Universidade Estadual Paulista Júlio de Mesquita Filho (UNESP)

Paula Carina de Araújo

EPISTEMOLOGY OF KNOWLEDGE ORGANIZATION: A METATHEORETICAL STUDY

EPISTEMOLOGIA DA ORGANIZAÇÃO DO CONHECIMENTO: UM ESTUDO METATEÓRICO

Marília, SP
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FULBRIGHT

CAPES

Paula Carina de Araújo

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Marília, SP, 22 de março de 2019.

For Maria Bernadete, Tadeu, Vanessa and, Matheus.

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"Decisions determine destiny".

Thomas S. Monson

ABSTRACT

It is a study about the epistemic stances that influence the knowledge organization domain by analyzing its scientific production. To describe the conception of epistemology in the Knowledge Organization journal through metatheory is the general objective of this research. It establishes other four specific objectives that will support the development of the research to answer the general objective: a) to analyze the scientific literature on epistemology of knowledge organization published in the Knowledge Organization journal; b) to discuss the concept of epistemology in the knowledge organization domain; c) to identify the purposes of epistemology on the knowledge organization domain; d) to present a deeper understanding on the main epistemological influences on the knowledge organization domain. The corpus is composed by 31 scientific papers published in the journal Knowledge Organization. The process of the study is composed by exploratory and descriptive study and, it has three parts: data collection, analysis and, synthesis. The data was collected through the database Web of Science (WoS) where the Knowledge Organization journal is indexed. In the analysis stage, two grounded theory tools were used, coding and memoing. The analysis and synthesis were made based on codes and memos generated in the collection stage. The coding process is formed by open coding, axial coding and selective coding. Three attribute families were identified and analyzed in this research: the concept of epistemology in knowledge organization, the purpose of epistemology of knowledge organization and, epistemic stances influencing the knowledge organization domain. Epistemology assume two different meanings on the knowledge organization domain, the traditional and specific meaning. Most authors states epistemology is the study of knowledge and justified belief, regarded to the narrow meaning. It is identified and described the purposes of epistemology on the knowledge organization domain. Empiricism, rationalism, historicism and pragmatism are described as the mains epistemic stances influencing the domain. However, the pragmatist stance is prominent in the analysis, followed by critical theories and historicism. The conception of epistemology on the knowledge organization domain is the critical study of principles, hypothesis and knowledge production in the domain. Epistemology is concerned with the scientific knowledge produced by the knowledge organization domain, as well as with the application of that knowledge to design the Knowledge Organization Systems (KOS) and to support the knowledge organization process as a whole.

Keywords: Knowledge organization. Epistemology. Epistemic Stance. Metatheory. Grounded Theory.

RESUMO

Estudo sobre as posturas epistêmicas que influenciam o domínio de organização do conhecimento (OC) por meio da análise da sua produção científica. Descrever a concepção da epistemologia no periódico *Knowledge Organization* por meio da metateoria é o objetivo geral proposto desta pesquisa. Estabelece outros cinco objetivos específicos que apoiarão o desenvolvimento da pesquisa para responder ao objetivo geral: a) analisar a produção científica em epistemologia da organização do conhecimento publicado no periódico *Knowledge Organization*; b) discutir o conceito de epistemologia no domínio da organização do conhecimento; c) identificar os propósitos da epistemologia da organização do conhecimento; d) apresentar um entendimento mais profundo das principais influências epistemológicas no domínio da organização do conhecimento. O corpus é formado por 31 artigos científicos publicados no periódico *Knowledge Organization*. A metodologia é baseada em um estudo exploratório e descritivo, formado por três partes: coleta de dados, análise e síntese. Os dados foram coletados por meio da base de dados *Web of Science (WoS)* onde o periódico *Knowledge Organization* é indexado. Na análise, duas ferramentas da teoria fundamentada em dados foram utilizadas, codificação e memorandos. A análise e a síntese foram feitas baseadas nos códigos e memorandos gerados na fase da coleta. O processo de codificação é formado por códigos abertos, códigos axiais e códigos seletivos. Três famílias de atributos foram identificadas e analisadas na pesquisa: o conceito de epistemologia na organização do conhecimento, o propósito da epistemologia da organização do conhecimento e, influência das posições epistêmicas no domínio da organização do conhecimento. Epistemologia assume dois significados diferentes no domínio da organização do conhecimento, o significado restrito e o significado amplo. A maioria dos autores declara que a epistemologia é o estudo do conhecimento e da crença justificada, relacionada ao significado restrito. São identificados e descritos os propósitos da epistemologia da organização do conhecimento no domínio da organização do conhecimento. Empirismo, racionalismo, historicismo e pragmatismo são descritos como as principais posições epistêmicas que influenciam o domínio. Entretanto, a posição pragmática é a mais proeminente na análise, seguida das teorias críticas e do historicismo. A concepção da epistemologia no domínio da organização do conhecimento é o estudo crítico dos princípios, hipóteses e produção do conhecimento no domínio. Epistemologia preocupa-se com a produção do conhecimento científico no domínio, assim como com a aplicação do conhecimento para o delineamento dos sistemas de organização do conhecimento e suporte para os processos de organização do conhecimento como um todo.

Palavras-chave: Organização do conhecimento. Epistemologia. Postura epistêmica. Metateoria. Teoria fundamentada em dados.

RESUMEN

Estudio sobre las posturas epistémicas que influencian el dominio de organización del conocimiento (OC) a través del análisis de su producción científica. Describir la concepción de la epistemología en la revista *Knowledge Organization* a través de la metateoría es el objetivo general propuesto de esta investigación. Establece otros cinco objetivos específicos que apoyaran el desarrollo de la investigación para responder al objetivo general: a) analizar la producción científica en epistemología de la organización del conocimiento publicada en el periódico *Knowledge Organization*; b) discutir el concepto de epistemología en el ámbito de la organización del conocimiento; c) identificar los propósitos de la epistemología de la organización del conocimiento; d) presentar un entendimiento más profundo de las principales influencias epistemológicas en el dominio de la organización del conocimiento. El corpus está formado por 31 artículos científicos publicados en la revista *Knowledge Organization*. La metodología se basa en un estudio exploratorio y descriptivo, que tiene tres partes: recolección de datos, análisis y síntesis. Los datos fueron recolectados a través de la base de datos *Web of Science (WoS)* donde se indiza el periódico *Knowledge Organization*. En el análisis, dos herramientas de la teoría fundamentada en datos fueron utilizadas, codificación y memorandos. El análisis y la síntesis se basó en los códigos y memorandos generados en la fase de recolección. El proceso de codificación está formado por códigos abiertos, códigos axiales y códigos selectivos. Tres familias de atributos fueron identificadas y analizadas en la investigación: el concepto de epistemología en la organización del conocimiento, el propósito de la epistemología de la organización del conocimiento y la influencia de las posiciones epistémicas en el dominio de la organización del conocimiento. La epistemología asume dos significados diferentes en el dominio de la organización del conocimiento, el significado limitado y el significado ancho. La mayoría de los autores declara que la epistemología es el estudio del conocimiento y de la creencia justificada, relacionada con el significado limitado. Se identifican y describen los propósitos de la epistemología de la organización del conocimiento en el dominio de la organización del conocimiento. El empirismo, el racionalismo, el historicismo y el pragmatismo se describen como las principales posiciones epistémicas que influyen en el dominio. Sin embargo, la posición pragmática es la más prominente en el análisis, seguida de las teorías críticas y del historicismo. La concepción de la epistemología en el dominio de la organización del conocimiento es el estudio crítico de los principios, hipótesis y producción del conocimiento en el dominio. La epistemología se preocupa por la producción del conocimiento científico en el dominio, así como con la aplicación del conocimiento para el delineamiento de los sistemas de organización del conocimiento y soporte para los procesos de organización del conocimiento como un todo.

Palabras clave: Organización del conocimiento. Epistemología. Postura epistémica. Metateoría. Teoría fundamentada en datos.

LIST OF ILLUSTRATIONS

SUMMARY

1 INTRODUCTION

Even in ancient time the seek to organize knowledge was present among society. We understand that knowledge organization (KO) is both the activity of ordering and representing information, and the field of study concerned with the nature and quality of KO process and systems (HJØRLAND, 2003, 2008, 2013a; TENNIS, 2008).

KO, for the purpose of this dissertation, is the field of study concerned with the nature and quality of the process of organizing and representing knowledge, since this dissertation is concerned with the epistemology of KO. Epistemological studies are considered one of the eleven approaches proposed by Hjørland (2002b, 2017) in the KO domain, and they are regarded to at least two purposes. First, to recognize how different epistemic stances influence the practice of representing knowledge. Second, to better understand the foundations, theories and methods that influence the research in the domain.

Abrahamsen (2003), for example, investigates genre as a basic criterion in subject indexing of music in libraries and bibliographical databases. He examines the concept of genre in relation to epistemology and to different values and views in both musicology and libraries. One of the aims is to identify how epistemological and paradigmatic assumptions influence the way musical genres are classified.

We can state that Abrahamsen approach on epistemology is regarded to the influence of epistemic stances in KO. This argument is bases on the author's statement which says that: "both the classification of recorded music, and the composition of the collection, express more implicit values that pay debts to different worldviews, ethical principles, paradigms, or epistemological considerations" (ABRAHAMSEN, 2003, p. 148).

In this research, the concept of epistemology is how we know (TENNIS, 2008). Considering the second purpose of epistemology of KO, we understand, as Hjørland (HJØRLAND, 2002b, p. 438), that: "all kinds or research (indeed all kinds of behavior) are governed by different kinds of assumptions, background knowledge, 'theories', etc". In this context, epistemological studies serve to analyze the explicit and implicit assumptions behind research traditions (HJØRLAND, 2002b).

