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Towards CyberPsychology: Mind, Cognitions and Society in the Internet Age
Amsterdam, IOS Press, © 2001, 2002, 2003

1 Actors, Artifacts and Inter-Actions. Outline for a Social Psychology of Cyberspace

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Abstract. Cyberspace is standing out there waiting for us to study it from a psychosocial perspective. A lot of work has been done by researchers in these past years but what is still missing is a discussion over the structure of a *genuine* psychosocial point of view.
The authors in this work discuss the opportunity to found this point of view on a three pillars: a theory of subjects, a theory of objects and a theory of processes relevant to the features of artifacts and services actives in Cyberspace.
The issues raised here constitute just the first essential step towards a definitive study of communication technology and the culture that has grown up around it: its goal is to open a conceptual and dialogical space to settle theoretical, methodological and operational standards to study cyber-interaction.

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1.1 Introduction

Even if social researchers are already hard at work studying the Internet's effects [1] research in this area is still scarce and limited in terms of both the number and scope of studies: actual research, and especially studies with relevant methodologies, is only just beginning. This is why their findings have been mixed so far. For instance, Kraut et al recently examined the Internet's impact on emotional well-being [2]. The results, discussed in the American Psychologist, showed that greater use of the Internet resulted in a small but statistically significant increase in depression and loneliness, and a decrease in social engagement. Even if these data are usually used by the press to support the risk of the Internet experience, according to a number of critics these results are biased by weak methodology [3]. The study lacks random selection and a control group, which the researchers say they couldn't afford.

However, when Web-related research technology matures, the opportunity for more creative, more interactive experiments will grow [4]. It is also true that the benefits of larger and different study samples and the reduced costs far outweigh the disadvantages for most types of psychological research [5]. We feel that the above considerations give rise to two different kinds of problem for the psychosocial study of Cyberspace.

First, it is by no means easy to arrive at an accurate definition of the subject under study – namely, that universe of objects which can be referred back to the concept of Cyberspace. Cyberspace is a universe made up of things that can be seen and heard, but they are neither physical objects nor necessarily a representation of physical objects. They are built up of information coming partly from operations within the physical world, but largely from the accumulation and exchange of knowledge arising from human initiatives in the fields of culture, science, and art [6]. In this sense, if a key goal for psychology is doing more thinking about how to get people to make better connections between Cyberspace and the rest of their lives [7] social psychology is facing the challenge of theorizing about how people live and move in the Cyberspace and how they master the net's services and contents to develop a culture of how to use what Cyberspace offers them. The main reason for this is that the artifacts that populate this universe are not only multifaceted in nature, but are also used in a wide range of different ways.

The second kind of problem - which is intimately linked to the first – has to deal with methodology. This lack of knowledge about the universe of objects which we would like to deal with is, at one and the same time, the cause and the consequence of methodological uncertainties. If we cannot yet give an exhaustive answer to the questions that surround the awareness of this situation, we cannot, however, help recognizing that a strictly experimental approach to the psychosocial phenomena of Cyberspace is hardly suitable at all. Generally speaking, Web-based experiments present specific problems [5, 8]:

- it is difficult to control the study environment because Web users use different types of hardware, software, and Internet connections. There is no way to ensure that everyone who participates in the experiment will receive exactly the same stimuli in terms of sound, colour, or timing;
- study participants are usually unmonitored, so the researcher cannot be sure about the information collected. Members of electronic communities very often adopt false "nickname" identities or gender switches, and openly accept them in others; and
- people who participate in online experiments are self-selected and by no means randomly representative of the general population. In particular they are usually skewed toward the high end of the socioeconomic and educational spectrum.

In this chapter, however, we will not be dealing with methodology. An explanation of why the methods of data analysis and production may be the best methodological approach will be dealt with in the second Chapter. Rather, in the pages that follow we would like to develop some ideas about how to set about defining a point of view from which to observe the information-based artifacts and forms of interaction that are present in Cyberspace, so that they can become valid objects for psychosocial investigation.

1.2 Definition of a point-of-view (I). Cyberspace as a universe of relevant psychosocial objects

The first step in defining a psychosocial point of view, we feel, is to identify the characteristics of the objects that are to be found on the Net, using as a starting point the way that subjects who interact within Cyberspace actually use those objects. Recently, Wallace [9] has identified six different Internet environments. Their basic features differ, and these basic features affect the way we behave when we experience them:

- the World Wide Web (web pages; web sites; portals; vortals; hubs)
- electronic mail (E-mail);
- asynchronous discussion forums (news-groups);
- synchronous chat (Internet Relay Chat)
- multi-user dungeons (MUD): text based virtual environments:
- metaworlds (3D MUDs): 3D virtual environments; and
- interactive video and voice (Web cam).

