The Other Side of Technology

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Editorial Preface

This number of PsychNology Journal publishes a second series of papers on ‘Space, Place and Technology’. The special issue offers two different yet complementary reviews, a theoretical paper and a research paper.

In ‘A Review of How Space Affords Socio-Cognitive Processes during Collaboration’, Nicolas Nova provides us with a comprehensive, up-to-date overview of the ways in which space is experienced by computer users, with a special emphasis on users’ interaction. The review synthesizes the results of experimental and ethnographic studies that may be of use to designers; the presentation considers the relation of the user with the artefact, with space/place, with another user and with activity.

Shaleph O’Neill makes an articulated critique of the concept of virtual presence from the viewpoint of Situationist Theory on the one side, and Place/Space Theory on the other. ‘Presence, Place and the Virtual Spectacle’ proposes a criterion, rooted into the users’ agency, to establish whether an environment can afford a genuine human presence or not. O’Neill maintains that Virtual Spaces hardly satisfy the ‘agency’ requisite and end up being more a ‘represented’ than an ‘inhabited’ Space.

Johanna Pöysä, Joost Lowyck, and Päivi Hakkinen present a work that falls within the area of Computer Supported Cooperative Learning: ‘Learning together “There”- Hybrid “place” as a conceptual vantage point for understanding virtual learning communities in higher education context’. Their contribution aims at investigating the nature of the place in which a web-based learning community operates. Their study includes online diaries, discussions, recordings of chats and videoconferences and suggests that a valid rendition of this place must include physical as well as virtual resources. An additional value of the article is to introduce the concept of space and place within the research field of communities of learning.

The second review ‘Presence and Mediated Spaces: a Review’, authored by Lucia A. Renò, examines the way in which the space/place dichotomy relates to the concept of Presence, and offers the basis to distinguish spatial presence from presence. She translates this dichotomy into a combination of various aspects, namely an individual versus a relational perspective, and Space as a physical rather than a subjective phenomenon.

In the section ‘Other contents’, the journal contains a paper external to the special issue, but related to the topic of Pöysä’s et al. The paper, ‘Some Reflections on Learning and E-learning’, is the third review in this number. In this review, Cristina Zucchermaglio and Francesca Alby make a detailed journey into the ‘theories that are behind’ the design of learning environments by dividing them in two categories, which they name ‘full’ technologies versus ‘empty’ technologies. Then, they examine virtual learning communities as a case of ‘empty’ technology and go on summarizing crucial aspects contributing to their effectiveness and usability. The discussion is rich with references to environments easily available on the Internet.

With this number, we are also glad to announce the arrival of two new Editors, Wijnand Ijsselsteijn from Eindhoven University of Technology (The Netherlands) and Matthew Lombard from Temple University (Philadelphia, USA). Their distinguished work in the neuropsychological and
social aspects of mediated experience respectively represents a precious resource to the Journal. This number also features a new structure of PNJ website, which besides having several ‘back-office’ advantages, is hopefully more organized and good-looking to the readers.

Sincerely,

Luciano Gamberini,
Giuseppe Riva,
Anna Spagnolli.
A Review of How Space Affords Socio-Cognitive Processes during Collaboration

Nicolas Nova


ABSTRACT

This paper reviews the literature about social and cognitive functions of spatial features used when collaborating in both physical and virtual settings. Those concepts come from various fields like social, cognitive as well as environmental psychology or CSCW (Computer Supported Collaborative Work). We briefly summarize the social and cognitive affordances of spatial features like distance, proxemics, co-presence, visibility or activity in the context of physical and virtual space. This review aims at grounding in an explicit framework the way human beings use space to support social interactions. This review can be used as a starting point to design efficient applications that take spatial context into account.

Keywords: HCI, CSCW, collaboration, spatial features, space affordances.

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1. Introduction

Cognitive research traditions have strongly concentrated on personal uses of space, namely as a basis for abstract thought (Gattis, 2001 for instance) studying the use of space on memory (Yates, 1969) and peculiar aspects of problem solving (Kirsh and Maglio, 1994; Kirsh, 1995). While many studies concern the relationship between space and individual cognition, we are instead concerned by social interactions.

The aim of this document is to present an overview of the literature concerning the socio-cognitive roles of space in both physical settings and virtual worlds, when available. Even though it deals with cognitive and environmental psychology, attention will also be drawn on other disciplines: geography, urban planning, social sciences and so forth. The topic of space and its social/cognitive functions is indeed very transversal and covered by different disciplines.

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Our focus here is to address the role of spatiality in collective situations. By collective, we refer to situations that involve two or more persons interacting together. There is a wide range of task that can be carried out by those partners from informative discussion to collaboration and joint activity. Our point is not to depict the functions of space in each of those situations but instead to provide the reader with an exhaustive view of how human beings rely on spatiality when interacting together.

Since the literature on space is vast and multidisciplinary (from cognitive psychology to Human-Computer Interaction, from architecture to computer sciences/virtual world research), this paper reports on the significant concepts dealt by those various disciplines. However, the functions of space presented here rely above all on social, environmental and cognitive psychology experiments.

Concerning the topic of how space is used by groups, three methods are used: ethnographic studies, experimental studies and prototypes design/test. The two first methodologies are often employed for studies that take place in both physical and virtual settings. The prototype design/test method is rather used for experiments in virtual and mixed realities. Tasks studied in those studies are both real ones (in social and environmental psychology) and artificial ones (in cognitive psychology mostly).

At this point, it is important to digress and provide a brief explanation of what we refer to while addressing the concept of virtual space. A wide range of computer environments could be considered as “virtual space”: mud/moo, chat, 3D environment, groupware, virtual worlds, video-games, teleconference systems and so forth. Generally speaking, a virtual space is a multi-user information space where users have a representation of their partners as well as themselves (Dieberger, 1999). This shared environment is hence populated by people and constitutes a context for collaborative activities such as learning, working or playing. The representation of environment ranges from text-based interfaces to the most complex 3D graphical output. The key issue is not the representation in itself but the fact that there is a spatial metaphor in which participants carry out a joint task. Of course, there are important differences between all these settings. Compared to face-to-face interactions, mediated communications through a virtual space is conveyed by different representations. Space could indeed be explicitly represented (like in text-based metaphor like in mud/moo) or implicitly (3D virtual worlds). The spatial representation could also be a limited portion of the real space as it happens in teleconferencing.

When dealing with the concept of space in collective situations, one should consider three dimensions as presented in figure 1: persons, space/place and artifacts, and a
corollary feature, which is activity. From the relation between each of those components, affordances of space emerge among the group. This decompositional framework allows to present in the following sections the functions of spaces that emerges from those relations. Each section describes the uses of space fostered by all the abovementioned dimensions. We also would like to show that specific functions of space are present in both settings whereas others are not available in one particular context.

![Diagram](image)

**Fig. 1:** in this example, groups of people are performing joint activities in the same workspace. The artifacts are objects used to carry over the task.

2. **Relation1: Person/Person**

When considering the person-to-person relationships in a spatial environment, the most important feature that must be taken into account is distance and its corollary: proximity. This section describes those two important features.

On the one hand, distance between individuals is meaningful in terms of social interactions. Proxemics is the term coined by Edward Hall (1966) to describe the social use of space in the physical world, and personal space in particular. Personal space is the area with invisible boundaries surrounding an individual’s body. This area function as a comfort zone during interpersonal communication. It disappears in peculiar environments (elevator, crowd). As a matter of fact, Hall proposes four main distances represented in table 1 that are employed in American interactions. Moreover, each distance has a particular meaning, in terms of the kind of interaction allowed. Hall
N. Nova argues that those meanings depend on the culture. Hall also shows how distance constrains the types of interaction that are likely to occur, by communicating to participants as well as observers the nature of the relationships between the interactants and their activity. Distance measures indicate an important facet of face-to-face communication. Allen (1977) demonstrated that the probability of two people communicating in an organization is a decreasing hyperbolic function of the distance separating them (past the first 30 meters of physical desk separation, it is rapidly decreasing).

<table>
<thead>
<tr>
<th>Category</th>
<th>Approximate distance</th>
<th>Kind of interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intimate distance</td>
<td>up to 0.5 meters</td>
<td>Comforting, threatening</td>
</tr>
<tr>
<td>Personal distance</td>
<td>0.5 to 1.25 meters</td>
<td>Conversation between friends</td>
</tr>
<tr>
<td>Social distance</td>
<td>1.25 to 3.5 meters</td>
<td>Impersonal business dealings</td>
</tr>
<tr>
<td>Public distance</td>
<td>More than 3.5 meters</td>
<td>Addressing a crowd</td>
</tr>
</tbody>
</table>

*Table 1. four types of distance (Hall, 1957).*

Other studies focused on the relationships between proxemics and social rituals. For instance, Hall (1957) points out that the distance between a boss and an employee when talking is higher than the distance between two employees. In the context of the military hierarchy, Dean et al. (1975) also reach the same conclusion: high-ranking individuals in a hierarchy use more space than those who have the same or a lower ranking. Distance between people is hence a marker that both express the kind of interaction that occurs and reveals the social relationships between the interactants.

Several academics (Jeffrey and Mark, 1998; Krikorian et al. 2000) show that the notion of personal space also exists in virtual environments (like 3-Dimensional worlds: Active World or Online Traveler). They found that personal space seems to influences behaviors within a virtual world. A certain social distance is kept and spatial invasions produced anxiety-arousing behavior (like verbal responses, discomfort and overt signs of stress) with attempts to re-establish a preferred physical distance similar to physical world observations. The authors suggest that the participants “are developing perceptions of virtual environments that mirror perceptions of real environments”. This leads to a transfer of social norms such as personal space from the real world to virtual space. Physical proxemics is translated into social interactions into virtual environments. Becker and Mark (1998) reached the same conclusion: in virtual world as well as in moo, they found that social distance exists and social positioning is expressed by the positioning of the avatars. People maintain an appropriate social
distance in virtual world: this social convention is transferred from the physical space. There is thus identification to some extent of the physical body with the graphical representation.

Smith et al. (2000) analyzed graphical chat logfiles and found that spatial management occurred in a very similar manner than in the physical space, considering proximity and orientation. For instance, participants maintained personal space (like in Jeffrey’s experiment) and seemed to stand near and look toward those with whom they spoke. The graphical component of such virtual environment is important since people clustered together when interacting as they would do in face-to-face interactions. In addition, Grayson and Coventry, (1998) showed that “proxemic information is preserved in video conferencing and produces effects similar to those of face-to-face interactions but less pronounced”. They explained this phenomenon by explaining that the video conveys only visual proxemic information compared to the multimodal information available in face-to-face interaction.

One the other hand, the concept of proximity is also fundamental (Kraut et al., 2002). It refers to the low distance between the participants of a team. According to Kiesler and Cummings (2002), “close proximity between people is associated with numerous emotional, cognitive and behavioral changes that affect the work process for the better”. Kraut and his colleagues propose a decompositional framework to identify the mechanisms by which proximity makes collaboration easier. The first effect of proximity is when initiating conversations: it is easier in physical settings than in mediated communication. Furthermore, proximity increases frequency of communication (people communicate most with those who are physically close) as well as the likelihood of chance encounter. Proximity also facilitates transitions from encounters to communication. In this respect, Kendon and Ferber (1973) focused on how partners makes the transition from seeing each others to engaging conversation: they often wait until the other is free, catch the other’s gaze to signal intent to interact and then walk to an adequate distance, according to the social norms described in table 1. Finally, community membership and repeated encounters allowed by close proximity foster informal conversations, which are the cornerstone of collaboration. The underlying cognitive mechanism here is grounding: the way people build and update the amount of information (understanding, presuppositions, beliefs, knowledge, assumptions…) shared by team-mates involved in a collaborative task. The disadvantage of physical proximity is that people must attend to the same thing at the same time unlike media space where participants could attend to different things. As a
matter of fact, the interaction must be synchronous and it privileges people who are nearby. Additionally, the opportunistic and spontaneous communication that is supported is not always welcomed by the participants because of task interruption or loss of privacy. Using other media to initiate communication is however possible, namely with buddy lists (who is available in the chat room). Spontaneous communication is less frequent in this situation. Chance encounters as well as informal conversations are also supported in virtual communities on the web and on mobile phones (Gross, 2002).

The second effect of proximity is that conducting conversations in collocated settings is way easier. Indeed, physical proximity allows the use of different paralinguistic and non-verbal signs: precise timing of cues (verbal backchannel for instance), coordination of turn-taking or the repair of misunderstanding. Nevertheless, there is disadvantage of physical proximity: the face-to-face interaction is costly from a cognitive point of view for both speaker and listener. They have to monitor what is being said as well as the feedback, which is given. Concerning the use of other media to conduct conversations, Clark and Brennan (1991) pointed out different grounding costs: emitting the message (more difficult to type in a chat than to talk in a phone), changing speakers, repairing misunderstanding and so forth. Beside, people try to ground their interactions according to the least collaborative effort: they adopt strategies in grounding considering the costs due to the media with as little combined effort as possible.

Finally, the last effect of close proximity in work settings is that it helps maintaining task and group awareness. According to Dourish and Belloti (1992), "awareness is an understanding of the activities of others, which provides a context for your own activity". When participants are collocated, it is easier for them to gather and update information about the task performed by the others and the global setting of the group activities. When people work in the physical domain, their collaboration is afforded by relatively unconscious use of the inherent properties of space, body presence, movement, sensory mechanisms etc. However, this information (conveyed by physical proximity) is necessary for internal communication but not sufficient. Supporting awareness in virtual environment is very challenging (Gutwin and Greenberg, in press) since:

- The interaction between the participants and the virtual workspace generates less information than in a physical one.
- The input and the output of a computer provide much less information than the action in the physical world.
- Groupware systems do not really provide users with the limited awareness information available.

A related situation of proximity is hence co-presence: when the participants of a team are collocated, their proximity is maximal. Presence is the psychological sense of "being there" in the environment, physical or virtual (Lombard and Ditton, 1997). Co-presence is thus the psychological sense of “being together” in such an environment. It can be defined as a form of human co-location where the participants can see each other. Zhao (2001) claims that it is the condition for having interactions between two people. He has defined a taxonomy of co-presence based on the different media used by the participants (see table 2). Co-presence is the cornerstone of collaboration since it is the subjective experience of being together with other participants. Face-to-face communication generates the most intense sense of co-presence. Talking in a chat, on the other hand generate a low sense of co-presence. As a consequence, creating a strong sense of co-presence is the challenging issue that virtual multi-user environments designers need to address. Co-presence also provide audibility: being in the same room, close to other persons allow people to perceive sound in the environment: overhearing others' conversations, someone picking up an artifact, others' verbal shadowing, the running commentary that people commonly produce alongside their actions, spoken to no one in particular. Gaver (1991) also pointed out the importance of ambient audio in the workplace.

<table>
<thead>
<tr>
<th>Where is the other located? How is the other present?</th>
<th>The other is located in physical proximity</th>
<th>The other is located in electronic proximity</th>
</tr>
</thead>
<tbody>
<tr>
<td>The other is present in person</td>
<td>Corporeal co-presence (face-to-face)</td>
<td>Corporeal tele-co-presence (face-to-device)</td>
</tr>
<tr>
<td>The other is present via simulation (AI)</td>
<td>Virtual co-presence (physical simulation, instrumental robots, communicative robots)</td>
<td>Virtual Tele-co-presence (digital simulation, instrumental agents, communicative agents)</td>
</tr>
</tbody>
</table>

Table 2. A taxonomy of human co-presence in a dyadic situation (from Zhao, 2001).
Furthermore, distance between people has great influence on friendship formation, persuasion and perceived expertise (Latané, 1981). According to Latané, the time spent interacting, paying attention and trying to persuade partners among a group decline with distance. Social influence appears to be heavily determined by distance. Latané et al. (1995) found that the degree to which people influence each other seems to decrease as the distance separating their homes increases. Moon (1998, 1999) also revealed that the perceived physical distance has a negative impact on persuasion in computer-mediated communication Bradner and Mark (2002) examined how geographic distance affects social behavior when people use computer-mediated communication. They focused on three behaviors, which are cooperation, persuasion and deception. The results of their experimental study shows that people are more likely to deceive, be less persuaded by and initially cooperate less with someone they believe to be distant. Even though participants initially cooperate less with remote partners, their willingness to cooperate increases quickly with computer-mediated interaction.

Before moving on to the next section, one should also mention another function of proximity, which is the possibility to for collocated people engaged in conversation to look at one another. Mutual gaze plays a powerful role in face-to-face conversation: regulating the conversation flow, monitoring if the addressee has understood what the contributor meant, communicating facially evident emotion, communicating the nature of the interpersonal relationship, communicating the status, preventing distraction and information overload, signaling interest and attention and coordinating turn-taking during the interaction (Kendon, 1967; Clark & Schaeffer, 1989; Argyle & Cook, 1976). Mutual gaze, like nodding are two means of acknowledgement to the addressee. In virtual space like MOO or 3D environment, gaze is a function rarely supported, apart from teleconference. In the context of those video-mediated social interactions, there is a strong lack of opportunity to connect via eye gaze. It is however possible though difficult to gaze into each other’s eye during a video-based conference (Cohen, 1982; Okada, 1994). Literature about the video-based teleconferencing indicates that this drawback leads to less satisfying and less productive conversations. Systems that provide video channel with eye contact also encourage participants to “overuse” the visual channel, which may be counterproductive (Anderson et al., 1997). Research has been conducted in order to track a computer user’s eye gaze, for instance to use this information for referential communication. We will address this question in the next section when considering referential communication.
3. Relation 2: person/artifact

Another topic the literature about spatiality addresses is the relationships between people and artifacts located in the vicinity of the participants of a social interaction. Indeed, when a speaker talk about an object to his hearer, they are involved in a collaborative process termed referential communication (Krauss and Weinheimer, 1964; Clark and Wilkes-Gibbs, 1986). In constructing the referring expression, the speaker tries to get the hearer to identify the object that he has in mind. Establishing a referential identity is a crux issue in order to build a mutual belief that the addressee(s) have correctly identified a referent. In this respect, spatial features like proximity, salience and permanence are often used in order to select reference objects and frames (Tversky and Lee, 1998). Those reference objects and frames serve to schematize the location of figures.

"In perceiving a scene, figures are not just discerned and identified, they are also located. Figures are not located in an absolute way, but rather relative to other reference figures and/or a frame of reference. (...) Reference objects and reference frames serve to schematize the locations of figures. (...) How are reference objects and frames selected? Proximity, salience, and permanence are influential factors" (Tversky and Lee, 1998: 163)

Those authors showed how two people work together in the creation of agreed references: referring is a collaborative process between speaker and hearer. Tversky also found that referenced frames often used are: natural borders, axes, side of a room, side of a piece of paper, horizontal and vertical lines (real or virtual). Language, by providing a framework to describe space and by selecting features of a scene schematizes space and allows people to ground the discussion. However, language is not the only part of this grounding process. As a matter of fact, the practice of pointing, looking, touching or gesturing to indicate a nearby object mentioned in conversation is also used on a regular basis. This process is called deictic reference. Space is then used so as to facilitate communication. Since we all know that the world is physically structured in the same way for everybody, this spatial knowledge can thus be used for mutual spatial orientation.

