

Telemedicine and Knowledge between Medical and Development Discourses

Development and Globalization: Organizing Rhetoric and Power
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1. Knowledge for Development

'Development' -a normative concept whose meaning is deeply rooted in the idea of progress- is a widely legitimated field of activity, and became highly ramified, as there are economical, human, social, cultural, political developments, depending on which element is stressed more. Beyond differences, the common meaning of the word implies that oriented social change is conceived as a desirable and morally legitimate improvement. In latest years, knowledge has become a key concept in rewording and reframing development projects. Information and communication technologies (ICT), the tool for that, hold the promise to improve organizations, and to hasten modernization.

'Knowledge society', 'information society', 'network society' are some of the concepts which recalled wide attention, and hence oriented the use of a good deal of resources for development. ICT had and have a great influence in turning attention onto knowledge; related key ideas have been a broadly legitimated source of accountability for a rhetoric that backed implementations of ICT for development relying on a linear conception knowledge-information-transmission-development. International, national and non-governmental organizations, experts, volunteers, material and immaterial artifacts constituted hybrid networks which kept coherent with, and strengthen this knowledge-based development discourse. When referring to 'knowledge', international organizations -such as the World Bank- seem to refer to information, often stressing its central role to make choices more rational, and to reduce transaction costs. Moreover this implies market as the main regulator of social relations. Another relevant characteristic of this wide spread conception and use of knowledge is that it is supposed to circulate one-way, meaning that 'developed' countries 'teach' the others how to deal with their social issues in terms of knowledge: in the 'Third World', knowledge is expected to be acquired rather than produced. Following this trend, ICT are a way to access remote resources and opportunities, then an instrument to improve local living conditions.

1.1. The Rhetoric of Knowledge for Development



Fig. 1

This image [fig. 1] is made up of night photos of the Earth. Illuminated areas are the more economically developed, allegedly enlightened by Reason. It can be interpreted as a metaphor: the picture shows who knows and who lives in the darkness of ignorance. This mindset is not new, but in recent years it interweaves 'digital divide' issues. World Bank [1999] writes:

Knowledge is like light. Weightless and intangible, it can easily travel the world, enlightening the lives of people everywhere. Yet billions of people still live in the darkness of poverty – unnecessarily. [...] Poor countries -and poor people- differ from rich ones not only because they have less capital, but

because they have less knowledge. [...] This World Development Report proposes that we look at the problems of development in a new way – from the perspective of knowledge.

Similarly, most of declarations by representatives of national governments and international organizations rely on similar assumptions and expectations. Assuming that knowledge can travel throughout the world without obstacles, knowledge is the lever to promote development. Consequently, information systems are increasingly implemented in developing countries in order to stimulate economical growth, promote education, and improve public services. It seems like that the metaphorical meaning of the picture has prevailed: knowledge enlightens, therefore who has no light is ignorant.

On the World Bank website we can read about “Knowledge Sharing”:

Fighting poverty requires a global strategy to share knowledge systematically and energetically and to ensure that people who need that knowledge get it on time. The World Bank has become a global development partner making it easier for people to find out who knows what and where the best expertise can be drawn upon, wherever it resides. Continuously sharing this global and local know-how with client countries, public and private partners, and civil society will better equip the development community to fight poverty.

This excerpt helps in focusing on a relevant aspect of this quite common conception of knowledge: it is like a thing that can be easily moved and used wherever needed, it can be managed. Organizations have a central role in it, and they set-up their political agenda consequently. A relevant example is the World Bank Development Gateway, a web portal aimed “to solve development problems by sharing high-quality information from local and national sources, tailored to users' needs by topic and community”.

2. The Case of Telemedicine In High Amazon

Health is one of the main issues in development contexts. As those efforts are increasingly thinking about their issues in terms of knowledge, health care systems (which became “knowledge-intensive organizations”) improvement in developing countries are pursued by information and communication technologies, too.

Making medical knowledge available everywhere, telemedicine promises to permeate rural areas of the ‘Third World’ providing universal access to information and a synchronous and sharpened contact between doctors and patients, potentially anywhere and anytime. Scientific medicine is supposed to have the same effectiveness anywhere. Thus, telemedicine could allow to share knowledge resources remotely and therefore to improve health care systems quite inexpensively.

The chosen health development project to study in this research is aimed to design, implement and evaluate low-cost telemedicine systems in isolated areas of developing countries. More specifically their information systems provide rural hospitals, health centers and posts with voice and data communication (e-mail, mostly), even where there are neither power nor telephone lines. Moreover distant training for medical personnel, support for off-site specialists consulting, help in accessing medical knowledge, and epidemic surveillance are provided.

Among the telemedicine projects undertaken by this agency, the one in High Amazon has been chosen because:

- it communicates groups characterized by different health care practices, so the information system is on their encounter point (although it is mostly used by health personnel, it indirectly relates actions coherent with different kinds of treatment followed by local population);
- at the moment of the ethnographic study, it was active since nearly three years, the experimental period finished and it was fully implemented and running within the health care system;
- it is intended to be a model of health care development that is being exported to other countries;

- it is being evaluated through quantitative methodologies, so that, a qualitative approach is useful to give a deep understanding -rather than a wide description- both of the social and of the artifact changes (mutually interrelated).

