

SEMIOTICS

An Asset for Understanding Information Systems Communication

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Abstract: Problem solving resides on knowledge and/or imagination use, and in a dialogue, even in a monologue, established communication often has misunderstandings, prideful assumptions and crosstalks. The processing and communication of Information in an organisation are produced by creating, passing and utilising signs, whatever they may be, with or without the perception of its Semiotics. Considering we could conceive it in such way, and because we are three dimensional beings, the act of solving is endemic and unconscious to us. We do it using a cognitive mental and visual mean that resides on a hyper-environment based on signs, even before the creation of its doctrine. Therefore, Semiotics exists in and within us. With that definition in mind, why we do not use it and establish it on a daily basis in the classroom, at the workplace, in social affairs?

1 INTRODUCTION

The existence of an undefinition of the information's concept and the assumption, of establishing a dialogue about a certain subject – where both speakers think that they have the same notion of the issue's meaning – reflects the origin of many misunderstandings not only in an Information Systems (IS) environment but also in the Social one. That for itself reflects the fact that 'information', as it is anchored to language, is a plastic and not passive concept – almost like a biologic entity that adapts to a current active environment, it has its DNA so it can have a diversity of form. To overcome this mishaps and communication flaws most of the times we tend to use analogies influenced by our education and Nature relation. We build a cognitive simulated environment that try to express a facsimile of reality, within which, through a sort of cognitive tools, we establish communication. Regarding simulation, modern French social theorist Jean Baudrillard (1996) claims that Modern Society has replaced all reality and meaning with symbols and signs, and that the human

experience is of a simulation of reality rather than reality itself. We give place to language and/or corporal mimetizations (Maran, 2003) for the building of digital, analog and social connections as a closer and familiar alternative, thus meanings of our interpretation becomes the responsibility of our cognitive, sensitive and emotional perception inherent to the cultural education of each person or the maturity of a certain system. In a Society dependent of communication (whatever its form ought to be) the contrariety of its lack or imperfection it is doomed to failure, as Society is an open system, fact that is an underlined characteristic of General System Theory. (Bertalanffy, 1968) Thus, this article will claim that those referred tools will be the 'symbols' and 'signs' that Baudrillard (1996) mentioned, represented by a doctrine of signs (Semiotics) and Peirce's Pragmatism.

2 SEMIOTICS: IN HOC SIGNO VINCES

The origin of semiotics took place through

Hippocrates, Plato and Aristotle. In conformity with Sebeok (1976; Nobre, 2007) 'semiotic' derives from the Greek definition of symptom, *semeion*, in other words "sign that stands for something other than itself". (Nobre, 2007) Henry Stubbes, in 1670 through signs interpretation in Medicine, and John Locke, in his 1690 *Essay Concerning Human Understanding*, revived and underlined the role of Semiotics describing it as the "doctrine of signs". (Nobre, 2007) As stated by Locke, the relations between 'things', 'ideas' and 'words' are semiotic in nature. Locke anticipated what later would allow philosophers to comprehend the bond between representation and knowledge. (Nobre, 2007)

Between the end of the 19th century and the beginning of the 20th century, bloomed a semiotic consciousness through the influence of two great scholars – Ferdinand Saussure [1857-1913] in Europe with Semiology and Charles Sanders Peirce [1839-1914] in North America giving emphasis to Semiotics. While Saussure went over a language relation, Peirce gave importance to the contextual side. Chandler (2002; Nobre, 2007) referred that Peirce's work developed a perspective of semiotics as permeating all reality, and a view of the universe as "perfused with signs" – An important perspective to our claim. As Nobre (2007) pointed out, Peirce's theory defends that "individuals cannot perceive things or think about the world without the mediation of signs".

Sustaining the semiotical practical side, against a conventional practical side, Lawes (2002; Nobre, 2007) said: "(...) semiotics takes an outside-in approach, studying human communications and culture." Semiotics is not just a theory but an overlooked common and unavoidable practice, present in communication, and as a discipline, corresponds to the analysis of signs and the study of sign systems. Semiotic theory is a powerful resource in the study of organisational creation of meaning within the context of the organisational communities. (Nobre, 2007) As eloquently Andersen (2000; Nobre, 2007) said "Semiotics is 'the mathematics of the humanities' in the sense that it provides an abstract language covering a diversity of special sign-usages (language, pictures, movies, theatre, etc.)." The section title, 'in hoc signo vinces', means "in this *sign* you will conquer". Not also it mentions the word 'sign,' as well – respecting to Portuguese Myth and History – refers to a vision had by the first Portuguese King on St. James day of 1139, just before an important battle, which he won – enough said.