It is to be noted that each individual views the environment from a different visual angle (Piaget and Inhelder, 1956). That is why speakers have to take the point of view of their addressee in order to understand the reference. This process is termed perspective-taking or mutual modelling: the ability of one person to empathize with the situation of another. The spatial arrangements of artifacts and participants differs upon
angle of view. One can discriminate different ways to describe spatial locations (Schober, 1993): egocentrically (with reference to oneself like "in front of me"), from the addressee's perspective (like "in front of you"); or from a mutual or "neutral" perspective ("between us"). Findings reveal that people find messages from egocentric perspectives easiest to produce, but that it easier to understand addressee-based perspectives (Levelt, 1989; Miller and Johnson-Laird, 1976; Schober, 1993).

Furthermore, assertions have been made that spatial references create a joint perspective (Garrod and Anderson, 1987): speakers seem to use the mental model of the space that was used in the previous utterance. Doing this, they minimize their cognitive effort since communicators do not need to assess other's perspectives. Schober (1993) also points out that it is easier to build mutual orientations toward a physical space (versus a shared conceptual perspective) because the addressee's point of view is more easily identified in the physical world. Erickson (1993) proposes that objects can generate and catalyze interactions: he talks about "evocative objects" that can capture people’s attention and encourage interactions. It is also obvious that objects can also catalyze direct interactions between people. In a research project examining how pairs collaborate in a MOO environment, Dillenbourg and Traum (1997) found that space supports grounding and building of a shared knowledge. Co-presence, even in virtual environment, creates a *micro-context* which supported verbal negotiation. It seems that mutual understanding was also improved by knowing where one's partner has been, this has also been shown by Nova et al. (2003). The virtual space helped to know what one’s partner knows, a first step in building a shared understanding of the task.

There has been very little research focusing on referential communication in virtual space. Computer widgets, like “What You See Is What I See” awareness tools has been designed in order to support referential communication. For example, telepointers or partner’s mouse motion are often used. Newlands et al. (2002) analyzed interactions of two groups of pairs performing a joint task in two conditions: face-to-face and using a video conference system. They found that deictic hand gesture for the purpose of referential communication occurred more frequently in the face-to-face condition as expected (five times more than in the remote condition). It actually depends on the physical settings. In addition, there are also less mouse gestures in the remote condition than hand gestures in the face-to-face condition. This means that is less deictic act in the computer-mediated interaction. Consistent with this, shared virtual work space appears to be meaningful for reference to concept and relations that
are difficult to verbalize (Bly, 1988; Whittaker et al., 1991). Perhaps one of the most interesting results is the fact that virtual space narrows down the conversational context: proximity between an individual and an artifact eases referential communication in a 3D virtual environment (Ott and Dillenbourg, 2001). They found that distance was used to define the referential context. This results means that spatial awareness supports grounding by providing subjects with the contextual cues necessary to refer to objects.

Finally, recent researches in wearable computing have also shown how proximity affects a common human activity: search behavior (Takayama et al., 2003). The authors use a proximity-sensing application designed to help end-users locate people. This system uses distance estimation based on signal strength alone. They found that this application changed people’s search behavior to reduce walking area, but may increase search times if the system demands too much of the user’s attention.

In examining the relationships between persons and artifacts in space, another relevant topic is how people organize tools and objects in space. When manipulating artifacts, human beings organize information spatially so as to simplify perception and choice, and to minimize internal computation in the physical world (Kirsh, 1995) as well as in virtual and augmented reality environments (Biocca et al., 2001). Biocca explored how people organized virtual tools in an augmented environment. Users had to repair a piece of equipment in a virtual environment. The way they used virtual tools showed patterns of simplifying perception and object manipulation (for instance by placing reference material like clipboard well within the visual field on their right). Researchers has indeed observed that people modify their environment to help them solving problems (Kirsh, 1994). The spatial environment is hence used as an external representation employed to solve the problem they are working on.

Finally, the artifacts in the environments are a important source of information (e.g. Dix et al 1993; Gaver 1991). By their positions, orientations, and movement, artifacts can show the state of people’s interaction with them. Artifacts also contribute to the acoustic environment: acoustically, physical artifacts make characteristic sounds as they are manipulated (e.g. scratch of a pencil on paper). The mechanism of determining a person’s interactions through the sights and sounds of artifacts is called feedthrough (Dix et al 1993). In addition, the presence and the ability to touch artefacts in virtual environements is also a core aspect of the sense of place and presence as shown by McCall et al. (2005).
4. Relation 3: person/place

Another question the literature raises is about the complex relationships between people and space. Effects of geographic location on human behavior are an often neglected domain in environmental psychology (Edney, 1976). When dealing with people and location, the fundamental use of space concerns human territoriality. Edney reviews the numerous definitions corresponding to this very notion: those definitions include lots of concept like "space, defense, possession, identity, markers, personalization, control and exclusiveness of use" (Altman, 1970:8) defines territoriality as it "encompasses temporarily durable preventive and reactive behaviors including perceptions use and defense of places, people, objects, and ideas by means of verbal, self-marker, and environmental prop behaviors in response to the actual or implied presence of others and in response to properties of the environment, and is geared to satisfying certain primary and secondary motivational states of individuals and groups".

In sum, territoriality reflects the personalization of an area to communicate a group (or an individual) ownership. There is a wide range of research concerning human territoriality and its various dimensions. Each of these dimensions are related to a specific psychological functions. First of all, territories support social roles among a community: specific contexts are related to specific roles (Prohansky et al., 1970). This means that the meaning of a particular place is endowed through its exclusive use. For each place thus corresponds a set of allowed behaviors.

Second, territory is linked to control: “the ability of an individual or group to gain access to, utilize, influence, gain ownership over and attach meaning to a space” (Francis, 1989). A simple meaning related to place control is the way it helps us to navigate in our daily environment. Control rely on three features: “(1) priority of access to a spatial area; (2) choice of the type of activity that will occur in the area; and (3) ability to resist the control of other persons in that area” (Holahan, 1982:267). Territoriality could hence be defined as a way to achieve and exert control over a segment of space (Prohansky et al., 1970) and then to maintain and achieve a desired level of privacy. As a matter of fact, individuals from a specific territory decide and know what information about themselves should be communicated to others. According to Minami and Tanaka (1995), "Group space is a collectively inhabited and socioculturally controlled physical setting". The activity then becomes a group activity in terms of interactions with and within space as well as control to the degree of space maintaining.
The third dimensions of territoriality it that it also “serves as a basis for the development of a sense of personal and group identity” (Holahan, 1982:261). This sense of group identity emerges from common territorial habits, knowledge and experiences (e.g. eating in the same restaurants, shopping at the same stores). The ways a group of people appropriates a territory is very large, ranging from residing in the same neighborhood to extreme territorial markers like wall graffiti (Ley and Cybriwsky, 1974). Beside, how different places and local settings shape identity formation is a very recent concern, in particular about geographies of youth cultures (Skelton and Valentine, 1998). The spatial environment, the inner city in particular, is the privileged locus for building a sense of group and spatial identity (Fried, 1963). According to Fried, The inter-relation between group identity (feeling that we belong to a larger human group) and spatial identity (based on our experience and knowledge about the environment) is of tremendous importance. One of the most striking feature is that the topic of territoriality in virtual space strangely received very little attention. Nonetheless, Jeffrey and Mark (1998) studied whether social norms like personal space, crowding or territoriality really exist in virtual space as in the physical world. They focused on virtual worlds like Active World or Online Traveler. They found that territoriality was an important feature in the context of virtual worlds. For example, building one’s house in Active World is a way “to provide a territorial marker and provide a feeling of ownership for the owner” (Jeffrey and Mark,1998:30). Furthermore, it seems that people build their house in existing neighborhood rather than in uninhabited places.

This leads us to the fourth dimension of human territoriality, which is trust. Studies concerning neighborhood and social networks showed that people may trust one another simply because they live in the same neighborhood (Edney, 1976). Unlike interaction in the physical world, trust is more difficult to maintain in remote interactions. Rocco (1998) compared trust emergence in team of strangers in both settings (face-to-face and collective e-mail communications). She found that trust (in this context, trust correspond to cooperative behavior in a 28 turns social dilemma game) emerges only with face-to-face communication. A pre-meeting enables trust emergence in electronic contexts. This conclusion is however doubtful since lots of users employ e-commerce sites like Amazon without any face-to-face contact. In survey studies, coworkers report trusting people who are collocated more than who are remote. Interestingly, she also found that the people who spend the most time on the phone chatting about non work-related matters with their remote coworkers showed
greater trust than those who communicated using only faxes and email. It is another effect of proximity as explained previously.

Finally, place attachment is the last dimension associated to human territoriality. Several segments of space appear to be contexts within which interpersonal, community and cultural relationships occur. People are attached to both these social relationships and the physical aspects of this portion of the environment (Low and Altman, 1992). Place attachment is bonding to environmental settings but not only to the physical aspects of a space.

Another related concern linked to the topic of human territoriality deals with the visibility and the permeability of its boundaries. Even though there are fixed and impermeable communities' perimeters (closed by walls for instance), one can discriminate temporary group territories. Small conversing groups in public place are an interesting example: the fixed barriers are replaced by what Lyman and Scott (1967) calls "social membranes". Knowles (1973) conducted experiments in order to understand which factors affect the permeability of those invisible boundaries. Using spatial invasions, he showed that people tend not to invade other group territories even if they are in a public space or path (Knowles, 1973). The task consisted in gathering a stationing group of people in order to interrupt pedestrian traffic in a university hall. He varied group size and the age of the obstructing group members. It seemed that fewer passerby walked through stationary old groups than younger groups, and fewer through a group of four than a group of two. Furthermore, Cheyne and Efran (1972) found that group spaces are invaded if the boundaries become fuzzy or if the distance among group members becomes large. Beyond four feet (the limit of Edward Hall's personal distance as presented previously in relation1), the boundary becomes ineffective and passerby begins to walk through the group. Space thus models group interaction. One could establish a number of social rules that govern group interaction. Agreements on spatial territory (Lyman, S. M., and Scott, M. B. (1967) or the closeness of members (Cheyne, J. A., and Efran, 1972) are examples of such rules.

When tackling the issue of group use of space emerges the domain of spatial problem solving. There appears the notion of Schelling Points (Schelling, 1960). This very concept, though not related to space in particular, comes from the field of problem solving and game theory. Schelling Points provide a possible and unique solution to the problem of coordination without communication (Friedman, 1994). For instance, in the context of mathematics, if two persons confronted with the following list of
numbers: 2, 5, 9, 25, 69, 73, 82, 96, 100, 126, 150 have to choose the same number, few solutions are available. According to Friedman, if they are mathematicians, they will both choose the only even prime. Non-mathematicians are likely to choose 100. Even if it is impossible for the players in such a problem to communicate, it may still be possible for them to affect the outcome by what they say. Such an outcome, chosen because of its uniqueness, is called a Schelling point, after Thomas Schelling who originated the idea. Applied to spatial coordination, a Schelling Point is an informal location where people are likely to meet each other. This notion is particularly bounded to urban life since each city offers such an essential coordination point. For instance Grand Central Station in New York or Shibuya Crossing in Tokyo (Rheingold, 2002). Joining a Schelling Point augments the chance to encounter people who belongs or not to a group and hence the likelihood of informal encounters. A related concern is “small” Schelling Point such as the coffee machine in organizations. This is the place, like an “anchor” in the environment to be to augment the chance of informal encounter and thus to gather crucial information about the community/team/organization. Coffee machines functions as small indoor Schelling Point in low-scale space like organizations buildings. Moreover, landmarks have always been recognized for their powerful role concerning navigation in both physical and electronic environments (Sorrows and Hirtle, 1999). Their key characteristics make them recognizable and memorable in the environment.

Finally, Halbwachs (1950) argued that collective memories usually contain a strong spatial dimension and are linked to certain places in the landscape. For instance, sacred places of the collective memory of religious groups from the Bible emerged from locations of specific events. There are hence examples of a “visible” past in space provided by conceptions of the landscapes: places reflect their history. In addition, the time factor is of crux importance with regard to the notion of territory. Interaction in the same place indeed forces the participants to deal with usual and ritual aspects. Then they are more and more familiar with the perceived environment.

5. Relation 4: space, place and activity

Relationships between space and human activity are intricate and implicit since it is where our actions take place. Place is defined in anthropological terms as a space that has acquired meaning as a result of human activities. Academics advocated for talking about place instead of space: “Space is the opportunity; place is the understood reality” (Harrison and Dourish, 1996). Their definition is “a place which is invested with
understandings of behavioral appropriateness, cultural expectations, and so forth. We are located in space but we act in place” (Harrison and Dourish, 1996). Erickson (1993) sums up this by stating that “Place is Space with Meaning”. By building up a history of experiences, space becomes a “place” and then its significance and utility is put forward. Harrison and Dourish go on and states that place is a medium for significant actions: place affords a kind of activity. Erickson (1993) claims that spatial constraints can generate activity; he takes the example of the pedestrians who wait for the light to change, they study the headlines and perhaps decide to buy a paper. When the traffic is moving, people wait and tend to buy papers; when the light turns red and traffic stops, pedestrians hurry across the street, and are less likely to buy papers. In the real sense, the traffic light is helping to sell papers by making people pause. There is hence a behavioral framing that come from our sense of place, which makes us know what is appropriate to do in different place. Each location, beside a specific layout and spatial organization, has social meaning and cultural understanding about its function, nature and role. This feature is definitely clear in the physical world. The common understanding of a place defines what types of social interactions can take place and which activities would be “out of place”. Benford et Fahlèn (1993) claims that spatial approach in collaborative systems is popular because of the benefit of usability through natural metaphors. This indicates that the strong relation to physical reality and then its intuitive nature. When we move on virtual space, the sense of place is much more difficult to support. Re-creating real places with technology is always challenging. Loosing the sense of place is a common consequence when using electronic media, from telephone to the Internet in order to bridge distance (Meyrowitz, 1985). A rather simple function of space here concerns the fact that people mostly act where they are. Proximity is the location of most human activity: social interactions, use of artifacts. Then “proximity helps people to relate people to activities and to each other” (Harrison and Dourish, 1996).

In examining the impact of inter-relation between place/space and social interaction, an interesting result is that physical settings constraints social interactions and conversely those interactions modify space. Seating arrangements thus appear to influence the interaction patterns of the group (Hare & Bales, 1963). The simplest example is that participants of a group generally welcome one into the group by repositioning themselves to form a circle thereby including the new member. Steinzor (1950) also suggests that interactions among people are affected by both content of what is being said and by non-verbal cues like postures, gestures and seating
arrangements. He found that participants of a meeting were observed changing his seat in order to sit opposite another member with whom he had previously an altercation. Furthermore, Steinzor showed that seating arrangement in small collocated groups help to determine the individual with whom is likely to interact: individuals in a circular seating arrangement interact more with individuals opposite rather than adjacent. It was observed that in four-person groups, more conversation occurred among persons seated closer together and facing one another, but only for those sensitive to rejection (Mehrabian and Diamond, 1971). Seating positions could also shows roles repartition and in particular who is the leader of the group. When considering group formations in virtual space (3D virtual world in particular), avatars often position themselves face-to-face and circle is also the preferred arrangement (Jeffrey and Mark, 1998).

Division of labor is another social function supported by spatiality. Indeed, Harrison and Dourish (1996) state that “distance can be used to partition activities and the extent of interaction”. Partitioning activity in different locations occur in both physical and virtual settings. MOO rooms are for example used to support different tasks in collaborative learning: a room for teleconference, a room for class meetings (Haynes, 1998). Research concerning virtual place also claims that virtual room could defines a particular domain of interaction (Benford et al. 1993). Different tasks could correspond to virtual location: room for meetings related to a project, office rooms, public spaces an so on. Fitzpatrick et al. (1996) showed “a structuring of the work environment driven by social world perspective”. Their study reveals that belonging to different virtual places provides a support for structuring the workspace into different area to switch between tasks, augment group awareness and provide a sense of place to the users.

In his essay about space that foster interactions, Erickson (1993) claims that spatial elements may be used to structure activity. He takes the example of a research (Marine, 1990) that observed that people waiting to use an automated teller station typically left a gap between the head of the line and the person using the machine. This is due to the fact that entering a secret code to withdraw cash is regarded as private activity. Research in MOO environments (Dillenbourg and Traum, 1997) also showed that space could be one of the main criterion for division of labor. In this experiment, people collaborated and coordinated their work on a spatial basis (e.g. one explores the rooms in the upper corridor and the other in the lower corridor).

When dealing with the topic of human activity, the notion of Social Navigation (SN hereafter) should be put forward. According to Dourish and Chalmer’s seminal paper
(1994), it describes situations in which a user’s navigation through an information space is guided and structured by the activities of others within that space. They define social navigation as «navigation towards a cluster of people or navigation because other people have looked at something» (Munro and Benyon, 1999:3). The simplest example of SN is "following the leader" to the baggage claim: in this case, we see somebody (the first guy who jump off the plane) following a certain path (the signal). We decode this signal as a cue: this guy may be aware of the way one should follow to get to the baggage claim. SN is a matter of other’s activity but also of artifacts change. Social space is built considering the traces left in the environment (virtual or not) by people. We all send signals into social space that can be decoded by others as trace for a potential use. Artifacts and modification of the environment like fingerprints, others were here, public crowds, recommender systems, brands (group identity), tags, graffiti, annotations constitute an indirect social space that could be decoded. From those cues, one can infer powerful things: others were here, this was popular, what’s happening? and so forth. Dourish use the term navigation to refer to all information-seeking activities. In this context, space is of tremendous importance when navigating. Navigation is embedded in three different frameworks: spatial, semantic and social. The first relies on the structure of space (using a spatial metaphor like an office or a street) whereas the second relies on the semantic structure of space (using semantic relationships between objects). The last relies on others’.

«Imagine browsing in a bookstore. If I pick up a new book because it is sitting on the shelf next to one I’ve just been examining, then I’m navigating spatially. If I pick up another book because it was referred to in a citation in the first book, then I’m navigating semantically; and if I pick up yet another because it was recommended to me by someone whose opinion I trust, then I am navigating socially.» (Dourish, 1999:19).

