Computer-mediated communication in higher education: educators' agency in relation to technology

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Abstract

In this paper I focus on the notion of communication and develop the idea that it is important for the educator involved in computer-mediated teaching to reflect on how an information-cybernetic notion of communication can affect her/his professional identity, understanding of teaching and learning, and the students' experience of social interaction. I outline some of the ways in which the information-cybernetic notion of communication is constructed as universal, natural and therefore invisible in a number of discursive practices that constitute the everyday environment of an educator in the information age.

From programmers' folklore:
- Daddy, what is musical notation?

- You see, son, it is a kind of MIDI-file, only on paper.

(http://www.anekdotov.net)

From a Year 12 textbook:
The vocabulary of computing is all around you. Before the advent of computers, memory was the mental ability to recall previous experiences; storage was an area where you kept out-of-season clothing; and communication was the act of exchanging opinions and information through writing, speaking, or signs. In today's world, these words and countless others have taken on new meanings as part of the common terminology used to describe computers and their use. (Shelly 2000, p 1.2)

Cultural critics, humanist writers and social researchers of technology have paid considerable attention to the ability of technology, and computer technology in

particular, to be a source of the ultimate and submissive worldviews rather than something helpful but conceptually neutral (Ellul 1964; Postman 1993; Roszak 1986; Shenk 1997; Talbott 1995; Weizenbaum 1976). This view of the relationships between technology and society makes it particularly important to explore the possibilities of increasing human agency in relation to technology, so that, for example, the status of the computer is seen as that of a 'valuable servant' rather than of an 'emperor', as computer enthusiasts try to represent it:

> Unburdened of vainglorious ambition, dressed in more modest but
> palpable working clothes, the computer, like the emperor in the fairy
> tale, may yet become a reasonably valuable public servant.

(Roszak 1986, p xii)

In the present paper, I focus on the issue of educators' agency in relation to computer technology. Specifically, I discuss this issue in the context of the technologist-humanist debates about the use of computer-mediated communication (CMC) in higher education.

This paper consists of three sections. In Section 1, 'The educators and technology', I discuss the possibilities of educators' agency in relation to technology that could be found within the theoretical perspectives of the social constructivism, cultural studies, and critical discourse analysis.

In Section 2, 'Communication', I focus on the technologist-humanist debates about the possible effects of the replacement of face-to-face teaching and the traditional campus by CMC and the virtual university; outline a range of concepts of communication developed within such different fields of knowledge as information and telecommunications studies, linguistics, semiotics and social studies of human interaction; and develop the idea that it is important for the educator involved in computer-mediated teaching to reflect on how an information-cybernetic notion of communication can affect his/her professional identity, understanding of teaching and learning, and the students' experience of social interaction.

In Section 3, 'Discursive environment', I discuss some of the ways in which the information-cybernetic notion of communication is constructed as universal, natural, and therefore invisible, in a number of discursive practices which constitute the everyday environment of an educator in the information age.

1. The educators and technology

There are a number of studies that show how concepts and metaphors developed within the field of computer technology may affect education (Bigum & Green 1993; Roszak 1986; Turkle 1997). For example, Roszak (1986) discusses how the notions of information and thinking developed within information theory and artificial intelligence studies - ie notions of information as data and thinking as data processing - can affect educational conceptions. Specifically, he argues that a curriculum in computer literacy developed within the Papert LOGO project may contribute only to the development of procedural thinking while ignoring other

cognitive styles and, therefore, may 'cheapen' whole areas of intellect. Roszak argues that teachers should recognise the risk and retain their 'professional authority against the data merchants and the computer enthusiasts' (Roszak 1986, p 86).

Sherry Turkle (1997) shows how educational conceptions of computer literacy have been shaped and reshaped by the concept of the computer developed within computer science. According to Sherry Turkle, in the 1970s and 1980s, professionals saw the computer as a 'giant calculator'. Computers were thought to be transparent; what happened inside computers could be mechanically unpacked. Programming was a technical activity, the rules of which were 'crystal clear'.

Computers required the user to issue exact instructions. Accordingly, the goal of computer literacy curriculum was teaching what was inside the computer, how it worked and how to write programs. In the 1980s, discussion of the general effects of such teaching on thinking was focused on the impact of computing and of learning programming languages (Papert 1980).

Since the development of a graphical user interface, however, the conception of the computer has changed. The desktop, with interactive objects and dialogue boxes, introduced a new way of thinking about the computer, primarily in terms of the manipulation of surface simulation. Consequently, argues Sherry Turkle, the notion of computer literacy has shifted from teaching what a computer is to teaching about the application software that can be run on it. The purposes of computer literacy curriculum have been shifted from concern with the development of children's thinking to practical, economic concerns, such as entering today's workforce, which requires functional fluency with word processors, spreadsheets, databases, search engines, disk drives and CD-ROM drives (Turkle 1997).

