



THE INDEXING CONTEXT FOR CATALOGING BOOKS USING A SOCIOCOGNITIVE APPROACH

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ABSTRACT

We evaluated study of the indexing process in the cataloging at university libraries, using a socio-cognitive approach to analyze procedures, difficulties and perceptions of librarians, users, and managers. The methodology consisted of the Individual and Group Verbal Protocols applied in university libraries. The results were the absence of procedures for book subject analysis and representation, incompatibility of indexing language, and problems of subject retrieval from the catalog. We have concluded that is tendency of catalogs to act as databases. Therefore, the cataloguer should present a posture of commitment similar to that of an indexer who works in the production of these bases.

Keywords: Indexing; Subject Cataloging; Online Public Access Catalogs; Academic Libraries; Sociocognitive Qualitative Approach.

INTRODUCTION

Indexing is still understood by indexers as an operation performed only in information services that produce databases. However, the irreversible scientific and technological evolution that has swept every field of knowledge and professional and social activity has altered the way information and knowledge are stored, treated and

retrieved, significantly changing information services and libraries. On the one hand, information services that in the past produced reference databases of journal articles based on indexing and abstract preparation now also house databases of full-text electronic journals that do not require indexing and abstract preparation. On the other hand, libraries that for centuries built their catalogs for the local and frequenting community now make them available on the Web in online format. In addition, there is individual access to an immense number of documents and other information resources on the Web itself, without accessing databases or library catalogs.

In a recent publication, Fujita, Rubi and Boccato (2009) indicate that catalogs are equivalent to databases and that Brazilian university libraries are information systems that produce them. In this sense, one can consider that catalogs today are plurifunctional, with multiple possibilities of access, whose forms of documentary representation are organized in metadata. An example of this is online catalogs, referred to by the international literature as Online Public Access Catalog (OPAC), which are available on the Web for access by anyone, anytime and anywhere. This availability, on the other hand, allows for constant evaluation and imposes conditions required for the ongoing improvement of search interfaces, and particularly of content selection and treatment for future retrieval.

The visibility that libraries and librarians have achieved for catalogs enables thousands of readers with the most diverse search objectives to gain rapid access to the documents they are looking for, and offers authors unprecedented opportunities for disseminating their works. This gives the cataloguer the responsibility of making ongoing cataloging improvements in the descriptive representation of information resources. However, thematic representation insofar as it concerns subject indexing is much more crucial to the definitive success of online catalogs since it must ensure, even at a distance, the specificity, precision, replacement and comprehensiveness of information retrieval, which are aspects of indexing that were previously less required in retrieval when catalogs were solely local, since the reference librarian was always present when the user needed him or faced difficulties.

Technological advances have enabled libraries to retrospectively convert printed catalogs into automated catalogs by copying catalogical records in computer readable format prepared by other libraries, and to ensure the continuity of this copying process within a context of cooperation among libraries that make their records available free of charge, provided the same metadata and remote data transfer format is used. The importance of the retrospective conversion of bibliographic records and of cooperative cataloging is well known, since it has expedited the move of local catalogs to remote servers accessible online and revolutionized the transformation of catalogs, although one must keep in mind the effects of these solutions on the indexing process in cataloging, and hence, on subject retrieval. For this reason, we believe it is important to investigate indexing in cataloging.

Considering that this research focuses on the study of indexing in cataloging, it is worth noting here that the cataloguer should be understood as an indexer, since the research area itself recognizes the indexing and cataloging of subjects as conceptually identical, according to the conception of Lancaster (2004), Silva and Fujita (2004), and Milstead (1983), among others.

With the purpose of investigating indexing during the cataloging of books, we established a research group to focus collectively on the Sociocognitive approach in the indexing context of the cataloguer at university libraries. The group's participants and observers include users, other librarians, and managers.

