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Video-Mediated Communicative Interaction: An Analysis

Introduction

The telegraph, followed by the telephone, allowed a remarkable breakthrough in the field of communication. The possibility of hearing a familiar voice in real time at a distance of tens, hundreds or thousands of kilometres is perhaps the most important achievement of nineteenth-century communications technology. The invention of the telephone immediately engendered the fantasy of an apparatus which would not only transmit sound (the voice), but also images, allowing visual contact with the person to whom one was talking.

In 1878 the British humorous magazine *Punch* published a cartoon with the caption 'Edison's telephonoscope'. It shows an elderly couple using a video-telephone to converse with their young daughter, who is playing badminton with her friends in a park. We are presented with a domestic interior, a drawing room in which is installed a wide screen on which the parents can see not only their daughter at full length, but also a considerable space round about the court, the park and several of the daughter's friends [Relieu 2007: 187]. This illustration is an eloquent witness to the expectation of an imminent technological breakthrough, which would finally allow mankind to conquer distance.

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The rapid evolution of telephone technology in the 1960s to 1980s further stimulated the fantasy of remote audiovisual contact. This form of communication attracted a particular practical interest on the part of the developing international companies, which hoped that new forms of communication could serve to reduce expenditure on business travel.¹ Certain large firms have budgeted considerable sums for the research and development of video technology and subsequently for the installation of new and costly equipment. But, alas, despite the wide range of available options, from desktop video to specially equipped media spaces, the most recent technologies have not produced the expected results. For one reason or another, users have given negative assessments of their experience of communication during tele- and/or videosections, and have described communication via the screen as more formal, colder, and less capable of conveying emotions, and, whenever given the choice, have preferred personal contact.

In 1990 Carmen Egado [Egado 1990] analysed the reasons for the 'failure' of televisual technologies in business and came to the conclusion that the chief methodological error had been a *misinterpretation* of the new means of communication as an adequate alternative to direct personal contact in the professional sphere, or even a replacement for it. The responsibility for this error was fully shared by the originators (who sold the technology), the engineers (who made it), and the users, all of whom wanted it to replace situations of personal communication. This error, or rather the *false expectations* which it raised among all parties, led in the end to user dissatisfaction and a collapse in sales.²

At the same time Egido noted [Egado 1990] that the misinterpretation of mediated visual contact as a substitute for personal meetings was a hindrance to the development of the true potential of televisual technologies, which remains undiscovered. She also had the foresight to predict that with time teleconferencing would become more and more accessible, which in turn would allow it to be used more and more frequently, in particular for informal and spontaneous forms of communication in the professional sphere.

Although Egido's article represents not so much a period as an apologetics in the discussion of the use of video for business, it is

¹ It should be noted that in business circles (i.e. among potential investors) the greatest interest was in those forms of video technology which support various types of conferences and meetings, and, to a lesser extent, in specialised installations (contact with the despatch room, video observation of production, mobile video). For this reason authors have mostly concerned themselves with the study of conferencing. At the same time it is clear that the configuration of interaction within the framework of a conference or business meeting is a particular type of remote communication, but by no means the only one.

² According to the study by Lipartito, so-called *failed* inventions in fact often form the rails along which technological progress runs [Lipartito 2003].

almost always quoted as an argument for the *unsuitability* of video technology for professional communication. Since the end of the 1990s investors have been gradually withdrawing from the financing of research into video communications.¹

What is the problem? Why does the screen make it so hard for people to work together? Why is a telephone conversation so much less problematic than a discussion over a video channel? Specialists from various disciplines — managers, engineers, sociologists, historians, linguists and anthropologists — have been trying to find an answer to these questions.

1. Videotechnology in social interactions

Approaches to research in video communication

The great diversity of specialists who have been involved in professional communication has from the first indicated that the problem is an interdisciplinary one. It is obvious that the methods, scholarly interests and practical objectives of the various authors are on totally different planes. The managers are concerned with the successful sale of new technologies and/or assuring the efficient working of remote offices, the engineers and designers with the possibilities for further development of the equipment, and the psychologists and ergonomists with optimising work activity, taking into account the psychological and anthropological characteristics of the workers. Finally, the sociologists and anthropologists are concerned with elucidating specific features of mediated interaction connected with the cultural and social differences of the users.

It is worth noting that for economic reasons there was communication between the managers and engineers from the very beginning, whereas the need to invite psychologists and anthropologists to join in the work was only felt much later on. Widespread notions among the first two groups in the spirit of technological determinism and their real financial superiority meant that from the 1960s to the 1990s the ‘struggle’ to improve the quality of distance communications was confined to a race for technical quality. It was only the practical failures in this direction, measured in the losses to investors (i.e. the collapse in the sales of the technology) that made them turn to qualitative research.

It is significant that this shift of attention was marked by the managers themselves, after they had been faced with the fact that, in practice, despite the availability of ever newer and technically more complex

¹ In the 1990s research into video technology with the participation of anthropologists continued only in large, financially independent laboratories such as FranceTelecom and Xerox. For the most complete bibliography of works on distance collaboration published before 2001 see [Navarro 2001].

technologies, employees stubbornly persisted in choosing traditional means of communication. This sort of observation gave rise to a series of studies devoted to media choice, privacy, the analysis of systems design,¹ various means of learning to use the systems, and the problems of the practical introduction, accompaniment and acceptance of technology in the workplace.² These works on management, while they often suffer from methodological eclecticism, are rich in interesting examples and subtle observations of the everyday routine of businesses.³

In the latter part of the first decade of the twenty-first century, as a result of the swift development of digital technology, video technologies intended both for personal and business use finally reappeared on the commercial agenda.⁴ This marked the final shift towards qualitative research into end-user practice. The new tendency was indicated by a sharp increase in research publications. In 2007 and 2009, the French journal *Réseaux*, which specialises in research into communicative interaction, published two special issues devoted to communication mediated respectively by video and mobile (audio and video) technology. Regardless of their basic discipline, researchers unanimously acknowledge the primacy of fieldwork based on observation of communications in their natural context. This methodological solidarity in respect of primary fieldwork gives grounds for calling this approach to the study of interaction *the anthropological paradigm*.

The fundamental aim of this article will be to demonstrate by means of a concrete example, namely the example of research into video communications, the methodology of modern applied research. Methodology in this case is to be understood as widely as possible and includes the set of problems to be researched, the variants of fieldwork, the theoretical approaches used in analysing the data, and the conclusions and practical recommendations made on the basis of the fieldwork.

I also consider it important to acknowledge the importance of the French school of applied sociology and anthropology, which has come into being at the point of contact between social psychology,

¹ For the bibliography in these subjects see [Webster 1998; Feldman, Pentland 2003; Mark, Poltrock 2004].

² Cf. the works of Orlikowski and her colleagues: [Orlikowski 1992; 2000; Orlikowski, Barley 2001; Orlikowski, Debra 1994].

³ A serious failing of these studies was that they were "closed". Even in those instances where the study really was of good quality, the complete "recipe", i.e. the methodology properly speaking, remained as a rule unpublished in internal company reports. At best brief summaries of the results were published, giving no clue as to the actual process of the gathering and interpretation of data.

⁴ It is interesting that aviation companies began once more to look apprehensively in the direction of the new generation of media, foreseeing real competition to their services; see, for example, [Lu, Peeta 2009].

ergonomics, anthropology and microlinguistics, and also to supply the relevant bibliography.

Imagined technology, or technology as a social product

Let us return to the illustration in *Punch* and to Egado's conclusions about a false interpretation of video as a substitute for real interaction. As soon as such equipment is conceived by the designer and/or engineer or fantasist, it is imagined as an object constructed within a particular social context and intended for particular social purposes. Thus the illustrator in the British magazine imagined 'Edison's telephonoscope' as an asymmetrical device, whereby the users at one end (the parents) would have access to both image (their daughter at full length, and the situation around her) and sound, while those at the other (the daughter) would remain as users of an ordinary telephone (she can only hear her parents). Thus from the start both the designers and the users and managers who order technology for optimising production or offer it for sale, are oriented towards previously adopted standards of interaction. Moreover, even though the configuration of the technology is known in advance and chosen (or even specially developed) to respond to specific needs, the innovation will inevitably alter the organisational process.