These artifacts can be considered:

- complex cultural objects [10-12];
- used by aware actors for their own ends [13, 14];
- which are active and used in contexts which are, in part, pre-built and in part the outcome of local subject-artefact interaction [15, 16];
- and which, in communicative terms, have their own specific identity – thoroughgoing, independent *enunciative mechanisms* capable of actively determining the communicative modes produced through those who use them [17-20].

In order to judge how important the artefacts on the Web are from a psychosocial point of view, we will now elaborate upon these four "initial intuitive ideas" in order to understand how the interrelations between them in the context of the ways in which they are used help us to arrive at a psychosocial definition of Cyberspace.

Recent developments in communication studies have revealed profound changes in how the relationship between interaction and communication is defined [17-20]. CMC studies are particularly affected by new stances emerging from this re-orientation in communication research. Communication was once seen as a process which can be switched on and off at will, an alternation of action and reaction or a series of actions performed in an inter-subjective vacuum; now it is seen as the outcome of a complex, coordinated activity, an event which generates conversational space within intertwined personal and social relationships. Thus, communication is not only – or not so much – a question of the transfer of information, but rather the activation of a psychosocial relationship, the process by which interlocutors co-construct an area of reality. As

Heidegger puts it, “Man speaks. We speak when we are awake and in our sleep. We are always speaking, even when we do not use words” [21]

Bakhtin, on the other hand, reminds us that “the effective reality of language, discourse, is not an abstract system of linguistic forms…or even the psycho/physiological act of using it, but the social event of verbal interaction using one or more speech acts” [22]. Two concepts have now become reference points for psychosocial research: the belief that language is the inescapable horizon of human experience and the recognition of language as a social act that goes beyond the individual himself. Awareness of the fact that a speech act is used during interaction, something that is shared and something that becomes the subject of a dialogue even when it comes in the form of a monologue, and even when it is guided by the intention on the part of the speaker to hide something from his listener, is now an integral part of the psychosocial researcher’s own awareness. What is more, the desire to investigate this *act of sharing* is leading research more and more in the direction of an examination of *conversation*, for this is the *natural* context in which it occurs. The aim here is to uncover the reasons that make it a *form* of social action. The most recent discoveries in this area would seem to suggest that, if this is to happen, we need to work on a number of different levels of analysis and inspect the phenomena involved from different points of view if we are to see them in *psychosocial*, *pragmatic*, and *cognitive* terms, as well as in terms of the *logic of the everyday*. This is the reason why conversation has become such an interesting object for psychosocial researchers [23, 24].

As human communication gives rise to high levels of ambiguity which are resolved by the 'inference-validation' and 'ambiguity-dispersal' device known as conversation, researchers’ attention has come to be focused on this [25]. Now conversation - including *virtual conversation* - is studied as both the theatre, the physical and symbolic location for this exchange, and the set of control conditions which ensure that it happens, with a probability of success that makes it the favourite communication tool in the ongoing process of human evolution. People involved in the process of communication are no longer seen as ‘senders’ and ‘receivers’, ‘locutors’ and ‘locutees’, but as co-utterers, i.e., interlocutors engaged in a coordinated communicative activity for which they are jointly responsible.

On the one hand, the psychosocial dimension of interlocutor individuation has become increasingly important. ‘Sender’ and ‘receiver’, both of which are abstract, monofunctional entities, have been replaced by interlocutors endowed with thoughts, emotions, affects, and a psychosocial identity which expresses their positioning within families, groups, organisations and institutions. This shift in emphasis has influenced the development of research models, concepts of communicative interaction, and CMC itself.

In parallel with this, researchers have started to study the dematerialisation of interlocutors, or rather, the increasing marginalisation of their physical presence, an effect of the use of the new media’s communication devices. The increasing irrelevance of the face-to-face mode in interaction has enabled communication researchers to mediate/represent the subjectivity of interlocutors using simulacra of various kinds. The anthropomorphism of the machines they have devised ranges from the telephone (minimum) to virtual reality (maximum), but this has never obscured the presence of the interlocutors who use them. In this perspective, we can say that to study communicative interaction the physical co-presence of interlocutors is not required, but the "co-presence of utterance, meaning the outcome of a communicative exchange in which two interlocutors mutually influences each other's actions ... and regulate the meaning of their communication through some form of feedback" [17, 26] is. This is a far cry from the mechanical abstraction of ‘sender’ and ‘receiver’: the machines which determine the mode and degree of ‘co-presence of utterance’ do not obscure, still less eliminate the subjective presence of the interlocutors who use them. In communication, the identities of

interlocutors cannot be regarded as wholly physical, or of only secondary importance: they result from the interweaving of many reality-levels which are symbolic and cultural as well as psychological and social.