This research presents two important differentials. The first, because it is characterized as collective, since it has common objectives, theoretical foundation and methodology and shares an ample collection of data developed by all the researchers to analyze different aspects and perspectives which, taken together, make up a highly revealing picture about indexing during the cataloging of books. The second differential is the adoption of a Sociocognitive approach that makes visible not only the task of subject indexing in the cataloging of books by cataloguers, but also privileges and interweaves the different views of the catalog's users – students, professors, researchers, reference librarians and library managers – that

are part of the Sociocognitive context of cataloguers, since they are users of the results of the task they perform.

With the cognitive approach, Information Science has an enormous potential to be exploited and considered in its qualitative researches: the knowledge of its professionals and specialists, who can provide a new vision of their interactions with the medium, of their procedures for solving tasks, of their representations about assimilated knowledge, and about how they organize their own knowledge, thus revealing aspects that are not explicit but that derive from innumerable and rapid associations resulting from actions and interactions for the construction of knowledge. As a result, the Sociocognitive approach complements and advances insofar as it includes and considers the perceptions of the participants in the professional's actions and interactions during and after the completion of his task, providing different perspectives, difficulties and procedures not yet evaluated by the professional.

In this sense, the common objective of this research was to carry out a study of the context of indexing in the cataloging of books at university libraries, using a Sociocognitive approach to analyze procedures, difficulties and perceptions of librarians, users and managers.

2 DIFFERENT THEORETICAL AND METHODOLOGICAL PERSPECTIVES ON SUBJECT INDEXING AND CATALOGING

The organization of information comprises the activities and operations of manipulation of information, which involves available theoretical and methodological knowledge both for the descriptive treatment of supporting material of the information and for the thematic treatment of information content (FUJITA, 2003).

In libraries, thematic treatment has to do with the subject the document deals with, in other words, it comprises documentary analysis as a theoretical and methodological area that encompasses the activities of classification, abstract preparation, and subject indexing and cataloging, considering the different purposes of information retrieval.

In line with our aforementioned objective, it is fundamental to discuss the theoretical aspects involving the divergences between the terms subject indexing and cataloging.

The term *indexing* belongs to the English theoretical orientation and, according to the “Principles of indexing” of UNESCO’s World Scientific Information Programme (UNISIST, 1981, p.84), it is “[...] the action of describing and identifying a document according to its subject”.

Chaumier (1988, p.63) believes that “[...] indexing is the most important part of documentary analysis. Hence, it determines the value of the documentary system”.

According to Pinto Molina (1993, p.208), indexing is “[...] the technique of characterizing the content of a document [...], retaining its most representative ideas to link it to suitable indexing terms”.

Lancaster (2004, p.1) explains that “[...] indexing processes identify the subject the document deals with [...]” and that they imply “[...] the preparation of a *representation* of the thematic content of documents”.

The indexing process comprises different stages, which Lancaster (2004) and Pinto Molina (1993) declare do not necessarily have to be carried out sequentially, since the professional indexer familiarized with the process can carry them out simultaneously.

The use of the term “subject cataloging” presents an American influence that goes back to Charles Ammi Cutter who, in 1876, presented his work *Rules for a dictionary catalog*, aimed at establishing rules for the formation of alphabetical subject headings that would make up alphabetical subject catalogs.

For Cutter (1904), the objectives of subject cataloging were: to enable the catalog user to find a particular document whose subject is known; find other documents about the same subject or about related subjects; and assist the user in the selection of retrieved records, the document most suited to his information needs.

Fiúza (1985, p.257) defines subject cataloging as “[...] the discipline or set of disciplines that deal with the representation, in library catalogs, of the subjects contained in the collection”.

According to Silva and Fujita (2004), the term subject cataloging is characterized by the attribution of subject headings for the representation of the total content of documents in library catalogs. Its origin is tied to the construction of the subject catalogs of libraries, which is organized through the determination of subject headings.

Based on these considerations, we find that the divergences between subject indexing and cataloging are clear when authors such as Fujita (2003), Lancaster (2004), and Silva and Fujita (2004) recognize subject indexing and subject cataloging as conceptually equivalent.

Fujita (2003, p.75) believes that subject cataloging in libraries derives from the activity of classification, since

The indices that used to exist in information retrieval systems, such as the old library card catalogs, were considered from a classificatory perspective because the so-called subject headings were composed under the influence of classificatory terminology rather than that of the text and its content.

