RDBCI: Revista Digital Biblioteconomia e Ciência da Informação
RDBCI : Digital Journal of Library and Information Science

DOI 10.20396/rdbci.v16i2.8649807

EPISTEMOLOGICAL ASPECTS OF INFORMATION SCIENCE AND INFORMAL BEHAVIOR: DIALOGUES WITH BORKO, LE COADIC AND SARACEVIC

ASPECTOS EPISTEMOLÓGICOS DA CIÊNCIA DA INFORMAÇÃO E O COMPORTAMENTO INFORMACIONAL: DIÁLOGOS COM BORKO, LE COADIC E SARACEVIC

ASPECTOS EPISTEMOLÓGICOS DE LA CIENCIA DE LA INFORMACIÓN Y EL COMPORTAMIENTO INFORMACIONAL: DIÁLOGOS CON BORKO, LE COADIC Y SARACEVIC

[1]Jorge Santa Anna
Universidade Federal de Minas Gerais[1]

Correspondence

[1]Jorge Santa Anna
Universidade Federal de Minas Gerais,
Belo Horizonte, MG - Brazil.
Email: professorjorgeufes@gmail.com
ORCID: http://orcid.org/0000-0002-0709-3639

Submitted: 10/10/2017
Accepted: 19/12/2017
Published: 18/04/2018

JITA: CE. Literacy

DOI 10.20396/rdbci.v16i2.8649807

RESUMO: Os estudos sobre usuários e seus comportamentos no que tange à busca por informação têm demonstrado o quanto o aspecto humano-social tem sido valorizado pelas ciências, sobretudo na Ciência da Informação. Portanto, apresenta-se pesquisa preliminar, cujo objetivo é discorrer alguns aspectos epistemológicos da Ciência da Informação, bem como os estudos do comportamento informacional, tendo como base teórica as reflexões apresentadas por Borko, Le Coadic e Saracevic. Por meio de pesquisa descritiva e bibliográfica de abordagem dedutiva, confirmou-se que a Ciência da Informação estuda o objeto informação e os procedimentos para coleta, armazenagem e uso desse recurso, caracterizando-se como uma ciência interdisciplinar, influenciada pelas tecnologias da informação e comunicação, cuja origem desse campo científico remete aos reflexos do desenvolvimento científico e tecnológico do século XX. Além disso, concluiu-se que os estudos das necessidades e do uso da informação, com foco no usuário, viabiliza a importância do ser humano, como principal elemento do processo informacional, sendo que os estudos vêm se aperfeiçoando, em que são investigadas questões comportamentais quanto ao uso dos recursos, produtos, serviços e sistemas de informação.

PALAVRAS-CHAVE: Ciência da Informação. Estudo de uso. Estudo de usuários. Comportamento informacional.

ABSTRACT: The studies on users and their behaviors regarding the search for information have demonstrated how much the human-social aspect has been valued by the sciences, especially in Information Science. Therefore, preliminary research is presented, whose objective is to discuss some epistemological aspects of Information Science, as well as the studies of informational behavior, based on the theoretical considerations presented by Borko, Le Coadic and Saracevic. Through a descriptive and bibliographical research of deductive approach, it was confirmed that Information Science studies the information object and the procedures for collection, storage and use of this resource, characterizing itself as an interdisciplinary science, influenced by information and communication technologies, whose origins of this scientific field refer to the reflections of the scientific and technological development of the twentieth century. In addition, it was concluded that the studies of the needs and the use of information, with a focus on the user, enables the importance of the human being, as the main element of the informational process, and studies are being improved, in which behavioral issues are investigated Use of resources, products, services and information systems.

KEYWORDS: Information Science. Use study. Study of users. Informational behavior.

RESUMEN: Los estudios sobre usuarios y sus comportamientos en lo que se refiere a la búsqueda de información han demostrado cuánto el aspecto humano-social ha sido valorado por las ciencias, sobre todo en la Ciencia de la Información. Por lo tanto, se presenta una investigación preliminar, cuyo objetivo es discurrir algunos aspectos epistemológicos de la Ciencia de la Información, así como los estudios del comportamiento informacional, teniendo como base teórica las reflexiones presentadas por Borko, Le Coadic y Saracevic. A través de una investigación descriptiva y bibliográfica de enfoque deductivo, se confirmó que la Ciencia de la Información estudia el objeto de información y los procedimientos para la recolección, almacenamiento y uso de ese recurso, caracterizándose como una ciencia interdisciplinaria, influenciada por las tecnologías de la información y comunicación, cuyos orígenes de ese campo científico remiten a los reflejos del desarrollo científico y tecnológico del siglo XX. Además, se concluyó que los estudios de las necesidades y del uso de la información, con foco en el usuario, viabiliza la importancia del ser humano, como principal elemento del proceso informacional, siendo que los estudios vienen perfeccionándose, en que se investigan cuestiones comportamentales En cuanto al uso de los recursos, productos, servicios y sistemas de información.

PALABRAS CLAVE: Ciencia de la Información. Estudio de uso. Estudio de usuarios. Comportamiento informativo.

DOI 10.20396/rdbci.v16i2.8649807

1 INTRODUCTION

The Information Science has become a field of knowledge of great contribution to the development of contemporary society, especially for proposing methods, theories and techniques directed to the management of information and knowledge, considered, at present, the basis for the social and economic development.

