical types of information could not be updated and disseminate promptly enough to meet the social workers' needs for coordination of activities and sharing of knowledge. At the time the research team became involved, wikis had become technically feasible for non-specialist groups and seemed to offer the timeliness, coordination, and group identity possibilities that the KMS did not support. Around the same time, the fCSW was seconded to a new health authority and no longer had a formal role in the case organization. Given the differences in interests, questions about the suitability of the KMS to support critical aspects of practice, and the loss of the social workers' champion, translation of the KMS into a well accepted system that could be "black-boxed" seemed unlikely.

Introducing a wiki

In this section, we use due process to consider the potential for replacement of the existing KMS with a wiki. The main issues and the relationships between them, according to the due process model, are summarized in Table 2, while more detail is provided below.

Perplexity

The precariousness of the current KMS gave rise to perplexity. Wiki technology offers a possible improvement in terms of functionality and support for the social workers as a community. Nonetheless, the KMS provided useful information which could be located using the classification scheme developed by the social workers. Content and links that did not need to be maintained dynamically continued to be updated, albeit sporadically, and the SWs had access to email and the telephone for communication and coordination. Still, there was a sense that a wiki was a more accessible and flexible tool for informal learning that would be able to offer all that the KMS provided and more, without the current disadvantages. Furthermore, there was a sense that being the first group in the health authority to have a wiki would be a recognition of the social workers as a professional group.

The research team designed and developed a prototype wiki to test the belief that the content and structure of the KMS could be "seeded" into a wiki without limiting the wiki's capacity to be an open system owned and maintained by the social workers themselves. Detail of the prototype design and the rationale behind it appear in the appendix. In essence, the rationale was based on the need for a strong base of participants who support the wiki and find value in it. Work practices needed to be folded into the wiki to increase its usefulness. Maintaining participation and engagement behind the wiki is much harder than setting up or maintaining the wiki itself, and we considered seeding of the existing much appreciated content in the

early stages to be vital, as a critical mass and sufficient relevance of content is necessary for uptake (Mader, 2007b).

Table 2. Due process for inclusion of a wiki in the existing network of relationships: Summary of issues

	<i>Facts</i>	<i>Values</i>
How many are we?	<p>1 Perplexity →</p> <p><i>(What is the wiki for? What do we use now?)</i></p> <p>Use of wiki to support collaboration and knowledge sharing</p> <p>Use of wiki to benefit existing work practices</p> <p>Overall satisfaction with the KMS except for some functionalities</p> <p>Satisfaction with the current classification system for resources (developed by the SWs)</p> <p>Belief that a wiki could be built upon the previous experience of the KMS with some design and content from the KMS “seeded” into the wiki</p> <p>Perception of wiki as a recognition of SW’s work</p> <p>The SW champion of the project is no longer working in a SW role. The commitment of the new SW coordinator is unclear</p>	<p>2 Consultation</p> <p><i>(What do we need? What do we want? What we would like to do that we do not do now?)</i></p> <p>Need for more self-management (e.g., autonomy, self-direction, and flexibility)</p> <p>Need to break up rigid separations between functional areas</p> <p>Need for more professional visibility and higher status</p> <p>High professional motivation but low job satisfaction</p> <p>More possibilities to meet colleagues</p> <p>Need for ownership of the wiki</p> <p>Need for further education and training</p> <p>Rather than a small group of <i>gestori</i>, all SWs could keep information up to date and use the wiki for communication and collaboration</p> <p>Regular use of email not expected to change much</p> <p>A champion is needed</p>
	<p>4 Institution ←</p> <p>“Political” and bureaucratic institution</p> <p>DIS sponsoring the wiki project</p> <p>Procedures and rules set by functional area managers not the SWs</p> <p>Rigid separations between functional areas</p> <p>Re-organization of KMS groups around territorial areas stopped by lack of monetary incentives</p> <p>Possibility for the health authority’s SW community to be extended to include the SWs employed by the municipality</p> <p>Employee rank (healthcare, administrative, technical.) affecting marginalization of SWs</p> <p>Circulation of official communications via email to SWs</p> <p>Little availability of PCs</p>	<p>3 Hierarchy (priority of expressed needs)</p> <p>1) Need for further education and training</p> <p>2) Need for more PCs</p> <p>Willingness to contribute dependent on training and computers in return</p>
Can we live together?		