A technology may be designed by one organization, built by a second, and then transferred into a third for use. In these cases, the institutional conditions and human agents involved in technology development are different from those involved in technology use. That is, external entities — the developing organizations — play an influential role in shaping the social practices of the organizations using the technology [Orlikowski 1992: 422].

It is also known that despite the significant variety and complexity of forms of behaviour, people most often follow a wide but nevertheless finite selection of communicative models. Following Wittgenstein's terminology [Wittgenstein 1998], one can say that each individual plays a limited number of linguistic games: café conversation, telephone negotiations, conference paper, job interview, greetings etc. The acquisition of the habit of 'correct behaviour' within these standard situations is accompanied by the development of the relevant fundamental expectations and the formation of certain models of behaviour.

The habits of learning to interact with technology are subject to the same principles. Just as recognition of the situational context suggests the appropriate form of behaviour to the individual, so recognition of familiar elements in equipment prompts the user to habitual methods of use.

When a new element is introduced into a standard scheme of interaction, for example video as a medium of communication, the whole communicative situation is reconstructed. However, this change is not as a rule recognised by the users and cannot be immediately accepted and adopted by them, because people always try to behave as usual and use their habitual cognitive and behavioural models. Thus, starting with expectations which are more appropriate for interaction with the prototype equipment, and bringing the corresponding habits into play, users frequently fail to obtain the desired effect and feel disappointed.

From this short introduction it is already apparent that the complexity of communicative interaction mediated by video technology is of two kinds. On the one hand there are complexities of a sociological nature, that is to say, the integration of the technology into a given previously existing social context and its inclusion in the structure of the action, the hierarchy of relationships, the corresponding social roles, etc. On the other hand there are complexities of an anthropological or cognitive nature: a particular group's traditional attitude to technology, and the cognitive and behavioural patterns that have, accordingly, come into being. This duality is indeed reflected in the research, and I shall consider both tendencies in what follows.

Designer versus user

From the very beginning both designer and user have some sort of idea of how the equipment is to be used. At the same time, there may be a total or partial mismatch between their ideas. If this mismatch is extensive, the user will experience great difficulty in mastering the technology. Elaborating a discussion offered by Lave [Lave 1988: 150–151], Orlikowski has proposed an opposition between the *technological artefact*, which embodies material and cultural characteristics conveying the experience of individuals and social milieux, and *technology-in-practice*, that is, personally and routinely oriented versions of use of the technological object, different versions of which are applied by the users¹ [Orlikowski 2000: 408].

Flichy [Flichy 2008] borrows the concept of the *frame* from Goffman [Goffman 1974] and proposes separating within the sociotechnical frame two different aspects: the frame of function and the frame of usage (*cadre de fonctionnement et cadre d'usage*). The frame of function corresponds to the technology as it is presented and includes the set of possible options, the means of use formulated in the

¹ 'Material and cultural properties that transcend the experience of individuals and particular settings vs repeatedly experienced, personally ordered and edited version of the technological artefact, being experienced differently by different individuals and differently by the same individuals depending on the time or circumstance.'

instructions, the types of activity for which the machine was invented, the social profiles of the users as envisaged by the developers, etc. The frame of usage includes the set of knowledge and techniques that may be brought into play during use. This means that a single frame of function may correspond to several frames of use [Flichy 2008: 164–166].

To ensure relatively problem-free use of the equipment, both frames, that of usage and that of function, must coincide at least partially, and preferably to the greater extent. Following this logic, the greater the extent to which the frames coincide, the more fully the potential of the technology is realised. It may be supposed that there are instances where the frame of usage extends over the entire area of the frame of function and even exceeds it. Such a profile corresponds to an extremely advanced and/or inventive user, who can discover potential in the machine that was not apparent even to its developers.

A confrontation of the developers' and users' perspectives would seem to be an extremely interesting and productive direction of collaboration, allowing the limits of both technological and social determinism to be overcome. Some companies' managers are attempting to introduce the use of technology in their establishments taking into account the needs and peculiarities of concrete organisations and their corresponding forms of activity. This practical managerial approach is to be found, for example, in the works of [Egido 1990; Feldman, Pentland 2003; Mark, Poltrock 2004; Orlikowski 1992; 2000; Orlikowski, Barley 2001; Orlikowski, Debra 1994; Webster 1998]. In the scholarly world, Computer-Supported Co-operative Work (CSCW) is particularly noted for paying attention to the perspective and practice of the user.¹

User versus technology

Poitou interprets technology as a materialised form of knowledge, which is 'encoded' in an abridged form in the equipment [Poitou 2007]. In his article he stresses the significance of the history of technological prototypes and the practice of their use for the successful management of knowledge within the framework of an enterprise.

When new technology is being created, data about the prototype may supply the designers with invaluable information about the probably intuitive mode of use of the future equipment.

¹ On the other hand, CSCW research has been criticised for being shut up in the laboratory: a hypothetical user tests various technological operations without any context of a particular activity, so that it is impossible to verify the compatibility of CSCW machines with real working processes.

Nevertheless, when considering its prior history (i.e. the characteristics of its prototype), it would be a mistake to regard the new equipment as a more finished version or improvement of the prototype, since the configuration of innovation always contains qualitatively different potential, which is by no means always evident or even imagined by its creators. For this reason comparison of new technology with its prototype is methodologically justified only when it is done for the purpose of elucidating specific characteristics of the new equipment. [De Fornel 1992].

Following Poitou's interpretation, technology as encoded knowledge may be 'read' in various ways. This multivalence and multidirectionality of technology is confirmed by many examples of how differently the same machines may be adopted and incorporated into the processes of activity in two separate social contexts [Gupta et al 2009; Hollan et al. 2000: 183; Mark, Poltrock 2004]. In the same way the methods employed by the users may be significantly different from those envisaged by the inventors and designers (see, for example, [Orlikowski 1992; 2000; Orlikowski et al. 1995]).

The process whereby technology is adopted and 'received' consists of several stages. At first the user involuntarily compares the innovation with technical equipment with which he is familiar (and which he has already mastered), and tries to use the new equipment analogically. Then begins the gradual discovery of the innovation, usually accompanied by experience of unsuccessful use: problems arising and attempts to overcome them. Finally either the new equipment is mastered and a new cognitive and behavioural pattern worked out to match, or else the innovation is rejected.

Given that the adoption of new technology takes place as a three-stage process, it is not surprising that both designers and users of video technology take conversation, either face to face or on the telephone, as their basic prototype. The similarity in the first case consists in the visual contact, and in the second, in the fact that the interaction is mediated and takes place at a distance.

As researchers have observed, beginners in the use of video technology constantly switch from one model of interaction to the other. However, they are likely to come unstuck in either case, since the visual contact is organised otherwise than during a face-to-face conversation, and does not offer the same field of interaction.

Insofar as participants in video communication can see each other, they are inclined to use their repertoire of gestures in the same way as they would when talking face to face, but when they do so the position of the screens, the limited field of vision and the single axis of orientation between them prevent either gestures or speech from being adequately conveyed. The difficulty in co-ordinating speech

and gesture makes the subjects feel uncomfortable, and may even prevent them from understanding each other [Heath, Luff 1992, cited in Licoppe, Relieu 2007: 14].

At the same time, the orientation towards the model of the telephone conversation also turns out to be unsatisfactory: the habit of doing other things while talking on the telephone is hardly acceptable when a visual channel is added (not to mention the difference in what is required of the speaker's appearance, facial expression, posture etc.).

The status of technology and the perception of media effects changes over time. As long as technology is 'weird' (exotic, unusual, expensive), the user's main attention is displaced and focussed on the technical equipment to the detriment of what he is supposed to be doing. At this stage users are observing the innovation and learning to work with it. This displacement of attention may be perceived as a hindrance rather than a help in doing their basic work. For this reason when new technology is introduced into the workplace, its social and psychological environment is as important as its technical one. It turns out that it is most important to establish a logical connexion between everyday practice and the innovation. It is no accident that the introduction of technology into routine forms of interaction is the most effective [Egido 1990: 361].

Various means are used to create and justify such a connexion, such as information sheets, instructions, and training. As Wanda Orlikowski has observed, the most effective method is the so-called 'process support technology-in-practice', i.e. ongoing training incorporated into routine organisational practices with the participation of experienced users [Orlikowski 2000: 418–420].