The Turkle reconstruction of the history of relationships between education and technology fields is quite remarkable, as it clearly demonstrates the position of technology as the active agent of educational changes. Although Turkle argues that educators should play a more active role in relation to the new information and communications technology (ICT), she understands this role mostly in terms of media literacy. However, this approach may be considered a partial solution; it opens the possibility of educators' agency in relation to the content of textual environment created by the new ICT, but does not provide a possibility for agency in relation to technology as capable of changing social situations and social relationships - 'in the same way that building or breaking down walls or physically relocating people may either isolate people in different situations or unite them in the same or similar situations' (Meyrowitz 1985, p 70).

What other paths of action may exist for an educator seeking an opportunity to exercise more agency in relation to technology? In the following paragraphs, I briefly discuss possibilities that may be found within the theoretical perspectives of social constructivism, cultural studies and discourse analysis.

Within the social constructivist approach to technology (Bijker et al 1987; Cawson et al 1995; Green et al 1993), technology is conceptualised as shaped by the

ideas and values of particular groups, both at the stages of production and consumption. Social constructivism is sometimes criticised for focusing only on those groups involved in the construction of technology directly, while social groups affected by technology are ignored. Cawson et al (1995) suggests that more attention should be paid to these groups. However, their involvement is seen mainly in terms of their participation in the construction of technology.

This vision of the possible paths of action for the underrepresented groups can be met, for example, within feminist studies of technology (Rothschild 1983). For example, Ruth Hubbard (1983) argues that technology is part of the male-dominated culture and therefore it reinforces male supremacy. She suggests that this can be changed if women become more involved with technology as its inventors, makers, and repairers rather than users - that is, she assumes that it is possible for women to receive control over technology mainly through participation in the process of its design and creation.

This view of the way to exercise more agency in relation to technology is, however, criticised because it makes it less important to seek the ways in which women could get more control over technology while remaining its users (Lawley 1993). Lawley argues that the latter direction is of the most significance, in particular in the context of CMC. Lawley (1993) suggests that, because there are barriers for women aiming to occupy positions of authority and control in computer companies, the most practical way for women to get control over technology would be via becoming trained as its competent users. This would help increase the representation of women in the user community which, consequently, would make it possible for this group to influence the design and implementation of computer technology.

It still remains unclear whether being a competent user means exercising more agency in relation to technology. Being a competent user of technology may be restricted to the knowledge of how to operate it. Within the perspective of the cultural and the humanist idea of technology's agency, being a competent user in this sense can hardly be considered an action of human liberation from the dominance of technology. Within cultural studies, the power of technology is seen in its ability to reshape the social and the human via an elimination of non-technological worldviews, mainly by a redefinition of concepts and metaphors within the non-technological fields, such as social science, education and everyday language (Grau 1996; Postman 1993; Roszak 1986).

For example, computer science uses a concept of language as a code. Code is 'a systematic agreement on what certain commands will do mathematically or logically' (Grau 1996); it is based on the notion of meaning as literal, static, irresolute. Computer language is a structure based on binary oppositions and rigorous discursive rules. Because the concept of code is the main concept of programming, computer scientists may develop a view of the natural language as a code as well. Grau suggests that the ideology of bipolar categorisation entailed by the notion of code may then affect the broader culture, including, for example, such an area as philosophical thinking.

Therefore, technological competence can be considered an action of conversion/submission of the user to technology unless it is accompanied by an ability to critically assess the possible impacts of technology on society and culture. The necessity to develop such an ability in order to exercise more agency in relation to technology can be supported by the idea of the 'reflexive monitoring of activity' as a feature of social action developed in critical social theory (Giddens 1993). According to Anthony Giddens' idea of a reflexive nature of social life, the structure of social activity is created and recreated by the very activities constituting it. This makes the role of theoretical reflections on social processes particularly important, as these reflections can assist the participants in modifying their environment and changing their positions (Giddens 1977a, 1977b).

Meyrowitz (1985) has applied the idea of reflexivity to the discussion of how deterministic perspective may be avoided in relation to the media. He argues that analysis of how technology works to reshape us is a way to obtain control over it. In order to have a free choice of technology and its uses, individuals and groups must be able to see how technology constrains their behaviour and actions. Meyrowitz argues that

> the most deterministic perspective may be unwittingly embraced by those who refuse to apply our greatest freedom - human reason and analysis to the social factors that influence behavior. We do not retain free-choice simply because we refuse to see and study those things that constrain our actions. Indeed, we often give up the potential of additional freedom to control our lives by choosing not to see how the environments we shape can, in turn, work to reshape us.
> (Meyrowitz 1985, p 328)

The outlined strategy of action is informed by an idea of the non-neutrality of a channel of information transmission in relation to interpersonal connections (McLuhan 1962; Ong 1977). This approach tends to explain the effects of technology on the individuals and cultures by the properties of the communication channels (orality, print, electronic and computer-mediated channels). Some educational researchers and theorists also suggest that educators may play a more active role in relation to technology through a critical analysis of technology as a discursive construction (Bigum & Green 1993; Haas 1996; Selfe 1999).

This view is informed by a range of theoretical and methodological conceptions, which are embraced by a term of (critical) discourse analysis (Fairclough 1992a). It is possible to speak of three general issues within the scope of the discourse analytic approach in the studies of social change: the discourse as a symbolic order affecting the construction of the social and cultural subjects and institutions (Foucault 1972, 1982/1983); the discursive practices as shaped by an interaction/contest of discourses (Gee 1990; Fairclough 1992a); and the discourse analysis as a kind of social and individual agency (Fairclough 1992a, 1992b, 1995).

