

A systemic framework to orient the design of artifacts of dialogue

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Abstract: In this paper we present a conceptual framework, based on a systemic approach, which informs the design of artifacts to support dialogue among people. The concept of dialogue is highlighted as a communicative practice which facilitates the creation, examination and circulation of meaning. We argue that current technology to support communication is insufficient to facilitate dialogue, since it only allows the management of messages which are simple and difficult to relate. The proposed conceptual framework introduces several notions, among them, platform, rules, movements, moments, and breakdowns in a dialogue. From this ontology, a taxonomy is shown, where tangible artifacts are distinguished, as electronic mail and symbolic artifacts, as problem-solving methodologies. Two cases of artifacts for dialogue are analyzed: a dialogical meeting record and an electronic forum. The paper closes reflecting on the scope of this proposal for the design of artifacts for dialogue.

Key words: dialogue, Bohm's dialogue, meaning, systemic approach, communicative practice.

Resumen: En este artículo proponemos un marco conceptual, basado en un enfoque sistémico, que orienta el diseño de artefactos para apoyar el diálogo entre personas. Se destaca el concepto de diálogo como una práctica comunicativa que facilita la creación, el examen y la circulación de significados. Argumentamos que la tecnología actual de apoyo a la comunicación resulta insuficiente para facilitar el diálogo, ya que permite sólo el manejo de mensajes simples y difíciles de relacionar. El marco conceptual propuesto introduce varias nociones, entre ellas, plataforma, reglas, movidas, momentos y rupturas del diálogo. A partir de esta ontología, se muestra una taxonomía donde se distinguen artefactos tangibles, como el correo electrónico y artefactos simbólicos, como las metodologías de resolución de problemas. Dos casos de artefactos del diálogo son analizados: un acta dialógica y un foro electrónico. El trabajo termina reflexionando sobre los alcances de esta propuesta para el diseño de artefactos del diálogo.

Palabras clave: diálogo, diálogo de Bohm, significado, enfoque sistémico, práctica

Introduction

During the last two decades new inter-disciplinary fields have emerged, these have researched and developed technologies to support groups' activities, particularly, the fields known as *Computer Supported Cooperative Work* (CSCW) and *Computer Supported Cooperative Learning* (CSCL), related to technologies of support for collaboration in working and learning, respectively. Not less important is the field known as *Computer Mediated Communication* (CMC), which develops technology to facilitate human communication through the information technologies. In all of these fields, human interaction and communication are fundamental aspects of research that inform on the design of artifacts. Indeed, the first problem appears here; we support that current artifacts do not assist adequately the higher layers of human communication, such as making-sense is, in communicational situations. Even though as from the works by Winograd and Flores (1986) advancements have been attempted along this line, progresses in this dimension are still modest; for instance, most of the post systems offer the concept of simple and isolated messages, the metaphor of the message sent by letter remains. Support for these systems has been developed to help the user organize the messages, sort them out and make their search easy. Recently electronic mails that structure messages and their responses as conversations have become massive. Although conversations help locate messages in a context, it is still difficult to follow the thread of the ideas generated by the participants. Conversely, when we converse face to face in a group, we can retake the previous idea—which someone said minutes ago—and go on to elaborate new ideas from it. Here we already detected a breach between what is possible for us to do in quotidian life and what communication mediated by computers allows us to (Suchman, 1987). Another instance is found in technology applied to support meetings, where cyclic models have been developed under concepts such as pre-meeting, meeting and post-meeting (Bostrom *et al.*, 1993), where the partakers maintain a conducting thread of the work by means of documents in the shape of agendas, acts and work documents. Nonetheless, in these systems one witnesses the lack of adequate artifacts that allow the

participants to make references to the meanings which appeared in previous reunions. This void makes both continuity and updating the communicative contexts enormously difficult in practice.

Manipulate meanings is a controversial topic, there is a rationalist inheritance that reduces the meanings to a semantic dimension. Dialogue, on the contrary, is deeply relational and uses the meaning in a different manner from that in which it has been treated by the rationalist approaches and the resulting technology. Facing these problems has made us cross diverse theoretical and practical approaches associated to dialogue and human condition so as to find orienting principles for the design. Definitely, we perceived that it is necessary to develop, in the first place, a discourse on dialogue that enables us to design technological artifacts which support it. More than an abstract definition, we are motivated by the answer to what dialogue is, what the conditions to make it occur are, and which results we are led to through its exercise. Clarifying the meaning of dialogue is one of the challenges this work tries to face.

Fundaments of dialogue

The study and development of the conceptual aspects which characterize the phenomenon of dialogue have been closely related to problem-situations, where its use turns out to be fundamental to establish solution mechanisms. For instance, we found Freire (1992) making use of dialogue to solve literacy problems; Slotte and Hämäläinen (2003) proposing dialogic structures to improve decision-making processes; Echeverría (2006), who suggests an ontology of the enquiry in his approach to *Ontological Coaching*. Dialogue is profusely used in several forms of psychological therapy, such as reflective groups (Andersen, 1994; Anderson, 1999), and therapies derived from NLP (Bandler and Grinder, 2003).

The occidental and modern notion of dialogue finds its origins in ancient Greece. Indeed, in Plato's *Dialogues*, we see how Socrates used his dialogical method to inquire into topic of justice, virtue, and well-living. Socrates' idea is to reach the truth of an aspect—that a group of people explored—following the logical rigor of dialectics. This approach, nevertheless, points at the product of the dialogue and underscores the “truth” and commitment

between the parts as final end. In practice, dialogue as process faces conflictive issues and doubts. As a matter of fact, this social practice allows revising every subject that appears from or is in the tacit background of the conversation. Therefore, a dialogue can comprehend both agreement and conflict. In this sense, Burbules (1999) states that dialogue is a particular sort of game, where a contradictory tension is maintained: it demands the participants to be sufficiently similar so that the dialogue becomes possible, and so different that the game is worth it.

In relation to the stability and conditions of dialogue, we find the Humanism of Silo (Rodríguez, 1993). He notices that some times dialogue fails at the aim of reaching a full understanding of that which is considered, even if all of the formal requirements are fulfilled to guarantee the production of the alternation of ideas of affections of the people. For example, an obstacle which can originate the failure of a dialogue can be our incapability to express with clarity all we think or feel, or the incapability of the others to understand what we are referring to. These situations are registered in us as not being understood in what we refer to. Silo's thesis is that a complete dialogue exists if within it the pre-dialogic elements are considered, this is to say, those elements upon which the need for said dialogue is based. Thus, for a dialogue to be coherent it is necessary that the parts: "1. coincide on the subject; 2. ponder the subject to a similar importance extent; and 3. posses a common definition of the decisive terms to be employed" (Rodríguez, 1993: 897)".