The variety of studies offered by this science has provided its recognition and appreciation, above all for enabling strategies to solve the informational problem, especially regarding the treatment, management and use of information in the most different social segments.

This fact demonstrates the inherent potential of Information Science that, even though it is considered as a relatively young science, its interdisciplinary, technological and human-social aspect has seen a promising future regarding the contributions of this area to science and society.

In the course of approximately four decades of existence, Information Science has expanded its scope of action, developing research on a wide range of subjects and enriching its theoretical and methodological basis, thus breaking traditional boundaries and paradigms, considered, at present, as incapable to meet the specific needs and constant instability and competitiveness of an increasingly globalized market.

Empirical social demands on Information Science make this field of knowledge a social science, as Shera (1971), Saracevic (1996, 1999), Capurro (2000), Le Coadic (2004a), and others. At first, this science has been devoted largely to studies on technologies and the ability to store / disseminate registered knowledge. However, the various manifestations of information in society have made possible new possibilities for Information Science, as reported by Saracevic (1999), Buckland (1991), among others.

In addition to presenting itself as a science focused on the management of registered information, with a greater concern with graphic registers of knowledge and communication processes (LE COADIC, 2004a), there is no denying that in recent years this science has acquired a characteristic eminently human, mainly because it addresses issues related to the retrieval of information, therefore, it is necessary, primarily, to identify the informational needs of users, as well as to understand human behavior in the face of the use of information systems, especially computerized ones.

Thus, due to the multiple needs and social requirements, the studies contemplated by Information Science manifest themselves on various research strands, both under an epistemological and pragmatic bias. The training and improvement schools, mainly in Brazil, have expanded their lines of research, which has triggered the formation of different subfields

DOI 10.20396/rdbci.v16i2.8649807

contemplated by this science.

Therefore, it is common to find both broad and specific studies, ranging from technical questions to humanistic ones. These diverse issues investigated include problems related to the organization and management of knowledge, the elaboration, application and use of technologies, techniques and methodologies for the treatment of registered information, among other lines of research, as well as a human factor approach. in view of studies on information use, informational behavior, cultural issues, historical and social memory, among other aspects analyzed by researchers.

In general terms, the technical-social dimension is welcomed as evidencing the broad scope of Information Science, as reflected in the study by Radamés Linares (2005). This science is consolidated from the conjunction of different branches of research, characterized as a field of professional practice and scientific research, but, specifically, addressing "[...] effective communication of information and information object, particularly knowledge recorded between the social, organizational and **individual need for the use of information** [...]" (SARACEVIC, 2009, p. 1, our translation, emphasis added).

Certainly, the diversity of the studies carried out by this area is justified, first, by its interdisciplinary nature, supported by a multiprofessional framework. However, in the last decades, research interest in the human-social aspect has intensified. Thus, the intellectual structure of Information Science, according to the aforementioned author, has stood out, especially, in the area of information retrieval, as well as in the area of human information behavior and metrics studies.

The literature is comprehensive in the development of studies on use and information users. It is a trend that encompasses several areas of knowledge, in which the user has become the main paradigm these days. The concern with the user has been noticed since the last decades of the twentieth century, especially with the development of automated information retrieval systems, in which these systems have been developed based on the user's behavior, in order to adapt to the needs specific to these individuals, in the face of the information retrieval and retrieval process, as reported in Lancaster studies (2004).

In this context, although the Information Science has been consolidating in the current society, as well as the human-social aspect of this science has been released through the use studies and users of information, therefore, lines of research directed to behavior information, which is configured as a subfield of Information Science - as described by Rolim and Cendón (2013) - many questions still need better clarification, as well as epistemological aspects such as concepts, characteristics and historicity, as well as questions related to user behavior when searching for information.

Regarding the informational behavior, Rolim and Cendón (2013) demonstrated the

DOI 10.20396/rdbci.v16i2.8649807

growth of this research topic, in the last years, however, evidenced lack of theoretical bases of these studies, being necessary to deepen these bases, since they serve as point guidance for data collection and analysis in user studies.

Thus, this article constitutes a preliminary research[1], whose objective is to discuss some epistemological aspects of Information Science in the light of the specialized literature, as well as the studies of the informational behavior, having as theoretical basis the reflections presented by Borko, Le Coadic and Saracevic. Therefore, the following objectives of a specific nature were outlined: to present concepts and characteristics inherent in the field of Information Science; contextualize the genesis and development of Information Science; to discuss the human and social aspects of this science; and demonstrate how the issue of informational behavior in the field of Information Science has been addressed.

As a methodology, considering the research approach, we used the deductive method, created by René Descartes, in the seventeenth century. By means of the deductive method, it is possible to arrive at results and conclusions by reason. It starts from general theories and laws to arrive at the determination or inference of phenomena. It initiates the investigation by means of a general analysis, specifying the subjects, in order to delimit the object of investigation. Thus, within the scope of this article, the reflection on epistemological issues of Information Science begins, such as concepts, characteristics and historicity, delimiting the subject on information use and behavior.

As regards the technical procedures used, the classification proposed by Vergara (2007) was considered, that is, the procedures are classified as to the means and the ends. Thus, as regards the ends, the research is characterized as descriptive, since aspects related to a field of knowledge, the Science of Information, are discussed. As for the means, the research is bibliographical, since it is used to studies developed by established authors in the area, having as reference the reflections of Borko, Le Coadic and Saracevic.