As Mantovani [13] says, contexts are not only physical but also conceptual in the sense that the actors perceive the situations through the models introduced by the cultural context and they act according to those; contexts are unstable because continually re-built in the interaction and constantly transformed by actions and choices of the subjects itself. The social context becomes "the symbolic system of a given culture, continually altered by practical human intervention." [27]. Thanks to the writings of Norman [10-12]and the contributions of cultural psychology, researchers have pointed out the impossibility of studying environment and people as separate from the consideration of artifacts and their role. These are no longer considered mere 'things', but rather as 'things for', good for making other things, invented for purposes that are 'graven' into their statute [13, 14].

It is not, therefore, possible to consider participants in a communication act mediated by the computer as consumers of a technology, but "as social actors, with purposes and autonomy of orientation in the situations" [14]. To understand how social actors move in virtual environments, it is useful to construct a three-level model of the social context [13] through situations, social norms and the use of artifacts: the first level is in general that of the social context, the second is that of the situations of daily life, the third is that of local interaction with the environment through artifacts.

As regards the status of language in psychosocial research into communication, the most important outcome of the shift towards conversational models has been the realisation that language is crucial to the way human beings attribute meaning to reality. Now verbal language is seen as fundamental to the construction of intra-subjective experience, inter-subjective relationships and the transformation of physical and social reality.

Thus, the linguistic and social dimensions of communication are inextricably intertwined, and this is true even of cybercommunication, in the sense that language generates the conventions we need to regulate social interaction. To say this implies an interactional and interlocutory concept of communication which attributes greater importance to the pragmatic rather than the representational features of language. As a result, discourse strategies and practices are seen not as epiphenomena of other less visible behaviour patterns or of latent non-verbal psychosocial structures – attitudes, representations, cognitive categorisations, personality traits – but as genuine instances of autonomous behaviour. We are now seeing the emergence of a pragmatics of conversation which is shifting the emphasis "from subjectivity to inter-subjectivity, from illocution to inter-illocution" [25].

1.3 Definition of a point-of-view (II). Three theories to explain how artifacts in Cyberspace are experienced

In the preceding paragraph we began to construct a psychosocial point of view from which to observe Cyberspace, identifying the reasons why the artifacts present within it are important for the researcher, shedding light on possible interconnections between them and developing theoretical and methodological ideas in psycho-social disciplines.

Now we shall attempt to define this point of view still further by turning our attention to the way the researcher can look at these objects in an attempt to understand the structure and thereby identify the logical co-ordinates that can be used as a basis for "theorising" about virtual interaction. This will be done by looking in particular at the way communicative action takes place in virtual contexts and the consequences of substituting *physical co-presence* with *enunciative co-presence,* seen as the result of a communicative

exchange in which the interlocutors are able to influence each other's actions and imbue the exchange with value [17, 26].

In order to be investigated correctly, a process such as this requires a model capable of describing how interaction between human beings in contexts whose level of virtuality varies actually works. This model must also be capable of integrating, from a psychosocial point of view, a *theory of subjects*, a *theory of objects*, and a *theory of processes* [28].

In the following paragraphs, we will identify a number of ideas which can be used as a basis for these theories and for their integration, which is indispensable.

1.3.1 Theory of subjects

We have shown elsewhere how the ways subjectivity is built up within digital communicative interaction are essentially based on three *psycho-social "roots"* [18, 20, 29]: cognition, communication and identity. We also outlined a "path" for each of these "roots". By following these "paths" we feel it is possible to identify suitable conceptual tools for "fine-tuning" a more mature approach to the study of subjectivity in Cyberspace, moving:

- from an intra-subjective interpretation of the cognitive processes to the idea that cognition is an activity which is the result of combined effort; furthermore, its products do not reside *within* the minds of the participants, but *between* their minds [30, 31]
- from communication seen as a linear process to the adoption of a "dialogic/conversational" model as a paradigm for communicative interaction [17, 26];
- from the passivity of an individual who simply uses a certain type of communication technology to the active participation of a subject and a mechanism which, while it is at work, actually influences the user's definition of himself, as it does those who interact with him [27].

