

# On identity in the organization of interdisciplinary scientific information: challenges of the knowledge society

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## Abstract

*This paper discusses the thematic organization of an area of knowledge – transportation – based on contemporary knowledge-production conditions. It begins with the basic assumption that knowledge organization demands concept organization, and such organization is based on language. Moreover, interviews with members of a research group who talk about their practices in the group, and the Proceedings of a congress organized by a research and teaching association in this area are considered discursive practices that legitimate that area of knowledge. The importance of considering such elements lies in the view that they illustrate the manner in which the area is organized and approaches the future – elements that simultaneously form and are formed by these aspects. For these purposes, the particular conditions in which knowledge is produced in contemporary times were considered. The empirical corpus of this study has included a research group organized as a self-denominated interdisciplinary network as well as eighteen volumes of Proceedings of the Congress organized by the Brazilian Association for Research and Teaching in Transportation. Analysis of interviews with seven members of this research group, which is very productive in its field of operation, has revealed that the new interdisciplinary manner of producing knowledge requires unity around a common core. Analysis of noun phrases that denominate topics and subtopics relative to the area's thematic fields present in the Congress Proceedings throughout twenty years has evidenced – and confirmed – the presence of a common thematic core.*

**Keywords:** Discursive practices, Identity, Knowledge Organization.

## Resumen

*Esta comunicación expone la organización temática de un área del conocimiento -transporte- basada en las actuales condiciones de producción del conocimiento. Comienza con la asunción básica de que la organización del conocimiento exige la organización de los conceptos y de que tal organización está basada en el lenguaje. Por otra parte, entrevistas con miembros de un grupo de investigación que discuten acerca de sus prácticas de grupo y las actas de un congreso organizado por una asociación de investigación y docencia en este área, se han considerado prácticas discursivas que legitiman dicho área del conocimiento. La importancia de considerar tales elementos obedece a la consideración de que ilustran la forma en que el área está organizada y se aproximan a los elementos futuros que forman y a la vez están formados por esos aspectos. Con este propósito, se consideran las condiciones particulares en que se produce el conocimiento en la actualidad. El corpus empírico de este estudio ha incluido un grupo de investigación organizado como una autodenominada red interdisciplinaria, además de dieciocho volúmenes de actas del congreso organizado por la Asociación Brasileña para la Investigación y Docencia en Transporte. El análisis de entrevistas con siete miembros de este grupo de investigación, que es muy productivo en su campo de operación, ha revelado que la nueva forma interdisciplinaria de producir conocimiento requiere unidad acerca del núcleo común. El análisis de las frases nominales que denominamos topics y subtopics, relativos a los campos temáticos del área presentes en las actas del congreso durante veinte años, ha puesto en evidencia -y confirmado- la presencia de un núcleo temático común.*

**Palabras clave:** Identidad, Organización del Conocimiento, Prácticas discursivas.

## 1 Introduction

This paper discusses the role played by discursive practices in the constitution of the thematic field of an interdisciplinary area of knowledge, in the light of theoretical frameworks in Linguistics and Information Science. Much has been said about the challenge faced by the Knowledge Organization area – especially regarding information retrieval – when dealing with contemporary knowledge-production conditions in virtue of the interrelation between knowledge production and political, ecological and ethical approaches.

This interrelation is evidenced in large knowledge-production domains, due to the influence they have on and receive from the socio-cultural environment. Some of these influences can blur disciplinary boundaries, particularly those related to nature or culture, identity, and language. In view of that, we have adopted the concept of *epistemic culture* (Knorr Cetina, 1999) instead of those of discipline or expertise, to reflect the changes that are typical of a transition into a knowledge society. Such concept can cover different pieces of scientific expertise and knowledge inscribed in spaces that transcend academic and operational boundaries, being determined as well as defining validation procedures for researchers and research itself.

In everyday contexts, the speed at which information production and reception is transmitted, streamlined by increasingly powerful real-time processing technologies, escalates the

influence relations between knowledge-production domains and the socio-cultural environment. Such speed has frequent repercussions in the organization of knowledge fields, as it shortens the time of production maturation and sedimentation, preventing accommodation and the gradual learning of the knowledge produced.

These repercussions result from the rise of new realities, which demand solutions and need to be dealt with faster and faster. Such speed in providing solutions also requires searching for information in environments under rapid transformation in terms of both technology and contents, which implies enhancing the ability to recognize new fields and areas of knowledge, as well as the way they are reorganized. As Gutiérrez (2005, p.14) states, paraphrasing Muñiz Sodré, there is a whirlwind of interactions in which technology and the symbolic universe are bound together until they fuse in technoculture. This has been happening since humans, throughout their historical evolution, began to perfect their instruments. Without the presence of the technocultural matrix and its transformations, it would not be possible to understand our evolution nor the reciprocal interactions among identity, knowledge and memory.

