Stretching out and expanding work practices in time and space: The case of telemedicine

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ABSTRACT

The article utilizes the imagery of stretching out and expanding for exploring what happens when medical practices and health working arrangements are temporally and spatially reconfigured. Based on the tenets of contemporary practice theory, and on the back of a three years' longitudinal study of telemedicine in northern Italy, the article investigates some of the practical issues raised by the subversion of the proximity principles that still underscore most current medical practices. The study argues that in order to cope with the expansion of their activity practitioners had to face three main practical problems: they had to redistribute their work and tasks among human and non-human elements, they had to reframe the ways in which the activity was made accountable, and they had to reconfigure the relationships between all those involved. The stretching out and expanding of medical practices in space and time implies thus much more than a simple redistribution of what was already there and it triggers profound changes which included the reframing of the object and content of the activity, the emergence of new artefacts and new identities, and the modification of the geography of the power positions between all those involved.

Introduction

One of the often mentioned characteristics of the so called 'New Economy' is the emergence and increasing diffusion of new distributed temporal and spatial working arrangements (DeSanctis & Monge, 1999; Hardill & Green, 2003). While there is convincing evidence that historically distributed work has always existed side by side with co-located forms of organized activity (O'Leary et al., 2002), a growing number of authors argue that the ability to support complex patterns of distributed working and innovation is fast becoming a critical success factor for organizations and firms (Hinds & Kiesler, 2002).

Research in this area has been often connoted by three main characteristics. First, it is focuses on inter-organizational or intra-organizational connections through computer-mediated tools and technologies (DeSanctis & Monge, 1999; Turner et al., 2003). The object of inquiry are often 'glamorous' high-tech workplaces that attract our attention especially for the apparent innovativeness of the technological arrangements put in place. Second, attention is mostly directed towards the challenges of managing distant relationships and coping with new emerging communication and coordination patterns (DeSanctis & Fulk, 1999; Hinds & Kiesler, 2002). The focus is thus exclusively on how communication technologies reconfigure access to information, how they affect access to people, and how they modify the way they conduct their business and interact with suppliers and customers (Dutton, 1999). Third, and strictly related to the former, is the fact that many of the available studies of distant work and virtual organizations adopt a normative stance and make little reference to 'actual circumstances and experience' (Woolgar, 2002; 4). The result is a prevalence of studies based on normative approaches which are driven by previous theory rather than based on the analysis of the actual conduct of work (Sarker & Sahay, 2004).

In this article, I shall offer a different view of what happens when working arrangements are temporally and spatially re-distributed. I will do so by deviating from the mainstream directions discussed above in three main ways.

In the first place, I will address the somewhat 'non-heroic' ambit of telemedicine, studying what happens when health care work becomes distributed and disconnected in time and space. Telemedicine, understood broadly as the delivery of health care services to persons who are at some distance from the provider (Grisby et al., 1995), is in fact one of the fastest growing areas of distributed and distant work (Roine et al., 2001). While in itself a very old phenomenon (the first experiments of the transmission

of electrocardiograms through wires and long-distance transmission of X-ray images dates back around the First World War), the use of telemedicine has experienced a significant acceleration in recent years in concomitance with the wider availability and reduced costs of information and communication technologies. As we shall see in the study, telemedicine can be very innovative even when there are no high-tech devices involved.

Second, I will refrain from focusing 'ex-ante' on some specific phenomenon (be it communication, collaboration, trust, or other) and focus instead on the conduct of daily activities. My aim is not observing the influence of some supposed variables as much as understanding how the practical problems introduced by the alteration of the spatial and temporal conditions of work were addressed and resolved in the site I observed. As I shall show, in fact, medical work is still mostly organized around the convention of the physical co-presence of the two parties and spatial co-location has a practical, cultural, and legal importance. For example, direct observation and apperception of nuances constitute two fundamental resources of diagnostic practice (Cicourel, 1990, 1999; Sinclair, 1997). Analogously, proximity is a cornerstone of nursing, the practice being historically based on the assumption that direct human interaction has a therapeutic effect (May et al., 2001). It follows that introducing distance between provider and client in medical encounters is bound to problematize certain conventional assumptions and upset some deeply entrenched practices.

In order to describe this break in the traditional way of conceiving medical encounters, in the article I shall use the imagery of 'stretching out' and expansion of existing medical practices in space and time. The metaphor of the 'stretching out' captures the idea that when extended in space and time, medical practices are put under pressure in that some of the existing taken for granted assumptions and practical arrangements become unsuitable for the new conditions of work. The idea of expansion, which I borrow from Cultural and Historical Activity theory (to be discussed in the next section) refers to the fact that this new of way of conducting medical work requires redistributing, reframing, and reconfiguring the existing activities. The notion of expansion spotlights some of the practical consequences and repair work which follow the stretching out.

Last, but certainly not least, in studying this stretching out and expansion I shall adopt an interpretive, articulative, and practice-based research stance (Gubrium, 1988; Nicolini, 2006; Nicolini et al., 2003). I shall thus endorse a type of social science which focuses on observing daily practices and understanding how members of situations assemble a reasonable understanding of the things and events that concern them. Instead of focusing on the mutual influence between technology and people (as in the

traditional approach), I shall investigate in which sense telemedicine constitutes a new way of accomplishing medical activities, as well as the consequences of this upon the identity and positioning of the different elements which enter into the carrying out of the activity (for a similar approach see also Lehoux et al., 2002; May & Ellis, 2001; Mort et al., 2003).

The results will be a view of telemedicine in which the stretching out and expansion of medical practices is made possible by the overall redistribution of the work performed by human and non human elements. As I shall show, the stretching out and expansion implies both a reconstitution of the object, the nature and content of the activity, and the reframing of the ways in which the activity is made accountable. The effort at reconfiguring health practices produces thus both a new set of activities and identities, as well as a modified geography of power positions.

The article is organized as follows: in the next session I will review some contemporary practice theories and derive from them some sensitizing concepts which will aid my description and discussion of the practice of telemonitoring. Thereafter, I shall introduce the site of my research and discuss three major concerns which practitioners have to face in coping with the stretching out of their activity, that is, the redistribution of the work and tasks, mending the process for ensuring the accountability of actions and interactions, and the modification of the relationships between all those involved. Finally, I will put forward some reflections on the more general implications of my findings.

How to theorize the stretching out and expansion of practices

In order to conceptualize the stretching out and expansion of medical practices and its implications, I will draw on some of the tenets of contemporary practice theory. By this label, I refer to the work of scholars from different disciplines who have developed explanations of social, cultural, and material phenomena based on the notion of social practices (Ortner, 1984; Reckwitz, 2002; Schatzki, 2001, 2005). Although practice theory does not constitute a unified corpus, most of these scholars are joined in the belief that practical regimes constitute the horizon within which un-reflexive reactions, actions, utterances, linguistic acts, behaviours, and routine conduct acquire meaning. Practice consists of all these elements but cannot be reduced to any of them. Practices and the complex nexuses of local and global interdependencies which they tend to form (Dopson, 2005; Schatzki, 2002) constitute therefore a phenomenon that needs to be studied in its own right.

