RECIIS
Electronic Journal of Communication Information & Innovation in Health
[www.reciis.icict.fiocruz.br]
ISSN 1981-6286

*Essays*

# Knowledge production, interdisciplinarity, and structuralism

DOI: 10.3395/reciis.v3i3.271en

*Maria de Fátima Gonçalves Moreira Tálamo*
School of Communication and Arts, University of São Paulo, São Paulo, Brazil
maria.talamo@pq.cnpq.br

## Abstract
This paper presents the organization of modern science, identifying knowledge production occurrences according to formal and informal contexts, and its paradigmatic transition to post-modernity, resorting to interdisciplinarity, the workings of which, following the principle of the economy of symbolic systems, allow repetition with different meaning and the consolidation of humanities. This phenomenon is exemplified by structuralism which, in contemporary times, continues to play an important role in the organization of new fields of investigation, such as the imprecise sciences and information science.

## Keywords
modern science; postmodern science; structuralism; interdisciplinarity; knowledge

## Introduction

The early 21st century is marked by great alterations, visible on all levels, economic, political, social and cultural, but difficult to be brought under a single denomination. Thus, information society, knowledge society, learning society, postmodern society and globalized society are some of the names that tend to simplify the great changes that affect how we talk about and produce the world's representations and scientific knowledge. Caraça associates this denominative/conceptual difficulty to the evident perception we have today that we are a complex system, that is, "a system the performance of which depends on the evolution of the context that gives it support – and we do not know where our system ends and the context begins and vice-versa" (CARAÇA, 2004, p. 185). The impact of this situation in knowledge production, especially in the countless forms of knowledge that were created over the course of the last four centuries, guides the discussion about the references that formed its bases and the need to redefine the disciplines, especially with respect to the notions of object, disciplinary limits and methods. Based on these presuppositions, the summary characterization of the forms of knowledge production has been made since the renaissance, revealing the limiting and rigorous character of modern science, the homogenizing operational procedures of which establish a single valid modality of knowledge: scientific knowledge. Its significant advancement was associated to systematic observation and quantitative translation of the information gathered. The characteristics elements of

post-modernity are discussed, inserting interdisciplinarity as one of the important auxiliaries to this process. Interdisciplinarity is exemplified with linguistic structuralism and its impact in the field of humanities. The text is finalized with two examples that demonstrate the importance of conceptual mechanisms for the workings of interdisciplinarity: structural analysis for imprecise sciences and structure for information science.

## Forms of knowledge production and the triumph of modern science

The scientific practices responsible for generating established knowledge experienced important variations and connections over time, especially in their formal and informal contexts of production and circulation. According to the relationship that these contexts assume – from complementation to hierarchy – there are specific formations of knowledge production, organization and circulation which characterize the way that different forms of knowledge are integrated into society.

With the Renaissance, for example, the Humanist movement opposes itself to the conventional knowledge of scholastics that reigned in the Middle Ages. In fact, as Burke (2003 p. 40-41) observes, it is estimated that the Humanists created the words "scholastics" and "Middle Ages" exactly to obtain a clearer and more direct definition of their own critique of the institutionalized space of knowledge, with the resulting creation of an alternative space for debate, the "academy". In fact, at the time, a significant part of the debate of ideas was developed outside the university environment, in the academies or even in informal environments: the mathematician Paolo Toscanelli, for example, obtained information about the routes to the Indies interrogating travelers who passed through Florence. In the academies, where the environment was less formal than a university department, the Humanists debated and produced innovative ideas. This points to a diversified knowledge production dynamic equally committed to different contexts and modes of communication: of repetition with different meaning and from informal information sources to institutionalized sources (BURKE, 2003, p. 41).

With the scientific revolution the focus of investigative reflection moves from Humanism founded on the classical tradition to nature impregnated by the idea of mechanicism, thus the structure of modern science begins. However, the movement of incorporating alternative forms of knowledge to established knowledge continues, albeit timidly.