This SN process exists in both virtual and physical settings. Collaborative filtering and recommender/voting systems are the most common though old, examples of SN in virtual space. In 3D virtual worlds, SN occurs like in the physical space: following leaders, going where groups of avatars go… Perhaps the field of mobile and wearable devices offers much more possibilities for SN since they are way more rooted in space. Indeed, linking information to specific location (defined by a GPS point) is today often used for tourist applications, field studies or police work (Rahlff et al., 1999). A very wide range of applications using various technologies are used to attach information to
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Furthermore, providing virtual environment users with awareness information raises two problems: privacy violations and user disruptions (Sohlenkamp, 1999). Indeed, when people are involved in a task, they do not want all information about him to be revealed. User disruption is also important since information overload is a growing problem. Awareness Tool should not provide the user with too many details of others’ activities.

Additionally, an important characteristic of places is their visibility. It is indeed possible in the physical world to understand the character of a place from the outside. Bruckman (1995) takes the example of a biker bar to show that it is possible to see from the street what kind of place it could be. In the context of virtual world, visibility is much more difficult to support, apart from 3D virtual world. Furthermore, the problem is that lots of “virtual communities do not define what comprises appropriate and inappropriate behavior as clearly as real world spaces do” (Dieberger, 1999:48). Apart from affording certain kinds of activities like we already mentioned, places afford specific behaviors. For instance, we don’t yell in a library, we wait in lines at the movies and so on. It is both a question of space layouts and cultural conventions.

Dieberger (1999) points out that social connotations may influence specific communication patterns in space. Different patterns of communication occur in lecture hall (interaction between one teacher and a group of student but not between students), meeting room (a focus person that change: turn taking occurs) or café (islands of communication). This kind of repartition does not necessarily occurs in virtual space. For instance, in the simplest chat, all users have the same distance from each other; the pattern of communication is hence simple and static. However, more complex virtual worlds allow different configuration: from chat rooms to 3D virtual rooms in which private communication or proxemics are supported. Teleconference systems like Centra¹ provide users with tools to support this kind of functions: turn-taking, applause or a sign that someone wants to ask a question.

Research conducted in MOO environments also shown that space modifies communication patterns among people (Dillenbourg & Traum, 1997). The authors found that pairs do not communicate in the same way when they are in the same virtual room or not. When the subjects are in the same room, they acknowledge more

¹ http://www.centra.com/

location: virtual post-its (Espinoza et al., 2001) or note for tourists (Cheverst et al., 2000) for instance.
than when in different rooms. Moreover, the delay of acknowledgement is shorter when subjects are in the same room than when in different virtual rooms.

6. Relation 5: space and artifacts

Physical and virtual spaces are not empty. Objects and things occupy our places and hence do have a certain state and location that may be modified. Each artifact in the environment could then have a role in social interactions in itself or by their modification. That is why relationships between artifacts and space allow us to define different functions.

To begin with, it should be noted that being in the same room provide access to the same tools (Benford et al., 1993). This is definitely obvious in physical settings, tools in the same room become collaborative as well as part of the same cognitive system, as stated by the distributed cognition theory (Flor and Hutchins, 1991). In virtual space like chat, users could also be provided with tools like shared board in different places. Chatting while standing in front of a board is hence possible like in the real world.

To broaden the view, there are a lot of examples of formal situations where spatial relationships between people and objects are used to reinforce social distinctions and thus to mould the kinds of social interaction to be expected within the spaces (Joiner, 1976). Joiner’s studies about small office spaces reveal that room settings (furniture and artifacts) convey at last two types of information: about the occupant as well as how the occupant would like visitors to behave when in his room. He discusses for example findings about chair position and location that have a clear impact on interaction patterns. Actually, as Joiner states, “the organization of the room provides cues for interaction through territoriality, zoning, distance and personal orientation” (Joiner, 1976: 227). Barriers between regions (front, back, outside) in an office space are perceived as a symbol of status. Zone patterns could thus be inferred from furniture arrangements/seating orientations. Though, his phenomenon very from one culture to another and depends upon the organization considered. For instance, the academic has an open seating arrangement unlike business office.

Even though Social Navigation is related to place and activity, it is also a matter of artifacts. For example, like Dieberger (1999) pointed out, the number of car parks in front of a restaurant, as well as the waiting line before a theatre is an indication of the place popularity. Such objects located in space functions as indirect social navigation indicators. Virtual and augmented space offers these indirect cues: a post it left on a
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pdf document, a virtual post-it attached to a GPS location or a counter on a webpage provide information about presence and popularity.

Additionally, environmental psychology studies that focuses on how human behavior and well-being in relation to the socio-physical environment gives us insights about this topic of space and artifacts. Indeed, those academics deal with how people plan their actions based on their understanding of a setting. For instance, Craik and Appleyard (1980) found that it was possible for professional planners to judge traffic volume and level of residents' concern about crime from photographs of residential street in San Francisco. Inferences on familiar settings hence appear to be powerful cues. Cherulnik (1991) also demonstrate the when finding a place to eat people rely on environmental inferences. In this context of unfamiliar settings, people also rely tremendously on spatial settings like restaurant facades. Visibility (the possibility in the physical world to understand the character of a place from the outside) is also an often-used characteristic.

7. Discussion

This document reported on social and cognitive functions of spatiality, gathered from various sources ranging from psychology (environmental, social and cognitive) to Human Computer Interaction. All the uses of space presented here should be seen as “social connotations” as pointed out by Dieberger (1999). This term refers to socially shared understanding of space based on cultural experience of the physical world as well as virtual space. One should however keep in mind that those spatial affordances may change over time. There is indeed a missing dimension in this review, which is time. We only focused on synchronous interactions that happen in both kind of settings and did not deal with how the affordances of space could change over time. Moreover, it is to be noted that spatial properties do not necessarily map well from physical space to virtual space. Indeed, even though we find proxemics, co-presence, neighborhood, close spatial interaction patterns in both settings, strong differences do remain. Table 3 proposes a summary of the affordances of space we reported here. Those functions presented in the table are the critical factors supported by spatiality in collaborative activities.

Such a list of how human beings use space is also meant to provide practitioners with a concrete framework about specific concepts of crux importance. Virtual and ubiquitous environment designers might pay attention to this list since it provides an efficient way to revisit the way we can support social interactions in virtual or physical
space. The mobile computing paradigm nowadays strengthens the necessity to take space and context into account.

One of most relevant issue for practitioners is the notion of place. Designers often have to deal with how can be created ‘virtual places’ that would provide participants with the same functions, roles and affordances as real places? How this can be achieved without spatial representations? This has been a lively debate especially in the web portal and weblog communities. A portal offers a spatial metaphor based on different areas all devoted to specific usage (newspages, personal document, group documents, discussion board, chat). Users of these platforms also employ different kind of tools that allow them to be aware of their partners’ activities as in real settings as we saw in the section about person-to-person relationships. Some interesting innovative tools has additionally been deployed to allow people to get real-time feedback for laughter, applause, turn-taking regulations or pacing. Through these pragmatic regulations cues a sense of being together is better conveyed. Finally, there are different levels of privacy that achieve the territoriality function. Relying on real space feature to design such environment seemed to be the most important source of inspiration so far. This lead to a new question: how could virtual space trigger innovative and unexpected behaviour among users, different from what happen in the physical world? and how could designers create way to support original affordances? For example, recent web applications like social software (as Friendster or Orkut) seems to achieve this goal through the emphasis put on explicitation of social relationships between people, which is not based on spatial features.
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<table>
<thead>
<tr>
<th>Definition</th>
<th>Functions</th>
<th>Physical space</th>
<th>Virtual Space</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distance</strong></td>
<td>Marker that both expresses the kind of interaction that occurs and reveals the social relationships between the interactants (personal space)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><strong>Proximity</strong></td>
<td>Initiating conversations, increasing frequency of communication and the likelihood of chance encounter, facilitating transitions from encounters to communication, community membership and repeated encounters, easier to conduct conversation, helps maintaining task and group awareness</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><strong>Visibility</strong></td>
<td>Understanding of the character of a place from the outside</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td><strong>Copresence</strong></td>
<td>Great influence on friendship formation, persuasion and perceived expertise, eye contact and gaze awareness. Also provides access to tools</td>
<td>x</td>
<td>+/-</td>
</tr>
<tr>
<td><strong>Deictic reference</strong></td>
<td>Mutual spatial orientation, spatial references create a joint perspective</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><strong>Territoriality</strong></td>
<td>Social roles among a community, control, privacy, group identity, trust and place attachment</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><strong>Schelling Point</strong></td>
<td>Spatial coordination</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><strong>Place</strong></td>
<td>place affords a kind of activity, division of labor, social navigation</td>
<td>x</td>
<td>+/-</td>
</tr>
<tr>
<td><strong>Space settings</strong></td>
<td>Constraints social interactions and conversely those interactions modify space, action planning.</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Summary of the social functions of spatiality described in this document present (x) or not in physical or virtual space.
8. References


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the **International Society for Gesture Studies** tool place at the University of Texas at Austin, June 5 - 8, 2002.  


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Presence, Place and the Virtual Spectacle

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ABSTRACT

This paper considers the concept of presence in virtual environments with respect to a Situationist critique of spectacularised urban space. The aim is to explore the concepts of space and place that have become bound up with presence research from an alternative critical viewpoint. The adopted Situationist perspective distinguishes between representations of places and inhabitable spaces, highlighting the problems of designing and inhabiting representational virtual environments. In particular the role of agency is considered in relation to the VR experience suggesting that, from a Situationist perspective, a large proportion of virtual environments cannot help but alienate their users.

Keywords: presence, place, space, situationists, VR.

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1. Introduction

Traditionally, real spaces have been designed and built by architects, urban designers and town planning committees. These spaces are designed to articulate space itself and to make it inhabitable. Most of these spaces have been designed with a purpose in mind, e.g. homes, office spaces, fire stations, art galleries etc. The physical articulation of space is combined with the function of the building in order to enhance the activities that have been planned to take place there. Moreover, older spaces are being redeveloped or reclaimed for different activities and the different needs of the emerging population. Churches become homes, homes become offices, car parks become skate parks. It is this inhabiting, this existing, this performing of activities within these physical spaces that creates meanings and associations for us that transforms these spaces into places.

Indeed the same could be said of virtual spaces. Chat rooms, for example, where the social needs of a community are supported by the structure of the information space. Or even websites, where navigational or functional features may frustrate a user. And of course there is virtual reality. Virtual reality aims at replacing or reproducing reality to...
a certain extent with convincing illusory worlds within which we might feel completely immersed and totally present. Indeed the holy grail of VR would be to design something like the production of some virtual space that might be experienced as indistinguishable from a real space. Apart from the technical difficulty, it is unclear how these types of spaces would be designed, or indeed what this means for theories of space, place and presence that are increasingly discussed within the presence research community. In this paper my aim is to develop a critique of virtual places that attempts to identify what we can and cannot design in virtual representations of real places. I shall start firstly by discussing the concept of presence in general and then explicate Floridi’s concepts of forward and backward presence. I shall then move on to a discussion of the production of space and place in relation to both real and virtual environments. Finally, I shall attempt to understand virtual environment design by making a distinction between designing for spaces that might become places and designing representations of places.

2. Presence

While there is a great deal of debate within the ‘Presence’ community about what presence is and how it occurs in virtual environments (VE), there is no fixed definition of what it is. For example Witmer and Singer propose that:

“Presence is defined as the subjective experience of being in one place or environment, even when one is physically situated in another” (Witmer & Singer, 1994 p. 225).

This is a common conception of what presence is, based around the idea that a person is in some way ‘displaced’ from one place to another, i.e. from a real world to a virtual world. Similarly Mel Slater states that:

“When you are present your perceptual, vestibular, proprioceptive, and autonomic nervous systems are activated in a way similar to that of real life in similar situations. Even though cognitively you know that you are not in the real life situation, you will tend to behave as if you were, and have similar thoughts (even though you may dismiss those thoughts as fantasy).” (Slater, 2003 p. 2).
These conceptions of presence suggest that virtuality in some way can replace or displace reality. When Slater says:

“One can be present but not involved. One can be involved but not present”

(Slater, 2003 p. 2).

We encounter this problem of displacement again. Indeed, it is possible to be present and not involved in something. One can simply be somewhere and observe what is going on. However, being involved but not present is not possible. One has to be present to be involved. Slater uses the example of watching a TV programme to explain this, i.e. being involved in a TV programme but not present in the action. Conveniently, he ignores the fact that whoever is watching the TV has to be present somewhere. That is to say, the observer is sitting on a couch in a room watching TV and is perfectly aware that this is the case. Moreover, being involved in a TV program does not allow you to take part in the action displayed. The viewer is not present to the actors.

From another angle Lombard and Ditton propose that:

“Presence is defined as the perceptual illusion of non-mediation… an illusion of non-mediation occurs when a person fails to perceive or acknowledge the existence of a medium in his/her communication environment and responds as he/she would if the medium were not there.”

(Lombard & Ditton, 1997 p. 9).

What Lombard and Ditton propose here, as presence, is really the idea of transparency: i.e. the apparatus of the virtual reality system that produces the VE in someway disappears and we experience only the VE. This, again, is tied to the displacement idea but is much more subtle because it includes the notion of medium. Presence here is defined as experiencing a VE through an interactive medium.

John and Eva Waterworth propose yet another conception of presence:

“We see presence as the feeling a conscious organism experiences when immersed in a concrete external world. This feeling must be distinguished from engagement in internally constructed mental worlds, in organisms equipped to construct such inner realities.”

(Waterworth & Waterworth, 2003 p.1).
They go on to develop the distinction between presence and absence – Presence being the focus of attention driven by the demands of an external world – absence being the degree to which knowledge and abstraction plays a part in diminishing a sense of presence.

3. Forward and Backward Presence

One particularly interesting take on all of these theories of presence, is that developed by Luciano Floridi. Floridi (2004) considers that the presence community has essentially misunderstood the concept of presence as the ‘epistemic failure’ (EF) to perceive mediating technology. Instead, Floridi offers his model of presence as the successful observation (SO) of some mediated object through levels of abstraction. For example, Floridi suggests that, in our everyday environment our sense of presence comes through the levels of abstraction built into our cognitive/perceptual system. Similarly, our sense of presence in a virtual world or remote location comes from how well our levels of abstraction fit with those provided by the technology we are using to sense the environment. Most VR systems, for example, are based around providing sense information for the visual system as opposed to e.g. haptics. While some may combine both, perhaps even with aural immersion, they very rarely provide full relocation of a person from a local environment to a remote environment.

Developing these ideas, Floridi outlines the ideas of forward and backward presence (Floridi, 2004) Forward presence is about somehow extending one’s range of manipulation from a local space to a remote space or the possibility of being perceivable as a property-bearer in the remote space. That is to say, maintaining agency over long distances or in a virtually displayed environment (e.g. a robot arm on Mars, drilling holes into rocks). Essentially, this is a matter of how well the system supports interaction with or at the remote location. Backward presence is essentially the converse of forward presence. It is the bringing of a remote space to a local one. It is about the display of remote information at the local site i.e. it is about surveillance, or looking at e.g. pictures of Mars taken by a rover and beamed back to earth. Essentially this is about display and requires neither direct manipulation of the remote environment nor any representation of the agent in the remote environment. Full presence would then be the combination of both modalities, although VR technology tends to produce experiences that render each of these forms of presence only in part, perhaps largely favouring backwards presence over forward.
The interesting thing about this is that Floridi immediately connects forward presence with agency, although forward presence may be just a matter of being perceivable remotely. Backward presence for Floridi has no agency and is essentially like what watching television is for most people, namely a passive experience that does not transport the viewer to the site of the action but merely provides a window onto another world.

The great difficulty with presence and VR technology is in trying to understand how well it supports both forward and/or backward presence. For example let us consider a virtual world created as part of the Benogo project (O’Neill et al, 2004; O’Neill & McCall, 2004; McCall et al, 2004a, McCall et al, 2004b; McCall et al, 2004c; Turner et al, 2003).

This virtual world is made up of photographs of a real place. By using real-time Image Based Rendering (IBR), a representation of that place is created in an HMD. 360 degree real-time head tracking allows for the impression that one is able to look around inside the virtual world. This system is high on backward presence. It brings a remote world to the location of the user in a particularly high fidelity way, creating an environment that appears very realistic. The real-time rendering also allows for motion parallax and occlusion in the virtual world over a very small area, so that depth perception and the closeness of objects is enhanced. However, this is as far as it goes. Beyond a 60cm diameter, the images disappear and there is no element of agency within the world other than the sense of ego motion. Nothing can be touched picked up or moved, there is no interaction with the displayed images. In short, there is no forward presence, the user does not inhabit the virtual space.
4. The production of Space

In ‘The Production of Space’ (Lefebvre, 1991; Shields, 1988), Henri Lefebvre produces a detailed exploration and analysis of the complex issues of space from a critical Marxist perspective. With the view that:

“Consciousness is produced through the material practices in the conduct of everyday life” (Shields, 1988 p. 2).

Lefebvre highlights the repression of the ludic aspects of existence in favour of rationality and productivity. The key to understanding Lefebvre’s critique of the production of space is in understanding his explanation of how this focus on rationality and productivity has resulted in not only the alienation of the ludic but also the alienation and exclusion of the body and its extensions.

Lefebvre sees the body and its extensions as central to the production of space. Moreover he explains that this production of space is, in its natural state, a playful and social activity. He suggests the example of the spider and its web. The spider has no logic or intellect, it cannot understand Cartesian space, and yet it extends itself out into the world by producing a web, full of angles and intricacy. The web is a natural extension of the spider. The web is the space that the spider produces naturally. Continuing in this vein, Lefebvre points out how the social activities of people and their bodies are central to producing natural human spaces. He goes on to elucidate how this naturally produced space has been lost as mankind has evolved and produced new ways of existing that are based on philosophical and scientific positions that exclude the body (particularly Descartes). Lefebvre traces the evolution of produced space from a naturally social body-space, through the development of settlements and cities as images (spaces of representation e.g. the Lascaux caves, sites of artistic expression) and on to images as cities (representations of spaces e.g. the Roman pantheon of the gods, Christian churches). His history of produced space arrives at the production of a fragmented post-modern abstract space where the image of space has all but taken over in the form of the ‘spectacular’ space that continues to further exclude the body.

Essentially taking a Situationist perspective like Guy Debord (1995), with whom he was closely associated for some time (Hussey, 2002; Knabb, 1981), Lefebvre calls for a realisation of the difficulty of living in this kind of space. By focusing on understanding
how this space is produced and how we live in it, the Situationists make us understand how to reclaim that space by re-appropriation, détournement and dérive. Ultimately, their aim is to reclaim their own agency in the production of space, freeing themselves from the illusions and spectacle of abstract space. The dérive, for example is a technique of aimlessly wandering through cities, experiencing them first hand, free from preconceived notions about social practices. Détournement, on the other hand is the Situationist practice of subverting imagery and slogans to make the alienation of the spectacle evident.