Most contemporary practice theorists also generally agree that practices are always materially mediated and that practice takes place through and amid a variety of artefacts and objects (Engeström, 2000, 2001; Law, 1992; Schatzki, 2002, 2005). Accordingly, although practices depend on reflexive human carriers (Weber's *Traeger*s) to be accomplished and perpetuated, agency is always the emergent property of a heterogeneous arrangement of people, things, symbolic artefacts, and other practices (Reckwitz, 2002). Finally, many practice theorists concur that practices perform meaning and support identity, so that the question of what people and things are depends upon the practices in which they are involved in (Wittgenstein, 1953). At the same time, practices perform by definition different and unequal social and material positions. To speak about practice is to speak about empowerment or disempowerment or about power in the making (Ortner, 1984).

Different traditions attract our attention to particular aspects of practice. Cultural Historical Activity Theory (CHAT), the practice theory stemming from the work of the school of cultural-historical Soviet psychology, directs our attention towards the mediated, object-oriented, and developmental nature of practices (Blackler, 1995; Blackler et al., 2000; Engeström, 2000, 2001). In this theory, practices are organized around an object, either material or ideational, that can be shared for manipulation and transformation by the participants. The attainment of the activity's object is pursued through the mediation of a variety of elements (people, artefacts, rules, division of labour, ways of relating) which embody a multiplicity of points of view, traditions and interests. For this reason, activity systems, that is, practices, are by definition internally fragmented and inconsistent and practicing is thus bound to produce contradictions and conflict (Blackler, 1995; Engeström, 2000). CHAT authors use the metaphor of 'expansion' for describing the resolution of these contradictions and the transformative process in which activity systems are by definition constantly involved. An expansive transformation is accomplished when the object and motive of the activity are re-conceptualized to embrace a radically wider horizon of possibilities than in the previous mode of the activity. Although the transformation is necessarily achieved by the emergence and institutionalization of new forms of mediation (i.e. new artefacts, rules, conducts, divisions of labour), the object of expansive learning is the entire activity system (Blackler et al., 2000; Engeström, 2001). The notion of expansion thus underscores that it is the subject-less effort of producing the same object of work in the presence of innovations, variations, or contradiction which results necessarily in a shift in the nature and identity of all the elements involved – including the object of the activity. In this theory then, pursuing the same thing

necessarily produces something different. As we shall see, this is very much the case of telemedicine.

Other authors draw our attention to the fact that participation in a practice is connoted in normative and moral terms, and that practitioners perceive practice both as a normative drive and a commitment (Boltanski & Thévenot, 2006; Garfinkel, 1967; Lave & Wenger, 1991; Macintyre, 1981; Thévenot, 2001). Ethnomethodologically oriented scholars, for example, emphasize that to be involved in a practice means to be routinely expected to perform doings and sayings competently, and to contribute to the production of orderly and accountable scenes of action (Garfinkel, 1967; Lynch, 2001). This normative expectation is reflected in the ubiquity of accountability concerns in human activity and in the fact that all social activities are produced in view of the possibility of their linguistic description (Lynch, 1993). Actions and interactions are customarily performed in such a way that they recognizable and reportable to others. Any breach in the existing fabric of accountability makes the activity illegitimate and untenable and needs therefore to be quickly mended.

In our context, this translates into an invitation to observe how accountability is obtained anew when medical practices are stretched in space and time and new artefacts are introduced into the caring process.

Finally, a further group of theorists underscore that practices embody particular configurations of interests and perform identifiable power regimes. Most of these authors build on the idea that the most fundamental social inequalities stem from the position which agents occupy within life sustaining practical activities. According to authors such as Bourdieu (1980), Foucault (1970, 1979) and Laclau and Mouffe (2001), practices necessarily perform unequally empowered social positions and sustain the relation of power between them. The positioning and the power that goes with it is defined both materially (e.g. in terms of a specific range of material possibilites and contraints), discursively (e.g. in terms of the possibilities of discourse associated with the position), and subjectively (e.g. in terms of the way the world is perceived and experienced). Discursive practices become especially important in this perspective, because discursivity (one of the dimensions of practice) is often both the locus of power struggles and the object of such struggles.

In sum, contemporary practice theories suggest that in making sense of the stretching out and expansion brought to bear by telemedicine we should examine the phenomenon from three specific angles: the re-distribution of work between the human and non-human elements implicated in the practice, the effort of restoring the accountability of actions and interactions, and the re-configuration of power relationships. This, in turn requires that we focus on the changes in the nature and components of the

practice, the reconstitution of the object of the activity, the reconfiguration of the mutual relationships between different practices, the establishment of ways of making the practice accountable, and what consequences these changes had for the identity and power position of the actors involved.

In the rest of the article I shall use this framework for charting the slippages and reconfigurations consequent to the introduction of distant working in the practice of caring for serious chronic heart failure patients.

Research methods and setting

The data discussed in the present article derive from a three-year research project conducted in northern Italy in which I observed three instances of telemedicine: a telecardiology consultation service and two major services of telemonitoring serious heart failure patients ('tele triage'). These sites were chosen for a number of theoretical and practical reasons. First, previous research indicates that telecardiology is among the most common initiatives of telemedicine (Nicolini et al., 2004). Second, all these sites were recognized as national and international centres of excellence. Third, these telemedicine initiatives had been in place long enough for organizational and professional issues to emerge. Last but not least, I was granted access to all the sites.

Data collection methods

Data were collected through participant observation (several weeks over a period of three years), semi-structured and ethnographic interviews, discussion groups and document analysis. The observation at the telecardiology call centre focused especially on the work of operators while in the other two sites I observed the telemonitoring activity in the context of the daily ward's routine.

In all these sites I conducted several semi-structured and ethnographic interviews with all the actors involved (managers, cardiologists, nurses, technicians, general practitioners of monitored patients). Interviews were transcribed verbatim and analysed for emergent patterns and recurrent themes. They are referenced with 'int.' and a reference to the occupation of the interviewee in the text. Finally, I analysed a variety of project documents and scientific papers produced during the initiative.

Research settings

The first site where I conducted the research was a telemedicine centre anonymized for this article as 'Telemed'. The centre, one of most advanced

in the country, operates since 1997 and is privately run by a well known cardiologist. It comprises a state-of-the-art call centre staffed on a 24/7 basis and provides telecardiology consultation to about 1500 participating general practitioners (GP). Once enrolled, GPs are given an easy-to-use portable electrocardiogram recorder which can transfer data through the normal telephone line (land or mobile). In case of necessity, they can send the electrocardiogram (ECG) to a call centre where an operator connects them with the first available cardiologist on duty who has been forwarded the ECG through a web-based system. The cardiologists, who work from remote locations, use the ECG for carrying out a remote 'second opinion' consultation, advising the GPs on the results and the meaning of the ECG, as well as on suitable courses of action. At the end of the call, the cardiologists summarize the outcome of the consultation to the centre's operators, who file the data for future reference. An example of a teleconsultation is provided in Table 1.