From the 18th century, initiatives for the diversified organization of education sites start being consolidated in a continuous and growing manner, although a significant alteration in its actors is not seen. Side by side with the different universities that already exist, institutions appear, some connected to the universities themselves, such as botanical gardens and laboratories, others independent, such as scientific societies and academies, which consolidate practices of circulating innovations coming from Enlightenment though.

It is important to note that the different forms of institutions and organizations impacted directed not only the knowledge production processes but also their forms of communication. While in scientific societies, networks of scholars were being formed, the academies ended up expanding the audience that shared new ideas, seen as innovations, with lectures on diverse themes, spoken in the national language. The partial substitution of Latin, the usual language of universities, for the national language as the communication vehicle, integrated these "new places and bases of culture", as named by Burke (2003, p. 47), to the social communication dynamic that would solidify many centuries later, with the integration of other cultural practices to the circulation of knowledge.

However, these alterations had a secondary role next to the vigorous development of Enlightenment thought of a unifying and universal nature. The mechanistic conceptions that characterize brought the model of physics study to the understanding of human and cultural facts. The great metaphor thus established put itself forward as an expressive resource that played an important role in cognitive processes, conditioning the way that the world was understood and observed. The perception leads, in this sense, to the production of representations. It is not by chance, therefore, that the knowledge of classical science is so dependent on data. This ends up symbolizing the decomposition, the simplification of the complex, the division of the whole into its parts and, in many cases, affirms the qualitative's dependence on the quantitative. This is recognizably the starting point for the modern organization of human knowledge into disciplines.

The mechanical concept of the world, based on the body/soul, part/whole, simple/complex dualities, also separates mankind from nature and attributes to the method the exceptional role of knowledge creation. With the creation of research instigation organizations in the 18th century, the set of words associated to research starts having more frequent use. These words not only share a common origin, with the nucleus "search", but they also display the systematic and professional character of investigative activity, the result or product of which is presented as useful knowledge. Thus, the meaning of the term "research" starts gaining traits that differentiate it from curiosity and speculation. If it is true that people produced brilliant ideas when they are free from institutional binds, it is not less true that putting these ideas into practice demands institutional contexts. Thus, the effervescence of the ideas in this period, leading to disciplinarization, was contained as the institution of the university became formalized. In other words, although the innovations of the 18th century were important for consolidating disciplinary practices, it has to be agreed that "it is virtually inevitable that the institutions which form sooner or later crystallize and become obstacles to additional innovations" (BURKE, 2003, p. 53).

For its turn, the advance of knowledge in the 19th century is fundamentally credited to science coinciding with the emergence of positivism, the mechanisms of

which brought important gains although, as Hobsbawn (1996, p. 351) points out, it was no more than a "philosophical justification for the method of experimental sciences". As a result, predictably, positivist method and scientific method became interchangeable and the idea of progress, so dear to the current, demands a basic methodological structure for the advance of knowledge.

The importance of method in modern science can be interpreted as the expression of the society's secularization in the world of knowledge, giving it a certain democratic character. According to Wallerstein (2004, p. 125), scientists never stopped saying that anyone could produced knowledge "as long as they used the right methods". This way, a comfortable situation is created regarding the questions of what is good and true: knowledge of good things constitutes the philosophical debate, but knowledge of true things was a scientific question, depending on method.

The difficulty in recognizing different ways of seeing the same problem, an obvious limitation of the structures that establish modern knowledge, was also at the base of the very dynamic of organizing scientific knowledge in universities. By institutionalizing a knowledge organization, the university formalizes its content rigorously, increasingly favoring the generation and transmission of specialization. In short, this is the context where knowledge organizes itself by following disciplinary matrixes.

In fact, until at least the first two decades of the 20th century, thought motivated by predictability and by causal relations finds its peak in the various manifestations of determinism and its triumph in reductionism. The disciplinarization resulting from the division of the whole formulates the logic of the school curricula and the organization of the university itself. However, it can't be overlooked, emphasizing what has already been said, that the history of knowledge is full of movement. "It is a history of the interaction between outsiders and establishments, between amateurs and professionals, businessmen and intellectual wage-earners (BURKE, 2003, p. 53). But we must also consider that the classic university organization will increasingly minimize movement between knowledge generation spaces. A conflict is therefore established between the production and organization of scientific knowledge within the very institution that unites them, the university.