Epistemology legitimate new point of views and theoretical assumptions. Through epistemology the researchers observe the research instruments, the concepts, theories and methods regarded to their investigation. Epistemology stimulate the critical thinking about science principles and statements (BRUYNE; HERMAN; SCHOUTHEETE, 1977).

Tennis (2008, p. 103) considers that the different "interpretations of epistemology, epistemic stances, and their ilk, make the defining and using of epistemology a difficult problem for the KO researcher".

By knowing epistemological theories, we may interpret large patterns of historical influence of different positions that have been learned through the history of science. In KO, we are "more inclined to talk about knowledge (pre)understanding, theories, paradigms, and epistemologies" (HJØRLAND, 2002b, p. 261). And, the individual, most of the time, is partly unconscious or neglected that it may be influenced by different theories, epistemologies, and paradigms (HJØRLAND, 2002a).

Studies that seek to better understand the foundations, theories and methods that influence the research in the KO domain are mostly theoretical studies. Many of them use metatheory, implicitly or explicitly, to gain a better understand of the domain, to have a complete perspective of it and, also to produce new theory (DOUSA, 2010; HJØRLAND, 2002a, 2005, 2014; TENNIS, 2005a, 2008, 2015). We use metatheory as a method in this dissertation.

In this context, we present a central research question for this dissertation: what is the conception of epistemology in the KO domain? This research question leads us to secondary questions that are also answered through this dissertation: what are the concepts and purposes of epistemology in KO? Which epistemologies influence the research in the KO domain?

We believe that epistemic stances influence both issues regarded to knowledge representation (relevance criteria, information needs, classification, indexing, information retrieval, etc.) and, the KO research. Therefore, the general objective of this dissertation is to describe the conception of epistemology on the Knowledge Organization domain through metatheory. And, we have the following specific objectives:

a) to analyze the scientific literature on epistemology of KO published in the journal Knowledge Organization;

b) to discuss the concept of epistemology on the KO domain;

c) To identify the purposes of epistemology on the KO domain; and

d) to present a deeper understanding on the main epistemological influences on the KO domain;

We consider the Knowledge Organization journal a publication that represents the thoughts in the domain, since it is considered the leading scientific journal in the field by the International Society for Knowledge Organization (ISKO) (ISKO, 2019). Because of that, the corpus of this researched is formed by papers published at Knowledge Organization journal, as we explain in chapter 4.

We understand that "genuine theoretical contributions to KO are very rare, but seem mandatory in relation to the challenges with which this field is confronted" (HJØRLAND, 2008, p. 87). Hjørland made this statement while discussing theoretical approaches to KO and, that is a strong argument regarded to the importance of this dissertation in the domain.

Therefore, "researchers find in epistemology not only the foundation to secure the accuracy, exactness and precision of the research procedure, but also a guide to the scientific thought that helps to develop the knowledge on the objects they investigate". We may talk about a general epistemology and an internal epistemology. The first is regarded to the history of all scientific disciplines. On the other hand, internal epistemology is more inclined to the history and practice in the researcher's scientific domain (BRUYNE; HERMAN; SCHOUTHEETE, 1977, p. 43–44, tradução nossa).

Epistemological studies are approached in many of Hjørland's studies. The author claims that research is always based on specific epistemological ideals. He believes epistemology is "the best general background that is possible to teach people within information science. It is the best general preparation we can provide for people in order to study any domain" (2013a, p. 179). And, it "is the interpretation and generalization of scientists' own collective experience" (HJØRLAND, 2002a, p. 263).

The scientific reason to develop the research proposed in this dissertation comes from the second purpose of epistemological studies, to better understand the foundations, theories and methods that influence the research in the domain. We believe that theory and practice are connected, and both influence the construction of knowledge. If we identify and describe the epistemologies that influence the domain, we may also relate and analyze the epistemic stances that influence the development of Knowledge Organization Systems (KOS), as well as their use.

As López-Huertas (2015, p. 578) we agree that "the identification of paradigmatic structures in disciplines might not be an easy task, but disciplines have the advantage of having a well-defined and delimited discourse, have a historical background, a tradition, that helps in keeping the trace and the evolution of their paradigms and theories".

"It is the interactions of the ontological, epistemological, and sociological priorities that define a domain's work as productive activity and thus reveals its critical role both in the evolution of knowledge and in the comprehension of knowledge as a scientific entity" (LÓPEZ-HUERTAS, 2015, p. 578). We do not only care how epistemology influence theoretical work in the KO domain, but also what is its impact in the social world.

We may confirm that by following Tennis' (2008) thought. He explains that "epistemology is an important part of the KO armature because it reflects our assumptions about language, the primary material of Knowledge Organization Systems (KOS)".

Dousa and Ibekwe-Sanjuan's (2014) research also demonstrates that assumption. He analyzed Julius Otto Kaiser's method of Systematic Indexing (SI) and Brian Vickery's method of facet analysis (FA) for document classification. He identifies the epistemological and methodological eclecticism in the construction of KOS based on Hjørland's (2003) typology of epistemological position.

Therefore, we understand "even a casual glance at the literature shows that epistemic, theoretical, and methodological concerns constitute the driving force behind argument and findings in much of the conceptual work of KO" (TENNIS, 2008, p. 102). But, "epistemology has no final answer, there is no consensus about the scientific method" (HJØRLAND, 1998, p. 613).

However, the insight in epistemology can provide you with knowledge about the merits and weaknesses of the different solutions. It is important to say that "progress in the scientific method as well as in classification must be based on the historical evidence gained in epistemology and science studies" (HJØRLAND, 1998, p. 613).

There is also a personal motivation regarded to the development of this research. We have a personal interest in the study of epistemological and methodological issues related to scholarly communication, in this research specially regarded to the KO domain.

The institutional motivation can be also cited since epistemology of KO is one of the axes studied by the research group *Formação e Atuação Profissional em Organização da Informação (FAPOI)* at *Universidade Estadual Paulista Júlio de Mesquita Filho (UNESP)*. I am a member of the research group that is leaded by professor José Augusto Chaves Guimarães who is the advisor of this dissertation.

Thinking that the building blocks of science is the knowledge from those that came before us, we may cite some researches that motivate the interest in the research object that we present in this dissertation: Hjørland (2002a, 2002b, 2005), Tennis (2008, 2015), Bufrem (2009, 2012), Freitas (2012), Guimarães (2014), Arboit (2014).

We agree with the hypothesis that scientific production, whatever its degree of development or it methodological formalization, always imply in ways of consciousness by which the research give meaning to their practice (BUFREM, 2012). That belief brought many thoughts about the practice of research in different domains.

Furthermore, we understand that the observation of the existing connections between a specific domain of knowledge to others, may enhance the possibilities to define the scientific object in study (BUFREM, 2012). Those relations embrace methodological, theoretical and epistemological issues.

Another research that stimulated the curiosity about the object of study in this dissertation was developed by Freitas (2012). She gives evidence of how the organization of scholarly communication, by its methodological options in Information Science (IS), contributes to the identification of its features through domain analysis.

Freitas (2012) reveals that turning back to epistemology is essential to study and to teach science. It is through epistemology that we may understand the patterns of theoretical and practical investigation. Through her research, she also brings to light the fact that some methods applied to the researches reveal authors' epistemic, political and ideological stances.

Guimarães (2014, p. 15, our translation) research on domain analysis as a methodological perspective in KO demonstrates how important the studies on epistemological, theoretical and methodological subjects are to the KO domain. He states that "there is a collective concern about the epistemological foundations, conceptual features, theoretical influences, methodological patterns, finally, its essence as a study area".

Regarding to the process of sociocognitive institutionalization of the KO domain, Arboit's (2014) research represents a substantial influence to this dissertation. She proceeds a diachronic analysis of the language used, expressed and registered by scientific community at conferences of the International Society for Knowledge Organization (ISKO). She understands ISKO as representative of the domain due to the central role it acquires.

Arboit (2014) also explains that the consolidation of KO as a domain is recent. Furthermore, she also realizes that the domain seeks its consistent consolidation by the construction and revision of its theoretical and epistemological foundations. We know that statement is real, if we look at the growing number of researchers seeking to study theoretical, philosophical and methodological questions to promote the collective understanding about the framework of the domain.

Considering the thoughts discussed until now, we present the outline of this dissertation. We reviewed the theoretical literature on epistemology of KO on chapter 2 and 3. Chapter 3 also provides the background to the development of metatheoretical study proposed in this dissertation. The process of study is described in Chapter 4 presenting the tools borrowed from grounded theory and the metatheoretical approach we applied. Chapter 5 and 6 brings the metatheatrical synthesis approaching the conception of epistemology of KO domain. We present the concluding remarks on Chapter 7.

2 EPISTEMOLOGY OF KNOWLEDGE ORGANIZATION

Dahlberg (1993) recognizes that the need to organize knowledge in ancient times was always closely related to librarians and philosophers. Other professionals have been engaging in that activity over the years. The term and field of knowledge organization has its origins in the library field. People like Charles A. Cutter, W. C. Berwick Sayers and Ernest Cushington Richardson established the field "knowledge organization" as an academic field around 1920 (HJØRLAND, 2008, 2016). Hjørland (2008, p. 97, 2016) considers "Bliss' book (1929) "The organization of knowledge and the system of the sciences" represents one of the main intellectual contributions in the field".

"An organization is a structure, or system, of effectually related parts, involving too some effectual relation of the parts to the whole" (BLISS, 1929, p. 75). It is also "the process of organizing such a system of inter related parts" (BLISS, 1929, p. 76).

Bliss (1929, p. xi) says that the organization of knowledge, in the broader sense, comprehends "the mental processes, the development of concepts and the conceptual synthesis of knowledge". It also comprises the "intellectual correlation and systemization of valid knowledge, from the simpler social synthesis of common experience and elementary education to the more complex conceptual systems of science and philosophy".