It is important to mention that some arguments presented were also taken from other authors' works, in order to enrich the discussions. However, the research base is in these three classics because: Borko was the one who presented the first scientific concept for Information Science in the 1960s, being used for analysis the article published in 1968, as this was one of the pioneering publications of the area of Information Science, as well as one of the most cited over the years; in Le Coadic, the book of 2004 was used for this work to discuss the human and social factor of Information Science and the possible relations of this field of knowledge with infocommunicative practices, and an article, also published in 2004, whose thematic approach addressed the paradigms in the scope of the use of the information

[1] The present study had its genesis from the reflections proposed in the discipline "Advanced Studies in Information", of the Postgraduate Program in Management and Organization of Knowledge (ECI / UFMG), whose preliminary proposal presented here represents the basis of promotion for the elaboration of a more in-depth research (dissertation), about the use of the information and the behavior of the user face the management of a newspaper portal.

DOI 10.20396/rdbci.v16i2.8649807

systems; and, in turn, Saracevic, because he has been one of the most cited authors in Brazil, emphasizing a human-technical approach on Information Science, having as publications most cited worldwide the articles published in 1996, 1999 and 2009.

As for the biographical data of these theorists, it is emphasized that Borko was born in New York City (USA) and studied Psychology at the University of California in Los Angeles in the year 1948, expanding his studies in Psychology by means of the Master and Doctorate. In addition to acting in the field of research and teaching, this researcher was president of the American Society of Information Science in 1966 and was a member of several national and international organizations.

Le Coadic completed his secondary studies at the Jules Simon Vannes High School. Graduated in 1964 in Engineering dedicating himself to the studies of the Masters in this same area. Through a visit to Canada, he was interested in the branch of Information Science. Back in France, he took his doctorate in "Structure and dynamics of scientific information systems", managing thereafter research programs in Information Science, and joining the teaching career at the Conservatoire National des Arts et Métiers (CNAM) in Paris.

Finally, Saraceviv was born in Zagreb, a city of the former Yugoslavia (now the capital of Croatia) in 1957, graduating in Electrical Engineering at the University of Zagreb. She completed her Master's degree in Library Science at Case Western Reserve University and in 1969 she was a PhD at the same institution, discussing topics related to Documentation in her thesis. Her professional career is directed to teaching, but also participates in the management of several scientific associations and in the edition of renowned journals of the area.

2 INFORMATION SCIENCE: CONCEPTS, CHARACTERISTICS AND HISTORICITY

A basic and preliminary definition for Information Science is anchored in the delimitation of the object studied by it, information, and this object can be manifested and studied in different contexts and under different conceptions and approaches. This mutant characteristic attributed to the information reflects the problems and difficulties in delimiting the scope of this area of knowledge, besides problematizing the formulation of the empirical and epistemological bases for this field of knowledge (SILVA; RIBEIRO, 2008).

This scope, diversity and ambiguity from the term information impacted on scientific studies in the area of information is corroborated by González de Gómes (2003, 32), for whom, Information Science can be defined as a comprehensive field of knowledge, in that research is conducted on various social elements, contemplating phenomena, processes, flows, "[...] constructions, systems, networks and information artifacts, as long as information is defined by information actions, which refer to the actors that act on them, the contexts and situations in which they occur and the information systems in which they occur ".

DOI 10.20396/rdbci.v16i2.8649807

Considering a scientific analysis of the term information, it is understood that, in order to be an object of study of a field of knowledge, it is necessary that the information be delineated, given the variety of conceptions and approaches that can be to manifest Depending on the context, information can be seen as: 1 - thing, materialized in a technological resource; 2 - process, based on communicative transfer actions; and, 3 - knowledge, consolidating added value to the skills and knowledge of an individual (BUCKLAND, 1991).

The different approaches prescribed by Buckland (1991) lead to the understanding that Information Science is characterized as an area of knowledge, whose object of investigation contemplates information in its materialized aspect, that is, the methods and techniques for treatment and management are applied only to information when registered on a medium.

Similar to Buckland (1991), Bates (2006) also defends this perception, stating in his studies that information, in a preliminary analysis, is related to three aspects, namely: it concerns something organized, refers to quality, acts and trends and evidence patterns of behavior. In these three aspects, information is diluted in a vast universe, energizing the natural elements as matter and energy. In this branch, information assumes, according to this author, various forms - what makes it capable of being managed, hence of being configured as an object of Information Science - as: systematized, organized, represented, treated, recorded, for purporses of recovery, and these manifestations are occasioned by the work of institutions focused on the organization of information, as in work practices carried out in libraries, for example.

The complexities involved in the term information enable diverse theoretical and methodological conceptions attributed to the field destined to the Information Science. Thus, it is important to investigate some aspects related to the epistemology of this area, such as concepts, characteristics and historical path. Chart 1 illustrates some of the themes addressed by the theoretical references analyzed in this article.

Chart 1 - Thematic issues analyzed regarding the epistemological aspect of Information Science: concepts, characteristics and historicity

THEORETIC REFERENCES	MAIN CONTEMPLATED THEMES
Borko (1968)	1 - Pure and applied discipline that studies information, its behavior, processing, flow and use; 2 - Interdisciplinary trend; 3 - Return to the accumulation and transmission of knowledge; 4 - Concerned with the origin, collection, organization, storage, retrieval, interpretation, transmission, transformation and use of information.