What seems fundamental to observe is that, starting in the Enlightenment, two forms or structures are set out to perpetuate the generation and transmission of ideas; a theoretical structure that considers the constitution of an object and above all establishes a method to distinguish between true and false, and an institutional structure that is based on the mediation of disciplines for effective teaching. This is the consistency desired by the modernity project itself, when it proposes science and teaching as one of its pillars (TÁLAMO & SMIT, 2007). This effectively creates a problem, which is how to resolve the contradiction between action that is necessarily different from investigation with the disciplinary mechanism that is based on normalizing discourse. The useful knowledge of modern science benefits society, but it depends directly on the multiplying effects of teaching to give positive values to its hegemonic model. Thus, the disciplinary mechanism becomes the necessary provider of investigative processes, limiting or neutralizing the expansion and development of alternative spaces for knowledge production. Indeed, with the reinforcement of disciplinary fragmentation demanded by university structure, movement becomes increasingly difficult.

Furthermore, disciplinarization, linked to the conception of useful knowledge, also contributes directly to the growing specialization of scientific knowledge, often expressed metaphorically by the word diversity. Discipline, therefore, assumes a fundamental role both for investigation and for teaching, presenting itself as a category that simultaneously organizes scientific knowledge and establishes parameters for the formation of scientific and professional settings, evidently involved with the specialization of work and division of knowledge. This confirms the statement by Kuhn (1968), about the structural dependence of science in relation to teaching; teaching shapes both the users of knowledge and those who will directly contribute to scientific advancement. The question is not limited, therefore, to the existence of such a relationship but to the way in which it updates and develops itself. Everything points to teaching being an internal component of the investigative process. Thus, changing this process requires a simultaneous alteration of teaching, which is an ambitious project because it clashes with the academic activities routine applied by its conditioning matrixes.

It is no wonder, therefore, that as teaching and research became more connected, modern scientific knowledge's greatest triumph was becoming known for what it allows people to do, that is, for its consequences and its benefits. These benefits exist throughout daily life and effectively contribute to confirm that science has a monopoly on truth.

Such a model for the intelligibility of reality has rationality as its basis and product, in other words, it is causal knowledge, founded on the regularities and predictabilities of observed facts. Scientific knowledge, in this sense, is qualified by the presence of a single model, born out of the natural sciences and imported to the rest. It can be seen that it is not based on the metaphor of method but on the imposition of a prior mechanical representation of reality. Importing this model to all areas of knowledge becomes an indisputable necessity of universal scientific knowledge (TÁLAMO & CARVALHO, 2008).

## Post-modernity: breaking with the single gaze

Confidence in modern science's method seems to have been the lightning rod for the conflicts that surrounded the questioning of scientific knowledge itself. according to Hobsbawn (1966, p. 350-352), well-educated men of the late 19th century were really amazed with

the victories they had attained, which to them seemed not only amazing but above all final. All the problems effectively recognized seemed to have been solved, leaving only lesser questions to be investigation: "… Nobody doubted progress, both material and intellectual, as it seemed too obvious to deny" (HOBSBAWN, 1966, p. 351). The motive, therefore, of what led modern sciences to recognize a single paradigm, can be understood, even if it contained differences and tensions that ended up compromising it.

Signs of a crisis in modern science's intelligibility model manifest themselves in the 20th century as a result of a series of theoretical and social conditions. The dominant model of the natural sciences, based on Newtonian mechanics, the fundamental premise of which was that physical reality was determined and presented temporal symmetry, contemplating linear processes with fluctuations that returned to equilibrium, is contested. Natural scientists, especially starting in the last two centuries of the 19th century, "see the future as being intrinsically indeterminate, see equilibrium as exceptional and understand material phenomena to be constantly distancing themselves from equilibrium" (SANTOS, 2004, p. 127). What is at stake, therefore, are the ideas of determinism and mechanicism that underlie the conception of a passive nature that science would be responsible for describing in terms of eternal laws. In other words, the concepts of law and causality that contribute to the idea that phenomena meld into a limited number of observable and quantifiable conditions are questions. Reality is simplified in this way and stripped of other forms of knowledge, which could possibly be more comprehensive and interesting to human nature.