This paper's theoretical assumption is that the concept of identity is one of the foundations for establishing *inter-* and *intra-*social group relations – and, as a consequence, for acknowledging what is produced by group members –. This leads to the idea that the process of organizing knowledge in a given area is performed by attributing the symbolic values its members have established as being its own, which will come to characterize the joint knowledge that is produced, transmitted and shared internally or with other groups. In this sense, and in certain circumstances, the symbolic and the conceptual realms are fused together, giving rise to key concepts firmly established in some areas.

Over this background, the present study aims to understand the form or representation of the thematic spectrum of action constructed by a new knowledge field, in this case Transport Engineering, as it is constituted as an area of knowledge throughout twenty years. To outline such representation, we have built a *corpus* of interviews with researchers who have established themselves as the core of the research group. A document that is significantly representative of this area and was also used as *corpus* were the Proceedings of annual congresses of the Brazilian Association for Teaching and Research in Transportation – ANPET –, the only national event promoted by the Brazilian society in this area. The present work provides analyses of the latter.

## **2 First movement: what is ANPET**

The Brazilian Association for Teaching and Research in Transportation – ANPET –, as can be inferred by information available at the website <http://www.anpet.org.br/anpet/interface/content/index.php>, defines itself as a non-profit organization founded 20 years ago, in 1986, with the purpose of functioning as a specialized forum for the discussion of research and teaching of transportation in Brazil.

Its main activity is to promote information and knowledge exchange among specialized researchers and professors as a means to improve the scientific production in this area. This activity helps the institution achieve its ultimate goals of fostering research in the transportation field and contributing to the analysis of problems in the sector and, as a consequence, to the proposal of adequate solutions. In view of its objectives, it has formed a network that acts in several areas in the transportation sector, involving all types of transports

(air, land and water) and themes such as transportation policies and planning, transportation system analysis, and transportation and the environment, to mention only a few.

Being integrated by professors, researchers and professionals of many research and education Brazilian institutions, as well as important agencies and companies in the transportation area, its activities – academic events – and products – proceedings and journals – constitute approved discursive practices in this area.

### 3 Theoretical assumptions

With the aim of showing that discursive practices play a role in the constitution of the thematic field of an interdisciplinary area of knowledge, our analysis focuses on the interdisciplinary interface between Linguistics and Information Science, specifically between Discourse Analysis and Conceptual Representation.

Similarly to Frohman's (1983), our theoretical approach is based on two assumptions: first, that adequate semantic principles are essential to the organization of concepts; second, as pointed out by Frohman in the referred paper based on CRG's text from 1955, that an adequate information retrieval system requires concept organization.

Our line of argumentation revisits Wittgenstein (1994), assuming that the use of words is linked to usage situations where acceptance rules are established based on correct or incorrect relations defined in time by shared practices – discursive practices, in our case. The discursive practices we refer to are similar to subject fields referred to by Knowledge Organization communities, considering that such fields establish conceptual networks developed *in* and *by* the discursive practices themselves. This means that any organization system that aims at information retrieval and is to be used should be based on conceptual organization criteria that results from analyzing the subject field under consideration.

This scenario becomes even more complex considering contemporary knowledge-production conditions in virtue of the interrelation between knowledge production and political, ecological and ethical approaches. By adopting the concept of epistemic culture we have taken into account that it was developed from a study whose author compared the contexts of works developed by different disciplines with the purpose of investigating *the machine of knowledge under construction*. Paraphrasing Christine Hine (2006), we can understand that the epistemic culture constitutes the manner through which scientists produce a specific type of epistemic object. This is the perspective that directs our view about new fusions among different and broad knowledge domains. In their dynamics, these domains are marked by a technological apparatus that allows, more than a simple message exchange, the development of cultural forms in the scientific field that influence and are influenced by the way of thinking their objects, concepts and practices considering political, ethical and ecological conjunctures.

In this view, an epistemic culture not only joins different pieces of scientific expertise and knowledge but also expresses the insertion of the “knowledge machine” in spaces that cross academic walls or even those of productive spheres, being equally inserted in everyday contexts and action locations. A knowledge production system of this nature has served as the empirical field of the present research.