The other two sites of the research are centres which provide distant telemonitoring and tele-assistance to serious chronic heart failure (CHF) patients. Serious heart failure is a highly debilitating condition affecting a growing number of patients, most of them aged 60 and over. In very simple terms, heart failure means that the heart doesn't work properly. People

Table 1   Vignette 1: An example of teleconsultation

Cardiologist	«Hi . . .»
GP	«Hi doctor, how are you? I am sending you this ECG because . . . I have here . . . an 87-year-old lady . . . she has a history of diabetes, ischemia, she had also a stroke, she is in therapy with (lists several medicines) . . . I don't know . . . tell me . . .»
Cardiologist	«How is she? How does she look? Is she there? Is she in the waiting room . . . an atrial fibrillation . . .»
GP	«What ? (alarmed) atrial fibrillation . . . is she fibrillating?»
Cardiologist	«no! . . . no! I was just wondering . . . I see here . . . she is on a sinusoid rhythm . . . more or less . . . but is she in pain or something?»
GP	«no, not really, she said she even ate lunch . . .»
Cardiologist	«Look, let me check the old ECGs . . . let me see . . . if she has had something before»
GP	«Was there a dyspnoea last time?»
Cardiologist	«no, that is because she was moving while you were using the ECG recorder (while talking the old ECG comes out of the fax) . . . How's the pressure?»
GP	«Uh . . . good you reminded me . . . the pressure is below 90»
Cardiologist	«Hum . . . and how's usually?»
GP	«she is hypertensive . . . so . . .»
Cardiologist	«. . . aha! . . . so she gets an ACE inhibitor!?!»
GP	«yes . . . yes, she takes half of this medicine and half of this other one. She also takes a diuretic . . .»
Cardiologist	«. . . I understand now . . . look, there is nothing . . . in these cases . . . let's cut the ACE inhibitor in half . . . if the pressure gets better we also diminish the diuretic. Make her do a blood test and we'll see how it goes»
GP	«Thanks a lot»

cannot carry out their daily activity, feel out of breath and get deep chest and other pains doing even the most light activity (e.g. even combing their hair). Acute crises are not uncommon, especially in more seriously ill patients. When such crises occur, patients need to be rushed to the hospital, put under intensive care, and 'stabilized' with an appropriate cocktail of medicines. One cannot really be healed of heart failure unless one goes through a (successful) heart transplant. Otherwise, like with all other chronic illnesses, all one can do is survive, with or in spite of, the illness.

Until a few years ago this condition was typically treated through a recurrent pattern of hospitalization, intensive therapy, discharge, deterioration of conditions and subsequent new hospitalization. Hospitals intervened on acute crises and then 'discharged' their patients who were then either left to their destiny or taken up by their general practitioners. This cycle, however, contrasted with the emerging evidence that unless the disease was properly 'managed', patients' conditions could seriously deteriorate over time. In order to guarantee 'continuity of care', some cardiology departments started to set up 'day hospitals', that is, a halfway solution between being at the hospital and being at home. Patients attended on a regular basis the 'day hospital' where they were seen by a specialist and could get access to specialized know-how without using precious 'ward' space. After carrying out most of the procedures that would have previously required hospitalization, patients returned home, often using an ambulance. 'Day hospitals', however, still required these very sick patients to travel significant distances so that the cycle of successive encounter and the effectiveness of monitoring is still necessarily limited. They are also very expensive to run. In this context, a medical foundation with several branches all over Italy, which specialized in the care of chronic cardiopathies, started to use telemedicine as a way of assisting these patients at home. Two different ways of addressing the issue were pursued by two distinct centres of the Foundation.

In the first one, which I will call 'Triage', patients were given a portable ECG recorder and were trained on how to use it to send their data over the phone using the telemedicine centre described above as a relay. These were patients with chronic conditions that ranged from serious to very serious (some were on a waiting list for a heart transplant). At regular intervals specialized personnel contacted the patients, checked the ECG together with a number of other parameters (some of which require lab tests to be carried out prior to the scheduled contact) and adjusted the dosage of medicines accordingly. Patients called if an emergency ensued, and returned to the centre for a general check-up about twice a year. Only when diagnostic parameters suggested a serious deterioration would medical doctors be involved. Otherwise the nursing personnel took care of everything (this

happened in about 90% of cases), hence the word 'triage', from the French 'trier', which means selecting after making an informed evaluation. The nurses were qualified but did not have a specialist or consultant status, in that this position had not been yet introduced in Italy at the time of the research. They were all quite senior and they all had a professional track record in cardiology (most of them had worked in the local sub-intensive emergency cardiology unit).

Extracts of a telemonitoring phone call from the 'triage' centre is provided in Table 2.

The second project, nicknamed here 'answering machine', was instead centred on an interactive voice recording system which allowed the centre to detect variations in the conditions of the patients. After being discharged from the specialized centres, patients were asked to call at regular intervals to the hospital and record into an interactive automatic answering machine the measures a dozen of vital signs, both instrumental (pressure) and non-instrumental (out of breath: yes/no; etc.). The data were automatically transferred into the electronic patient record and checked every morning by a nurse. If the data exceeded the established parameters, the nurse informed the doctor who would then call the patient, check his or her situation, and then decide on which course of action to take.

In the following sections I shall use the data gathered in these three sites for illustrating some of the consequences arising from these new arrangements.

Stretching as re-distributing medical work

If one observes the two vignettes in Tables 1 and 2, one will notice that a first notable effect brought to bear by 'telemedicine' is the significant redistribution of tasks and competencies between all the actors involved, both human and non-human. This is recognizable in both examples. Let's start with the case of telemonitoring (Table 2).

In this case, the whole exchange is conducted by a nurse. The nurse is checking some general health indicators and the overall well-being of the patient, which is what one would expect from a good nurse. However, she is also discussing symptoms, reading diagnostic clues, setting the dosage of medicines, which is something one would *not* expect from an Italian nurse.[1]

While this is not totally unexpected, given that the service had been structured according to the idea of nursing triage, one can note that the emerging new division of labour involves much more than a simple redistribution of what was already there. In fact, the redistribution follows a more

Table 2 Vignette 2: a tele-monitoring call

[The nurse arranges the agenda on her desk in the little room she has been given at to the end of the corridor and opens up the ring binding folder which contains the ECG plot received from the call centre by fax, copies of old tests and a log piece of paper made of about three pieces of A4 side by side. Then she takes up the phone and dials.]

Nurse	«Good morning, how are you?»
Patient	«Not too bad, thank God . . . however, you know . . . my triglycerides[a]»
Nurse	«I know . . . I've seen your tests . . .»
Patient	«Yeah . . . my triglycerides!»
Nurse	«They are not exactly where they should be . . .»
Patient	«(mumble) . . . well, you know, I cannot resist . . .»
Nurse	«I know . . . some crisps here . . . some cheese there . . . and your triglycerides stay high. Can you tell me your pressure please?»
Patient	«90 over 130»
Nurse	«Seems fine to me . . . Did you measure it in the morning?» (while speaking she writes down the data on her log book)
Patient	«Oh yes . . .»
Nurse	«How about your weight?»
Patient	«Well eighty . . . eighty two kilos . . .»
Nurse	«(smiling) Eighty or *eighty-two* kilos?»
Patient	*«Eighty-two* (in a low voice) but it varies[b] . . .»
Nurse	«You'll have to check your diuresis . . . two kilos are quite a lot . . . remember how to do it, right? When you go to the toilet you . . .»
Patient	«Yeah, I remember . . .»
Nurse	«But you'll have to be more strict with your diet . . . no crisps . . . too much salt, and no cheese either, or at the most a little bit . . .»
Patient	«. . . But my brother brought me some mozzarella . . .»
Nurse	«Next time tell your brother to bring you one mozzarella only . . . not a whole crate, as he usually does! Let's see your tests . . . did you do the usual battery of test?»
Patient	«Yeah . . . (patient reads tests)»
Nurse	«Not too bad, apart what we said . . . everything seems stationary. How about your therapy»
Patient	«(Patient starts to spell out what medicines he takes at what hour of the day) Epotem . . . half , and it doesn't really bother me, you know . . .»
Nurse	«Good! We can try to raise it»
Patient	«I know . . . we need to get to one pill . . . then I take Luviom (lists continues with other 7 items)»
Nurse	«That seem fine to me . . . have you had any other tummy problems?»
Patient	«No, no . . .»
Nurse	«OK then, please repeat your tests in 15 days . . . then we'll see if you behaved with your diet . . . I insist . . . check out what you eat . . .»
Patient	«Yeah, yeah . . . thank you . . . Oh, by the way, have you heard from signor Oloni . . .»
Nurse	«Yes . . . I talk to him recently . . . he is due for a check up here next month . . .»
Patient	«Well then, I'll have to call him and find out when he's coming . . . I may pop in at the ward to greet him . . .»
Nurse	«That's fine . . . bye»
Patient	«Bye»