DOI 10.20396/rdbci.v16i2.8649807

Le Coadic (2004a, 2004b)	1 - Focus on information studies; 2 - It is a consequence of the Information Society, Information Explosion and Information Industry; 3 - Study infocommunicational phenomena; 4 - Its origin was influenced by World War II; 5 - Study information retrieval systems; 6 - It is based on technological development and information services and products.
Saracevic (1996, 1999, 2009)	1 - Focus on information studies; 2 - It is based on interdisciplinarity, technological imperative, social and human dimension; 3 - It originates with the Second World War and advance of the documentation; 4 - Concerns the retrieval of information; 5 - Extends the services and products provided by the information units; 6 - Investigate the relations between information and knowledge; 7 - Return to quantitative information studies (metrics).

Source: the author (2016)

Based on the authors described in Chart 1, considering the epistemic aspects of Information Science, especially with regard to definitions, characteristics and historical path, it is perceived that the most appropriate definition for Information Science is that which considers this field of knowledge as the set of methods and techniques used in favor of the systematization of registered information, that is, documentary information. Thus, this science has both aspects, pure and applied science, having as one of its basic and primordial objectives, to investigate

> [...]the body of knowledge related to the origin, collection, organization, storage, retrieval, interpretation, transmission, transformation, and use of information. This includes research on the representation of information in both the natural and artificial systems, the use of codes for efficient message transmission, as well as the study of processing and techniques applied to computers and their programming systems [...] (BORKO, 1968, p. 1-2, our translation).

DOI 10.20396/rdbci.v16i2.8649807

Although this definition is perhaps the most complete, it does not mean that this science is limited only to the registers of knowledge. On the contrary, over the years, the studies are directed to more complex aspects, due to making the recovery systems more sophisticated, focusing on the satisfaction of the information users, so that an optimization process is consolidated regarding the use of information. Based on this vision, characteristics about human behavior regarding the search and retrieval of information are consolidated, as well as the way in which this information will become knowledge, as well as studies that deal with the improvement of systems recovery activities, which is achieved through the development of information and communication technologies (SARACEVIC, 1999).

This broad intervention of Information Science, which can not be limited to documentary information, was introduced from the initial concepts and characteristics, being described by Borko (1968, p.1), as a complex discipline that contemplates all phases of the informational cycle, from the moment of production, processing and use, as well as all the phenomena, processes and elements that permeate this context. Thus, Information Science "[...] investigates informational properties and behavior, the forces that govern information flows, and the meanings of information processing [...]".

Over time, with the increasing competitiveness and globalization of the market, the value attributed to information is intensified, with a view to transforming it into knowledge, aggregating value to society as a whole, thereby awakening studies towards to ensure the storage, retrieval and use of information. Thus, there is a need for information management, as well as the need for management of information resources, which has aroused research interests within organizations, conditioning new paradigms for the area (VAKKARI, 1994).

Thus, Information Science has been directed towards scientificity, guaranteeing the management of information and knowledge, in all market segments of society, as well as in various institutions and organizations. In order to do so, it has been based on different paradigms, whose objective is to make the use of information possible by humans. Information and communication technologies, as well as the information user, represent dominant paradigms in the area (LE COADIC, 2004b).

In the view of Le Coadic (2004b), Information Science uses digital technologies to facilitate the development of the information industry in society, and new information services expand as collaboration networks are used by researchers, companies and by society in general.

It is observed, since its birth, in the last decades of the twentieth century, that Information Science has evolved from a technique-centered practice to an intervention directed at human behavior. Thus, this science has been transferred from the practice of document organization - a characteristic that comes from the documentary sciences, especially Librarianship - to a rigorous social science, considering the emerging social

DOI 10.20396/rdbci.v16i2.8649807

demands and the new social challenges, as well as the great advances of the information Technology. In addition, the scientific studies carried out at the outset by researchers from outside the area and the profession, such as Psychology, Sociology, Economics, Informatics and Telecommunications, contributed a great deal to the scientific development of this area of knowledge (LE COADIC, 2004a).

Historically, information science has its genesis coupled with problems of information retrieval, problems faced by American researchers, who, given the volume of scientific knowledge published, have developed mechanisms and strategies to ensure the organization of publications, as well as the recovery of these information items, when incorporated into automated systems and databases (SARACEVIC, 1999; LE COADIC, 2004a).

Therefore, the problems caused by the information explosion, which began with the creation of the press in the 15th century, triggered new forms of information recording, expanding documentary support, as well as the need to establish a scientific discipline to guarantee the preservation of knowledge generated in society, knowledge intensified from scientific development and digital technologies (LE COADIC, 2004a).

In this regard, it is noted that the evolution of Information Science is based on three major events: information explosion, documentation development and advances in information retrieval practices. These historical facts, intensified during the eighteenth and nineteenth centuries, along with the economic, social and political instabilities promoted by the impacts of the Second World War, were responsible for the emergence of a discipline that favored the construction of knowledge through the strategic use of information (SIQUEIRA, 2010).

According to Saracevic (1996), the course Information Retrieval represented a milestone, a historical advance in Information Science, mainly due to the accumulation of information that emerged in the post-World War II period. However, some problems have been consolidated, such as: a) how to describe the information intellectually?, b) how to specify the search intellectually?, and, finally, c) what systems, techniques or machines should be employed?