In treating the organization of documents, Jaenecke (1994, p. 8) states that "its main objective has so far been the ordering and supply of knowledge." He makes this statement while questioning the purposes of KO. The provision of knowledge, pointed out by Jaenecke (1994) relates to information retrieval, once information is organized in order to be found by those who need it.

Sales (2015a, 2015b, 2016) studies the concept of KO in the context of the ISKO. He acknowledges that there are at least two perspectives regarded to the nature of KO: KO as an activity of operational nature and as a field of study that seeks, its theoretical, methodological and practical development.

He also presents a deeper understanding of the concept regarded to IS domain. He approaches three different perspectives of the concept of KO: - First perspective: KO as an independent scientific discipline and a subfield of a Science of Science, the same way it is stated by Dahlberg (1993, 1995, 2006); - Second perspective: KO uses, sometimes, subjects from IS to apply to KO, which is regarded to Hjørland's thoughts;

- Third perspective: KO as a research field that deals with the development of theory, methods and, practices that connects the context of production and use of information. It considers KO as a part of IS (SALES, 2015a, 2015b, 2016).

Confirming the first perspective, Dodebei (2014, p. 4, our translation) cites Dahlberg's statement on her understanding about KO:

> I consider Knowledge Organization as a subdiscipline of Science of Science with application fields not only in the Information Sciences but also for all subject fields (domains) needing Taxonomies (classification systems of objects) and other fields like Statistics, Commodities, Utilities, Weapons, Patents, Museology etc. According to Science Theory, every domain has its own area of objects and of methods and processes, next to other relationships.

Hjørland is a prominent author on epistemological issues on the KO domain. He claims that there is a narrow and a broader meaning to explain KO. The narrow meaning is regarded to the cognitive approach. Activities such as document description, indexing and classification performed in libraries, bibliographical databases, archives and other kinds of "memory institutions" by librarians, archivists, information specialists, subject specialists, as well as by computer algorithms and laymen, are part of the cognitive approach (HJØRLAND, 2008, 2016).

Considering KO as a field of study we can state it "is concerned with the nature and quality of such knowledge organization process (KOP) as well as the knowledge organization systems (KOS) used to organize documents, document representations, works and concepts" (HJØRLAND, 2008, p. 86, 2016).

On the other hand, "the broad sense is thus both about how knowledge is socially organized and how reality is organized". We can say it "is about the social division of mental labor". Some examples are: "the organization of universities and other institutions for research and higher education, the structure of disciplines and professions, the social organization of media, the production and dissemination of 'knowledge' etc." (HJØRLAND, 2008, p. 86–87).

From the distinction between the cognitive organization of knowledge (narrow meaning) and the socio-cognitive organization of knowledge (broader meaning), we agree with Hjørland that "there exists no closed "universe of knowledge" that can be studied by KO in isolation from all the other sciences' study of reality" (2008, p. 87).

We can connect Barite's explanation about the concept of KO to Hjørland's thoughts about the narrow and the broader meaning. Barité explains that KO seeks to

offer a conceptual framework to the different practices and social activities regarded to the knowledge access. KO also "intends to be an instrument for representing, managing and using information, as well as integrating the applications related to the structure, layout, access and dissemination of knowledge in society" (2001, p. 39-40, our translation).

First, he considers the meaning of KO related to the cognitive approach. Then, he also cites the social activities regarded to KO and he states that "KO connects theoretical and methodological contributions from different areas like linguistics, documentation, informatics, philosophy, science history and cognitive sciences" (BARITÉ, 2001, p. 40, our translation).

Bräscher and Café (2008, p. 6, our translation) distinguish information organization from KO and they explain that when they "refer to KO and knowledge representation, they talk about the conceptual world and not to the information registers". They also add that "KO seeks the construction of models of world that are abstraction of the reality". And, "the knowledge representation is part of a domain analysis process and it aims to show a consensual vision about the reality we want to represent".

The terms information organization, organization of information and information architecture were analyzed through a bibliometric study to recognize if they were synonyms for KO (HJØRLAND, 2012, p. 8). Hjørland (2012) concludes that, apparently, they should not be considered synonyms because each term produces a different set of ranked authors, journals and papers. Therefore, they are approached by different discursive communities.

Hjørland (2012, p. 12) states that "knowledge should be the preferred term in LIS—and thus that KO should be preferred among the four terms considered in this article". Furthermore, Hjørland (2012) recognizes that the term information became popular with library science and documentation more because of its appeal than for its scientific merits. There are different opinions when is discussed the criteria of when documents represent knowledge or when documents inform people.

When Hjørland and Albrechtsen (1995) claim that it is necessary to incorporate knowledge on the cultures in which information systems are functioning, they are proposing a socio-cognitive approach to KO. Later, in explaining it, Hjørland (2013a) states that one cannot create an operational, transferable and standardized definition of a domain that ignores the historical, social and political issues defining the field.

Following the socio-cognitive approach (HJØRLAND, 2002b, 2008, 2013a; HJØRLAND; ALBRECHTSEN, 1995), Esteban Navarro and Garcia Marco (1995, p. 149) present a complete definition and, as stated by Guimarães (2008, p. 86), a definition that strengthens the social dimension, materialized and cyclical of knowledge. Esteban Navarro and Garcia Marco (1993, p. 149) claim that KO is a

> [...] discipline devoted to the study and development of fundamentals and techniques of planning, construction, management, use and evaluation of description systems of, cataloging, ordering, classifying, storing, communicating and retrieving of documents created by men to testify, preserve and transmit their knowledge and their actions, from their content, in order to ensure their conversion into information capable of generating new knowledge.

KO deals with knowledge, individuals and the social level. Therefore, we may look back to Hjørland and Albrechtsen (1995) proposal on domain analysis. They claim that the individual in a domain have its own understanding about the world, its own knowledge and cognitive behavior, which influences the development of a domain. Furthermore, domain analysis implies the inexistence of absolute true, there is no universalism or essentialism. Hjørland does not agree with theories and methods based on positivism, rationalism and cognitivism (AMORIM; BRÄSCHER, 2016).

Later, in his studies on the socio-cognitive approach in KO, Hjørland comes up with some arguments on the importance of the study of epistemology in KO. He understands that "epistemological knowledge form an interdisciplinary foundation for general theories about knowledge organization, information retrieval, and other basic issues in IS" (HJØRLAND, 2002a, p. 268).

Therefore, Hjørland explains that the researchers may know the epistemologies, they may interpret the historical influences patterns and recognize the different stances taken through the history of science. Hjørland (2002a, p. 263) defines epistemology as "the interpretation and generalization of collective experiences of the scientists".

Individuals have different opinions and make different decisions based on their beliefs and thoughts. When it comes to be with the representation of knowledge, creation of KOS, etc., it is not different. Each epistemic stance determines which knowledge is created. Because of that, Tennis (2008, p. 103) states that "epistemology is how we know".

He believes that the "literature shows that epistemic, theoretical, and methodological concerns constitute the driving force behind argument and findings in

much of the conceptual work of KO". This way, epistemology is "the claim on what knowledge is valid in research on organizing knowledge, and therefore what constitutes acceptable sources of evidence […] and acceptable end results of knowledge […] (TENNIS, 2008, p. 102–104).

If we look to the etymology of the word epistemology, it means (discourse (logos) about science (episteme)" (JAPIASSU, 1988, p. 24, our translation) and, the "modern epistemological thought was originated in philosophy during the XX century. It was the same period that the industrial society was being consolidated and the science and technique development was a reality" (SANTOS, 1989, p. 17, our translation).

"Epistemology delineates the conditions of scientific knowledge objectivity, the ways of observation and experimentation, equally examines the relations that science establishes between theories and facts" (BRUYNE; HERMAN; SCHOUTHEETE, 1977, p. 41–42 our translation). Following the same thought, Arboit, Bufrem e Freitas state that "epistemology can be considered the main support to any science, since we analyze the foundations, future and relation with theory and practice (2010, p. 19, our translation).

The concept of epistemology is explained in a narrow and a broad meaning as Steup (2018) states in the Stanford Encyclopedia of Philosophy:

> Defined narrowly, epistemology is the study of knowledge and justified belief. As the study of knowledge, epistemology is concerned with the following questions: What are the necessary and sufficient conditions of knowledge? What are its sources? What is its structure, and what are its limits? As the study of justified belief, epistemology aims to answer questions such as: How we are to understand the concept of justification? What makes justified beliefs justified? Is justification internal or external to one's own mind? Understood more broadly, epistemology is about issues having to do with the creation and dissemination of knowledge in particular areas of inquiry.

Following the same though Araújo (2012) acknowledges that there are at least two different approaches regarded to the concept of epistemology. Both come from the Greek word *episteme*, as we discussed in chapter 2. Considering the traditional approach, epistemology is the study of knowledge, genesis, limits, values and, through that vision, it is the same as theory of knowledge or gnoseology. On the other hand, there is the specific approach, which presents epistemology as the critical study of the principles, hypotheses and knowledge production of the various sciences, looking close to scientific knowledge cognitive structure, value and objectives. More than that,

epistemology cares about scientific knowledge features, delimitations, and methodological process in each domain (ARAÚJO, 2012).

James Frederick Ferrier introduced in 1875 the concept of epistemology gathering the narrow and the broad meaning. "Ferrier completely breaks with the common sense school and provides a system of absolute idealism focusing on epistemology and metaphysics" (KEEFE, 2011, p. 7). He believes that before we can ask what exists (ontology) we must first consider what is knowable (epistemology) (KEEFE, 2011).

The concept of social epistemology, first presented by Jesse Shera and Margaret Egan in 1952, follows the tradition presented by James Frederick Ferrier. Social epistemology is "the study of those processes by which society as a whole seeks to achieve a perceptive or understanding relation to the total environment— physical, psychological, and intellectual" (EGAN; SHERA, 1952, p. 132)

Budd (2002, p. 93) states that Shera attempted to articulate a program by which theory is conjoined with action. Furner (2004) acknowledges that Egan and Shera situate social epistemology on the one hand in relation to economics and on the other in relation to sociology, psychology, and traditional epistemology. It is important to state that social epistemology is not our object of study, since we are studying the conception of the traditional epistemology.