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[a] Level of fat in the blood.

[b] Patients with serious heart failure can retain water at an outstanding rate. During crises it is not unusual for them to gain as much as 5–7 kilos of weight in one day. For this reason diuretics constitute on of the main medications in this condition and control of urination is critical.

complex pattern dictated by the practical concerns associated with this new specific activity, and involves the creation of new arrangements, a new mastery, and a new instrumentality. Let's examine these aspects in some details.

Nurses already routinely deal with medicines and diagnostic indicators on hospital wards. Over time they learn how to handle specific drugs and what the effects of different dosages are on patients; they are also officially and unofficially asked to read tests and act in consequence. In intensive care units, they are expected to know which medicine to give to patients in case of emergencies. But because of the proximity to doctors and the frequent planned (and above all unplanned) interaction between health professionals on the ward, their individual clinical knowledge rarely takes centre stage. Hospital wards, and especially intensive or sub-intensive units such as those dealing with the pathologies discussed here, thrive in fact on forms of distributed cognition as the one discussed by Hutchins (1995a, 1995b). In these settings knowing is hence distributed between a complex array of people (including the patients), artefacts and representations. As noted by Hutchins, at least for what concerns humans, 'there is a substantial sharing of knowledge between individuals with the task knowledge of more expert performers completely subsuming the knowledge of those who are less experienced' (Hutchins, 1995a: 49). The knowledge collectively 'possessed' by the members of the medical team is both highly variable and redundant. Individuals working together on a collaborative task engage in interactions that will allow them to pool the various resources to accomplish their tasks. These interactions are only in part planned and ordered. In the hospital ward I observed, programmed and legitimized forms of interaction and coordination (e.g. formal meetings) and informal gatherings (e.g. taking a coffee together) coexisted with a further layer of interaction based on random encounters (or failed encounters). In the wards people run and bump into each other all the time, interfere with each other, or miss each other when they should meet. The result of this planned chaos is not only effective team performance but also high reliability. All medical personnel have 'war stories' to tell about when they were just 'passing by' and noted some mistake made by another colleague, and how their intervention saved the day and prevented a catastrophic consequence.

Not only mastery, but also memory is distributed in this way. Patients' medical trajectories both within one medical institution and between them are only minimally recorded in the patient record: most of the time, such trajectories are distributed between several disconnected actors, as shown by Engeström (2000). Within a ward, a critical activity that sustains this collective remembering is for example the mainly discursive practice of 'handing

over cases' to the personnel on the next shift. This is a critical passage that determines whether a patient local trajectory is constructed or not, and the practice is only partially substituted by the use of supporting devices such as written or electronic records.

It is important to note that co-presence, proximity and mutual visibility are all key features of this form of organization of knowing and remembering. For example, all cases discussed by Hutchins describe co-located people (quartermaster on a deck, pilots in a cockpit), who cannot avoid running literally into each other. Distance therefore interferes with these processes and requires remedial strategies.[2]

In the case described in Table 2, distance is repaired using a well-known approach, that is, through task decomposition and the introduction of standard procedures (see Kielser & Cummings, 2002, for a discussion of this approach to distributed work). The work previously carried out in collaboration between doctors and nurses is split into two unequal portions. The nurse is granted an agreed space of discretionality (interpreting the tests and managing the patient's therapy within the interval set by the national guidance) defined by a precise remit. Within such space, she can move with a high level of autonomy and, in fact, only major changes of medication regimes are discussed with doctors. For example, in Table 2 she agrees on a variation of the dosage without interacting with a doctor. As one of the nurses put it in one of the interviews:

> I call the doctor only if the matter is really urgent and I warn him/her if the patient is not collaborating.
>
> (int. with a nurse)

The image of decomposition and distribution, however, only captures part of what happens here. The objective is in fact reproducing at individual level as much as possible of the redundancy collectively sustained in the ward. This is achieved by training (that is, by 'filling up' some of the gaps) and by the development of a new division of labour and new instruments. For example, each case is allocated to a specific nurse, who follows the patient for months after they leave the hospital. As it emerges from the vignette, a central role is also played by a tool developed by the nurses and that acts as a proxy for the loss of collective memory – the patient log the nurse is handling and observing during the call. The log (Figure 1) is very similar to the one already in use in the ward with a few notable differences. In the telemonitoring log, most of the space is used for registering the evolution of critical vital parameters (pressure, weight, blood test, etc.).

Moreover, the 'note' space, an unstructured section where actions taken are noted, becomes prominent. The form of the log, which keeps side

One field is used
for each
telephone contact

Space for registering the
evolution of critical vital
parameters (pressure,
weight, blood test, etc.)

The unstructured
'notes' space

Figure 1   The patient log.

by side the results of several calls, allows the nurse to get an instantaneous appreciation of the history of the condition with a single glance. The log at the same time represents and creates the patient history.[3] The effort of repairing the effect of distance is distributed between human and non-human elements. In order for this to happen, however, all these elements need to change. The redistribution of work performed here is thus more complex and more subtle than a simple mechanical task decomposition. The redistribution follows a hologrammatic logic, that is, it attempts to mimic in practice the resources used in the collective process of distributed knowing and re-membering within the microcosm of the individual work. In the process, however, both the nature of the work and of the workers, as well as the tools used in the process, undergo modification and realignment.

While the establishment of the telemonitoring service tends to rely on the individualization of what was traditionally a collectively sustained competence, an almost opposite phenomenon is recognizable in the situation illustrated in Table 1. In this case, we observe the splitting between two people of the task and mastery usually enacted by one individual. The GPs sees the patients, while the cardiologist, who has the task of understanding and interpreting the symptoms, is far away. In this case, the expansion of a medical and health care practice produces a split and a breakdown which reveals the visual and tactile nature of cardiology (an aspect that is less than obvious given that cardiology belongs to internal medicine).

Several aspects of the verbal interaction in Table 1 indicate this that the cardiologist's effort is directed at understanding and comprehending the person he is not 'facing', literally an effort of 'figuring out' a distant patient. The understanding the cardiologist seeks is sensuous and emotional in character, not a cold cognitive representation only.

This is especially visible in the search for information about the state of the patient; especially the line when the cardiologist explicitly asks the revealing question: 'How is she? How does she look?'