Apart from these theoretical conditions, it is also necessary to point out those of a social nature. The most important of these, as Santos (1987) observes, relates to the impact of the industrialization of science on its so-called autonomy and neutrality. These values, which seemed to be spontaneously shared by scientists, in the 1930s and 1940s were affronted by the industrialization of science, which transferred the definition of scientific priorities to the economic and political system. The world had to confront "a scientific means of production inclined to transform accidents into systematic occurrences" (SANTOS, 1987, p. 34). This same industrialization is also responsible for the stratification of power in the scientific community, which not infrequently confuses titles with intellectual skills.

However, the crisis in the modern science paradigm does not lead to its rejection as a means of knowing. It questions rather its foundations and relocates it as one of the possible explanations of reality. It therefore becomes a question of recognizing the forms of knowledge and their connections as legitimate and not as an imposition of chaos or an epistemological "anything goes" (NUNES, 2004, p. 62).

Boaventura Santos (1987) uses a speculative exercise, based on four theses, to discuss the possibilities opened up by the crisis in modern science. They are:

- 1st thesis – All natural-scientific knowledge is social-scientific
- 2nd thesis – All knowledge is local and total
- 3rd thesis – All knowledge is self-knowledge
- 4th thesis – All scientific knowledge aims to become common-sense

With the first thesis, the dichotomies between natural and human sciences, between subject and object and between permanence and mutability are discarded. The universality of knowledge expressed in a single language is also combated while the subject's interference in the process of investigation itself is recognized (3rd thesis). On the other hand, with the proposition of the localism notion (2nd thesis), it is understood that territory influences the production of knowledge, making it difficult to express it solely through causal laws, which ends up linking knowledge to its necessarily provisional nature. In this sense, humanistic studies are revalued along with their characteristic analogy processes, as the science text has to live with culture's other texts, even entering into a dialogue with common sense (4th thesis).

From these four theses, it is possible to develop a reflection on the diversity of forms of knowledge, an "emerging order of knowledge that is, in itself, described as an alternative paradigm ..." (NUNES, 2004, p. 60). This alternative order becomes official with the adoption of the prefix "post" for modernity, with its crisis that launches transformations the depth and extension of which are not always recognized.

Post-modernity doesn't aim at "a unified science nor even a general theory, but simply a set of thematic ducts where streams of water converge, which we now conceive as watertight theoretical objects" (SANTOS, 1987, p. 10). Interdisciplinary investigation positively impacts the limits of modern rationality, firstly because it is associated to themes that represent problems which are considered relevant from different points of view and by different actors. Secondly, because it mobilizes different knowledge and equally different paths and means to attack determinism, proposing solutions that necessarily presuppose the scientist's activity of interpreting and understanding.

## Interdisciplinarity and conceptual flow: the structuralist movement

Among the visible consequences of knowledge generated within the scope of modern rationality, specialization and fragmentation stand out. The number of available disciplines, for example, means it is impossible to know a specialty in its entirety or to make necessary disciplinary connections between them. It is also not rare for the scientist to find indefinite zones in his own field, and to interpret these requires sharing knowledge or a heuristic method.

To sum up, it can be seen that, on a par with the relationships between the disciplines that produce and store knowledge and the shape their teaching takes, there are other forms of knowledge – so-called alternative

ones – within the concept of knowledge, and scientific knowledge seeks other forms of segmentation – whether of the object, the method or content itself – as a means to a comprehensible promotion of reality. In this sense, interdisciplinarity appears as one of the possible ways to obtain knowledge. This experience is characterized by different disciplinary fields coming together to solve specific problems, especially through the sharing of methodologies and the migration of concepts (DOMINGUES, 2005).