On the other side if we allow change, dialogue must be distanced from their pretensions of searching for the "truth" and be oriented toward creating coherent meanings. In fact, David Bohm refers to dialogue as a river of meaning that flows around and through the participants. Thereby, for the meanings to flow, Bohm does not believe in the existence of fixed rules for dialogue, as those presented by Apatow (1999) and Burbules (1999), save those agreed in the very dialogue. In spite of these objections, the notion of social rule is fundamental to study dialogue with the rigor we want.

Two rules recurrently appear in dialogue. The first states the relation with the emergence of empathy, in an I-You relation, instead of considering it merely a role. The second rule is in respect to the primacy of cooperation over competence between people taking part in a dialogue. The I-You relation is the way Buber (1942) refers to dialogue in contraposition to the instrumental relations of the I-It nature, which are commonly established between people when they assume asymmetric roles in social relations. I-You relations transfer us to the ideals of equality and authenticity of social relations, such as those we find in the pedagogy of Paulo Freire assuming an emancipating perspective, and by Apatow (1999) and Burbules (1999) from maieutics and the second philosophy by Wittgenstein, respectively. In the I-You encounter, human being truly becomes a person and stops being a simple individual, or a social role. It is in this sort of relation where the real dialogue can occur; both parts are at the same level.

In cooperation people work together so that both gain comprehension rather than one wins argumentation. The idea is to advance in comprehension experiencing “fusion of horizons”, as Gadamer (2004) points out from hermeneutics. This fusion demands the participants frequently suspend their own and other’s preferences, prejudices and sentiments, precisely to put them to the test (Bohm, 1996). This requisite is heavily demanding, as much as it might not be possible to fulfill it in practice. The dilemma is to be found in how to reach greater levels of coherence of meanings suspending the elements that are at the very base of the meanings.

For Bohm (1996), dialogue is neither discussion nor debate nor mediation nor negotiation. These forms of communication are characterized by the explicit search of an objective, either winning, learning the prevailing opinion, avoiding the breakage of the interaction or mutually ceding to continue advancing. For instance, in debate there are emotions of competition and ambition to win. Conversely, in dialogue one works with the other, not against them. Therefore, the resulting emotions are neither resentment from losing nor euphoria from winning an argumentation. The subjacent emotions in communicative interaction are central to determine whether we are living a dialogue or not.

If we make dialogue an instrument to achieve very specific aims, we are at risk of overlooking the subjacent background of the very objective. Bohm warns us that in dialogue there is no taboo topic and the revision of every subject arising from or found in the tacit background of the conversation is permitted. Taking all of this into account, we already have a real problem. What must be supported, the very dialogue, or the particular purposes pursued in it? For David Bohm, searching for fixed purposes, despite praiseworthy, restrains the dialogue itself for this imposes barriers to the free flow of significances. The previous questions put us in the track of characterizing and defining the elements of the dialogue in a more precise manner.

Systemic model for dialogue

The definitions of second-order cybernetics (Von Foerster, 1996) have been successful dealing with complex objects. From this approach, dialogue as a first-order object is discarded, characterized by concepts such as “observed system”, “component”, “noise”, “entropy” (Wiener, 1948, 1998); as it is constructed by observers who, with their emotions, attitudes and actions—behaviors in general—, create a situation proper to them; dialogue is neither a pure second-order object for it is not only about including the observer in the definition of the phenomenon which brings-into-the-hand through its operations of distinction. In dialogue the participants’ understandings fall into a drift of meanings that can simultaneously change that who distinguishes as well as that distinguished. This dynamics profoundly affects the very condition of “being observer”.

In the core of any communicative situation highly complex aspects are conjugated, namely, information, its expression and the listening (Luhmann, 1986). The reduction of information to its expression or codes is the same as pretending that the ink in and the paper with which this article is written are the information herein contained. Different codes and means to express the information can be chosen. What makes information something significant for people is the process of listening or the interpretation that operates in the background of obviousness of the observer and from the contingency of the communicative action itself. To communicate, inform,

and express, according to Luhmann (1986), arise from a process of mutual selection that makes their separation difficult. This has implications in dialogue as a form of communicational activity, given that this complexity is joined by the active part of the dialogue's partakers.

To sum up, dialogue can be seen as a situational phenomenon that in its interior holds observers who are mutually transformed by means of their own participation in a communicative dynamics with certain contradictory characteristics. Indeed, in practice we recognize that dialogue does not try to solve problems, nonetheless, it does; dialogue does not try to change people, however it does. These characteristics make the finding of a definition of dialogue difficult if one insists on the use of a logic that does not accept opposing poles, such those commonly used in hard sciences. Fortunately, we find an exit to this apparent cul-de-sac in modern systemics.

Our aim is to present, from the perspective of the systemics, a theoretical framework that help orient, independently from the area of application, what we have called the design of the artifacts of dialogue. The conceptual model we present offers, from the perspective of systemic complexity, an ontology of the interaction that takes place in the dialogue between people.

Dialogue complexity

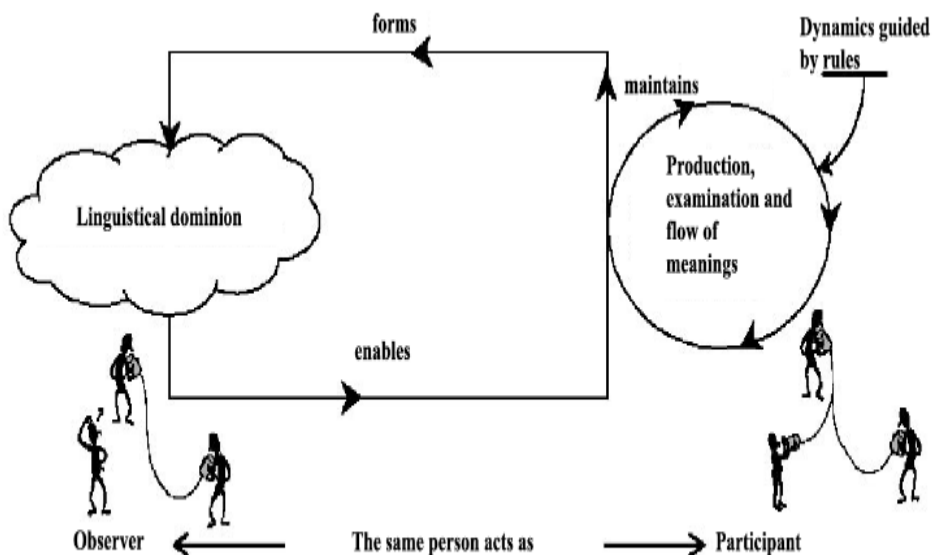
An important aspect to be considered in the study of dialogue is the multiplicity of dimensions that it is possible to examine. On the one side, it is possible to analyze the product of taking part in a dialogue, for instance, the solution of a problem. On the other, it is possible to analyze the process lived by the partakers of a dialogic situation, for instance, the rules of the dialogue.

