Building a Bridge between Different Scientific Communities: On Sheridan's Eclectic Ontology of Presence

Abstract

Sheridan's recent paper (1999) on presence is particularly relevant to research on virtual environments (VEs). Sheridan's "eclectic" ontology and his "model of evaluation" proposed as a bridge to close the gap between different positions are discussed. A modification of the evaluation model is suggested to make it apt to provide common ground for different perspectives. VEs are boundary objects that interest various research communities with different worldviews, and cooperation among these communities is necessary if VEs are to become tools for communication and coworking.

1 Introduction

In his paper published in the Forum section of *Presence: Teleoperators and Virtual Environments,* Thomas Sheridan (1999) acknowledges the importance of the discussion on the ontology of presence for future research on virtual environments (VEs). He remarks that there are opposed positions, that he is committed to one of them, and that he will attempt to propose an "eclectic" solution that could be accepted by all the parts and provide a shared concept of "presence." We consider this paper a very good occasion to clarify the terms of the problem and to evaluate its implications for the development of research on VE as a tool to be used in everyday life to cooperate and communicate with other people (Riva, 1999). The fact that Sheridan's proposal seems to be needing substantial reform does not affect its value to the current debate on presence in VE; science is more a matter of exploration of new territories than of possessing indisputable truths.

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2 Problem Setting: Three Moves

In this section, we consider the opening moves through which Sheridan sets the stage for his argument: we know that the ways in which the problem space is constructed exerts a strong influence on the ways in which the problem will be finally solved (Schon, 1979). In these moves, a rhetorical (persuasive) dimension is apparent, which aims to foster principles and values that are regarded as the moral foundations of the community of scientists and technologists working on VEs. Billig (1987) has emphasized the importance of the rhetorical dimension in arguing and thinking; as a consequence, we are aware of the fact that problem setting involves more than producing an acceptable conceptual framework: it requires building through appropriate discoursive practices a social reality, a community (Brown & Duguid, 1991) that is capable of taking charge of the problem and of finding a good solution. The community of practices addressed by Sheridan's paper is that of scientists and technologists engaged in VE development: This community is reminded of its responsibility of defending "hard" science against "social science," which is beginning to enter the technical field of research on VE.

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2.1 First Move

The paper opens with an overt appreciation of the "lively discussion on the ontology of 'presence', namely the philosophical aspects of the experience of virtual and 'real' reality and being" (p. 551). But, a few lines later, the initial appreciation turns to blame: "This author is troubled that many of the 'alternative ontologies' posed are presented as though they are mutually exclusive of the others." Evaluation of the "lively discussion" oscillates between two poles: on one side it is said that "this topic is obviously critical to virtual reality research pursuits because the philosophical perspective affects what we do in our scientific and engineering pursuits and how we interpret and describe what we find"; on the other side, Sheridan admits to being alarmed by the apparent conflict between different perspectives. What is most interesting in this first step is the way in which the conflict is characterized: "[this author] is also troubled that numerous proposals claim to be at odds with the conventional Cartesian perspective that has formed the basis for science and engineering for so long. Social science—in contrast to the so-called 'hard' sciences—has seen a variety of paradigms enter the intellectual fray, grow in popularity and fashion, and then fade out, almost without a whimper." One could infer from this passage that what disturbs Sheridan is not so much the conflict between different views but the fact that social science, used to build volatile models, may tarnish the purity of the scientific enterprise. This appeal to arms in defense of "hard" science (we will not question here the assumptions underlying Sheridan's position: the contrast between "science and engineering" and "social science," the ascription of Descartes to the roles of engineers, the idea that science grows by amassing immutable truths) exhibits the peculiar force of Sheridan's argument that incorporates a precise concept of science and technology as moral enterprises ("hard" scientists and technologists often function as "moral agents") (Kling, 1994).