2.1. Knowledge and Information and Communication Technologies

Telemedicine is the implementation and use of ICT for medical purposes. This means that technology is shaped for medical usage, and, on the other hand, that telemedicine is affected by the context and made up of intentions and expectations that inform related actions. Norman [1997], in his theory about distributed cognition, argues that most of the knowledge we have about the environments we live in, is embedded into the artifacts, not in mind. Therefore a telemedicine system -if used differently from expected- can make us suspect that local and promoters' knowledges are different. Studying the telemedicine system is a way to understand medical knowledge issues because it requires changes of behaviors to target people, and -bringing the focus of development promoters' action onto knowledge- it stresses and makes visible local aspects of medical knowledge.

Given those premises, the implementation of telemedicine for development is relevant to be studied through qualitative methods as a point of encounter between diverse knowledges to look at what is not considered by this health development approach, and in order to search for answers to general questions like: how do different knowledges meet? Are boundaries between medical knowledges created, sustained or overcome? What are the implications of knowledge-based development efforts?

3. Hypothesis and Research Questions

My hypothesis is that health care development through ICT -pursued improving the organization of the existing public health care system- requires to mobilize hybrid networks (made up of actors, norms, agreements, expectations...) and to "align" them. Those legitimized networks are a source of accountability for health development at all levels, and back a (supposed) universal knowledge. The main research question is: are expectations from ICT and knowledge-based development projects more relevant than ICT and knowledge themselves in development process?

Thus, my main interest is the interplay between telemedicine system, context and local medicines. Consequent research questions are:

- locally, is telemedicine changing scientific medicine? (I refer to physicians' and patients' perceptions and behaviors within and outside health care system)
- how do telemedicine and local medicines affect each other? How do they affect physicians' and patients' normal patterns of action?
- what are the boundaries of medical knowledges?
- is there a health care institution strengthening through telemedicine?

4. Methodology

My research has followed two main lines of analysis. One is centered on interorganizational legitimation between the partners and actors involved in the project; it has been carried out through a documental study of their intra and interorganizational communications and publications. The other line of research is based on an ethnographic study where the telemedicine system has been implemented, and the interplay with patients and local context. Chosen methods were centered on health care perceptions and related behaviors. Used techniques have been:

- 1) participant observation: a daily experience which gave insights on the situation. It has been important in confirming and changing my ideas, adapting them to local daily life and common sense;
- 2) semi-structured and unstructured interviews,

a) to individuals: it was quite evident that responses and comments were too positive for the actual situation¹;

b) to groups (health teams, users, families and neighbors): they were more fruitful, because participants had to state their position in front of people they had and will have to do with;

3) focus groups (with physicians, nurses, information systems in-charge workers, health promoters) have been very effective: people had not to answer questions, but to sustain their positions in debates I was periodically resuming and refocusing on topics I was suggesting (this method highlighted different sources of accountability different participants were relying on in explaining and justifying their actions, and in describing happenings);

4) shadowing: for no longer than a day, I could follow side by side some health personnel in their activities (an instructor educating nurses and workers in a distant health care center about the use of the terminals, a doctor controlling all houses of a district in order to overthrow any stagnant water -where mosquitoes reproduce-, a physician visiting her patients at home not for serious sick calls).

The aims of those methodological choices are:

- to focus on perceptions of the process of development rather than on its results;
- to pay special attention to normal patterns of actions and social relations;
- to provide a beneficiaries' account of the social context affected by the telemedicine system.

The project has undergone a first statistical evaluation carried out by its promoters. The problems in designing ex ante a complete set of statistical indicators to describe social dynamics provoked by the introduction of a telemedicine system, made my qualitative study useful for them (and helped me in gaining access to field). On the other hand, their statistical evaluation is part of my research field as far as it affects the project network which is legitimizing and making telemedicine works.

5. Project Legitimizing Network

In this paragraph I am going to describe briefly the social network legitimation that has been aligned around (and is supporting) a health care development model and a telemedicine system and which have been implemented in High Amazon in order to improve the local public health care system. This description is centered on the Peruvian branch of the considered health development project. As it is considered a successful project by promoters, financiers and independent organizations (it has been awarded with an international prize), it is of special interest in order to understand how a social network to support ICT in developing countries keeps together.

As anticipated, this part is based on a documental study of the mailing lists I was joining and which are the main tool for communication and coordination between involved actors, who belong to a number of different organizations and set in two continents, and on the academic publications that promoters authored. The data recollection started two years and half ago, participating in a conference organized by this project promoters, and spending a few days in their university. Then I started taking part in the discussions on the mailing lists used by project's partners.

The declared background motivation behind the project -funded by the European Commission, some Spanish public institutions, World Bank (infoDev programme), institutions and programmes in partner countries (in Latin-America)- is to reduce the gap between 'First' and 'Third World', where most of people are unable to meet their basic needs. On the other hand, promoters declare that "society is advancing towards information and knowledge driven structures, where communications and information technologies play a crucial role in development, and may be key

¹ The bias was probably due to the perception of the communication system as a donation that any complaint could withdraw.

to effectively improve living conditions of broad sectors of left out population". Within this general frame, a "tremendous potential exists for improving health matters through the use of telecommunications and information technologies".