5. Virtual spaces and places

As Turner and Turner have pointed out (Turner and Turner, 2003), Virtual environments continue to be spaces where bodies are excluded. Their critique of the lack of contextualisation in virtual environments explores the role of the body in understanding and turning spaces into places. While they do not draw upon Lefebvre’s theories of space, they do explore philosophical, psychological and phenomenological studies of place and how a sense of place comes about. Their explication of place, drawing on the likes of Merleaux-Ponty, Heidegger, Relph and Gustavson, arrives at an understanding of place that is very similar to Lefebvre’s production of space, in that they also highlight the role of the body and the social as important factors in the existent production of places. What Lefebvre calls space they call place. Where they differ is in the fact that Lefebvre's critique focuses on the alienation of the body and its extensions, including social and political aspects of existence, from everyday life. This consideration of alienation is not a strong feature in much of the other place literature. However, it is more than relevant to the discussion of space and place in VR.

Like Floridi, Turner and Turner point out the essential visual nature of most virtual environments that tends to exclude the body (i.e. they lack forward presence as agency). Moreover, they realise that most people that use virtual environments are usually researchers, or participants in research experiments who, as a result, spend very little time in them. In short, Turner and Turner point out that people generally visit virtual places, as if they were tourists. Tourism, according to the Situationists is an entirely spectacular affair, which is the result of the separation of the ludic and the productive in everyday life, to form work and leisure activities. Indeed, Turner and Turner discuss the nature of the manipulation of the tourist and tourist sites so that the tourist’s gaze:
“Falls upon what the gazer expects to see – untidy aspects of life are tidied away or outlawed.” (Turner and Turner, 2003 p 307).

6. Agency and the Virtual Spectacle

If Floridi’s model of presence is right then VR that does not support forward presence (and this appears to be the case with most VR) runs the risk of being essentially spectacular rather than interactive. This being the case it would render most of our virtual spaces as essentially uninhabitable, in a traditional sense, due to the exclusion of the body. A Situationist critique of VR (O’Neill, 2004) then reveals ‘the illusion of non-mediation’ as the development of new mediating technologies that promote a higher level of fidelity and reality that, while they cannot be distinguished from the mediated experience, continue to alienate the user as the spectator of non-interactive spectacles. The illusion is no longer in just trying to hide the technology, it is in trying to hide the fact that we cannot act in these types of environments that are presented to us as the highest forms of mediation available to us. However, if we cannot inhabit these spaces, our sense of presence is diminished and they cannot in turn become meaningful places to us. We cannot make meaningful attachments to these virtual places as we cannot use them like real spaces. In short, they remain representational.

This state of affairs begs the question; are virtual environments best understood as spaces or as representations of places? As representations they may have meanings for us and may respond better to analysis in this respect. While it is not possible to build emotion into bricks and mortar as such, it is distinctly possible to render representations of places that carry some element of extra feeling or meaning with them. Landscape artists for generations have been attempting to capture something of the sense of a place with their brushwork or photographic skill. This is what distinguishes great works of art form well executed draughtsmanship. Perhaps this type of analysis of illusion is more appropriate for spectacular virtual spaces than a critique of space and place alone.

7. Remediation and Representation

Bolter and Grusin (Bolter & Grusin, 1999) concentrate on the notion of ‘remediation’ when tackling this issue. They identify two fundamental types of media that they consider to have been derived from older media forms such as painting, photography and film. ‘Immediacy’ is a feature of media that offers ‘being there’ type of experiences through high fidelity representations of real worlds or realistic fantasy worlds that hide
its mediating qualities. ‘Hypermediacy’ is a feature of media that foregrounds the medium itself, resulting in the opposite of immediacy, where mediation is made obvious and an understanding of it is necessary to operate in it.

A fundamental aspect of their critique is the idea that all ‘new media’ arrive on the scene as unique entities offering unparalleled forms of experience and representation, when they are in fact modifications or reformulations of already existing mediating principles. A feature of this appears to be the primacy of immediacy type technologies in driving media forward as part of a quest for better and more realistic mediation, giving the illusion of non-mediation (Lombard & Ditton, 1997).

An example of this type of media would be a flight simulator that offers a first person perspective of flying a plane. Bolter and Grusin argue that the flight simulator is a ‘remediation’ of the televsional experience, which in turn is a remediation of cinema or photography that portrays the same scenario. Each successive remediation is considered as an upgrade, a step closer to reality for the viewer, as the medium by which the experience is conveyed is either hidden or systematically removed from the experience, resulting in a unified space of reality and the illusion of non-mediation. ‘Telepresence’, for example, is the feeling of being immersed in a mediated virtual environment while physically being located somewhere else (Witmer & Singer, 1998) without necessarily being aware of mediation taking place. The flight simulation is experiencing the virtual environment as your ‘immediate’ surroundings. That is to say that the media represented to you is done so in such a way as to make you believe that you are actually flying a plane.

This idea is also evident in the work of Paul (2003) where she discusses the recombinant possibilities offered by media that result in seamlessly integrated visual images that defy pictorial logic, presenting often-fantastical scenes as if they were reality. Manovich (2001) also discusses this notion of illusionism and the technological progression towards the improved rendering of reality for the viewer from a cinematic perspective. Oliver Grau’s book “Virtual art” (Grau, 2003) traces the development of this type of immersive technology back through the renaissance to the frescoes of ancient Rome, where some interiors were painted with representations of outdoor scenes on a grand scale.

8. The spectacular space of VR

Virtual environments have given rise to an interesting and unclear relationship between the dialectics of space, place and the form and content of representation.
Clearly, there is already an existing critique of virtual reality that draws upon notions of representation and remediation. However, it has not as yet been able to delineate the relationship between representing spaces/places in relation to the problems of inhabiting those spaces/places.

Virtual worlds essentially combine rhetorical elements of spatial organization with the logic of the image. They offer the possibility of occupation and inhabitation of technologically localised places. However, more generally they deliver visitation and visualisation of places that, despite attempts, remain remote. It is perhaps obvious, but often overlooked that, as Floridi points out, it is the possibility of agency and ‘being observable there’ that is key to the production of presence in a remote virtual environment. Similarly, it is the insights of Lefebvre and the Situationists that point out the alienating characteristics of the spectacular space of which virtual environments appear to be the latest manifestation. Essentially, virtual environments are like Lefebvre’s ‘images as cities’ they are totally abstract and representational and as a result alienating to their inhabitants when presented as alternative spatial realities.

If we can see the difficulty in attempting to theorise virtual spaces from the logic of real spaces, in light of VR’s representational origins, then perhaps it is possible to develop a hybrid critique that fully explores the unique features that virtual environments do possess. After all, the combination of the representational and the spatial with new technology raises new questions about viewing and inhabiting spaces of all sorts.

9. Discussion

As we move towards becoming designers of these new types of spaces it is important to identify some specific features of this combination and attempt to understand whether we are designing spaces, places or representations with our various versions of this new technology.

To summarize:

- In order for a virtual space to become a place it must be inhabitable and for this to occur ‘forward presence’ in the form of agency as defined by Floridi is a primary requisite.
- If virtual spaces do not include forward presence in the form of agency, then they are effectively uninhabitable, which renders them mere representations of spaces/places.
• Without the possibility of agency, represented spaces cannot follow the logic of real space and are, as a result, pushed into the realm of the spectacle, as clarified by Lefebvre and the Situationists.

• Underlying the very nature of VR is the aim to produce the ‘illusion of non-mediation’, promoting the idea that virtual places could be possible replacements for real places when in fact they are not. Indeed, this particular form of spectacular utopia remains unrealized, while the rhetoric remains evident.

• Virtual worlds that do promote agency do not, a fortiori, support the full agency of the human body. Therefore, while presence may increase and the experience may seem more realistic, the alienation of spectacular VR remains. Indeed, it takes a firmer hold, hiding itself behind the positive notion of the possibility of interaction that is ultimately diminished.

It might be that, in designing virtual worlds we should be designing spaces to become places like architects do. The problem lies in the fact that we are not designing inhabitable spaces like architects. Virtual worlds, whether seemingly new or based on already existing spaces or places, remain largely representational. This applies to any VR technology that attempts to recreate any space as it can only ever be an interpretation of that space. Therefore we ‘spectacularise’ them, taking on the role of tourists that visit them fleetingly, not inhabiting them daily.

As technology develops, better presence experiences will be possible and more agency will be supported. However, this does not swing the critique of virtual spaces towards logic of real space. While the logic of real space becomes more relevant, the notion of spectacular VR can never be fully eroded. Indeed, if a virtual world should ever be built that successfully maintains the illusion of non-mediation allowing full inhabitation and agency, one might argue that the spectacle had taken over entirely as in the film The Matrix, where agency in one world is indistinguishable and yet very different from agency in another.

So the question is: are we making representative spaces or places? If we are designing representative spaces, should we not be concerned only with the physical aspects of space that can be measured and represented faithfully, textures, qualities of material etc? Indeed, representations of spaces can, in many respects, be formal and symbolic, as in architectural plans and drawings, showing fixtures, fittings and
measurements etc. In this sense, they need be nothing like reality and may still afford us the opportunity to view or even visit them.

If we are designing representative places should we not be taking into account that our representations are really only snapshots of spaces at specific times of day under specific lighting conditions, perhaps using certain camera effects, or indeed rendering effects in VR, all of which might give the representation extra meaning, perhaps even extra meaning that might not be representative of a particular place i.e. meaning we do not want? Furthermore, we must ultimately be aware that, without agency in the virtual world, the experience of inhabiting that space will always be diminished and therefore remain largely placeless.

10. References


Learning Together “There”-Hybrid “Place” as a Conceptual Vantage Point for Understanding Virtual Learning Communities in Higher Education Context

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ABSTRACT

This article examines the concept of virtual learning community as a hybrid learning place. It is argued that a hybrid place experience could provide a conceptual vantage point to better understand the origins of virtual learning communities in higher education context. With some empirical observations it is demonstrated what may constitute students’ experiences of hybridity during a web-based university course. It suggested that the research on learning places should include not only virtual but also physical environments, with individually-focused ways. Finally, the role and the challenges of educational design in optimising resources for virtual learning communities to develop are discussed.

Keywords: hybrid place, virtual learning community, higher education, educational design, collaborative learning, computer-supported collaborative learning.

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1. Introduction

Looking at the studies of collaborative learning and computer-supported collaborative learning (CSCL), in addition to cognitive approaches, many of the contributors make reference to contextual aspects surrounding joint learning activities. For example Crook (2000) lobbies for more ecological approach in studying collaborative learning. He states that in spite of the growing level of complexity in research settings, an understanding of collaboration is essentially created through focusing on the actual environments in which collaborative learning activities are orchestrated. Also, respecting the diversity of social, cultural and material conditions surrounding collaborative activities could help a broader perspective of collaboration that acknowledges not only the collective but also individual levels of learning (Stahl, 2004).
Alongside, the current wave of interest in higher education (e.g., Virtual University) sets demands on developing novel educational practices that support collaborative learning in virtual environments (Häkkinen & Järvelä, in press). The ecological approach, together with the advent of educational technology may allow to extend the idea of learning environments towards informal, attractive and rich learning infrastructures that can facilitate successful collaborative activities in virtual learning communities to emerge (Goodyear, 2000; Pöysä & Lowyck, in press).

“Community”, as well as “communication” and “communal” are words, drawn from the same basic origin in English language- one that evokes some kind of association, sharing and participation in common relationships (Davies & Herbert, 1993). Traditionally, humans have always been part of groups that can be called communities where close ties and personal relationships, often based on kinship and on reciprocity, bind people together (Putnam, 2000; Hyypä, 2002). What is more recent is the extension of community into virtual environment its members linked globally by information and communication technologies. As such, virtual communities could be seen as one of the spatial and temporal transformations of the contemporary social life in general that are rather supplementing than replacing older ties (Shumar & Renninger, 2002; Parkin, 1998).

Educational research on learning communities has resulted in a rich mixture of different understandings of the concept of community. The concept is being used to denote to “social infrastructure” (Bielaczyc & Collins, 1999; Bielaczyc, 2001), “communities of practice” (Lave & Wenger, 1991; Wenger, 1998), “communities of learners” (Brown, 1997; Brown & Campione, 1994) or “knowledge building communities” (Scardamalia & Bereiter, 1992; 1994), for example. Albeit, as the existing literature testifies, the concept of community has been examined from various points of view, research and conceptualisation also involve common themes of interests. Often, it is underlined that associations take place in some defined and shared area- be it physical or a virtual environment. But, it is also remarked that the connection to a community is not only spatial but also emotional and cognitive. Scholars in phenomenologically inspired environmental psychology (see Buttimer, 1980; Casey, 1996; Relph, 1976; 1985; Seamon, 1982; 1983; 1993; Tuan, 1977) have for long studied person-environment relationship with the focus on the ways in which a sense of place is created. It is argued that an undifferentiated “space” becomes a distinctive “place” when members come to know it better and endow it with value (Tuan, 1977).
However, place is difficult to define in abstract and in this light, definitions draw on duality as an essential quality of place. It is emphasised that place holds both material and symbolic meanings as counterparts. Place may not be seen only as an entity, a state of being, but also as a continuous and changing process of creation of communal identity (Fernback, 1999). Also, places are constantly defined and redefined by its member (Casey, 1996), which may happen both at individual and at communal level. That is, place is experienced individually but held collectively. Yet, more recent space-place debates emphasise the affects of information and communication technologies in conceptualisation and in this way, highlight the concept of place as hybrid. Hybrid place experience, then, does not denote to a single place, but instead it is likened to an experience being distributed over various places nearby and remote, including environments online (e.g. Blum, 2002; Powell, 2004; Rohde et al, 2004).

However, in spite of the increasing number of research in the field, we do not fully understand how communities evolve in educational context. Too narrow focus on the “technology” might blind us about what university students’ actual learning environments include and consist of (Nardi & O’Day, 1999; Goodyear, 2000). Primarily, early research on virtual communities often abstracted participants from their physical environments (Jones, 2002). In recent discussions this starting point is made less relevant in the face of more holistic portrayal and the theme is also taken up in the studies of educational technology. It is emphasised that during a web-based course, the boundaries between “physical” and “virtual” are not as firm as many might suggest and in this way, students’ interaction may not be restricted to the technology deployed on online learning setting (Dillenbourg, 2000; Rohde et al, 2004; Pöysä, Mäkitalo and Häkkinen, 2003). Instead, interaction often consists of an amalgam of virtual and face-to-face communications where students’ on- and offline milieus are not separated but are part of the other. As Illingworth (2001) says, virtual interaction and learning should be seen in a broader social context that also include face-to-face settings- the physical contexts of virtual interaction.

In this article it is put forward that a hybrid place experience, distributed over virtual and physical learning environments, could provide a conceptual vantage point to better understand the basics of development of virtual learning communities in higher education context. With some empirical examples, the aim is to illustrate how students experience hybridity- what may constitute their “learning place” in the context of web-based university course. Through the examples the relevance of and the tensions between the variety of material and symbolic resources available, on- and offline, are
explored. Finally, it is discussed, how educational designers, looking for innovative ways to optimise resources for collaborative learning in learning communities to emerge, could utilise “placial” approach in their design practices.

2. From local place sentiments towards place experienced as hybrid

The material and symbolic aspects connected to community may, then, crystallise around the rich and vivid concept of place. In its conventional meaning, the concept has a strong territorial connotation. According to Casey (1996), place gathers. Thus, place is not empty of content but collects a history in forms of individual and collective experiences and memories. This continued history allows people to return to place again and again not just as a same position or a site but as same place. In this way, place has an identity and unique attributes, designated by its members and those attributes make it different from other places. Rather than to Erfahrung, “knowledge” of place, then, denotes to Erlebnis, “lived experience”. However, Casey (ibid.) notes that this experience is appropriate only to particular place, to its unique properties and cultural characteristics.

Place experience can be defined through a sense of “being-in-place” (e.g. Casey, 1996; Lovell, 1998; Schama, 1995) where the heart of the experience is the varying intensity of which people belong to and identify themselves with certain place (Relph, 1976). To be present in place can be, then, seen as fusion of experiences that take on culturally constituted, material and symbolic qualities of that place (Seamon, 1983). Similarly, the same place may foster different experiences for different individual actors. However, these experiences are not necessarily intense or positive but, still, distinctive (Relph, 1985).

In modern world, the holistic notion of place experience remains highly topical when the use of information and communication technologies enables people to interact and to share information faraway (e.g. Blum, 2002; Powell, 2004). Alongside face-to-face communications, day-to-day experience of living is more often performed and mediated with the use of mobile technology, writing emails and more. This has extended the possibilities to exchange experiences without moving “in” or “out” the actual geographical place. In this way, contemporary everyday life is organised around and defined by a variety of elements from environments nearby and remote.

Aforementioned, place experience, mediated through different technologies, can be characterised as hybrid. To be ‘There’- to be present in hybrid place, is an experience of presence being distributed over both symbolic and material resources in on- and
offline environments (Gamberini & Spagnolli, 2003). The hybrid place experience is an experience of about where the participant is but it draws its meaning from the personal combination of the ingredients of immediate and distant environments. It is not completely about either and but it has qualities of them all (Blum, 2002). Its varying intensity can be maybe best understood as an experience based on different material and symbolic resources available (as a mixture of places on- and offline, different participants, various tasks and roles) in the given situation. The variety of resources from which the presence derives, are, then, all necessary ingredients of the situated experience of hybridity (Gamberini & Spagnolli, 2003; Mantovani et al, 2001). In this way, hybrid place may become equally “real” comparing to sentiments connected to “traditional”, local places (Blum, 2002).

3. Virtual learning place

Nowadays in university setting, educational practices are more often fixed around web-based, collaborative learning environments. This poses challenges for educational design: it may no longer rely on understanding of learning merely at solitary level. Virtual learning communities- with all the complexity of relationships between individual and collective needs, different motivations and personalised objectives- could enrich learning and enable the novel forms of interactions and relationships between the learners to grow. In this paper it is argued that the essence of virtual learning community in higher education setting could be better understood in terms of hybrid place experience.