'Looking', the articulated, apperceptive and highly refined expert of way of seeing is a fundamental resource for diagnosis. Cardiologists who work at a distance become painfully aware of how much they rely on this tacit and often un-noticed skill. They discover, as one of them put it, that seeing the patient tells you a thousand things:

> When people enter my studio I already understand . . . whether they're out of breath, whether they're chronic, whether they have swollen jugular veins . . .
>
> (int. with a cardiologist)

Diagnosing patients is in fact a complex operation of signification in which each element is both context and content. Take away any aspect and the whole process can run into trouble. Accordingly, distant cardiologists need to develop interactional strategies and competencies to operate and investigate via the senses of the colleague who is co-present with the patient. As one of the informants put it:

> Cardiologists practically make their visit with the hand, eyes and gestures of the other doctor, and it is almost as if they can see the patient, because they speak between professionals and they understand each other.
>
> (int. with a cardiologist)

The strategy is quite straightforward:

> I ask my colleague about the jugular veins, pulse, whether eye pupils are widened, because I miss these data to evaluate and interpret the numerical data of the ECG . . .
>
> (int. with a cardiologist)

Because each cardiologist has her own way and style, the process is not a mere mechanical form of 'collecting information at a distance' as much as a form of mutual adaptation and, in the long term, learning.

Consider the central section of vignette 1 in Table 1: «and how is the pressure?» «Uh . . . good <u>you reminded</u> me . . . the pressure is below 90». Here the cardiologist is helping the GP to proceed in the very practical endeavour of constructing a diagnosis by searching for elements that make sense when taken together. The word 'reminded' means that the GP has already encountered this situation. As I have discussed elsewhere (Gherardi & Nicolini, 2002) the words 'remind' and 'remember' uttered loudly in an a learning situation are often verbal markers for something that needs to be kept in mind, a sign of the relevance of the piece of information or event under consideration and its accountable nature. The interaction continues with the cardiologist using exclamations to mark the practical process of attributing meaning to diagnostic signs: «. . . aha . . . so she gets an ACE inhibitor!?!» The exchange is different from the retrieval of information from a database both because there is an expectation from the cardiologist that the doctor will actively try to complete the story he is sketching and because in this way the relationship allows the doctor to be socialized in the cardiologist practice and to learn the ropes, and more, of diagnosing heart disease symptoms:

> By now I have grown professionally . . . when I call a cardiologist at the centre . . . I know already on the basis of which cardiology clinical element they respond . . . so I know in advance what I have to do, and if I have a question I ask.
>
> (int. with a GP)

On the one hand the cardiologist learns how and what to ask for. On the other the GPs learn what to look for and how to see.

Finally, returning to Table 2, one notes that the redistribution of knowing and tasks associated with the introduction of telemedicine involves a further character, which is the patient. The patient does and knows many things. From the verbal interaction we gather that the patient weighs herself, measures her pressure, carries out and reads tests, takes the ECG, transmits it to the centre, etc. Most of these actions would not be carried out if she was lying in a hospital bed. The introduction of telemedicine achieves a result similar to that obtained with the introduction of 'self-service' in catering and purchasing: it transferring aspects of the task and the knowledge necessary to perform it to the client. By doing so, it renders the patient more proactive and independent *and* it saves money for the system (Anderson, 1996; O'Cathain et al., 2005).

In sum, in all three cases of telemedicine the stretching out and expansion of medical practices implies the redistribution of work and tasks

among human actors and between them and non-human elements, the creation of new instrumentality, the emergence of new ways of doing and saying, the constitution of a new interactional order and, more broadly, a whole new way of knowing in practice. This new way of practicing, moreover, bestows a new identity to all the elements involved in the practice, so that the meaning of what it means to be a nurse (or a doctor, patient, diagnosis, ECG, etc.) ends up being stretched just as the practice in which they are involved in. As one of the nurses aptly put it:

> I would say that this new way of working changes significantly the nurse's role . . . this is a new professional role in the making.
>
> (int. with a nurse)

Maintaining and restoring accountability

In the previous paragraph I have described the active re-distribution of tasks, mastery, and agency brought to bear by the introduction of distance into the practice of caring for cardiac patients. As I have shown, the redistribution affects both humans and non-humans, and follows a logic that is all but mechanical.

Some interesting practical implications of telemedicine become evident if we also pause to observe which aspects were *not* redistributed. This dimension was well captured during the research by an experienced nurse: when asked whether she thought her job had significantly changed since the introduction of telemedicine, she answered in fact that 'everything is the same, only different'.

Her statement is consistent with my observation that the intense activity of redistribution, realignment, and redefinition (i.e. change) described above, was accompanied by another, more subtle and silent type of work, that is, repairing the breaches (or potential breaches) in the overall fabric of accountability caused by the stretching out.

This aspect becomes clearer if we consider that one of the central organizing principles of accountability of modern medicine is the primacy of doctors and their diagnostic decisions. According to Berg (1997), in western medical establishments practices are set up in such a way to support the institutionalized myth that 'it is always the doctor who decides'. Berg (1997) calls this a myth because all medical decisions depend on prior substantive work and the alignment of long and complex chains of people, information, tests, and machines. As institutionalist scholars have convincingly argued, however, it is exactly upon such myths that institutions are built (Scott, 1995).

This 'a doctor is always in charge' accountability regime is however partially disrupted by the introduction of distance between the different actors involved in the medical practice. As mentioned previously, for example, one of the characteristics of ward care is the presence of a high degree of operational ambiguity. In the ward this ambiguity is nearly always positive, in that it generates a series of overlaps that allow pooled knowledge resources to be distributed among all the staff present, thereby minimizing chances of omissions or mistakes. This arrangement, however, also produces another notable effect, that is, it supports a sort of 'circulating accountability'. Although in (most) western cultures accountability is strictly individual, in many teamwork situations informal and tacit arrangements apply so that distribution of tasks follow the contour of experience and competence instead of the rigid profiles of bureaucratic accountability. For example, in a ward, because of the intense regime of interaction, it is not unusual for non-medical personnel to carry out medical duties. This, however, presupposes a regime of proximity in which there is always 'a doctor' nearby so that accountability trails can, in case of necessity, is brought back to the person in charge. All this changes, however, when distance is introduced in the equation. The distance between health care professionals interferes, in fact, with both these processes and thus requires some remedial strategies to be put in place. Several were observed in my case studies.

First, telepractitioners (both nurses and doctors) developed a shared repertoire of discursive practices which tended to 'formally' downplay what nurses did. Even when they were clearly interpreting clinical data (such as electrocardiograms), nurses refrained from using terms such as 'diagnosis', which were reserved to doctors – even though in most cases physicians simply endorsed what the nurses had told them. Consider the quote below:

> In theory these tests are read by the doctors, but in practice we read them. I print them off, pointing out what seems to be pathological and describing what I see. Then I make a diagnosis which, however, needs to be rendered official by a doctor.
>
> (int. with a nurse)

As in Os Guinness's story of the three umpires,[4] the nurse here skilfully exploits the socially legitimated nature of medical knowledge, operating on the basis that 'they ain't diagnoses until a doctor calls 'em'.