In the information transfer process in a hybrid context such as the one under study, language plays the leading role, as discursive practices are constitutors and constituents of the cultural contexts in which they are included and, according to Hall (1997), the bond between culture and language is approached in a more specific manner due to its representational aspect. This relation is expressed in his statement that language is one of the means through which thoughts, ideas and feelings are represented in the culture of a given group or community.

Therefore, the cultural issue gains importance as we realize how this set of manifestations acquires meaning within specific contextual and ideological relations. Again according to Hall, the circuit of culture indicates that meanings are produced in different instances and flow by means of different practices and processes (Hall, 1997).

In present times, one cannot fail to consider as analytical assumption the existence of a direct relationship with the subject that generates and disseminates knowledge. González de Gómez (2005) states that shifting from practical inter-subjectivity to dialogical and discursive inter-subjectivity implies shifting from action to practical discourse or to theoretical discourse. This statement is based on Habermas's concept of action, which refers to the area of communication, where intentions implied in utterances are assumed and recognized, and the concept of discourse, which refers to argumentation, where validity intentions are focused and where the possibility of legitimacy – or not – is examined.

#### **4 Analysis**

To present our analysis, we have based our current results on the comparison of results from previous studies with a research group organized as a network named Network of Studies in Transport Engineering and Socioeconomics – RESET (Orrico and Oliveira, 2005) – with the analysis of noun phrases that represent areas and papers published in the Proceedings of ANPET's Annual Congress.

The research group studied is interdisciplinary, assuming that such a conception occurs when different disciplines interact in such a cooperative way that they incorporate conceptual schemes and methodological instruments from one another, and are able to deal with an object or subject of study that could not be approached by any of them separately without hindering the investigation.

In this new object construction, in which disciplinary boundaries are blurred, the organization of researchers is also presented in a new manner, establishing new configurations in the relations among them and forming a network.

The analytical procedure with the group required the previous identification of the researchers, taking into account that the group is constituted by members with different professional experiences and from different regions of Brazil and abroad. This careful choice of the group to be studied had the purpose of minimizing the interference of regional peculiarities in the representation process, in order to analyze the construction of meanings common to diverse members from different geographic regions and different levels of expertise and involvement in the group. In this sense, the members were divided in three subgroups: researchers who were more stable in the network constituted the group of effective members (formed mostly by founders of the group), with 7 members; members under training, including students, especially master and doctorate students, were 17 researchers

when data were collected; and collaborators, who bring researchers to the research network when specific projects arise, were 13 when data were collected. Therefore, our complete universe comprehended 37 researchers.

Once the research group to be studied was selected, we analyzed the academic history of its members, now considering only the more stable researchers of the group. This analysis took into account the following factors: a) distribution of the members of the research group into academic title categories; b) occurrence of poly-competence in the researcher and research group's intellectual profile, i.e., studies in different areas at the same level (horizontal poly-competence) or at different levels (vertical poly-competence); c) occurrence of multidisciplinary composition in the research group. According to Sanz-Menéndez (2001), poly-competence refers to a differentiated education of an individual regarding its academic and professional history.

To form a list of researchers that fulfilled our current goals, the data collection categories below were defined:

- Principal academic diploma: highest academic studies of the researcher according to the following scale: Post-Doctorate, Doctorate, Master, Specialization;
- Secondary academic diploma: academic studies taken immediately before the principal level, according to the same scale;
- Baccalaureate.

Firstly, questionnaires were sent through electronic mail and replied by the 37 members of the RESET group. These questionnaires sought to gather three types of information: 1) to outline a profile of the researchers, characterizing them in terms of their academic experience and engagement in the group, and locating them in their specific research fields; 2) to identify discursive marks representative of the concept of information that could suggest how information circulates among researchers; and 3) to gather representations of RESET's formation process.

In a following stage, oral interviews were conducted only with effective members of the group. The interviews were semi-structured, i.e., were based on a predetermined scheme, but with freedom to add or modify questions as needed. The scheme was divided in six question categories: 1) about the type of research done by the interviewed; 2) about the research group and other relations resulting from it; 3) about the institutional context of the research; 4) about the activity sector the research refers to; 5) about space and time relations of the research; and 6) about information practices and uses in the context of the research.

The analysis of interviews with the more stable members of the group was based on the theoretical-methodological framework of the French School of Discourse Analysis, justified by the fact that this group represented itself as the core of the network. The choice of this methodological approach is related to Frohmann's (1994) statement that DA is an important method not only because it exposes significant problems and issues but also because it allows qualitative insights in several disciplines.