Blackburn (1996, p. 123) understands epistemology as the theory of knowledge. He explains that epistemology's central subjects are: the origin of knowledge, the place of experience in generating knowledge, and the place of reason in doing so; the relationship between knowledge and certainty, and between knowledge and the impossibility of error; the possibility of universal skepticism; and the changing forms of knowledge that arise from new conceptualizations of the world. That concept is regarded to epistemology narrowly defined.

Theory of knowledge, gnoseology and epistemology are described as synonyms by Abbagnano (2003). He explains that the term epistemology was introduced by the philosopher James Frederick Ferrier from the Institutes of Metaphysics in 1854. Abbagnano presents the reality of things or, in general, the external world as the problem of the theory of knowledge.

The same way, Ferrater Mora (2001, p. 2016, our translation) considerers epistemology the same concept as gnoseology and theory of knowledge. But he acknowledges that epistemology was introduced to designate the theory of scientific

knowledge, or to elucidate problems regarded to knowledge which the main examples were extracted from the sciences.

On the other hand, Lalande (1993) follows what Steup (2018) describes as the broadly understanding of epistemology and Araújo (2012) calls specific approach. The word epistemology designates the philosophy of science in a precise sense. Epistemology "is essentially the critical study of principles, hypothesis and results of various sciences, and it aims to settle its logical genesis (not psychological), its value and objective importance" (LALANDE, 1993, p. 313–314, our translation).

Japiassú and Souza Filho (1990, p. 84–85, our translation) describe epistemology as the discipline that takes the sciences as object of investigation trying to group: "a) the criticism on scientific knowledge (exam of principles, hypothesis and conclusions from different sciences, seeking to determine its scope and objective value); b) the philosophy of sciences (empiricism, rationalism, etc); c) the history of sciences". Furthermore, epistemology is interested in the increasing of scientific knowledge and it is a discipline whose object is the sciences in the process of becoming, considering its genesis, formation and progressive structuring.

Hessen (2012) also understands epistemology and theory of knowledge as different concepts. He explains where the place of theory of knowledge in the philosophical system is, which is composed by: theory of science, theory of value and theory of world view. Theory of knowledge and logics are part of the theory of science branch, and the former is divided in general theory of knowledge (investigates the relationship between thought and the object in general) and special theory of knowledge (investigate the axioms and fundamental concepts regarded to our thoughts concerning the objects).

Epistemology is considered by Hjørland "the most important field related to information science"; "the best general background it is possible to teach people within information science" (HJØRLAND, 2013a, p. 179), and he also emphasizes that "any theoretical question in information science is in the end based on epistemological assumptions" (HJØRLAND, 2002b, p. 439).

Epistemological and critical studies are one of the eleven approaches to domain analysis, proposed by Hjørland (2002b, 2017). He states that "epistemology is the philosophical study of knowledge and epistemologies are theories or approaches to knowledge" (HJØRLAND, 2002b, p. 439). Furthermore, he considers that "theories of

epistemology are the most fundamental theories of relevance [...]" (HJØRLAND, 2002b, p. 439, 2017).

Hjørland acknowledges that there is a wide range of epistemological theories. And, throughout the years he applies different epistemologies to his studies. He considers four theories as the basic epistemological theories: empiricism, rationalism, historicism, and pragmatism (HJØRLAND, 2013a).

Hjørland uses those epistemological theories to approach the subjects he studies (concepts, relevance, etc.) considering the point of view from those epistemologies. In his opinion, "these positions are generalizations of existing epistemologies, and they represent ideal types which do not exist in pure form. They form the most general level of the description of framework theories [...]" (HJØRLAND, 2002b, p. 440).

Svenonius (2004) looks at the epistemological foundations of KO. She explores how epistemology has contributed to the design of knowledge representation embodied in retrieval language designed for organizing information. By doing so, she considers epistemology the branch of philosophy concerned with how and what we know.

Through language analysis and meaning it is possible to deal with what and how we know during the twentieth century (SVENONIUS, 2004). Svenonius (1992, 2004) discusses operationalism, referential or pictures theory of meaning, instrumental theory of meaning, and systems theory as fundamental epistemologies to KO.

Garcia Marco and Estevan Navarro describes epistemology as the "branch of philosophy devoted to the study of the processes of human knowledge, its logic, origins and basis" (1993, p. 128). Smiraglia (2001), Zins (2004), and Channon (2013) follows the same thought.

They state that epistemology is the study of the characteristics of scientific discourse and the evolution of scientific paradigms. Furthermore, "epistemology is devoted specifically to scientific knowledge", according to them. Regarding to KO, the authors recognize that:

> The study of epistemology is, therefore, essential for the design and implementation of better cognitive strategies for guiding the process of documentary analysis, particularly for indexing and abstracting scientific documents. The ordering and classifying of information contained in documents will be improved, thus allowing their effective retrieval only, if it is possible to discover the conceptual framework (terms, concepts, categories, propositions, hypotheses, theories, patterns, and paradigms) of their authors from the discursive elements of texts (words, sentences and paragraphs) (GARCIA MARCO; ESTEBAN NAVARRO, 1993, p. 129).

Epistemological studies "represent an analysis of the approaches or paradigms in research fields" (HJØRLAND, 2002a, p. 438). Abrahamsen (2003), García Marco and Estebán Navarro (1993) and Smiraglia (2001) also connect epistemology to paradigms. Garcia Marco and Esteban Navarro (1993, p. 128) consider epistemology "[...] the science centered on the study of the characteristics of scientific discourse and on the evolution of scientific paradigms".

Hjørland and Hartel (2003) introduce three kinds of theories and concepts and they address their implication to KO: ontological theories and concepts about the objects of human activity, epistemological theories and concepts about knowledge and the way to obtain knowledge; sociological concepts about the groups of people concerned with the objects.

Hjørland's contribution to epistemology of KO is recognized by many authors (ABRAHAMSEN, 2003; GNOLI, 2008; HANSSON, 2013; KLEINEBERG, 2013; TENNIS, 2008; ZINS, 2004). The main attribute of the concept of epistemology in the paper written by Hjørland and Hartel (2003) is the study of how to obtain knowledge.

They consider that different epistemologies "have different views about the role of, for example, observation, theoretical analysis, language, traditions, sex, and values in the production of knowledge". The main claim in this paper is that the studies of domain in KO should "consider the complex interaction of ontological, epistemological and sociological factors influencing the development of fields of knowledge" (HJØRLAND; HARTEL, 2003, p. 244).

Since we discuss the epistemology in KO in this work it is important to understand the concept of ontology in the KO domain.

Through ontological theories, reality is described or explained, and we can also understand how it is structured. Ontological theories "imply assertions of what constitute the world and its objects" (HJØRLAND; HARTEL, 2003, p. 239). We can

consider that epistemology is how we know the world, i.e., its ontology, what is out there in the world (objects, properties, events, process, etc.).

Smiraglia (2001, p. 198) explores the contrast between ontology and epistemology presented by Poli (1996). He considers that "epistemology ("knowing") represents the subjective side" of reality […] and epistemology also "[…] allows for the perception of the knowledge and its subjective role".

In order to address the importance of epistemology in KO, Smiraglia (2001, p. 199) states that:

> Whereas ontology may be relied upon to frame the organization of knowledge, epistemology provides us with key perceptual information about the objects of knowledge organization. Each perspective can contribute to understanding, collectively a balanced perspective can be achieved. To begin, empiricism can lead us to taxonomies of knowledge entities. Rationalism can demonstrate the cultural role of, and impact on, knowledge entities.

Smiraglia (2001, p. 199) also approaches Hjørland (1998) and Hjørland and Albrechtsen's (1995) arguments that KO "must proceed from more finely developed epistemological positions".

Ten basic questions related to KO to be addressed in the 21st century are presented by Gnoli (2008). One of these basic questions is related to epistemology: "Can the two basic approaches, ontological and epistemological, be reconciled?".

Gnoli (2008) quotes Poli (1996), Hjørland and Hartel (2003) to explain the distinction between ontology and epistemology. By doing so, the author explains that epistemology "is about how humans know the world through their sense organs, and how they process knowledge according to categories both innate and culturally biased".

A preliminary classification of KO research is proposed by Tennis (2008). The author divides KO research among epistemology, theory, and methodology and suggests three spheres of research: design, study, and critique.

As we said before, Tennis (2008, p. 103) states that "epistemology is how we know". He adds that "in KO we make implicit epistemic statements about knowledge of concepts, acts (such as representation), entities, and systems". Tennis also considers that "in doing so we create knowledge, and our epistemic stance dictates what kind of knowledge that is". [...] "There is the added burden of embodying your

epistemic stance in your method and in your writing, which leads to a number of misunderstandings in scholarly communication".

We agree that epistemological thought has changed over time. "In some cases, two or more stances have coexisted, while others have fallen out of favor, in their strictest sense" (TENNIS, 2008, p. 104).

Epistemology is also considered by Tennis (2008, p. 104) as "an important part of the KO armature because it reflects our assumptions about language, the primary material of KO systems". This is also a García Marco and Estebán Navarro's statement:

> "[…] epistemology is also the study of reflections made by philosophers and theorists of science in an abstract and conceptual network, traced between man (subject) and nature (object) in the process of research and knowledge, within the limits and possibilities of understanding reality and its linguistic expression (1993, p. 129).

Epistemology "addresses the concrete question of how we know what to present in classification, indexing, or other KO systems" (TENNIS, 2008, p. 104). By considering this, we observe the author's concern about how different epistemic stances influence the representation of knowledge, which is one of the purposes of epistemological study.