A similar approach was taken at the Telemed centre. Specialist cardiologists went to great length to make clear prior to and during the consultation that they did not make diagnosis and that they only provided 'support' to the GP. The latter remained therefore formally accountable for the course of action pursued after the interaction, even though no cases were

reported in which the GP did something different than he was recommended. As one of the e-cardiologists put it:

> At the end of the day, the final decision is always with the GP who is responsible for the patient. He/she is the one who makes the diagnosis . . . I am only here to provide a consultation.
>
> (int. with a cardiologist)

A second way of supporting this myth required nurses to maintain, both symbolically and materially, accountability trails which would link their acts to some previous, recognizable, and legitimate medical decision. One of the skills developed by the nurses was therefore figuring out at what point it was necessary to report to the doctor (which often meant working hard to obtain his or her attention) so that the trail would not become too thin. At this juncture, the nurse would fill in the doctor with just enough details to allow him or her making a decision that would act as a sort of accountability milestone, should something happen and the need to reconstruct what happened ensue.

> I have known these doctors for a long time. I learned which are the ones you need to ask everything and who instead are those who will give you more freedom.
>
> (int. with a nurse)

Third and final, the effect of 'the doctor is always in charge' was achieved by enlisting a variety of symbolic artefacts such as flow charts and protocols, which, although very seldom used by the nurses, were often mentioned and visibly posted in their room.

Protocols and flowcharts allowed the nurses to follow a particular course of action without having to formally decide. To the extent that they could attribute the decision to the protocol, they established an accountability trail which lead directly to the professional institution that had issued it, a sort of institutional 'super doctor' invested with all the power of the institution that enacted these regulations and that few would dare arguing. In this case, one of the new skills developed by nurses entailed knowing how much they could 'push' the protocol. As one of them put it:

> If we use the protocol and something happens it is easier to get away with it . . . however, this can be done within a limit: one has to show of being able to carry out her duties, otherwise you're in trouble, with or without the protocol.
>
> (int. with a nurse)

In sum, the stretching out of medical practices introduced some potential breaches in the overall fabric of accountability. The expansion affected in particular the principle that responsibility trails need to be ascribed (or ascribable) to one, and only one legitimate doctor. This required all those involved to put in place a variety of remedial strategies: the principle, and the regime of accountability that it generated, was in fact a key factor in making activities comprehensible, meaningful, rational, and thus orderly. The breach would therefore jeopardize the very possibility of sustaining the practice itself as a legitimate endeavour. In this specific case, practitioners used the ancient strategy of the *larvatus prodeo*[5] ('masked, I go forth'): instead of embarking into the lengthy (and risky) process of seeking to legitimize the new ways of working, they opted for extending the existing ways of making things accountable to the new practices, connoting them as a plain extension of the existing ones.

Reconfiguring (power) relationships

In the last two sections I have depicted the process through which medical practices are reconfigured in order to cope with distance in the process of caring for serious CHF patients. Such reconfiguration affects all the elements involved and requires the re-constitution of the texture of accountability which sustains the sense and orderly production of the caring practices.

As several authors have convincingly argued, however, the process of stabilization of any heterogeneous networks (be it a complex socio-technical system or a heterogeneous practice like telemedicine) implies by definition a silencing of some voices, the elimination of alternative configurations, and the establishment of a specific regime of empowerment and disempowerment (Star, 1991). A critical question that needs to be asked of both tele-consultation and telemonitoring is thus what are the power dynamics and the politics behind them, and what are the hidden human costs, if any, implicit in these new ways of practising medicine.

This issue has been tackled before in the literature, but only at very high level of generality (and according to a polarized logic). For example, the introduction of telemedicine has been often heralded as a way of introducing a more even distribution of health care services, therefore improving the access of remote communities and patients (Brauer, 1992). This optimistic vision is matched by a contrary view that highlights how telemedicine might in fact deepen the existing inequalities. Cartwright (2000), for example, argues that besides deepening the so-called digital divide, telemedicine can be used as an excuse to reduce investments in local services,

dividing the world into those who have access to 'real doctors' and face-to-face care, and others who will have to be content with electronically mediated and sensorially anesthetized relationships.

My observations suggest, however, that although telemedicine is bound to trigger some shift in the power geography of health care proviso, gains and losses are much less clear-cut, and the situation is much more complex than this polarized debate may suggest. Moreover, it is impossible to discuss about the effects of telemedicine in general, for each telemedical regime performs its own power arrangement (Hanlon et al., 2005). This emerges well if we consider for example the redistribution pattern performed by the 'triage' and the 'answering machine' way of caring for CHF patients at a distance. As I noted above, both these ways of translating telemedicine in practice imply an enrichment of the nurse's work and a redistribution of skills and responsibilities. In the words of one of the nurses:

> . . . our responsibility has increased and hence our training and skills need to be different and updated. The issues we are asked to address are different and more challenging than those we were used to face in the ward . . . the response needs to be given right away and in many cases there are no cardiologist at hand who can solve the problem for you . . . this is a much more challenging and in many ways rewarding job.
>
> (int. with a nurse)

In fact, both projects have raised polemical responses from the cardiology establishment,[6] which is used to seeing nurses as carriers of orders with only a shallow understanding of what is going on. The extent of this process is however different in the two cases. The 'triage' model articulates agency so that the role of the nurse is enhanced, its status raised and its self-esteem increased. The 'answering machine' arrangement, on the contrary, only requires nurses to download and compare data, and to communicate significant variations to the doctor who will then decide. The former has in fact demanded a long local negotiation and corresponds to the embodiment in the machine of the struggle of a women cardiologist to raise the profile of nurses often relegated in an implementer's role by the majority of male doctors. The latter corresponds to a translation into the arrangement of artefacts and humans of the existing power relations to be found in the 'day hospital'.[7]

The political implications of the redistribution performed by these two types of telemedicine extend, moreover, well beyond the relationship between nurses and cardiologists, and include other actors as well, such as the GP and the patients.

For what concerns the former, one can note that the three different forms of telemedicine perform almost opposite power effects. While the tele-consultation brings GPs and specialists necessarily closer, to the point that they have to learn working together in order to recombine in a meaningful whole different diagnostic signals, both telemonitoring system have the counterintuitive effect of potentially cutting out GPs from the caring process. In both telemonitoring centres, in fact, the nature of the process is such that over time there is the risk of establishing direct and preferential relationships between patients and specialized centres. This in spite of the fact that the original intention was exactly the opposite, and the project was heralded as an opportunity for breaking down the barrier between GP and hospital consultants. At least two factors concur at producing this effect. First, chronic patients, whose well-being and survival depend on rapid access to medical attention, quickly elect to rely on the specialized centre's support instead of other health agencies such as their GPs. After all, this is a very complex pathology and, unless family doctors have a special interest in deepening the understanding of this specific illness, it s not rare that patients are more knowledgeable than their GPs. Second, GPs – who in Italy, just as in many other countries, are under constant pressure and stretched to their limit – are usually happy to delegate the management of these patients to a trustworthy specialized centre. The result is that the centre and patients establish a fiduciary relationship that leads to a progressive bypass of other actors, starting with GPs. GPs are disempowered by the new arrangement and the flow of decision-making. This in turn might trigger a potential shift in the existing geography of relationships (and funding) within the health care environment. In spite of the fact that appearances are saved by official statements that claim that the services are organized 'in collaboration with GPs', there is a real risk that the telemonitoring service becomes a "closed environment", as clearly stated by one of my informants:

> There is a risks is that this becomes a 'closed environment' because the relationship is between the patients and providers that might be far away from their communities. This would cut out the general practice from the loop.
>
> (int. with a cardiologist)

Finally, the reconfiguration of the caring practice affects also the positioning and empowerment of the patients (and their families). At first, telemedicine seems to have an obvious and exclusive positive effect: not only patients can remain in their familiar milieu and conduct an almost normal life, but through telemedicine they are also actively involved their own care process.