The application of the discourse analytic approach to the study of sociocultural changes in education enables the researcher to approach these changes in terms of the changing discursive practices and the effects of these changes on

identities and subject positions (Cormack & Comber 1996; Kamler et al 1997; Luke 1995). Within the discourse analytic approach, the educator is conceptualised as positioned into the intersection of multiple and competing discourses, such as the discourses of education and the discourses of industry and management. The appropriation of these discourses by education may result in the redefinition of teacher and student identities, and their different positionings in relation to each other and to the world outside the classroom (Comber 1997; Fairclough 1992a). Therefore, it is important for the educator to critically reflect on the way these discourses affect her/his social and professional identity.

Within the range of education and technology studies, this issue has been discussed, for example, by Bigum and Green (1993). They interpret the practice of instructional computing in terms of the interaction of 'two complex and contradictory discursive fields' - education and industry - 'each of which is thoroughly imbricated in the maintenance and renewal of social power and the structured forms of privilege and subordination which characterise our society' (Bigum & Green 1993, p 24). They argue that the application of instructional computing to literacy pedagogy entails the penetration of the industrial discourse of computing into the field of education which, in turn, contributes to the process of changing the discourse of education and, specifically, the enforcement of the industrial discourse of education - as well as the colonisation of education by the corporate purveyors of technology products. This colonisation of education is 'materialised' in the changing discursive practices of educators: as Bigum and Green (1993) note, the reviews of hardware and software written by teachers are similar to those written by computer magazine reviewers, although the latter group is driven by interests different from those which, ideally, should drive the former.

A question can be asked: why do educators accept the industrial discourse of technology? One of the possible ways of answering this question is via a study of the way that technology has been 'sold' to the public in general and to education specifically. This involves studying a broad socioeconomic context, industry interests, government and institutional policies, and promotional practices (Buckingham et al 2001; Kenway 1995; Kling & Iacono 1990; Nixon 1998).

Another way is via a study of those factors contributing to educators' uncritical adoption of a technocratic vision of the new computer-based technologies as transparent tools which 'carry with them neither the guarantees of success or failure, or of benefit or harm - it is all a matter of how wisely people use them' (Burbules & Callister 2000, p 9). This line of inquiry is offered, for example, by Haas (1996) and Selfe (1999). These scholars emphasise the importance of focusing on those myths and narratives of technology that make the technology 'invisible' to educators.

Christina Haas (1996) argues that English teachers should be aware of the possible impact of two major myths about technology - the 'transparent' myth and the 'all-powerful' myth - on their thinking about the computer as a reading/writing technology. The 'transparent' myth of technology was developed in the classical rhetorical theory and in cognitive studies; it implies that writing is not changed by

its medium. Therefore, it makes unnecessary the inquiry into the possible impact of technology on writing and reading. In this way, the 'transparent' myth of technology makes its non-neutrality invisible for educators, and by doing this, contributes to technology's agency.

A polar view of technology is constructed within the 'all-powerful' myth of technology developed in computer science and communications studies. This view implies that computer technology - being a radically new medium of information storage and communication - dramatically changes the nature of writing and reading. The adoption of the all-powerful myth within the postmodernist studies of computer-mediated communication and hypertext (Landow 1992; Poster 1990) results in an adoption of technological determinism, argues Haas (1996). Specifically, this helps promote an opinion that development of the new, postmodernist literacy abilities and skills follows automatically from the experience of using computers as a reading/writing medium. As Haas argues, these two myths affect the rhetoric of the mainstream talk about computer technology in English studies in such a way that the argument about technology and humanities is shaped by assumptions about the agency of technology. The wide proliferation of these assumptions leaves very little space for human agency in general, and for humanities specialists in particular.

In her paper focusing on the role of literacy educators in technology-driven educational policy, Cynthia Selfe (1999) argues that it is necessary to critically approach the major cultural narratives of technology supporting the technologist and the humanist myths of technology. Selfe blames these major cultural narratives and myths for making technology invisible to literacy educators, and contributing to the implementation of the narrow technicist conceptions of literacy, inequity of literacy education and even to illiteracy in the USA. Rather than taking for granted the technicist claims of technology as a panacea for literacy teaching, or the tendency of humanists to ignore technology, Selfe argues that literacy educators should be able to approach technology as a cultural formation. Doing this presupposes analysis of the major cultural narratives and myths (such as the American Cultural Narrative about Computer Technology) that are reflected in and shape educational policies, particularly the policy of the Information Superhighway.

Both Haas and Selfe focus on the basic assumptions about technology that have been developed in the non-educational fields or in the broader culture and are taken for granted by educators. Jane Kenway (1995) focuses on the issue of how educators are positioned as consumers of ready-made notions of technology. Kenway shows that the notion of the Information Superhighway, as available to educators and parents, is constructed by a group which can be labelled 'cultural mediators'. This group includes journalists; representatives of the various industries involved; experts who usually come from those university research centres associated with science, technology and communications; enthusiasts of innovative technology and computers; and governments.