Our objective is to gather in a conceptual schema a set of distinctions that allow a third to observe the changes in the emerging properties of a group, which are acquired via dialogic artifacts. Therefore, let us propose adopting a systemic approach to study both the stability and change in a situation of dialogue inspired by the thought of the complex proposed by Varela (2000). In particular, we need a framework that allows us to observe, from a third state, how dialogue oscillates as a process and as a product.

Hence, we define dialogue as a process guided by rules that produces, examines and makes meanings flow and whose result is the linguistic dominion which enables said dynamics. Figure 1 illustrates this dual character of dialogue.

To clarify the components of this ontology we quote what is considered to be a linguistic dominion from what Maturana and Varela state (1995: 134): “a consensual field of coupled behavior which is specified (becomes consensual) during the process of its generation [...] A consensual Field [...] where the coupled organisms are reciprocally oriented in their behavior, internally determined, by means of interactions that have been specified during their coupled ontogenies”.

Figure 1
Model for dialogue



A consensual field is inseparable from the actors that enable and constitute it. The actors bring-into-the-hand meanings of the consensual field, yet at the time they create new meanings which make them flow by means of their behaviors expanding the limits of the very field. Here it is not important to know whether the participants understood the same from the semantic viewpoint; rather, we define, there is a shared meaning if the behaviors of the actors of the interaction are congruent with the mutual expectations, generated in the linguistic dominion wherein they participate. In Lotman's conception on semio-sphere similar notions to that of linguistic dominion herein referred to are found; in the sense that partakers are immerse in a universe of production and flow of meanings from which they are an inseparable part (Lotman, 1996).

An observer is a system capable, through their recurrent interactions, of accessing their own linguistic states. This property appears from the recursive capability of the language (Echeverría, 1994), which allows us to make any deed object of distinction. For example, we can observe, observe the observation, observe the observation of the observation, and so on successively ad infinitum. Nonetheless, acting as an observer is only one of the possible roles played by a person in a situation of dialogue; their active participation in a dialogue is what permits the creation and flow of meanings. The transition between the roles of actor is performed in the context of the dialogue by means of the moves of the game.

Platform of dialogue

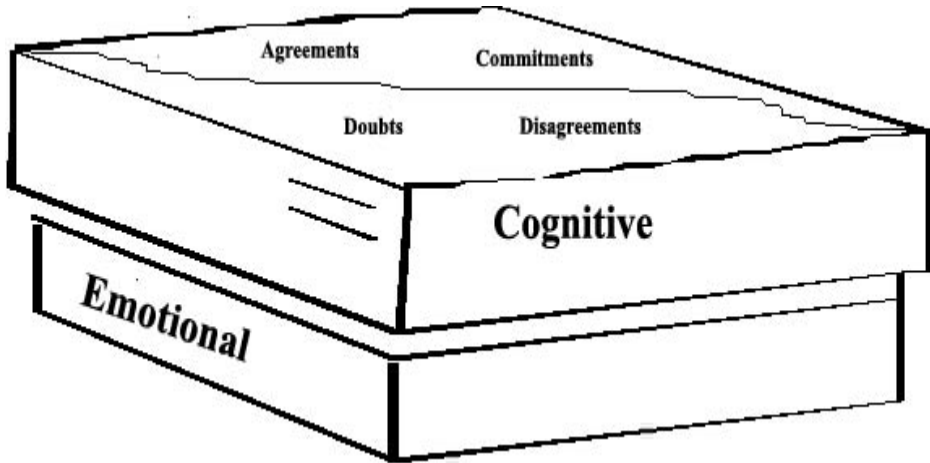
Let us propose the existence of a virtual place, with a proper architecture, which we have called *platform of the dialogue*, where the dialogic synthesis occurs. It is a common co-present terrain when the actor of the dialogue has either the role of observer or participant. The platform is a sort of field of meanings where the communicational moves take place within a praxis guided by rules. In this sense and looking for other components of this platform, Parra and Andrade (2002; 8) express on this common terrain: "among the learning processes of those committed to recognition, the space of recognition is configured, the common place where the phenomenon of the synthesis is produced which becomes materialized as the agreements, disagreements, questions, inquietudes and confusions".

Inspired by these aspects of the phenomenon of dialogue, it is possible to postulate the configuration of a platform of dialogue composed by four basic cognitive aspects. The first two related to the stability of dialogue: agreements and commitments; and the second: related to change: doubts and disagreements.

The participants of the dialogue must be sufficiently similar so as to make common distinctions to understand the terms used in the game; however, this is a necessary but not sufficient condition for the game to occur. The other ingredient is that in dialogue any difference sufficiently stressed between the players must be present in order to produce the necessary tension in said dynamics; this shows the need to incorporate the stability/change duality into the platform the dialogue. We have yet to consider another dominion upon which this platform is supported: the emotional dimension. Indeed, in every conversation there are emotions and language entangled, such as Maturana states (1994), it is emotion the scaffold on which the cognitive is placed (see figure 2).

The emotional topic inaugurates different conceptions from the cognitive ones, which we will not deal with in this article because of extension limits. We notice, nonetheless, that if the adequate emotions are not produced, simply dialogic synthesis will not appear. Dialogue requires the movement of the participants to a common affective space which demands from them openness and the legitimation of the other. Fortunately, there is literature that deepens into the emotional dimension of groups considering both emotions and moods (Echeverría, 1994). Who has not felt the influence exerted by the enthusiasm of a group in a brainstorming session? In the negative case, resentment might make dialogue collapse due to the settling of the victim's logic or the defense when someone feels threatened by others' argumentations.