However, research on virtual communities in educational context demands a consideration of the use of the term “virtual”. “Virtual” learning community is not comparable to “virtual reality” or “cyberspace”, even though it may have elements from them. Normally, participants are not anonym individual actors who tend to gravitate toward online community mainly for the reason of mutual interests and shared affinity, for example. But, in educational context virtual communities often arise through assignment, and hence it may be unrealistic to assume that a community holds too exaggerative meanings to the students involved (Kolb, 2000). Yet, technology may alter the ways in which learning activities are orchestrated. With different constellation of communicational, spatial and temporal possibilities, elements of web-based, collaborative learning environments may allow for particular qualities of communication to develop between the participants and in this sense create an access and intimacy not transferable to situations offline (Langham, 1994).
Aforesaid, experiencing virtual learning community could be referred to experiencing place as hybrid. During a web-based course, the actual learning place students inhabit is often multi-locale, a complicated mix of formal and informal interaction, in face-to-face and online situations. It can be characterised as an experience of presence being distributed over different places in virtual and physical learning environments, on campus and at home. To look for the essence of hybrid place is maybe to highlight the variety of material and symbolic resources available for the participants- the relevance of and the tensions between and also, the way and the level of intensity they come together in a given situation. These different resources may consist of various locales (virtual or physical) and different co-participants involved, varying motivations occurred as well as a range of personal and shared tasks and roles performed, as an example. In the following, with some empirical observations it is described how students’ experience the hybridity- what may constitute the lived “texture” of their learning place during a web-based university course.

3.1 Hybrid place in university setting

The study in question was conducted during a semester long web-based course. The course was organised for teacher trainees majoring in English philology at the University Jyväskylä (n=13) and at the University of Oulu (n=9) in Finland. The observations here are from a sub-group of three students studying at different universities (two of the group members, Saara and Liisa in Jyväskylä and one of them, Tiina, in Oulu). The group chosen here was a good example of students who were not only meeting face-to-face but also collaborating from distance.

The course was carried out in four different phases. In the first phase of the course Oulu and Jyväskylä had local face-to-face meetings where the web-based learning environment (called Discendum Optima) was introduced and the contents and the nature of the work was discussed with the students. In the problem-based casework students’ main task was to formulate joint research topics connected with the domains of culture and communication in virtual environments. To prepare for the research workshop, students charted the field by analysing the key concepts and reading articles of their own choice or from the reading list (“Resource Library”). The aim of the second phase of the course was to form research groups. During a face-to-face meeting in Jyväskylä, Saara and a fellow student, Liisa, formed a group together. They found a common topic that was related to the other studies they have to accomplish. Later on, Tiina from Oulu joined their group. In the third phase the sub-group worked together on
their topic “Communicating thoughts. The scope was to make a profound analysis of the topic and to arrive at joint research report. In the fourth phase all the groups presented their joint products during a videoconference meeting between Oulu and Jyväskylä. The course finished with an evaluation discourse concerning the content, organisation and the working processes of the course. Evaluation took place in the web-based environment.

The examples here draw upon a broad range of material. The data comprise online diaries, a shared online document of the group (named “Project log”), web-based discussions (in discussion forums), chat logs, recorded videoconferences and “Net Meetings”. Online diary was implemented in the form of text notes (regular personal emails with the researcher) and visual notes (photographs taken from important places, events and people with short captions explaining them). Individually prepared diary was particularly designed to give access to participant’s personal experiences also outside the web-based learning environment and in this way to highlight processes that may otherwise remain “invisible” or be simultaneous.

The study fostered the impression of changing and subjective qualification of what “being-in-place” can mean to different individuals. Below, with some examples, the aim is to show how differently members, even from the same sub-group of students (Saara, Liisa and Tiina), experienced their learning place during the web-based course.

In the examples 1, 2 and 3 the ways in which participants experience hybridity derives from their experiences working in online learning environment. However, the experiences are grounded on the affordances and limitations of environments offline. These examples represent either individual experiences or they point to situations when students were collaborating simultaneously with their fellow student(s), for example using chat function in Optima learning environment or having “Net Meetings”.

Example 1:

In the fragments here student depict their experiences in online environment, referring to discussions taking place in discussion forum in Optima environment or to information searching in the Internet, for example. Yet, these experiences are influenced by an environment other than the virtual. Also, tensions created by the text-based quality of communication are strongly present in the excerpts. In example, the limited access to the Internet hampering participant’s personal contribution to the course or additionally, the fragile nature of communication in online milieu colour these personal accounts.
“Working today was really difficult. All I got done was answering other people’s comments about my comments (plus we solved the problem about seeing and showing our pictures, so now I am on the net!). I tried hard to create a new discussion about the communication problems, misunderstanding and correction when teaching and learning in this kind of an environment, but just could not find the right words. So, no new discussions. I’ll try to make one still this week, now that I have had time to think about it.”

“Yesterday it was not fun in Optima, as it usually has been. Maybe this time I tried to be more serious: I did not want to comment others only, I wanted to say something that I find important, too! But I was too shy for that... Maybe next time?”

“I am sitting in the Norssi lobby for teacher trainees and feeling extremely insufficient: just few seconds ago I visited Optima environment and became more disoriented and confused than ever again. There is just too much information in there for me to grasp and to go through it takes just too much energy and time for now. I am also extremely disappointed about the fact that I have to wait at least for another month before I’ll get my own internet-connection.”

“I’m planning to spend some time Googling... looking for articles about language use and virtual communities. Somebody on some discussion list here wrote about people starting to talk the same language so that they can think there is a community. Is the C only a linguistic thing in computer-mediated (text-based) environments?”

Example 2:

The following fragments are based on experiences in communicating online and synchronously for example as a pair using chat or, as a sub-group, having a “Net Meeting”. The use of chat or “Net Meeting” was experienced to allow for interaction with qualities close that of speaking, and in this way, to enhance and fasten their negotiation processes as a group. Yet, to find a physical place and suitable time for the “meetings” online was experienced to be even more complicated than in traditional learning settings.
“Ok, so now we used the chat-thing in Optima with Tiina. She scared me by inviting me in, and we had a nice long chat about our project (our chat can be found in the CT-folder).” [...] [Folder of the sub-group] (Diary entry by Saara, 4.11.)

“In any case we are now in good phase. We have a group of three (Tiina is from Oulu-group) and yesterday we had a netmeeting with video-connection. Scary but also a good chance to find out how to use the latest technology and how it helps us!” [...] (Diary entry by Liisa, 7.10.)

“... just think how quickly we reached a decision in NetMeeting! --Then there is this problem of finding a place and a time slot for working here, even if it is only for one person. I really don't think that virtual learning is free of limitations of time and space; these aspects can actually be more complex than in 'traditional' forms of learning.” [...] (A message for the sub-group in the “Project log”, by Tiina, 13.11.)

Example 3:

In the following excerpts participants share their online learning experiences within the sub-group. It is reflected how the online environment may also ameliorate individual work in offline learning environments. In this light, for example the jointly constructed online document (“Project log”), acting as a visible history of their collaborative work, was experienced to be highly beneficial.

“It is definitely a benefit of Optima that the group, every member of it, can see all the previous documents, too. That way everyone can always go back to what has been said and done. That way the ideas stay "deposited" forever. I suppose, if we went on with this project that we could go to our ideas and start elaborating them. In any other environment at least some, probably many, of the (possibly good) ideas would be lost because they would not be written down. This makes making notes to some kind of a file very important during the F2F meetings.” [...] (A message for the sub-group in the “Project log” by Saara, 22.11.2002)
“OK, I have been reading your interesting messages [writing to Saara and Tiina] and I even printed both of your 'mind maps' so that I'll be able to really think (and touch) them. For now I can't give any valuable suggestions but I expect to have few after I have thoroughly read yours. We have our class on Wednesday, so I'll try to come up with something by then or during that time. I'll be all alone there so don't expect anything too intelligent, though =).” [...] (A message in the discussion forum by Liisa, 29.10.)

“I think our project log or adventure log is helping me to keep the sense of continuity: if this document was not here, some parts of our work would seem to be fragmented and not part of a whole. Now I can go back and read the whole adventure from beginning to end several times and see if I have anything new to add.” [...] (A message for the sub-group in the “Project log” by Tiina, 13.11.)

In the examples 4 and 5, the hybrid place experience arises out of individual as well as of collective experiences distributed over on- and offline environments. These examples aim to demonstrate some possible modes virtual learning environment can become integrated into physical environment, on-campus or at home. Also, the examples may provide information of events originating elsewhere, not available in the web-based learning environment.

**Example 4:**

Following excerpts pinpoint to a situation at the university campus, where the virtual learning environment was strongly present in physical place. Here, the hybrid place was practiced as a robust combination of activities online and as ordinary face-to-face communications in the computer lab, partly simultaneously. Yet, not all the individual activities conducted on the computer were shared with the peer.

…”Today we spent most of Optima-time [pointing to a classroom session] writing explanations to our digi-pictures. Lisa wrote something to Tiina in Optima, but my computer decided to go crazy so I could not read it, and Liisa just said it was not important. I read the message later, and maybe it was not important, but it is interesting to get a grab of what is going on in Optima – basically I have to read the messages every time I
see that something is going on in our CT-folder (as Tiina has named it). Anyway, we are learning how to work asynchronously and in writing. Not very easy at times, and definitely takes time. But it is interesting, anyway. We made a suggestion to Tiina that she will start working on our front page and then we'll complete it, let her comment it and then put it into the CT-folder - - let's see how much this will take time!!" […] (Diary entry by Saara, 30.10.)

[…] “In the beginning Saara was my biggest comfort especially our f2f discussions, but gradually I did more and more of the discussions in Optima.” […] “My learning environment was Optima, classes, NetMeetings and basically whenever I met Saara and we started to discuss about Optima.” […] (Diary entry by Liisa, 28.11.)

[…] “Unfortunately, I can't attend to the face to face meeting today. I'm still working with our group (Saara and Liisa from Jyväskylä), and we're going to have our second Netmeeting tomorrow morning. We'll probably shift our focus to making the final presentation this week, though our conversation is still going on. Hopefully, I will have the permission of both Saara and Liisa to take a few screenshots tomorrow if we're going to use Katri’s [a teacher in Oulu] videocamera. It would add a nice touch to the presentation.” […] (Personal log by Tiina, 28.11.)

Example 5:

These fragments show how the virtual environment may come together with informal situations in physical environments. For example, the online, collaborative work of the students in Jyväskylä was often grounded on the face-to-face communications. In this way, much of their work was done remotely by using private channels of communication outside the public discussions in Optima environment.

[…] “I think that, as you yourself [Liisa] said, part of the reason for you seeming less active here in Optima is that at times I write things like ‘Liisa and I just discussed... Even if we are working with you, Tiina, here on line, we cannot help discussing things as we meet around the campus here in Jyväskylä. I might give a hint to Liisa that ‘you just might want to go and see
what Tiina has written’, and so the story goes on: I tell her shortly what you’ve written and then we discuss it and then I end up answering you on behalf of both, Liisa and me.’ […] (A message for the sub-group in “Project log” by Saara, 8.11.)

[…] “If I had had Internet connection at home I would have felt even more freed: I could have read Optima whenever and wherever I wanted, now I had to use timing and place that was arranged for us by the ‘teachers’ “ […] (Diary entry by Liisa, 28.11.)

[…] “I woke up at 9 am, started making some pea soup. (Thinking about how I should start working in Optima). […] I got the soup ready to stew at 10 o’clock, and finally started reading what you two have been writing here. I sat down knitting a sock and reading Optima... (you can see a picture of the almost finished sock in the Test folder) ... and thinking but did not get much written... but I was “thinking* all the time” […] “So, what’s the point of this little story? It’s related to the fact that sometimes I don’t count the invisible work (i.e. thinking or talking) as work... but I should do so. Seen from that point of view, I have been working on this topic (though, I have to admit, in a somewhat fragmented way) all the day, except for a few pauses. This is an interesting point of view to look at things and it helps me to feel a bit better about my contributions here.” […] (A message for the sub-group in “Project log” by Tiina, 17.11.)

Finally, through examples 6 and 7 it is described, how students experienced their hybrid learning place, especially the presence of online learning environment during their informal practices offline, on campus (with a pair or as a larger group of students) or, for example, when studying alone at home.

Example 6:

In the fragments here it is presented how virtual learning environment somehow moulded participants’ informal practices offline, as a joint or as a solitary experience. Here, participants’ interaction was not restricted to the course itself, but students met for other studies on-campus, for example.
The excerpts below illu minates a situation in which the group members’ learning activities were primarily situated offline (for example reading the material at home) and this way, not constantly “visible” for the other members of the group. Here, the main resource for communicating was the remote technologies. With these notes, participants might have strived to amplify the sentiments of (still) “being-there”, actively working for the task and in this way, to keep the sense of continuity of their joint project.

[...] “I just wanted to inform that I got the book we were yesterday talking about and I’ll try to start reading it this weekend. It didn’t look very appealing but it discusses about the ideas we are dealing here, so it might turn out to be very useful, in any case.” […] (A message for the sub-group in discussion forum by Liisa, 7.11.)

[...] “I suppose we are all feeling guilty about not being too active in Optima this week. I think there’s no need for that, since we all have been working
on our project ‘in real life’ -- i.e. reading at home!” [...] (A message for the sub-group in “Project log” by Saara, 15.11.)

[...] “I realised that I think about our project (or the two projects) or something that is happening here in Optima almost always I’m on my way to the campus or back home, especially after I’ve been actively doing something here (read: spent time reading and/or writing). So -- I think I want to find a picture of me on my bike and include it in our presentation =) as “the* context of thinking!” [...] (A message for the sub-group in “Project log” by Tiina, 13.11.)

In the study, the material collected allowed the identification of the continuously changing and varied nature of the elements in experiencing “place” - attributes typically connected to hybridity of place. As observations here suggest, during the course, students’ learning place was full of elements of various places and different participants. In this way, insights drawn from the data highlight participants’ virtual and physical learning environments as deeply relational, coming together in different ways in students’ everyday practices. These observations also stress the positive role of educational technology in enhancing a sense of (learning) place for the participants. Yet, though the examples here provide insights how communication technologies can contribute of making the place, they also highlight the critical role of face-to-face communications in actual practices during the course. But, these varied, parallel, and also to some extent overlapping experiences may only hint at the whole complexity- and the richness- of students’ joint learning activities occurred during the course.

4. Discussion

Aforesaid, a place experience is not necessarily tied to a certain location (be it real or virtual environment) and in a similar way, a certain location is not necessary to place making (Blum, 2002). In this work, even a limited overview on the working practices of virtual learning community in university setting somehow illuminates the many overlaps between on- and offline learning environments. That is, students’ learning place was experienced to produce multiple and simultaneous practices, various people and intentions involved in them. In this way, web-based courses should not be seen as a substitute for the traditional educational practices in university context but rather, they may have a potential in enriching them. When on- and offline learning environments
come together as virtual places for learning, they may allow for certain social practices and connectivity to develop, not possible before.

As Casey (1996) finds, place is mould through the efforts and practices of those who essentially practice that place. Violich (1985) argues that places and people are inseparable, thus, and as Buttimer (1980) say, to understand how a sense of place is created is essentially to honour and equally value the actual experiences of people involved in them. Participants’ points of view are grounded in the everyday experiences of place and in the same vein, place experienced by an “outsider” may not represent the most significant feature for the members themselves (Barth, 1981). Looking at learning as essentially situated (Lave & Wenger, 1991), an understanding of participants’ personal experiences of their learning place could be thereby best created through looking at the everyday local level of practice, in individually-focused ways. The process of studying virtual learning community as a hybrid learning place should not be, then, limited to investigations of working practices only visible in the web-based learning environments. Instead, its challenge could be to somehow cover also physical learning environments and events outside the formal learning practices, be they simultaneous or even somehow hidden.

From educational design point of view, to succeed in “designing” or maybe at best seen as, supporting learning communities in virtual environments to emerge is to provide inviting and supportive learning infrastructures that meet the real activities of the participants. That is, to construct learning environments which may encourage participants to create their own and at the same time, communal places for learning (Goodyear, 2000). In order to make explicit how the different aspects of sense of learning place are achieved calls for an engagement and an interchange between the “users” and the “designers”. Here, “educational design” is used to refer to a holistic architecture of designing instruction- to collaborative and cyclical processes, where the role of design is indirect (Lowyck & Pöysä, 2001).

Interactive design process could serve two functions. Firstly, when viewed from the stance of the “user”, it may assist and sensitise community participants to become more aware and conscious of her or his individual learning processes. In this way, this may also help learners to situate their own learning processes within larger collaborative activities. Secondly, it could help the designer to include and to foster understanding of various underlying structures and interconnections within the community, which might otherwise go unnoticed and also, stay unquestioned. Thus, in creating a sense of learning place the transition from a viewpoint of “designing for”
towards “designing with” might be theoretically promising if also problematical. A challenge for the research in design is, then, to focus on how to develop a real interchange between the user and the designer. Finally, the notion especially important here is that in educational design, there is certainly a demand for finding a balance between on the one hand, overly “learner-optimistic” approaches (Lowyck, Elen & Clarebout, in press) and the other hand, over-scripting “natural” and rich collaborative learning (Dillenbourg, 2002). That is, to equally acknowledge not only cognitive but also social and contextual aspects of learning collaboratively.

5. References


Presence and Mediated Spaces: a Review

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ABSTRACT

The aim of this work is to present a review of presence in mediated spaces, namely those spaces experienced through the use of technologies. First, a distinction will be proposed between studies focused either on physical or human space, single or multiple inhabitation. Then, the way in which spatial issues are connected to presence will be described. Finally, some controversies on the nature of Mediated Space (MS) will be briefly mentioned, and how they are connected to the research areas previously identified.

Keywords: mediated space, human space, physical space, spatial presence, place.

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1. Introduction

There are many situations in which people feel they are in a technologically-mediated space, which is a space the user experiences through the use of technological devices. Examples include: navigating in a virtual environment; being a character in communities such as MUDs (Multi User Dungeons) or MOOs (Object Oriented MUDs); participating in a video-conference; communicating through a video-telephone; playing a video-game.

The aim of this work is to review in the area of presence in mediated spaces. First, a distinction in emphasis will be reported between physical and human space on the one side, and single versus multiple Inhabitation on the other. Then, the way in which spatial issues are connected to the “presence” concept will be described. Finally, some controversies on the nature of Mediated Space (MS) will be briefly mentioned, including realism, homogeneity, dematerialization.

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1 “MOOs and MUDs ... are software created environments. The software and databases reside in server computer connected to large networks ... Users or players connect or ‘jack in’ from remote network sites... choose characters for their virtual identity, a name with an associated descriptions. Participants are then presented with a scene, described textually, which establishes the user’s location in the MOO.” (Gaitenby, 1996, p.139).
2. The Mediated Space (MS)

Technology can help overcome some limits on human activity, by replacing and/or enhancing the resources available to support it\(^4\) or, in other words, to ‘mediate it’. Application fields abound, from medicine to psychology (therapy, diagnosis, rehabilitation, and prevention), from scientific visualization to architectural and engineering design, communication, marketing, advertising, organization and work, entertainment and gaming. In response to the broad use of technology in everyday life, research interest has been directed towards the study of mediated space. The nature (human or physical) and the number of users inhabiting MS may vary considerably, creating differences that will be described in the following sections.