These 'cultural mediators' are involved in such activities as writing the consumer guides, providing commentaries and critique, making promises and

predictions, and so forth. The group members are central in the market exchange, as they help consumers, including teachers and parents, 'to understand, appreciate and consume' (Kenway 1995, p. 36) technology. However, Kenway argues, this group involved in the discursive construction of technology and education cannot or does not care about a serious and professional assessment of the educational quality of new software; journalists typically do not know much about education, and those who are treated by the press as 'education software experts' are usually marketing directors and corporate communications people.

However, this group suggests very authoritative and persuasive constructions of ICT and education. Due to this fact, critical studies of narratives and myths shaping ICT and education in various media and marketing discourses can contribute significantly to the developmental process of educators' agency in relation to technology. Kenway (1995) shows that in studying the discursive construction of technology and education, it is important to not only reveal the content of the narratives and myths shaping the construction of these phenomena, but also understand how these constructions are offered to the public. She demonstrates that the suggested construction of technology and education is made possible due to the dominance of particular *genres* of talking about these themes. According to Kenway (1995), the dominant genre in the media's reportage of education and technologies involves excited pronouncements about new software, placing attractive images of children around the screen, engaging tales about children's travels in cyberspace, and stories from teachers whose lives were changed due to the use of computer technology.

The path of action in relation to technology, which is supported by the theoretical perspectives of the cultural and critical studies of technology and the discourse analytic approach in education and technology research, is to reflect critically upon the metaphors and the concepts supplied by technology. In addition, the discourse analytic approach orientates towards understanding that technology is a discursive construction. This understanding seems to be of particular importance in the context of the following: who would argue against the idea that it is useful to reflect critically on the concepts borrowed from another disciplinary area? The history of ideas tells us that a particular discipline can become an 'exporter' of its concepts and metaphors to other disciplines. It is also known that this process of interaction between different disciplinary fields is usually subject to critical consideration and methodological reflection.

However, the case of interaction between technology and education seems a little more complex. This complexity follows not so much from the ideational content of the interacting disciplines or fields of knowledge, but from the fact that it takes a certain effort to realise that this conceptual interaction (or expansion) actually takes place at all. In the age of ICT, the peculiarity of the process of exporting technological concepts into other areas of theory and practice is that technology offers itself on a casual basis, with the implication that its concepts come as an integral part of its usage in practice. This invisibility of technological concepts and metaphors makes it difficult to determine what exactly requires critical assessment. CMC might be considered such a case.

2. Communication

The issue of CMC has received particular attention in the context of higher education, as it appeared to hold promise for significant change in this field (NET*working97 1997). The debates between technologists and humanists often focus on the issue of the replacement of face-to-face teaching and the social network with CMC and the technological network (O'Hagan 1999). Technologists argue that the use of CMC has a great potential in higher education because it makes available the best materials, supports learning across institutional and national boundaries, and helps overcome a model of passive learning as a result of inquiry-driven searches and interactive discussions (Tripathi 1997, 1999).

These views are criticised for being based on a too narrow understanding of teaching as information delivery and ignoring the role of the university in the personal development and socialisation of students (Crowley 1999; Gandolfo 1998). It is emphasised that the traditional university and networked, virtual education provide different communicative experiences to students and that it is necessary to assess the benefits and disadvantages of these experiences for different groups of students. Flew (1999) suggests, for example, that the traditional university, with its diverse forms of communication, is the most suitable for the cohort of 18-24 year olds, as campus experience is essential for young people's development. Virtual learning is better suited to older students who need more flexible teaching arrangements, are more independently motivated, and need specific, immediately applicable outcomes. Therefore, the focus in their education must be on deliverance of updated knowledge, which can be successfully made by non-university providers of educational packages.

However, the rapid progress of CMC technology threatens to undermine even this compromising scenario. A question is sometimes asked: if rich, interactive services can be delivered online, and computer-mediated communication can help organise more active participation, feedback and collaboration in the group than can be achieved in the traditional classroom, why should we retain campuses? This question is supported by numerous studies of the successful use of technology in terms of social contacts and the activity of interaction (Holt et al 1998; Patrikis 1997; Pearson 1997), as well as by the demands to explain, at last, what is so particularly good about face-to-face teaching (Higher Education Financing and Policy Review Committee 1998).

Various methods are used to assess the merits of the virtual classroom in comparison to the traditional classroom. Experiments and quantitative research demonstrate the advantages of computer-mediated teaching in comparison to face-to-face teaching (Schutte 1996). Qualitative and ethnographic methods are used in many studies, where computer-mediated teaching is compared to the traditional face-to-face teaching and learning experiences. Conclusions are generally made that computer-mediated education has high potential not only in terms of effective delivery and ease of access to materials by students, but also in terms of the possibility to provide individualised instruction and to increase active learning among geographically separated students (Cravener 1999).