2. 'User versus user' interactions

The basic corpus for this section consists of the works published in 2007 and 2009 in *Réseaux*. These two issues are distinctive by virtue of their interdisciplinarity. Articles by linguists, sociologists, social psychologists and ergonomists were published between the same covers. While each author remains more or less within the limits of his own discipline, the combination gives a multi-faceted view of the approaches and research methods used in studying mediated communication.

The most recent research on mediated communication is very diverse and therefore hard to compare. On the one hand, the diversity of modern technology used for video communications is very great: large- and small-scale videoconferencing, desktop video, media spaces, mobile video, telepresence systems and other means of video communication, every one of which has its own set of technical features. On the other hand, the social milieux in which video is

applied are highly heterogeneous. To give a very general impression of the variety of social contexts which form the anthropologist's 'field', I shall list but a few of them: court sittings, job centres, specialised medical videoconferences involving many cities, business meetings, public municipal and official environments and many others. In this article I shall make use predominantly of material from research on professional communications.

The theoretical basis of recent research

Simplifying matters somewhat, it may be said that contemporary applied research is founded on three basic methodologies: the conversational analysis of Sacks, Schegloff and Jefferson, the ethno-methodology of Garfinkel and the distributed cognition theory of Hutchins.

I shall briefly discuss the contribution of each of these theories to the study of video technology. Within the framework of the theory of distributed cognition, Lucy Suchman has proposed the term of 'situated activity' [Suchman 1987], which is widely used in the description and interpretation of semi-professional and professional milieux. According to the theory of distributed cognition, any workspace is understood as a sociotechnical system, including subjects (the employees), objects (documents, technical equipment) and the activity itself, which takes place (in both time and space) within the given professional environment [Hollan et al. 2000].¹

Another important conclusion stemming from Hutchins' work is that *collaboration* and support from external facts (devices, negotiations) are key conditions for activity within sociotechnical systems. Such is their significance that it is impossible to determine, for example, who controls a marine vessel once it has entered port, or who regulates the speed in an aircraft cabin [Hutchins 1994; 1995]. In this way it is asserted that in professional contexts the process of thought should be interpreted as *distributed* between the persons and objects involved in any given activity [Hollan et al. 2000].

Situated activity is a routine process, i.e. a series of more or less typical actions carried out in order to complete a specific task (or more than one task) by one or more employees involved in the activity. I must stress that each technology is only an element in the context of the interaction, and not the central fact around which the activity revolves. An understanding of the meaning of the distribution of activity in time and space within the context of the workspace can give an adequate interpretation of the role and degree of relevance of this particular technology in the whole activity.

¹ Activity in this case is contrasted with any individual operation carried out within that activity.

From this ergonomic-anthropological perspective, the technical characteristics of the equipment are secondary in comparison with the structure and order of the situated activity into which the technology is to be integrated. A detailed study of the working process may provide information on how, where, and in what manner the innovation may be most efficiently incorporated into a given organisational context.

While the significance of the theory of distributed cognition consists in its determination of a fundamental framework for the understanding of the whole context of the activity, ethnomethodology and conversational analysis provide mechanisms for the analysis of intelligibility (i.e. the processes of the genesis and recognition of meaning) within the process of that activity.¹

One of the weightiest propositions put forward by the anthropologists who have studied professional communication in the office is that the observed physical actions (note-taking by hand, writing, reading and printing documents, movement from office to office, using the telephone, etc.) of employees doing work which requires the engagement of intellectual and communicative resources are inseparable from the mental labour. In other words, the very *practices of collaboration* form the structure of every individual professional activity, within which those practices have their *raison d'être* [Cardon, Licoppe 2000]. It follows that one must not separate and write an algorithm for the intellectual work on the one hand and a scheme of movement and/or manipulation of documents and equipment on the other. The impossibility of constructing an abstract model of such activity means that the methods of traditional ergonomics and management sociology — which propose, on the basis of so-called organograms, an optimisation of the production process — are powerless.

On the basis of the study of the use of an intranet (which may be regarded as a hypertrophied model of office work) Cardon asserts that no employee can recall when, how or why he decided to look for any particular document, read it, print it or save it [Cardon, Licoppe 2000: 22]. In the same way, office workers are hardly aware of the particular means by which they receive information (in a document or orally) or take a decision, since the very process of finding and processing information is embedded within their multifarious background activities (telephone conversations, emails, chatting in the corridor, looking up archived data or working documents, etc.). Thus all the intellectual work that precedes the final result remains as largely unexamined *ancillary* activity.

¹ For a survey of the approaches developed on the basis of ethnomethodology and conversational analysis used in applied research, see [Mondada 2006; Relieu 2006].

In this case the strong point of anthropological research is the study of professional activity in its natural context (rather than experimentally or in the laboratory).

User versus user: on the way to co-operation

Communication by video should thus be understood as a specific kind of interaction. In Irving Goffman's terms [Goffman 1974] this new means of *interaction mediated by video technology* is a new frame, which presumes a specific mode of thought and behaviour, and evokes in the participants a system of specific expectations which fit only this frame.

For the communication to remain intelligible to both participants, the speakers must take into account the technical peculiarities of the mediating equipment and make constant adjustments to their actions accordingly. Meta-commentaries (utterances serving to verify the line of communication or confirm the visibility of the other person, explanations and instructions for the use of the equipment, discussion of technical hitches) provide data on the users' perception, interpretation and 'mastery' of the technology (how they 'cope' with it). For this reason the attention of many researchers (linguists and anthropologists) has been focussed on analysing utterances at the beginning or end of the conversation, where meta-commentaries are most frequently encountered [Bonu 2007; Luff et al. 2003; Licoppe, Dumoulin 2007; Mondada 2007; Velkovska, Zouinar 2007 etc.].

Lorenza Mondada interprets mediation as a specific element in the communicative situation, the recognition of which by the participants is expressed in their mutual readiness to overcome the technical problems arising from a new form of interaction:

Les procédés de vérification de la connexion et le traitement des problèmes techniques par les participants montrent ainsi que l'accomplissement de l'interaction, la poursuite de l'échange médiatisé et plus précisément le maintien de l'alignement entre les participants demandent un travail interactionnel constant et continu. [The procedures for verifying connection and the ways in which technical problems are addressed by participants are evidence that the achievement of interaction, the continuation of mediated exchanges, and, specifically, the maintenance of alignment require constant and uninterrupted co-operation between participants]. [Mondada 2007: 144].

Nevertheless, the process of learning to use new equipment is not particularly rapid. Even when the participants are at the point where they are able to resolve technical difficulties as they arise, distance communication by video often remains a painful process.

In order to collaborate successfully, the participants in video communication must be trained in this type of mediated collaboration. In other words, they need to develop a new model of behaviour, different from that used in face-to-face collaboration. Using Harold Garfinkel's concept [Garfinkel 1967], one could say that employees working at a distance require a sufficient level of *accountability* both with regard to their co-operative actions and with regard to their understanding of the differences between mediated collaboration and direct collaboration (i.e. in each other's physical presence).

Researchers have noticed that regular users are able to develop a mutually satisfactory model of communication which allows them to resolve technical problems as they arise and at the same time get on with their work efficiently. Nevertheless, 'tuning' a mediated working routine can introduce significant changes into their usual form of co-operation. A striking example of such a change is the introduction of videoconferencing into court hearings, that is, into a heavily ritualised social space. In spite of the conservatism of the institution, the real need for a court on a distant island to be linked to Paris caused the ritual of the opening of the session to be adapted to the conditions of the video conference. For example, the formal and ritual necessity of standing up and sitting down created evident problems of framing. As a result regular participants gradually adopted a convention of not standing up at the appropriate moments, which was always a matter of surprise to newly-arrived magistrates [Licoppe, Dumoulin 2007: 114–5].

The need for training in a new kind of collaboration mediated by video technology, which is not at first entirely evident to the user, has led researchers to conclude that it is more productive and sensible to introduce the innovation into routine professional procedures than occasional irregular sessions. Infrequent and sporadic users are inclined to have excessive expectations of the new technology but are not yet capable of resolving problems as they arise; consequently such irregular users are more frequently disappointed. Mediated collaboration remains problematic until all the distance participants have recognised the new form of interaction as convenient and effective, and until they have all developed a new model of communicative behaviour.

User versus user: speaking comprehensibly through the screen

If we accept the conclusions of the classic works of the communicative interaction analysis school [Schegloff 1968; Schegloff, Sack 1973; Sacks, Schegloff, Jefferson 1974], the mutual intelligibility of a conversation is largely dependent on its structure. Thus the opening and closing utterances have a particular function. Researchers today

are analysing communication mediated by video following the methodology of conversational analysis.