Likewise, Smiraglia (2015a, p. 49) proposes an operationalization of domains for analysis. One of the aspects of a domain that can be extracted by analysis is "an epistemological consensus on methodological approaches". He explains that "most domains that embrace a single theoretical paradigm (or a consistent set of such paradigms) will share methodological approaches rooted in different epistemological points of view".

In another research, Kleineberg (2013) seeks to demonstrate that an implementation of perspectivism and contextualism in any phenomena-based KOS requires a revision of the underlying concept of phenomenon as a relation between the WHAT (ontology), the WHO (epistemology), and the HOW (methodology) of knowledge.

The concept of epistemology is presented as the "who of knowledge" by Kleineberg (2013). He considers epistemology the study of knowledge and how it is acquired and influenced and the epistemological dimension as an integral part of

reality. Furthermore, Kleineberg argues that the epistemic contexts are not limited to theory but also include the method applied to the knowing subjects (2013, p. 354).

Considering that statement, we identify a connection with the thoughts presented by Tennis (TENNIS, 2008, p. 102) that "epistemic, theoretical and methodological concerns constitute the driving force behind argument and findings in much of the conceptual work of knowledge organization".

Another perspective is presented by Hansson (2013). He discusses the relation between epistemology, social organization, and KO. He seeks an understanding of the character of the connection between epistemology and social order in KO systems. Epistemology is defined by Hansson (2013, p. 385) as "a sort of key with which it is possible to unlock the ontological level of reality, whether natural, social, or spiritual". He also considers ontological assumptions related to epistemology, likewise Hjørland and Hartel (2003), Abrahamsen (2003) and Gnoli (2008).

We know that epistemic stances influence the organization of knowledge and, what kind of knowledge is created. "A knowledge organization cannot be epistemological neutral" (MAI, 1999, p. 547). We agree with Mai that people "within the field of knowledge organization and representation must base their practical work and discussion in an epistemological tradition" (1999, p. 547).

Mai's statement that "any theory of knowledge organization must further involve considerations regarding the epistemological basis of the theory and regarding the practical utilization of the theory", reinforces the importance of epistemological studies in KO for a better understanding of the domain (1999, p. 547).

Seeking to develop a deeper understanding about the domain of epistemology of KO, we presented in this chapter the concept of epistemology and KO. This theoretical discussion was the foundation to develop this study. As we apply a metatheoretical study to achieve the objectives indicated in the introduction, we describe metatheory in chapter 3 and we also present some metatheoretical work developed on the KO domain.

3 METATHEORY

Metatheory is a meta-analytic work that has raised from sociology (RITZER, 1991a, p. 237) and it is described as "the set of assumptions presupposed by any more or less formalized body of assertions" (BULLOCK, 1988). Vakkari and Kiokkanem (1997, p. 500) understands that "metatheory should be specified into unite theories by placing them in concrete social settings. One can say that a concept in a metatheory consists of a range of variation of meanings fixed by the definition of the concept". Therefore, metatheorizing supports the analysis and understanding of the conception of a concept in a domain.

Ritzer (2001, p. 15) explains that "metatheorizing, […], is not a process that occurs *before* theory is developed in order to lay down its prerequisites. Rather, metatheorizing is a process that occurs *after* theory has been created and takes that theory itself as the object of study".

The metatheory of a domain may be compared to the analysis of its presuppositions. Following this thought, Vickery points that to achieve success through metatheory, it is important to connect with the presuppositions already existing in the domain, show the weaknesses and propose alternatives (1998, p. 458).

Ritzer (1991b) differentiates among three types of metatheory: metatheorizing in order to better understand a domain (M_u), as a prelude to the production of a new theory (M_p) and to produce a perspective that overarches some part or all the domain (M_o).

Metatheorizing to better understand a domain (M_u) has two dimensions: internal-external and intellectual-social. The dimensions "are continua with no hard and fast lines between the poles of each" (RITZER, 1991b, p. 17). We may explain the two dimensions, following Ritzer's (1991b, p. 17) thought:

Internal: related to things that exist within the domain.

External: refers to phenomena that are found outside of the domain but that have an impact on it.

Intellectual: theories, metatheoretical tools, ideas borrowed from other disciplines, with some relation to the cognitive structure of the domain.

Social: deals with the sociological structure of the domain: schools, the effect of individual background factors, the impact of the larger society.

The combination of the internal-external and intellectual-social dimensions generate a table with four approaches (Figure 1) that express the four types of M_u.

Figure 1 - MAJOR TYPES OF MU (RITZER 1991A)

Intellectual

Cognitive Paradigm	Use of concepts borrowed from:
Schools of Thought	Philosophy
Changes in Paradigms, Schools of Thought	Economics
Metatheoretical Tools	Linguistics
Theories	etc.

Internal ———————————————————— **External**

Communal Paradigms	Impact of Society
Invisible Colleges	Impact of Social
Schools	Institutions
Networks	Historical Roots
Individual Backgrounds	

Social

SOURCE: Ritzer (1991b, p. 18)

The **internal-intellectual** approach deals with school of thoughts, paradigms and theories in a domain and their influence. The **internal-social** approach "focus on relatively small groups of theorists who have direct links to one another". It involves the study of the theorists of the domain to identify communal paradigms, invisible colleges, schools, networks, individual backgrounds, etc (RITZER, 1991b, p. 19–20).

On the other hand, the **external-intellectual** approach is concerned with ideas, tools, concepts and theories from other academic disciplines. And, the **external-social** approach "involves shifting to the more macro level to look at the larger society and the nature of its impact on sociological theorizing" (RITZER, 1991b, p. 21).

Ritzer also presents metatheorizing as a prelude to theory development (M_p). "M_p can lead to creative new ideas" (1991b, p. 37) and, it is "an appropriate and significant source of sociological theory" (1991b, p. 35). He indicates some sociologists that are metatheorists: Weber, Marx, Durkeheim and, Parsons.

We can state that M_p "is ubiquitous in classical and contemporary theory, that it can be the base of creative theorizing, but if it is not done judiciously, metatheorizing can severely hamper creative theorizing" (RITZER, 1991b, p. 49).

Ritzer (1991b, p. 47) focuses on works that are explicitly metatheoretical when he presents M_p. But he recognizes that "in many theoretical writings the metatheoretical work has been only implicit". Ritzer explains that by implicit metatheoretical work he means "that the author has shaped his/her theoretical ideas in an unspoken and unwritten dialogue with the work of other theorists" (1991b, p. 47).

That is one of Ritzer's criticism to metatheorizing. He acknowledges that "these implicit dialogues are far less desirable than explicit engagements with other theories". Specially, because the reader cannot assess the adequacy of the author's interpretation of other theories (1991b, p. 47).

Another criticism is regarded to the gap between theory and empirical research. There is "the need for more cross-fertilization of theory and research". Ritzer argues that theorists must develop their approaches in an intellectual dialogue with other theorists but also with empiricists. He believes that some theorists "while continuing to rely on metatheorizing, should entertain the possibility of doing more theorizing that is tied (preferably explicitly) to research in the social world" (1991b, p. 48).

Ritzer offers some conclusion about how to do metatheory well: - metatheorizing should be explicit rather than implicit; - metatheorizing should be systematic rather than haphazard; - those who do M_p must subordinate their metatheorizing to their ultimate goal of developing and refining sociological theory (RITZER, 1991b).

M_o is the third type of metatheorizing proposed by Ritzer. Considering M_o, "[…] the study of theory is oriented to the goal of producing a perspective – one could say a metatheory – that overarches some part or all of sociological theory" (RITZER, 1991b, p. 51).

Colomy (1991) "situates metatheorizing in a postpositivist approach to social science and suggests that Ritzer's triadic typology of metatheorizing […] should be supplemented with a fourth type, viz., metatheorizing as adjudication (M_a). M_a or metatheorizing to evaluate a theory "refers to metatheorizing oriented towards devising and applying explicit, universalistic criteria to adjudicate the competing claims issued by rival social scientific traditions".

By introducing an additional type of metatheory, metatheorizing as adjudication (M_a), Colomy proposes that metatheorizing can make a vital contribution by

adjudicating the theoretical conflicts between competing approaches" (COLOMY, 1991, p. 270).

Even metatheory is a method borrowed from sociology, it is widely used in KO research. Although, many authors do not specify they are metatheorizing (ARAÚJO; TENNIS; GUIMARÃES, 2017). We will see in the next section some examples of metatheorizing works in KO.

3.1 METATHEORY AND KNOWLEDGE ORGANIZATION

By discussing epistemology, theory and methodology in the field of KO, Tennis (2008) claims that the majority research in KO is done using writing as the technique, which is not well understood in the larger Library and IS community.

Ritzer's (1991a) criticism to metatheorizing is closely related to this claim. He affirms that do M_u conduct abstract research and believe "that others will be able to translate their ideas" (RITZER, 1991a, p. 244). He recognizes that metatheorizing can proceed unconsciously, but the author argues it would be more productive if metatheorizing occurred in a more self-conscious way (RITZER, 1991a, 1991b).

Another criticism was presented by Vickery (1998) in his paper about metatheory and IS. He observes that many metatheorizing works remain at a too general level. Hjørland agrees with this observation and points out that "epistemological and metatheoretical views have seldom been formulated or analyzed. Instead of conscious analysis such views have mostly been unconscious attitudes by information scientists" (HJØRLAND, 1998, p. 620).

Metatheory "presents all the situations or states of affairs that can be expressed within the logical possibilities of the conceptual apparatus of a theory" (VICKERY, 1998, p. 453). We can consider that one of the reasons to apply metatheory to KO domain is, as argued by Hjørland, "to raise its theoretical and philosophical level, the better to understand the limitations and possibilities of different approaches" (1998, p. 620).

If we look at the journal Knowledge Organization, a few authors indicate they are using metatheory in their research. In the 2008 research, Tennis states that his work is "situated in a metatheoretical framework, drawn from sociological thought" (TENNIS, 2008).