Lancaster (2004) explains that the difference in the literature of the area about the expressions subject cataloging, indexing and classification are minor and cause confusion. In the opinion of this author, the term subject cataloging has an American influence whose usage was reinforced by the utilization of subject heading lists, and its origin is connected mainly to the construction of subject catalogs of libraries where the subject headings are determined.

Silva and Fujita (2004, p.142) point out similarities and differences in alphabetical subject indexing and subject cataloging:

Alphabetical subject indexing is tied to the determination of subject headings and for this reason it is, in some cases, also called subject cataloging. Despite the divergences about similarities and differences between the terms, alphabetical subject indexing and subject cataloging are equivalent because they are the results of the same process: subject analysis.

Moreover, the authors state that the distinction between the two processes lies in the use of different documentary languages (subject heading lists for subject

cataloging and thesauruses for indexing) and in the results of the two processes, whose final product is the index and the subject catalog.

On this subject, Foskett (1996) asserts that books are catalogued while other items are indexed, and points out similarities and differences between the two processes. Similarly, both practices aim to identify the item and provide access to it by means of several approaches, including the subject. The differences have to do with the fact that in book cataloging, its content is treated as a whole and the subjects are supplied on a limited scale (a classification number for bookshelf arrangement and one or two subject headings for access through the catalog). In contrast, in the indexing of other materials, the tendency is for detailing, with a greater generosity in the supply of terms for access by subject.

At this point, we highlight two aspects we consider important for an understanding and differentiation of subject cataloging and indexing:

1. both derive from intellectual processes to determine the subjects that best represent the document for its later retrieval, be it by means of indices or through catalogs; and
2. the current tendency of catalogs to act as databases, including the availability of complete texts.

From this perspective, Fattahi (1998) offers an interesting point of view about the trend for integration between bibliographic databases and indexing and abstract services in the context of online catalogs. This proximity opens up a window for the entire bibliographic *corpus*, causing these services to become highlighting factors for the catalog. In this scenario, the user expects greater consistency within and between the two systems.

Notwithstanding the considerations about the elements that differentiate subject cataloging and indexing presented so far, it is our opinion that indexing is the process which, from the theoretical and practical standpoint described up to this point, offers better systematization of procedures and evaluation of performance in information retrieval, which are important advantages to be added to the current evolution of online catalogs.

Subject cataloging is linked essentially to the construction of library catalogs and indexing to the construction of library indices in bibliographic information services that produce databases.

However, the tendency is for catalogs to begin acting as real databases. We believe this is due to two factors: the dimension the Internet has given the catalogs of libraries, since they are now available without spatial and temporal boundaries, enabling the user to access them anywhere, anytime; and the user's ever growing demand for catalogs to act as real databases, offering specificity, speed and hyperlinks to complete texts.

Therefore, we believe the term indexing should be adopted also to denote the thematic treatment performed during cataloging in university libraries. However, the change in name will not suffice unless it is accompanied by a philosophy and objectives that are well described in the library's indexing policy, as is the case of indexing services.

3 DEVELOPMENT OF THE RESEARCH: METHODS, ENVIRONMENTS AND PARTICIPANTS

The object of analysis in the investigation of indexing in cataloging is the context of indexing at nine university libraries of the São Paulo State University "Júlio de Mesquita Filho" (Unesp), São Paulo, Brazil, in three subject areas of the three major fields of learning: Pedagogy in Human Sciences, Engineering in Exact Sciences, and Odontology in Biological Sciences.

The selection of these libraries was based on the criterion of diversity of areas, teams, users and university library environments, considering the *multicampus* characteristic of Unesp, which is located in different geographic sites in the state of São Paulo, thus favoring the collection of data and enriching a significant sample for the development of the analyses from different perspectives.

The library system of Unesp is composed of thirty-two libraries of university units and complementary units in twenty-three cities in the state of São Paulo. The records of all the libraries of Unesp are available in a central catalog publicly

accessible via the Internet, called the Athena catalog. The Aleph system is the software used for automating the services of acquisition, registration, cataloging, loan and control of journals.