Bonu's article analyses several videoconferencing sessions using the Realmeet system, which provides an uninterrupted audio and video connexion of high quality between two separate media spaces. One of his conclusions is that the lack of any conventional closing procedure in the video session (comparable, for example, to the closing utterances on the telephone) makes it hard for the participants to recognise the point where their business negotiations may be regarded as finished [Bonu 2007: 40].

Using data from weekly videoconferences amongst a number of remote participants, Lorenza Mondada has shown that the conventional practice of greeting has come to serve equally to check the connexion. The lack of any response to a greeting came to be recognised by the participants as a broken connexion and a signal for further technical work with the 'silent' remote partner. The same practice of greeting was spontaneously modified when new remote partners were about to join in the conference. In this case the exchange of greetings was spontaneously extended and served as a useful opportunity to repeat and enunciate the previously established rules for remote collaboration [Mondada 2007: 155–8].

It may be assumed that the evolution of conventional standards for indicating the beginning and end of the conversation within the framework of mediated communication will improve the usability of the equipment and help the users to develop new models of collaboration.

The work of [Bonu 1007; Licoppe, Dumoulin 2007; Mondada 2007] touches on the specific features of turn-taking during videoconferencing.

At present it is the British who are most critical of mediated video-communication in the professional setting [Heath 1997; Heath, Luff 1992; Hindmarsh, Heath 2000; Luff et al. 2003]. On the basis in particular of fieldwork in media spaces, the authors have shown that specific aspects of the medium (video) destroy the integrity of the workspace and prevent the transmission of basic deictic gestures. According to them, even the most sophisticated media space inadvertently fractures the integrity of the action and/or gesture at the moment of transmission.

I shall give a simple example of this scission of space: speaker A points to an object visible on his screen, which physically exists in the zone of speaker B. At the same time speaker B is unable to relate A's gesture, which he can see on his screen, to the object beside him [Licoppe, Relieu 2007: 15].

According to these works, video communication is trapped in a paradox: visual contact gives the illusion of a common environment, accessible to all participants, whereas in reality the participants are in separate rooms remote from one another and have no real access to their colleagues' space. The persons engaged in communication think that they understand what is happening in each other's field of vision, but what they think often does not correspond to reality. Video mediation provides a specific type of co-presence which, in fact, fractures the link between the action and environment, and makes the realisation of the most elementary actions problematic (pointing, referencing to an object or to a present person) and results in dissatisfaction with the quality of remote collaboration.

This means that video telephony creates a separation between (1) individual A's real space; (2) the image of that space on B's screen; (3) B's real space; and (4) the reproduction of that space on A's screen. This fragmentation of workspaces results in a series of failures of communication, since both partners think that they are seeing the same thing [Luff et al. 2003]. The authors' verdict was that video was a harsh and uncongenial channel for distant collaboration [Heath 1997; Heath, Luff 1992; Luff et al. 2003].

From this we must conclude that the deictic gestures extensively used in real face-to-face communication cannot be directly transferred into situations of interaction mediated by video technology [Licoppe, Relieu 2007: 15].

Velkovska and Zouinar's article [Velkovska, Zouinar 2007], based on material of mediated video communication at an employment agency provides a detailed analysis of failure of communication between a client and a consultant resulting from their misinterpretation of each other's deictic gestures, compounded by the impossibility of keeping track of each other's actions visually. The situation is a very simple one: in front of the client is an apparatus which serves as both screen and scanner and which by default functions as a video touch screen. In order to start the numerisation process of a CV, a person has to identify 'the tool bar element' which allows him or her to proceed to the numerisation. This element is situated on the bottom of the touch screen. In the situation described the client cannot identify the 'tool bar element', and the remote consultant is trying to explain to her where it is, saying 'It is in front of you at the bottom'. The client looks down, but sees, instead of the button, a brightly-lit notification, 'Touch Screen'. It appears to the consultant that the client is looking in the right direction, so he confirms in words that she has found the right element and gives further instructions. The client, encouraged by the agent's words, tries to press the notification, which is not in fact a button, and naturally does not produce the required effect. The situation becomes heated...

According to Heath,

The relative weakness of such systems [videoconferencing, media spaces] to support synchronous remote working derives from their inability to assist individuals in working flexibly with documents, models and other workplace artifacts. Many of these troubles can be attributed to a failure to support the resources that people routinely rely on in everyday interaction. [Hindmarsh, Heath 2000: 1876].

Separating the problem of the technical shortcomings of the equipment and the problem of cognitive ability to work with such equipment, it may be concluded that a practical knack of identifying misunderstandings resulting from the media and distinguishing them from misunderstandings of what is said is the key to success in remote collaboration.

Some problems may be partly overcome by further improvements in the technology and design of the equipment. Thus, efficient transmission of deictic actions is connected with improvement in the synchronisation of gesture and speech.

...dans la mesure où les interactants sont engagés non pas seulement dans un exercice d'intercompréhension mutuelle, mais dans une activité pratique, comme par exemple produire une invitation, annoncer une nouvelle, ou raconter une histoire, une mauvaise synchronisation du geste et de la parole menace précisément l'intelligibilité de ce qu'ils sont en train de faire. Dans ces conditions, il est bien évident que la qualité de l'image, mais également la précision de sa synchronisation avec le son, ou bien encore la possibilité de pouvoir entendre les réactions d'un auditeur pendant la production d'un tour de parole constituent des ressources essentielles dans la réalisation d'une communication visiophonique viable [Should the partners be involved not only in a process of mutual inter-comprehension, but also in some practical activity, such as making an invitation, announcing a piece of news, telling a story, poor synchronisation of word and gesture endangers the intelligibility of what they are doing. In these circumstances it is quite clear that the quality of the image, as well as its synchronisation with the sound, or, for example, the possibility of hearing and understanding the reaction of the audience during a speech act, constitute the essential resources for the realisation of viable video communication] [Licoppe, Relieu 2007: 13–14].

Lahlou notes in particular that a widespread inconvenience in interaction in videoconferencing conditions is that it is impossible (or problematic) to show one's interlocutor supplementary visual

materials and documents that are to be found in one of the remote spaces and brought into play in the course of the discussion (media presentations, blackboards, etc.) [Lahlou 2007: 65]. This results from the fact that the majority of the devices currently used for video-conferencing are incapable of simultaneously transmitting two separate images — the conference hall and the graphics. Moreover, the cameras used for the meetings are not as a rule provided with a zoom (or at any rate, one that works adequately).

*User versus user: from passive watching
of the screen to interactivity*

The production and recognition of the image is a separate question, the solution of which is essential to the achievement of mutual intelligibility in video communication. This topic is directly connected with the problem of framing.

In their article based on material from court proceedings, Licoppe and Dumoulin [Licoppe, Dumoulin 2007] have analysed the transformation of the ritual of the opening the session under the influence of the videoconferencing regime. The performative role of the traditional quasi-ritual utterances at the beginning and end of the session is well known [Austin 1962]. However, the practical necessity of establishing a connection with a remote site required a modification of the ritual and the introduction of a special ‘pre-opening’ phase, during which technical matters would be dealt with. As a result the President of the Supreme Court of Appeal [Tribunal Supérieur d’Appel], who was in charge of the session, found himself having to work with the engineer on the technical provision of the connection. This innovation significantly changed the traditional roles and conventional exchanges of words: in the first place, instead of pronouncing the performative utterance marking the opening of the session, the President was verifying the connexion by exchanging personal greetings with his colleagues in the remote town. Furthermore, during these exchanges he addressed his colleagues by name instead of using their official titles. However, as soon as the image was adjusted and the connexion could be considered established, the President switched to a more formal register and finally declared the session open. The authors note that in certain instances the performative utterances were omitted altogether. The transformation of such a conservative milieu as a court is an eloquent example of the restructuring of communicative interaction under the influence of the media.