Thus, with the technological evolution of information processing and retrieval systems, "information storage and retrieval activities [...] were stimulated". Therefore, "[...] with the use of the computer, Information Science started to face new challenges ..." (OLIVEIRA, 2005, p.15).

Information retrieval systems become more efficient, it is possible to establish information search strategies, but it is also easy to manage them based on users' needs and expectations, which has fostered interactions between information scientists and computing engineers. Thus, the sophistication of these systems establishes "[...] a greater number of

DOI 10.20396/rdbci.v16i2.8649807

access points, being able to search for keywords, which appear at any point in the registry, including the abstract and the full text when these are available [...]" (CENDÓN, 2005, p.62).

The studies of the systems of information retrieval evolve in the sense of amplifying the purely technical concern, being developed efforts to enable the human being to use these systems, being able to be adapted to the human factor. In this regard, for the management of computerized systems, it is necessary, in addition to technical knowledge, the acquisition of knowledge from other sciences, such as knowledge of cognitive, communicative and social sciences (OLIVEIRA, 2005).

In the last decades, it is increasingly common to perceive the complexity of the problems that permeate the information practices, which has allowed the development of specific techniques and methods, which has conditioned to the Information Science, its interdisciplinary characteristic. Thus, this science seeks to dialogue with various fields of knowledge, such as Information Technology, Psychology, Sociology, History, among other scientific areas, to join efforts to solve complex problems that can not be solved by only one area of knowledge (Silva and Ribeiro, 2008).

In fact, throughout the development of Information Science, it is possible to describe three important aspects inherent to this area, namely: the interdisciplinary nature of this scientific field, the technological imperative that permeates this science and its social and human dimension (SARACEVIC, 1996). According to this author, these three characteristics or reasons constitute the model for understanding the past, present and future of Information Science and the problems and issues that science faces. Based on the evolution of this area in the field of Applied Social Sciences and its interaction with other fields, it is possible to envisage a promising future for Information Science in the coming decades, mainly because it is based on mixed approaches, contemplating technical and humanistic aspects.

3 INFORMATION SCIENCE IN THE LIGHT OF HUMAN AND SOCIAL ASPECTS

Although information science has been based on three pillars of a technical nature, namely the informational explosion, the technological imperative and interdisciplinarity, in the course of its evolutionary process, it does not mean that it does not continue to conquer, an aspect increasingly more human, focused on the resolutions of social problems, therefore, also concerned with issues inherent to culture, social historical memory, human rights and guarantees etc. (SARACEVIC, 1996, 2009).

In Saracevic's publications (1996, 2009) there is a discussion that tends to bring this science closer to the technological apparatus, especially in what concerns the development of the internet, information retrieval systems and the formation of collaboration networks. Le Coadic (2004a), in much of his discussions, also presents the technological aspect as a trend linked to Information Science, just as in Borko (1968) we also notice the interference of

DOI 10.20396/rdbci.v16i2.8649807

technologies in the formation and development of information studies.

However, even though technology is one of the main characteristics of this area of knowledge, it must be considered that these technologies are constructed, tested and used, only by humans; therefore, studies must be developed in the face of the use of these resources, considering their applicability to society and to the benefit of the human being as an element that lives in society and uses these resourcees to improve their forms of sociability (SARACEVIC, 2009; LE COADIC, 2004a).

In sum, information studies should consider the human-social aspect, that is, the science in charge of information management, in general, "[...] had and has an important role to play because of its strong social and human dimension which goes beyond technology [...]" (SARACEVIC, 1996, p.42).

In this same line of thought, it is possible to

> Information Science, concerned with clarifying a concrete social problem, that of information, and **aimed at the social being** that seeks information, is located in the field of social sciences (sciences, and of man and of society), which are the main means of access to an understanding of the social and the cultural (LE COADIC, 2004a, p. 19, our highlight).

The cited author reports that, in the information society, the traditional paradigms that for centuries have sustained the social dynamics are redefined. Therefore, the information market - strengthened every day with the use of digital technologies, which break the boundaries of time and space - continues to exist, but offering information products and services adequate to the novelties and potentialities of these resources.

Consequently, all elements of society, especially those units that provide services and offer information products, such as research institutions and information units, must follow this evolution, adapting to the needs demanded by the consumer market. Hence the importance of the human being in this context, a fact that has considered the user one of the main paradigms of Information Science, as described by Le Coadic (2004a).

In this approach, it is evident that

> [...]with the advent of electronic technologies (analog or digital) and photonic information (microcomputers, interactive kiosks, laser disks, optical fibers, multimedia devices, videodiscs, library management, etc.), libraries, documentation centers, museums and cultural institutions in general **can no longer be just deposits of books, documents, objects and artifacts** (LE COADIC, 2004a, p. 17-18, our highlight).

In fact, information science is now supported by several paradigms. According to Le Coadic (2004), this area of knowledge is based on different paradigms that need to be in line with the needs of the user, considered as the key element for the continuous improvement of

DOI 10.20396/rdbci.v16i2.8649807

information products and services. The mentioned author identifies four different paradigms, which are: paradigm of the collective work, of the flow, of the use directed to the user and the electron.

These paradigms condition the Science of Information an approximation with the phenomena of generation, storage, transfer and use of information and knowledge. Therefore, the various activities carried out in this context characterize these phenomena as infocommunicational in nature (LE COADIC, 2004a).