The methodology adopted for collecting the data consisted of a diagnostic study comprising three parts:

- a) Functioning and procedures for the treatment of documentary information from the standpoint of management of Unesp's library network;
- b) Functioning and procedures for the treatment of information in Unesp's library network from the standpoint of the cataloguer^{i [1]};
- c) Evaluation of online information access and retrieval by the distance user.

The first part of the research consisted of applying an organizational diagnostic questionnaire to the directors of the nine university libraries. The questionnaire was developed based on the organizational diagnostic proposed by Almeida (2005, p.53-55) for the identification of organizational, material, procedural, processual and documentary items and of people that constitute the Sociocognitive context of the cataloguer.

In the development of the second and third parts, on the functioning and procedures of information treatment at Unesp's library network from the standpoint of the cataloguer and the evaluation of online information access and retrieval by the distance user, the introspective technique of the verbal Protocol was used in the following modalities:

1. Individual Verbal Protocol (IVP), an introspective data collection technique applied to:
 - a) the cataloguer of each library to identify the procedures of subject analysis in book cataloging, as well as difficulties and restrictions;
 - b) first and last-year undergraduate students of the courses of Pedagogy, Odontology and Engineering at Unesp, in order to evaluate difficulties in the use of the documentary language adopted by the Athena cataloging system.

2. Group Verbal Protocol (GVP): a group set up in each library, consisting of the library manager, reference librarian, researching user (research group leader), and an undergraduate or graduate student to access the knowledge of the people participating in the indexing context in the cataloging of the nine university libraries as a qualified data collection source of the diagnosis.

A total of thirty-six data collections were made (nine group verbal protocols, nine individual verbal protocols with cataloguers, and eighteen individual verbal protocols with student users).

The results obtained from the analysis of the data of both the verbal protocols and organizational diagnostic questionnaires were presented at a meeting attended by the librarians occupying the post of Library Director of the libraries participating in the data collection and the professors acting as commission coordinators of the respective libraries, in order to obtain the librarians and professors' assessment, particularly with regard to the methodology and results obtained. The discussion held in this meeting was recorded, transcribed and analyzed and the results confirmed important aspects of the evaluation of the results and of the data collection methodology.

4 INDEXING IN THE CATALOGING OF BOOKS AT UNIVERSITY LIBRARIES: APPLICATION, EDUCATION AND FUTURE

The proposal that brought together three researchers in this research is based on the view that catalogs must improve the subject retrieval of their local and distance users, adopting indexing in book cataloging. To this end, the common objective of the researches was the study of the indexing context in book cataloging at university libraries, using a Sociocognitive approach to analyze procedures, difficulties and perceptions of cataloguers, reference librarians, library managers, research users and undergraduate students as participants in the collection of data.

The surprising fact of the analysis of the results obtained from the various perceptions of the participants of the data collection is that there are converging

views about the inexistence of procedures for book subject analysis and representation, as well as incompatibility of documentary language and problems of subject retrieval from the catalog. This indicates that all the participants, including users, are aware that there are problems which need to be solved based on well-founded and systematized proposals.

We consider it necessary for catalogs to allow for more accurate and specific subject retrieval. This proposal, albeit ideal from various qualitative standpoints, may be difficult to implement without the political commitment of managers, educators and users, since it breaks away from the cataloguer's professional schemes to introduce another process with its own systematization, instruments of representation and norms.

In this sense, one must consider the professional conditions of the cataloguer who today is engaged in the descriptive representation of books, starting from the characteristic of the software that uses a metadata format, to which is linked the adoption of standards for bibliographic records based on codes, norms and procedures. In short, the cataloguer is subject to a work reality that imposes a set of standardization procedures, norms, codes and rules that allow not only for data transfer but also data sharing.

Allied to this professional reality is the situation of the small number of cataloguers per library, the workload and the time pressure to process large numbers of books. These are restrictions that lead the cataloguer to engage in record copying through cooperative cataloging as a time-saving solution and to disregard the importance of subject analysis and representation.