Domingues (2005) believes that one of the emblematic examples of interdisciplinarity in the 20th century was structuralism. By sharing a single methodology – structural analysis - some disciplines in the human sciences became closer and obtained recognized scientific gains. This was so true that the movement impacted teaching: a whole university, Vincennes, took on the project in its entirety. The movement's failure, in the 1980s, was not enough to stop it being seen as a positive experience, "a new look on the world and society's symbolic production", identifying itself with "French intellectual history from 1945" (DOSSE, 2007, p. 11).

Around the idea of the sign and of structure, Saussure and his followers developed an approach operating with the idea that in the culture field everything that is acquired, transmitted and shared is fused in a system that can be formalized as signs. The idea is therefore to analyze cultural reality as a language, or a system of signs.

The sign, for its turn, cannot be defined in an isolated manner. Its existence is relational. The sign's existence derives from the structure of the system, in which it is a knot or a point on the network. The sign has no existence prior to the structure it integrates, resulting, in fact, from the same structure. Its value is, therefore, negative, as it is always formed in relation to the other signs that share the same structure, meaning that the unit and its combinative relations can be simultaneously identified. Therefore investigative interest lies on the relations' form of expression – the structure – and not exactly on the elements that are immediately perceptible in the universe of culture.

In the 17th and 18th century, the term structure had a predominantly descriptive character, pointing to the "way in which the integrating parts of a concrete being are organized in a totality" (DOSSE, p. 24). From the 19th century, the term gains an "abstract" feature and represents a more lasting signification, "which combines in complex form the various parts of a set" (DOSSE, 2007, p. 24). This notion is exactly what gives origin to the term structure in the two first decades of the 20th century and that confers the revolutionary methodological character of the movement.

Although the term structuralism, as proposed by Saussure, comes from the term structure, this contains specific features that result in its having a broad application, which does not remove the disciplinary barriers of the research community it unites. Thus, expressions are formed such as scientific structuralism, semiological structuralism and historicized or epistemic structuralism.

Indeed, around the concept of structure, a constitutive thinking about culture is formed, expressed in Foucault's definition (*apud* DOSSE, 2007, p. 11) about the structuralist movement: "it is the awakened and restless consciousness of modern knowledge". In this sense, structuralism made possible the production and affirmation of a thinking which profoundly altered the humanities' relationship with the world, especially, in its golden phase, of linguistics, psychoanalysis and anthropology.

It must be highlighted that structuralism does not propose importing a model between disciplines. Using a rigorously formalized method, able to subsidize and support an analysis program in various fields of knowledge, the movement's interdisciplinarity counts with clear premises that constitute Saussure's legacy to the humanities. They are, succinctly:

1. language, that is, the system, pre-exists its use;
2. language is a social phenomenon with rules that develop with use, meaning that knowledge must project on reality that is not immediately visible (structural unconscious, deep narrative structure, myth structure etc.);
3. language is form and not content, which puts the study of forms and their relations in the forefront, distanced from substances (semiotic square, binary oppositions, etc.);
4. the notion of an object as being created from a point of view, in this case language;
5. discourse, that is, the mobilization of the language system, can be used both to translate and to mask reality, evidently including scientific discourse. An example of this is the work Mythologies, by Barthes, which "unmasks the petit-bourgeois and chauvinistic spirit that inspires the aesthetic of modern consumption (DOSSE, 2007, p.13). In this sense, structuralism "made a suspension of sense triumph as a means to combat Eurocentrism and the various forms of westernized theologies for the benefit of a certain differentialist thinking (DOSSE, 2007, p.13).

Together, these premises allow a shared scientific method and terminology to be defined, with no traces of superiority of one form of disciplinary knowledge over another. That is, the human sciences enter into a dialogue based on a common method and terminology. Besides, as it develops, the structuralist movement goes through its construction and deconstruction, which in the 1980s calls itself post-structuralism, marked by research of how the subject and thought relates to action. In this movement, knowledge becomes engaged with social concerns. Post-structuralism, in this sense, reinvents one of the concerns of structuralism, which is breaking with artificially-raised disciplinary matrixes.

