THE IMPACT OF TECHNOLOGY IN ORGANIZATIONAL COMMUNICATION

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Abstract

In this chapter a case study is presented, in which the ethnomethodological approach is used to analyze the impact of the implementation of an information system, called Sispes, on organizational communication processes in the residence for elderly Giovanelli (Italy). Sispes is a web based platform which sustains communication processes and knowledge management according to a customized workflow management system.

Adopting structuration theories in the analysis of the case study, and taking inspiration from the philosophical tradition, especially in epistemology and in the analytic philosophy of law, an innovative perspective is adopted, which specifically acknowledges the role played by the communication processes in shaping both the attitudes of the involved actors and the social reality in which they are immersed. According to this perspective, three types of communication processes are presented, namely the normative, descriptive and constructive approach. These latter are then applied to a concrete case study.

INTRODUCTION

It is commonly known that the introduction of any technology system in an organizational reality causes some relevant changes in internal processes and in the workers' attitude to share knowledge. This chapter investigates the evolution of communication processes within the organization, and the impact of the use of information systems (ISs from hereafter) on knowledge management assets. In order to overcome some problems deriving from the adoption of classical theories on organizational communication processes, a new approach based on a philosophical analysis is introduced, that distinguishes communication processes into three main categories: normative, descriptive and constructive. These latter allow the analysis both of the attitudes of the involved actors and of the social reality in which they are immersed[1]. By applying this new vision to the analysis of the impact of technology on communication processes within a small firm in Italy, the residence for elderly Giovanelli, the chapter investigates how the introduction of an IS, named Sispes, has affected the information strategy of the firm, the workers' attitude to share information and knowledge, and some communication processes. Finally, the chapter shows that the proposed normative, descriptive an constructive approaches allow to better understand the communication processes' dynamics. In the two following sections, some background literature (e.g. theories on technological impact and on communication processes within organizations) is presented. In the main part of the chapter, theories on communication processes and a case study are described. Finally, some future trends and final remarks are discussed.

[1] This includes the modification of existing practices, the creation of new ones, the modification and creation of concepts and even of physical objects, as we will illustrate in the paper.

BACKGROUND

In the last decades, organizations had to deal with dynamic markets, characterized by specialization of work, outsourcing processes, just in time and distributed production, etc. In this scenario the continuous innovation in technology solutions and its contradicting empirical effects on organizations have maintained a strong interest for researchers who try to develop new and more complete theoretical models.

Even if non profit organizations (such as cooperative and social based firms) are working in a more stable environment, the turbulent network of stakeholders influence them. In this scenario, public or private residences for elderly are not an exception, they become part of inter-organizational or informal networks, opening their virtual value chain to other companies, outsourcing their non core services and, finally, specializing their core activities such as nursing, medical, and physiotherapeutic services (see for instance Child, 1972; Child and Faulkner, 1998; Cook, 1977; Lowndes and Skelcher, 1998; Murray, 1997; Vangen and Huxham, 2003). This allows residences for elderly to offer a good quality service, improving the guests' welfare. In order to do that, they have to coordinate a constellation of specialized units, some of which are part of the organization (administration, R&D, etc.) while others refer to different companies (such as restaurant, cleaning, transportation and logistic services).

In order to stimulate coordination in a complex environment, innovative Information and Communication Technologies (ICT) solutions are implemented and communication processes are continuously reengineered. The following paragraphs describe some organizational coordination and communication processes, and how ICT, information or knowledge management systems might sustain these processes. Finally, it is argued that these latter are not

neutral assets in organizations, but are strictly related to pre-existing coordination processes and types of production.

Organizational coordination and communication processes

The importance of coordination and communication processes has constantly increased at any level of the organization: technical, managerial and institutional (Parsons, 1951). This very complex organizational issue can be studied in accordance with contingency theories, which consider the organization as dependent on the complexity and the dynamicity of the environment in which the firms operate (Emery and Trist, 1960; Lawrence e Lorsch, 1967; Ashby, 1967; Mintzberg, 1983) and on the types of production technology adopted within the organization. For instance, through an empirical analysis of English production firms, Woodward (1965) has discovered that coordination and communication processes might change according to the kind of model of production (called "technology" in the organizational literature) developed within the firm. Also, Thompson (1967) has extended her analysis, depicting the following models:

- Long linked technologies: they imply a serial interdependency among single production phases. These are scientifically analyzed and organized, and communication processes have to maintain the efficiency of production phases.
- Mediated technologies: they allow people to communicate in order to share opinions, negotiate, and achieve common agreement. Technology has the role of mediator among individuals, and its infrastructure should be very easy to understand and use, thus comprehensible and standardized.
- Intensive technology: workers have to use various communication channels, according to their emerging needs. The aim is to achieve new and innovative

shared opinions, ideas, information, and desires in a non-predefined way, typically developed by teamworks or communities of practice.

Taking also into consideration some important studies on knowledge management[2] (KM from hereafter) and IS, coordination and communication processes might be related with the information and KM strategies adopted within the organization. In particular, Davenport et al., (1998) describe four different models, which represent both the way in which information should be organized and the way in which communication processes should be designed:

- Information anarchy: every worker manages her/his personal information and networks of communication channels. The dimension of the communication network depends on the ability and attitude of each single agent to manage relationships and communicate with colleagues, customers, suppliers, etc.
- Information hierarchy: workers adapt their communication processes to communication channels that are scientifically organized, typically by the management. Usually these are vertical channels, which enable the twofold processes of top down and bottom up communication.
- Information feudalism: workers share knowledge within each single unit, teamwork, or community. Communication channels are organized and managed within each single group and there is no official communication channel across units.