There is a discussion in the literature as to whether it is more important to show the head and shoulders (the so-called ‘talking heads’ format) or the desk and hands (the ‘video as data’ format). It must be said at the start that this discussion is meaningless outside the

context of a concrete form of action, in which it is proposed to use the equipment. It is quite obvious that in certain cases the collaboration consists more or less exclusively of discursive practices (consultation, public speaking, discussion, briefing), where the ‘talking heads’ format is often satisfactory. In these situations, where the shared action is confined to speech, the video channel (albeit with certain limitations) plays a useful part, supporting some non-verbal communication (mimicry, gestures, body language), and assists in the organisation of the conversation, since it helps in retaining attention, understanding nuances of meaning, and reducing the number of confirmative utterances. Nevertheless in many other cases, when the main content of the work is concerned with the manipulation of data (documents, objects, etc.), the ‘video as data’ standard appears more convincing.

In the overwhelming majority of cases both formats have their uses. It may be affirmed that a single fixed camera is incapable of fully supporting the most kinds of activity. Velkovska and Zouinar [Velkovska, Zouinar 2007] give the example of a device which allows the format to be changed, switching from video to scanning functions. Although the authors are critical of the design of that particular equipment, further improvements allowing the combination of the two formats look very promising for many administrative organisations.

Morel and Licoppe in their article state that when mobile videophones are used, ‘talking heads’ function as the default format:

Les “têtes parlantes” constituent un tel standard culturel, ressource interactionnelle dont l’usage et la pertinence “vont de soi” dans de nombreuses séquences, et par ailleurs format mis en avant dans de nombreuses publicités sur la visiophonie mobile [‘Talking heads’ represent such a cultural standard and interactive resource, the use and appropriateness of which is taken as self-evident in many utterances; they are also, incidentally, the format which is used in many advertisements for videophones] [Morel, Licoppe 2009: 195].

The mobile camera is a special case. It requires the user to work as cameraman and director, so that at every moment the subjects engaged in interaction are involved in an activity directed towards the production and recognition of the meaning of the image being photographed and displayed. Since this kind of visual thinking (a constant awareness of what the viewer is seeing) is on average not particularly highly developed, communication is often difficult for the viewer, who cannot always keep up with the movement of his interlocutor’s camera (that is, his train of thought and vision).

The ‘talking heads’ format frees the participants from the need to consider and discuss the meaning of the picture and how far it

corresponds to the idea, and allows them to continue the conversation more or less symmetrically. The authors conclude that when the participants have no ‘suitable’ frame, by spoken or unspoken agreement they choose the ‘talking heads’ format.

This line of reasoning questions the notion that the mobile camera could be used successfully in distance collaboration. At present it seems that users are not sufficiently visually literate (i.e. they are not trained cameramen) for the mobile camera to be successfully introduced into the stable working process without constant technical assistance.

Leaving aside the discussion of which frame format is more desirable, Morel and Licoppe believe that an important subject for future research will be the study of *what sort of event* prompts the transition from the use of one standard to the other [Morel, Licoppe 2009: 196].

An evident shortcoming of the fixed camera is that it provides only partial access to the partner’s working zone, and does not permit a second participant to observe his colleague’s space [Luff et al. 2003]. At the same time the problems created by the mobile camera are no less: as soon as one of the participants changes the shot, either by deliberately turning the camera or by an inadvertent movement (as, for example, when shifting position), his partner ceases to see a picture that he can understand and completely loses both the sense of what he can see and, consequently, control of the situation. This sort of usurpation of the visual channel by one of the participants and the difficulty in following his unpredictable movements and thoughts leads to a failure of understanding and a negative emotional reaction to the whole situation [Cahour et al. 2007]. It may be said that the use of asymmetrical technologies increases the partners’ dependence on each other:

Le fait de pouvoir se déplacer avec la caméra et de l’orienter aisément, modifie radicalement les droits d’accès visuel et autorise une forme d’expérience négociée des environnements distants, sans pour autant que les interactants partagent la même perception des éléments filmés. [The possibility of moving around with the camera and freely changing its direction radically modifies the principles of visual access and legitimates the emergence of a kind of negotiated experience from remote spaces, without, however, allowing all participants to share the same perception of the objects being filmed] [Morel, Licoppe 2009: 196].

In an article based on material from court videoconferences, the authors also discuss how the framing changed the procedure for opening the court session. It is well known that space within a court

is highly regimented and symbolically loaded, and the places for the participants — the prosecutor, the lawyers, the judges and the rest — are strictly determined. The requirement for certain individuals ‘to appear in person before the court’ (that is to say, to be, at the very least, within the field of vision of the President of the Supreme Appeal Court) forces the judge, the technician, and even other parties concerned to work together for the purpose of creating a suitable frame. Thus, in one case a lawyer was forced to leave his place at the advocates’ bench, i.e. to change his normal position, in order to be visible within the frame, while the technician had to turn the camera in such a way that all the other essential persons should be visible too.

Le recadrage de la scène de manière à ce que l’écran englobe tous les participants ratifiés, orientés et arrangés de telle manière que leurs segments transactionnels se recouvrent et se chevauchent avec ceux des magistrats parisiens, constitue un accomplissement collaboratif. [The reframing of a scene in such a way that the screen embraces all the participants who are entitled to appear, with these latter oriented and arranged such that their transactional contributions overlap and intersect with those of the magistrates in Paris, constitutes a significant collaborative achievement] [Licoppe, Dumoulin 2007: 128].

To sum up, it may be noted that the average user’s visual literacy is limited to the passive reading of images, that is to a more or less conscious recognition of the meaning of the visual transmission. In other words, it may be said that at the present stage the ‘average European’ has overcome his fear of the Lumière brothers’ oncoming train. However, in order actively to generate meaning in the conditions of video collaboration he or she will require further competences, for meaning must be simultaneously generated verbally and visually.

User versus user: asymmetry in mediated communication

It is obvious that all the cognitive complexities described here as connected with the processes of the generation and recognition of the meaning of interaction in conditions of mediated communication are embedded in the social context of the situation. In reality interactions are rarely (if ever) symmetrical: differing social roles, characteristics of gender and age, and relations of authority and subordination make almost any communication (especially in the professional sphere) asymmetrical. The inclusion of a technological medium in the general configuration of the situation may further restructure an already existing asymmetry.

In the conditions of professional communication problems of a cognitive order connected with the generation and recognition of the meaning of actions are intensified by organisational changes

resulting from the introduction of new technology (in the present case, video) into the accustomed professional context.

Every interaction includes the problem of mutual observation. This mutual observation is concerned, firstly, with the process of the generation of meaning: the speakers constantly observe the extent to which the one understands the other's words. Secondly, it is concerned with observing the situation: in the case of personal interaction, both participants observe the space and its visual and auditory limits (who is present, what can be seen and heard), etc. The appearance of a screen between the participants specifically reformulates the problem.

While the process of observation within the framework of communicative interaction is balanced, the partners feel relatively comfortable. By contrast, unequal abilities to observe the situation lead to a feeling of discomfort. In the case of video mediation, the participants are frequently unaware of the limits of their partner's space, and this increases their feeling of mistrust towards the technology.

This contradiction of values — efficiency versus privacy — may be illustrated by the following example. Mutual visibility during the process of carrying out a task helps colleagues to maintain the necessary level of intersubjective understanding:

To develop a shared knowledge structure it is important that collaborators are enabled to monitor their partners' activities and to understand the impact of their partners' progress on their own work [van der Kleij et al. 2009: 376, cited in Kraut et al. 2002].

However, the possibility of visual access to a colleague's space has provoked at discussion about the right to privacy. The quotation continues with the author's practical recommendation:

Monitoring can help people determine when and which collaborative actions are required. In other words, monitoring helps determine whether it is time to harass someone to complete his or her section of the task [Ibid].

It is obvious that the use of video for surveillance of employees' work is liable to have negative consequences and lead to the alienation of users who are sensitive to having their work observed by video. This ambiguous attitude towards video monitoring is clearly expressed in one employee's answer to a questionnaire:

It's good for me to have it [others' snapshots] because then I can check to see if someone's at their desk if they are on another floor, you know, to see if they are there and go catch them, but, by the same token I don't think I really want anyone checking to see if I'm sitting at my desk, you know what I mean [Webster 1998: 273].

According to Webster's data, users would as a rule prefer to use desktop video for short conversations on specific topics, and usually with the camera switched off. She also noticed that workers in closed offices are more mistrustful of video than workers in open offices [Webster 1998: 273].