Structural analysis establishes a certain standard – structure – for constructing a unit, on any level. In this sense, as has been said, the performance of interdisciplinary is based on the notions of sign and structure that result from the possibility of analyzing culture as language. It is this metaphor underlying structuralist thought that makes it possible to propose the structures of significance systems. This structure results from the relations and distribution of a system's elements, where the code comes before the message and the linguistic system is form and not content. For example, the terms "communication structure", "social structure", "myth structure" and "language structure", to cite but a few, denote the existence of a real and concrete, non-observable reality that models culture, making sense possible. In this way, structuralist thought builds an interpretative framework of sense, founded on the metaphor of language.

To sum up, however structuralism is applied, it is the term structure that plays the unifying role. The word's use was extended not only by its presence in the various discourses of science but also by its integration into common language. In its diverse uses, some constituting features established by its originating movement can be detected, especially those associated to a form that, while not observable, relates to concrete actions, giving them sense.

With linguistic structuralism, the term structure becomes fully characterized by its interdisciplinary use. A similar use of the concept is developed with two complementary movements: migration and dissemination. According to Mari (2005), migration consists in the transposition of metalinguistic concepts from one field to another, resulting in new forms of signification and application. Dissemination shows the effect of migration on local production, with sense being altered through contamination by other concepts belonging to the field.

The concept of structure in Lèvi-Strauss' allows the formulation of the internal logics underlying the real in societies. This way it frees itself from a descriptive and empiricist methodology widespread at that time and promotes an interpretation that goes beyond the surface of social systems. In other words, Lèvi-Strauss breaks with the naturalist and biologist affiliation of French anthropology. The research he takes on after this break is emblematic. His theses – the elementary structures of the Nhambiquara Indians' family relationships and family and social lives – constitute "one of the most important events in post-war intellectual history and the cornerstone of the structuralist project's foundations" (DOSSE, 2007, p. 49).

The title of his thesis about family relationship structures quickly develops conceptual value, becoming central to the anthropology of that time. Therefore, with the appropriation of the linguistics term and its consolidation in another field, conceptual migration and dissemination are fully accomplished.

The impact of the epistemological revolution Lèvi-Strauss carried out cannot be reduced to the simple use of the term or method. It must be observed that this appropriation is founded on the existence of formal correspondence between the structure of language and the family relationship system: the family relationship system is a language, therefore. It is a harmonizing hypothesis that makes possible the migration and dissemination of concepts from linguistic structuralism to anthropology, which is in harmony with the principle of economy, equally characteristic of interdisciplinarity.

This principle is confirmed by the growing application of the term structure in the systematization of seemingly incoherent domains. Thus, many composite terms are created with the word structure: myth structure, communication structure, family relationship structure, side by side with related ones such as system and general laws.

Although a broad or exhaustive analysis of the interdisciplinary dimension of the term structure is not carried out here, the arguments presented show that the interdependence between migration and dissemination of terms falls under the principle of economy of symbolic systems, increasing the insertion and operationalization of concepts in metaphorically-related fields. Indeed, the interdisciplinary use of the term helps the concept to circulate more quickly and efficiently, as Mari (2005) observes, given the consistency of its informative content.

Finally, it is left to observe that, with interdisciplinarity, science can more easily perform the complex task of publicly circulating knowledge, adopting forms of communication that allow its different actors to be recognized. This sheds light on the motive that led a "[French] national team trainer to declare, in the 1960s, a "structuralist" reorganization of his team so as to improve results" (DOSSE, 2007, p. 21). The trainer, in fact, translates to common sense that which is fundamental to the structuralist movement, that is, structure supports process and the game, in this case, is nothing more than its updating.