Consultation

Consultation involves assessing the suitability of the new actor to be part of the network. With respect to a potential wiki, different actors, including different social workers, will carry with them their different experiences of technologies and different expectations. Most social workers were reported to have basic technological skills (e.g., they used a PC to write documents, send emails, make power point presentations, and seek information on the Internet), while some were comfortable users of social media. When the research team met with the human actors who had promoted the KMS, the idea was to start to talk with them about their experience with the KMS and to understand how they felt about introducing a wiki. It was clear, though, that the transfer of the fCSW to another healthcare organization, had resulted in a change in the actor-network. Loss of the critical figure of the fCSW, even though she was replaced with a new coordinator, resulted in new interests and new priorities. It was therefore necessary to develop a wider picture of the situation as perceived by the key actors and to obtain a view of what they now desired.

We sought answers to the following questions (asked from the point of view of the actors in the network): What do we need? What do we want? What we would like to do that we do not do now? Some of the needs were unchanged, including a desire for greater self-management (e.g., autonomy, self-direction, and flexibility) and recognition of the professionalism of the social workers. Despite high professional motivation, job satisfaction was low and a tool that enabled greater self-management alongside more possibilities to meet colleagues would be welcome. But for this to occur, the social workers would need to feel ownership of the wiki. The actors we consulted believed that there was a need for all social workers (rather than a small group of *gestori*) should keep information up to date and use the wiki for communication and collaboration if these benefits were to be obtained. The involvement of all social workers would require improvements in technology, and further education and training in technology use and use of the wiki for resource maintenance and collaboration. Nonetheless, there was a sense that “old habits die hard” and it was unlikely that email exchanges would be replaced by collaboration mediated by the wiki. No new champion of the social workers’ point of view emerged during the consultation, although there was still a remnant sense that the fCSW’s goal of breaking up of rigid separations between functional areas was still important.

The combination of actors and interests identified to this point are summarized in the actor-network presented in Figure 2. Without the strong involvement of the fCSW, it appeared that the obligatory point of passage (OPP), if the interests of all the actors were to converge in a new stable network, i.e., if the wiki were to replace the current KMS, was the DIS.

Hierarchy: How much is a wiki valued?

In subsequent conversations with the research team, the fCSW affirmed that the social workers liked the idea of the wiki and had positive expectations of it. As hoped, they saw it as a form of recognition. As the fCSW put it, the way they felt was, “they do not recognize us by giving us money, but someone acknowledges that we do something!” Furthermore, the social workers considered participation in a research project as itself a form of recognition, and an opportunity to reinforce their institutional visibility. They are willing to contribute to the wiki if they are going to receive more training and more computers in return, and these changes in themselves would contribute to increased status, job satisfaction and professional identity.