2.2 Second Move

The paper defines the positions in conflict, which are basically two. (This scenario may seem oversimplified, but we accept it here for the sake of the argument.) The first position assumes "that actual and virtual presence are quite distinguishable, that mostly we know where we really are, unless we are asleep, drugged, or just not paying attention. However, by some effort to 'suppress disbelief,' *we can experience a sense of presence in an environment that is not real, but virtual*" (p. 551, emphasis ours). The second position maintains "that in a deep sense (*a*) we are always in a virtual world, and that (*b*) *we cannot know reality,* that (*c*) our fallible senses and brains can deceive us . . . that (*d*) reality is not something fixed, but that we are constantly changing our reality through our actions" (emphasis and inserted letters are ours). It is necessary to say that most of the authors supporting the second position do not in fact assert that we cannot know reality (point *b*) nor that our senses and brains can deceive us (point *c*): they say that what we know is reality, no less and no more than this. This position was known by medieval and modern philosophers under the name of "intentionality": on one side, the human mind tends to (intention) capture reality (and normally succeeds in doing this), and, on the other side, reality (what we are able to grasp of our environment and of ourselves) is structured to meet the structure of the human mind. The space in which reality and mind meet is not "outside" nor "inside" the head: it is a relational space, a place held in common by both environment and mind. (This idea has been clearly set in cognitive science by Clancey (1997), Clark, (1997), and Mantovani (1996a).) This is exactly what is said by Mantovani and Riva (1999) in a paper published in the same Forum section of Sheridan's: "The dualistic view has no real foundation because the whole human experience of being in an environment is bioculturally mediated so that there is no 'outside' (things, objects) as independent from and opposed to an 'inside' (mind, knowledge, perception, and so on)" (p. 543). The powerful moral claim present in the second move of Sheridan's paper seems to be misdirected: we concede that the view that reality cannot be known is destructive for scientific work, but we assert that the second position does not hold this idea. We can guess why Sheridan fails to grasp this point; what probably lets him suspect that reality risks to become a quite slippery concept are points (*a*) and (*d*), stating that "reality" is constantly changing and is modified by human action. We will clarify our version of these two points further, but we maintain that authors of the

second position do not think that "we cannot know reality"; on the contrary, this concept is present in Sheridan when he writes that, although "mostly we know where we really are," under special conditions, "we can experience a sense of presence in an environment that is not real, but virtual." (If "real" and "virtual" are separate entities, as Sheridan believes, this is plainly the same as saying that we sometimes are unable to discern a "true" from a "false", deceptive reality.)

2.3 Third Move

The paper contains a proposal to settle the "ontological conflict." "This paper will characterize a perspective on 'presence' that is tolerant of many of these supposedly conflicting ontologies but currently lives happily in a Cartesian world, and that has already proven its mettle in various hard science and engineering applications" (p. 551): estimation theory, which "may provide some basis for a bridge" to close the gap between the alternative positions. Here again we are disoriented by the shifts in Sheridan's argumentative moves: if there is contrast, as he said in the above lines, between the two perspectives, how can he talk of "*supposedly conflicting* ontologies"? And if he intends to defend one part against the other, as he admits, how can he say that his proposal is "tolerant"? Actually, through the opening moves of Sheridan's paper, we can see a double gap: the first is about the concepts of presence, the second is about the relations to be established between two different scientific communities. The latter gap involves a serious problem of communication (and mutual respect) among different cultures.

3 Reconfiguring the Model of Estimation

The bridge that Sheridan offers to overcome the gulf opening between the positions presented above is a well-known information-processing technique. Figure 1 shows how the process of estimation happens. (The paper provides a qualitative description of the model.)

What is mostly interesting from our point of view is the way in which Sheridan presents his model: "*To the left of the dashed line is the intelligent estimator*, the animal, or computer, and to the right is its environment. *The blob on the right represents the true reality 'out there.' We assert that this true reality can never be known* but only estimated, because of 'filters' that lie between the information processing internal to the animal or machine and the outside world" (p. 554; emphasis ours). These lines support the remark we made to Sheridan's second move: it is the Cartesian position, and not its Gibsonian or Heideggerian opponent, that states that "true reality can never be known." We say that this skeptic idea comes from the dualistic framework that contrasts "true" reality with mediated (filtered) reality. In our view, also contrasting knowledge and estimation (" 'Real' reality can never be known, because of sensory and action constraints, only estimated" (p. 556)) is unfounded. In our perspective, estimation is just a technically sophisticated way of knowing and evaluating the environment in which the actor is immersed. If the dashed line separating the left from the right side of the model is canceled, we remain with a nondualistic model that portrays the intelligent actor as immersed in his or her environment as an active part of it (figure 2).