User sensitivity to the question of privacy is obliquely confirmed by the fact that even when using a personal mobile videophone people prefer to have the video switched off when they are using it from home [Morel, Licoppe 2009: 174]. This is a somewhat paradoxical situation: one might expect that using a personal videophone (and paying a high subscription for it) would be attractive to people who wanted to remain visible to the people they are talking to while on the move. However, the desire to control the situation and one's own image in the frame (position in space) motivates a choice of the traditional format, particularly for long conversations. To be fair, it should be said that this choice is partly to be explained by the poor coverage of this form of communications.

As a positive effect of teleconferencing on organisational structures Egido has noted a relaxing of the management hierarchy, and a devolution of decision making towards junior management. Thus teleconferencing technology, which obviates the need to pay travelling expenses, has allowed lower levels of management (whose travelling expenses would not normally be paid) to be included among the participants in important business meetings, thereby in a manner of speaking democratising large companies [Egido 1990].

As already noted, the transformation of the order of interaction as a result of the introduction of video media may be expressed, in particular, by a change in standard roles. For example, the chairman of a meeting may frequently be called upon to carry out various technical functions: checking the audiovisual connexions, whether wi-fi is working in the room, taking a sort of roll-call of the participants, and constantly monitoring the quality of the channels. Numerous examples of this are given in [Licoppe, Dumoulin 2007; Lahlou 2007; Mondada 2007] and others.

Using materials derived from consultations at an employment agency, Velkovska and Zouinar [Velkovska, Zouinar 2007] demonstrated that video media increase the asymmetry of social roles in an administrative context. In the traditional face-to-face situation the job-seeker and the agency employee often look at vacancies on the monitor together, with the visitor playing an active part in the search, spontaneously reacting to the advertisements as they appear in front of him, since he has the more detailed information about his own profession. Meanwhile the role of the consultant, who has only a general notion of the vacancy (if, for example, it is question of operating a specialised machine) is confined to that of a guide through the database.

In the situation of remote interaction the agency employee is alone with two screens. On one of them, on his monitor, he sees the vacancy database, and on the other, the applicant or his documents. The applicant is confronted with a workstation including a screen and a scanner by means of which he can send instant copies of his documents, diplomas, certificates etc. The applicant and the consultant are consciously in unequal positions: the very fact that the former is out of work already makes him the weaker element. The need to interact with unfamiliar apparatus, which requires a certain, albeit minimal, technical competence (it is necessary to switch between the video and scanner functions) increases this asymmetry. The limited zone of visible space in the office for the applicant reduces the possibility of co-operation to zero (for example, they cannot look at the vacancies together), finally separating the participants into two opposing worlds [Velkovska, Zouinar 2007]. On the last page of their article the authors mention that this asymmetry was subsequently corrected by changing the design of the workstation on the client's side.

Unlike Velkovska and Zouinar, who do not go into detail about what the designers changed in order to improve the usability of the equipment, Lahlou describes a specific instance when a change of design made distance communication less problematic.

He writes that during videoconferences the remote side is often in the minority: there may be only one or a few colleagues on the other side of the screen, while there are dozens in the conference hall. This asymmetry inevitably results in an usurpation of the airways by the majority, and makes it more difficult for their colleague to participate fully. To solve this problem it was proposed to make the screen bigger and increase the volume of the remote colleague's contributions:

Ces mesures ont donné l'effet attendu, à savoir que les participants distants ne sont plus oubliés dans la discussion: on les consulte systématiquement dans les tours de table; ils ont moins de difficulté à prendre la parole; leurs réactions à ce qui est dit dans le site principal sont plus souvent attendues, et prises en compte; les locuteurs du site principale les regardent lorsqu'ils parlent. [These measures produced the expected effect, which is to say that the remote colleagues are no longer forgotten during the discussion: they are allowed their turn systematically, they have fewer difficulties in speaking, their reactions to what is being said in the main office are more often anticipated and taken into account, and the speakers in the main office look at them [on screen] while they are speaking] [Lahlou 2007: 91].

The asymmetries that result from various 'social atmospheres' may be levelled out by maintaining a mental frame appropriate to the

communicative situation [Lahlou 2007: 95]. Thus communication is more effective when the remote colleague is in a room of the same sort — a conference hall in the case of a conference or an office in the case of a confidential conversation.

User versus user: emotions mediated by video

Every social interaction is emotionally coloured. Observation of mediated visual communication confirms that the media do not prevent the conveyance of emotion, but they do have a positive or negative effect on the conversation [Cahour et al. 2007; Morel, Licoppe 2009]. Nevertheless the authors note that the affects that accompany mediated conversation are still not well studied.

In the case of private interpersonal contacts the videophone or Skype is an adequate substitute for the personal contact that might be desirable but, by force of circumstance, unattainable. It may be assumed that in this case the relative effectiveness of the videophone is connected with the participants' shared access to their sensual (bodily or emotional) experience: they show each other their babies, try on and display their clothes, eat 'together' via the screen, or transmit images of nature or public places — mountains, concerts, events, and notable sights.

It may be supposed that this illusion of togetherness may be sufficient or insufficient depending on the closeness of the people concerned, the nature of their relationship and that of their common task (if there be one).

Professional interactions also bear an emotional load. In one of her articles Cahour offered a series of methodological approaches for collecting information about the affective events that accompany the process of co-operative action and affect the decisions taken and the actions of the subjects [Cahour 2006]. She maintains that the possibility of access to data on affect depends of the extent to which the subjects conceal or reflect upon it. Certain affects are partially visible and can be detected from behaviour, for example, by comparing the degree of appropriateness of the linguistic and paralinguistic reactions to the overall format of the situation and the status of the interlocutor. Other affects are socially camouflaged in order not to interrupt the interaction (the work) and to avoid the possible risks associated with loss of face (Goffman's use of the expression: [Goffman 1967]). Considering a specific instance of interaction between an insurance agent and a client, the author analyses various levels of camouflage of affects and discusses particular techniques for their interpretation (for example, the explicatory interview¹) which help to verbalise the emotional experience and thereby make it accessible to the researcher.

¹ The method of the explicatory interview is described in [Vermersch 1994].

She stresses that within the framework of professional environments affects may be produced both by the type of activity in which the subject is engaged and by the tools which he has to use. Cahour and her colleagues have analysed a teleconference in order to demonstrate how the technology can produce a negative feeling of embarrassment in the process of interaction [Cahour et al. 2002]. In another article they deal with a quasi professional interaction: two colleagues choosing a present for their friend over the videophone. The authors point out how specific technological features of the equipment (particularly visual access) influence the changes in the users' emotions [Cahour et al 2007].

Cahour and her colleagues believe that adaptation to technology is an emotional as well as a cognitive process [Cahour et al. 2002; 2007; Cahour 2006]. Insofar as personal evaluations of technical equipment are heavily influenced by the emotions, the experience of use, the emotions, and satisfaction with the equipment make up a large component of 'usability'. The authors suggest methods for improving the procedures for evaluating the usability of technology, taking into account the physical and emotional experience of the users.

Even though the study of the emotions is the challenge faced by today's designers and researchers, it involves definite methodological difficulties. The most important of these is the necessity of observing interactions in their natural social context, that is in those situations where the users are most emotionally involved and least conceal their emotions. Such studies are possible, for example, within longitudinal prospects, when professional interactions are recorded on video over a long period.

Lahlou describes the ideal field for such a study:

...nous avons construit un bâtiment entier, complètement instrumenté pour l'observation continue de l'activité, comprenant notamment la salle de réunion [...] plateau projet, "lounge", salle de repos, espaces de discussion, bureau de passage, bureaux isolés, petites salles de visioconférence, cuisine... Ce "bâtiment du futur", utilise une infrastructure et une architecture entièrement reconfigurable à la manière d'un studio de cinéma. Il dispose à la fois de technologies de pointe préfigurant ce qui sera l'environnement "normal" dans 5 à 10 ans, et d'une maintenance adaptée; ce qui le rend utilisable au quotidien [...] Le bâtiment est habité en permanence par des équipes d'ingénieurs qui y ont leur poste de travail et exécutent leurs tâches quotidiennes.

[We constructed a whole building fully equipped for constant observation of the action, including in particular a conference hall [...], a project area, a lounge, a rest room, discussion spaces, a hot-desking area, self-contained offices, small videoconferencing

halls, and a kitchen... This 'building of the future' uses a flexible infrastructure and architecture that allows it to be reconfigured at any moment, like a film studio. It makes use of special technology to anticipate the office environment that will have become the 'norm' in five or ten years' time, and has constant technical support, which makes it suitable for use every day. [...] The building is constantly manned by teams of engineers, who have their permanent workspaces and carry out their everyday tasks] [Lahlou 2007: 68–9].