Figure 2
Platform of dialogue



The components of the platform of dialogue have a historic trend. Ergo, the perception of the participants can change along time. Something that was a doubt can become commitment to the search for information that allows reaching an agreement after some time; the agreements can be questioned and give way to conflicts and doubts, and thus successively. In spite of this dynamic character, this platform, as a theoretical construct, has the characteristics of a *boundary object* (Star, 1989); this is to say, it enables the participants to make references to a “common space”. Notwithstanding, at the same time, the same platform gathers the interpretative variety of those who live in it. An instance of this sort of object is the *cases of use* employed in the capture of requirements in *software engineering* (Jacobson, 1987). When a case of use is well performed, it allows the software developers to know what they will develop, and the clients to have an image of the service they will receive and for which they are willing to pay. Developing *software* and buying are congruent actions. All in all, the platform of the dialogue gathers “shared meanings”, which are the fruit of a game directed by rules; in the following section we describe such rules.

Rules of the dialogue

According to Bridge, cited by Burbules (1999), the game of dialogue has seven conditions: the topic is not limited; the participants have an open spirit; the participants are receptive to newfangled viewpoints and criticisms; anyone can take part; time is not a serious limitation; the objectives of the discussion are not immovable; the purposes and practices of the members are manifested and are open to examination. We have summarized these conditions in three generic rules that must be observed by the partakers of the dialogue game, and they are presented in table 1.

Table 1
Rules of dialogue

Rule	When it is fulfilled	When it is not fulfilled
Openness: There is no exclusion of subjects, not restriction in the way to approach them; the interlocutors' participation is not discouraged.	The interlocutors are identically capable to introduce subjects, asking questions, regulate the course of conversation and examine the presented points of view respecting the rhythms of group assimilation.	Some participants exclude or discourage the others' participation: either taking too long in each intervention or by means of frequently intervening or quieting the others or shouting, ignoring the others' interventions, among other forms of explicit or underhanded exclusion.
Continuity: Commitment of the participants to make the meanings flow, despite the difficulties that might appear.	A persistent and broad flow of meanings is established that crosses common preoccupations, even difficult and conflictive ones. The argumentations are elaborated on the basis of a chain of collectively-reached common meanings.	Some participants do not take the topic seriously or conclude it before it is due. This occurs when the participants consider that the conversation does not provide anything important for them, and perhaps because of this give up examining the suppositions and sentiments in the background of the conversation.
Symmetry: An authentic reversible and reflective interaction avoiding behaviors motivated by or self-adjudicated social roles.	There are not asymmetries in the relation between the interlocutors; then if we ask we expect to be asked; if we propose we wait to be proposed; all in all, the relation is I-You without imposing the expectations of the roles in the game.	The participants self attribute privileges they do not want applied to their interlocutors; demand attitudes and behaviors from the others, they are unwilling to display; and they have plans which they are not willing to show, nor be examined by the others.

The rule of *openness* enables creating the necessary space to gather meanings, the rule of *continuity* prevents the meanings from being incoherent and the rule of symmetry aims to place the players in similar conditions to make moves. In all of the cases we use the concept of rule not as a prescription of behavior but as a sort of “road sign”, which must be interpreted and applied in its real-life context. Thereby, we achieve the level of precision and flexibility we are looking for.

The rule of symmetry does not suppose we all are the same in the communicative interactions. Equality among people is a utopia of modernity. Indeed, in dialogue diversity is recognized and accepted as a base fact. Even because of practical movements many of the techniques used in *coaching*, psychological therapy and education assume unevenness in dialogue. In all of these techniques the facilitators of dialogue are empowered vesting them with abilities of enquiring into people and their vital situations. In all of these cases, the expert facilitator of the dialogue distinguishes with precision what sort of moves he can make, such as it is examined in the following section.

Moves and moments of dialogue

A move is a sort of participation or the elemental act of a player in a game. In the game of dialogue, speaking and listening are the basic moves. Essentially we speak to affirm ourselves or to enquire (Echeverría, 2006); the difference is in the center of attention. In the first case it is inside us; in the second, conversely, it is in listening to the other. As a matter of fact, learning to listen is primordial to improve our capability of dialogue. Nonetheless, it is necessary to define more precise moves. In Burbules (1999) we find a taxonomy of five basic movements in the game of dialogue. The first thing is *to know how to make* questions creating inquietudes in the others. Questions open or close environments of enquiry and actions; yet it also demands special training to perform them well. We find classifications of sorts of questions which facilitate the activities of enquiry and efficacious listening in NLP techniques (Bandler and Grinder, 2003), in systemic family therapy (Andersen, 1994; Anderson, 1999), in modern maieutics (Apatow, 1999) and in Ontological *Couching* (Echeverría, 2006), to mention some examples.

The second move of dialogue states a relation with *answering the questions* we are asked. The third is *making sentences of construction* proposing topics in a particular direction of exploration. The fourth move corresponds to a reorientation inviting the other participants to take the topic toward another direction. Finally, the fourth move is *making regulating sentences* that allow redirecting the dialogue, making meta-references such as: “Order!, we are changing the subject” or “can anyone explain to me why we were stuck in that point?”

The five moves, however, would not be completely useful if the participant in the dialogue does not recognize the appropriate moments to make them. In order to characterize these moments of dialogue we propose two coordinate axes where the game participants can assume: a) an explanatory notion of the world; and b) a particular way of existing and being. The two explanatory ways of the world are taken from Maturana (1994), and the two ways of existing and being are taken from Leiva-Lobos *et al.* (2001) thus making an adjustment of the world-being.

On the one side, Maturana (1994) states that our notion of the world is continuously moving between two explanatory ways; the difference lies in whether the observer considers or not the biological explanation of their cognitive abilities in the listening of their own explanations. Both create two different notions of the world which Maturana calls transcendental and constitutive ontologies, respectively or just *universe* and *multiverse*. In the universe the existence of external entities that transcend our experience in the world is postulated. Countless times reality becomes an argument to force another, since we believe to have a privileged access to the only possible reality (Maturana, 2007). Therefore, we assume the right to impose our certainties upon others by means of instrumentation or violence. In this notion of the world, researching and learning any topic become a process to unveil “the reality”. Conversely, in the multiverse it is postulated that the world admits different readings; even the universe has its place. In this stadium of explaining the world the cooperation and legitimacy of the other in coexistence are admitted. This notion of the world, researching and learning become processes to glimpse new worlds, and making them emerge accepting the diversity of looks.

On the other side, a person can adopt a manner of being or existing *involved or not-involved* (Leiva-Lobos *et al.*, 2001) in the world. The involved mode of participation will occur as long as a person assumes an attitude of understanding which has led other person to assume their position opening to understand the involved beliefs, sentiments and experiences that are the base of their behavior. Conversely, the non-involved is a skeptical and questioning attitude; it stresses the judgment on the basis of logic and external evidence.