Those general principles drive to a brief description of this development project approach. The health development network joins a research group from a Spanish polytechnique, an international non-governmental organization, two Peruvian university (one for medical, the other for technical matters), the High Amazon branch of the Peruvian health care system, financiers and other supporting organizations. In order to be understood, the promoters' network cannot be reduced to formally interweaved agencies. From the documental analysis of communications and the main publications by this project promoters it emerged that they rely on two main sources of accountability:

- scientific medicine,
- ICT ability to diffuse medical knowledge and to improve organizations.

It means that the telemedicine system design and expected use reflect the routines implied by a scientific conception of illnesses and treatments (abstraction of symptoms, exams by a physician, diagnosis, treatment and monitoring). Elements of those routines can be carried out remotely through the information system.

6. Ethnography

Some months after having started the online participant observation, I went to Peru. The approach to the field continued in Lima, where I spent several days in local partner universities, then nearly two months were spent in High Amazon. I was based in the main hospital of the area, from there I went to health centers and communities; my stays lasted between one day and one week. It was from November to January, when holiday travels and meetings, and the beginning of the raining season increase health problems.

6.1. Setting

The empirical part of this research focuses on High Amazon (North-East Peru), in a town, its hospital, and in communities of its region, where a telemedicine service is active since nearly three years. The Peruvian High Amazon is a poor rural area characterized by isolated villages scattered in the zone. This telemedicine system is made up of radio connections (on High Frequency and Very High Frequency spectra) enabled to transmit two-ways voice and data messages. This information system is designed and implemented upon the existing health care system, and embeds its hierarchical structure, made of a hospital and one hundred health centers (nearly a half has been electronically connected) scattered through an area of 18500 km² with more than 67000 inhabitants.

The population is mainly composed by *mestizos* and natives, who mostly live less accessible areas. The incidence of diseases in this area is high, mainly malaria, hepatitis, respiratory infections, dengue, HIV/AIDS, diarrhea, and enteric diseases. Rivers are the principal mean of communication between communities and health centers. Even though there are boats that travel through the two main rivers, most of them reach villages close to the coast; from the communities without an easy access to "frequented" harbors, traveling is by small canoes or on foot. According to the study carried out by project promoters before the implementation of the telemedicine system:

- around 75% of healthcare personnel feels isolated as a professional;
- most of medical posts are run by auxiliary medical personnel, nurses or a recently graduated physician at best (with little training);
- rural health posts remain unattended during coordination trips of their staff;
- average time it takes to arrive to a health center is 10.5 hours.

6.2. Usage of the Telemedicine System

A typical day in the hospital communication office begins by checking who is “online” in the health centers and reading them official messages arriving as sealed papers from the hospital administration. Who cannot be reached will be informed some time later. Who has no radio will be notified when in the hospital, or when somebody goes where they work. Information is supposed to circulate in real-time, but some piece of information can take up to five days or more to arrive from the upper level of the hierarchy to health care practitioners working in distant centers.

During the morning there is always a number of physicians and officers in this room, dealing with what happened during the previous night, asking for information from remote health centers, being asked confirmations about reception of what sent by boat. Sometimes remote consultations are required, even if it is clear the difficulty to interpret patients’ conditions when instruments to produce clinical data lack onsite. Communications to support logistically medical activity (maybe to organize a safer and faster patient’s transport to the hospital) are more frequent.

Health posts have to send periodically many reports (about their activities, needs of medicines, health condition of the population, of specific patients...), officers and doctors in the hospital spend a great deal of time in checking and confirming data. The accounts are always and exclusively oriented towards upper hierarchical levels rather than lower. In two months I did not see any attempt to be accountable to who has less power or influence (patients, for example).

The telemedicine system is designed and inserted into the Peruvian public health care system hierarchical structure, with the advantage that personnel is already used to the relations it implies, and the chance to use existing facilities. The losses are information delays (quite problematic in epidemiological vigilance), some geographical incongruence, and some endemic areas not covered.

Although the system permits remote consulting, usually patients arrive quite late to health care centers. So that, the information system tends to be used to organize patients’ transportation to a better-equipped center, in order to leave the responsibility on them.² Therefore a system that was supposed to decentralize health care, facilitates transportation and treatments’ centralization into higher nodes of the system, which is quite necessary when patients arrive late. This is mainly due to people’s perception of public health care: when I asked to far communities inhabitants if they knew about radios and computers, and if they perceived a change since their installation, who knew about the communication system said to feel safer; during an interview, one said: “before we died here”. Public health care is associated with quick recovery, communication and urgent transportation are perceived as strictly related. The telemedicine system develops as far as it is coherent with the expectations from the medical knowledge it is active in relation with.