At a closer scrutiny, however, things turn out to be slightly more complex and somewhat ambivalent. Telemedicine constitutes in fact a specific disciplinary regime that both empowers and dis-empowers the patients and their families, and the two effects are inextricably linked together. Consider the following.

In modern western hospitals proximity plays a fundamental disciplinary and compulsion function, sustaining the professional dominance of health care practitioners over patients. Critical hospital medical practices such as monitoring parameters, controlling the evolution of symptoms, prescribing conducts ('you need to rest'), and disciplining the assumption of drugs all depend on some level of compulsion supported by an appropriately engineered interactional order and spaces (Foucault, 1975; Turner, 1987). Telemedicine, of course, changes all this raising the issue of how to perform this control at a distance or, using medical jargon, how to obtain a 'high level of compliance', that is, strict adherence to the control and therapy regime.

To obtain these effects, the practice of telemonitoring cannot rely on the physical presence of the hospital ward and the compulsion it can guarantee. There is no nurse in the patient's home who will stand in front of the patient's bed urging her to take the prescribed medications, or who will ensure she eats only certain foods. To ensure patient compliance, the two centres reverted thus to a very well-known principle for controlling people at a distance: producing and enlisting disciplined bodies and minds (Law, 1987). In both telemonitoring centres much effort is dedicated to socializing the patients so that they know about their disease and above all become accustomed to self-managing their condition. This educational aspect includes distributing leaflets, constant work to make clear to patients the symptoms and the effects of the drugs they will have to take and more generally the dynamics of CHF itself. This form of sharing knowledge also specifically involves medical information, ranging from explaining what a specific medicine is, to how it works, what dosages are necessary and what its side effects are. Through this process, the patients and their families are thus socialized into the rhetoric and the discourse of active involvement in the process of care but also enrolled in a specific disciplinary regime which sustains a specific hierarchy of positions and knowledges. This emerges, for example, from the reaction of one of the cardiologists when one of the patients took her therapy in her own hands:

> *Nurse*: Well, today Mrs.*** called . . . she discussed Lasix with her doctor . . . she has decided to take it at 5 in the morning and ALL together because the doctor told her that the main thing is the dosage . . . she said this makes her feel better.

Dr: What?!? Absolutely not, never !!!

Nurse: Well, I told her . . . but she is insisting (opening her arms) . . . she also said to me that she is not applying the medicated sticking plaster because it makes her dizzy . . .

Dr: . . . no she can't be dizzy! . . . the therapy must not change and get her to put on the plaster . . . *(Reconstructed from observation notes).*

The professional dominance is revealed here in the in practitioner's de-legitimization of the knowledge and experience of the patients. The patient is required to be competent, but what counts as legitimate knowledge is strictly controlled by the professionals. Although individuals with chronic illness can develop a sophisticated awareness of their body's patterns, professionals are sometimes reluctant to acknowledge this expertise as credible. Research has found thus that people with chronic illness are often scolded when they told the doctor of a decision they had made in their self-care management (Paterson, 2001).

The complex and often ambivalent status of the empowerment made possible by this type of telemedicine becomes even clearer if we pause to observe that the stretching out and expansion described here have indeed a precise direction, that is, it amounts in effect to bringing the 'hospital outside of the hospital'. While this movement has the beneficial effects mentioned above, there are also some more subtle unsettling implications for patients which clearly emerge as soon as we shift our position from that of the dominant health care discourse to some of the silenced voices (Star, 1991).

As I mentioned above, the logic of action of modern scientific medicine is still centred on attacking acute illnesses by all available means, often de-humanizing individuals in order to save their lives (Wiener et al., 1984). This logic of action and the related conducts are however mostly associated with the specialized scientific medical establishment: it exists side by side with other health care logics of action, such as the more care-oriented approach usually adopted by community services and family doctors and the so-called alternative medicines. Bringing the hospital outside of the hospital has therefore the literal effect of breaking down barriers and extending one specific logic of medical action in a territory already occupied by other ways of caring. As one of the GPs clearly stated:

When a doctor embraces a methodology like electrocardiography or hemodynamics he/she starts to see the patients as a series of numerical indexes . . . when I worked in the hospital there were colleagues who

would refer to a patient as 'the person with 18 in the right atrium'. This sent me ballistic because that was not 'Mr or Mrs with 18 in the right atrium' but someone who had a condition, a personal history . . . [That's why I quit the hospital and became a GP].

(int. with a GP)

The result of bringing the hospital outside of the hospital is not only the sidelining of the GPs described above, but also the marginalization and silencing of alternative, more practical, and often more caring approaches. Participating in the telemedicine regime described here means in fact that patients adhere to a type of personal and existential regime that if is acceptable for a limited time while at the hospital, may become less acceptable as a daily way of living. When stretched out its original boundaries, the hospital tends to occupy the life of patients. As one of our informants put it:

Specialist cardiologists are very aggressive about hemodynamic and clinical parameters . . . in order to reduce your overall body pressure of the ventricular diameter to their standards, they often go beyond what is an improvement for the patient. Very often patients are happier with two kilos of retained water and a little bit of dyspnoea,[8] but maybe they still manage to get to the bathroom, comb their hair, even walk to the bar and buy a magazine . . . I am thinking of a patient whose life was prolonged by two months, but who had her last year so completely disrupted and such a very low quality of life.

(int. with a GP)

The doctor's words remind us that aligning networks comes at a cost. What looks like order and progress from one perspective might look and feel very different from another.

In sum, for the patients, just as for all the other actors involved in telemedicine, empowerment is a process and not an end state, and the process of empowerment does not mean a univocal accrue of discretion and capability. While it is customary for the idea of empowerment to have positive association, my description suggests here that it is more productive to critically interrogate empowerment as a change in the overall geography of the material and the discursive constraints and possibilities granted to the different positions which compose such geography (see also Anderson, 1996). My research suggests, in particular, that because of its heavy reliance on the proactive competent contribution of patients, telemedicine brings fully to the fore the ambivalence and tension implicit in the notion of patient empowerment (Mitcheson & Cowley, 2003; O'Cathain et al., 2005). If on

the one hand, telemedicine offers the professional a new opportunity for exposing the rhetoric of empowerment without actually fully enacting it in practice, it also sets the conditions for the patients to become active agents in the management of their condition. The fact that most of the process takes place away from the controlling gaze of the health care professionals offers in fact a host of new strategies and tactics through which the patients can actually take control of their therapy, from playing the system as in the case above, to 'making experiments with my medicines that are my life' (as another patient put it), to simply withdrawing information when it does not comply with what the doctor or the nurse expects to hear. While providing new means of distant control, telemedicine also opens variety of tactics of resistance that in the long term might deeply modify the relationship between health care practitioners and patients.