In reflecting on the communicational aspect of the information, the author considers the communicative process as the object of study of this science, being the analyzed information as a resource that, when transmitting messages, makes possible the understanding of something, a receiver, by means of a communication channel.

Therefore, the information analyzed at the core of the communication also considers users as centers of attention, since the communicative process only materializes when it produces the message processing by the receiver. Users are considered in the process of transmission of messages (communication), the communication channel, formed from a technological artifact and the information itself, contained in the contents of the messages (LE COADIC, 2004a).

Therefore, the lack of connection between what one wishes to communicate, the communicative channel and the agents involved represents an obstacle to the generation of knowledge, which requires the establishment of mechanisms capable of ensuring the true meaning contained in the messages, as well as the intentions of the emitter, as the receiver's understanding, thus guaranteeing the legitimacy of communication (FOX, 1983).

For Saracevic (2009), information as a product of human activities, conditions to this resource a collective construction, thus fostered by social practices, hence the importance of creating techniques and methods to promote the management of this product, in view of allowing its preservation for memory purposes, as well as to enable the production of knowledge, contributing to the improvement of social practices and of the human being himself.

3.1 Information Behavior: A Sub-Field of Information Science on the Rise

Based on the need to improve computerized information retrieval systems, as well as on the continuous improvement of products and services offered in information management institutions, the information user gained greater recognition, being considered as the main element to be analyzed in the process of evaluation, management and configuration of information products and services (LANCASTER, 2004).

DOI 10.20396/rdbci.v16i2.8649807

In the field of Information Science, the value attributed to the user constituted the institutionalization of a new paradigm, which, combined with the technological paradigm, provided the birth of new methods, techniques and management of information resources, as pointed out in the studies of Vakkari (1994).

Thus, considering the issues related to the human-social aspect, therefore, behavior studies, at the core of Information Science, and considering as basic theoretical references the works of Borko (1968), Le Coadic (2004a, 2004b) and Saracevic (1996, 1999, 2009), it is possible to delineate some of the main themes contemplated in the studies of these theorists, as shown in Chart 2.

Chart 2 - Themes analyzed regarding the human-social aspect and informational behavior in Information Science

THEORETIC REFERENCES	MAIN THEMES CONTEMPLATED
Borko (1968)	1 - Behavior, use and transmission of information..
Le Coadic (2004a, 2004b)	1 - Study of use and users; 2 - Relationship between use and need; 3 - Studies oriented to systems and users; 4 - Users and information in the communicative process.
Saracevic (1996, 1999, 2009)	1 - Social science; 2 - Information behavior; 3 - Study of the use and of users; 4 - Users' needs; 5 - Man-computer interaction; 6 - Human communication.

Source: the author (2016)

Based on the themes mentioned in said works, it can be seen that the research carried out by Information Science throughout its historicity has been developing a field of interdisciplinary studies, whose research object is directed to the users, their needs and their behaviors. Thus, research in Information Science in the last decades of the twentieth century has aroused a greater interest in complex and broad questions on the

> [...]nature of information, the structure of knowledge and its records (including bibliometrics), **usage and users**, leading to studies of **human behavior** towards information; the human-computer interaction, with an emphasis on the human side of the equation; relevance, utility, obsolescence and other attributes of the use of information together with measures and methods of evaluation of information

DOI 10.20396/rdbci.v16i2.8649807

> retrieval systems; economy, impact and value of information, among others (SARACEVIC, 1996, p. 45, our highlight).

In this context, studies about the profile of users and their needs, as well as the performance of information systems have grown in recent years, as presented in the systematic literature review presented by Tuomaala, Järvelin and Vakkari (2014).

Such growth can be perceived by virtue of new approaches that are delimited, as well as new research directions that are established within this subfield of Information Science, which is the study of the users and their behavior in the information retrieval and search process. Thus, even if there is interest in this research area, this subfield still lacks the theoretical basis for experimental and empirical studies about user behavior regarding the use of information made available in information systems (ROLIM, CENDÓN, 2013).

For Saracevic (2009), this subfield permeates the context of Information Science, especially with the establishment of the first epistemological approaches of this area. Through a literature review, the author found that between 1972 and 1995, this subfield was covered by disciplines such as User Theory (information needs and users), and from 1996 to 2006 new disciplines start, concerned with user study, (information search/search behavior, user-centered approach to information retrieval, users, and use) and with the relevance judgment of users (situational relevance).

Research published in the late twentieth and early twenty-first century has shown a gradual increase in the study of users. According to Saracevic (2009, page 4, our translation), in the scientific field of Information Science, "three areas of greater and continuous interest are studies of information retrieval, users and usage, and metric studies [...] ".

The complexity involved in this subfield has further awakened the need for interaction with other disciplines, especially the cognitive disciplines, which provide theories about human behavior and human interactions in the face of information transfer, whether in the relationship between humans or in the man-machine relationship (SARACEVIC, 1996, 2009).

However, it should be pointed out that the concern with the use and user of information, and therefore, the research on information behavior, has its genesis in the first publications on Information Science, at which time user and community studies become a concern, also, of Library Science and related areas (SARACEVIC, 1996).