Email limited usage is interesting, too: often personnel prefer voice communication even to transmit reports based on data tables (even though spreadsheet file models to fill up and send via email are provided). A system maintainer declared: “for us email is secondary, what matters is the voice, to listen to the others”. Indeed a sense of isolation is felt by health personnel working in far communities. It affects the system because who tries to keep in touch with “the city”, uses electronic communication quite a lot (for personal talks and even to organize unnecessary patients’ transportation in order to leave their workplace for a few days); who “gave up”, does not take care of their terminals, which more probably will get damaged. It is noteworthy that where terminals are not keeping closer coherence with scientific medicine, personnel is more involved in other medicines (even prescribing plants, sharing patients with local healers or attending to them).

Even when it was not directly asked, most of the interviewed personnel declared to perceive an increased monitoring due to the information system: phone and radio are often used to check everything’s state. Coherently, the email is not really appreciated because «you never know if an email has arrived and been read, you don’t know when you will be replied, and if not, why», said an employee of the epidemiology office. Before the introduction of electronic communication channels, all messages had to travel along rivers, this was taking long time, the information could be lost or not sent, it was difficult to be requested and its absence always justifiable. The electronic communication network has not increased the quantity of information officially required, but is cutting the possibility to justify missing information. E-mail, is not perceived as reliable and requires

² Legally the responsibility for patients is on the personnel in charge of the center as long as they stay there.

a higher abstraction from the context than voice communication, so it is mainly used to transmit data whose process of formalization was already rooted in previous bureaucratic paper forms.

The information system is also starting to be used for distant education, that cannot be delivered through other means. Some radio conferences are delivered from the provincial hospital; via email, courses are sent from a partner university to health personnel working in this region of the Amazon. The promoters' concern is analogous: they cannot know very much about reception and effect of their messages.

Interviews and direct observation revealed a difference between what the information system is declared to be used:

1. for remote consulting,
2. to send activity and epidemiological reports,
3. to coordinate patients' transportations.

and the actual use:

1. to support medical activities logistically (a few consultations),
2. to coordinate and track any transportation through rivers (documents, blood samples, patients, gasoline, medicines),
3. to send reports.

This difference is not about the frequency of use -which I did not measure- but about the kind of carried out functions and perception of the system. It can be noted that the declared use of the system is rational, focused on medical activity and supposed to rely on a formalized and efficient organization; the real one reflects some of the problems that daily medical activity has to face there. At this point of observation, the main reasons seemed to be:

- lack of trust, everything is double-checked because people do not confide the others achieve their tasks;
- insecurity, the difficult environment always interferes with activities and make people doubtful;
- low resources oblige to improvise solutions to solve problems;
- weak transport infrastructures make communication channels used to make more effective the use of existing ones, as far as possible;
- hierarchically lower level personnel do not always welcome a system that allows them to be more controlled;
- the problem of laboratory instruments' lack to produce clinical data on-site cannot be solved by a communication channel.

Is it enough to explain why the system use is different from expected? Why do patients arrive often late to the health centers? What happens beyond the information systems that is not perceptible through the information system itself? Appropriate answers could not be found within the hospital, nor through the information system, but going to the communities to see how people and system are mutually influenced.

6.3. Different Medicines

At the beginning it was not easy to know what patients do before going to a health post. I was within a medical system and identified with public health care institution, thus I was told and shown what was supposed to be coherent with my perspective.

6.3.1. Use of Plants

In the communities, it took a while to suspect and then confirm that plants are the first cure. Direct questions like: "do you use plants?" provoked negative responses. When I learnt something about the use of plants, it changed: "do you take honey and lemon for cough?", "Yes, sometimes, but I prefer mint", for example. Implying some common knowledge my inquiries were more successful. Even if I did not develop a knowledge about use of plants in treatment, I learnt enough

to ask questions about their behaviors and discuss about them. Refreshing drinks are drunk for fevers, bananas and lemon for diarrhea; furthermore hot/cold equilibrium seems a reason why neither healthy nor sick people like to boil water (although strongly suggested): water is to refresh, boiled water (which tastes different) loses its effect. To clean the body or to discharge "the inner dirt", there are treatments based on strong disinfecting plants (*ojé*, *uñas de gato* used for cancer, too), on plants that provoke vomit and/or on long fasts. Those remedies are suggested by relatives and neighbors, cultivated in back-gardens or found in the jungle.

Patients use to go to health posts (if they do³) if plants-based home-made medicines are not effective. It always takes some time, from two days to two weeks, more or less, plus the time to arrive to a health center that can be days away (traveling on foot and/or by canoes). What is most relevant here is that the justification for the plant which has been used is always based on the need of balancing hot and cold, or of cleaning the body. The reasons to take a cure and to justify it, are coherent with this source of accountability that suggests diagnosis and treatments.

6.3.2. Scientific Medicine

During a focus group, a physician from a village three days away from the hospital, whose population is mainly native, was complaining about the delay between patients' first symptoms and their arrival to his health post. They can arrive with two or three weeks old infections, so he faces big problems in the diagnosis, because of the lack of instruments, and in treating, because he has a limited set of drugs and there is no medical literature on how they interact with the vegetal medicines patients took.