[2] Knowledge management is a discipline that promotes an integrated approach to the creation, organization, access, and use of an enterprise's information assets. These assets include structured databases, textual information such as policy and procedure documents and, most importantly, the tacit knowledge and expertise of individual employees (Harris et al., 1998).

- Information federalism: the personalized and informal communication channels, developed within each single unit, are placed side by side with the formal communication processes managed across the firm.

Galbraith (1973) argues that complexity, information asymmetry, uncertainty, and strong interdependencies among units force organizations to elaborate information, and to coordinate their activities. Thus, in a complex organization the four models of information strategy are often mixed together in order to satisfy all the organizational needs. Together, the information strategy and the technical complexity of production determine the structural complexity of the firm, and change the types of communication processes.

Information and knowledge management systems

For long time, a huge amount of organizational resources, in terms of time and money, have been invested in ICT solutions such as very traditional ISs or more innovative KM systems, which aim at effectively and efficiently managing communication processes within and across organizational units. In contrast with the contingency theories described above, practitioners have for long time considered that ISs are neutral assets within the firm, and can be implemented to deterministically direct and change human coordination and communication actions. For instance, ICT, IS and KM systems facilitate synchronous and asynchronous communication processes when there is no physical proximity (Sarbaugh-Thompson and Feldman, 1998), enable knowledge sharing among organizational units, simplify some managerial decision processes, and support the electronic data interchange among firms.

The typical KM architecture, described by Davenport and Prusak (1997), is a centralized system, composed by the following elements which enable various communication processes:

- the enterprise knowledge portal, which provides a unique access point to corporate knowledge, with personalized services. This is often a web-based interface which guarantees, through authentication processes, the creation of personalized channels of communication within the firm;
- groupware applications, as chats, forums, discussion groups, e-mails, etc, which enable social interactions within workgroups and across organizational units. The high level of informal communication, that technology can sustain, contributes to make the newcomer feel as a central member of the organization;
- workflow management systems, that allow users to model communication and production processes.

Different components of KM and IS solutions can sustain a particular information strategy model and a type of production technology rather than another; for instance, workflow management systems may support information hierarchy and long linked technologies, while groupware applications usually favor feudalism in information strategy and intensive production technology. Practitioners usually don't take into account the organizational complexity and the unpredictability of the effects of an ICT solution.

Phenomenological and structuration theories

The considerations underlined above determined the inclusion in the research of more phenomenological approaches, focusing on the relations among social actors, organizations (in particular the system of communication and coordination processes), and technologies. Along these lines, Weick (1979; 1996) sees the organization as a system taking in equivocal information from its environment (enactment), trying to make sense out of that information

(selection), and using in the future what was learned in the past (retention). Organizations evolve as they make sense of themselves and their environment. He argues that technologies are stochastic systems implemented in a very complex environment, thus it is impossible to foresee their positive or negative effects. Thus communication is a key process because of its role in the sense-making processes people use.

Also, the structuration theories, based on (Giddens, 1984), show that technologies and social structures are strongly related and interdependent (Orlikowski, 1991; Orlikowski & Gash, 1994; Orlikowski & Robey, 1991). According to these theories, there are strong relationships and interdependences among human actions, institutional roles (the *de facto* organizational model) and the technology architecture of IS or KM systems in use within the company. In particular, the design of technology should be strongly influenced by the institutional roles and organizational properties. Its introduction forces people to try to understand the processes designed in the system, and often to change their traditional activities. If people adopt the new processes, they introduce new activities, new beliefs, new expectations that in the long term might change the organizational structure of the firm. On the other side, if the traditional activities are too different from those embedded within the system, people tend to desert IS and KM systems, and continue to work as they did before, retaining a stable environment. One of the critical factors of these processes is the interpretative flexibility that exists. In other words, the choice of changing channel of communication or of not adopting the new ICT system very strongly depends from the capability of workers to understand it. Often workers interpret and adopt technology in a way that is not predictable beforehand and might use the same technology in different processes and for different aims.

To conclude, from what said, it derives that on one hand the effectiveness of IS and KM systems introduced within a firm, are dependent on the information strategy of the firm and the type of production technology that has been developed; on the other hand, the design of these technologies is in its turn affected by the organizational structure, and at the same time by the users. The effects of these interdependencies cannot be clearly foreseen, as they depend on the ability of workers to understand the technology and to adopt/adapt it for their business needs.

COMMUNICATION PROCESSES

As explained in previous paragraphs, communication has nowadays become one of the most important assets in organizations. This is because organizations cannot be considered just as "containers" of individuals with common aims, but have to be regarded as evolving social contexts in which real persons face various situations and problems (see for instance Foresto, 2004; Klein, 1998; Malizia, 1993). Thus, communication is the means they possess in order to understand and adapt to the dynamics of these changing environments.

Classical organizational communication theories

The discipline that studies the relations between communicative processes and organizational settings is called "organizational communication"; it has the twofold purpose of:

- understanding how communicational processes shape organizations and
- understanding how organizational life influences the form and content of communicative acts of the individuals who interact within it.