## Final considerations: interdisciplinarity in the constitution of new fields

Interdisciplinarity, as it has been dealt with here, is one of the possible strategies for overcoming the limits of modern rationality. It must be highlighted, however, that it is supposedly a mechanism created in the tension between the formal and informal spaces of knowledge production, as it necessarily depends on communication processes for the performance of conceptual migrations and disseminations.

Resorting to interdisciplinarity in post-modernity, in turn, is a more precise strategy or procedure for apprehending the world through the sharing of positive experiences. The economy principle, in this sense, makes conceptual decisions, which every field of knowledge requires in order to confront and interpret its problems, procedures and objects, less arbitrary.

The use of the structuralist movement to exemplify interdisciplinarity not only demonstrates the importance of the procedure in consolidating knowledge fields but

also reveals that interdisciplinary operations, when satisfactorily developed – which can be verified by terminological legacies – leave perennial marks in the production of forms of knowledge. In this sense, it can be stated that the structuralist movement not only consolidated the human sciences in the early 20th century but also left an important legacy for reflection about fields that would still be created.

Structural analysis, for example, exists within the context of imprecise sciences, using the denomination created by Moles (1965). This author considers the procedure to be a privileged approach for obtaining precision in questions related to phenomena that are vague, whether due to probable error in their determination, or unavailability of adequate techniques to deal with them, or the fact that they are "vague in essence". To this effect, resorting to structural analysis or method, whatever the field of application, is necessary in order to overcome imprecision and superficial and inadequate conceptualization.

In this aspect, it is worth noting that to Moles (1965, p. 153), resorting to structural analysis makes it possible to "discern in every 'world spectacle', in every one of the world's complex phenomena, in every observable appearance, 'the units, combination rules that will base the reconstruction of a level of desirable precision defined by the demands of investigation. This combination is the code or structure and must be compatible with the 'representation of reality as it is perceived, on a scale chosen by or imposed on the observer by circumstances'" (MOLES, 1965, p. 153).

Another example of the importance of the interdisciplinary structure concept can be found in Saracevic's text (1999). Here the author, motivated by the curiosity to know the field of information science with precision and establish a structure that unites not only his own works but also those of his colleagues who say they belong to information science, begins his reflection by claiming that the lexical definitions of a knowledge field are not always sufficiently exhaustive and precise. He then decides to establish a premise that attributes a limited or almost undiscriminating character to the subject dealt with by a knowledge field as a matrix element to forge its identity. As he had already proposed in earlier texts, he elects the problems dealt with by information science as directives that define the field limits.

To affirm that the determinant is not the subject but the problems, especially the way of knowing them, demands the mapping of the questions, their interpretations and the possible ranges of solutions proposed for them. Continuing this reflection, Saracevic (1999) adopts the strategy of identifying, retrospectively, what he calls potent field ideas. They are information recovery and relevance and interaction, which form a structure for the understanding of information science itself.

What is being stated, therefore, is that developing the field of study of the problems associated to what the author calls potent ideas does not in itself characterize information science. These elements must be structurally modeled through their identification and combination.

When he discusses the probable structure of information science, Saracevic (1999), referencing various authors in the area, notes that the discipline's work affects two large sub-areas – information analysis and information recovery – which cover additional specialties. He then starts an empirical study that generates, by studying co-citations, the distribution of authors in these two sub-areas. The distribution standard obtained leads to the conclusion that the sub-areas do not engage in dialogue, do not cooperate, basically. The difficulty of identifying distribution and combination parameters does not allow the structure of the information science field to be modeled in this case. There are only two isolated areas and, in the absence of a connection between them, a field indetermination.

To recognize field fragility, Saracevic (1999, p. 1057) uses a metaphor comparing information science and Australia: both present a great developed coastal area and a limited interior. Both the areas of one geographical space and one field of knowledge are not equally developed. Both equally do not connect. In face of this situation, questions arise about the theoretical foundations of the field that unites both areas, whether they exist and if they can be shared. In some way, the integrating effort of field work must be encouraged and a unified theory should be an investigation motive to effectively structure it. This way, the exercise of interdisciplinarity gains intensity, as it is not restricted to conceptual migration, but also performs dissemination.