ACTORS

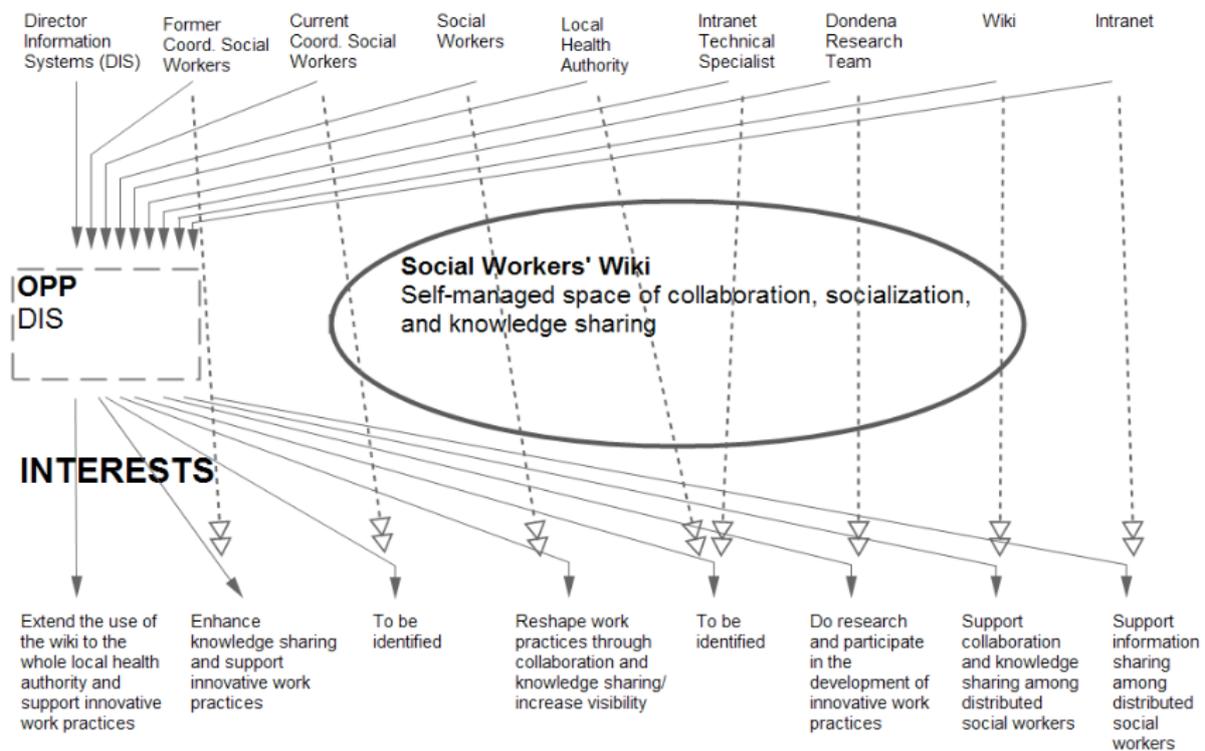


Figure 2. Actor-network forming in response to potential inclusion of a wiki

Institution: Toward a transformed actor-network

While there was a strong sense that replacing the intranet-based KMS with a wiki was both valuable and feasible, the global network within which any local network of social workers and information technology might be situated remained largely unchanged. Apart from the strong support of the DIS, the local health authority was a large, bureaucratic institution with rigid separation between functional areas, whose managers in turn adhered to and applied rigid procedures and rules which were largely set by medical and political needs rather than the perceived desires of the lower status social workers. Few resources were allocated to social workers, resulting in poor access to new technology or to monetary incentives for innovation, although – provided the functional managers agreed – there was an increasing likelihood that time could be made available for training. Finally, the organization's use of technology was unlikely to change, so social workers would continue to receive information from outside their own group by email, and would still need to use the intranet to access resources maintained outside their group.

Conclusion

We have analyzed the situation that led to the proposal to adopt a wiki to support informal learning and professional identity among social workers in a local health authority. Adoption of ANT as a framework guided us to take into account, not just the technological features that might be offered by a wiki, but also the social and contextual issues and the socio-technical interactions between the wiki and existing technologies and the human actors in the process of adoption of a wiki. We saw that is necessary for all of these interests to align if a wiki is to meet the set of needs and desires that the human actors hold for it, and we developed a

prototype of a wiki that has the potential to both maintain the value of work completed to date and meet additional needs for informal learning through collaboration, breaking down of function barriers, and maintenance of professional identity. The successful adoption and sustainability of the wiki depends on creating and strengthening its association with the other human and nonhuman stakeholders in the network. Only when these actors become allies, enrol in the project and their interests are taken into account, can the wiki become less precarious and be included in the social workers' technology-mediated informal learning actor-network.

Acknowledgements

We wish to thank the wiki project participants at the local health authority who so graciously shared their experiences and insights with us. We also thank Ciro Sementina and Gianmaria Battaglia for the inspiration to begin this work, and Paul D. Jackson for his contribution to keeping the research "on track". The research was supported by the Carlo F. Dondena Centre for Social Dynamics at Bocconi University in Milan, Italy.

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Appendix: The prototype wiki design

Unlike structured knowledge management and content management systems that require the organization of the system and its contents to be designed before it is created, there is no need to plan the structure of a wiki. Nonetheless, being confronted with a blank, unpopulated space and knowing it must be fully populated can be disorienting and confusing, perhaps particularly for busy practitioners who do not have time to “play”. In this case, the social workers had already organized and populated a space that they considered satisfactory, except for some difficulties encountered when searching and browsing, as these functions were not very intuitive, and when updating the contents, as some parts the Intranet could only be updated by sending information to a third party.

To acknowledge the existing resource, and the effort already put into developing it, as well as to seed the wiki with content already known to be valuable and to avoid the ‘blank space’ problem, we decided to develop a prototype of a wiki that reproduces much of the structure and functionality of the existing system. This choice had two important advantages:

- The work that the SWs had already done was acknowledged and celebrated.
- The SWs would not feel as though they had to duplicate work they had already done.