Concluding remarks

In the previous sections I have used an articulative and practice-based approach for examining some of the work and organizational implications associated with the stretching out of existing health care practices. The starting point of my discussion has been that practices in general, and medical practices in particular, take place in and transpire through material arrangements of people, artefacts, and other objects (living and non-living). While several authors have emphasized the critical and active role of material and symbolic artefacts in human practices (Engeström, 2000; Latour, 2005; Law, 1992; Pickering, 1993; Schatzki, 2005), the interest here has been on their spatial relationships and the effects that the stretching out in time and space of material arrangement of artefacts and people bring to bear on human practices. The discussion showed in particular that western contemporary health care practices carry in them deeply embedded some very specific spatial assumptions. By altering them, and by affecting in particular the fundamental spatial relationships of proximity and distance, telemedicine produces significant misalignments, tensions, and contradictions which necessarily determine a shift in the way the activity is carried out, as well as in the nature and identity of many of its components.

My observation highlighted first that the stretching out of medical practices brought to bear by telemedicine implies much more than the simple redistribution of the existing work. Because the spatial relationship played a critical and active constitutive role in sustaining the practicing, the stretching out represented an expansion of the fabric and object of the activity. The alteration of the spatial arrangement introduced in fact a variety of tensions

and contradictions which, in turn, required the development of new arte-facts, a novel division of labour, new ways of interacting, new discursive strategies, and the negotiation of a new form of distributed mastery between all the elements involved. The result was an expansion of the prior notion of what it means to care for distant patients, working with distant colleague-doctors, and, more broadly, 'doing cardiology'. As I have shown, within a regime of activity all elements depend on each other and hence a slippage in any of them requires a generalized readjustment. Far from a simple activity of patchwork, it was the whole fabric of the practice that required to be reconstituted. In the process, all elements, both human and non-human, became different and acquired a new identity. Such identity depended very much on the specific regime of practice: what it means to be a nurse at the 'triage' centre is different from the 'day hospital' one. In this sense, one sees that a generalized discussion on whether telemedicine enhances or reduces the nurses' or the patient's autonomy is analytically misdirected in that differ-ent telemedicines generate different practical identities and power positions (Collin-Jacques & Smith, 2005). As demonstrated by this study, it is much more productive to address the issue from the perspective of *how* and *in which direction* telemedicine modifies the existing medical practices, asking therefore the value laden question of whether we like, or subscribe, or agree with the type of doctor, nurse, GP, and patient performed by a particular telemedical practice.

Second, the observation also brought to the fore the critical import-ance of institutional and personal accountability in the process of practice expansion and reconstitution. As I have shown in the article, one can hardly understand the process of resolution of tensions and the practical concerns introduced by the stretching out if accountability is not brought into the equation. Although this aspect is of paramount importance in a highly insti-tutionalized environment such as health care, it is my contention that this equally applies to all other organizational circumstances. From a practice-based perspective, the expansion and reconstitution of a practice are always carried out also in view of sustaining the trails of accountability. The work for making any practice effective includes not only developing new artefacts, rules, forms of sociality and identities, but also ensuring that all of this is rationally describable and therefore accountable. Two interesting con-siderations arise from this. On the one hand one may notice that from the articulative perspective adopted here, the traditional dualism between stability and change of a practice is of limited analytic value. While practices are by definition shifting all the time, not all aspects change at the same pace and not all the local adaptation are discursively recognized as change. Practice, in fact, requires a continuous production of difference in order to

address the slippages, misalignments, and contradictions brought into a practice by different elements. At the same time, competent practice requires that most of these slippages are not construed as change, in order not to upset the existing accountability regime all the time. As it emerges in the case study, the effort of the practitioners is aimed both at producing change and at creating a semblance of stability. Continuity and discontinuities co-exist in all practical endeavours, and they do not constitute an ontological dualism; the artful, strategic, and mostly discursive construction of continuity and change is one of the vulgar competences that practitioners need to master in order to produce organized activity. Naming change is already doing organizational politics.

At the same time, accountability concerns are one of the ways through which local practices constitute and participate in broader phenomena. While practice is by definition a local phenomenon, complex activities such as telemedicine can be only be sustained to the extent that they are part of larger discursively and materially supported nexuses – what authors such as Foucault (1979) and Laclau and Mouffe (2001) call 'discourses'. In this sense, we need to abandon the ontological distinction between local and global phenomena, in that all practices are, by definition, both local and translocal.

Third, and finally, one might note that power issues and micro-political processes are an inherent aspect of practices and therefore need to be taken into account in their description. As I have shown, in fact, all activities constitute and sustain by definition a specific regime of power. Describing the micro-politics of the three systems is just another way to describe the stretching out of the practice. To use Sherry Ortner's (1984) words, telemedicine, like all other practices and organized social-material arrangements, is in fact a relatively seamless whole in which however not all dimensions and practices have the same significance: 'at the core of the system are the specific realities of asymmetry, inequality and domination' (Ortner, 1984: 148). Practices always have political implications so that the study of practice is after all the study of all forms of human action, 'but from a particular – political – angle' (p. 148).

As in the previous discussion of the ambivalent status of empowerment, the critical contribution of the articulative approach to describing the stretching out and expansion of practice does not lie, in my view, in taking one of the other side as much as bringing to the fore the fact that there is no change in practice without empowerment and dis-empowerment. One of the main critical tasks and contributions of social scientists is thus preventing the premature closure of possibilities – a manoeuvre that can only be performed by the voices speaking on behalf of the status quo and which tends

to reinforce the latter. By showing how empowerment and disempowerment works, practice-based approaches offer the truly revolutionary possibility of demonstrating that all that things could have and can be different an therefore can be acted upon.

Acknowledgement

Notes

1   As I mentioned above, these were not specialist or consultant nurses, in that this position had not been yet introduced in Italy at the time of the research. What nurses do vary by country and evolves overtime and my discussion needs to understood against the specific historical and background at the time of the research.
2   One could note in passing that that the increasing use of temp and agency nurses in several western countries might have the same destabilizing effect and with significant effects on the safety of patients. For a discussion on the relationship between team stability, expertise, and safety see, for example, Finn and Waring (2006). I would like to thanks the anonymous reviewer for pointing this out.
3   It may be interesting to report that the nurses have been provided with an electronic patient record designed in order to collect all the diagnostic data for reporting and scientific purposes. None of the telemedicine service nurses use it, however, because the system records and presents data according to contacts (all the data recorded during a single contact appear on screen). The electronic record then doesn't allow the nurses to 'see' the recent history of the condition and hence fails in the most important function (for a discussion on the importance of spatial arrangement of patient records, see Bang & Timka, 2003). The system was designed without talking to or observing the nurses' activity.
4   In the story three umpires, each representing a different contemporary take on the philosophical status of reality, discuss how they make a call. The realist asserts that 'there's no-balls and there's wides, and I call them the way they are'. The second umpire, a relativist, accuses his colleague of being arrogant and states that 'there's no-balls and there's wides, and I call them the way I see it'. Finally, the third constructionist umpire says 'They ain't nothin' until I call' em' (see Guinness, 2000).
5   The phrase was made famous by Descartes who used it for referring to the precautions he took not to offend the authorities with his new philosophical system.
6   Both projects were criticized for this during a presentation at the Italian Cardiology association.
7   In fact, both the doctor and the technologist were male.
8   Lack of breath.

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