From the patients' standpoint, obstacles which must be faced are not only geographical. Attending to a health center will require them a certain effort to abstract their physical conditions, anamnesis and symptomatology (locals do not always master the Spanish language, and native women do not even talk to unknown people without their partner's permission), and an economical toll (the monetary interchange is quite unfamiliar there). In communities where the majority of the population is *mestiza*, the delay is usually shorter, between two and ten days, probably for a weaker sense of diverse ethnical belonging.

I am not going to describe here the principles of the Peruvian public health care system; but I will remind that, while the scientific medicine is heavily implied in the way this institution deals with patients' diseases, it does not mean that this source of possible accounts is commonly shared. It is not uncommon to hear from patients complains about being misunderstood (or even not understood at all), or about not understanding the way the physician discussed and approached diseases and treatments; this, and the non confrontational habit of avoiding to tell what could make doctors angry, eventually enhanced an incommunicability. Doctors, on the other hand, say that population should be more educated.

Furthermore frequent doctors' change does not permit to develop a mutual understanding with local population. In consequence of this state of things, many patients do not pass through medical examinations, and prefer to go directly to the chemist's, who usually is somebody from the same community.

A brief example, helps in understanding the difficulty for scientific thinking to shape everyday life: in a wooden, quite dark house it was impossible for a family (and for me, too) to see the dangerous mosquitoes' larvae a doctor was trying to show, in order to demonstrate the risks of stagnant water. That empirical evidence is not visible in their actual material environment, and not significant in their cultural space, because it implies an alignment of senses, objects (water, pipette, larvae, light), and thinking that is not effective. I do not mean such alignment will not be possible, but this example demonstrates that the spreading of scientific medicine is not just a matter of formal education or information transmission, but has to deal with the contexts and social environments people live in and constitute. In population's perception, public health care is associated with quick recovery. Patients tends to arrive late, therefore they have to be transported to the hospital more that if they arrived earlier. Sometimes doctors and nurses have been accused of deaths of people arrived in serious conditions.

³ Public health care is free under 18, for pregnant women, and in cases of "extreme poverty" (but each decision is arbitrary). Thus, full aged attend less to health posts.

6.3.3. Local Healers

Local healers deal with illnesses which are not conceived as physical, as the ones scientific medicine is supposed to deal with. Illnesses that appear not to be treatable by plants and public health care, are perceived as due to others' hate, envy or revenge. This is called *mal de gente* (disease provoked by people), or -more generally- *brujería* (witchcraft), and it is curable by local healers, only. There are several kinds of healers, and many contrasting opinions about them, underlining their social relevance. They have a deep knowledge of the community they live in, and of people's beliefs and fears; on those levers they act using dreams, rites, symbolic objects, magic. I cannot say if they use their influence instrumentally, and probably it is not a suitable perspective to understand their role. What is important to be said here is that people (and some health personnel, too) believe in their ability to treat, on the other hand they exert a strong social pressure over their communities. In some villages, people whispered their fear to be made sick if they do not attend to local healers.

7. Medical Knowledge Boundaries

In the High Amazon, *mal de gente* is quite common. From scientific medicine point of view, it is because of the high incidence of illnesses in the area, and the weaknesses of the health care system. But I would like to focus the attention on the fact that this conceived-disease can be used - and it is used- to justify high children mortality, tensions among families of the same community (for economic reasons for example) or other socially relevant facts. Local healers (are believed to) produce and treat this disease, and through that role, they can make actions accountable and thus deeply affect social relations within their communities.

The participant observation of this Amazonian project focused on a striving co-existence of different medicines (vegetal and ritual) beside the scientific one, and noted that patients' actions are accountable to the medicine they were following in a specific moment. Cross doubts, which would weaken the reliance on each treatment, are quite unusual. Each kind of cure implies a sense of normality for patients and their social contexts, in other words each treatment brings its own ethnomethods, which direct activities into normal patterns of action, and are used to justify them in case of need. The same body high temperature can be an unbalance between hot and cold (maybe due to some "inner dirt"), a malaria case risking to complicate (and that should be conveyed to the hospital), or someone else's revenge made disease by a sorcerer. From interviews and observations within the health care system, the problem of mutual understanding is usually reduced to different languages spoken. As a disease is not conceived the same by different medicines, the problem is not only about translation into different words. Thus, a wider conception of understanding is required, dealing with different medical knowledges.

Diverse medical knowledges providing a source of accountability, are an example of social construction of health, which is a social regulator whose function cannot linearly be substitute by public health care. These findings lead to be skeptical about the health ministry's aim -declared by a public administrator during an interview- to create direct and effective relations between physicians and patients living rural areas through communication networks, because boundary agencies between health personnel and patients, and different medicines seems necessary.

7.1. Different Sources of Accountability and Different Rationalities

After having described the case-study and the main points emerged from the observation, I propose a theoretical perspective which I think effective in relating the general frame presented at the beginning with the empirical part. The first research question was if telemedicine was changing local perception of scientific medicine. From the ethnography emerged that public health care is associated with quick recovery, and communication channels are expected to strengthen this aspect. Moreover the communication system is keeping the health personnel' conception of health and activity coherent with scientific medical knowledge, not simply controlling them. Therefore

telemedicine is not changing scientific medicine perception neither within nor outside the health care system, they rely on the same source of accountability.