We are now going to "dismantle" the conceptual framework which has guided us in the past. We feel, in fact, that it is the paths relating to the first two "roots" described above – cognition and communication – which contribute most usefully to the construction of a *theory of subjects.* We will deal with the third path when we turn our attention to problems relating to the *theory of processes.* More and more, in fact, identity, when related to the ways information technology artifacts are used, seems to be the result of a 'process' rather than a starting point in itself. There are ever more complex links and interconnections between the construction of a subject's identity and the context or contexts in which artifacts are used. They are less and less "stable" and increasingly sensitive to variations between themselves. This is why we need to deal with them together. They need to be seen as the basis of what we are going to say about the processes through which subjects and objects dynamically intertwine.

Given the above, let us now try to analyse the two "roots" which are most important for the way subjectivity is built up, in an attempt to understand how cognitions and communication are used in Cyberspace in such a way as to become co-determinate to a decisive degree.

1.3.1.1 Networked reality and cognition as a coordinated activity

"Cognitions emerge [...] from the conversational interactions in which children participate from a very early age [...]. Far from being circumscribed by experimental laboratory settings, cognitive activities are routine daily activities. In other words, *it is in everyday*

life, and in conversational interaction especially, that we put our cognitive skills to practical use" (Trognon [32], p.117. Our italics).

"The higher mental functions are dialogic processes derived from interpersonal activity. (They) develop through the progressive internalization of semiotically manifested perspectives on reality [...]. The emergence of these functions in the context of social activity constitutes the cultural line of development". (Fernyhough, [33], p. 47)

These two quotations illustrate well the so called "dialogic approach" [33, 34] which is trying to assess how cognition relates to interaction, and especially to conversational interaction. Although methodological problems still have to be solved, cognitive studies are increasingly concerned with defining and exploring the relationship between cognition and interaction. As Perret-Clermont and Brossard [35] and Fernyhough [33] have shown, the essential groundwork for this new approach, in psychological terms at least, is provided by Bakhtin [36, 37], Bartlett [38], Gergen [39], Piaget [40], and of course, Vygotsky [41].

Though they differ in detail on many points, all of them agree that the social system should be seen as a network of relationships providing the *space* in which cognitions are elaborated. They would agree, for instance, on the fact that cognition has a dual social connotation. On the one hand, it is both "action, to the extent that those who take part in it have to organise a flow of shared activities by coordinating and concatenating their actions ... [and] communication, to the extent that the interlocutors make themselves mutually accessible, or make explicit the elements that enable them to understand each other and act together" [42, p. 19]. On the other hand, cognition is always a function of social action and is always action-oriented, never an end in itself [32, 34, 43].

Most researchers, or at least those who adopt a psychosocial approach to cognition, would find little to disagree with here. What is new, however, is that cognitive activities are increasingly being performed in networked contexts which, to varying degrees, are undeniably virtual. The network model is therefore essential to how the matrices of cognitive functions - De Kerckhove's brainframes [30, 44] - are constructed, and to the overall configuration of the knowledge system, which Pierre Lévy's [31] recent concept of *collective intelligence* describes particularly well. Thus, cognition is now seen as something that happens 'between' rather than 'inside' subjects, a media-structured loop that begins and ends with the subjects themselves, a continuous exchange which generates a shared construction of reality at the interface between individual and collective, cognition and interaction, mental activity and social activity [33, 34, 45]. Cognition has lost its traditional connotation as a private event, and is now regarded as both a coordinated activity (in terms of process) and as a networked reality (in terms of how the products of the process are distributed).

The concepts of brainframe and collective intelligence are especially useful because they enable us to describe this type of cognition [18-20]. in terms of two levels - micro and macro, depending on 'closeness' to subject - interconnected by a self/other-oriented process of self-definition which resembles the auto-poietic phenomena described by Varela [46].

1.3.1.2 Virtual conversation

Another important change in psychosocial terms taken by CMC is in the concept of communication: the model of communication as the passage of information from one person to another is becoming obsolete. This model, usually called the "parcel-post model" [47, 48], is now in a state of crisis, partly because of some of the peculiar features of electronic environments, such as the asymmetry between message sender and message receiver.

The model of communication as information transfer does not take into account the cooperative component, which stimulates reciprocal responsibility for successful interaction and a series of subtle adaptations among interlocutors. As Dohény-Farina [49]

notes: "The theory of communication as information transfer separates knowledge from communication; it treats knowledge as an object that exists independently of the participants in the innovation venture. With this independent existence, information becomes an object that can be carried through channels" (p.8). However, it is possible to communicate only to the extent that participants have some common ground for shared beliefs, recognize reciprocal expectations and accept rules for interaction which serve as necessary anchors in the development of conversation [50]. So, with CMC is emerging a new, alternative concept: communication is a common construction of meanings [23, 24].