This sort of research field allows one to obtain audiovisual data that reflects a wide range of situations in which interaction takes place, from the routine to the exceptional (for example, confrontational). It is nevertheless apparent that such a method is extremely expensive and can only be employed in circumstances of a prolonged collaboration between a commercial organisation and the research group.

In an article devoted to telepresence systems Relieu [2007] describes two real instances of spontaneous acquisition of technology. These are the art installation 'A Hole in Space' in the USA in 1980 and a recent experiment carried out between the offices of France Télécom. In the first instance a telebridge was constructed connecting two streets in New York and Los Angeles. In neither city were the residents given advance warning of the event, and they did not know either whom they were seeing, nor how the screens were constructed. By its very presence in a public space, the technology encouraged random passers-by to enter into communication with strangers on the other side of the screen.

In the second case the telebridge connected two corridors in the offices of France Télécom. The employees discovered the technical installations during their work breaks or fortuitously as they passed by. The corridor — a public space and a place for informal conversations — was a convenient field for observing informal interaction. The author describes and analyses how individuals spontaneously entered into mediated conversation, without being under any organisational pressure to do so. His attention was particularly drawn to the way they entered into communication and the way they worked together to adjust their interaction: they discussed the extent to which they could see each other and adapted their positions and gestures so that they should be comprehensible to the remote partner.

Conclusion

Society's attitude to technology is always ambiguous. On the one hand, the dream of the 'technological miracle' is still alive, and

people are inclined to mythologise and fetishise technology and often therefore to expect more from it than it can provide. On the other hand, technology is like a black box and one needs to know how to decode it: one has to get to know it, learn how to deal with it, and finally to develop new programmes of behaviour which allow it to be used effectively.¹ This is a labour-intensive process. The average user, with his subconscious desire to follow his usual way of life and use familiar, unproblematical tools, is not inclined to invest a great amount of mental and emotional effort in mastering the innovation, and prefers to reject it. The multiple difficulties that accompany remote collaboration through the medium of video technology are a striking example of this.

Interaction — the origin, content and consequence of social life — is at the same time a most complex and multi-faceted phenomenon, and people continue to learn it over their whole lifetime. Though we have more or less mastered various forms of verbal communication, we still know very little about sensual and non-verbal means of communication. Having learnt to make ourselves understood on paper or over the telephone, we find ourselves comparatively helpless when we have to interact through the screen. Even in our fantasies (let me recall the illustration of Edison's telephonoscope for the last time) the artist limits himself to a traditional one-sided video, for which a passive 'reading' of the screen is sufficient.

The genesis and recognition of meaning are the two fundamental processes of communication. The cognitive models developed in conditions of face-to-face interpersonal interaction are not entirely effective in conditions of remote communication. Communication mediated by video technology requires that the participants develop new models for the generation and recognition of meaning, which have to become obvious for them, that is, categories of common sense. Only when the subjects have begun to generate and recognise verbal and non-verbal meanings equally easily in the conditions of video collaboration are they able to maintain a stable level of mutual intelligibility.

The introductions of new technologies into the professional environment confronts the users with two types of difficulty: organisational and cognitive-emotional. On the one hand, employees attempt to adapt their equipment in such a way that it makes as few changes as possible to their routine practice, and thus obstructs them as little as possible in their work. On the other hand, the actual logic of an activity mediated by technology may be significantly different from what they are used to. The user is therefore forced to develop

¹ Robert Cresswell indicated this ambiguity metaphorically in the title of his book, which juxtaposes the myths of Prometheus and Pandora [Cresswell 1996].

new cognitive models. The need to overcome organisational and cognitive difficulties at the same time places the employees in a situation of discomfort (stress) and explains their unwillingness to make use of technical innovations.

Despite the practical difficulties and the pessimistic forecasts of science regarding the incorporation of video into the professional environment, the real necessity of collaborating at a distance, stimulated in particular by the growth of offshore zones and the increase in size of conglomerate enterprises, the various branches of which are often not only in different countries, but on different continents forces users to adopt new means of communication and adapt them to their requirements.

The experience of end users is making itself known more and more, and being taken into account by engineers and designers. It may be said that the processes of creating and learning to use the technology are undergoing a rapprochement. On the one hand, as they overcome current technical difficulties and adapt their collaborative activities, the remote partners demonstrate their readiness and ability to orientate themselves towards the technology. On the other, the engineers and designers, taking into account the 'user perspective', strive towards an ergonomic optimisation of the equipment. Such an interpretation allows us to avoid both technological and social determinism.

There are professional barriers that impede the establishment of an effective dialogue between developers and end users: various professional jargons and habitual viewpoints and interpretations of problems, methods and objectives. Anthropologists may be effective mediators and 'interpreters' on the way to such a collaboration.

In this article I have attempted, using concrete examples of work devoted to the study of remote collaboration mediated by video technology, to show the nexus of problems that specialists working in the field of applied science are endeavouring to resolve, the methodological approaches that they use and the conclusions that they have drawn.

In my opinion, the development of this tendency in applied anthropology is very important for improving the dialogue between various sections of society, and in particular between professional milieux. The basic methodological difficulty in this direction is learning to co-operate with extremely different audiences: buyers (industrialists, administrators, managers), various types of specialist (designers, engineers, psychologists, ergonomists) and end users. The paradox is that while they are theoretical gurus in the field of communication, the researchers are frequently practically incapable of applying their knowledge and 'changing their register of com-

munication' and vocabulary to one which is comprehensible to the audience to whom they are addressing themselves.

Following this road, anthropologists will have to find and determine for themselves a new professional identity as 'participant researchers' studying a given segment of society in order to achieve effective interaction. I must stress that the concept of effectiveness in this case is treated not from the point of view of production (in is not the result of the collaboration that interests us), but from the point of view of the process of collaboration. In this case the anthropologists, linguists and social psychologists act as specialists in communicative interaction who understand the general mechanisms and rules of social interaction, and can therefore not only analyse and uncover communicative errors, but also *propose practical means* of solving these problems. The passive role of an attentive observer and analyst is supplemented in this case by the active position of an involved auxiliary specialist offering consultancy services.

References

- Austin J. L. *How to Do Things with Words*. Oxford: Clarendon Press, 1962.
- Bonu B. 'Connexion continue et interaction ouverte en réunion visio-phonique' // *Réseaux*. 2007. Vol. 5. No. 144. Pp. 25–57.
- Cahour B. 'Les affects en situation d'interaction coopérative: proposition méthodologique' // *Le Travail Humain*. 2006. Vol. 69. No. 4. Pp. 379–400.
- _____, Brassac C., Vermersch P., Bouraouis J.-L., Pachoud B., Salem-bier P. 'Étude de l'expérience du sujet pour l'évaluation de nouvelles technologies: l'exemple d'une communication médiée' // *Revue d'anthropologie des connaissances*. 2007. T. 1. No. 1. Pp. 85–120.
- _____, Lorant F., Sanchiz F. 'Use of Teleconferencing: Perturbing Cognitive and Social Comfort?' // *Proceedings of the 11th European Congress of Cognitive Ergonomics* (Cognition, Culture and Design). 7–10 September 2002, Catania, Italy. Pp. 319–28.
- Cardon D., Licoppe C. 'Technologies de l'information et de la communication en entreprise: théories et pratiques' // *Cours, Ecole d'été de l'Association pour la Recherche Cognitive. Bonas, 2000*. <www.arco.asso.fr/downloads/Archives/Ec/Cardon-Licoppe.pdf>.
- Cresswell R. *Prométhée ou Pandore? Propos de technologie culturelle*. Paris: Éditions Kimé, 1996.
- Egido C. 'Teleconferencing as a Technology to Support Co-operative Work: its Possibilities and Limitations' // *Intellectual Teamwork*. Pp. 351–71.
- Feldman M. S., Pentland B. T. 'Reconceptualizing Organizational Routines as a Source of Flexibility and Change' // *Administrative Science Quarterly*. 2003. Vol. 48. No. 1. Pp. 94–118.
- Flichy P. 'Technique, usage et représentations' // *Réseaux*. 2008. Vol. 2. No. 148–149. Pp. 147–74.