According to Carey and Dorn (1998), a survey of students' opinions about using email and Listserv has shown that students believe the advantages of using such tools include: increased productivity, less commuting, reduced stress, flexibility of user location, and quick access to an enormous amount of information. The social aspects of teaching and learning are also a focus of many qualitative and ethnographic studies of the use of CMC in higher education. Researchers emphasise that its use helps increase cooperativeness and the equity of participation. For example, according to Gillespie (1998), using a chat room, bulletin board, and private email in place of face-to-face individual consultations; synchronous meetings in a physical location; and print and video material have resulted in the increase of collaboration and participation in discussions.

It may be concluded that the issue of CMC and higher education has shifted from asking 'to use or not to use' towards asking 'what CMC software to choose'? This shift, however, does not necessarily entail elimination of the broader humanist concern with the ability of technology to turn from a means to an ends, although it may sometimes seem that, in the case of CMC, technology has fully understood its 'proper' place. For example, one may encounter an opinion on the relationships between education and technology similar to that expressed in the words 'You do the teaching, we handle the technology' which appeared on *Blackboard.com* (http://www.blackboard.com), a website that provides courseware to online educators. From this quote, one could infer that the relationship between education and technology is one of complete harmony. Education and technology are represented as collaborators; or rather, technology represents itself as the assistance of education, if not a humble servant, waiting for orders and not bothering its master with explanations of how and by what means these orders will be executed.

Meanwhile, a different opinion about the relationships between technology and education can also be heard from the educators' camp. Educators are saying that higher education is becoming oppressed by the authority of 'computer wizards' - teachers' evaluation of their teaching and student learning 'is framed more by the technology they use rather than the educational outcomes they want to achieve' (Gilding 1998); 'dominant conceptions of Web-based instruction for many organizations are primarily driven or shaped by IT personnel and departments, not by educators' (Rodenburg 1999).

The educational research of computer-mediated vs face-to-face teaching is criticised for being affected not by education, but rather by the conceptual framework of technology (Neal 1998). Specifically, the educational thinking about CMC can be affected by a technological notion of communication. Chris Bigum (1996) warns of such a possibility in his review of the Tiffin and Rajasingham (1995) book on the perspectives of the virtual classroom. Bigum considers the Tiffin and Rajasingham views an example of linear extrapolations of the potential of current information and communications technologies over their use in the education system, and argues that it is important for educators to avoid reducing education to the technological notion of communication:

> Metaphors of human communication are important. But it is more important to understand the implications of using a particular metaphor and to use it carefully and

critically, conscious of what it means to reduce human communication to considerations of bandwidth, frequency and other properties of signal transmission.

(Bigum 1996, p 112)

Different notions of communication are developed within different disciplinary areas. Each reflects a certain aspect of this phenomenon, has a specific communicative practice as its object, and entails specific understandings of the roles of the participants of communication. Within a general field of communication studies, four models of communication have been developed: the information-cybernetic model; the linguistic model; the psychosocial model; and the conversational (interlocutory) model (Riva & Galimberti 1998).

The information-cybernetic model, also known as a parcel-post model, was suggested by Shannon & Weaver (1949) for modelling signal transmission in the telecommunication systems. Within this model, communication is defined as the transfer of information/message; its participants are defined as a transmitter (source) and a receiver of information; and their main concern is about disturbance (noise) in the transmission system, as this may modify the signal (Riva & Galimberti 1998).

The parcel-post model of communication is still the best known and most widely used, even in fields far from the development of the telecommunication systems (Katz & Kahn 1973; Schramm 1973). However, the use of the parcel-post model as a basic model for understanding human communication can be criticised for its inability to conceptualise the specificity of human communication as an interaction of sociocultural subjects in the medium of natural language. Within linguistics, semiotics and social and psychological studies, the parcel-post model of communication is considered insufficient, as it enables the researcher to conceptualise the participants of communication only as abstract, monofunctional entities - as a sender and receiver involved in the process of a mechanical transfer of information from one to another.

Ways to overcome the restrictions of the information-cybernetic model of communication have been suggested within linguistics and semiotics (Jakobson 1970; Sebeok 1976). These models are aimed at conceptualising human communication in terms of the intention of the communicative act and the relationships between participants. For example, Jackobson (1970) distinguishes between three types of communication - monologue, dialogue and discussion - according to the roles of the participants. A monologue is communication between a single sender and one or more passive receivers; a dialogue occurs when the sender and the receiver take turns; and a discussion is started by a sender addressing multiple receivers who then take turns as senders, although the initial sender usually retains control of the conversation. The linguistic and semiotic models of communication, however, have also been criticised for their inability to represent both participants of communication as equally active subjects and to understand communication as embedded in a broader sociocultural context.

An alternative to the information-cybernetic and linguistic and semiotic models of communication has been offered within social and psychological

research. A number of psychosocial and conversational models of communication have been developed, in which the participants of communication are conceptualised as interlocutors endowed with a psychological and a sociocultural identity, as subjects positioned within groups, organisations and institutions, and as collaborators involved in the process of mutual construction of meanings and social reality (Riva & Galimberti 1998; Schegloff 1992). In these models, the focus has shifted away from the practicalities of information transmission towards the ways in which meanings are processed and shared.