The shift towards the interactive nature of communication is the key characteristic of the *interlocutory* (conversational) models [26]. The importance attributed to *interlocution* in these models results from efforts to combine pragmatic linguistics with social psychology on the part of researchers in France such as Charaudeau [51], Ghiglione [23] and Trognon [32, 43], as well as American and British researchers like Potter and Wetherell [52].

Interlocutory models are based more or less explicitly on the concept of communicative interactionism and place much stress on the crucial importance of interaction and conversation in communication. Major features of the interlocutory approach include a new conceptual definition of communication [53, 54], clarification of the contractual (negotiable) nature of some aspects of communication [23] and a radical revision of the concept of the interlocutor [51].

As an "irreducible relational fact" [54, p.115] communication is seen as a primary form of human recognition, and as the foundation of the intersubjectivity through which the reciprocity of all human relationships is expressed. *Verbal cooperation*, which accounts for most of communicative phenomenology, is thus a genuinely *coordinated activity* in which the utterances of one interlocutor are interwoven with those of another.

At the beginning of the 90s, Stasser gave a definition of computer mediated communication – CMC - which is particularly interesting for the discussion that is to follow. In his words, CMC may be defined as *a process by which a group of social actors in a given situation negotiates the meaning of the various situations which arise between them* [55].

This definition can be applied both to synchronous and asynchronous CMC [56]. As we know, synchronous CMC - video-conferencing, Internet Relay Chat, or IRC, MUD (also MOO, MUSH and VEE), etc. - is produced when communication occurs simultaneously between two or more users, as in any normal telephone or face-to-face conversation.

Asynchronous CMC – E-mail, newsgroups and so on - is produced when communication is not simultaneous. Hence the essential difference between the two is a temporal one: for CMC to be synchronous, the computers involved must be linked in real time.

Despite the predominance of the textual mode, it has been shown that asynchronous CMC differs in psychosocial terms from non-electronic written communication as well as from other existing means of communication. Experimental studies have revealed significant differences between CMC and non-electronic written communication [57, 58] relating to degree of *social presence* and *media richness*. Social presence is the user's perception of the ability of the means of communication to marshal and focus the presence of communicating subjects [59], while media richness is the ability of the means of communication to interlink a variety of topics, render them less ambiguous, and enable users to learn about them within a given time-span [60]. Studies by Rice [58, 61] have shown that there are significant differences in user perceptions of the degree of social presence/media richness in E-mail and video-conferencing compared with other means of communication, such as the telephone and written texts.

In addition to the fact that synchronous CMC does provide a real-time link between users' computers, it also has special features which distinguish it from other forms of communication. According to Newhagen [62] these include (especially in synchronous CMC via Internet) multimediality, hypertextuality, packet switching, synchronicity and interactivity.

There is a technical reason for these differences between synchronous and asynchronous CMC. Communication with a keyboard and computer screen takes longer than normal face-to-face communication, and the absence of metacommunicative features like facial expression, posture and tone of voice encourages users to find other ways of making communication as complete as possible. These limitations make CMC interaction more *rarefied* than the kind of interaction that happens in normal conversation, in the sense that CMC uses mainly textual devices - abbreviations and smiles [56] as well as MUD metacommands - to reproduce the metacommunicative features (emotions, illocutionary force) of face-to-face conversation.

However, the differences between CMC and face-to-face conversation are important from a psychosocial point of view. While face-to-face conversation occurs in a cooperative environment constantly regulated by mutual adjustment and correction [26, 63], CMC occurs in a much less cooperative environment because of the special conditions imposed by the medium itself [64]. In most CMC environments, and in asynchronous CMC environments especially, two typical features of face-to-face conversation are missing [13]:

- the collaborative commitment of participants and co-formulation of the message;
- the feedback which allows the social meaning of the message to be processed immediately.

In addition, CMC in no way guarantees that a user's declared identity is the real one, but this topic has much to do with theory of processes and will find its place in next paragraph. At this point, however, it is worth bearing in mind that the use of false identities, often of a different sex, is widespread in electronic communities and in MUDs especially [27, 65].