The following research question was if telemedicine and local medicines affected each other. The telemedicine system and the local treatments are in indirect interplay; indeed the use of the communication channels is affected by the presence of other medicines, because they affect patients' use of the health care system, therefore other medicines affect the actual possibility to use it for consulting or accessing remote sources of information (knowledge sharing) between health personnel.

Avgerou [in Krishna and Madon, 2003] focuses her attention on information systems in developing countries as hybrid networks, with a particular attention for ideas and institutionalized practices they imply and back. My participant observation suggests to pay the same attention to hybrid networks, ideas and institutionalized practices that co-exist in the context where the information system is implemented. The same author, in a previous work [2000], invites to recognize the mismatch between the scientific and economic rationalities that information systems usually embed and those which exist in development contexts, often dismissed as 'irrational'. Through a literature review, she advocates a shift from an universalistic and not-contextual notion of rationality to a conception of it as a way of reasoning arisen from particular historical experiences (Western European). Her aim is not simply to see if different rationalities are conducive or not for ICT adoption, but to question the assumed supremacy of the technocratic and economic rationality over other rationalities that may counteract it. To her, the point is that the rationality of Western modernity (Weber is pointed as the reference author) is instrumental in defining problems and addressing solutions, but quite ineffective in affecting actions to achieve such solutions. Heeks [2004] refers to Latour's inscription concept in order to underline the non-neutrality of the information systems. The origin context is inscribed into information systems, thus the encounter with other actors-networks produces improvisation, adaptation, clash or abandonment.

Escobar [1995], following Foucault's critical approach, sees 'development' as a space of meaning and activity that constructs and shapes its objects. Ferguson [1994], on a similar line of thought, sees development projects as a kind of Trojan horse to affect political matters through pretended neutral actions. Avgerou [2002] argues that development through ICT is not a linear techno-rational process, but a few studies have addressed those issues.

From this frame it is interesting to look at the model proposed by Heeks [et al., 1999] in order to evaluate health care information systems feasibility. Three rationalities are pointed out: technical, managerial and medical. All of them contribute to shape the telemedicine system and organizational change. The level of mismatch with empirical target reality helps in foreseeing the chance of success.

This approach would lead to describe telemedicine system and its rationality rooted into scientific medicine reasoning, technological constraints and managerial issues. But it would not have been possible to do the same for other medical knowledges, because:

1. I cannot take-for-granted that cause-effect approach provides a suitable outlook on that;
2. methodologically, I cannot get other medical knowledges' inner logic, whereas accountability is accessible.

Those authors suggest to work on rationalities embedded or implied by information systems, but my data recollection showed that the rationality of the telemedicine system makes the declared use accountable, but it is not shaping its actual use. Considering telemedicine system as a source of accountability which relates health personnel's activity to scientific medicine is more explicative of what happens on the ground.

Lupton [in Albrecht et al., 2000 p.50] writes: "there is not such a thing, therefore, as the purely 'natural' body, the body that may be separated from society and culture" and argues that health, illness and disease, and health care can be viewed as socio-cultural products, pushing the analysis towards beliefs and meanings rather than physiological aspects. To support that, I refer to Good [1994], whose work about illness in different cultures argues that illness understanding does not arise from a direct access to patients' state. Closer to this case-study: a sick body is not a only

physical object, it is conceived accordingly with the social contexts patients live in. As the disease is not conceived the same by different knowledges, the problem is not only about translation into different words⁴, because any sickness is experienced within different medical knowledges. This phenomenological approach is fundamental to understand different medical knowledges encounter and how they affect health care. The same author accepts Foucault's concept of discourse, which is not made of signs, but of practices that constitute the objects it deals with.

7.2. Medical Discourses

Recalling recollected data and the quoted authors, I suggest to join ethnomethodology and the concept of discourse to relate social perception and construction of normality, action, thoughts, and accounts: a discourse is a coherent space of meaning which actors' decisions and actions are accountable to; discourses, based on common sources of accountability, make the social environment normal and understandable to the involved actors. Medical discourses shape interweavings between artifacts, expectations, myths, accounts, and norms oriented to healing. Most of patients move through different ways of treatment, but discourses keep their inner coherence; discourses remain coherent although people's actions do not. Thus the local scientific medicine influence on health practices and the telemedicine system use are evolving accordingly to how public health care service is perceived by health personnel and patients. Here is evident an anti-universalistic conception of medical knowledge, based on the assumption that scientific method is a source of truth and knowledge only where science has already arrived; otherwise it is a position among others, which will not become action directly. Therefore medical (and other) discourses provide a frame for the production and change of accepted knowledges.⁵

From this perspective, it is not suitable to look for subjects or objects of knowing. Knowledges are more coherently described by the concept of discourse. The health development process can be seen as an interplay between those medical discourses that patients go through during their recovery. How do discourses work together or against each other in developmental contexts? Within a particular discourse, other treatments are meaningless, whereas they can be physically effective or counterproductive. As this is not accountable in developers' actions, it's not seen by them. Therefore considering multiple sources of accountability offers a chance to relate this understanding to actors' practices within and across their own epistemes, and to look at categories of development critically.