If we consider n participants in a dialogue, there are potentially $4n$ states of world-being adjustment, depending on whether the individual takes a value in {multiverse, universe} for the explanation of their manner to explain the world, and takes a value in {involved, non-involved} for their manner of being toward the other human beings. If we assume that the participants coincide in the world-being adjustment, there is a subset of cases left to be analyzed, which we have called the four characteristic moments of dialogue, such as table 2 shows. Special emphasis should be made in the fact that these moments are not fixed states but mobile in the real situation of the dialogue game.

Table 2
Characteristic moments

	Manner of being or existing	
	Involved (inclusive, sympathetic, believes, understanding, internal)	Not-involved (distanced, apathetic, critical, argumentative, external)
World		
Multiverse	Mutual recognition (relativism)	Perspectivism (competence)
Universe	Mutual discovery (impatience)	Power (manipulation)

The previous table shows these four moments inspired by the work by Burbules (1999). Firstly, in *mutual recognition* we are in a distended conversation whose focus is in deepening into the mutual understanding of the points of view that are involved. Secondly, in mutual discovery, nonetheless, it is sought to unveil altogether some general rule that explains what is involved or to find some consensual solution to a situation-problem. Thirdly, in *perspectivism* points of view are interchanged, yet without completely abandoning the position wherefrom the argumentations are exposed. Finally, in the dialogue of *power*, interaction aspires to improve the people's capacity of action (Echeverría, 1994). Burbules (1999) identifies "teaching" as dialogue of power. However, Freire (1992) extends teaching to what we have called dialogues of recognition and mutual discovery.

Rupture of dialogue

The identification of the characteristic moments of dialogue allows us to detect how it can be broken by the violation of some of its basic rules. In table 2, under the boxes the danger from falling into the four defined vices: relativism, impatience, competence and manipulation is shown. Any of these vices can break the dialogue, as it is indicated below:

Relativism: it attacks the continuity of dialogue, since the relativist can only accept judgments from those who agree with them. This has an appearance of tolerance, it is a pseudo-openness, but deep inside it is highly prejudicial and superficial.

Competence: it destroys openness and symmetry of dialogue. Symmetry is lost since one or both parts believe to have the exclusivity of reason and therefore, assume privileges. This shuts down communication channels, creates a feeling of confrontation where mechanisms of defense appear, thus reducing the space to the openness of dialogue. Hence, we witness the transformation of a dialogue into a debate.

Impatience: the anxiety to reach an agreement that does not come, in spite of the efforts, can enormously frustrate people. In these cases, a sensation of waste of time can arise, and if it is shared undermines the continuity of the dialogue.

Manipulation: when one of the participants becomes aware that their counterpart leads them to a place planned beforehand, however, not explicitly stated, we face a manipulation situation. Here, the other appears as an instrument for ends alien to the very dialogue; thus violating the rules of openness and symmetry.

Manipulation states the ethic dilemma of manipulating communication for certain ends. This problem is diluted when the participants are previously warned of the ends pursued by the dialogue. Nonetheless, we warn that forcing the course of meanings, so that it agrees with a previously prefixed direction, attacks the free flow of ideas that the dialogue propitiates in the perspective of Bohm (1991). For this author, dialogue can make evident what is implicit in the mind of the participants. It can reveal the patterns of incoherence which lead a group to avoid certain topics or, on the other side, to persist bringing out or defending opinions on topics against all reason. Therefore, dialogue comes to create a coherent way of thinking that is accomplished as a collective practice with actors who incarnate that particular communicational practice.

Either the way the dialogue begins, using certain artifacts will make the creation, examination and flow of significances easier. For instance, in *Soft Systems Methodology* (Checkland, 1981) a “Rich Picture” allows a group to examine the different points of view that take part in the description of a situation-problem as any *boundary object* does (Star, 1989). Then, such an artifact facilitates the creation of shared meanings even though an agreement is not necessarily reached.

Artifacts and design through dialogue

Let us understand *artifacts of dialogue* as the tools designed to help achieve desired transformations within a space of coexistence through dialogue. One of the difficulties to be dealt with in real social situations where anomalies are detected is how to manage the heterogeneity of the groups of interest; especially when the groups see each other as antagonistic and conflictive. And if we add to the aforementioned that there is no agreement in the nature of the problem, the result is a complex-and-diffuse situation-problem. In these cases, dialogue has been used as a powerful tool to find a

way out of these complex situations. It is the case of the use of the methodology of the *Soft Systems Methodology* (Checkland, 1981; Checkland and Scholes, 1999). These applications make us postulate dialogue as an object of design given the intentional character to produce the transformation of situations. It is clear that dialogue generates effects to be in charge of human inquietudes. And in this point an ethic objection of the use of dialogue appears when it is simply reduced to its instrumental form.

Design of coexistence

If the artifacts of dialogue are used in a social manner, their design does not have the implication of instrumental design of the artifacts used in industry any longer. Although we seek desired transformations, the artifacts of dialogue would always expand and empower the horizons of those who employ them instead of displacing them to mere passive consumers. Indeed, Von Foerster (1996: 134), quoting Illich (1973), is the one who defines an instrument for coexistence as those “instruments that offer the person who uses them the greatest opportunity to enrich their environment with the fruits of their vision, *listening and participation*” [italics added]. Illich indicates (*Ibid.*) that a library is an example of an artifact employed in a social way.

Industrial designers determine the significance and expectations of use of the artifacts that will come into the world. In this sense, we have been the victims of the artifacts which have led us to the excessive specialization of functions, the industrialization of values, centralization of power and which transform people into accessories of bureaucracies or of machines (Von Foerster, 1996). On the contrary the artifacts used in a social manner enrich the environments instead of restringing them.

Desired transformations

Consider a group in a situation of game A, and we want to support the group incorporating artifacts that enable the arrival of a situation B using dialogue as a vehicle. With this schema a series of transformations can be studied, where mobilizing a change in a group of people is sought. There is a lengthy list of desired transformations in different spheres: in education, from superficial learning to significant learning; in organizational change

we see how a human conglomerate becomes a community of practices (Brown and Duguid, 2000), such as it occurs with a group that experiences an A situation and reaches a B situation, or in the case of a group with confusing ideas on a subject, which after an interactive communication process, achieves clearer ideas on it; in psychological therapy, a family with dysfunctions becomes a functional family, and people with impoverished mental models become people with enriched mental models, among other sorts of transformations. Either the case of transformation we have conceived two sorts of supportive artifacts for dialogue and its ends: the symbolic and the tangible.