In this sense, CMC may be regarded as an example of virtual conversation, i.e., a necessarily 'pared-down' or, perhaps, more accurately, *rarefied* form of conversation which lacks the rules on which effective interaction depends [18, 20, 29]. Computer mediation creates an asymmetrical imbalance in the sender-receiver relationship: the sender can transmit information and get cooperation under way, but has no guarantee that the receiver receives the transmission, while the receiver has no guarantee that the sender's declared identity is the real one.

Ghiglione's definition [23] of communication as the co-construction of a reality using systems of signs and rules applies equally well to CMC as an instance of virtual *conversation*, with the important difference that in CMC a reality is asymmetrically co-constructed because the receiver can decide at will to terminate interaction, or continue it by turning himself into a sender. This decision is far from casual: it depends on how the receiver interprets the situation, what his aims are, and the social rules that govern his behaviour. Some researchers have even used the term "electronic opportunism" to describe this feature of CMC [66].

The characteristics of CMC which we have been dealing with here, taken as a whole, form an out-and-out “virtual conversation”. They make it an essential component of Cyberspace, allowing us to see how it works, because they form an enunciative mechanism, well expressed by the words of Stasser presented before, but which bear repeating because, after this analysis, they now seem much clearer than before: CMC may be defined as *a process by which a group of social actors in a given situation negotiates the meaning of the various situations which arise between them* [55].

1.3.2 Theory of objects (artifacts)

In recent years, the belief that if we want to understand the meaning of people's actions we have to pay attention to the environments in which they live has become widespread in the psychosocial sciences. In more concrete terms, this means that, in order to sustain the operations that take place within our minds - operations that represent the process of planning the actions that we then carry out - we inevitably need some awareness of the environment within which those operations take place. As we know, a large part of the environment in which we work is made up of objects. Most of these can be considered as *artifacts*, or objects made to make other objects and "things used to do or make other things" [27, p.23]. They have been invented with an aim in mind and are used to fulfil certain functions which are, as it were, "programmed" into them.

This is as true for a pencil as it is for a typewriter or a computer. Moreover, it is true for the non-material objects that populate Cyberspace which we listed above, elaborating upon Wallace's list [9]: the World Wide Web (web pages; web sites; portals; vortals; hubs); electronic mail (E-mail); asynchronous discussion forums (news-groups); synchronous chat rooms (IRC); multi-user dungeons (MUD): text based virtual environments; metaworlds (3D MUDs); 3D virtual environments and interactive video and voice (Web cams).

As these are artifacts or "things made to do other things", it is not possible to discuss them without making some reference to the subjects who use them. As noted by Gibson [67] the relation between actors and their environment is circular: "actions of the organism have consequences for the environment, and the nature of environment has consequences for the organism" [68, p. 81].

So, the process of knowledge does not mean people contemplating "external" objects without touching them, but means also moving in the environment, using it for their goals [69, 70]. Zahoric and Jenison clearly explain this point: "Gibson's unique insight rests with the notion that the perceiving organism and the environment are intimately related - namely, that the environment has provided conditions commensurate with the organism's evolution.

As a result, perception for the organism is the pickup of information that supports action, and ultimately evolution" [68, p. 83]. Perceiving is an activity by means of which the organism identifies the resources it needs in the environment and attempts to capture them in order to achieve its own evolutionary aim – sustenance and transmission of its own genetic pool [69].

If artifacts are social objects, the result of ideas or physical structures, then every time that one is planned or constructed, the needs of the people who are to use it must be borne in mind. As Norman [12] and Zhang have demonstrated on more than one occasion, [71] the way we approach a problem is influenced by the way data is presented to us. Using a blackboard or a computer means producing different kinds of representations and setting off different types of processes. For example, if we want to "automate a working environment through the introduction of computer technologies", considerations such as these naturally carry a certain weight. Even more so, given the fact that information technology artifacts – be they software or hardware – go to make up "the essential interface between actors and their environment" [27, p.105]. As Suchman has already pointed out, "their meaning is given to them by the social world at the moment in which they act as mediators of the way we interact with it" [72]. It is also worth adding at this point that, as Flores says, "technology consists not in planning physical objects, but in planning practice and the possibility of realisation through artifacts", in planning "modes of being" [73].

In this sense the Internet does not provide undifferentiated information, ready-made objects equal for everyone. It offers different opportunities according to the actors and their

needs: "Affordances are not 'things which are outside' simply waiting for someone to come and take a view of them. They are resources, which are revealed to those who seek them. If 'a nipple is for sucking', then this affordance is taken up by a hungry calf which perceives the nipple precisely because it needs it, but this is not the case of an eagle circling high in the sky which does not need milk for its survival. The tree in the middle of a field on a summer's day is an affordance only to those who seek its cool shade" [69, p. 544].