This approach implies that a sensible balance can be found between structure and self-organization, to avoid imposing a stifling organization on one hand, and disorientation on the other. The SWs had increased ownership of the new system: they could change anything (both content and structure) without the need to refer to a third party. We anticipated that, as the SWs got a feel for how they wanted to move on with the organization of the space, folders and areas could be added, renamed and moved to new positions. In this manner, the wiki will grow according to how the SWs use it and develop the content, making it possible to adjust the structure based on the content, and not the other way around. Moreover, self-organization of the space should develop a sense of empowerment and confidence in use of the wiki as a space to improve practice and as a showcase to demonstrate professionalism and improve status and recognition of the SWs within the health authority.

While the SWs must be invited to define their own goals for the wiki, we envision the wiki as an informal learning environment where the SWs can:

- share information and resources for taking proper decisions
- interact with distributed colleagues and exchange experiences
- support mixed teams
- nurture ability to exercise assertiveness in collective decision making
- foster positive thinking on their own ability to influence and make changes within the local health authority
- nurture ability to learn new skills for improving their own personal or group influence

Building on the previous experience of KMS maintenance based on *fruttori* and *gestori*, all the social workers should feel free to edit the wiki content and structure, but some “nominated individuals” could also be in place to take responsibility for the structure.

Prototype wiki structure

Figure 3 shows a map of the structure of the prototype wiki, derived from the existing KMS, an understanding of its perceived strengths and weaknesses, and our analysis of the actor-

network that is forming around the social workers and the wiki. There are eight main pages, some of which are directed primarily toward practice-related content while the others provide spaces to share less formal content and to interact in different ways.