3 SEMIOTICS: A REASON FOR IS EVOLUTION

The solution for the majority of the generated problems by the poor and dubious information interpretation has to pass through comprehension, implementation and use of Semiotics in every Information Systems. Many semioticians defend its instrumentalization in IS by some time now, showing several times the multidisciplinary solutions that Semiotics offers. Following, we present strong viewpoints resulted from years of research among many semioticians where they expose the lack of interest from the technologic community.

Favareau (2002) declared that the use of explicitly semiotic terminology "has been and remains assiduously avoided in the practices and explanations of traditional Western Science in general." Such exploration remains still yet to be undertaken almost 320 years after Locke's call for the formulation of an explicit semiotic science of representation – "the signs the mind makes use of." (Locke 1959; Favareau, 2002)

Kull (2003) assumed the opinion that "[t]he modern age, as starting in the 17th century and being characterized particularly via the formation of experimental science together with the philosophy of Descartes and Bacon, would be replaced by anything that also replaces the experimental science, a strive for technological progress or innovation, and cartesianism – this can be semiotics." Late 60s and early 70s, during the birth of the General System Theory by Bertalanffy (1968), a search for a theoretical basis of biology led several biologists to an idea of applying the principles of semiotics in biology. Among them were C. H. Waddington (in 1972), who claimed that a paradigm of general biology should be taken from general linguistics, T. A. Sebeok (1969; 1972), who developed semiotic models for analysis of animal communication, F. S. Rothchild (1962), who formulated first principles of biosemiotics, and R. Jakobson, who interpreted the genetic phenomena in linguistic terms. (Kull, 2003)

Also, supporting the adoption of semiotics in IS, Lederman (2007) asserted that "[a]dopting the terms signal and transformation, taken from the general systems and semiotics literature, and adding the concept of action, [he has] proposed a common terminology that legitimises the label information system, [so] this approach makes a novel contribution to the IS literature and will assist IS researchers in classifying a wide variety of systems as within or outside the information systems category." Thus, Lederman (2007) concluded that

using such “terminology from general systems theory and the semiotics literature, it is possible to find common ground between these systems and traditional IS, thus making the term ‘information system’ a legitimate label for such systems.”

But as Price (2005) wisely referred “[t]he actual interpretation of the sign depends both on the interpreter’s general sociolinguistic context (e.g. societal and linguistic norms) and on their individual circumstances (e.g. personal experience or knowledge).” So with this condition, “the correspondence between semiotics and information quality can be clarified and the applicability of semiotics to the formal definition of information quality justified.” (Price, 2005) At this point we can ask: “sign for what?” According to Collier (2003), “[t]ypically, signs serve as vicariants, or stand-ins, for the objects they represent within some context of other objects and signs. In order to achieve this, we need account of sign function, which requires an account of functionality in general. Unless we have built this into our account of information from the beginning, either implicitly or explicitly, this takes us beyond the theory of information systems.” We might observe that adaptation, or development alone, ensure only coordination, and neither gives a basis for the information asymmetry that it is required, unless there are further assumptions hidden in our theories of these actions. If there are, Collier (2003) suggested that “these assumptions go beyond information theory, and take us into the science of semiotics, or semiology.”

Closing this roll of personalities, we leave here a Wersig’s (1996: Capurro, 2003) quote describing one more prove of the status quo of current lack of interest from the former appointed scholar community: “The very notion of semiotics, which in fact became one of the most important critiques of too simple an application of information theory to human communication, led to the insight that Shannon’s mathematical theory was only a theory on the syntactical level (relation of signs to signs), but with no reference to the semantic (relations of signs to meanings) and pragmatic (relation of signs to humans) levels. In consequence, some attempts were made to develop out of Shannon’s theory a semantic (Bar-Hillel and Carnap, 1953) or pragmatic (Yovits, 1975) information theory. But they remained in the literature with no great success.” (Capurro, 2003)

Ramaprasad (1996), concerning the presented relation levels, said that “[i]n terms of creating knowledge, the semantic aspect of information is more relevant as it focuses on conveyed meaning. The syntactic aspect does not capture the importance

of information in the knowledge creation process.” Complementing this view we share one from Stamper (2000): “A semantic model provides a conceptual design for an information system. It represents the patterns of behaviour of an organization, or the possible actions that an organization can perform. However, there are other norms, as specified in business rules and regulations. These rules determine the conditions for the events and actions. Therefore, during the process of information modelling, norms have to be identified by studying the organization’s behaviour and rules.” Wrapping this semiotic characteristic Freeman (2004) stated that “[s]emantics is the essence of human communication. It concerns the manufacture and use of symbols as representations to exchange meanings.” Or at least faint perceptions of comprehensive meanings. Goldkuhl (2000) presented in his work a set of steps elaborated by Stamper ([1994, 2000]: Goldkuhl, 2000), which was meant to analyse “different aspects of information systems as sign systems”, a semiotic ladder. It consists of the following steps: physical world, empirics, syntactics, semantics, pragmatics and social world.