Putnam et al. (1996) singles out three fundamental questions that organizational communication tries to answer:

- Do communicational processes depend from the type of the organization or, vice versa, the latter depends on communicational processes?
- Do communicational fluxes follow the direction of the organizational hierarchy or these fluxes influence the structure and the workflows of the organization?
- Is communication a central element in the creation of the identity of an organization or it is merely a functional instrument?

Considered the relevant role of technology in communication processes, it is reasonable to add another relevant question to the analysis.

- Are communication processes affected by the channel of communication, in particular by technology?

Organizational communication includes both internal processes of communication (among the members of the organization itself) and communication towards the outside (how the organization presents itself and exchanges information with external stakeholders). In this chapter only the internal dimension of organizational communication is analyzed.

The literature in this discipline has classified communication according to different criteria that we will try to sum up very briefly:

- level of formality;
- direction of informational fluxes;
- content of the messages;
- function that it performs;
- purpose that it has.

The first typology distinguishes between formal communication with its rigidity, precision and authority, which follows predefined patterns and informal communication, which

is flexible, personal and is free from etiquettes (Stohl and Redding, 1987). Alternative ways to describe informal communication are coordination by feedback (March & Simon, 1958) or by clan mechanisms (Ouchi, 1980).

The typology based on informational fluxes is more articulated, as it includes vertical communication (both top-down, from the top management to the basis and bottom-up, from the basis to the top management), horizontal (between individuals who occupy the same positions in the hierarchy), and transversal (or cross-channel, which is similar to the horizontal one in character but involves wider parts of the organization, namely members working for different units). Very traditional works explored these types of information fluxes, for more details see (Simpson, 1959; Welch, 1980; Penley, 1982)

The typology based on the content of the messages singles out political messages relative to strategies, correct behaviors etc., basic messages -information for the well functioning of the organization- and messages related to the image -definition of the style of the organization- (Tanis, 2008; Watzlawick, et al., 1967).

The typology based on the function of the communication sees the properly functional communication as the one in charge of guaranteeing the correct functioning of the organizational "machinery", the informative communication as the one in charge of the visibility of the enterprise, with its products and services, the creative communication as the one ensuring the promotion of changes and progress and, finally, the formative communication as the one with the function of establishing a sense of belonging through presentations, meetings, parties etc. (Goffman, 1974).

The last typology, based on the purposes, includes messages to inform, create involvement, and sell products and services. Companies must communicate with their present

and potential customers, casting into the role of communicator and promoter (Prandelli and Verona, 2006).

Why these classifications are not fit to our target

The typologies just presented overlap in many respects and this is not by chance; one thing that they definitely have in common is that they describe the communication processes as they take place inside an organization. They accomplish this aim starting from different perspectives and targeting various aspects but, despite the questions listed in the analysis in (Putnam et al. 1996), they focus much more on communication itself than on the interaction of this latter with the organizational reality and its actors. As the main objective of this work is to understand the changes in the complex interrelations between communication processes, organizational structure, and technologies, we find the solutions offered by the classical theories of organizational communication unsatisfactory.

In other terms, our aim is to analyze whether the changes into the communication processes induced by the implementation of an IS for the management of data (developed according to a managerial information strategy and coherent with the technology of production of the firm) give as output the creation of new objects and practices or contribute to create a new organizational reality. The traditional classifications present different aspects of the communication processes, but most of the times these are simultaneously present in organizational life and are intermingled, thus they are not able to properly explain these dynamics. In order to analyze these changes we will propose a new classification anchored in the philosophical tradition. The rationale of our proposal is that of characterizing the different "attitudes" that social actors, inside an organization, can enact with respect to communication

processes. Finally, this new classification reflects the need to understand the interdependences among organizational structure, actors, and ISs, typically described by structuration theories.

Our proposal of classification

Our proposal is rooted in the philosophical tradition, especially in epistemology and in the analytic philosophy of law. In the latter ambit, a sharp distinction between normative and descriptive discourse has traditionally been traced (Villa, 1999). This same distinction can be translated in more general terms by the epistemological conception of normativism and descriptivism conceived as different kinds of epistemological analyses. In both traditions a third element, namely contructivism, has lately been added, which presents new peculiar features (see Piaget 1967; Vygotsky 1978).

We will rely on these previously proposed classifications and apply them to the study of communication processes, thus indicating three different types of communication; the typology is meant to specifically address the role played by the communication processes in shaping both the attitude of the involved social actors and the social reality in which they are immersed. Under this perspective, the effects of the communication on the organizational reality become the real focus of the analysis. These three types of communication processes are: normative, descriptive and constructive.

Normative processes

The communication is unidirectional, namely directed from the “top” (the management) of the organization down to the workers and it possesses some peculiar features, as being constituted by formal rules that are meant to be clear, precise and rigid. In this case the purpose

of communication is that of giving a list of requirements to be met; in a sense it is presupposed that the knowledge about what is right is possessed only by the top management, which becomes a sort of guide for the other members of the organizations. In the normative vision, the function of communication is that of giving directions and prescriptions and transmitting an evaluation scale (Villa 1984; Wrenn 2001). Communication is seen as the carrier of the judgment on what is right or wrong, good or bad.