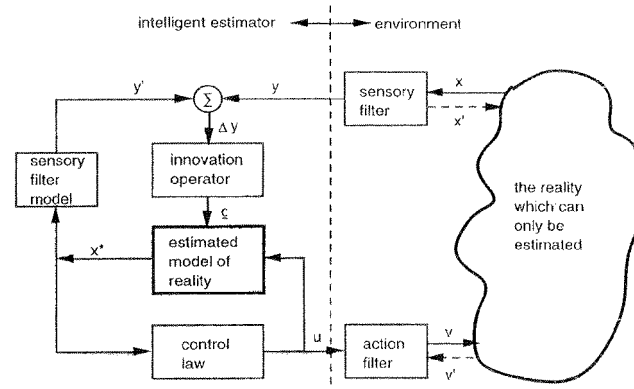

Figure 1. *The process of estimation (Sheridan, 1999).*

We can put the environment in the actor's mind as well. In fact, if we suppress dualism, we can see the mind as inscribed in the environment and, conversely, the environment as inscribed in the mind. Also, the traditional separation of a perceptive input and a motor output (Sheridan's filters) can be substituted by a more ecologically valid reference to adaptive action, again in a Gibsonian vein (Flach

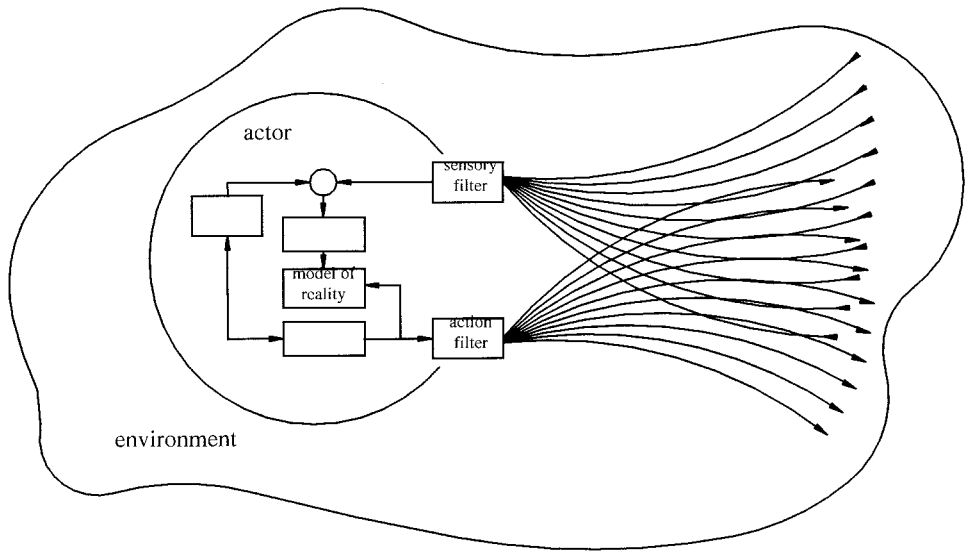

Figure 2. *Reconfiguring the process of estimation.*

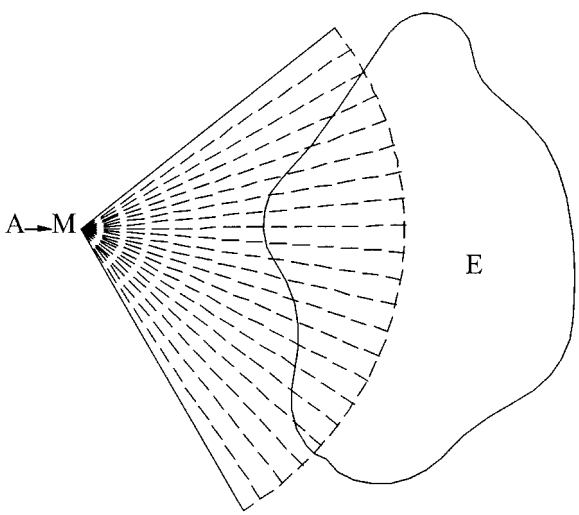

Figure 3. *Actor (A) through artifact mediation (M) explores and structures the environment (E) (Mantovani, 2000).*

& Holden, 1998). We tried to convey this picture of the situation in figure 3.