The mentioned expressions “assiduously avoided”, “still yet to be undertaken”, “a novel contribution” and “remained in the literature” are some of the descriptions of the hard battle over 320 years of a flawed introduction of a obvious mental and cognitive breakthrough philosophy: Semiotics.

4 SEMIOTICS: A WAY TO UNDERSTAND IS

What is information in organizational systems? As Liu (2000) said “[i]n order to understand the nature of information, one may have to find some fundamental and primitive notions with which the question can be investigated and explained.” We can say that information is ‘carried’ by signs one way or another, using a radio waves analogy. We could say that a sign is a portrait of certain information but in a reduced mode, almost like a hologram, i.e., it has the important information in sight and the rest is disclosed through perception and cognition. All that simply because “the concept of a sign is such a primitive notion that serves the purpose.” (Liu, 2000) By considering Stamper’s (1992: Liu, 2000) opinion we also can state that “[i]nformation processing and communication in an organisation are realised by creating, passing and utilising signs.

Therefore, understanding signs should contribute to our understanding of information and information systems.”

Goldkuhl (2000) declared that “[t]here is an urgent need to create a deeper understanding of information systems in organizational settings. Their special character is that they are formalized sign systems and as such are used for human communication.” The present imperfections of IT-based information systems “give rise to a strong imperative” for researchers in IS and other scientific communities to build a better understanding of the nature of such systems and their organizational use. Hence, “[j]ust viewing an information system as a technical black box having some social and organizational effects is not enough. We must understand information systems in a deeper sense than as just one kind of technical artefact.” (Goldkuhl, 2000)

The exposition of signs, mainly in the advertising business, has to do with the way we do such representation. And representation is considered to make part of the core of the discipline of information systems. Regarding this Shanks (1999) has “explicitly adopted a realist ontological position and a subjectivist epistemological position and provided clear definitions for information system, data, information, and meaning”, suggesting “that both semiotics and ontology are two key areas of theory that form the foundations of representation in information systems.”

Respectable information is such that is reliable and has content quality. Quality perception of the information delivering and terminologies comprehension it is a current necessity. The childhood of information is data, but if its maturity does not have good health it will develop into unreliable and flawed knowledge. Facing such difficulties a “semiotic approach for understanding representation has been used to develop a framework for understanding the quality of data models.” (Shanks, 1999)

As Nobre (2007) stated “[s]emiotics is a powerful theory for the study of human culture, [nevertheless] semiotics can also be applied to other contexts such as the study of information exchange between animals in general. Even more intriguing is the study of information exchange between biological organisms, such as bacteria and other micro-organisms.” But do not go no farther, just remember that Hippocrates, founder of Western Medical Science, “established ‘semeiotics’ as a branch of medicine for the study of ‘symptoms’ – a symptom being a ‘mark’ or ‘sign’ that stands for

something other than itself” as described by Sebeok. (1976: Nobre, 2007) Not also discarding the following Favareau’s (2002) observation where he concludes that “[w]hat is missing from these otherwise highly successful theories of biological sign transmission, then, is a correspondingly coherent theory of biological sign meaning.”

Resuming this section, we can affirm that a sign, within an information system environment, could pass (carry, transport) information from an emitter to a receptor by a simple representation, easily and effectively, in a symbolical language (pictorial or textual) that both or others can perceptively recognize and understand. The comprehension of your ‘biologic’ environment in which we participate is one of the first commitment steps that we have to endeavour.

5 SEMIOTICS: SOME PRACTICAL SENSE

The present and later past times are not all dismal for Semiotics. Some efforts have been made for its implementation and introduction in the management and practice of Information Systems, presenting methodologies for solving problems for all kind of systems. Several problems have origin in scope or inconsistency of their own to which semiotics ought to address. (Price, 2005) Few of which we will indicate subsequently.