7.3. Different Institutions and Autopoietic Knowledges

I argued there is a public health care institutionalization through telemedicine, but the main point is not in the direct interchange and use of scientific medical knowledge, but in legitimating and making it more accountable where different medical knowledge coexist. The accountability implied and required by the telemedicine system tends to strengthen the coherence of scientific medical action. In this context of multiple sources of accountability, health care is not getting institutionalized accordingly to one medicine. An interplay between diverse medical knowledges is defining a new sense of normality for the people affected by this health development project. It means that there is not a homogeneous institutional space for scientific medicine to spread out through, and where an information system can linearly improve public health care diffusing medical knowledge.

⁴ Within the health care system the problem of mutual understanding is usually reduced to different languages spoken.

⁵ I find fascinating the possibility to extend the understanding of discourses of vegetal and magical medicines. During a talk, arose the idea that *mal de gente* comes from colonial period: then, much more people died because of illnesses arrived from Europe than in fights. It is not senseless that the unknown and incurable perceived-illness (due to others' egoism or envy) was produced on social perception of health by Spanish conquest. To me, this perspective of study, sensitive to construction processes of present and future (without reproposing passionate economical and military analysis) is as attractive as difficult to support empirically.

Both the concepts of discourse and ethnomethodology have been used in studies of institutions. The former to argue how alliances between words and things create discourses that shape institutions. The latter was implied by the New Institutionalism [DiMaggio and Powell, 1991] to highlight how normal patterns of action make real social models and institutions, and social models and institutions make actions accountable. Czarniawska [1997] pays special attention to institutionalized actions that are meaningful, and can be accounted for, independently from the agent. Diverse institutionalized knowledges (made up of explicit and implicit, tacit and practical aspects) enter in interplay during development efforts. As medical knowledges keep self-accountable, autopoietic systems view can be a way to improve description and understanding of social contexts that are targeted by development project based on knowledge. From this perspective, we could look at medical knowledges as discourses which:

- shape heterogeneous networks;
- co-exist within the same social environment (made up of health relevant matters);
- reduce external complexity keeping their inner coherence (self-accountability independently from contingencies);
- reproduce themselves affecting patients' perceptions of illness and behaviors.

Medical discourses make health institutionalized patterns of action self-accountable and provide a frame to the reproduction and change of accepted knowledges. The "irrational" use of scientific medicine is not due to ignorance, but affected by the continual production of supportive divergent knowledge. Indeed each treatment is based on its particular "episteme" that backs a knowledge and a consequent experience of the illness: it addresses ways to conceive a disease and deal with it.

7.4. Telemedicine: Medical Knowledge and Development Discourse

Thompson [2004], through the discourse analysis of a speech given by the president of the World Bank, gives a clear example of the wide relevance of the "discourse of ICT implementation, which is -in his opinion- reproducing the North American conception of development. Similarly, the Peruvian Health Care Ministry and international organizations such as Pan-American Health Organization and World Bank share similar main points of attention and sources of accountability with this telemedicine project promoters. It is seeable in their official publications and in the interest their working groups on telemedicine showed for this telemedicine project when I met them in Washington, D.C.

'Accountability' has (at least) two relevant meanings in this research:

1. *the sense of normality providing possible justifications in case of need*; which is implied by all the normal patterns of treating action (that scientific medicine justifies and public health care system embeds) and is strengthened by the possibility to communicate within the health organization rather than by communication itself;
2. *the responsibility of an agency*; a simplified line of accountabilities can be sketched from the lower health care system hierarchical level up to the telemedicine project financiers:
 - health centers activity is more accountable to local hospital,
 - hospital accountability is stressed by project partners and promoters,
 - partners and promoters are required to be accountable by international financiers.

It has to be noted that health personnel activity is required to be accountable to health institution rather than to patients.

Summing up, both aspects of accountability related to this telemedicine system support a treating action more coherent to scientific medical knowledge even in remote sites, whereas patients have no part in them. On the other hand, sick people move between other medicines which are more accountable to the local contexts they live and constitute (see local healers and *mal de gente*); this reduces scientific medicine area of influence and effectiveness, and do not allow a wide use of remote consulting (the main way for "knowledge sharing"). Divergence between public health accountability to scientific medical knowledge and patients' accountability to

their context lead the telemedicine system as the accountable infrastructure for the development discourse rather than a medium for medical knowledge.

7.5. Development as Producing Accountabilities on Expectations

Looking at different medicines as self-accountable knowledges, provides a perspective on the relations between power and knowledge which often pass unseen in health development projects, then to criticize technocratic and ethnocentric approaches to knowledge-based development. Although it is a sustainable statement that technology and science are not teleological, both of them are eschatological in promising a better future (which is of main relevance in developmental contexts). Indeed this telemedicine project embodies expectations of health development which are accountable to the planned uses of the system, and coherent with the common assumptions of development. But those shared expectations are not affecting health care matters in the planned way, they are a widely referred to source of accountability that mismatches with the actual use of the system and the contextual situation.