4 The Case of Divine Presence

In the previous section, we showed that at the core of Sheridan's view is dualism and that, if dualism is removed, what remains is just the view that we proposed in our non-Cartesian paper (1999). We showed also that the concept that reality cannot be known is inherent in Sheridan's position, as Sheridan says with the utmost clarity. What is difficult to explain is why he attributes the opinion that "we cannot know reality" (p. 551) to the non-Cartesian position. We guessed that this misattribution may depend on the fact that Sheridan may find it difficult to make sense of the idea that human beings construct reality through their actions. We will use Sheridan's example of God's situation with respect to "real" and "virtual" presence to try to clarify in which sense we say that reality is constructed, and to show that the product of our construction is not an arbitrary fabrication.

Let's consider the case of divine presence in Sheridan's presentation: "God represents an ultimate ontological challenge with regard to perceiving and interacting with 'reality' and 'presence,' and (depending upon one's beliefs) with respect to accepting virtual reality as reality, or making a distinction. *While God is apparently not Himself (Herself, Itself) arguing a philosophical viewpoint on reality as are the other three [i.e. Descartes, Heidegger, and Gibson], the sacred texts (Bible, Koran, Bhagavadgita, etc.) are taken by believers as arguing in behalf of God's presence and reality*" (p. 553; emphasis ours). The case is well chosen: God is the most evident, present, palpable reality for believers. (It is not neces-

sary, I presume, to remind here that many texts report mystical encounters with God as endowed with a strong—sometimes overwhelming—physical presence; but, Sheridan says, He (She, It) is also a special kind of reality, something that differs from ordinary things: "ontologically, God may be said to be a virtual reality, as contrasted to physical sensible reality." Although He (She, It) may dwell in the heavens, on earth, and everywhere, as more or less all religions maintain, the ways in which His (Her, Its) presence is revealed differ in the various religious traditions. To understand which sort of God's presence a person can experience, one has to know his or her religious tradition. This means that the characters of every possible experience of God's presence depend on the peculiar religion (or absence or it) a person is living in: God's presence is constructed differently by Muslims, Hindus, Jews, Christians, and so on, because experience is culturally mediated.

The interesting point is that God's presence (*if, how,* and *when* God can be experienced) is the result of a complex set of cultural practices and theories that pervades the everyday life of members of a given community and gives sense to every part of it. Sheridan acknowledges this fact when he says that there are cultural artifacts (Bible, Koran, Bhagavadgita, and so on) that tell to believers what divine presence is like. God's presence is made possible, structured, explained—we prefer to say that it is mediated—by cultural artifacts. Culture is not the result of individual deliberations; on the contrary, it is the prerequisite for individual deliberations and actions; it is the condition that makes it possible for individuals to act as members of a given community, to understand mutual intentions, to develop common action.

> The web of culture that holds people together in social groups is constructed from shared beliefs and feelings, knowledge of a common history, and a sense of place in the natural and social world. These strands provide the connections by which members of a society can communicate with one another. Myth and magic, rites and ceremonies, poetry and everyday conversation all form part of the web. A culture is built and maintained in large part by symbolic stories and rituals, in which objects and events are given meanings that in various ways go beyond themselves. (Holyoak & Thagard, 1995, p. 168).

Culture shapes individual minds and organizes their ways of knowing and acting in their social and physical environments.

Sheridan concludes his discussion of God's presence saying that both for believers ("conventional believers," he writes—a curious definition, far too large to account for any historically existing religion) and nonbelievers ("many others [for whom] God is a metaphor for the universe of what is unknown and unknowable": the positivistic idea of God), "the sense of divine or otherwise spiritual presence or reality is enhanced by voluntary effort on the part of the observer. The difference is that the criteria of the believer for accepting an internal model of reality (with respect to God) differ from those of the nonbeliever" (p. 553). It is true that criteria—cultural standards—for defining, circumscribing, and structuring reality may differ, but it is not true that their application requires "voluntary effort": the way in which the cultural web normally operates is mostly automatic and effortless for people who have been socialized in a given culture. Applying existing cultural norms in everyday life does not demand from members of a given culture more effort than going to work at MIT every morning for a MIT scientist, or attending a faculty meeting, or preparing a barbecue with friends. We say that the same arguments that have been used to consider divine presence can be used to think of a virtual office: as God's presence is mediated by the artifacts and traditions that tell believers (and nonbelievers) what God's presence is (if it is "real" or not, how one can experience it, what is the meaning of the experience, and so on), presence in an office is similarly mediated by cultural norms that tell coworkers (and outside people) what sort of physical and social object an office is (we mean, that particular kind of office), how mutual presence is acknowledged, how smooth cooperation can take place in it, which use one is expected to make of tools, informations, time, and space (Mantovani, 1996b). These cultural norms may differ in different organizations and in the diverse communities of prac-

tices living in them: MIT, IBM, Microsoft, and so forth all have their ways of organizing office (spaces, division of work, procedures) just as Muslims, Catholics, or Jews (and positivists) have their specific ways of constructing divine presence. Office is both real and virtual in the same sense in which, according to Sheridan, God's presence is both real and virtual: all our world is "real" (we are not inventing flowers, trees, and mountains with our imagination) and at the same time constructed (meaning that human experience is socially, historically, and culturally mediated).