The social and psychological models of communication draw upon broader theories of social interaction, language and understanding developed within hermeneutics, ethnography of communication, ethnomethodology, phenomenological sociology, symbolic interactionism, and postmodernist literary criticism (Bakhtin 1981, 1986, 1990; Barthes 1989; Garfinkel 1967; Giddens 1986; Habermas 1987; Siran 1993; Volosinov 1986). These studies have provided a foundation for understanding the phenomenon of communication as a sociocultural practice and as a personal experience of interaction between the Self and the Other (both in the Bakhtinian and the psychoanalytic understanding of these categories). Communication has been conceptualised in terms of the worldviews and values involved; communicative interaction has been approached as assuming either the supremacy of hierarchy, control, power and routine, or the possibility of equity, freedom, cooperativeness and creativity (Resnyansky 1993, 1994).

In the context of these studies, the information-cybernetic model - when applied to the understanding of human communication - loses its universal status, scientific objectivity and ideological neutrality. It starts to serve as a metaphorical representation of certain kinds of relationships possible between participants: those of inequity, power, hierarchy and control (Duncan 1967). In terms of the purposes of communicative interaction, this model stands for the supremacy of the mechanical transmission of given information by the source of power and control and its 'undistorted' reception by the passive recipient.

For example, Cherry (1967) argues that this model represents the situation of routine communication within an established role-status structure where one of the participants functions as a source of truth, information, instructions and control, and the other as a passive receiver. It may be suggested that this specific ideological potential of the information-cybernetic model is becoming particularly significant in the context of a trend to replace the social matrix of education by the communication technology network.

If the broader philosophical and sociocultural view of communication is adopted, education can be approached in terms of the possibility for students to be involved in a particular kind of experience of social interaction: either that which is built on the supremacy of power and control and passive, mechanical acceptance of instructions from an authoritative source; or that which provides an experience of an active agency, freedom, and equal and creative interaction with the 'Other'. The latter experience may be considered of particular importance to those vocations and occupations shaped by an intersection of professional and non-professional

discourses, such as social and legal work (Pense 1994), teaching (Comber 1997), medical practice (Usherwood 1996), and even scientific research (DeHart 1990) and engineering (Johnston et al - 1996).

Therefore, the question of the kind of communicative experience that will be available to the student seems one of the questions to be asked in discussions of the use of CMC in higher education in general, as well as in making decisions about the choice of a particular instructional medium and software.

For example, the Internet exists as a conversational medium and/or as an information superhighway, 'a series of convenient off-ramps that allow discrete individuals essentially one-way access to the riches of the Internet' (Shank & Cunningham 1996, p 39). Therefore, the Internet is capable of providing two different kinds of interaction experience. Shank and Cunningham (1996) argue that one experience of Internet communication is that of an isolated individual acquiring information. In this case, the receiver of the information is positioned as a pure 'Cartesian observer', an outside agent who retains a great degree of control over the flow of information but is unable to affect its production.

Internet communication can also be experienced as 'multiloguing', an involvement in a complex semiotic act of conversation with 'Others' in a non-linear and non-hierarchical environment where 'there is no "teacher" or primary "discussant" either to lecture or to lead and orchestrate the discussion ... everyone has equal access to being heard' (Shank & Cunningham 1996, p 37). Because Internet communication is capable of providing these different experiences of the relationship between the individual and the collective, it could be reasonable for the educator involved in computer-mediated teaching to realise which kind of communication is 'promoted' by certain uses of the Internet.

3. Discursive environment

The notions of communication developed within the telecommunication field and within social sciences are orientated towards seeing people communicating via a computer in different ways. The information-cybernetic model views people as simply 'users' of technology, dependent on its capabilities, while the psychosocial and conversational models orientate towards seeing them as social actors. As Riva and Galimberti (1998) argue, this conceptual shift from the information-cybernetic model of communication has entailed a change of the understanding of communication technologies:

> communication technologies are no longer 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 the interlocutors who use them,
> whether singly or in networks.
> (Riva & Galimberti 1998)

Specialists in communication studies might have developed a view of communication technology as a transparent augmenting system. However, this view

might also make invisible the capability of technology to affect communication (see Haas' argument about the transparent myth of technology) and prevent the user from understanding the fact that the social and human notions of communication may be at odds with the notion that shapes communication technology.

For example, Douglas Rushkoff (1999) shows that the notion of communication recalled by the contemporary Internet, and the World Wide Web in particular, is closer to the parcel-post model than, for example, to the idea of multilogue. Rushkoff argues that the original conception of the Internet, as an interactive mediaspace based on the affirmation of the supremacy of social contact, has shifted to an understanding of the Internet as a broadcast medium. This shift, supported theoretically by the conception of the Information Economy and practically by the development of the World Wide Web, has meant affirmation of the supremacy of commercial content over social contact; it helped in 'convincing users that our interactions with one another were less important than the data we could download and the things we could purchase with our new equipment' (Rushkoff 1999).

Within the conception of the Information Economy, online interaction has been redefined in terms of exchange of immaterial bits of information rather than physical objects (Negroponte 1995). However, this modification does not avoid the Internet being viewed as 'a set of information that could be accessed'. On the contrary, this view is supported. In this way, cybertheorists have contributed to the process of the commodification of the Internet - because 'anything that can be accessed can be given a price tag' (Rushkoff 1999).