Descriptive processes

Communication processes are bidirectional; instead of imposing rules aimed at the ideal functioning of the organization, the management tries to understand which are the real processes at stake inside the organization and the communication has the purpose to gather information from workers so that their condition could be improved in order to allow them to work more effectively. In this case, communication doesn't have the purpose of transmitting values, but rather of drawing a faithful description of the organizational reality "as it is" (Rorty 1980). Thus, according to this vision, interpretations should ideally be avoided in favor of a neutral and objective rendering of "how things really are".

Constructive processes

Communication processes are informal, "horizontally and transversally oriented" processes in which participants negotiate the meaning of the content of communications, thus they cooperate in the building of socially constructed concepts that are used inside the organization. This results in what has been called "sense-making" (Weick, 1979; Weick, 1996;

Weick and Roberts, 1993), the social construction of organizational reality, which includes the creation of common values and of a sense of identity and of belonging to the organization itself.

The assumption behind this conception of communication is that reality (and organizational reality in particular) is not detached from the individuals who perceive it, thus knowledge of this reality is not neutrally given (and transmissible), but is always filtered by the interpretative schemas of subjects. These interpretative schemas are continually reshaped as individuals interact with other individuals, thus creating new concepts and other social products (von Glasersfeld 1987; von Glasersfeld 1999; Watzlawick 1984; Raskin 2002). In this sense, communication is not merely an exchange of information, but is rather the creation of new ways of experiencing the reality and from these new social entities can emerge.

To sum up, the advantage of the classification that is proposed is that it directly indicates what a communication process does to a social environment: the name of each type of communication process already concisely explains its aim. In the normativistic case the communication aims at regulating social interactions, in the descriptivistic case it aims at illustrating the contents of such interactions and, finally, in the constructivist case communication reshapes the social environment.

Advantages and drawbacks of the three approaches

After having explained the advantages of the classification we are proposing, we will now sketch the advantages and drawbacks of the three types of approaches to communication that the classification indicates, in order to understand what to expect when passing from one type of communication to the other.

Normativistic communication has the advantage to be controllable and precise but, on the other hand, it is very rigid and this can prevent the spontaneous emergence of initiatives from the bottom of the organization.

Descriptivistic communication enjoys the advantages of its being bidirectional, in the sense that information comes from more sources and this, for sure, enhances participation from the bottom and the possibility for the top management to sense the mood of the whole organization. On the other hand, it is based on a debatable assumption, namely that it is possible to exchange information which is neutral with respect to values. Therefore, even though in this case the top management takes into account the feedbacks from the basis, it can happen that the basis is not satisfied in the end because the requests that they are allowed to express have to follow predefined patterns that are biased on the top management's vision, even if the latter pretends to be neutral.

Finally, constructivistic communication has the advantage of being free from imposed patterns, its content and form are completely determined by the actors involved in the communication process; in this way, new and unpredictable results can emerge, leaving room for creativity and spontaneity.

On the other hand, in this case, communication can be very fuzzy and uncontrollable and it can be more difficult for the top management to extract the results of these processes, as they are often not readily available.

What can be induced from this brief analysis is that, roughly speaking, normativistic communication is fitter to environments in which there is a strong and well defined hierarchy and the job mostly consists in well consolidated practices and the actors at the lowest levels of

the organization have mainly to execute predefined routines. Descriptivistic communication is instead desirable in those settings in which the structure of the organization is flatter and the jobs of all the actors involve a higher degree of autonomy. Constructivistic communication appears to be very effective in scenarios where many different independent units coexist and thus it is very hard to have a global vision that encounters the needs of all. Since in these settings communication must cross the boundaries of specific work units, it is difficult to find "a language that everyone can understand", while it seems more plausible that the consensus on how to communicate and the understanding of what is being communicated must be negotiated, given the heterogeneity of competences and capabilities.

THE CASE STUDY

The analysis carried out in the residence for elderly Giovanelli is part of a wider project[3], in collaboration with Spes Trento[4] and the department of computer and management sciences of the University of Trento. The researchers have spent 4 months in the residence Giovanelli, in order to help the director of the residence to introduce Sispes, and help licensed practical nurses (LPNs), physiotherapists, social assistants and sanitary assistants to understand the technology, adopt it, and use it in the most effective way.

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[3] This is a three years research project, called INterdipendences and CONnections with SPES (InConSPES). In particular, Spes Trento intends to value workers' knowledge and conduct innovation within the organization, through a series of knowledge management actions. These are (i) the analysis of communication processes within the firm; (ii) the study of the co-dependences among technologies and organizations (both humans and processes); (iii) the state of workers' welfare; (iv) the guests' healthiness; (v) the identification of rates of knowledge performances.

[4] Spes Trento Cooperativa Sociale is a company that manages 5 residences for elderly in Trentino.

Description of the company

The residence Giovanelli, founded in 1729 as a hospital for elderly, is located in Tesero, in the province of Trento, Northern Italy. Nowadays, the residence is a public institution of assistance and charity. Currently, the residence guarantees some core services such as sanitary attendance, nursing, medical, physiotherapeutic, entertainment, and often religious services. The labor force is of approximately 50 employees, plus a variable number of volunteers.

The professional roles are divided in five units: the administrative office, the assistance and sanitary unit, the entertainment unit, and the technical services division.