Tennis (2015) also takes a metatheoretical approach to analyze classification theory. He considers metatheory is a good tool for his research because the object of study is theory. The author explains how different types of metatheory are applied to his research:

> […] we must understand how theory is produced, metatheory in the first sense; we want to do this to encourage further theory development, metatheory in the third sense; and evaluate — perhaps by putting various conceptions in relation to one another and asking which work and why. This is metatheory in the fourth sense. We will use these together to talk about how classification theory can be subdivided into three kinds: foundational, first-order, and second order (TENNIS, 2015, p. 245).

Clearly, Tennis (2005a, 2008) builds his metatheoretical work on Ritzer's metatheory. In both papers, the four purposes of metatheory are described as proposed by Ritzer (1991a). In the first paper, Tennis (2008) recognizes that his work is an example of M_o that provides an overarching perspective on theoretical work. In addition, he explains that his work can also serve as a preliminary mechanism for evaluation, the type of metatheory presented by Colomy (1991).

Ritzer's metatheory was also used by Tennis (2015) as a method of analysis to understand how classification theory can be subdivided into the three kinds cited above. Therefore, his 2015 paper, is the only to apply the three different types of metatheory: - metatheorizing to better understand theory (M_u); - encourage further theory development (M_p) (RITZER, 1991a) and - evaluate theory (M_a) (COLOMY, 1991).

Dousa (2010) describes Pragmatism as a metatheoretical perspective in KO and reviews its three variants: Charles Sanders Pierce's scientifically oriented pragmaticism, William James's subjectivist practicalism, and John Dewey's socially oriented instrumentalism. He also indicates the connections between them, and KO theories propounded by Henry E. Bliss, Jesse H. Shera, and Birger Hjørland, respectively.

Looking at Dousa's (2010) research, we may consider that he is applying the external/intellectual approach of Ritzer's metatheory, the one that is concerned with ideas, tools, concepts and theories from other academic disciplines, in this case from Philosophy/Pragmatism.

KO for feminist research is the subject of Samuelsson's work (2010). The author analyzes KOS that index and classify feminist dissertations in a Swedish bibliographic context. Discourse theory is used to analyze feminist KO and to discuss how KOS can articulate feminist perspectives. Samuelsson also says that her "theoretical and methodological approach is post-structuralist and discourse oriented" (2010, p. 5). She presents "a social constructionist, anti-essentialist perspective" (2010, p. 5).

The paper highlights that "feminist discourse consisting of feminist theoretical and metatheoretical perspectives are not considered at all in the KOS" (SAMUELSSON, 2010, p. 3). We understand that Samuelsson (2010), also applies the external/intellectual approach of Ritzer's M_u on the empirical investigation of feminist metatheory in dissertations on that subject, since she approaches discourse analysis.

The contributions from domain analysis and metatheory to bibliometric studies were outlined by Castanha and Grácio (2014). Their concern relates to the need for epistemological, sociological and historical analysis of bibliometric data and the use of other qualitative approaches to enable a more consistent analysis of the data obtained through bibliometric.

While it is possible to study networks, and recognize invisible colleges through bibliometric research, this is not what Castanha and Grácio (2014) do. They are concerned with the influence of metatheory on bibliometric studies. The authors do not explicitly say they are using Ritzer's work. However, considering that metatheory is a concept borrowed from sociology, we understand that their study is part of the external/intellectual approach in Ritzer's M_u.

3.2 METATHEORY IN THIS DISSERTATION

Although metatheory is a concept borrowed from Sociology, we will propose to apply M_u and M_o, to epistemology of KO domain in this dissertation. We intend to gain a better understanding of the domain by using M_u, and to produce a perspective that overarches some part or all the domain with M_o. By using Rizer's (1991b) perspective, we believe we will be able to propose a metatheory of epistemology of KO.

One of the reasons for that choice is that "metatheory thus presents all the situations or states of affairs that can be expressed within the logical possibilities of the conceptual apparatus of a theory". In addition, "forming a unit theory from a metatheory means specification of its general concepts to fit into certain concrete settings which

the researcher wished to study" (VAKKARI; KUOKKANEM, 1997, p. 453). We also believe that "besides the mental satisfaction, metatheoretical work allows us to represent, organize and explain the theoretical constitution of the field and, this way, to recreate knowledge" (ARBOIT, 2014, p. 24, our translation).

We describe the process of study on chapter 4. We outline the methodological assumptions and the parts of study we have already developed (exploratory study and data collection) and we indicate how we will seek to do the analysis and synthesis of the data.

4 PROCESS OF STUDY

Researchers must watch over the object of their study in order to recognize, to learn from and to understand it. We believe that to achieve that goal, it is important to describe the research's assumptions, statements and, motivations. In this chapter, we outline all the process of this investigation seeking to answer the objectives presented before.

Considering the purpose of this research, we classify it as descriptive since we will analyze and describe the data seeking to present a metatheory of epistemology of KO. We intend to recognize the conception of epistemology in KO, and to understand the epistemic stances that influence the studies on epistemology of KO on the KO domain.

We developed a metatheoretical investigation based on Ritzer's metatheory. By doing so, we may achieve, through metatheoretical study, a deeper understanding of the domain. We also applied methods from Grounded Theory Methodology (coding and memoing) in the analysis of the corpus. The corpus of this research is composed by papers on epistemology of KO, published in the journal Knowledge Organization.

4.1 METHODOLOGICAL ASSUMPTIONS

By doing research we seek to construct an argument and we attempt to show why a particular statement should be accepted as true. In order to do this, we bring together other statements, or premises and a valid argument is one in which the conclusion follows from de premises. "This does not mean that the conclusion itself must be true, only that it is a reliable or as well established as the premises from which it is derived" (BENTON; CRAIB, 2001, p. 6).

We know that epistemology is important to the construction of knowledge. Epistemic stances influence the organization and representation of knowledge (classification, indexing, etc.) and the creation of knowledge through research. Furthermore, researchers' values, beliefs and epistemic stances dictate the way they create and share knowledge and, that is the ontological commitment of this dissertation.

Hermeneutics is close related to methodology and philosophy of science; it is also an important form of reflection and a result of interpretation. We will study

epistemology of KO from a hermeneutic perspective (ALVESSON; SKÖLDBERG, 2009; TENNIS, 2005a). "Hermeneutics as the methodology of interpretation is concerned with problems that arise when dealing with meaningful human actions and the products of such actions, most importantly texts" (MANTZAVINOS, 2016, p. 1). We will analyze and interpret 31 papers that compose the corpus of this research as it will be described in the next section.

Our ethical commitment in this research is to be faithful to the authors' ideas expressed in the papers that we analyze as part of the corpus of this research. This way, we will be able to construct a valid and trustworthy argument. Once we explain our ontological, ethical commitment and the epistemic stance, we may present in the next section how the research was conducted in this dissertation.

4.2 PARTS OF THE STUDY

A metatheoretical investigation follows three steps to achieve its general objective: collection, analysis, and synthesis (TENNIS, 2005a). In order to develop this research, considering those steps, first we proceed an exploratory study and the data collection is part of it. Then, we borrow from Grounded Theory Methodology the method used for the analysis and synthesis. We describe in this section the exploratory study, the analysis and the synthesis.

4.2.1 Exploratory study and data collection

The exploratory study supports the understanding of the domain. In this section we indicate the corpus of this research, the one that better represents the epistemology of KO domain in this research. First, we collected papers from Web of Science (WoS), Scopus, Library & Information Science Abstracts (LISA) and Library, Information Science & Technology Abstracts (LISTA), resulting in 124 papers.

Second, we excluded the duplications and, analyzed the title, abstract and keywords of total of papers retrieved. Then, we got 68 papers that approached the subject epistemology of KO. After studying more about the methods, we applied on this research (metatheory and grounded theory), we understood that we should reduce the corpus of the research, since the method requires a deep analysis of the papers.

Knowledge Organization journal is recognized as the main publication in the domain since its first edition in 1974, when the title of the journal was International Classification (GUIMARÃES, 2014). The journal became the official publication of ISKO in 1989 as it is described in the chapter and preamble document (ISKO, 1989, p. 1).

ISKO was founded in 1989 by Ingertraud Dahlberg, the first president of the society and, it is the leading international society in this domain. It has a broad and interdisciplinary scope and, its mission is "to advance conceptual work in knowledge organization in all kind of forms, and for all kinds of purposes, such as databases, libraries, dictionaries and the internet" (ISKO, 2019).

Sales and Murguia (2015, p. 399, our translation) acknowledge that ISKO represents "an institution that intend to facilitate the research and the application of knowledge organization seeking the ordering of knowledge". ISKO also expresses a thought that bring to light a new theoretical and professional field.

The description of ISKO's aims and tasks at the ISKO Chapter and Preamble document shows the importance of the society for the domain.

> It is the aim of the Society to promote research, development and application of all methods for the organization of knowledge in general or of particular fields by integrating especially the conceptual approaches of classification research and artificial intelligence. The Society stresses philosophical, psychological and semantic approaches for a conceptual order of objects (ISKO, 1989, p. 1).

Arboit (2014)approaches the foundation, development and importance of ISKO for the KO domain and, she explains that scientific societies play an important role in the development of scientific knowledge communication. Guimarães (2008, p. 88, our translation) states that as ISKO was created, "the knowledge organization area goes beyond a pragmatic necessity of the documental universe. It becomes a field of theoretical reflection and production and it constitutes an international and scientific forum".

The Knowledge Organization Journal was created in 1993 and, it continues the former journal International Classification published since 1974. We may describe its scope as follows:

Knowledge Organization publishes original research articles that: (1) clarify theoretical foundations (general ordering theory, philosophical foundations of knowledge and its artifacts, theoretical bases of classification, data analysis and reduction); (2) describe practical operations associated with indexing and classification, as well as applications of classification systems and thesauri, manual and machine indexing; (3) trace the history of knowledge organization; (4) discuss questions of education and training in classification; and (5) problems of terminology in general and with respect to special fields (ISKO, 2008).

