

## Knowledge Organization and industrial heritage in São Paulo: the project Eletromemória



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### Introduction

This paper discusses and analyzes the issues related to knowledge organization on industrial heritage, in the specific domain History of Electric Energy in the State of São Paulo, aiming to represent, retrieve and disseminate the information found in dispersed documentary collections, from its availability, in a web-based research tool.

These issues have arisen in the development of a thematic project, financed by FAPESP in two phases, aimed at collecting the historical heritage of the generation, transmission and distribution sector of electric energy in the state of São Paulo throughout the 20th century. In the first phase, named Eletromemória I, from 2007 to 2011, we carried out surveys and analyzes of the electric power generation, transmission and distribution units constructed during the decades of 1950-1970, representing the period of consolidation of the state electric system. In the second

phase of the project, named Eletromemória II, which began in 2012, about 50 units of electric power generation have been studied, among power plants and small hydroelectric plants (SHPs), built between 1890 and 1960. Interdisciplinary and inter-institutional, the project team, counts on professors, researchers and students from the three São Paulo universities - USP, UNESP and Unicamp - in the areas of History, Geography, Museology, Archival Science, Librarianship and Architecture.

Considering the various issues involved in the implementation of projects of this nature, Eletromemória II, by contemplating historical, documentary, environmental and industrial heritage aspects, defined four thematic axes of action, each of which addresses issues related to the area of knowledge referred to:

- **History:** focuses on the research on the transformations of productive units and their equipment, considering the history of technology, as well as the history of workers who experienced the operation of these plants at different times.
- **Industrial Heritage/Material Culture/Museology:** focuses on the research of the conditions of the assets represented by buildings, equipment and other elements of the material culture identified in the studied units, in a perspective of study of the remnants of the industrial heritage of the state of São Paulo and its museological potential.
- **Landscape/Environment:** based on a descriptive-comparative approach, we focus on the study of the landscape surrounding the places of implantation of the studied units, considering the original fauna and flora and their current conditions, the changes of the water regime and the history of use and occupation of the areas.
- **Information Science:** focuses on the identification of the documentary records related to the studied plants and the definition of parameters for the representation of the information related to the accumulated knowledge about each one of the analyzed units.

By aggregating different areas of knowledge, in an example of an interdisciplinary research community, the project requires a search instrument that consolidates the data obtained. In this work we approach the elaboration of the

Inventory of Industrial Heritage of Electric Energy in the State of São Paulo, an instrument that consolidates the research under two aspects: the terminological standardization and the standardization of the descriptive structure of contents.

As hypothesis, we consider that the mediation of knowledge organization systems in distinct communities can happen at the level of Documentary Languages and Terminology. In this sense, it is necessary to design tools that articulate and transpose knowledge domains and promote real communication bridges among its various agents.

The theoretical-methodological referential is found in the epistemological frontiers of Archival Science, Library Science and Museology gathered from the point of view of Information Science. This is an experience report, an exploratory qualitative approach.

### **Terminological standardization**

The work of the Information Science axis group during Eletromemória I aimed at the elaboration of a controlled vocabulary to represent and retrieve the information stored in documentary collections belonging specifically to the domain of electric energy. The basic premise was that terminological control would guarantee the conceptual representation of the domain, even though the interpretation was submitted to the views of diverse communities and conditioned to the specific characteristics of the broad documentary typology of the focused universe. The controlled vocabulary was elaborated from the subject catalogs of archival, bibliographical and museological collections of Fundação Energia e Saneamento and had its first version included in the database Enerweb, available at: <http://www.energiaesaneamento.org.br/>.

Eletromemória II extends the mapping of documentary collections, and inserts new research axes, aiming to update the instrument of terminological control, including terms referring to the industrial heritage of the electric sector that will be used to describe the productive units of historical characteristic. We know that, especially since the 1990s, in the business environment of concessions, the regulation of the economic activity brought a minimum standardization of the terminological references of the collections. The existence of these minimum documentary standards to comply with the legislation allowed the interlocution among collections of different companies from the point of view of the used terminology. However, the occurrence of this type of

control for the collections of the beginning of the implantation of the electric power, between the end of 19th century and the middle of 20th century, is still extremely limited, lacking terminology control for the documentary production or for other technical assets issues, such as equipment and constructive techniques.

One of the characteristics of vocabulary control tools is also the possibility of terminological integration in different areas of knowledge. The association of research in both axes - information and documents - will enable the creation of a more comprehensive instrument, both from the point of view of the informed contents and the terminological control of the information, enabling the researcher to have ample and qualified access to the collection.

The field surveys carried out in the electricity generating units and in public and private collections aim to diagnose the archival, industrial, material culture and museological potential heritage, indicating their state of organization and conservation, as well as their relationship with the environment and its transformation in time, allow the collection of new terms to be inserted in the controlled vocabulary.

In order to include these new terms, a meeting was held with the researchers of the project for the elaboration of a conceptual map, as defined by Fendrich and Pereira (2006) and Rovira (2005), that is, propositions were organized about the main theme of the project (History of Electric Energy) which, visualized graphically allowed the understanding of the relationships among the connected concepts stimulating the solution of problems and enabling the perception of different paths within this conceptual system.

The discussions allowed to identify the terms: **Patrimônio industrial** (Industrial heritage); **Paisagem e Meio-ambiente** (Landscape and Environment); **Processos de eletrificação** (Electrification processes) and **Documentação** (Documentation) as subcategories of the category **História da Energia Elétrica** (Electric Energy History); to be restructured in the controlled vocabulary. All subcategories must be organized from the establishment of logical-semantic relationships among the terms that compose it. These relationships are established from the definitions of each term identified as belonging to that subcategory. The definition of a term should be drawn from what is prescribed by ISO 704 (2000) and 1087 (2000).