The full extent of semiotic properties of many stimuli, agents and their combinations are not yet known. Semiotics has to be better understood by researchers and practitioners in order to manage the organization more effectively. (Ramaprasad, 1996) Therefore, the body of knowledge has to be built further by the discipline of IS. Hence Cecez-Kecmanovic (2002) claims that “[t]his body of knowledge may draw from relevant theories and models from other disciplines concerned with similar phenomena in organizations but from different perspectives (such as sociology, social psychology, organisation theory, Semiotics, linguistics and others). In this way IS professionals may gain better understanding of human and social issues and deal more competently with organisational complexities.”

The reason for information being often ‘sticky’ and not free-flowing can be explained through a semiotic perspective said Ramaprasad (1996). Information value becomes “increasingly agent and context-specific” as information flows up the

semiotic levels, from the morphological level to the pragmatic level. Each iteration of the semiotic cycle makes the level of specificity increase. What makes it sticky is this specificity that acts as a barrier to transference of information from one agent and context to another. However by having common semiotics across agents and contexts, and thus reducing the barrier to transference, information can be unstuck and made free-flowing. Ramaprasad (1996) concluded that “factors such as organizational culture can raise the barriers by fostering a diversity of Semiotics or information particularism, or lower the barriers by fostering homogeneity or information globalism.”

According to Ramaprasad (1996) “knowledge of the semiotics, tacitly and explicitly, plays a key role in determining the effectiveness of the generation-dissipation organization cycle. An organization is a cause as well as a consequence of information generation and dissipation. Consequently, the effectiveness of an organization depends upon the Semiotics of the stimuli and agents used for information generation and dissipation. A Manager who understands the stimuli, agents, and Semiotics – tacitly or explicitly – will be more effective than one who does not.” This last phrase is very explicit related to the value incursion that IT-based systems and others are loosing by not applying Semiotics to problem solving and comprehension.

We recognize that some expressions that appeared above – “manage the organization more effectively”, “gain better understanding of human and social issues”, “information can be unstuck” and “[manage] more effective” – are descriptors of the probable outcome of an introduction of Semiotics into the decisive crossroads of IS.

Following we will describe three approaches that some researchers tried to construct and apply in the real world, and those are: MEASUR (Methods for Eliciting, Analysing and Specifying Users’ Requirements), FRISCO Report (task group Framework of Information System Concepts report) and FIS (Framework of Information Semiosis).

The MEASUR, also seen as a semiotic approach to information systems, is a research programme initiated in the 70s by Ronald Stamper. Its main objective is to “investigate and deliver a set of methods that can be used by researchers and business users in their understanding, development, management and use of information systems.” (Liu, 2000) In 1992, Stamper proposed a new paradigm for MEASUR: the information field. As opposed to information flow, “this information field paradigm

enables to us understand information from a new perspective and therefore to develop information systems more properly.” (Liu, 2000)

The FRISCO task group, founded by several scientists of Western and Northern European countries, approach to bridge the gap between “reality” (our human simulation) and its modelling concepts is based on Semiotics, i.e. the theory of signs, their form (syntax), meaning (semantics) and effect (pragmatics). Hesse (2002) advises that report “should not be expected to provide the ‘ultimate theory of Information Systems.’ However, it could fill a significant gap in the IS foundation field, which has been neglected in a period of technical revolution and ad-hoc adoptions for fast-grown applications. In particular, it might provide managers and system designers with better insight regarding the significance of “information” in the organisational context and, hence, lead to more effective cooperation of all groups involved in the development and use of Information Systems.” (Hesse, 2002)

In pursuit of an “effort to bridge the gap between methods and technology,” Goossenaerts’ (2000) paper presents “the result of a fundamental investigation into the relationship between industrial networks on the one hand, and the possible services of ICT networks on the other hand. The result is a Framework of Industrial Semiosis (FIS) which applies and further elaborates the concepts of semiotics in the context of industry.” And as promising results there are “evidence of a widening scope of the work of human resources, including engineers and business engineers” where “relevant knowledge is acquired and applied: to assess the situation, to solve problems, to take right decisions and perform the right actions.” (Goossenaerts, 2000) In the end there are some work done and few experimented methodologies but still there is no bet from the professional side.