To sum up, the structure concept helps to see the information science field as a knowledge production place and not only for the proposition of targeted solutions to improve processes. The integrating vision defended by Saracevic, based on the mobilization of the referred concept, demonstrates the importance of interdisciplinarity even when it does not have effective conditions for full development. To question the reasons for the limitations and the possibilities to overcome them is, no doubt, a way to reactivate metaphors and identify forgotten significations and expressions, the reappropriation of which will make it possible to systematize, as Saracevic wants, a formal theoretical work, supported by experimental evidence that connects the great areas of separated fields.

## Bibliographic references


BURKE, P. Uma história social do conhecimento – de Gutenberg a Diderot. Rio de Janeiro: Jorge Zahar, 2003.

CARAÇA, J. Um discurso sobre as ciências passadas e presentes. IN SANTOS, B. de S. (Org.), Conhecimento prudente para uma vida decente. São Paulo: Cortez, 2004. p.183-90.

DOMINGUES, I. Conhecimento e transdisciplinaridade II. Belo Horizonte: Editora UFMG, 2005.

DOSSE, F. História do estruturalismo. Bauru: Edusc, 2007.

HOBSBAWN, E. Era dos extremos: o breve século XX: 1914-1991. São Paulo: Companhia das Letras, 1995.

KUHN, T. A estrutura das revoluções científicas. São Paulo: Perspectiva, 1968.

MARI, H. Metáfora, metonímia, denotação e conotação: a propósito da migração de conceitos. IN: DOMINGUES, I. (Org.) Conhecimento e Transdisciplinaridade II. Belo Horizonte: Editora UFMG, 2005. p.42-100.

MOLES, A. A. As ciências do impreciso. Rio de Janeiro: Civilização Brasileira, 1965.

NUNES, J. A. Um discurso sobre a ciência 16 anos depois. IN: SANTOS, B. de S. (Org.). Conhecimento prudente para uma vida decente. São Paulo: Cortez, 2004. p.59-84.

SANTOS, B. de S. Um discurso sobre as ciências. 8. Ed. Porto: Afrontamento,1987.

SANTOS, B. de S. Para uma sociologia das ausências e uma sociologia das emergências. IN: SANTOS, B. de S. (Org.), Conhecimento prudente para uma vida decente. São Paulo: Cortez, 2004. p.777-819.

TÁLAMO, M. F. G. M.; CARVALHO, R. Produção Científica e Informação. IN: GAIO, R. (Org.) Metodologia de pesquisa e produção do conhecimento. Petrópolis: Vozes, 2008. p.105-16.

TÁLAMO, M. F. G. M.; SMIT, J. Ciência da Informação: a transgressão metodológica. IN: PINTO, V. B.; CAVALCANTE, L. E.; SILVA NETO, C. (Org.), Ciência da Informação: abordagens transdisciplinares gêneses e aplicações. Fortaleza: Edições UFC, 2007. p.23-47.

TEFKO, S. Information Science. Journal of the American Society for Information Science, 1999; 50(12):1051-1063.

WALLERSTEIN, I. As estruturas do conhecimento ou quantas formas temos nós de conhecer? IN: SANTOS, B. de S. (Org.) Conhecimento Prudente para uma vida decente. São Paulo: Cortez, 2004. p.123-130.

# About the author

## *Maria de Fátima Gonçalves Moreira Tálamo*

Maria de Fátima Gonçalves Moreira Tálamo has a bachelor's degree in Linguistics from the State University of Campinas and a master's degree and a doctorate in Communication Sciences from São Paulo University. A retired professor of the São Paulo University School of Communication and Arts, where she works as a collaborating professor and advisor on the post-graduate Information Science program, in the Information and Culture area. She does research in the Information and Knowledge Organization area. She coordinates the "Documentation" area of the "Eletromemória" project (USP, Unesp, Fapesp, and São Paulo State Energy Foundation). She also has a scholarship from CNPq (National Council of Scientific and Technological Development).