The professional reality in subject cataloging was investigated by Šauperyl (2002, p.164-165) at three North American university libraries with twelve cataloguers, whose final considerations address the difficulties of the cataloguer's work due to "[...] intricate cataloging policies and rules, because they catalogue in many different fields of knowledge, because cataloging instruments do not offer much support, and because of time and productivity pressures".

In recent results obtained from a diagnosis of national libraries in Latin America, Fujita and Gil Leiva (2009) found that the inexistence of an indexing policy is due to staff constraints.

The greatest challenge, therefore, is not the cataloguer's acceptance of the introduction of indexing in his work routine. The issue that remains pending in the proposal is the working conditions to be adapted in order to meet the need to include indexing in cataloging. In our opinion, these conditions are tied to the discussion of an indexing policy for libraries which will lead to administrative decisions that promote changes as a function of the quality and specificity of retrieval of catalogs.

Another aspect examined in this research is the theoretical and methodological perspectives of the subject cataloging and indexing processes, which, despite their conceptually equivalent objectives of subject analysis and representation, follow different historical, institutional, theoretical and methodological paths.

Initially, with the objective of establishing rules for the formation of alphabetical subject headings that would form alphabetical subject catalogs, it is worth noting that the professional practice and theoretical fundamentals of subject cataloging are older than those of indexing, considering the institutional existence of libraries and the first publication of Charles Ammi Cutter, dated 1876.

Indexing, as a practice, is older from the standpoint of the construction of alphabetical indices, but it is more recent in terms of the institutional practice of indexing with procedures of subject analysis and representation of documentary contents in information services, which began to produce reference databases in the early 20th century.

Indexing as a process of subject analysis has theoretical and methodological roots in the English line and subject cataloging in the North American line. They were developed separately in different institutional environments and documentary typologies and, in the case of indexing, in more specialized subject areas. Thus, indexing is performed in indexing and abstract services and involves journal articles and scientific documentation in general, while subject cataloging in libraries involves

books and documentation published conventionally. The worldwide growth of indexing and abstract services and the importance of databases for scientific and technological development have led to the ongoing drive for theoretical and methodological advances in indexing aimed at improving subject retrieval.

The literature on indexing and indexing languages (thesauruses) has grown in quantity and quality, according to scholars such as Foskett, Lancaster, Austin, Farradane, Metcalfe, Aitchinson, Gilchrist, and others. Indexing has achieved qualitative scientific advances in processes, products and instruments, whose indexing consistency and subject retrieval have often been evaluated through use, with an extensive body of literature of international repercussion in the area of Information Science.

Allied to this aspect, scientific advances in indexing have opened up a work market for professionals from other areas and produced repercussions in teaching in the initial and continued education of librarians, in the techniques and standardization of subject analysis and representation, and principally in subject retrieval, with changes in the search interfaces of automated systems, undoubtedly influencing the intelligent indexing systems of metasearch engines such as Google and Yahoo.

The repercussion of the advances in indexing is also well known in the information behavior of users, as reported by the research users and undergraduate students participating in this research, who prefer subject retrieval resembling a database or a Web metasearch engine.

On the other hand, the evolution of subject cataloging, which is restricted to the institutional environment of libraries, was tied to the technical perspectives of the cataloguer's professional practice based on the rules of Charles Ammi Cutter.

According to Guimarães (2008), subject cataloging and indexing are theoretical lines of the thematic treatment of information (TTI). However, this author considers that the first approach of subject cataloging focused directly on the professional activity in libraries and was strongly influenced by the School of Chicago, which derived from Cutter's principles of alphabetical cataloging and from

the tradition of subject headings of the Library of Congress, whose emphasis lies in the catalog as a product of the treatment of information in libraries.

The advance of the manual catalog as an instrument of information retrieval, according to Guimarães (2008), was underpinned by important contributions from Cutter, Coates and Kaiser in the construction and organization of subject terms for the formation of subject headings. Olson, Berman and Šauperl stand out for their current contributions to the theoretical and methodological studies in this field.