2.1 Physical and Human Space

Even if MS is rarely conceptualized explicitly, studies position themselves varyingly on a continuum with a physical and a human conception of space at the extreme poles. This continuum partly reflects the distinction between “space” and “place” introduced in human geography. Here, ‘physical space’ means a focus on geometry, metrics, spatial configuration, the relative location of objects that for Casey (2001) describes space; ‘human space’ has to do with affective, socio-cultural aspects of an environment, similar to the notion of place (Adams, Hoelscher, & Till, 2001; Casey, 2001). Research dealing with physical space includes:

- Studies with the mediated environment as a faithful or a realistic recreation of natural environments. In the field of spatial navigation, Colle and Reid (1998), giving participants the capability to move about in a three-dimensional space, maintain that the similarity of MS with natural space is an important element in the users’ spatial navigation and orientation. In architectural and engineering design, Hirose, Takahashi, Koshizuka, Morinobu, and Watanabe (1996), showing an alternative way to generate virtual worlds, consider virtual spaces as a truly realistic reproduction of real environments. Rinalducci (1996) argues that virtual environments (VEs) are the extent to which the visual

\(^4\) Rolland, Ariely, and Gibson (1995), referring to Augmented Reality (a reality where a virtual image is superimposed on a real image through a see-through head-mounted displays), consider Virtual Environments as an enhancement rather than a replacement of real environments. Sharma and Molineros (1997) distinguish between Augmented Reality (AR) and Virtual Reality (VR): the former would enhance the person’s perception of the surrounding world, making the virtual world sensitive to the actual state of the surrounding real world during the user interaction with it; the latter would replace the perception of the real world with that of an artificial world.
features in virtual spaces are similar to the visual features in real spaces. A realistic reproduction of natural environments is considered as an aid to bridge the limits of the natural environments. In architectural design, Schmitt, Wenz, Kurmann, and van der Mark (1995) argue that a physical-based ‘physical space’ virtual reality (VR) that operates primarily through the simulation of physical aspects of real architectural objects can create convincing architectural VEs. This physical-based VR appeals to the fundamental elements of architectural perception, which includes tectonics, lighting, and materiality, because many limits of classical design models (Cartesian or geographic world models) are overcome. In the same way, Zobel (1995) argues that virtual space, in its similarity with natural environments, promises to bring the experiential qualities (texture, form, color, light, scale and movement) to the forefront, allowing participants to interactively manipulate and arbitrarily scale the environment.

- Studies of spatial orientation and perception in mediated environments, where the accuracy of the user’s spatial perception and distance estimation of the virtual environment (VE) is at stake (Wartenberg & Wiborg, 2003). Again, Colle and Reid (1998) underline the importance of metric features in three-dimensional spaces for the acquisition of a metric spatial knowledge (survey knowledge) of a local, immediate virtual environment (space within the user’s spatial span of attention). In order to understand the spatial exploration and navigation of the user, the authors propose a model that assumes the existence of two modes of spatial knowledge acquisition. The model depends both upon the metric features being explored and upon the action of the person in the virtual environment. Popp, Platzer, Eichner, and Schade (2004) underline the central role of distance knowledge (distance perception and estimation), during the navigation of environments in reality as well as in virtuality. The spatial knowledge is based both upon the Euclidean distance (the geometrical length between two points) and upon the route distance (the length between two points estimated both upon explicit knowledge, such as counts of steps, walking time, information from maps, and upon implicit knowledge, such as heuristics about time, speed, physiological effort).
When the mediated space is treated as a place, researchers focus mostly on the affective, social and cultural aspects of the experience in the mediated environments and the way in which its characteristics help to convey it.

- This is expressed in the design process, as is the case of Ciolfi and Bannon (2003; 2004). In research on the design of interactive physical environments, they adopt a geographical perspective on place, where the mediated ‘place’, focused on user’s experiential quality and pragmatically-oriented, is a dynamic interconnection of structural, personal, social and cultural elements. In the field of virtual learning environments, Kalay, Yongwook, Wook, & Jaewook (2003) treat MS as a ‘place’ for learning. In the design of these environments, the authors propose to use, as a metaphor guiding the design, a place-making metaphor where a place is “the setting that transforms mere spaces and activities into unique socio-cultural events ...” (ibidem, p. 195). The place is the product of human action, and a shared sense of place orients people with respect to the space where they and other users are spatially, culturally and socially located. In the field of Computer Supported Cooperative Work (CSCW), Harrison and Dourish (1996) consider the MS as place constructed by user’s action, reflecting cultural and social meanings ascribed by users. An interesting concept in their theory is “hybrid space”: the interactions take place in a hybrid space that comprises both physical and virtual space and from which human space emerges.

- The attention to the human place is also present to guide studies of the users’ experience: Gaintenby (1996), studying MUDs and MOOs, underlines that MS is “a product of not only physical objects (e.g., computer and fiber-optic cables) and forces (e.g.: electricity and information processing), but constitutive legalities and practices … It is through these practices and struggles that the notion of virtual space is made culturally, socially and politically meaningful.” (ibidem, pp. 136-137). A further, recent example is provided by the construction of the “place probe,” aimed at depicting the characteristics of the Place experience in natural and mediated environments (McCall, O’Neill, Carroll, Benyon, & Smyth, 2005).
Some studies seem to occupy a more middle position between focusing on physical and human characteristics of the mediated place: Bowman, Wineman, Hodges, and Allison (1999) emphasize the mixed nature of mediated space, as both a three-dimensional space, like natural space, and as a presentation of some forms of abstract or symbolic information, like scientific simulations and database visualizations. O’Neill and Benyon (2003), advancing a semiotic approach for investigating presence, consider the mediated space as an information place, constituted of semiotic forces (interpretations, meanings and significances that people ascribe living in a world of interactive systems), and not only of simple computational forms. The human interaction with technology results from the combinations of all those components: “We are increasingly living in a physical world augmented by virtual displays, and populated by interconnected information and communication devices” (ibidem, p. 87). Add to this a study about virtual learning environments (VLEs), which analyzed some features (such as representational fidelity and presence) of an effective virtual environment for conceptual learning, and highlighted the importance of physical space as well as social space, in which users are immersed, for the enhancement of the sense of being in that environment (Whitelock, Romano, Jelfs, & Brna, 2000).

2.2 From Single To Multiple Inhabitants

Studies can be positioned along another continuum, distinguishing between systems with one or multiple users inhabiting the mediated space. The former are studies interested in the individual’s perception, memory, spatial knowledge, emotion and/or on possible medical diseases and psychological disorders (traumatic experience, phobia, symptom distress, teen healthy).

Regarding the study of individual users, some instances have been already provided by the study on spatial orientation listed above, although this area of research does not necessarily deal with single users exclusively, as testified by the studies on the judgments of a shared visual space. For example, Kelly, Andrew, Beall, and Loomis (2004) focused their attention on the establishment of common ground (that is fundamental in planning complex coordinated actions) in virtual and real environments, in particular when the users (or collaborators) have visual access to the same space and perform collaborative tasks. The fields of medicine and clinical psychology provide

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5 The representational fidelity of a VLE is constituted by technical fidelity, representational familiarity, and representational reality. “Technical fidelity is the degree to which the technology delivers realistic renderings, colours, textures, motion etc. Representational familiarity is the extent to which the environment that is simulated is familiar to the user. ... Representational reality is the extent to which the world is possible.” (Whitelock et al., 2000, page 279).
other instances where the individual with his/her disorders and diseases has a central role in the creation of MS, because the patient ‘projects’ his/her distress, humour, anxiety, phobia, … in it. Hodges et al. (1999) considered the virtual environment as a space that assists post-traumatic stress disorder (PTSD) sufferers to imagine, visualize and describe their traumatic experiences. In the same way, Schneider and Workman (1999) treated the virtual environment as a space where the patients can be distracted from their disease. In this case, the MS mitigates chemotherapy-related symptom distress in children aged 10-17 years with cancer, through distraction. These advantages make the virtual environments a promising tool in clinical psychology for health care (Nemire, Beil, & Swan, 1999; VEPSY Updated Project: Riva et al., 2001).

The opposite extreme is occupied by the large body of studies on multiple users and privileges themes such as are interaction and communication, awareness and coordination. Maxfield, Fernando, and Dew (1998) argue that CSCW allows the sharing of product data and access and interaction with them through the creation of a virtual space constituted both by a shared data space and by local environments. In this sense, the CSCW bridges the limit of geographical separation in distributed working. Benford et al. (1995) maintain that, to promote cooperative work in virtual spaces, it is important to provide a direct visualization of shared data, allowing users to step inside databases and work together within data as opposed to merely with data. Therefore, virtual spaces, as abstract spaces, provide an arena for social action and interaction as well as natural spaces do. In the same way, Fraser, Benford, Hindmarsh, and Heath (1999) underline the key role of collaborative virtual environments (CVEs) in supporting awareness and interaction between users. Supporting awareness in interaction becomes an important factor in allowing tasks to be accomplished through CVEs; in fact, participants use features of the VE interface as resources to support their and other’s awareness of action.

Also in this case, studies may be positioned in a middle way between the two poles: Boechler (2001), for example, underlining the key role of cognitive psychology in the identification and analysis of how the process of mind interacts with the web, argued that the World Wide Web (WWW) is a space with both a cognitive component and a social component. In his study of the Internet, Chan (2000), referring to home-page and to user’s performance in the creation of his/her own home-page, maintained that in their home pages, users put their private life on stage during performances of self-presentation in anticipation of an audience.
Intersecting the continua

Studies cannot but intersect the two continua. For example, in the studies of spatial orientation and perception in mediated environments, the MS may be treated as physical space. Wartenberg and Wiborg (2003) argued that an accurate space perception and distance estimation of VE can have a central role in the design of products, architecture, and workplaces; while Colle et al. (1998) sustained the similarity of MS (also in its metric features) with the natural space as an important element in navigation and orientation of a MS. On the other hand, clinical (psychology and medicine) research provides useful examples of studies matching “human space” with single inhabitants’ perspectives. Hodges et al. (1999) considered the virtual environment as a space with affective (traumatic) connotations, which assists post-traumatic stress disorder (PTSD) sufferer to imagine, visualize and describe their traumatic experiences. The encounter between the multiple Inhabitants and the physical space is represented by those researchers studying the role of physical features supporting the users’ interaction, as mentioned above in Kelly et al. (2004). Finally, a concern for multiple inhabitants in a human space is shared by those studies that analyze the affective and socio-cultural experiences with other users. For example, in the field of CSCW, Benford et al. (1995) consider mediated spaces as natural spaces because of their socio-cultural features (human space), which provide an arena for social action and interaction between users (multiple inhabitants). Also, Peris et al. (2002), analyzing online chat rooms, maintain that the Internet is a new social space (human space) for establishing communication between users (multiple inhabitants), whereas the chat channel is an interactive medium.

3. Spatial Presence

Initially coined as ‘telepresence’ (Minsky, 1980), ‘presence’ refers to computer-generated systems that allow users to control, manage and manipulate objects located in a remote environment. Since then, the same term has been extended to include all situations where people experience the sensation of being present in a mediated site, either physically remote or computer-generated (Draper et al., 1998). Lombard and Ditton (1997) proposed a definition of presence as: “the perceptual illusion of nonmediation”. While the use of the term “perceptual” emphasizes the role of human sensory, cognitive and affecting processes, the “illusion of nonmediation” underlines the extent to which the medium appears to the user as an invisible medium or as a
social entity. Furthermore, following the IPP model which describes the sense of presence as constituted by immersion, presence, and performance (Bystrom, Barfield, & Hendrix, 1999), Slater and Steed (2000) propose that the virtual environment is an overall gestalt formed from moment to moment through attentional resources, which are important determinants of presence process. Starting from this assumption, Slater (2002) argues that, in the presence selection mechanism, it is crucial to focus upon the essential features which allow us to maintain the perception of a virtual environment: “... even though we know “really” that there is not one there. The sixth sense is this process of seeing what we expect to see, and it doesn’t take much for a virtual reality to convince us ...” (ibidem, p. 438).

As it appeared from the research studies mentioned above, the topic of mediated space is becoming strictly tied to the topic of presence. In the field of virtual learning environments, Selverian and Hwang (2003) have suggested that learners can experience two types of presence in a VLE: “spatial presence, involving perceptions of sensorially “real” environments, and social presence, involving perceptions of social interactions with persons, places, or things” (ibidem, p. 516). Similarly, in the field of collaborative and networked environments, Biocca, Harms, and Burgoon (2003), reviewing existing theories and measures of social presence, suggest that presence is frequently treated as consisting of spatial presence or physical presence and social presence. The former is “the sense of “being in the virtual place,” ... ways in which our perceptions and actions create a sense of space” (ibidem, p. 456); the latter is “the sense of “being together with another,” including primitive responses to social cues, simulations of “other minds”, and automatically-generated models of the intentionality of the other ...” (ibidem, p. 459).

Other empirical studies (Schubert, Friedmann, & Regenbrecht, 2001; Lessiter, Freeman, Keogh, & Davidoff, 2001) have underlined how the possibility to physically control, manipulate, and act on features of a displayed environment increases the sense of being physically located within it. There is a parallelism between these studies in the identification of presence-related components: Schubert et al. (2001) maintain that presence is constituted of ‘spatial presence’ (the sense of being and acting in the virtual space rather than in outside); ‘involvement’ (the extent to which the user focuses his/her attention only on the virtual space); and ‘judgment of realness’ (the extent to which the user considers the virtual space as similar to real space). In the same way,

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6 Selverian and Hwang, from their review of seventeen VLEs studies, found that high levels of spatial presence were associated with the achievement of lower-level learning objectives (memorization and repetition), while social presence was associated with higher-level learning objectives (analysis and synthesis). Finally, high levels of both spatial and social presence were consistent with the achievement of higher-level learning objectives.
Lessiter et al. (2001) identify three similar determinants of presence (sense of physical space, engagement, and ecological validity). These classifications have also some points of contact with the model proposed by Waterworth and Waterworth (2001), according to which three dimensions are key to the presence experience: ‘locus’, the extent to which the user experiences the sense of being in a real or in a virtual world; ‘focus’, the extent to which the nature of the user’s attention are present stimuli or internally-accessed information; ‘sensus’, the level of attentional arousal of the user, from alertly awake to totally unconscious. Following this theorization, Riva and Waterworth (2003) and Riva et al. (2004) proposed a cognitive neuroscience approach of presence, in which it is described as a unitary feeling of being in a world existing outside the self. This experience results from the integration of three layers: ‘proto presence,’ as related to the level of perception-action coupling; ‘core presence,’ as the selective attention operated by the self on perceptions; and ‘extended presence,’ as the experience itself. In particular, proto-presence, based on proprioception and bodily orientation in the world, is the extent to which the organism differentiates itself from the external world. In virtual environments, the proto-presence is also known as ‘spatial presence’, strictly tied to the relation between the MS, the sensorial inputs and body movement.

The growing interest in spatial presence is also featured by the increasing interest in its measurement; indeed one of main objectives in the Measurements, Effects, Conditions (MEC) Project is the conceptualization and measurement of presence, in particular the development of a new spatial presence questionnaire based on a solid theory of spatial presence (Vorderer et al., 2004).

Another perspective concerns those studies that start from a belief that presence depends on a realistic re-production of natural space and/or of natural interactions. Witmer and Singer (1998) refer to the mediated space as the extent to which it mimics natural interaction and natural environment through involvement and immersion⁶, allowing the user to experience the sense of being there. Following this theorization, Baños, Botella, Garcia-Palacios, Villa, Perpiña, and Alcañiz (2000) maintain that presence and reality judgment are important factors in virtual environments designed for the treatment of mental disorders (for example phobias): “the VR in mental health works in part because participants feel that the environment is real.” (ibidem, p. 328). But reality judgment doesn’t refer to the sensorial or pictorial realism, it refers to the

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⁶ “Involvement is a psychological state experienced as a consequence of focusing one’s energy and attention on a coherent set of stimuli or meaningfully related activities and events. ... Immersion is a psychological state characterized by perceiving oneself to be enveloped by, included in, and interacting with an environment that provides a continuous stream of stimuli and experiences.” (Witmer & Singer, 1998, p. 227).
willingness to consider virtual experiences as veridical. In a study of the perception of the distance from an object to a nearby surface (Hu et al., 2002), an accurate perception of the distance (physical space) is shown as an important component that increases the sense of presence in a VE, particularly where the user performs actions.

The great interest for the nexus between presence and the fidelity, similarity, or reality of user interaction and/or MS with natural interaction and/or natural space is evident in several studies (Bailenson, Swinth, Hoyt, Persky, Dimov, & Blascovich, 2005; Friedman, Slater, Steed, Leeb, Pfurtscheller, & Guger, 2004; Vinayagamoorthy, Brogni, Gillies, Slater, & Steed, 2004; Lok, Naik, Whitton, & Brooks, 2003; Mania & Chalmers, 2001; Kalawsky, 2000); however, “It is important to keep in mind … that intensity does not equal quality. We can be bored in VR and moved to tears by a book” (Ijsselsteijn, 2004, p. 48). Therefore, though a higher sensorial involvement is an important but not a sufficient condition to feel present in a technologically-mediated environment, other factors may contribute, just like social interaction (Ijsselsteijn et al., 2001).

From a different perspective, close to existential philosophy and ecological psychology, Zahorik and Jenison (1998) acknowledge the role of the surrounding space by defining presence as “the extent to which a person successfully supports action in the environment” (ibidem, p. 87). Underlying this definition is the dynamic interaction between user and environment, where experiencing the sensation of being there is strictly tied to the extent to which the environment supports the user’s action and interpretation. “Things in the environment are not merely sets of discrete, atomistic features. They afford potentials for interaction with perceivers/actors—they are “ready-to-hand.” Additionally, the use of a virtual reality system to monitor these interactions is unobtrusive and therefore does not interfere with the perceiver/actor’s “throwness” in the environment. Further, this method does not depend on the subjective thoughts or feelings of the perceiver/actor, nor does it depend on objective measures of task performance. How well a task is completed, or how it feels to do a task is irrelevant. How the task is done, in terms of the dynamics of the perceiver/environment interaction is all that matters.” (ibidem, p. 88).

Extending the previous perspective with theories from human geography and ethnography, Spagnolli and Gamberini (2005) propose a model in which they emphasize the central role of place and action in the constitution of presence: with the presence concept, they refer to “the property of the agent who manifests herself through the constitution of a place during action: action catalyses some cultural, material, and cognitive resources and holds them together in a new whole, the Place;
the agents’ connection with those resources becomes the origin and the evidence of her presence." (ibidem, p. 8).