5 Stretching Communities Across Boundaries

In this moment—in which virtual environments are no longer simply technical objects but begin to appear as promising social tools for communication and cooperation—we see them as boundary objects that can be accessed through different routes and employed by different communities. "Boundary objects . . . forge coordination links among communities, brining them, intentionally or unintentionally, into negotiation. Boundary objects are objects of interest to each community involved but viewed or used differently by each of them. These can be physical objects, technologies, or techniques shared by the communities. Through them, a community can come to understand what is common and what is distinct about another community, its practices, and its world view. Boundary objects not only help to clarify the attitudes of other communities, they can also make a community's own presuppositions apparent to itself, encouraging reflexion and 'second-loop' learning" (Brown & Duguid, 1998, p. 104).

We do not know if Sheridan will agree with the way in which we discussed his paper and reconfigured his model, but we hope that he will be content that we made an effort to understand his view and to help build a bridge between distant perspectives. We believe that the bridge we mostly need is that connecting "hard" science with other kinds of scientific discourses. We are uneasy with Sheridan's sharp contrast between "hard" and social science; we feel that different scientific communities should open themselves to cooperation with other communities and cultures. (Scientific disciplines define cultural communities, provided with languages, commitments, and principles of their own.) We understand that this could be difficult, especially for people trained to be experts in technical fields, but we think that the development of virtual environments as social tools requires technologists joining forces with scientists from other disciplines such as cognitive science, cultural psychology, communication studies, and ergonomics. We do not know if these are "hard" or only semi-hard sciences, but we know that gusto for exploring boundaries and appreciation of free discussion are distinctive characters of every strong scientific community.

References

Billig, M. (1987). Arguing and thinking: A rhetorical approach to social psychology. Cambridge: Cambridge University Press.

Brown, J. S., & Duguid, P. (1991). Organizational learning and communities of practice: Towards a unified view of working, learning, and innovation. *Organizational Science, 2,* 40–57.

———. (1998). Organizing knowledge. *California Management Review, 40*(3), 90–111.

Clark, A. (1997). *Being there*. Cambridge, MA: The MIT Press.

Clancey, W. J. (1997). *Situated cognition*. Cambridge, MA: Cambridge University Press.

Flach, J. M., & Holden, J. G. (1998). The reality of experience. *Presence: Teleoperators and Virtual Environments, 7,* 90–95.

Holyoak, K. J., & Thagard, P. (1995). *Mental leaps: Analogy in creative thought*. Cambridge, MA: The MIT Press.

Kling, R. (1994). Reading "all about" computerization: How genre conventions shape nonfictional social analysis. *The Information Society, 10,* 147–172.

Mantovani, G. (1996a). Social context in human-computer interaction: A new framework for mental models, cooperation, and communication. *Cognitive Science, 20,* 237–269.

———. (1996b). *New communication environments: From everyday to virtual*. London: Taylor & Francis.

———. (2000). *Exploring borders: Understanding culture and psychology*. London: Routledge.

Mantovani, G., & Riva, G. (1999). "Real" presence: How different ontologies generate different criteria for presence, telepresence, and virtual presence. *Presence: Teleoperators and Virtual Environments, 8*(5), 540–550.

Riva, G. (1999). Virtual reality as communication tool: A sociocognitive analysis. *Presence: Teleoperators and Virtual Environments, 8*(4), 462–468.

Schon, D. A. (1979). Generative metaphor: A perspective on problem-setting in social policy. In A. Orthony (Ed.), *Metaphor and thought*. (pp. 254–283). Cambridge, MA: Cambridge University Press.

Sheridan, T. B. (1999). Descartes, Heidegger, Gibson, and God: Towards an eclectic ontology of presence. *Presence: Teleoperators and Virtual Environments, 8*(5), 551–559.