As promoters' evaluation and my observation showed, the telemedicine system is achieving some of the goals it was aiming to, but the usage is different from expected (logistics rather than medical knowledge sharing). Health development expectations -rather than the information system daily use- influence normal medical activity. For example physicians do not rely on the knowledge interchanged over the information network, but feel more legitimate in their activity because they are potentially connected with their professional community. On the other hand, only a few patients are sensitive to this knowledge, and they go through health care system their own way, indirectly affected by other medical knowledges.

Thus, the activities of people involved in this telemedicine project are accountable to a system which supports scientific medical knowledge, which is supposed to be normal, but it is not. More on the ground: local health is poor, health personnel actions become more accountable to scientific medicine because of the telemedicine provoked expectations. High expectations of health development and risk of failure -together with no accountability to go back to- produce a broadly felt sense of uncertainty: if the system does not work, neither the new, nor the previous situations are accountable; the weak sense of normality sustained by the development effort is always risking to fall into disillusion and malcontent.

8. Other Approaches to ICT and Development

8.1. Technology and Knowledge Transfer

Since when development was conceived as industrialization, and pursued exporting machinery and building factories, development studies discussed about 'technology transfer', which is still quite common. In latest years, characterized by a growing attention to knowledge, a similar approach goes under the label of 'knowledge transfer'. In this line of research, many studies about ICT for development report the problems of dealing with side effects, processes of improvisation, adaptation, appropriation, drifting [Ciborra, 2000]. Going back to the observed telemedicine project, it is going through local appropriation accordingly with existing cultural practices and social context. In other words the system is drifting from planned use, but it is working. Explaining this process needs to refer to the influence of perceived institutions because it helps in understanding the drifting is not unlimited, but more likely shaped by how sickness and healing are embedded into patients' patterns of action. The theoretical standpoint proposed here aims to depart from the focus on "here and now" actions, which characterizes many studies about information systems, leaving aside broader and relevant social and political aspects.

8.2. Institution building

Since Hirschman's proposal to focus development on institution-building rather than on economical indicators, institutions gained a central role in analyzing and promoting development. Both technology and knowledge transfer are heavily affected by institution-building. It means that

technology or knowledge -in order to be effective- needs to be transferred within suitable organizational contexts. McMaster [1997] pushes further this aspect, arguing that technology diffusion and adoption are related to values and human relations. In any case, most of these studies and projects are based on a rationalistic conception of organization, which does not see (or repress) other organizing processes. Concerning that, it is of particular relevance to note what promoting institutions requires and implies in developing countries. For that, institutions need to be considered as perceived and enabled-through-action social models, broader than organizations.

8.3. Diffusionism

Diffusionism [Rogers, 1995] is another well-established approach to development. It is based on the idea that existing social networks are the main channels to spread innovations. It has been widely used with social network analysis, in order to address key agencies through which development could diffuse. 'E-readiness' evaluations can help in measuring the chances for ICT to be used in a specific area (province, region or country). Those evaluations can be compared in order to make decisions about ICT implementations, and integrated development plans which consider ICT as one of the aspects of development policies. Usual e-readiness indicators are: number of internet accesses, teledensity, infrastructures, price levels, use within administrations and enterprises, computer literacy. E-readiness is widely used in the telecommunication sector, but it does not provide enough information about how to evaluate ICT feasibility within health or education sectors. 'E-assessment' is a more suitable tool to provide information telemedicine projects, as it considers populations' educational level, wealth distribution, social inequalities, ongoing policies.

9. Rethinking about What To Do

What is central in development matters related to knowledge is that those efforts tends to expropriate from target social groups the ability to know and understand, or -at most- to ask them for a delegation. Indeed, from what has emerged from this case, the telemedicine project is exporting a source of accountability.

From the standpoint proposed in this paper, e-readiness and e-assessment are questionable approaches to development issues, as they look at target populations as ICT conductive matter, and are not accountable to local accountabilities. In the effort to export knowledge, we can see a soft and indirect power which produce a dependency on heteronymous knowledge. Unlike during the colonialist period, influence on populations is indirect and applied promoting and sustaining heteronymous senses of normality and expectations as they were a political. Therefore a universal political agenda should be questioned, and -assuming that only part of people's demands and claims can be brought into an agora where ideas are represented and decision taken- it is relevant to address the need to go beyond the usual conception of participative action based on explicit will.

Growing attention accorded to autonomy in politics goes side by side with the weakening reliance on an universal rational understanding of societies. This recalls the position expressed by Feyerabend [1981], who criticizes Popper's idea of open society in order to claim a society in which each tradition has the same access to power rather than individuals' right to access hegemonic tradition centers of power, having to accept their frame of mind. Ethically the issues is intricate, but the question asked by the diagnosis laboratory director is quite clear: "these people [natives] have lived for centuries without us, is it right to bring our health care?" Another question left me without a good answer, in a health post a young boy -bored with entering data into a computer- was asking random questions about my country, one of them was: "how does a country develop?"

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