Dahlberg (1995, p. 9–10) describes ISKO as a new society that aims classification as a new and wider concept. In other words, it is a type of knowledge organization that embraces the way knowledge is understood, organized, described and represented and, this way, it is available to everybody. Considering that explanation, we understand the Knowledge Organization journal is representative of the thought of the domain, since it is the official publication of the society.

Therefore, we chose the Knowledge Organization journal as the source for the identification of the corpus of this research. The journal is indexed in the database WoS since 1993 and, WoS was the information source to retrieve the articles. This way, we searched for articles published from 1993 to 2017 using the following string: (epistemolog* OR "theor* of knowledge") AND ("information organization" OR "knowledge organization").

Some authors use "theory of knowledge" and others "epistemology" to refer to the same concept, because of that we included both terms in the search strategy. The same happens to "information organization" and "knowledge organization".

We retrieve 33 articles and 2 of them were excluded from the corpus after an analysis of their title, abstract and keywords. Finally, the corpus is composed by 31 papers published in the journal Knowledge Organization until 2017. The data collection was made in July 13th, 2018. The papers were collected in the reference manager Zotero were they are organized and stored.

4.2.2 Analysis

Grounded theory is a specific methodology developed by Glaser and Strauss (1965, 1967) during a field observational study of hospital staff for the purpose of building theory from data. They state that grounded theory is "the discovery of theory from data systematically obtained from social research" (GLASER; STRAUSS, 1967,

p. 1). The researcher reads the text from the corpus looking for items of interest and then codes them.

Strauss (1987, p. 5) explains that grounded theory does not have any particular commitment to specific kinds of data, lines of research, or theoretical interests. Its methodological thrust to qualitative data is towards the development of theory. Therefore, he considers grounded theory "a style of doing qualitative analysis that includes a number of distinct features, such as theoretical sampling, and certain methodological guidelines, such as the making of constant comparisons and the use of coding paradigm, to ensure conceptual development and density".

Two streams of work and thought contributes to the development of grounded theory: the general thrust of American Pragmatism and Chicago Sociology at the University of Chicago from the 1920s through the mid-1950s. "Both the philosophical and the sociological traditions assumed that change is a constant feature of social life but that its specific directions need to be accounted for; they also placed social interaction and social processes at the center of their attention" (STRAUSS, 1987, p. 5–6).

Bradley (1993, p. 438) investigates the methodological issues and practices in qualitative research. She affirms that "grounded theory, for example, focuses on the development of abstractions from empirical observation and has systematic procedures for collecting data from multiple situations in order to establish boundaries of the theory".

Regarded to the development of our research, we borrowed from grounded theory those systematic procedures in order to identify, analyze and describe the conception of epistemology in KO. Two of those procedures are coding and memoing, their use in this dissertation proposal will be described in the following sections.

4.2.2.1 Coding

The coding process is complex and, in general, coding means "taking raw data and raising it to a conceptual level" (STRAUSS; CORBIN, 1990, p. 66). The investigator reads the text at many levels and, he creates codes that represent the interpretation of the text.

"Coding gets the analyst off the empirical level by fracturing the data, then conceptually grouping it into codes that then become the theory which explains what

is happening in the data" (GLASER, 1978, p. 55). "[…] coding leads to the development of theories through an abstraction process. The concepts or codes connect to the empirical material and, in the beginning of the process, they are close related and similar to the text. But, later, they get an even more abstract characteristic" (FLICK, 2004, p. 189, our translation).

Coding is a process of making interpretations and it involves interacting with data (analysis) using different techniques. By doing that, the investigator is "deriving concepts to stand for those data, then developing those concepts in terms of their properties and dimensions" (STRAUSS; CORBIN, 1990, p. 66).

"Interpretation is the core of qualitative research" (FLICK, 2004, p. 188, our translation). Bradley (1993, p. 433–434) describes the researcher as the interpreter, and she states that "the concepts of 'preunderstanding' and 'understanding', taken from hermeneutics, can help conceptualize the researcher's interpretive activity".

"*Preunderstanding* is the fusion of knowledge, training, experience, interpretation, and ways of thinking and articulating that individuals bring to any situation". On the other hand, "*Understanding* is the knowledge and insight that the researcher develops during the research process. […] In other words, all understanding develops from preunderstanding" (BRADLEY, 1993, p. 434).

The interpretation of data may pursue two different strategies. One strategy aims the revelation, exposition or contextualization of parts of the text. That is a strict sequential analysis, seeking to rebuild the structure of the text and the case. The other strategy is codification. It uses paraphrase, abstract or categorization to summarize the text and then develop the theory (FLICK, 2004, p. 188, our translation).

Considering that coding is one of the systematic procedures in grounded theory, in this research we follow the three rounds of coding (horizontal axis) proposed by Strauss (1987): open coding, axial coding and, selective coding. In order to make better interpretation, we read the texts at different coding levels as Tennis (2005a) did in his dissertation. He considered the physical, verbal and abstract level. This way, based on Tennis' model (2005a, p. 47), we propose the coding process for this dissertation in Figure 2:

Figure 2 - ROUNDS AND LEVELS OF CODING

ROUNDS OF CODING

Open coding	→	Axial coding	→	Selective coding

CODING LEVELS

Physical Level	Physical Level	Physical Level
↓	↓	↓
Vebal Level	Vebal Level	Vebal Level
↓	↓	↓
Abstract Level	Abstract Level	Abstract Level

SOURCE: Adapted from Tennis (2005a, p. 47).
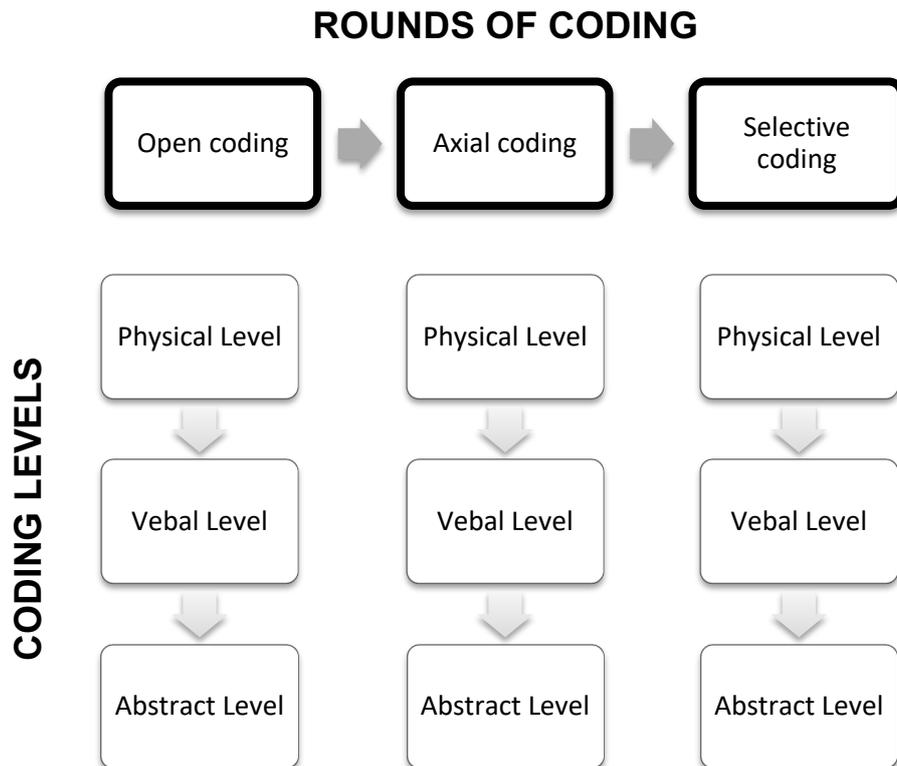
As we see in Figure 2, there are three coding levels and we may explain them. "The physical level deals with the text and the codes embedded in those texts during the process of coding. The verbal level deals with the words and phrases in the texts. The abstract level deals with attributes and conceptions" (TENNIS, 2005a, p. 47).

The corpus of this research consists of 31 papers on epistemology of KO, published in the journal Knowledge Organization from 1993 to 2017. We use ATLAS.ti, a qualitative data analysis and research software to develop the analysis and synthesis of our research. It is possible to analyze large bodies of textual, graphical, audio and video data using ATLAS.ti. There is a screenshot from ATLAS.ti in Figure 3, illustrating the coding process.