The administrative office has to manage three main activities. The first one concerns all the bureaucratic administrative activities that are related to the guests. For instance, to guarantee contacts between the residence and guests' relatives, help guests to obtain certifications from the public government (such as residential certification, identity card, etc.), organize the documents to ask for public funds, evaluate new requests of guest staying, manage the general and analytical accounting, etc. The second group of activities is focused on the relationships with public stakeholders, such as the Province of Trento, which finances all the public residences for elderly in Trentino, and other public institutions that take care of security, privacy of the healthcare procedures, human resources administration, etc. The third group of activities concerns the economic and financing programming, the management of the residence's patrimony and all the economic aspects of outsourcing processes such as collaborations with practitioners and specialists.

The social assistance operators, who have direct contact with the guests and can have a pulse of their more or less explicit needs, constitute the assistance unit.

The sanitary unit has to guarantee the sanitary, medical, and pharmaceutical services that guests need. The three major roles in this unit are the physician of general medicine, LPNs - including the nurses' coordinator -, and the physiotherapists. The doctor has to guarantee the basic medical assistance to the guests, maintain a good relation with relatives, and cooperate with other workers in order to provide a good quality service. The LPNs are professionals that enact the therapies suggested by the doctor, and the nurses' coordinator has to coordinate the nurses' turnover, the activities carried out in the residence, and has to control the distribution of medicines. Finally, the physiotherapists have the goal to improve the life and welfare of the guests, through the most effective physical and psychological rehabilitation.

The entertainment unit has to guarantee a good level of social life to guests, paying also attention to their relations with relatives and cultural or religious local associations. It is constituted by animators who usually organize recreational events, such as newspaper readings, birthday parties, visits in tourism destinations, etc.

Finally, the technical services division has the aim to guarantee some services such as laundry, restaurant, and instruments and furniture maintenance.

Description of the technology

The technology introduced in the residence for elderly Giovanelli is Sispes, an IS created by Spes Trento. It is a web-based system, which manages most of the information flows among socio-assistance, sanitary, entertainment, and administrative units.

It is composed by an enterprise knowledge portal, which provides the unique access point to corporate knowledge. Information can be obtained and added only through an authentication process. It includes also a groupware application, which enables workers to share documents,

start forums, leave messages, and manage a group agenda. Finally, it provides a complex system of workflow and document management that allows users to add and retrieve information from the corporate archives.

The main characteristic of Sispes is that it is focused on the residence's guests and all the information is managed according to this perspective. Thus, all information, autonomously managed by each single unit, is not shaped according to the theme or the topic of interest of the group, but rather according to the guest's needs. Therefore, doctors, nurses, animators, and administrative offices collectively contribute to the management of guests' information, according to some predefined channels of communication. Each contributor accedes to the IS through an authentication process, sees the most relevant links to document management systems related to her/his activity, and can add information which she/he is responsible for

Figure 1 shows how workers can access the enterprise knowledge portal in order to add their information.

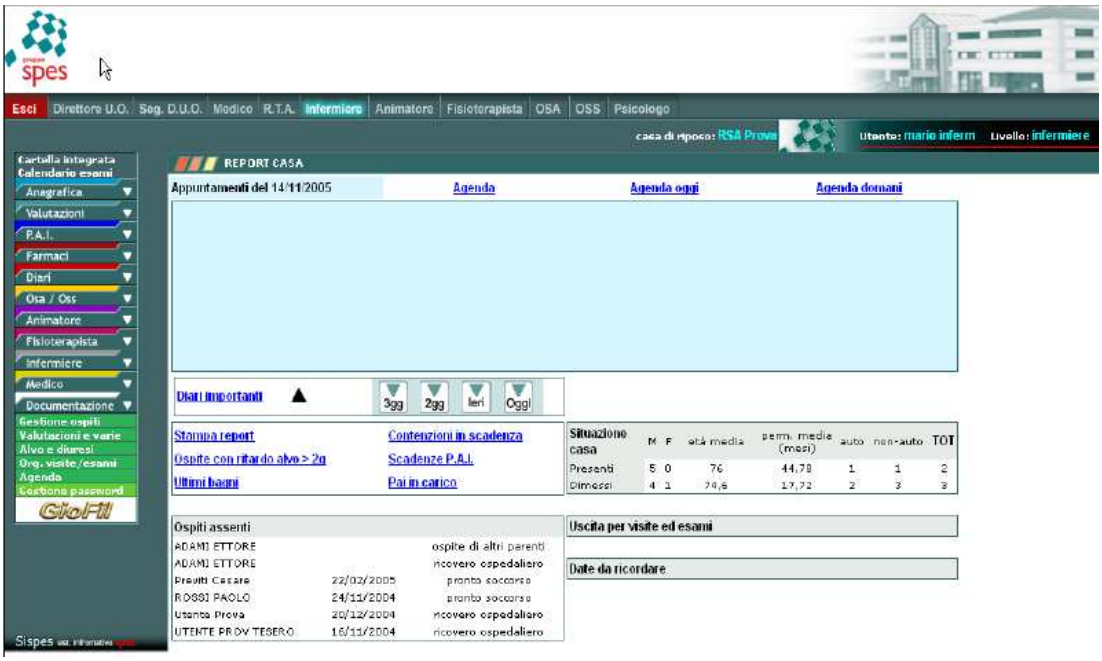

Figure 1. The Sispes enterprise knowledge portal

One of the most important services provided by Sispes is the creation of guests' integrated folders, which report on all the information about each single guest. An example is depicted in Figure 2. The data, provided by each single integrated folder, refer to the fundamental information of the guest (such as age, gender, relatives' phone numbers, etc.) and on her/his state of well-being and health.