Symbolic artifacts

Symbolic artifacts are plans that help regulate the interactions between the dialogue partakers. Instances of these plans are the techniques, methodologies and protocols used as resources for action in situations (Suchman, 1987) where it is desired that meanings are produced, examined and made to flow between people. We have detected several instances of this sort of artifacts in disciplines as dissimilar as individual psychological therapy, such as that of groups, organizational change, the methodologies of organizational cybernetics and the methodologies of research-action. Here the list of symbolic artifacts is lengthy as well: the questions of the therapists in NLP, the inquiring questions of the Reflexive Group of the Familiar Systemic Therapy (Andersen, 1994; Bandler and Grinder, 2003), *Brainstorming* techniques, *focus group* techniques, the methodologies of the Soft Systems (Checkland, 1981; Checkland and Scholes, 1999), the use of the Structure of Dialectics in Education (Burbules, 1999), the methodology of *Team Syntegrity* processes (Beer, 1994), among other.

For instance, in the group work technique called “six hats to think” (De Bono, 1993), each hat labels the move of dialogue each player makes. If every member of the dialogue has the same opportunity to use any of the hats, the technique favors the application of the rule of symmetry and allows making the meanings visible in a less ambiguous manner. The computing technology that supports this technique, conversely, is a tangible artifact.

Tangible artifacts

If we use the language of cybernetics (Von Foerster, 1996), the tangible artifacts correspond to the systems of first order employed in dialogue. Thereby, a tangible artifact could convoke greater consensus in relation to their properties than second order objects. This sort of artifacts might have presence in the groups in two ways; firstly, a tangible solid relation between artifacts and symbolic so that the former has a technologic supportive task for the latter; secondly, a tangible artifact that was not originally thought as a helper of the processes of dialogue. A first example of this last classification is a marker utilized by a group of people who converse on a subject in front of a whiteboard. One of the participants picks up the marker and makes a diagram with it, this helps the understanding of a subject under study; this makes, in the aforementioned situation, the marker a tangible artifact in the dialogue. A second example is electronic mail; this technologic artifact was thought to support communication, not specially to support dialogue. It seems sensible to think that electronic mail, as a tangible artifact, could evolve to maintain and improve the effectiveness of dialogue, such as it is described in the section called Electronic Dialogical Forum.

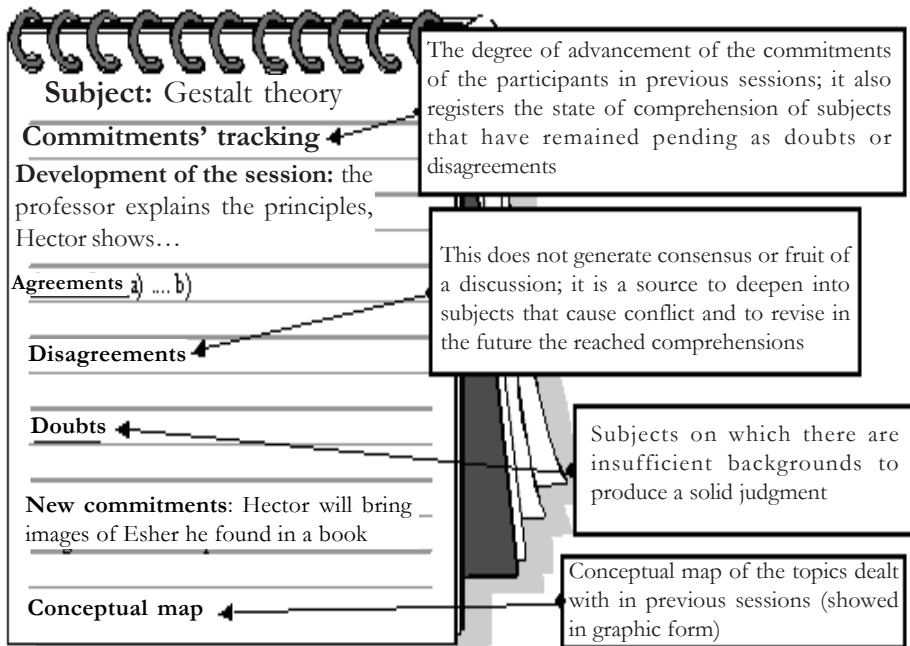
Dialogical act

A dialogical act is an example of an artifact of tangible dialogue where doubts and conflicts that arise from the session are registered, differently from the typical acts of meetings where mainly agreements and commitments are written down. Hence, the act is a representation of the state of the elements which are part of the platform of the dialogue we have presented in the third section of this article.

The dialogical act was born in 2005, as an innovation in the process of teaching-learning in a course of Human-Computer Interaction (HCI), carried out in the department of Computing Engineering of the University of Santiago de Chile. The innovation lays in incorporating two additional strips to the expositive form of making classifications: a) learning-making; and b) dialogue between the students.

The students are informed of the rules of the dialogue at the beginning of the course, and the professor acts as a facilitator of the learning process. The first time the professors lectured on HCI the symmetry was total: we all were students. All in all, the dialogical act directly supports the rule of continuity of dialogue making the maintenance of the memory of the group easier. In the dialogical act, the tracking of commitments is indispensable to preserve the group memory, since it facilitates the conjunct perception of the learning. Part of the act is shown in figure 3.