One or two other points to give an even clearer idea of the importance of a suitable *theory of objects*. Let us bear in mind Gregory Bateson's line of reasoning [74]: "Imagine that I'm blind and use a stick. While I walk along, I touch things as I go: tap, tap, tap. Where do I actually begin? Does my mental system finish at the grip of the stick? Or does it finish with my skin? Does it start halfway up the stick? Or at the end of the stick?" [74].

One thing we can say, in order to give a brief answer to Bateson's questions, is that the stick is the means through which information flows – the information the blind man needs if he is to walk along the road. The stick is, in fact, neither "inside" nor "outside" the blind man's system of cognition/action. It is simply the "end point", limit or "frontier", and like all frontiers it belongs neither to one nor to the other of the two territories that communicate through it, even though it is a part of them both. What can be said is that as soon as the blind man starts to walk along the street, the stick becomes an offshoot of his mind. Just like any information technology artifact, be it a research engine or a simple pop-up menu. A suitable *theory of objects* must be capable of telling us something about the points at which the blind man's hand meets the stick, the stick touches the pavement, and so on. In other words, to leave the metaphor behind, it needs to tell us something about the characteristics of the artifacts – be they cognitive, material or "natural" – that go to make up the system as a whole. What is clear from the above is just how delicate the place of a *theory of objects* is in terms of the overall dynamics of a suitable psychosocial point of view for observing Cyberspace. It acts like a hinge, so to speak, between the *theory of subjects* and the *theory of processes*, whose job it is – as we shall see shortly – to generate data and hypotheses about what happens in the interaction between user, information system and the surrounding working environment.

1.3.3 Theory of processes

Lastly, as far as the theory of processes is concerned, it seems to us that one of the most interesting ideas in the context of this chapter is the Theory of Activity [75]. As we know, this theory focuses on "practice", on the activity of subjects. The aim here is to show how activity is united with knowledge. Here, knowledge is not meant as a series of discrete, disembodied cognitive acts, such as acts of decision-making, classification, or memory.

Nor does it refer directly to the brain as such. As Nardi says, knowledge can be summed up in everyday activity – "we are what we do; and what we do is closely and inextricably linked to the social matrix of which every person is a part. This social matrix is made up of people and artifacts" [75].

The mechanism which structures the organic whole that is this social matrix is mediation, and mediation is a function of artefacts, as we noticed when discussing the theory of objects. Artifacts, in fact, connect us closely and organically with the physical environment that surrounds us and help develop knowledge and the functions of knowledge.

As noted by Gergen [76] "all that is meaningful grows from relationships'' (p. ix). In fact, according to this author the human experience is constructed through relationships between social actors and their social and physical environments: ''Discourse is not the possession of a single individual. Meaningful language is the product of social

interdependence. It requires the coordinated actions of at least two persons, and until there is mutual agreement on the meaningful character of words, they fail to constitute language.

If we follow this line of argument to its ineluctable conclusion, we find that it is not the mind of the single individual that provides whatever certitude we possess, but relationships of interdependency'' [76, p. ix].

In this sense, knowledge is no longer to be seen as a "mental" entity. Instead, it takes on the characteristics of a "situated" phenomenon, where the material and social contexts have a fundamental role to play. So the subject – artifact – action triangle of Cyberspace assumes those forms and modes of interaction which are specially suited to the setting up and development of knowledge, skills and learning and training control loops which are rather rare in the settings traditionally used for processes such as these. The utility of this theoretical standpoint for observing the phenomenology of subject-artifact interaction on the net becomes even clearer when we bear in mind the fact that, alongside the idea of the unity of action and knowledge, it is also orientated towards the objects of human action, their organisation into hierarchies, the central importance of mechanisms governing interiorisation/exteriorisation in managing relationships with the environment, the way that artifacts act as mediators, and the central importance of the idea of development.

The Theory of Activity is further bolstered when related to Situated Action Theory - SAT - developed within the field of socio-cognitive research known as 'cognition in practice', which gives it a broader hermeneutical base useful if we want to understand how subject-object interaction can be seen as a part of a dynamic process involving the immediate context. Though based on traditional cognitivist analyses of information processing and symbolisation, SAT introduces a change of perspective in that it sees action not as the execution of a ready-conceived plan, but as adaptation to context As Suchman [72] notes, "instead of separating action from the circumstances in which it occurs as the execution of a carefully thought out plan ... [SAT] tries to study how people use circumstances to develop an intelligent course of action" (p.167).