Figure 2. An example of a guest's integrated folder

Methodology of analysis

In this work we have adopted the ethnographic approach. Ethnography is mainly based on the active participation of the observer inside the firm, with the aim to get a detailed understanding of the circumstances, the strategies and the relationships of the subjects being studied (Spradley, 1979). In the first phase of our analysis, an investigator spent four months working in the administrative offices of the residence Giovanelli, helping workers to understand the technology, adopt it, and use it in the most effective way. In doing that, he has analyzed how

the implementation of Sispes affects both technical processes and the social attitude of communication. Even though, in most cases, four months are not enough to deeply understand the organizational culture, the hidden power of workers' relations, and some of the tacit aspects of communication, in this case this experience was complemented by official documents of the firm and a series of qualitative interviews to the 15 key employees of the firm. They play various roles within the firm and utilize different services supported by the technology platform.

The second phase of our analysis has been made two years after the first implementation of Sispes, and was motivated by the fact that, in the first phase, workers might have been biased by the introduction of an innovative solution or might have needed time to get used and to deeply understand the IS. We interviewed 8 key employees, maintaining the same structure and method of analysis of the first phase. Workers spent from 40 to 60 minutes, presenting from their points of view the effects of Sispes on the communication processes and on their attitude to share knowledge.

All the documents, the interviews and the direct observations made by the investigator have been deeply analyzed using the analytic induction method to systematically examine similarities among various knowledge bases in order to prove how communication processes evolve in an organization (Ragin, 1994; Taylor and Bogdan, 1998).

RESULTS OF THE CASE STUDY

In this section, we will highlight the changes that the introduction of the system Sispes in the residence for elderly Giovanelli determined at a communicational level. We will also evaluate the impact of these changes on the work environment and on the services provided to the guests.

Before Sispes

We will start with a brief presentation of the ante-Sispes situation, namely of the ways in which communication used to be carried out in the residence. For the sake of simplicity, we could group these communication processes in two categories: informal and formal.

Informal communication

With respect to the informal communication, we could single out two subcategories: completely unstructured, like occasional conversations and gossips, and semi-structured.

Unstructured informal communication, as is very common in many work settings, played a very important role prior to the introduction of Sispes, especially due to the lack of official occasions for contact among people belonging to different units (for instance nurses and animators). Informal communication had in this sense the purpose of filling the gap determined by the absence of formal communication and information procedures involving all the people working with the same guest but at different times or under different perspectives. Under another respect, we could say that it substituted the processes needed by the intensive production technology of the residence.

Nevertheless, informal communication often carries with it undesired consequences, like malicious gossips, negative moods, competition among different units that should cooperate instead and the like and all this can sometimes degenerate, thus creating a (socially) unhealthy environment. This adds to the reasons why not too much of the “burden” of information about professional matters should rely on completely unstructured informal communication.

A partial solution to the problem of the informative gap mentioned above was given in the residence Giovanelli by semi-structured communication, as in the case of the so-called "Guest's diary"[5]. This used to be a paper diary in which LPNs wrote notes about the stay of guests; what could be written in these notes varies between particularly relevant information on what happened in the last turn of work to very ordinary and general information about the guest. Since there were no precise rules to determine the content and the format of these notes, very often they needed to be explained during formal meetings by the LPNs who wrote them.

In many cases, these explanations could not wait for the scheduled formal meetings, as for instance when seemingly relevant information was graphically unreadable or when relevant information was submerged and lost in the mass of other – maybe not so relevant - notes. In these and similar cases what intervened was again unstructured informal communication.

Formal Communication

On the other hand, formal communication used to be (and for the most still is) exchanged through four kinds of formal meetings: consignation meetings, meetings for the Individual Assistance Plan (IAP from hereafter), meetings of the LPNs and meetings of the units.

- Consignation meetings are held on a daily basis, at the time of the change of turn, with the participation of the LPN who finishes the turn, the one who begins the new turn and the representative of the social assistance operators (SAOs from hereafter). They are aimed at informing about the variations in the conditions of the guests that could have taken place during the previous turn.

[5] We will return later in this paragraph on this practice, since it is one of the best examples of the changes brought about by Sispes.

- IAP meetings[6] are technical meetings among physicians, LPNs, physiotherapists, animators and the representative of the SAOs, in which interventions and goals to be achieved in every assistance domain are discussed. The result of these meetings is written in the IAP file-card, which is then hung to the guest's bed. These meetings are not held on a regular basis, their frequency depends on the guest's conditions, but they have to be scheduled at least once every six months.
- LPNs meetings are held once in a month, with the participation of all LPNs and - often - of the Administrative Director; organizational aspects are discussed.
- Meetings of the units are organized once every two months, and specific problems of each particular unit are discussed. The participation to these meetings is obviously restricted to the members of the relative unit.

This is, roughly speaking, the communicative scenario in which Sispes was introduced in November 2004.

After the implementation of Sispes

After the implementation of Sispes in the residence for elderly Giovanelli many changes in communicative processes took place, some at a general and widespread level, others in very detailed procedures. We will start by describing what has been changed as a general attitude, then we will give a pair of illuminating examples of specific practices that have been modified and, finally, we will try to give an interpretation of these changes in the light of the paradigm previously introduced.

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[6] IAP meetings are another meaningful example of the changes introduced with Sispes, as we will see below.