- de Fornel M. 'Contraintes systémiques et contraintes rituelles dans l'interaction visiophonique' // *Réseaux*. 1988. Vol. 6. No. 29. Pp. 33–46.
- _____. 'Usages et pratiques du visiophone à Biarritz: objet technique, Cadre interactionnel et sociabilité ordinaire' // *Rapport PAA/TSA/UST/R1029*, France Télécom Recherche et Développement, 1991.
- _____. 'Le visiophone, un artefact interactionnel' // P. Chambat (sous la dir.) *Communication et lien social. Usages des machines à communiquer*. Paris: Editions Descartes, 1992. Pp. 221–37.
- _____. 'Le cadre interactionnel de l'échange visiophonique' // *Réseaux*. 1994. No. 64. Pp. 107–32.
- Garfinkel H. *Studies in Ethnomethodology*. Englewood Cliffs: Prentice-Hall, 1967.
- Goffman E. *Frame Analysis. An Essay on the Organization of Experience*. Harmondsworth: Penguin, 1974.
- _____. *Interaction Ritual: Essays on Face-to-Face Behavior*. New York: Pantheon Books, 1967.
- Gupta A., Mattarelli E., Seshasai S., Broschak J. 'Use of Collaborative Technologies and Knowledge Sharing in Co-located and Distributed Teams: Towards the 24-h. Knowledge Factory' // *Journal of Strategic Information Systems*. 2009. Vol. 18. Pp. 147–161.
- Heath C. 'The Analysis of Activities in Face to Face Interaction Using Video' // *Qualitative Research: Theory, Method and Practice* / Ed. by Silverman D. London: Sage, 1997. Pp. 183–200.
- _____, Luff P. 'Media Space and Communicative Asymmetries: Preliminary Observations of Video Mediated Interaction' // *Human-Computer Interaction*. 1992. Vol. 7. Pp. 315–46.
- Hindmarsh J., Heath C. 'Embodied Reference: A Study of Deixis in Workplace Interaction' // *Journal of Pragmatics*. 2000. Vol. 32. Pp. 1855–78.
- Hollan J., Hutchins E., Kirsch D. 'Distributed Cognition: Toward a New Foundation for Human-Computer Interaction Research' // *ACM Transactions on Computer-Human Interaction*. 2000. Vol. 7. No. 2. Pp. 174–96.
- Hutchins E. 'The Technology of Team Navigation' // *Intellectual Teamwork*. Pp. 191–220.
- _____. 'Organizing Work by Adaptation' // *Organization Science*. 1991. Vol. 2. No. 1. (Special Issue: Organizational Learning). Pp. 14–39.
- _____. *Cognition in the Wild*. Cambridge: MIT Press, 1994.
- _____. 'How a Cockpit Remembers its Speed' // *Cognitive Science*. 1995. Vol. 19. Pp. 265–88.
- Intellectual Teamwork: Social and Technological Foundations of Co-operative Work* / Ed. by Galegher J., Kraut R. E., Egido C. Hillsdale: Lawrence Erlbaum, 1990.
- Kleij van der R., Schraagen J. M., Werkhoven P., De Dreu C. K. W. 'How Conversations Change Over Time in Face-to-Face and Video-Mediated Communication' // *Small Group Research*. 2009. Vol. 40. Pp. 355–81.

- Lahlou S. 'L'activité de réunion à distance' // *Réseaux*. 2007. Vol. 5. No. 144. Pp. 59–101.
- Lave J. *Cognition in Practice*. Cambridge: Cambridge University Press, 1988.
- Licoppe C., Relieu M. 'Présentation' // *Réseaux*. 2007. Vol. 5. No. 144. Pp. 9–22.
- Licoppe C., Dumoulin L. 'L'ouverture des procès à distance par visioconférence. Activité, performativité, technologie' // *Réseaux*. 2007. Vol. 5. No. 144. Pp. 103–40.
- Lipartito K. 'Picturephone and the Information Age: The Social Meaning of Failure' // *Technology and Culture*. 2003. Vol. 44. No. 1. Pp. 50–81.
- Lu J.-L., Peeta S. 'Analysis of the Factors that Influence the Relationship between Business Air Travel and Videoconferencing' // *Transportation Research*. Part A: Policy and Practice. 2009. Vol. 43. Issue 8. Pp. 709–21.
- Luff P., Heath C., Kuzuoka H., Hindmarsh J., Yamazaki K., Oyama S. 'Fractured Ecologies: Creating Environments for Collaboration' // *Human-Computer Interaction*. 2003. T. 18. No. 1–2. Pp. 51–84.
- Mark G., Poltrock S. 'Groupware Adoption in a Distributed Organization: Transporting and Transforming Technology through Social Worlds' // *Information and Organization*. 2004. Vol. 14. Pp. 297–327.
- Mondada L. 'Imbrications de la technologie et de l'ordre interactionnel. L'organisation de vérifications et d'identifications de problèmes pendant la visioconférence' // *Réseaux*. 2007. Vol. 5. No. 144. Pp. 141–182.
- Mondada L. 'Interactions en situations professionnelles et institutionnelles: de l'analyse détaillée aux retombées pratiques' // *Revue Française de Linguistique Appliquée*. 2006. Vol. 11. No. 2. Pp. 5–16.
- Morel J., Licoppe C. 'La vidéocommunication sur téléphone mobile: quelle mobilité pour quels cadrages?' // *Réseaux*. 2009. Vol. 4. No. 156. Pp. 165–201.
- Navarro C. 'Partage de l'information en situation de coopération à distance et nouvelles technologies de la communication: bilan de recherches récentes' // *Le Travail Humain*. 2001. Vol. 64. No. 4. Pp. 297–319.
- Orlikowski W. 'The Duality of Technology: Rethinking the Concept of Technology in Organizations' // *Organization Science*. 1992. Vol. 3. No. 3. Pp. 398–427.
- _____. 'Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations' // *Organization Science*. 2000. Vol. 11. No. 4. Pp. 404–28.
- _____, Barley S.R. 'Technology and Institutions: What Can Research on Information Technology and Research on Organizations Learn from Each Other?' // *MIS Quarterly*. 2001. Vol. 25. No. 2. Pp. 145–65.
- _____, Debra G. 'Technological Frames: Making Sense of Information Technology in Organizations' // *ACM Transactions on Information Systems*. 1994. Vol. 12. No. 2. Pp. 174–207.

- _____, Yates J.A., Okamura K., Fujimoto M. 'Shaping Electronic Communication: The Metastructuring of Technology in the Context of Use' // *Organization Science*. 1995. Vol. 6. No. 4. Pp. 423–44.
- Poitou J.-P. 'Des techniques de gestion des connaissances à l'anthropologie des connaissances' // *Revue de l'anthropologie des connaissances*. 2007. Vol. 1. No. 1. Pp. 11–34.
- Relieu M. 'Remarques sur l'analyse conversationnelle et les technologies médiatisées' // *Revue Française de Linguistique Appliquée*. 2006. Vol. 11. No. 2. Pp. 17–32.
- _____. 'La téléprésence, ou l'autre visiophonie' // *Réseaux*. 2007. Vol. 5. No. 144. Pp. 183–223.
- Sacks H., Schegloff E., Jefferson G. 'A Simplest Systematics for the Organization of Turn-taking for Conversation' // *Language*. 1974. Vol. 50. No. 4. Pp. 696–735.
- Schegloff E. A. 'Sequencing in Conversational Openings' // *American Anthropologist*. 1968. No. 70. Pp. 1075–95.
- Schegloff E. A., Sacks H. 'Opening Up Closings' // *Semiotica*. 1973. Vol. 8. No. 4. Pp. 289–327.
- Suchman L. *Plans and Situated Actions. The Problems of Human/Machine Communications*. Cambridge: Cambridge University Press, 1987.
- Velkovska J., Zouinar M. 'Interaction visiophonique et formes d'asymétries dans la relation de service' // *Réseaux*. 2007. Vol. 5. No. 144. Pp. 225–264.
- Vermersch P. *L'entretien d'explicitation*. Paris: ESF, 1994.
- Webster J. 'Desktop Videoconferencing: Experiences of Complete Users, Wary Users, and Non-Users' // *MIS Quarterly*. 1998. September. Pp. 257–86.
- Wittgenstein L. *Philosophical Investigations* / Trans. Anscombe G. E. M. Oxford: Blackwell, 1998.