Our study of the discourses produced by group members is guided by the concept of network, which in different levels (inter-group, intra-group, in between concepts) constitutes the



Figure 2 (Table of Noun Phrase (NP) Nuclei in the Proceedings) shows the presence of themes from 1988 to 2002 and demonstrates, similarly to the relations among researchers, that the term transportation constitutes the core. As can be seen in Figure 3 (Table of Year/Number of Themes), themes might increase or decrease, as is the case of Planning, which appears in the third year and presents ups and downs during approximately a decade, from 1989 to 1997. Nonetheless, we stress that spaces for discussion are created representing intersections between transportation and aspects directly related to it considering historical, social, political and economic issues. In the time span studied, regarding the general context of the Congress' evolution, there is a characteristic "swelling" of themes between 1993 and 2000: from 5 themes in 1992 to 19 in 1993, followed by a quick decrease from 20 themes in 2000 to 6 in 2001. A complementary contextualization study may indicate whether the historical, social, political and economic issues mentioned influence externally the course of these themes.

Figure 2.- Table of Noun Phrase Nuclei in the Proceedings<0}

Transportation (different types)	131
System	15
Technology	7
Teaching/Education	11
Infrastructure	8
Paving	10
Modeling	21
Planning	19
Economy	4
Management	20
Research	9
Organization	6
Information	4
Economic Aspects	6
Political Aspects	5

Figure 3 – Table of Year/Number of Themes

1988	6
1989	14
1990	8
1991	5
1992	5
1993	19
1994	19
1995	0
1996	19
1997	46
1998	23
1999	23
2000	20
2001	6
2002	3

The movements we have considered as characteristics of a disciplinary field, translated into the development of groups and themes of the most representative scientific meeting in the

area, seem to reflect an effort to dialogue with other fields, which on its turn is translated by attempts to dialogue with other groups in this area or with other social actors involved in the transportation field. The case of education can be an example: when the binomial teaching/research in transportation seems to emerge, it suggests a concern with forming competencies in this field. In other moments, when teaching/research is associated to *traffic*, this suggests something relative to the user. Nonetheless, this dialogue takes place within the transportation field, creating axes that seem to promote a differentiated view: *social research and transportation: concepts; social research and transportation: users and quality*, etc.

On the other hand, there are other aspects to be considered: the case of *networks*, for instance. This theme appears only once, in 1998. However, in discussions within the group of researchers, this concept is used as a metaphor, constituting an element that provides an identity *to* and *from* the area, *to* and *from* the researchers, first and foremost the name of the group under study: Network of Studies in Transport Engineering and Socioeconomics – RESET. How to deal with this observation? Might we assume a process of naturalization of the idea of *network* in this field to such an extent that it no longer constitutes a problem to be discussed in events of this area?

## 5 Conclusion

The academic events organized by a teaching and research association are the highest forum of an area's identity regarding the construction of new research fields and paths. The discursive practices formulated by researchers and by the discursive instruments of their Association develop the area's identity.

Based on the assumption employed by Montesi and Urdiciain (2005, p. 65), for whom the author of a text is the best person to write the text's abstract, as "in principle, nobody has more command of the substance of the article than the author, and there is rarely anyone more familiar with the relevant literature and terminology" than the author, we have taken the proceedings as an adequate thermometer of the paths taken by its members, ultimately constituting this area.

Based on these assumptions, we understand that the analysis of interviews with research group members and of the themes organized in the Proceedings are representative practices of this area, and thus can be used to represent the studies relative to the area's representation.

The methodology used in the analysis has focused on noun phrases (NP) and has allowed us to identify the major themes and their respective subdivisions, evidencing the fields of knowledge that are typical of this area and constitute its identity. Moreover, the comparison of these NP with the interviews with productive members of the research group has shown that the organization is marked by contemporaneity. The weakness of disciplinary boundaries imposes new perspectives to the treatment of knowledge organization in view of the influence they both have on and receive from the socio-cultural environment.

The speed at which informational exchanges are made possible, especially by new technologies and the new configuration of knowledge production, has frequent repercussions in the organization of knowledge fields, as it shortens the time of production maturation and sedimentation, preventing accommodation and the gradual learning of the knowledge

produced. Such rearrangement can be noticed in what has been shown, especially during the first 10 years of Proceedings analyzed.

Although we can have an overall view of the area through the analysis made, the forces involved in the process of constructing the epistemic culture of the transportation field may explain the naturalization of the concept of network and the significant variations in thematic arrangements. A complementary contextualization study is already underway with the aim of suggesting the operation and influence of historical, social, political and economic forces involved.

We believe this study may have contributed, within an interdisciplinary perspective of science in the knowledge society and based on linguistic and cultural fundamentals, to the retrieval of interdisciplinary information.

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