For Borko (1996), the information scientist has a very broad scope of investigation. Among the several lines of research, the great majority is derived from the technical procedures used to enable treatment and retrieval of information, however, with regard to human-social issues, Information Science develops studies directed to information needs and uses, user behavior studies, citation studies, communication patterns, and literary usage studies.

DOI 10.20396/rdbci.v16i2.8649807

The term informational behavior was mentioned by Borko (1968, p. 4, emphasis added), in the 1960s, when he described that Information Science is essentially defined as the science that "investigates the properties and **behavior of information**, the use and transmission of information, and the processing of information for optimal storage and retrieval."

Behavior refers to the positioning of an individual when they search for information in order to fill their anomalous state of knowledge. However, according to Le Coadic (2004a), there is a distinction in terms of use and usability, as well as user and usage studies. For said author:

> [...]Using information is to work with information material to obtain an effect that satisfies a need for information. To use an information product is to use such an object in order to obtain, also, an effect that satisfies a need for information, whether that object subsists (is then referred to as use), modified (use) or disappears (consume) (LE COADIC, 2004a, p. 39).

In fact, the purpose of a product, system or information service should revolve around issues related to the use of information and the effects resulting from such use in activities performed by users. Therefore, the main function of information systems is how information modifies the performance of these activities (LE COADIC, 2004a).

In this context, the work of Le Coadic (2004a), similar to Borko (1968) and Saracevic (1996, 2009), also contemplates the importance of the user and his behavior in the face of the use of systems, services and information products. Thus, the relations between use and necessity "are interdependent, mutually influencing in a complex way that will determine the behavior of the user and their practices" (LE COADIC, 2004a, p. 39).

According to Saracevic (2009) and considering the reflections proposed by Le Coadic (2004a), the studies of user behavior, as well as their needs, should be driven by demand (with a focus on the system) as well as by the user. However, for Le Coadic (2004a), system-oriented studies are not enough, since they do not analyze information needs. Therefore, the author recommends the importance of previously studying the user, because it is through the knowledge of their expectations that their needs will be known, therefore, the systems will be managed according to specific purposes, considering the profile of the user community.

When performing usage studies and users of information, knowledge about user profile and behavior is applied, a fact that represents one of the most important strategies used in data collection for the improvement of computerized search and information retrieval systems. Therefore, the study of user behavior in the search for information is one of the topics of greatest relevance to the area and has been growing gradually over the years, encompassing "... a wide range of processes that people use when involved with information and for states and related cognitive and social effects [...] "(SARACEVIC, 2009, p. 13, our

DOI 10.20396/rdbci.v16i2.8649807

translation)).

The above-mentioned author demonstrates the complexity involved in these studies, which requires the constant improvement of methods and techniques for data collection, as well as the use of several theoretical approaches, as evidenced by Rolim and Cendón (2013).

Considering these complexities and the need to expand the studies in this sub-field of Information Science, according to Saracevic (2009), it is increasingly becoming the collaboration of several areas of knowledge in the resolution of problems related to the use of information and its interference in contemporary social practices.

Thus, cooperation among the different areas of knowledge represents a strategy for solving information problems, thus providing improvements in the intervention of Information Science in society. Therefore, it is evident that, in the social context as a whole, "[...] the professional and scientific activities carried out by Information Science are necessary ..." (SARACEVIC, 1996, p. 60) which gives it a promising future. Accordingly, as Saracevic (1999) puts it, in the service of social causes, this science tends to broaden its research interests, being redefined, restructured and reinvented, fulfilling the needs, desires and expectations of the various information users.

4 FINAL THOUGHTS

The analysis in the bibliographic references contemplated in the methodological path of this article helped us to reinforce the essence of Information Science, its basic principles of sustentation, as well as its development over time, characterizing this field of scientific knowledge directed to the resolution of informational problems , which makes its recognition and applicability possible in today's society.

The epistemological aspects analyzed here define Information Science as a science that studies the information object and the procedures for collecting, storing and using this resource, characterizing itself as an interdisciplinary science, influenced by information and communication technologies, and the origins of this field refer to the reflections of the scientific and technological development of the 20th century.

The results obtained with the analysis in the social and human aspects evidenced that the studies of the needs and the use of the information, with focus on the user, allow the importance of the human being, as main element of the informational process, being that the researches have been improving, in which behavioral questions about the use of resources, products, services and information systems are investigated.

By comparative analysis between the three theoretical references it is possible to

DOI 10.20396/rdbci.v16i2.8649807

observe, in general lines, similarities regarding the concepts, characteristics and history of Information Science, as well as having been noticed that the studies on informational behavior follow the evolutionary trajectory, strengthening through times, to the point of consolidating itself with a broad and deep subfield of this science.

Even though there has been a long period of time between the analyzed authors' publications, from 1968 to 2009, in general, the discussions presented in the analyzed themes remain the same, which shows that these themes are the epistemic base, the essence of Information Science, being that this science has, for a long time, been faithful in studying these themes, consolidating its field of knowledge and legitimizing its research practices in specific themes linked to the informational scope.

In fact, the issue of informational behavior in the field of Information Science focuses on the user, however, it shares technical aspects as well as humanities in order to be able to improve the quality and excellence of the information supply, a fact that confirms the participation of this science in the development of society, especially when valuing the socio-cultural and humanist dimension as one of its contemporary paradigms.