6 CONCLUSIONS

As Favareau (2002) clearly adverts in respect to the role of the semiotician that it “is not to “anthropomorphize” the individual activity of communally mindless neurons but to understand how the communal activity of individually mindless neurons actively anthropomorphizes, in a very “minded” fashion, us.” Therefore, a semiotician does not want to control the way a human think, he wants to present a freewill methodology where we can orientate and guide its process of thinking and

expresses its thoughts by an understandable and fashioned way to others. As we saw in this article there are conditions, long time alerts and some studied methods with which we can begin to introduce to professionals and their companies, to professors and their schools. Semiotics it is not just Literature to rest in the University shelves or tedious theoretical deambulations, it is Art Thinking. Semiotics should be seen as a form of *Tikkun Olam*. As Sir Ken Robinson (2006) defended, and still does, “[s]tudents with restless minds and bodies – far from being cultivated for their energy and curiosity – are ignored or even stigmatized, with terrible consequences. We are educating people out of their creativity.” So, let's use Semiotics, and other developments that other semioticians are doing in this area, to “acknowledge multiple types of intelligence.” (Robinson, 2006)

REFERENCES

- Baudrillard, J. (1996); *Simulacra and Simulations*; University of Michigan Press; February
- Bertalanffy, Ludwig von (1968); *General System Theory: Foundations, Development, Applications*; New York: George Braziller
- Capurro, R. and Hjørland, B. (2003); The concept of information; Annual Review of Information Science and Technology Ed. B. Cronin, Vol. 37, Chapter 8, pp. 343-411
- Cecez-Kecmanovic, D. (2002); The discipline of information systems: issues and challenges; Eighth Americas Conference on Information Systems, pp. 1696-1703
- Collier, J. (2003); Hierarchical Dynamical Information Systems with a Focus on Biology; *Entropy*, 5, 100-124
- Favareau, D. (2002); Beyond self and other: On the neurosemiotic emergence of intersubjectivity; *Sign Systems Studies* 30.1
- Freeman, Walter J. (2004); How and why brains create meaning from sensory information; *International Journal of Bifurcation and Chaos*, Vol. 14, No. 2, 515-530
- Goldkuhl, G. and Ågerfalk, Pär J. (2000); Actability: a way to understand information systems pragmatics; CMTO Research Papers No. 2000:13, Linköping University. Presented at the 3rd International Workshop on Organisational Semiotics, 4 July, Stafford, UK
- Hesse, W. and Verrijn-Stuart, A. (2002); Towards a Theory of Information Systems: The FRISCO Approach; Position paper and Poster, 1st Semantic Web Conference (ISWC), Chia/Sardinia
- Kull, K. (2003); Ladder, tree, web: The ages of biological understanding; *Sign Systems Studies* 31.2
- Lederman, R. and Johnston, R. (2007); Are Routine Manual Systems Genuine Information Systems?; In *Information Systems Foundations; Information Systems Foundations, Theory, Reality and Representation*, Dennis N.Hart and Shirley D. Gregor (Editors), ANU Press, ACT.
- Liu, K. (2000); *Semiotics in information systems engineering*; Cambridge; New York: Cambridge University Press, 2000; ISBN 0521593352
- Maran, T. (2003); Mimesis as a phenomenon of semiotic communication; *Sign Systems Studies* 31.1
- Newman, J. (2001); Some Observations on the Semantics of “Information”; *Information Systems Frontiers* 3:2, 155–167
- Nobre, A. (2007); *Semiotic Learning – A Conceptual Framework for Facilitating Learning in Knowledge-intensive Organisations – 9th International Conference of Enterprise Information Systems (ICEIS)*, Funchal, Madeira, Portugal, June
- Price, Rosanne J. and Shanks, G. (2005); Empirical Refinement of a Semiotic Information Quality Framework; *Proceedings of the 38th Hawaii International Conference on System Sciences*
- Ramaprasad, A. and Rai, A. (1996); *Envisioning Management of Information*; Omega, Int. J. Mgmt Sci. Vol. 24, No.2, pp. 179-193
- Robinson, Sir Ken (2006); Ken Robinson says schools kill creativity; TED Talks, access 2007, available, http://www.ted.com/index.php/speakers/sir_ken_robinson.html
- Rocha, P.A. (2008); *Information Systems Research: Revealing its Collective Unconsciousness*, Proceedings of the IADIS International Conference Information Systems 2008, Algarve, Portugal, April 9-11, 2008, ISBN: 978-972-8924-57-7
- Shanks, G. (1999); *Semiotic Approach to Understanding Representation in Information Systems*; Proceedings of the Information Systems Foundations Workshop Ontology, Semiotics and Practice
- Stamper, R. et al. (2000); Understanding the roles of signs and norms in organizations - a semiotic approach to information systems design; *Behaviour & Information Technology*, Vol. 19, No. 1, 15-27