Generally speaking, first of all, for what concerns professional matters, information used to be mainly transmitted during regularly scheduled formal meetings, where the representatives of the different teams normatively gave instructions on what to do. Nowadays, even these formal meetings are based on reports printed out from Sispes. In these reports information coming from all Sispes users is contained; this means that members of teams who didn't have the occasion to share information before the introduction of Sispes are now allowed to communicate in this virtual space. The result of this global process is the writing of an “integrated folder” that enables the collaboration of the different teams for the creation of a “holistic profile of the guest”, taking into account sanitary, physical, social and sometimes even spiritual needs at the same time. Before Sispes, goals to be achieved and rules to be followed in order to reach the guests' well-being were pre-imposed by people occupying the highest positions into the hierarchy of the residence. Now the sharing of data, information, ideas and opinions across different units results in a capitalization of specialized knowledge and capabilities and the profile of guests (with relative problems and needs) emerges from this cooperative exchange.

There are others, maybe less striking effects of Sispes that is anyway worth considering. A first aspect is linked to the initial difficulties connected with its introduction; most workers were not that used with information technologies, some of them were not even familiar with computers at all, indeed.

This novelty encouraged people to talk to each other in order to learn to use Sispes more effectively. As one of the interviewed people put it:

> *“For a certain period some of my colleagues and I couldn’t talk of anything else. Sometimes it happened that we met a bit earlier than the beginning of the turn in order to try to learn together*

> *how to use it. Some colleagues were more "expert" in the daily journal, some others on the guest's diary, so we tried to unify our strengths.*[7]*"*

A second aspect is the rigor that the use of Sispes and computers in general brought to work practices. This manifests itself in many respects: the creation of a new, more organized archive (that adds to the paper archive), the use of e-mail for communications, which has the double advantage of being immediate but written (so permanent, in a sense), the execution of the various activities following specific workflows and practices, thus gaining in accuracy and precision.

Finally, a tool that enables workers to at least have an idea of what is going on in the whole organization makes them more aware of the role they play, of the usefulness of their work, of their contribution to the global results of the enterprise. This can give motivations to the workers by providing a sense of belonging and participation in the organization. This was also observed in a modification in the behavior of some workers of the residence Giovanelli.

How these changes were instantiated is maybe better explainable by giving a couple of examples.

The first example is the guest's diary; as already explained, this is a sort of repository of records of the events occurred during a turn and it is read at the consignation meeting. Before Sispes a lot of initiative was left to the person filling a diary, who could more or less decide, based on her/his judgment what and how to write. Sispes, instead, presents the users with forms containing predefined fields and menus; this on the one hand contributes to structure

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[7] All the interviews are translated from Italian.

information, to make it more precise and more easily readable and accessible, even though, on the other hand, it introduces some rigidity that sometimes annoys the user.

The second example is given by the IAP meetings; they used to be started by a general update where everyone communicated with the others about all the information she/he could gather under her/his domain of competence and only after that people could begin discussing about the future plans. Nowadays this phase has become nearly useless, as people already come to the meeting with reports printed from Sispes where information from all available sources (even cross-units) is contained. Given this, much more time is left to brainstorming about the planning of the activities related to the guest's stay. Coming to the meeting already with an idea of the overall situation allows people to be more concrete and more focused on what has to be changed and what has to be improved and, instead of providing many scattered services to the guests, it is easier to perform a joint action targeted to the general well-being of the guests.

To sum up, it is certainly possible to argue that the everyday use of Sispes has improved both the communication and the management of data and information but, more importantly, the common interface has given the opportunity to people coming from different units and teams to have an easy access to information produced by varied and heterogeneous sources. This interface supports a many-to-many communication channel, which makes visible and available different viewpoints on the same subject matter. It is from these varied viewpoints that new knowledge can emerge, as it is well shown by this testimony:

> *"One of the functionalities that I really appreciate in Sispes is that it gives me the opportunity to see the guest under different points of view. For instance, once it happened that I noticed a*

guest who looked depressed and with Sispes I could see whether the animators got the same impression."

The visibility and availability of information encourages the discussion and thus the same information can be elaborated many times with the final result of socially constructing new knowledge. Furthermore, with Sispes it is now possible for members of different teams to jointly draw a global profile of the guests.

Finally, and more importantly, it could said that the creation of a new holistic view of guests due to the introduction of Sispes contributes to elicit synergies among different teams whose effects are more valuable than those obtained by the sum of the activities conducted separately by the very same teams.

What happened in the residence Giovanelli is a typical example of transition of an organization from mainly descriptive and normative communication processes to more constructive communication practices. This transition has especially been made possible thanks to the introduction of a new technology, i.e. of the Sispes system. In order to validate this opinion, the following relevant remarks have been collected during the second phase of analysis:

"The holistic vision of guest's information is very important. Consider when a physiotherapist changes the wheelchair of a guest, or when a physician modifies the medical treatment. I can access all this information just by reading the daily diary of the elder. This allows us to discuss on the reasons of these choices (often during the consignation meeting), thus increasing workers' consciousness and responsibility and improving the quality of our service."