Figure 3
Extract of a Dialogic act



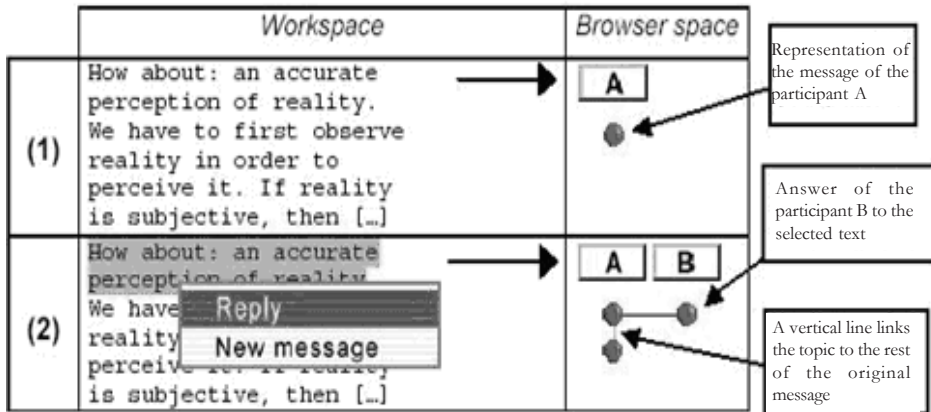
The facilitators of dialogue must have enough emotional intelligence to observe the load of emotions each move brings into the game of dialogue, either it is produced in the classroom, in an e-mail message or in a virtual forum. In the case, studied by Leiva-Lobos and Covarrubias (2006), the learning simply did not occur if the professor did not emotionally support the group-course, in one case because of the lack of confidence from some students, and in the other because of the excess of confidence from others. We have observed that sooner or later, all of the characteristic modes of dialogue appear: mutual recognition, mutual discovery, perspectivism which suddenly changes to debate and struggle for power. Undoubtedly, emotionally tuning a group is part of the work for us to be in the spirit of the game of dialogue. Our experience indicates that the times the HCI has been offered in this modality, the students have had better performances than the average in the department of Computing Engineering in the University of Santiago de Chile.

Dialogic electronic forum

Reyes and Tchounikine (2003) show a *software* prototype that overcomes two problems with the current electronic tools of the forum type. Firstly, the threads of the conversations do not explicitly show which part of the message was answered. This is a subject of grain or the minimal unit of answer in text messages. Such a problem was repaired allowing the users to respond paragraphs in place of the complete message. The second problem has to do with the temporary order of the messages do not always agree with the order of interventions. This generates confusion among the participants making them lose parts of the argumentations unfolded on a collectively developed topic.

Showing in a hierarchical manner the chain of answered messages, on the basis of an original message does not solve the making-sense problem of the ideas that flow along the texts. The solution of the authors was to create a visualization of graphic nature, where each intervention has as a heading the alias of the person who created the message and links said alias to the person who receives the topic from the selected text (A and B in figure 4).

Figure 4
Prototype of forum (Reyes and Tchounikine, 2003)



The tools of the forum type overload cognition and do not permit adequately following the historic trajectory of the interventions. In this sense, they discourage participation. Conversely, the constructed prototype helps the community to preserve dialogue; therefore, it becomes an artifact of dialogue. In practice, users can review, produce and make topics flow, which in this case correspond to parts of the complete message the users decided to answer. As a matter of fact, by means of the threads it is possible to unite argumentation lines summarizing or comparing points of view producing new argumentation threads, thereby enabling the creation and circulation of meanings. Most of the current electronic tools of the forum type are far from offering these services of support to high-level communication that dialogue needs in order to be efficacious.

Conclusions

In this work we have formulated a conceptual framework, with systemic origin, to support the design of artifacts that facilitate dialogue, particularly the creation, examination and flow of meanings. The result is a way to understand dialogue and its artifacts within a common framework, which allow as a final end the desired transformations in the dominion of high-complexity coexistence.

In the process of inquiring into the notions of dialogue, we perceived in certain social dominions that dialogue has a bad reputation. Anxiety, competence, mistrust, manipulation, and relativism have settled in the background of our time the idea that dialogue is a costly process, which inexorably bears a “waste of time” seal. Added to these difficulties, dialogue requires the participants to move into a common affective space that demand openness and legitimation of the other from them, attitudes scantily cultivated in the current society of consumption. Instead, on the contrary, there are instrumental forms of social interaction with the aim to persuade or impose points of view. This conceptual framework, with systemic origin, allows us to visualize said difficulties in human communication without putting our focus on design aside.

The strength of the dialogue lays in that it treats differences, does not avoid them, and settles on them constructing meanings growing in coherence. And this is applicable to almost any context of human coexistence; either it is education, enterprise or family. In all of them, dialogue as a recurrent social practice creates community. It is because of this reason that an ontology that helps us understand the processes of creation, examination and flow of mutual understanding by means of dialogue was necessary. Only after this task is approached in its complexity a coherent discourse can be mounted upon the artifacts of dialogue. The results of the use of these artifacts are still preliminary and require to be deepened into.

There is human intentionality in all technology. There have been attempts to deny this fact by-passing the designers’ responsibility and adjudging it to technics. Our inquiry on dialogue challenges this comprehension placing the design of artifacts of dialogue at the ethic level. The design of coexistence stresses the expansion of views and improving the collaboration between people. We consider it necessary to give an opportunity to a new technology that allows making the environments where human beings coexist and give meaning to their lives by means of dialogue more significant. We hope this article helps this urgent task.

Bibliography

- Andersen, Tom (1994), *Equipo reflexivo: El diálogo y diálogos sobre los diálogos*, Spain: Gedisa.
- Anderson, Harlene (1999), *Conversación, lenguaje y posibilidades: un enfoque posmoderno de la terapia*, Buenos Aires: Amorrortu.
- Apatow, Robert (1999), *El arte del diálogo*, Spain: EDAF.
- Bandler, Richard and John Grinder (2003), *La estructura de la magia, Lenguaje y terapia*, vol. 1, Santiago: Cuatro Vientos.
- Beer, Stafford (1994), *Beyond dispute: The invention of Team Syntegrity*, Chichester: John Wiley and Sons.
- Bohm, David (1996), *On dialogue*, London: Routledge.
- Bohm, David *et al.* (1991), *Dialogue: A proposal*. <<http://www.std.com/~lo/bohml/0000.html>>.
- Bostrom, Robert *et al.* (1993), "Group facilitation and group support systems", in L. Jessup and J. Valacich [eds.], *Group support systems: New perspectives*, New York: MacMillan.
- Brown, John and Paul Duguid (2000), *The social life of information*, Boston: Harvard Business School Publishing.
- Buber, Martin (1942), *¿Qué es el Hombre?*, Mexico: Fondo de Cultura Económica.
- Burbules, Nicholas (1999), *Diálogo en la enseñanza: Teoría y práctica*, Buenos Aires: Amorrortu.
- Checkland, Peter (1981), *System thinking, systems practice*, Chichester: John Wiley and Sons.
- Checkland, Peter and Jim Scholes (1999), *Soft system methodology in action*, Chichester: John Wiley & Sons.
- De Bono, Edward (1993), *Seis Sombreros para pensar*, Spain: Granica.
- Echeverría, Rafael (1994), *Ontología del lenguaje*, Santiago, Chile: Dolmen.
- Echeverría, Rafael (2006), *Actos de lenguaje. La escucha*, vol. 1, Santiago, Chile: LOM Editores.
- Freire, Paulo (1992), *Pedagogía del oprimido*, Madrid: Siglo XXI.
- Gadamer, Hans-Georg (2004), *Hermenéutica de la modernidad. Conversaciones con Silvio Vietta*, Madrid: Mínima Trotta.