We also highlight the worldwide effects of the movement of cooperative cataloging, subject heading lists (currently thesauruses), online catalogs, continually updated cataloging codes, and metadata in catalogical format.

The evolution of the main subject heading list, the Library of Congress Subject Headings (LCSH) in thesaurus format, considered an indexing language, is the most characteristic example of the existence of a worldwide trend for thinking of subject cataloging with the scientific and methodological rigor of indexing to achieve specificity and accuracy both in subject analysis and representation and in retrieval, since subject headings, which were heretofore precoordinated by cataloguers, are not necessary after the evolution of manual catalogs into online catalogs that allow searches for any word of the coordinated subject with or without other words.

These differences lie mainly in the fact that cataloging in the library involves a set of principles established and recognized worldwide, which provide standards for the elaboration of bibliographic records, contributing to the construction of the area of cataloging and to the interchange of information. Indexing and abstract preparation services, however, do not, and show differences in their methods of description and access points as well as different standards.

In addition, one must consider the objectives and functions of a catalog and a database; the structure and content of a bibliographic record of the catalog and the database, and the forms of access points.

According to Fattahi (1998), cataloging could learn some principles from indexing and abstract preparation services, such as additional author access points.

The current situation of cataloguers that copy ready-made bibliographic records from other libraries and for this reason do not perform subject cataloging differs from the time when the evolution of online catalogs did not exist and the cataloguer performed the original cataloging of books in his library. The process of subject cataloging was lost in the midst of the evolution of the area of cataloging and of online catalogs, and evolved under the influence of the indexing process.

In this sense, the question remains about how to ensure the quality of subject retrieval in the current conjuncture of cooperative cataloging through record copying, since it involves not only the inclusion of indexing but also the assumption that a copied record must still be adapted to the procedures of subject analysis and representation.

This issue, and the work situation of cataloguers mentioned earlier, transforms the need for greater specificity and accuracy in subject retrieval into a challenge that cannot be faced solely by cataloguers, because it depends on a combination of administrative, technological, educational, theoretical and methodological factors linked to an indexing policy to be discussed by everyone involved: library managers, researchers of the area of Information Science, cataloguers, reference librarians, research users, readers and students.

Overcoming the problem to be faced by everyone and especially by the cataloguer must be underpinned by the advantage of improved subject retrieval that the inclusion of subject analysis and representation of indexing will give to the online catalog. University library users are interested not only in subject retrieval but also in the visibility and dissemination of scientific production through online catalogs, since a catalog brings together all the information resources, including complete texts of theses, dissertations, articles, scientific reports and others.

The proposal for the future is that libraries get together in systems and organize teams that can share decisions aimed at indexing quality and consistency in the subject retrieval of their catalogs, based on methodological guidelines that are developed collectively and described in an indexing manual, as exemplified by

indexing and abstract preparation services, which operate within a system of cooperation for the production of reference databases.

In this sense, the experience of university library systems in inserting indexing processes and adopting an indexing policy described in an indexing manual is important for studies of ongoing evaluation of subject retrieval. Moreover, the participation of Information Science researchers is equally essential in the development of research dedicated to the improvement of online catalogs insofar as it concerns the process of subject analysis and representation, as well as in metric studies on Brazilian and international scientific visibility.

From the educational standpoint, we believe it is imperative that the cataloguer, in his initial and continued education, be provided with knowledge about the context of cataloging in libraries, examining the procedures, instruments, rules and conduct employed in the subject analysis and representation of books by indexing, observing the workings of the catalog through the subject retrieval and information behavior of the user.

In this context, we recommend that indexing as a process of subject analysis and representation should not be dissociated from the library environment in curricular contents. We believe that the analyses of the verbal statements of the participants of this research, users, cataloguers, library managers and reference librarians, should be considered in education, since they sufficed to demonstrate the Sociocognitive context of the cataloguer and also clearly revealed what the participants think about the problems in this context, how they could be solved, and what instruments and methods are needed.

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ⁱ In the context of the Library Network of UNESP, the indexers correspond to the cataloguers who develop the cataloging and indexing activities.

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