Sometimes it seems that the information-cybernetic notion of communication has already become a part of the conceptual field of educators. When educators think and argue about the use of CMC in teaching and learning, they think and argue mostly about specific educational issues and concepts (instructional theories, learning styles and teaching approaches). For example, the author of a webpage called 'A tool for evaluation of software used in distance education' (Braxton 1999) gives a set of criteria for the choice of instructional technologies, such as interactive television, audiographics, computer conferencing, Interactive Relay Chat, Multi-User Object-Oriented technology, electronic mail, Listservs, audiocassette courses, videotaped courses, correspondence courses and websites. They are discussed and evaluated according to different instructional theories (behaviourist, cognitivist, humanist); different kinds of learning activities (lecture, test, instructor-led discussion, group discussion); and different types of learners (independent, or dependent on the control of a teacher).

Tables and graphics demonstrate how particular instructional media correspond to these variables in the teaching process. For instance, if a teacher subscribes to the humanist theory and a student-centred approach, he/she should choose computer conferencing and the Internet. If the teacher works within the cognitivist paradigm and tends towards a teacher-centred approach, she/he can use audio technology and email, though email (according to the graphic) drives the teacher closer towards behaviourism.

While teaching and learning are conceptualised here within different instructional approaches, the media of instruction is conceptualised only according to the information-cybernetic approach, that is, as synchronous or asynchronous, and one-way or two-way communication. For example, Braxton (1999) suggests distinguishing between high-level dialogue and low-level dialogue. The latter equals 'unidirectional communication'; dialogue is understood simply as a contact. This understanding may be interpreted as an acquisition of a too narrow and mechanical view of communication. (Compare it, for example, with the view developed in the works of Bakhtin and Volosinov, who understood dialogue as a process of active and cooperative mutual understanding resulting in the construction of a new point of view.)

The understanding of dialogue as a contact may be natural for the communication technology specialist who defines communication in terms of the number of participants, the direction of message exchange and the mode used for the transmission of signals. However, why does it seem natural for the education specialist to think in this way as well?

I suggest that the way contemporary educators think about communication could be affected by a specific range of texts available to them as part of their professional activities and everyday life. These texts are usually written by experts in CMC and addressed to the general public as well as specifically to educators (for example, see December Communications Inc (http://www.december.com)). They include, for instance, net guides, software descriptions, and information about conferencing software available on the Internet. In these texts, the information-cybernetic notion of communication is constructed as being natural, objective and ready to use in different settings, becoming 'invisible' for educators' critical reflection.

One way of representing the technological notion of communication as a thing beyond reflection can be found in the genre of software guides available on the World Wide Web. Many sites provide information about software for CMC. In searching for information about conferencing software, for example, one may visit a site called Internet Tools Summary (http://www.december.com/net/tools/faq.html) - 'a compact, comprehensive, carefully organised set of links to essential Internet sites about Internet-based tools for information, interaction, and communication'.

This site does not provide the user with any explicit definitions of CMC. It contains just an index that gives 'essential links, compactly organised, to help you explore Internet tools'. This index can be considered not only as a way of facilitating the search for particular software, but also as constructing a particular notion of communication. The software used for CMC is classified in the index according to three categories: Interpersonal, Group and Mass communication. Within each of these categories, software is subcategorised according to the mode of communication: Audio, Video and Text. That is, the suggested classification of conferencing software is based on the information-cybernetic notion of communication.

It is not my task here to discuss whether this notion is both necessary and sufficient for making decisions about the use of particular conferencing software in the educational setting. My task is to attract educators' attention to the fact that even such a seemingly neutral, objective source of information can become a pathway for the introduction of a highly specialised notion of communication for universal usage. This makes it necessary to realise the specificity of reference websites as a particular and distinctive genre of 'talking' about technology. Many such sources inform the user that their aim is to provide her/him with comprehensive data about software.

For example, a website called Thinkofit is advertised as a 'comprehensive guide to software that powers discussions on the Web' (*Conferencing software for the web* - http://thinkofit.com/webconf). This site does, in fact, include much information about all kinds of conferencing software, including new and defunct software, freeware and commercial software, and software designed for use in industry and in education. This site may be considered comprehensive in terms of the quantity of items on its lists. Nevertheless, in terms of whose view is represented in the software descriptions, it is a somewhat restricted source of information. All descriptions are made within one specific technological approach to communication that focuses on issues of access, delivery, regulation of the flow of communication, and information storage.

Among the sources addressed to the non-expert user of information and communication technology, an important place belongs to the wide range of books and articles written in the genre of 'guide'. These guides provide the user with a basic understanding of CMC, the Internet, World Wide Web, email, electronic discussion and so on. They describe different kinds of conferencing software (web-based and email), introduce the user to internet culture, explain how to communicate according to netiquette rules, and recommend how to make sense of the electronic discussion. In a word, these guides are maps of the world of CMC, and may be of great help to the novice who needs orientation in this world. The novice should also be aware that these guides not only aid orientation in the world of CMC, but also construct the world itself.