While before the implementation of Sispes communication was mainly aimed at informing, with the purpose of performing a decisional process on the interventions to execute on guests, and the information "traveled" within the boarders of each working area, with Sispes cross-unit communication is no more limited to the formal meetings imposed by the top management, but becomes an everyday practice, linked to the use of Sispes. This practice contributes to the creation of a new global perspective on the treatment of guests, which can be renegotiated every time that new information is added to Sispes. . As a confirmation of this statement, let's consider the testimony of a physician:

> *"Before the adoption of Sispes, social assistants didn't share all their information with us, they were afraid of discussing this with us. Now they are aware that their knowledge is very important to us and we discuss daily the consequences of our decisions. Consider that they are the only ones who see the body of a guest naked, therefore only they can see pressure sores, or test the reactions to a particular therapy."*

As we hope to have demonstrated, the constructivistic approach enhances, at least in a setting with these features (namely composed by heterogeneous units) the unpredictable creation of knowledge from social exchanges. It is exactly this unpredictability that prevents the acquisition of this knowledge through traditional normatively or descriptively oriented procedures. There is a part of knowledge, which is so intrinsic in work practices that it cannot be imposed or transmitted by the top management, it can only emerge from "experience on the field"; it is this kind of knowledge which is the special target of constructivistic approaches.

FUTURE TRENDS AND CONCLUSION

In this work a new approach for the classification of communication processes has been proposed. The approach provides a line of interpretation that allows the joint analysis of communication processes and of the organizational reality in which they take place.

While the chapter is mainly focused on the relations between communication processes and IS and ICT applications, the satisfying results encourage the application of this theoretical apparatus also to the study of the relations between communication practices and production technologies.

Once the results of this analysis will be available, it should be possible to associate to each type of production technology the communication approach that suits it better.

With respect to the case study, an interesting observation could be made: surprisingly, the very methodology that was used, namely ethnography, enhanced a particular kind of communication, which was probably already there even if latent: the constructivistic attitude. In other terms, the presence of the investigator during the phase of implementation of the technology encouraged people to cooperate and contribute to the understanding and the effective use of the application by the whole organization. What emerged in the process of interviewing people was that the lack in communication among members of different units was strongly perceived. They didn't actually work together, but their work was strongly interconnected and they shared the target - the guest - a sensible one indeed. The experience of the interviews unveiled a hidden and implicit need: that of having a consolidated practice for sharing and communicating information at all levels of the organization.

In the setting just described, the most important effect of the transition from normative and descriptive communication practices to constructive ones has been the building of a global perspective on guests, which strongly ameliorated the services offered to them and, consequently, their overall condition.

In this sense it can be said that a change in the communicational attitudes led to a change in the firm's worldview, which in turn led to a change in the work practices. The way in which services are delivered to guests has changed as a consequence of a new " internal" communicational attitude.

At a more abstract level, the analysis of this case study has taught that technology is in fact a major social actor, as it modifies pre-existing practices, like in the case of meetings (where the reports of Sispes often give the directions of the discussion) and gives new possibilities, like that of inferring new information from statistical results extracted from the data stored in Sispes.

A final remark on the future directions that the project can take is in order. So far, the main focus has been on the influence of information technology on communicative practices and social issues, but the opposite is also very interesting and under the scope of the project. This case study has already shown that people often use the very same tools for very different and sometimes unforeseen tasks and this can suggest to software designers new applications of these tools. Furthermore, it is especially when these tools are already in use, that users find bugs and weaknesses. For instance, some users found Sispes too rigid when they had to insert data whose category they could not find in the proposed menus; in these cases they were forced to use one of the predefined choices, but this made it more difficult to retrieve these data afterwards. All the criticisms emerged from the interviews should definitely be used as guidelines to improve the software and eventually to personalize it in accordance with specific needs. From a theoretical

standpoint, this could result in the study of the influence of the underlying social and communicational setting on the reshaping of the ICT tools.

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KEY TERMS AND THEIR DEFINITIONS

Normativistic communication: communication conducted with a normative style, i.e. with the purpose of communicating how things ought to be and what is right or wrong. The adjective "normative" can also be applied to theories, statements, beliefs, etc.

Descriptivistic communication: communication conducted with a descriptive style, i.e. with the purpose of describing reality as it is and how things actually are. Also "descriptive" can be applied to theories, statements, beliefs, etc.

Constructivistic communication: communication that, even if often not purportedly, constructs new knowledge, which is internalized by the participants to the communication. Not only the information that the participants posses is transmitted, but new knowledge can also emerge.

Ethnography derives from Greek (ethnos = people and graphein = writing) is a genre of writing that uses fieldwork to provide a descriptive study of human societies. Ethnography presents the results of a holistic research method founded on the idea that a system's properties cannot necessarily be accurately understood independently of each other.

Structuration theories firstly proposed by Anthony Giddens (1984), they are an attempt to reconcile theoretical dichotomies of social systems such as agency/structure, subjective/objective, and micro/macro perspectives. Agency refers to the capacity of individual

humans to act independently and to make their own free choices. Structure refers to those factors such as social class, religion, gender, ethnicity, customs etc. which seem to limit or influence the opportunities that individuals have. The approach does not focus on the individual actor or societal totality “but social practices ordered across space and time”.

Knowledge management comprises a set of theories and practices used by both researchers in business and computer science studies and practitioners to identify, unveil, create, organize, represent, and distribute knowledge within and across companies.

The enterprise knowledge portal is the evolution of an information system which has a knowledge management goal. It combines the enterprise information portal functionalities with knowledge management features, capturing explicit and tacit knowledge, integrating access to expertise, supporting reasoning functionalities, serving as a centre of experiential learning, and optimizing decisions.