According to Dahlberg (1978), the definition of a term must state the essential characteristics of the concept, that is, the characteristics without which we cannot understand the concept that the term designates. The definition should also state the

common characteristics, i.e., those that allow two terms to be in the same subcategory/category, as well as the disjunctive characteristics, those that establish the boundaries of that subcategory/category.

The use of domain terminology as a reference for a controlled vocabulary ensures the control of the meaning of its terms and consequently guarantees the quality of the information it represents. In order to ensure future interoperability with other terminological control instruments, ISO 25964-1 (2011) is used for the preparation of thesauri and interoperability across vocabularies.

Thus, it is expected that the defined and adequately related terms, guarantee the meaning of the metadata that constitute the research tool Inventário do Patrimônio Industrial de Energia Elétrica de São Paulo (Inventory of the Industrial Heritage of Electric Power of São Paulo) and at the same time guarantee the content of the documents described there.

### **The Inventory of Industrial Heritage of Electric Energy in São Paulo**

It is a research instrument that articulates the knowledge produced by distinct areas, referring to the same research object. After analyzing the concepts of each area, it was clear to the researchers that it was necessary to articulate the contents in order to develop a common data structure that met the minimum criteria of information representation of each one of the treated thematic axes, preserving its specificities. Therefore, the definition of the metadata structure should consider the existence of:

1. Informational needs for each area of knowledge;
2. Normative standards that meet these needs and that enable the articulation of contents on two levels: information of different nature on the same unit and information of the same nature on different units.

The performed comparative analysis took into account issues such as the great geographic and temporal scope of a project of this nature. Considering the universe of research, the researchers should combine information about units spread across all regions of the state of São Paulo, built at different times, and therefore with specific characteristics, whether constructive, functional or environmental. In addition, issues of administrative nature, such as the transition of ownership among various companies and government agencies, should also be considered in the construction of the instrument.

After analyzing the possibilities in the areas of Archival Science, Museology and Librarianship, it was realized that, for the purpose of the project, it would be interesting to use a descriptive instrument that could be applied to any of the units, describing it at several levels, which corresponds to the concept of multilevel description used by the international standard of archival description, ISAD-G (CONSELHO INTERNACIONAL DE ARQUIVOS, 2000).

Although it is a more comprehensive research tool than a traditional heritage guide, defined as a "documentary description tool that allows an overview of an archive service or a body and which presents practical information about the content and organization of each of the funds "(CUNHA, CAVALCANTI, 2008, p.183), or in librarianship perspective, "a document with instructions to guide users on the knowledge and exploitation of the collection of documentary bodies" (CUNHA; CAVALCANTI, 2008, p. 183), we realized that the concept could be applied to this case, and it is obviously necessary to broaden the concepts to be applied. The idea that each productive unit could be considered as a relatively independent unit, configured as an individualized set, made this option the most interesting one. In this way, it is possible to treat all the described collection from a documentary point of view, especially considering the research context in which the project is inserted.

At the same time, the final instrument would have to consolidate the concept of inventory used by the area of Industrial Heritage, in order to make it recognizable to all researchers. The record of goods and other things belonging to a person or community (RETTIG, 2009, p. 190) should follow the guidelines of Nizhny Tagil Charter, which indicates the need for field surveys, the elaboration of industrial typologies and site inventories that provide easy and free access to the public of interest. It also guides the inclusion of descriptions, drawings and photographs, as well as the indication of documentary sources (TICCH, 2003).

In order to meet the specificities previously presented, the instrument was divided into six large informational areas:

1. Fund/Collection - Identification of the production unit: containing basic identification and ownership data, construction data, geographic location, onset and end dates of operation. This area reconciles information from all the specific fields of knowledge, considering the accumulation and rights over the collection. The term Fund, used in

Archival Science, refers to issues similar to the term Collection, used in Library Science and Museology.

Within this item, we incorporate issues such as authorship, provenance and provenance of the collections, considering theoretical issues of Archival Science, but which were adapted to meet the methodological characteristics of the different areas.

2. History of the unit: with information on the history of the production unit, from the motivations for its creation, importance to the region and chronological data on the productive unit;

3. Industrial Heritage/Museology: with the description of the remaining physical structure (both architectural and equipment) and museological aspects, such as the analysis of the possibility of implementing a visitation route;

4. Landscape/Environment: with a comparative analysis of the environmental characteristics of the surroundings of the studied unit;

5. Archival collection: containing information on the location of documents of historical value, their conditions of preservation and access.

6. Keywords: all the research items underwent analysis and terminological standardization, constituting descriptors, formatted from the defined controlled vocabulary. In this way, terminological normalization is responsible for making content compatible among the different studied units, allowing the comparative analysis in different contexts.

## **Conclusions**

Considering the hypothesis of this research, where terminology and information structure are responsible for the mediation of knowledge organization systems in distinct communities, the paper presented a report on the experience in which the development of the information representation instrument incorporates and articulates concepts from different areas of knowledge.

The comparative analysis of concepts used by the different areas on the History of Electric Energy in the State of São Paulo and the organization of the informational references on the theme allowed the creation of a descriptive instrument in which the terminological control and the registration of the contents are combined.

On the other hand, the elaboration of a single instrument, presenting information specific to each area of knowledge about the same object, articulated among them,

allows the researcher a comprehensive and interdisciplinary view of the researched unit, in this case, each small hydroelectric plant participating in the project .

We understand that, both the knowledge about each unit and the relations established among them, become clearer and can be used consistently by the various communities of researchers involved.

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**The references was made following the ABNT rules.**

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