As a means of constructing a particular notion of communication, these sources have three important features. First, they are usually easy to read and understand. This makes them quite attractive, or at least preferable as sources of knowledge for a non-expert user. On the other hand, this can also make the process of perception and acquisition of the concepts presented relatively 'unconscious' and thus beyond critical attention. Second, the rules of the genre require these guides to give a positive 'bigger picture'. The tendency is to demonstrate the full potential of technology without focusing on the possible restrictions that may follow from the various concrete contexts of its use. This may explain why those things that appear as problematic in academic papers are represented as definite and clear in the 'guides'.

Third, these sources are represented to the reader as authoritative sources of knowledge since they are usually written by people who have a certain amount of

experience in working with information and communication technologies. Thus, David R Wooley, an author of the book *Web-based computer conferencing*, is recommended to the reader as a pioneer of online conferencing for over 25 years (Thinkofit.com - http://thinkofit.com/whoweare.htm). Such a recommendation leaves no doubts that the author knows what CMC is. However, it also leaves almost no possibility for questioning whether this knowledge is all that is necessary to know about CMC in order to successfully and efficiently apply it in other fields of human activity, such as education.

Wooley (1998) provides recommendations concerning the choice of conferencing software. He describes the difference between mailing lists and web-based conferences in terms of access, traffic and flow of conversation, and offers a set of criteria for choosing between web-based conferences and email discussions. The former is considered 'better' because it automatically establishes a context for each message, while participants of the email discussion must quote material from earlier messages. Wooley considers quoting disadvantageous as it makes the traffic heavier and obscures the flow of conversation.

These criteria seem to be of universal and primary value for Wooley and a great number of other computer experts. They certainly are - if the main reason for participation in CMC is 'rapid' communication and 'exchange of information'; if its main purpose is to monitor a number of threads or to deal with a large number of messages. The question is: do these purposes have a primary value in teaching and learning, particularly in those cases when the computer is the main or only available medium of communication between the teacher and the student or between students? The speed of the traffic or the 'unobscured' exchange of messages may be considered vital parts of the communication in the technological or industrial contexts. However, in the educational context, the purpose of using CMC may be the development of critical thinking (LeCourt 1998). In this case, as Donna LeCourt demonstrates, the 'disadvantage' of email discussion turns out to be an advantage as it helps students to better understand the idea of the (de)contextualisation of utterances and the significance of this activity in social interaction.

Conclusion

In this paper, I have argued that it is important for the contemporary educator using CMC in higher education to make the notion of communication an object of critical reflection and assessment. This is important because the notions of communication developed within technological and non-technological areas of knowledge and practice entail particular assumptions about the participants of communication and therefore may affect their subject positioning as well as their understanding of the broader context, purposes and essence of their interaction. Specifically, the notion of communication employed in CMC technologies may affect the identities of teachers and students as well as their understanding of the process of teaching/learning. Therefore, it may be suggested that a part of the professional competence of the contemporary educator should be an ability to assess the notion of communication offered to her/him together with communication technology.

Teaching and learning involves understanding human communication as a social and psychological process. Technology uses an information-cybernetic model of communication. How can this technological notion of communication, offered to the educators, together with hardware and software, affect distance education or a project of the 'virtual university', for example? Both are based on the replacement of face-to-face communication with CMC. How can this notion contribute to the strategic decisions made about the implementation of technology, to the choice and the evaluation of specific instructional media and software for computer-mediated courses? How can it affect the construction of the identities of educators and students as both participants of the educational process and as professionals? To which extend does it answer to the needs, purposes, and values of educators?

I suggest that adopting the discourse analytic perspective may help the contemporary educator to more clearly perceive the 'communicative problems' existing in the interaction between the fields of education and technology. I suggest that the discourse analytic approach can become an efficient instrument, helping educators exercise more agency in relation to technology. Making the discourse analysis a part of the educator's 'tool kit' can help overcome some restrictions of the agency strategies developed within the social constructivist and the humanist cultural studies of technology.

Within the social constructivist studies of technology, the issue of user agency is discussed mainly in terms of representativeness of different groups or embracing the opinion and preferences of the user in the process of technology development. However, the social constructivist approach does not provide a theoretical perspective for an avoidance of a broader kind of technological determinism - specifically, the impact of technology upon culture and society via a redefinition of key concepts and metaphors. The latter issue is addressed within the cultural studies of technology. These studies provide a foundation for the idea that educators can play a more active role in relation to technology if they are aware of the restrictions and the limitations of the concepts and metaphors offered by it. Educators should assess these critically, on the basis of their own professional knowledge and worldview.

This strategy has great potential in terms of efficiency and practicability. However, its implementation requires certain conditions. Specifically, in order for educators to critically assess the concepts and metaphors offered by technology, they have to be aware of the problem - they must be alerted to it. In this paper, I have argued that achieving such an awareness may be a rather difficult task because technology offers its concepts and metaphors on a 'casual basis', within discursive practices which have become an everyday informational environment of the modern educator, such as web guides, CMC software webpages, software evaluations and descriptions, and specialised search sites on the World Wide Web.

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