Finally, the notion of Place has been dealt with thoroughly by the Benogo Project, which aims to investigate and develop "novel technology, that allows real-time visualization for a moving observer of recorded REAL PLACES, with ideas of researchers from diverse fields to develop new tools for empirical and theoretical studies of presence based on the concept of the observer's embodiment in the computationally created virtual environment."\(^5\). Above all, Turner and Turner (in press), reviewing the established place literature and arguing about the relation between place, sense of place and presence, have advanced the idea that place could be considered as a factor that influences the presence experience: “we propose that sense of place reasonably and usefully be considered as a further ‘content factor’” (ibidem, p. 5) that influences the sense of presence.

4. Discussion

The study of virtual/mediated space has been characterized by some recurrent controversies, including: a realistic approach, countered by a socio-constructionist approach to the nature of the mediated space; an identification of the mediated space solely with the digital and electronic components, opposed by a hybrid conception of the mediated space; an emphasis on freedom and dematerialization, countered by one on the material and political constraints embodied in the mediated place. We'll briefly consider each of these points separately.

The first debate goes back to an opposition between positivistic and constructionist approaches to human reality. According to the rendition made by Mantovani and Riva (1999), an ontological, ingenuous realism considers reality as “a set of objects located outside the mind (the influence of Cartesian dualism between res extensa and res cogitans is obvious) and [...] a set of well-defined characteristics. [...] The relationship between reality and virtual environments has been viewed as that between a state of “real” things (“real” by definition being extra-mental and “objective”) and one of simulated things which, although not real (in the sense that what is perceived does not correspond to “external” objects physically present in the environment), is still in some way “real” (in the sense that it produces a convincing perception of the presence of extramental objects).” (ibidem, pp. 5-6). Scholars who consider the MS as a social construction that involves socio-cultural, affective, and cognitive features as well as

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physical features see the mediated space as constructed by the very act of usage, appreciated in terms of the users’ categories and interests. From a cultural-psychological model, it is a powerful new artifact that requires the formation of appropriate cultural codes to be integrated smoothly with people’s everyday experience (Mantovani, 2001), so there is no difference between real and virtual spaces, insofar as they are both places for meaningful social interaction mediated by artifacts. The technological simulation has the capacity to reproduce a context in which social actors may communicate and cooperate (Mantovani et al., 1999). Similarly, against an ingenuous realism considering the MS as the reproduction of real-world structures (such as rooms, corridors and buildings) and recognizable objects (such as tables and whiteboards), Benford et al. (1995) propose a data approach in which the mediated environment is an abstract space based upon a direct visualization of shared data, allowing users to work together. The virtual space is similar to the natural space, not because of the reproduction of physical features, but because it generates a social context.

Another controversy concerns the degree of purity of a mediated space. A perspective that could be defined as ‘purist’ defends a conception of MS as a space completely separated from natural space, regardless of the pictorial similarity between them. The hybrid perspective is adopted by those researchers who treat the MS as inter-related with natural space in specific ways; for example, Murray et al. (2000), examining how people navigate, explore, and experience a virtual environment (a facsimile of a city), suggest a continuous relationship between real and virtual spaces. Also in the field of CSCW, Harrison and Dourish (1996) maintain that the interactions in media spaces occur in a hybrid space that comprises both physical and virtual space. In the design of technologically-mediated learning, Kalay et al. (2003) propose a place-making metaphor, where a place is “the setting that transforms mere spaces and activities into unique socio-cultural events”.

These opinions partly overlap with the concrete versus abstract ones; the abstract one has been very popular and tends to consider the virtual space as an illusion or as a free land where everything is possible, just because of its digital nature. Instances abound from the early definition of Cyberspace as a ‘consensual hallucination experienced daily by billions of legitimate operators, in every nation… A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding…” (Gibson, 1984, p. 51).
C. A. Childress (1999), suggesting a parallel between cyberspace and the Celtic “Otherworld,” considers the Internet as an entirely new dimensional space: a domain outside normal time and space (without physicality and geographical localization). Childress sees the Internet representing a different domain of experience against the human experience with natural space and objects; therefore it needs new and adequate models for conceptualizing and managing the human experience and activity with it. D. S. Horner (2001), arguing about cyberspace and the fundamental error of conceiving people as essentially immaterial substances or potentially virtual inhabitants of mediated spaces, invites us to resist the seductions of fantastic conceptual possibilities, even if “The creation of new technologies of the virtual holds out the promise of deliverance from the limitations of existence in physical space. The ontology of this virtual space is an ontology without bodies.” (ibidem, p. 71).

Lauria (1997), arguing about the nature of mediated space, such as immersive virtual environments that literally situate the user into an informed computational space, us located in an intermediate position. She argues that “virtual reality can be considered a metaphysical testbed, where the conceptual world, or the understanding of the knowing subject, merges with the experience of the virtual world, to yield a unit in knowing through a conflation of illusion and reality.” This nexus between ideal and real, illusion and reality is presence.

In conclusion, these studies tend to treat space as an external variable to be processed by the user; a constructionist approach emphasizing the strict relationship between the configuration of space and the nature of the human presence is embraced by scholars of user interactions and by clinical applications of mediated spaces. This latter approach seems like a promising line of research as the interest shifts from virtual to mixed environments, where the experience of the virtual place is less the experience of a wired, artificial reality and becomes more intertwined with our ordinary experience.

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Some Reflections on Learning and E-learning

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ABSTRACT

Educational technologies’ designers always refer to a model, more or less explicit, of the teaching/learning process. Even when not explicit there is always an idea about how people learn behind the design of an e-learning product as there is for every other formal or informal context of learning (school, training classes, working places, etc.). At the same time there is an implicit model of the role of technology: computers can be seen essentially as a ‘cognitive tool’ which allows one access to a series of information and contents to isolated users or as a ‘social tool’ which allows one to communicate, share and negotiate competent practices, identities and meanings. In this paper we outline an analysis of the most widespread educational technologies by investigating the nature of such ‘theories’ that are ‘behind’ their design and that supports —more or less— learning social practices. Finally, we outline some principles to follow for the design of effective educational technologies following a social and situated learning theory.

Keywords: learning, e-learning, technology, virtual communities.

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1. Learning as participation

The most recent studies of situated and cultural psychology analyze the ways in which social actors reciprocally coordinate their activities and the relation among human action, activities and tools in working and organizational settings (among the others, Rogoff & Lave, 1984; Hutchins, 1995; Engestrom & Middleton, 1996; Heath, Luff, 2000; Zucchermaglio, 1996; 2002). These studies are ethnographies of everyday working activities during which knowledge is built and shared in social contexts and underline the situated, social, locally constructed character of practices of work and use of technologies (Suchman 1997; 2000). Therefore studying the construction of repertoires of meanings and shared practices becomes essential in order to
understand the use of technological artefacts inside specific communities of practice. Two concepts are emerging as central: 1) the concept of “mediation” (Vygotsky, 1990; Cole, 1995; Engestrom, 1987): working practices having a meaning only inside a repertoire of meanings shared among a community. An electronic mail system, a word processing system, a database will never be used in similar ways in different communities of practice: they will assume specific meanings and they will sustain peculiar working practices through the mediation of the pre-existing work practices system (Zucchermaglio, 2000). 2) the concept of “community of practice” (Wenger, 1998; Lave and Wenger, 1991; Seely Brown and Duguid, 2000; Orr, 1990): human action is always built through answer to other persons, in social contexts of inter-subjectivity. In fact it is only the interaction among individuals that makes possible the existence of a “discursive world”, defined as repertoire of social and shared meanings (Mead, 1934). Human action, even that mediated by technological artifacts, is always a social action: an action whose meaning is interactively and discursively built in the social practices that we share with other individuals (Bachtin, 1979).

In such a cultural and situated perspective learning must be considered as a constructive, social and situated process: a process of "enculturation", of entering into a culture of practitioners; learning is a complex social action embedded in historically and culturally defined frames of activity (Vygotsky, 1990; Lave, 1988; Chaiklin &Lave, 1993; Engstrom, 1987). The analysis of learning processes occurring in everyday contexts or those found among traditional populations that have not "invented" a school system, highlights that learning could be mainly described as a process of apprenticeship, that is, as a graded, contextually embedded practice, inserted into a relevant frame of activity (Lave & Wenger, 1991; Hutchins, 1993). Learning about an activity depends on authentically participating in that activity - not in an approximation to it. In this sense learning does not always involve abstract, decontextualized subject matter, but also concerns work practices, social rules and the communicative practices of an organization. In an apprenticeship practice much crucial learning happens without direct teaching. Although there is very little "traditional teaching" - only occasional instructions or pointing out of errors by the tutor - there is much learning through this graded, contextually embedded practice. In this view, learning is in part the process of socially constructing a communal understanding: learning is not individual and receptive at all, but a constructive and social process. In this framework learning is not a specialized activity that should be directed by someone in special occasion, but a
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normal feature of the human functioning in everyday and work settings: learning is a social practice situated in other cultural and social practices.

This perspective on learning have definitely overcome the "transfer model", by which knowledge and practice were considered in isolation, proposing a view on learning as "participation" in a social practice, and taking knowledge back in the contexts wherein it is meaningful. In this view, learning to work implies participating as a member of a specific community of practices (Wenger, 1998), and does not mean to acquire abstract concepts and notions of that set of practices.

2. An ‘educational’ classification of e-learning technologies

Technologies, also educational ones, are never neutral: their different educational conceptions are defined by differences at the level of quantity of initiative and autonomous building allowed to novices, their transparency/visibility, their representation of expert knowledge, the role assigned to social interaction and more in general by their epistemology and learning model. Educational technologies designers always refer to a model of the teaching/learning process. Behind the design of e-learning products, as for every other formal or informal context of learning (school, training classes, working places, etc.) there is always an idea, also a common sense one, about how people learn. At the same time there is an implicit model of the role of technology: computers can be seen essentially as a “cognitive tool” which allows one access to a series of information and contents to isolated users or as a “social tool” which allows one to communicate, share and negotiate competent practices, identities and meanings.

Trentin (1998, 2002) presents a classification of educational technologies in the model of the three generations of the distance learning systems. In this model the first generation includes the early courses through post mail of the ’50s and ’60s, which were followed by the multimedia distance learning systems, the second generation based on printed materials, television’s programs, audio tapes and later didactical software. The systems of first and second generations share the same conception of learning as an almost exclusively individual process: learners study the materials and, at the most, can ask for help from their trainers. The key idea of the third generation of distance learning systems is to reproduce, even if with the inevitable mediation of technology, learning as a social process, in which the major part of the training process takes place on the web, through the interaction of participants in a learning community. Also on the basis of this preliminary analysis we can propose an ulterior distinction
between ‘empty’ technologies (simulation environments and virtual communities) and ‘full’ technologies (lessons, books, hypertexts) (Zucchermaglio, 1992), which we will now analyze in further detail, through the illustration of some e-learning products or contexts considered prototypical examples of such technologies. These examples are collected through a wide navigation among e-learning web sites and are quoted only to illustrate typologies and without any supposed completeness.

2.1 The ‘full’ technologies

The ‘full’ technologies -among which are all the technologies born for subsequent developments from the machines built in the ‘60s (as CAI, CBT and ITS)- remain the most widespread and are designed thinking that learning is essentially a process of information transfer from the system to the learner’s head. Even if the systems differ for different variables (typologies of users, contents, technological instruments, etc.) nevertheless we believe that they can be compared for the more or less explicit learning model which guide their design and allow to start to reflect upon the crucial and often ignored role of such model in the realization of effective e-learning systems.

2.1.1 The mediated lesson

Eurolearning defines itself as “the first European portal of distance learning” and is an Opera Multimedia production (www.eurolearning.it; Deplano, 2001). After the registration, you can access a free version of an introductory course in how to use a computer. When the course starts a screen appears containing a teacher who is speaking in a window at the left side, an animation in the central part of the screen and below a brief text summarizing the more important concepts; everything with an excellent speed of use and synchronization of video, text, animation (cf. fig.2).

Fig. 1: Eurolearning.
The didactical metaphor implicit in the design of Eurolearning is clearly a lesson in classroom, with teacher who explains and students who listen possibly without interrupting. That is an only individual use (learner in front of the screen), passive and specially predetermined in its development by designers, who fill the technology (which therefore is ‘full’) with the knowledge to be learned. Training is here considered as an enterprise of “knowledge distribution” (Eckert, 1993) and learning consequently as a decontextualized and individual process completely independent from every form of social involvement in meaningful practices. In this case the traditional model was directly moved to training on-line, which is not surprising if we think that the model of transfer continues to be the dominant model not only for school contexts but also for educational contexts in general (cf. Zucchermaglio, 1995). However the problematic question is: if this is a model that doesn’t work really well “in person”, why transfer it on the web where there is not even the opportunity to raise a hand and ask a question.

2.1.2 The mediated book

A site of e-learning by Somedia, training company of L’Espresso group, offers for free a complete course named ‘Guide to Internet Use’ (www.somediaeasy.com/corso_free/tot_corsofree.htm). After the instructions, there is a ten items test aimed to evaluate the initial preparation whose negative result however doesn’t limit access. The learner can therefore approach to the course which starts with a list of options on the left side (index, report, refresh, exit, etc.), a navigation bar in the center, the content of the selected unit on the right (cf.fig.2). The unit consists of a text articulated in a list of chapters which contain boxes for further investigation and exercises inserted through hypertextual links.

![Fig. 2: Somediaeasy.](image-url)
After four lessons there is another check, again with 10 multiple choices questions. A communicative environment supports the course in which there is a tutor with whom to talk privately and a forum where participants can post ideas and comments to discuss among themselves and the tutor.

The electronic book seems to be the most widespread e-learning model on the web, which consists in well-done notes with some hypertextual links. In the major part of the cases the socio-interactive dimension (usually represented by forum, mailing list, chat, bulletin boards) though present is clearly accessory and ornamental compared to the different didactic units.

As with ‘the lesson’, the model of ‘the book’ suggests that learning is almost a process of transfer of information (all explicit and predictable) from an expert source (teacher in a video or book) to students/novices. The computer is also in this case only a repository full of information to transfer and the individual use is the only one easily supported\(^2\). Learning is conceived again as an individual process and as an ability that should be practiced and evaluated in a decontextualized way: without the help of others and the signs of context. In some way the belief is that people learn better when concentrated on books or listening to a lesson without being disturbed by other people. The social context is conceived as a disturbing variable, whose consideration creates only troubles for a formal, orderable and technical architecture of training on-line. Besides also in this case the fundamental support for knowledge creation coming from social interaction is neglected, as is the consideration of social interaction as a central component of any meaningful knowledge acquisition.

2.1.3 The hypertext

An example of courses following a hypertextual architecture (and not only calling hypertext an index) are those developed by the department of Training and Educational Sciences of University of Turin in the FAR project-Formazione Aperta in Rete (Open Training on the Web; http://hal9000.cisi.unito.it/wf/DIPARTIMEN/Scienze_de/FAR/Gruppi-di-/). The undergraduate courses available are in Educational Sciences, DAMS, Medicine (cf.

\(^2\) It is somehow possible imagining social usages of such full technologies. Though in general the learning model embodied in their design supports mainly an individual type of usage. The rigid connotation of the knowledge transmission process implies a correspondent rigidity also in the educational uses of these technologies. Even in the best of the contexts, uses will be ‘closed’, of the ‘right’ or ‘wrong’ kind, not allowing a constructive activity by learners and social uses of the tool.
fig.3). On the website didactical paths for primary and secondary instruction are also available.

![Hypertextual System Image](image_url)

**Fig. 3**: FAR Project- Educational and Training Sciences University of Turin.

The primary characteristic of the hypertextual architecture is represented by the modularization of information. That means that contents are divided in autonomous portions of information (nodes) connected among them by logically meaningful links. The elements of a hypertextual system are the database (the base of knowledge) and the windows. The database is a network of nodes containing information linked together. The windows are graphical objects which appear on the screen and have one to one correspondences with nodes; in general they can be moved inside the screen, resized in relation to necessities and closed when not used. Even a linear text can be viewed as modular if considered in accordance with the different parts in which it could be divided: chapters, paragraphs, beginnings of lines.

However there is a fundamental difference: paragraphs of a book are inserted within a continuous flow which represents the path followed by the one who ‘thought’ and organized the contents showed; nodes of an hypertext instead allow one to personalize the reading of the text, moving from one information to the other, from one idea to another one.

In practice that means that a text can be connected to its own explication, the values of a chart can be connected to their comments, different parts of the same text can communicate even while maintaining their modular organization. The hypertext seems to be a useful tool to make more flexible information’s usage paths and render explicit the logical connections among contents; it remains anyway inside the previous paradigm considering learning as a process essentially ‘mental’ and ‘individual’ and the
user still not very autonomous, even with some concession to the composition of the studying path.

This short analysis of the most frequent 'full' technologies present in the e-learning market, shows that the major part of technology's designers are still immersed in an "old-fashioned" paradigm, which guided the first attempts of education through computer; the major part of them believe that "knowledge is a fluid that should be transferred inside the student-recipient" (Kay, 1989) so following a learning model that is mainly outdated and surpassed by the recent developments of cultural and situated psychology. Traditional didactical procedures are in these cases simply transferred inside technologies with a sort of technological determinism according to which technology is only a neutral container/dispenser of information to isolated individuals in cheaper and faster ways than traditional classroom’s situations.

2.2 ‘Empty’ technologies

E-learning environments which intend to support collaborative learning are designed considering the social and constructive nature of the learning process. “Empty” technologies allow flexible, explorative, social and open uses, able to embody at the best those principles that define human learning and support processes that include and imply metacognition and reflection, cognitive apprenticeship practices, situated knowledge, cognitive complexity, social construction of cultural knowledge (Resnick, 1987; Lave e Wenger, 1991; Lave, 1993; Hutchins, 1993; Wenger, 2000; Gherardi, 2000). Users actively participate in a group whose interactive and collaborative practices are technologically mediated. This allows the simulation of real working settings and dynamics, the preparation of interdependent tasks, defined with the participation of the users themselves. ‘Empty’ technologies in fact are not really ‘empty’: their design –as we'll see- must embody some fundamental principles of human learning. We will briefly describe simulation environments and virtual communities through the illustration of some systems considered prototypical examples of such typologies.

2.2.1 Simulation environments

The multimedia systems of self training built by Mafrau, a distance training company (www.mafrau.it), follow a methodology defined MUST (Models of Simulated and Tutorial Universes; cf. Deplano, 1997). One of their main products is ‘Act as a
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manager’, a course realized for Telecom Italia (Fig. 4). Once the system is started, a lady explains the structure of the course, the possible paths and the different types of use interrupted sometimes by videos taken from a Woody Allen movie in order to illustrate parts of her presentation. Afterwards the user enters in the core of the system and receives the assignment of general manager from the executive committee of the company Granonostrum. Then he can choose among some tasks available in a list. Once chosen his own mission, the user can move autonomously inside the whose company to search for information: clicking on ‘sensitive’ objects he can access different types of documents inside the offices.