- Illich, Ivan (1973), *Tools for conviviality*, London: Calder & Boyars.
- Jacobson, Ivar (1987), "Object oriented development in an industrial environment", in OOPSLA '87: *Object-oriented programming systems, languages and applications*, New York, USA: ACM Press.
- Leiva-Lobos, Edmundo *et al.* (2001), "Diseño como Modo de Ser", in Proceedings of the 4th International Working Conference of the Andean Institute of Systems (IAS) SISTEMICA '2K, 19-23 February, Lima, Peru.
- Leiva-Lobos, Edmundo and Eliana Covarrubias (2006), "Aprendizaje colaborativo en la programación de computadores para profesionales del diseño y la arquitectura", in *La Nueva Política de Innovación para la Competitividad y sus Desafíos para el Diseño, la Arquitectura, la Construcción, el Urbanismo y la Geografía*, Santiago, Chile: Facultad de Arquitectura, Universidad de Chile.
- Lotman, Yuri (1996), *La semiosfera*, Madrid: Cátedra.
- Luhmann, Niklas (1986), "The Autopoiesis of Social Systems", in Geyer and Van der Zouwen [eds.], *Sociocybernetic Paradoxes*, London: Sage Publications.
- Maturana, Humberto (1994), *Emociones y lenguaje en educación y política*, Santiago, Chile: Hachette.
- Maturana, Humberto and Francisco Varela (1995), *De máquinas y seres vivos*, Santiago, Chile: Editorial Universitaria.
- Maturana, Humberto (2007), *La objetividad, un argumento para obligar*, Santiago, Chile: Dolmen Ediciones.
- Parra, Jorge and Hugo Andrade (2002), "Reconocimiento, diversidad y aprendizaje: Una dinámica de sistemas para el reconocimiento de la perspectiva ajena como una reinterpretación de una encomienda esencial del enfoque de sistemas", at *VI Congreso de Informática Educativa RIBIECOL*, Medellín, Colombia: Universidad EAFIT.
- Reyes, Pablo and Pierre Tchounikine (2003), "Supporting emergence of threaded learning conversations through augmenting interactional and sequential coherence", in B. Wasson *et al.* [eds.], *Proceedings of the International Conference on Computer Supported Collaborative Learning: Designing for Change in Networked Learning Environments*, Bergen, Norway: Kluwer Academic Publishers.

- Rodríguez, Mario (1993), *Las condiciones del diálogo*, lecture given on October 6th 1993 before the Academy of Sciences of Russia that grants the Doctor Honoris Causa title.
- Slotte, Sebastian and Raimo Hämläinen (2003), “Decision structuring dialog”, document proposed for publication on 9.4.2003, Systems Analysis Laboratory, Helsinki University of Technology. Available at: <http://www.sal.hut.fi/Publications/pdf-files/SLO04b.pdf>.
- Star, Susan (1989), “The structure of ill-structured solutions: boundary objects and heterogeneous distributed problem solving”, in L. Gasser and M. Huhns [eds.], *Distributed artificial intelligence*, San Francisco, Estados Unidos: Morgan Kaufmann Publishers Inc.
- Suchman, Lucy (1987), *Plans and situated actions: The problem of human-machine communication*, Cambridge: Cambridge University Press.
- Varela, Francisco (2000), *El fenómeno de la vida*, Santiago, Chile: Dolmen.
- Von Foerster, Heinz (1996), *Las semillas de la cibernética: Obras escogidas*, Barcelona: Gedisa.
- Wiener, Norbert (1948, 1998), *Cibernética o el control y comunicación en animales y máquinas*, Barcelona: Tusquets.
- Winograd, Terry and Fernando Flores (1986), *Understanding computers and cognition*, New Jersey: Ablex.

Edmundo Leiva-Lobos. Doctor in Sciences of Informatics; research lines: Computer Supported Cooperative Work (CSCW), organizations and social responsibility. Recent publications: with Gloria Appelgren, “Creating a common terrain for collaborative learning by means of connectivity” (*Creando un terreno común para aprendizaje colaborativo mediante conectividad comunicativa*) in Revista de Ciencias y Tecnología: Enlace Informático, Colombia (2005); with Morales L. Y., “Analysis of a conversational model for virtual environments of learning” (*Análisis de un modelo conversacional para ambientes virtuales de aprendizaje*), in Revista Ciencia e Ingeniería Neogranadina, Colombia (2007).

Héctor Antillanca. Doctor in Sciences of Engineering; Research lines: Computer Supported Cooperative Work (CSCW), software engineering. Three last publications: with P. Araya, “A methodology of agents for devel-

opment of components that support awareness of work team in collaborative systems” (*Una Metodología de Agentes para el Desarrollo de Componentes que apoyen la Conciencia de Trabajo en Grupo en Sistemas Colaborativos*) in *Workshop Chileno de Ingeniería de Software*, Chile (2001); with G. Pérez, “Cooperative system of information, a practical approach” (*Sistema de información cooperativo, un enfoque práctico*), Encuentro Chileno de Computación, Chile (2003); with C. Sabja and A. Soto “Method to transform the design of an application based on MVC++ Architecture to a Web application” (*Método para transformar el diseño de una aplicación basada en la arquitectura MVC++ a una aplicación Web*) at XXXII Conferencia Latinoamericana de Informática CLEI 2006, Santiago, Chile.

Héctor Ponce. PhD Management Systems; research lines: strategies of visual learning, Computer Supported Cooperative Work (CSCW). Three last publications: with López, M., Labra, Brugerolles, J. Tirado, C., “Experimental evaluation of a virtual training program on significant reading (E-PELS)” (*Evaluación Experimental de un programa virtual de entrenamiento en lectura significativa (E-PELS)*) in *Revista Electrónica de Investigación Psicoeducativa*, num. 2 (2007); with Caldana, D. and Correa, R., “Competences of the Chilean governmental auditors to obtain electronic evidence of audits” (*Competencias de los auditores gubernamentales chilenos para obtener evidencia electrónica de auditoría*) in *Contaduría y Administración*, num. 223 (2007); and “The Last Days of Systems Research Centre: an empirical case study”, in *Journal of Systems Research and Behavioral Science*, num. 1 (2004).

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