This necessitates profound changes in how 'social context' has previously been defined. In SAT, social context is not something physical and highly stable like an organisation or the power structure within it. As Mantovani [13] stresses, contexts are not given, but made, so that:

- context is conceptual as well as physical: actors perceive situations using cultural models, and act accordingly in cultural ways;
- context is unstable: cultural models are constantly modified by subjects' actions and choices.

In this sense, social context may be regarded as the symbolic system of a given culture which is continually being altered by practical human intervention [77].

So, as we have seen, social context may be defined as the symbolic system of a given culture which is continually being altered by practical human intervention and it cannot be explained exclusively in terms of interpersonal relationships or the physical environment in which information exchanges take place. It is a prerequisite of communication, "a shared symbolic order in which action becomes meaningful, and so generates meaning" [13, p.106].

Thus, SAT implies a radical redefinition of the meaning of communication. Context may be co-constructed by social actors, but they use communication to exchange meanings, not pieces of information. More precisely, the content of communication is interpretations of the situations which actors are involved in. In this sense, the most effective way of clarifying the meaning of messages is to relate them to a shared context of meaning.

The last trend in cultural psychology [78] was the analysis of distribution of knowledge in the social world: ‘‘Within each local setting, such ‘cognitive actions’ as remembering and decision making are distributed not only among the artifacts but among the rules and among people according to the division of labor’’ [79, pp. 17-18]. Following this vision, action can be described as part of a strategic game [80] in which certain goals, both individual and collective, are aimed at, through the joint efforts of several actors. In order to be achieved, many human activities, including the shared experience of new communication media, require that knowledge relevant to the goal be distributed and that actions be coordinated among the various actors by means of cultural modes which pre-exist those interactions (between actors, and between them and the environment) and make them possible [69, 70].

1.4 Conclusions

As the reader will already have realised, the *raison d’etre* of this chapter is not so much the novelty of the material we have dealt, which is for the most part already well-known or has already been used elsewhere. Rather, it is the way in which we have attempted to make these concepts interact in an attempt to build up a useful approach to the psychosocial investigation of interaction occurring in Cyberspace. Obviously, there are now two final steps to make.

Firstly, we need to develop a methodology for the application of this theoretical approach. The following chapter is a first step in this direction, but more work will of course need to be done to create a working model for applying the techniques of data analysis and production referred to above.

Second, we need to analyse the literature relating to interaction in Internet and in virtual environments in the light of the theoretical approach we have developed above. A start has already been made in this sense. The aim of an analysis of this kind would be to catalogue works that have already been published or are to be published with reference to the three theories of subjects, objects and processes. As we have already pointed out, work has already begun on this, but it will require some time before we have an instrument which can be used for the debate taking place at present.

To conclude, it is clear that this is only the beginning of a task which will require much more work and, most important of all, active participation in the debate on themes relating to the study of virtual interaction that has been going on within the scientific community for some time now.

In this sense, we know that the issues raised here constitute just the first essential step towards a definitive study of communication technology and the culture that has grown up around it. However, we are also just as aware that for some time now communication technologies have no longer been seen by researchers as 'rigid prostheses', external tools marking the limits and limitations of users who are slaves rather than masters, but as 'transparent interfaces', ways of genuinely enhancing the communication of interlocutors who use them, whether singly or in networks. And this should create room for new theories which, until some time ago, were crushed on the one hand by the weight of the technologies and on the other by sociologising.

Our approach supports the research directed to build usable and socially plausible communication tools which can account for communication, co-operation, and conflict among different actors and not only for the characteristics of graphic design. Animated and 3D web sites can stand as a superb piece of computer graphics but they cannot substitute for the social dimension of the interaction process as culturally constructed human activity. Attention for the social distribution of knowledge and action between communicative

subjects, objects and processes, the rules governing them, the cultural grid providing the common reference ground for their joint activity is what our chapter wishes to introduce in research on Internet and new communication media.

This new forum for thought and debate will – at a theoretical and methodological level and in terms of the techniques of intervention - be the central issue in our approach to the study of cyberinteraction.

1.5 Acknowledgment

This work was supported by the Commission of the European Communities (CEC), and in particular by the IST programme (Project VEPSY UPDATED, IST-2000-25323 - http://www.psicologia.net; http://www.vepsy.com) and by a Murst (Italian Ministero dell'Università e della Ricerca Scientifica) fund "Modalità di costruzione della fiducia nelle interazioni in rete. Il caso business-to-consumer" (D1 – 2001).

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