![Fig. 4: Mafrau’s course “Act as a manager”.](image)

On a structural level, the system includes a simulated environment and a tutorial subsystem, as well as a certain number of service functions. The user must conclude one or more missions such as, for example, compiling a document by navigating among different environments represented as offices of a company which contain every kind of organizational information (organization chart, production data, budgets, etc.).

In every moment the user can access the tutorial function constituted by hypertexts made of texts, graphical elements, interviews, videoclips. The user can navigate inside the two systems (simulation and tutorial) without any limitations of time: when he believes the mission is concluded in a satisfying way, he can submit it to evaluation and, based on his score, go on in his work or ask for another mission.

In such a simulated environment the user has the chance to face a series of ‘realistic’ events (as well as access to expert sources) acquiring new knowledge in the meantime. As in everyday working life, learning knowledge is linked to working objectives (for instance the editing of a final document). In addition, simulations are
particularly useful for acquiring competencies needed to face all those situations in which it is difficult to have a direct experience, such as risky or rare ones. The learning model in this case is much different than in ‘full’ technologies: even if an individual use is preferred (also if the tutorial system simulates experts’ participation in the realization of activities), learning is considered less ‘mental’ and therefore more connected to actions to realize, as actually happens in developing expert working practices (Scribner, 1984). Further, the path to the solution is declinable and diversifiable in relation to the user’s competencies (also the initial ones): this last characteristic, typical of ‘empty’ technology, allows flexible, explorative, social, open and diversified uses by different users. Also the role of the expert is different: in this case he designed the simulated environment and the ‘missions’ (‘empty’ technologies in fact are not really empty) instead of simply ‘filling’ the system with units of information to be learned. Design assumes a role of scaffolding which is realized in building characteristics and limits of the simulation’s environment and designing different courses of actions (missions) rather then simply exposing decontextualized contents. A limitation is their technological complexity, which makes it difficult to put these systems on the web (sometimes they are on cd also if connectable to the web). Another relevant aspect of these systems is the presence of a playful dimension (humoristic videos, crosswords instead of tests, a Star Wars robot which zaps you if you make a mistake, etc.) which, for some aspects, makes the system resemble a videogame, breaking the historical association between boring moments in which one studies and learns and moments in which one plays and has fun.

2.2.2 The development of virtual communities for learning

All the e.learning situations that explicitly aim for the constitution of a virtual community focusing on the interaction among participants. In this typology are the training experiences that principally aim to create interchange and interaction among participants and are centered specially on sharing practices (also conversational) rather than on only informative contents, using both asynchronous technologies (such as e-mail) and synchronous cooperative environments (such as CVE- Collaborative Virtual Environments). These latter are technologies particularly useful for building virtual communities. CVE are environments that explicitly aim to build a virtual community based on textual and synchronous communication on different levels.

3 The flight simulator is a very effective training method and can be considered a forerunner of all educational technologies.
(public and private). Besides textual interaction, some typologies allow a visual interaction on two or three-dimensional worlds.

CVE are similar to self-training simulated environments for the representation of a simulated universe but are different in two main characteristics:

- a larger space for processes of communication and negotiation among participants aimed at building/developing a community;
- an initially less structured virtual environment, with more space for the co-construction of objects, situations and meanings by users.

Examples of such systems can be found at www.activeworlds.com. Active Worlds is a kind of three-dimensional CVE, which contains a universe with educational aims, besides a playful/social one (cf. Fig. 5). The learning model behind its design is constructivist, situated and collaborative: users can explore, communicate among them, build their own identity choosing an avatar and a nickname, build objects, problematic situations and the same environments in which they are moving (cf. Talamo, Zucchermaglio, Ligorio, 2001). Through using these systems, e-learning has the opportunity to move the center and control of educational activities from the teacher to the learner, facilitating creation of objects and materials by participants and designing activities that require the interchange and negotiation of knowledge and experiences by the members of a community.

![Fig. 5: Activeworlds.](image)

The project on professional communities’ network -realized by a consortium guided by Cuoa Foundation- is an example of training which aims to develop a community,
although not using CVE environments but other web based technology (www.comunitapersonali.it; Fig.6).

The project involved about a hundred professionals divided in the following communities: 1) ALEA – Strategy and Marketing Expertise Center; 2) CLUB BIT – Computer Backup; 3) AICQ – Quality Control Italian Association, section of Veneto; 4) LOG IN – a group of professionals in logistics. While the first three communities represented groups with their own organizational structure, a mission and a defined and shared program of activities, the community on logistics (LOG IN) was built inside the project.

The project provided virtual and ‘face-to-face’ meetings (possible because all the participants came from a close geographical area) on specific themes connected to the same common professional interest that characterizes belonging to each community, despite belonging to different companies.

Face to face meetings have a fundamental role in community life, being the moments in which are built virtual ‘objects’ to be published on the website of the community.

Starting from a meeting, an audio-visual film and several didactical units related to the theme are realized. A discussion on emerging questions is made using on line tools such as a mailing list and a forum. Each face to face meeting connects to virtual meetings, where the discussion and reflection on the same themes continue facilitating more contextualization to each company’s reality and promoting interchange of experiences among participants. For example in Club Bit community, arguments were discussed such as: AS/400 systems (subject also of a “face-to-face” seminar) were compared to other operational systems with which some members of the community had experience, raising a series of comments, perplexities, questions and answers.
between who had already used the system and who had not; the impact of the Euro’s introduction inside companies from a computational point of view, with reciprocal suggestions of books and documents on the argument; Unix and ERP systems, with related difficulties found by participants in different companies and of who “is not on the train yet”\(^4\); the début of Windows 2000 and its implications.

The space of the website is so organized:

- a discussion area: an asynchronous forum (on the Newsgroup model) within which one can insert messages that can be read by all the members;
- a training area: a space organized in order to contain knowledge units dedicated to specific themes of the community;
- a library area: a sort of archive for interesting materials like newspapers, bibliographies, case studies, etc.;
- a profile database: a database containing data on all the participants to the community; a short presentation of each with the possibility to search more data via keywords;
- chat: a discussion area in real time that also provides on line appointments.

Analyzing the different phases of this e-learning methodology, a process of integration and complementarity emerges as the following:

- organization of “face-to-face” educational-informative sessions in order to increase participation by members of the community. Some examples of arguments treated during seminars are: Internet Marketing (Alea community), E-commerce Assessment (AICQ community), Security on ADSL or HDSL Internet Connections (Club Bit community);
- each meeting realized by each community is video and audio recorded, transferred into digital format, edited and finally transformed into a multimedia document in streaming technology. These tools aim to guarantee replicability, duration over time and asynchronous use of “face-to-face” meetings;

\(^4\) Quoted by Club Bit forum, www.comunitapersonali.it
- the multimedia document so realized is published on the community’s portal, in a proper section. Tutors and the knowledge manager promote the interaction of the community on these materials. Feedback during virtual meetings, spontaneous comments on seminars, are used as moments of evaluation of the same seminars and as indications for future seminars. The tutor often tries to stimulate a discussion on arguments of future “face-to-face” meetings using the virtual space as a moment of shared design of seminars.

The e-learning methodology is based on the effective complementarities between the ‘face-to-face’ dimension (meetings, seminars, etc.) and the virtual dimension (through online discussions, interchange of documents, training units, chat, etc.) and on a particular attention to the experts’ role.

Principal roles of experts inside the web community are: knowledge manager, tutor, leader (cf. De Pietro, 2001).

The knowledge manager plays a key role in organizing and certifying knowledge inside the community. On the one hand, in the role of organizer, he suggests new arguments of discussion, proposes interesting case studies, furnishes explanations and answers to questions posted by community members, configures and edits materials available online, constructs didactical material for the training online section; in the other hand, in the role of certifier, he establishes times and procedures for the validation of the knowledge acquired by the community. The knowledge manager needs the trust of the community in order to perform these functions and must win it directly ‘on the field’.

The tutor is a networking figure to which members can turn to for organizational, managerial and technical aspects. For instance the tutor organizes meetings, helps members to face technical problems, verifies the right functioning of technologies. He also mediates between the community and the knowledge manager. As expert of didactical methods, the tutor participates in converting the materials selected by the knowledge manager to the new multimedia format available online. He also plays a fundamental role in animating the community. He tries to involve members in discussions, facilitate discussions on new arguments and the need for new services. He designs and edits contents of the web site, records “face-to-face” meetings with a video camera, produces and publishes the related multimedia movies.
The community leader legitimates the new online environment as the usual tool to interact among community members, as vehicle to access information and training. The leader represents therefore the ideal partner in the activities of both knowledge manager and tutor, embodying the driving force of the community and promoting participation in online activities. He can be distinguished for his industriousness in terms of observations and interventions inside the new online environment. The leader is usually an influential member and a deep connoisseur of the community, characteristics that allow him to be a point of reference in determining themes that can concentrate participation and interest of the whole community.

The educational model followed in projects like those presented, beyond their differences, sees learning as a process of participation in a community of practice in which are built and shared rules, languages, knowledge, values, ways of doing and thinking. Such systems reproduce therefore a lot of the principal conditions of the apprenticeship, intended as a situated and social learning process inside a community that realizes a specific and meaningful project (instead of simply following a training course) and in which experts members have specific and differentiated roles (leader, tutor, knowledge manager). This model at the moment seems to be the less widespread among e-learning typologies, although results of some experimentations are promising (cf. Talamo, Zucchermaglio, 2003) and indicate this typology of educational technology as the more promising among those able to realize forms of knowledge acquiring which respect principles of situated, social and cultural learning.

However further studies on educational virtual communities are necessary to better define their characteristics, ways of functioning and indications for design and educational use. Among the critical aspects are the following:

1) **Presence.** “face-to-face” meetings seem still to be fundamental in the creation of a community. Virtual interactions recorded after participants in a virtual community have met face to face, show an evident communicative jump: a more direct and informal language and a different quality of contents that indicate a major opening and availability (Talamo, Zucchermaglio, Ligorio 2001; Zucchermaglio, 2000). It seems there are dimensions of a community that are negotiated more easily in presence (like for instance the “common enterprise”) and others also through technologies (like the “shared repertoire”, cfr. Wenger, 1998).
2) **Dimensions.** A minimum number of participants is needed to create a community (the project on professional communities’ network started with 25 participants but this number has progressively increased until 70 in order to maintain a continuous level of interaction). However overly large communities can also hinder an effective communication. The variable ‘dimension’ must be put side by side with the level of interactivity of participants, because sometimes registered members are not active members of the community. For instance some communities require at least one or two interventions in a forum to demonstrate participation. In these cases there is a large number of registrations at the beginning and later a dramatic resizing of community’s members. Situations like this hinder the development of a sense of belonging and make more difficult and artificial the creation of a community.

3) **Time.** Time necessary to activate a community in terms of both quality and intensity of interaction is not short. The CUOA project needed about 6 months to let the community acquire legitimacy and be the point of reference of participants. Therefore adequate activation periods should be planned in advance in projects that imply a community’s development.

4) **Interdependence.** A relevant aspect in building an online community is the activation of some form of interdependency among participants, supported by tasks assigned to members or embodied in participants’ common interests and objectives and opportunely stimulated by facilitators. ‘Real’ and not formal links with everyday problems and practices of members are particularly useful.

5) **Facilitation’s roles.** Supporting figures with their various functions of assistance are crucial, especially at the start of a virtual community. Successively the community concretizes a need of self-regulation, deciding and developing new paths, perhaps following one or more emerging leaders. Community has a life cycle during which subjects, rules and activities change but experts’ roles are a constant reference from the beginning during the whole development of the community. For example in the process of animation and management of a virtual community (Talamo, Zucchermaglio, 2003) practices of reciprocal tutoring should replace the traditional single teacher: learning from each
other is a characteristics of the collaborative and social learning contexts. As regarding group's tutoring, the tutor's role should develop with the developing phases of group. There is a lack in our knowledge about the process of develop of these phases in real learning on line contexts and also about the realization, more or less efficient, of tutoring functions in relation with these. Collison, Elbaum, Haavind and Tinker (2000), however, argue convincingly that the roles of human e-learning tutors differ from those of face to face tutors in at least three respects: a) They have to function as a guide-on-the-side instead of as guide-in-the-center, deepening the conceptual level of participants and training them in new conversation skills; b) They have to be project leader designing a regular, manageable feedback loop; c) They have to be leaders of the group processes, gradually building a community.

We believe therefore that virtual communities are a very good example of ‘empty’ technologies, in the provocative sense we defined before. However speaking about ‘empty’ and ‘open’ technology doesn't mean leaving users free to be lost in the communicative space provided by the system; at the contrary the system (and the educational project around which the cooperation of community's members is realized) must embody (also through the experts' mediation) a trajectory defined also by users and should maintain the complexity of the task as integral part of the meaning that they are going to construct. The system should provide bonds that allow users to co-build their own knowledge and prevent from getting lost inside the socio-communicative space provided; tasks, indicators and roles (like those of experts but not only them) that support and guide learning should be designed in advance, like in the best educational contexts independently from the presence of technologies. In fact effectively constructive educational contexts are those that seem ‘empty’ but instead embody inside of them a lot of analysis, organization and prediction of possible and effective educational interactions (Zucchermaglio, 1992).

A fundamental distinction between ‘empty’ and ‘full' technology is in fact being part of a real and meaningful learning project.

‘Full’ technologies, like courses on the ‘book’ or ‘lesson’ model, are self-referring systems, closed in themselves and rigidly predefined (needs' analysis surveys on the web or a tutor who is only a technical help-desk don’t influence so much the predefined path or the interactivity of the system).
At the opposite, ‘empty’ technologies (and especially virtual communities) don’t exist as single systems but always as technological mediation inside meaningful projects. For instance in the project on professional communities’ network, virtual moments integrate with “face-to-face” seminars inside the project’s overall objective of developing and supporting a community of professionals coming from different companies. Furthermore the technological mediation allows a continuous contextualization and negotiation of considered relevant training activities showing a system’s flexibility which ‘full’ technologies don’t have.

Such analysis suggests anticipating social and open uses of technology in the design phase, substituting the task of working with given and fully organized by others materials, with instead the task of building something in interaction with others, selecting and organizing the appropriate material to reach learning objectives, working on meaningful tasks ‘inside’ and ‘outside’ technology.

3. Some conclusive reflections

Design of technologies should be explicitly centered on communication and social interaction processes: technologies should be conceived as cultural systems that mediate and support distributed and shared social construction of new knowledge. A technological system shouldn’t simply show itself to the user, but rather be viewed as a tool that helps to reflect upon his own learning process and control it in an active and aware way and supports communication and negotiation processes among members of a social community inserted in a ‘rich’ learning and working context.

Such design will benefit from the analysis of the complex process of negotiation among novices and between novices and experts. Technologies in fact shouldn’t try to substitute experts but to the contrary should be the tools that mediate among experts, novices and practices to be learned. The ‘quantity’ of teaching done by the expert doesn’t decrease but change; in this sense educational ‘empty’ technologies require experts to rethink their roles, which will be more related to things like designing environments and managing the community than to traditional teaching.

On the basis of our analysis we could propose, as conclusion, a list of indications for design that are usable by a wide range of educational technologies and try to bring ‘inside’ the system the characteristics of social and situated everyday learning. Let’s try to list some of them.
1. Arranging meaningful and complex situations, which allow users to understand the objectives with respect to the acquisition of knowledge. In this way users can prefigure characteristics of the situation, analyze possible relations with already known situations, consider which new knowledge is required to participate in productive and less peripheral ways to the new activity, establish meaningful relations with experts and other novices variously ‘incompetent’. From the point of view of design that means creating contexts of apprenticeship in which knowledge can develop through experts’ scaffolding in the social and collaborative realization of an ‘authentic’ task, meaningful also to novices, in a similar way to what happens in extra-scholastic contexts, facilitating therefore social sharing of tasks and contextualized use of tools.

2. Arranging situations in which knowledge is connected to conditions of its usage and application, considering that to be expert in a field means essentially knowing how to move inside it and how to use the resources of the community (among them for instance artifacts, physical characteristics of the environment, competent people): allowing therefore an instrumental use of knowledge, creating contexts for a meaningful and situated learning and not only for a passive transmission of information.

3. Arranging situations in which is made possible visibility and social modeling of knowledge through participation in a community of apprentices. In this case a strong characteristic of the training context is making visible the process of knowledge acquisition by novices, so that it can be examined, criticized and realized as an object of construction and reflection also by other novices. The correction can be made by the experts but also by other novices inside a ‘horizon of observation’ shared among members of the learning community (Hutchins, 1993). The novice who is wrong is not the only who benefits from the chance to be immediately and effectively corrected; also the other community members can observe practices of correction of mistakes and in this occasion of observation “knowledge of the whole activity’s system can increase” (Hutchins, 1993:57). In a socially structured activity’s system, correction of mistakes therefore can be a learning occasion for all the participants in the activity, not only for who is wrong. From the point of
view of design that means designing learning contexts focused both on collective comprehension of phenomena and on performances and learning of single individuals. In this way otherwise obscure processes become transparent and less expert members are allowed to participate in activities, providing different levels of participation (differentiated but always meaningful) which respect different initial competencies of members. As for example thinking of activities in which each group performs tasks differently connected to the central problem and one must plan division of work among members. Such sharing tasks among members and experts allows facing more complex tasks and situations and working on the area of ‘potential development’ of novices.

4. Arranging situations that increase integration among different knowledge areas and fields of activity through building learning contexts that allow exploring more or less complex arguments without a clean field’s distinction. Examples are projects that allow an educationally interesting usage of previous experiences and knowledge of members: projects with a concrete and clear objective (writing a document, finding a solution to an organizational problem, planning a new management of working activities, etc.) which allow involving novices in meaningful practices of building and interpreting knowledge and avoiding the risk of decontextualizing and impoverishing of meaning the usage of symbols, artifacts and tools; wide and long term projects, proposed and supervised by experts (but not only by them), which involve novices in building and experimenting new working and organizational practices (cf. Zucchermaglio & Colazingari, 2000). Such projects favor social interaction among community members which is a major source of informal learning: for instance through the organization of small design groups on specific projects, transversal, distributed over time, situated in real contexts and with an authentic aim. These contexts – in which it is easier to reflect upon activities with an aim intelligible also to learners - allow to emerge the initial representations which every novice carries and can become explicit in the encounter with those of others (experts and other novices): in this essentially argumentative and constructive process learning emerges as absolutely natural.
5. Arranging situations that support development and usage of meta-cognitive and self-regulative abilities of learning to learn. An essential objective is in fact increasing novices’ ability to be active agents of their learning. That means considering developing an autonomous ability of knowledge acquisition, practices and capacities as an important result of learning’s activities. From the point of view of design that means creating learning contexts in which an important portion of control of the learning objectives is the responsibility of novices allowing them therefore an autonomous, collaborative and constructive activity.

4. References