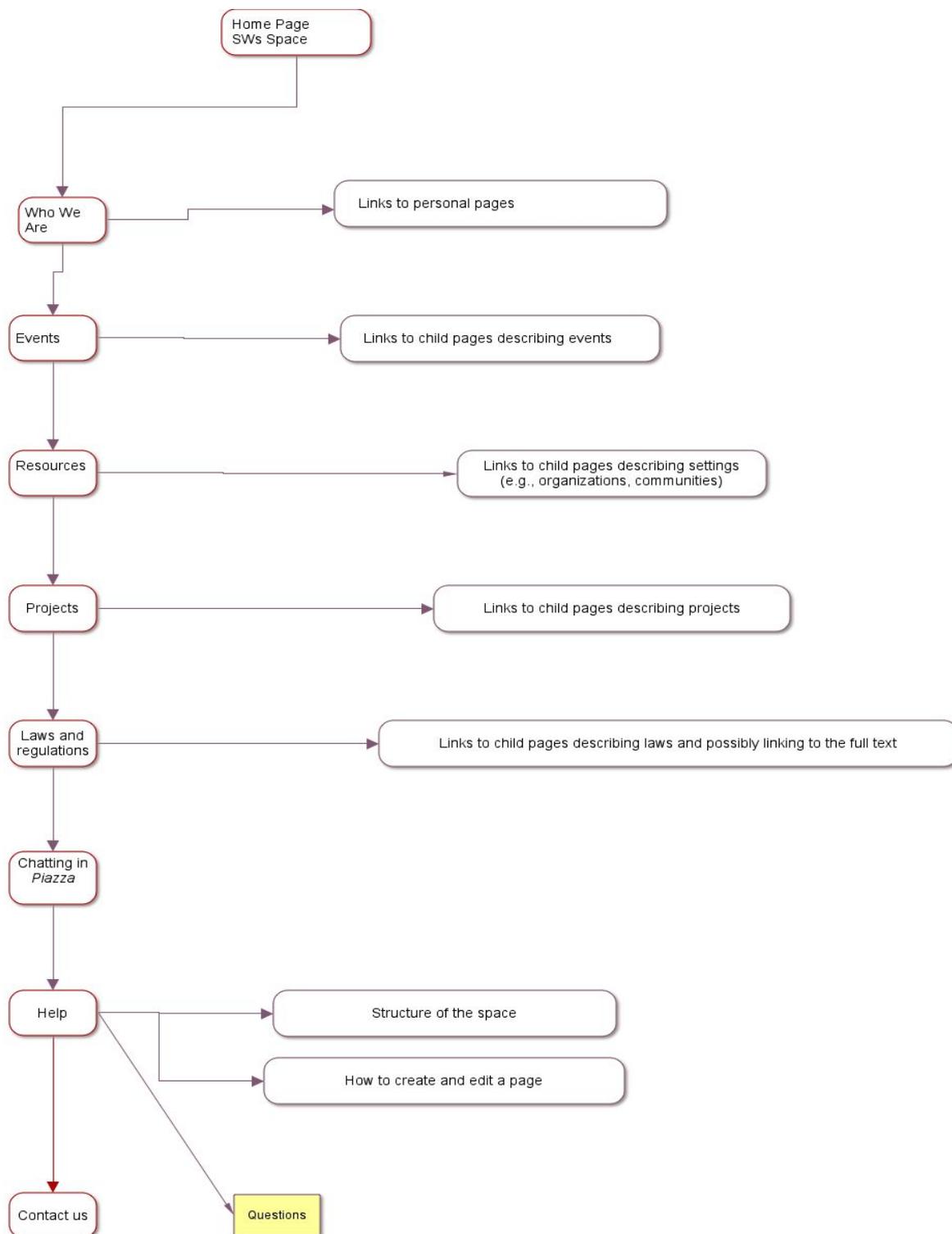


Figure 3. Map of the structure of the prototype SW wiki.

The prototype space contains two broad categories of information:

- Directory information, e.g., name, address and contact details of resources and events, with the possibility to add comments that might be updated at any moment, for example, comments can be added on the availability, or any particular current strengths or weaknesses, of using a certain resource.
- More static “document repository”, including both copies of documents and links to external documents such as legislation and other material needed for reference.

The SWs can easily browse these types of information by identifying wiki pages with keywords or tags. Some of the main pages, such as *Events*, *Resources*, *Projects* and *Laws and Regulation*, are hubs (Kleinberg, 1999), in the sense that they are parent pages that link to other pages (child pages that the participants create and that appear immediately in the parent page). Each page allows social interactions by using a commenting feature. More detail of the intended nature of each page is provided below.

- *Homepage*: A welcome page with a short description of the goals of the space.
- *Who We Are*: A page linking to the social workers' personal pages. A custom-designed Personal Template is available. It encourages SWs to introduce themselves and to add information about themselves, such as a picture, a basic profile of what they do, etc. This page also gives the SWs a space in which they can trial the wiki; discuss the tool and its potential value to them and any role they might play (or want to play) in developing and sustaining it.
- *Events*: A page linking to child pages describing events relevant to the SWs. A custom-designed Event Template can be used to guide SWs to enter the description of a specific event, to upload presentation materials related to it and to write comments.
- *Resources*: A page linking to child pages describing settings including non-profit or public organizations, including hospices, community health organizations, etc. This page currently constitutes the most critical information asset of the wiki and is seeded with content from the KMS using a Resource Template designed to reflect the structure of existing entries in the KMS. The SWs will be able to create additional pages for new resources the Resource Template. They will also be able to add new entries using free format, change the template structure, and regardless of the structure of any page, add comments.
- *Projects*: A page linking to child pages describing projects involving the SWs.
- *Laws and Regulation*: A page linking to child pages describing laws, rules and regulations affecting the work of the SWs. These pages are seeded with information and links to the full text of laws, currently held in the KMS.
- *Chatting in Piazza*: A space to gather, socialize and talk, with no prior objectives, rules or structure.
- *Help*: A page linking to some basic instructions on how to create and edit a page using the wiki software and to basic organization of the space.
- *Contact Us*: A page with information about who to contact for problems with the use of wiki.

Tagging and searching

Wiki is a technology that privileges browsing over search. All the pages in the space can be easily browsed through the use of tags. In the software chosen for the prototype (Confluence), labels (tags) are added in a specified field at the top of a page. For each tag, a page listing all of the pages in the space related to those specific tags is generated. Tag pages also show the most recently used and most popular label. The popularity of tags is also displayed in a tag cloud (a display where the font size shows the frequency of use of each tag) which can be accessed from a Browse space menu.

Because the SWs had already developed their own classification scheme, the prototype design allowed for tags to be imported with resource details, but we did not set up a formal hierarchical vocabulary that must be used, rather we have allowed that information about used and popular tags would guide the SWs to use existing tags where terms already existed. There is a risk that terminology will become fragmented, but given the difficulties encountered in searching the existing KMS using the structured vocabulary, it may well be that full text searching supplemented by tagging would be more effective.

Nonetheless, consistency of use of tags across the space and taggers remains important. Furthermore, while development of shared meaning and agreement about tags serves a functional purpose, it can also contribute to breaking down functional barriers and development of professional identity if the SWs use the wiki (e.g., discussion pages) to negotiate the social meaning of the tags they use, and to understand why others have assigned certain tags to a page.