The limited nature of the methodology established here enables the continuation of the research, and a review of the literature with a more comprehensive sample is recommended, with national and international authors on how the subject informational behavior has been treated in recent years. In addition, it is expected the realization of applied field studies about users' behavior and perception regarding the use of computerized information systems, such as the search for information in the portals of scientific journals.

REFERENCES

BATES, Marcia. Fundamental Forms of Information. **Journal of the Association for Information Science and Technology**, v. 57, n. 8, p. 1033–1045, 2006.

BORKO, Harold. Information Science: what is it? **American Documentation**, v. 19, n. 1, p. 3- 5, jan. 1968.

BUCKLAND, Michael. Information as thing. **Journal of American Society for Information Science**. n. 42, v.5, p. 351-360, 1991.

CAPURRO, Rafael. Hermeneutic sand the phenomenon of information. **Research in Philosophyand Technology**, v. 19, p. 79-85, 2000.

CENDÓN, Beatriz Valadares. Sistemas e redes de informação. In: OLIVEIRA, Marlene de (Coord.). **Ciência da informação e biblioteconomia**: novos conteúdos e espaços de atuação. Belo Horizonte: UFMG, 2005. p. 45-75.

DOI 10.20396/rdbci.v16i2.8649807

FOX, Chris. Information and Misinformation: An Investigation of the Notions of Information, Misinformation, Informing, and Misinforming. In: _____. **Information and propositions**. Westport: Greenwood, 1983. p. 74-108.

GONZÁLEZ DE GÓMEZ, Maria Nélida. Escopo e abrangência da Ciência da informação e a pós-graduação na área: anotações para uma reflexão. **Transinformação**, Campinas, v.15, n.1, p. 31-43, jan./abr. 2003. Disponível em: <http://basessibi.c3sl.ufpr.br/brapci/v/a/173>. Acesso em: 25 nov. 2016.

LANCASTER, Frederick Wilfrid. **Indexação e resumos**: teoria e prática. 2. ed. Brasília: Briquet de Lemos, 2004.

LE COADIC, Yves François. **A ciência da informação**. 2. ed. Brasília: Briquet de Lemos, 2004a.

LE COADIC, Yves François. Princípios científicos que direcionam a ciência e a tecnologia da informação digital. **Transinformação**, Campinas, v. 16, n. 3, p. 205-213, 2004b. Disponível em: <http://www.scielo.br/pdf/tinf/v16n3/01.pdf>. Acesso em: 25 nov. 2016.

OLIVEIRA, Marlene de. Origens e evolução da Ciência da Informação. In: _____ (Coord.). **Ciência da Informação e Biblioteconomia**: novos conteúdos e espaços de atuação. Belo Horizonte: UFMG, 2005. p. 9-28.

RADAMÉS LINARES, Columbié. **Ciencia de laInformación**: su historia y epistemología. Bogotá, Colombia: Editorial Rojas Eberhard, 2005.

ROLIM, Elizabeth Almeida; CENDÓN, Beatriz Valadares. Modelos teóricos de estudos de usuários na ciência da informação. **DataGramaZero**, v. 14, n. 2, 2013. Disponível em: <http://basessibi.c3sl.ufpr.br/brapci/v/a/11781>. Acesso em: 24 nov. 2016.

SARACEVIC, Tefko. Ciência da informação: origem, evolução e relações. **Perspectiva em Ciência da Informação**, Belo Horizonte, v. 1, n. 1, p. 41-62, jan./jun. 1996. Disponível em: <http://www.brapci.inf.br/index.php/article/download/11621>. Acesso em: 17 mar. 2016.

SARACEVIC, Tefko. Information Science. **Journal of the american society for information science**, v. 50, n. 12, p. :1051-1063, 1999.

SARACEVIC, Tefko. Information Science. In: BATES, Marcia; MAACK, Mary Niles (Ed.). **Encyclopedia of Library and Information Science**. New York: Taylor & Francis, 2009. p. 2570-2586.

SHERA, Jesse. The sociological relation ships of information science. **Journal of the American Society for information science**, v. 22, n. 1, p. 76-80, mar./abr. 1971.

SILVA, Armando Malheiro da; RIBEIRO, Fernanda. **Das ciências documentais à ciência da informação**: ensaio epistemológico para um novo modelo curricular. 2, ed. Porto: Afrontamento, 2008.

DOI 10.20396/rdbci.v16i2.8649807

SIQUEIRA, Jéssica Câmara. Biblioteconomia, documentação e ciência da informação: história, sociedade, tecnologia e pós-modernidade. **Perspectivas em Ciência da Informação**, v. 15, n. 3, p. 52-66, set./dez. 2010. Disponível em: <http://www.scielo.br/pdf/pci/v15n3/04.pdf >. Acesso em: 17 mar. 2016.

TUOMAALA, Otto; JÄRVELIN, Kalervo; VAKKARI, Pertti. Evolution of Library and Information Science, 1965–2005: Content Analysis of Journal Articles. **Journal of the association for information science and technology**, v. 65, n. 7, p. 1446-1462, 2014.

VAKKARI, Pertti. Library and Information Science: Its Contentand Scope. In: GODDEN, Irene (Org.). **Advances in librarianship**. San Diego, 1994.

VERGARA, Sylvia Constant. **Projetos e Relatórios de Pesquisa em Administração**. São Paulo: Atlas, 2007.

DOI 10.20396/rdbci.v16i2.8649807