Figure 3 - CODING PROCESS AT ATLAS.TI
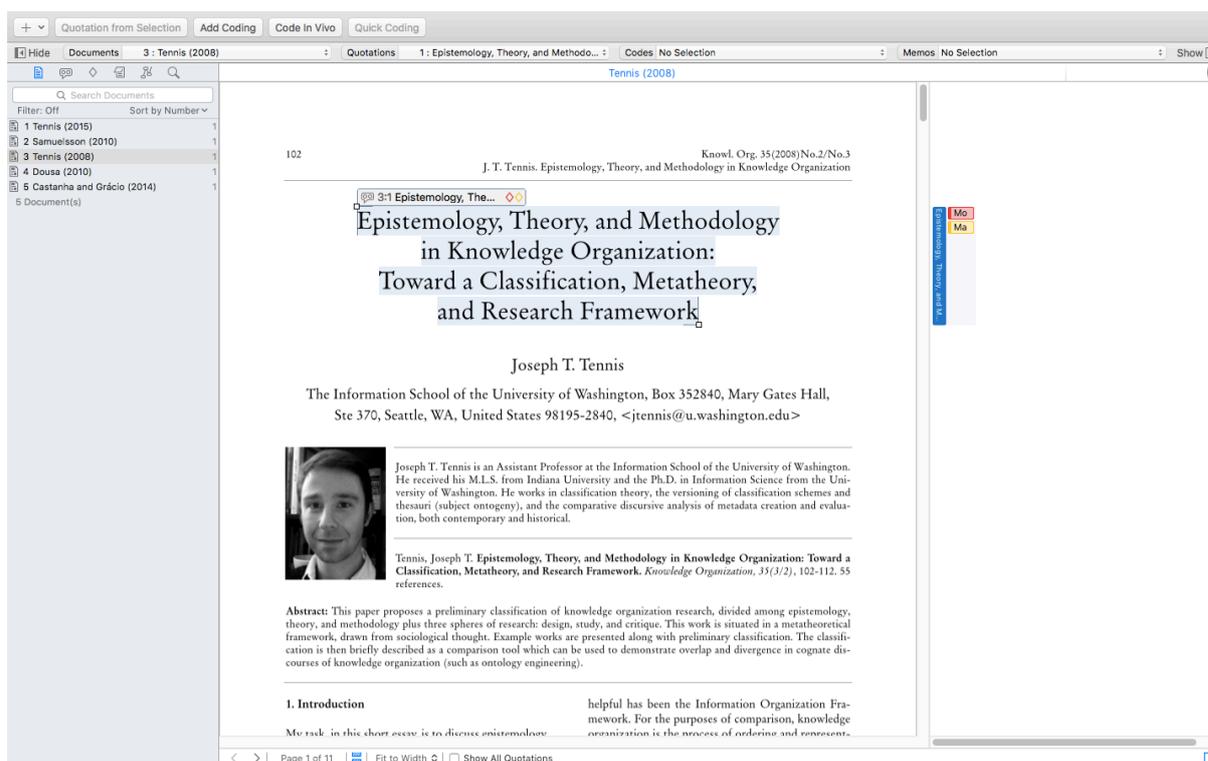
SOURCE: Screenshot from ATLAS.ti

Each paper was analyzed in the three rounds of coding cited in Figure 2. We created a new project at ATLAS.ti and added the papers from the corpus of our research. We coded the texts, added memos, developed the data analysis, conducted searches, identified connections between codes, prepared reports, and used visualization techniques. All those tools are essential to develop the research.

Glaser (1978, p. 57–60) indicates six rules of coding in Grounded Theory Methodology. The second one is "analyze the data line by line", and we did not consider that rule in this dissertation since we chose to code structured ideas as we will explain in this section. This way, we followed five of Glaser's rules in this dissertation:

(1) ask a set of questions of the data: as we analyze the papers, we ask questions like: a) what is the object of study? b) which epistemologies influence the author's thought?

(2) the analyst must do his own coding;

(3) the analyst must always interrupt coding to memo the idea;

(4) stay the confines of his substantive area and the field study: we must focus in identifying the influence of epistemologies in the KO domain by analyzing the papers that are part of the corpus of this research;

(5) the analyst should not assume the analytic relevance of any face sheet variable such as age, sex, social class, race, skin color, etc, until it emerges as relevant.

Considering the coding process and the five rules cited before, we will create a codebook that will guide the analysis and synthesis in this dissertation. Now, we outline the coding process and describe how we intend to approach the analysis in this research.

a) Open coding

Open coding is considered "the unrestricted coding of the data" and, "the aim is to produce concepts that seem to fit the data" (STRAUSS, 1987, p. 28). "It is coding the data in every way possible". We may state that "the goal of the analyst is to generate an emergent set of categories and their properties which fit, work and are relevant for integrating into a theory" (GLASER, 1978, p. 56).

Strauss and Corbin present a summary on open codification:

> Concepts are the basic building blocks of theory. Open coding in grounded theory method is the analytic process by which concepts are identified and developed in terms of their properties and dimension. The basic analytic procedures by which this is accomplished are the asking of questions about data, and the making of comparisons for similarities and differences between each incident, event, and other instance of phenomena. Similar events and incidents are labeled and grouped to form categories (STRAUSS; CORBIN, 1990, p. 74).

In this round we coded different incidences into as many categories as possible. As we analyzed the papers, new categories emerged, and new incidents fit existing categories. Through this process we divided and understood the text. Then, we could develop categories and organize them. Flick (2004, p. 191, our translation) states that "the result of open coding should be a list of codes and categories that are added to the text".

In open coding, we code in different levels: line by line, each sentence, paragraphs or the whole text. The choice for one or another level of coding depends on the research question, the corpus of the research and, the researcher style (FLICK, 2004). Considering we were looking for the conception of epistemology of KO, we coded structured ideas. This way, we coded paragraphs and also sections of the

papers we analyzed. We also added comments to describe the codes as we judged it was necessary. As we finished the open coding, we got 1.522 codes.

b) Axial coding

Axial coding "consists of intense analysis done around one category at a time, in terms of the paradigm items (conditions, consequences, and so forth)". It is called axial coding "because analyzing revolves around the 'axis' of one category at a time" (STRAUSS, 1987, p. 32). It is also "a process to connect subcategories to a category. It is a complex process of inductive and deductive thought that embraces different levels" (STRAUSS; CORBIN, 1990, p. 114).

The researcher moves from the inductive thought (developing concepts, categories and relations considering the text) to the deductive thought (testing concepts, categories and different relations in the text, specially, those parts or cases that are different from the one they are developed from) during the axial coding (FLICK, 2004).

Once we passed the first round, it was important to look over all the codes that were created and their instances. This way, we crosscut or related concepts to each other in this round, and they lead to the creation of core categories. Considering we are applying metatheory to better understand epistemology of KO, we organized the codes in the four approaches from M_u table: internal-intellectual (287 codes), internal-social (19 codes), external-intellectual (270 codes), external-social (7 codes).

We needed to merge some codes in one category and exclude some of them since they were not relevant to the research. In this round we also created some hierarchical relations too. We have, for example, three codes that are similar: feminist discourse, feminist perspective and feminist stance. As we analyzed the quotes those codes are attached, and we realized that those three codes could be grouped and be represented by the code Feminist Stance (FIGURE 4):

Figure 4 - MANAGING CODES AT ATLAS.TI
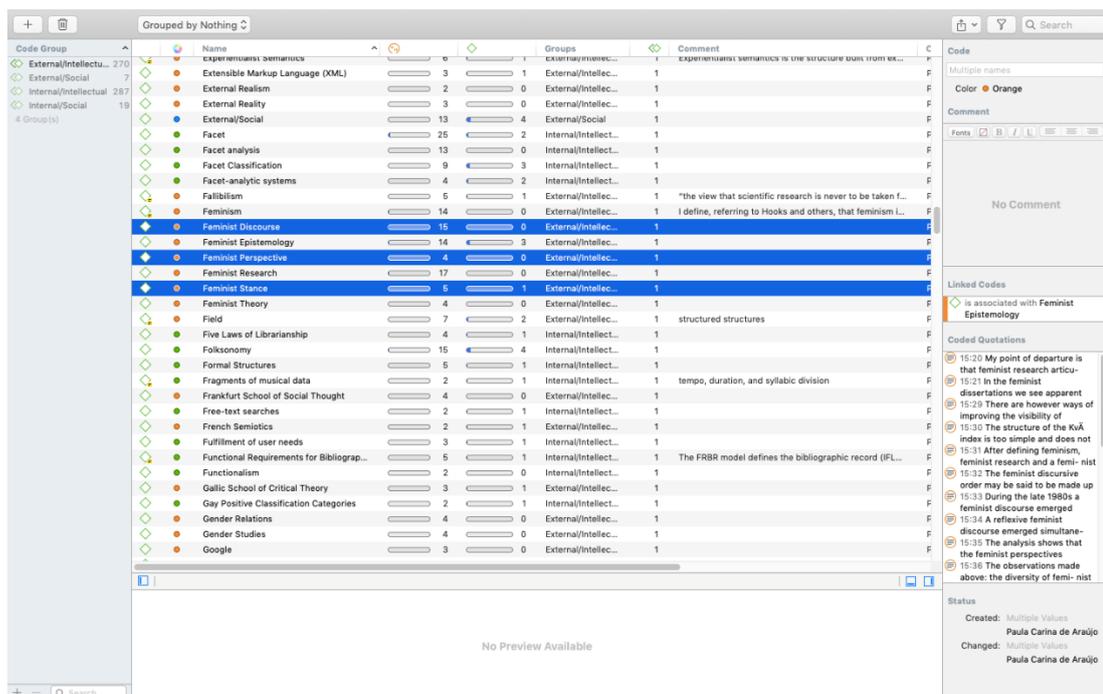
SOURCE: Screenshot from ATLAS.ti

Axial coding embraces a more intensively and concertedly coding around single categories. The analyst is influenced "to build up a dense texture of relationships around the 'axis' of the category being focused upon".

Strauss (1987) indicates a way we can operationalize that in three stages: - first, by laying out properties of the category; - second, the analyst hypothesizes about and increasingly can specify varieties of conditions and consequences, interactions, strategies, and consequences (the coding paradigm) that are associated with the appearance of the phenomenon referenced by the category; - third, the latter becomes increasingly related to other categories.

From the 1.522 codes we reduced to 594 codes. In this round of the research, we selected the main categories regarded to the research question considering codes and memos. We may look to different parts of the text that are evidences of those main codes and then create the axial categories. Those categories are the ones that connect different parts of the text with the same or similar codes.

c) **Selective coding**

"Selective coding pertains to coding systematically and concertedly for the core category. The other codes become subservient to the key code under focus" (STRAUSS, 1987, p. 33). It "continues the axial coding in a deeper level of abstraction.

The objective of this round is to elaborate the core categories in which the others may be integrated" (FLICK, 2004, p. 194, our translation).

"This type of coding is likely to occur in the latter phases of a study". In this level of coding, "all categories are unified around a core category, and categories that needed further description are filled-in with descriptive detail" (CORBIN; STRAUSS, 1990, p. 14).

Selective coding significantly delimits the work from open coding, we may see the focus within the total context we developed during open coding (GLASER, 1978). "The core category represents the central phenomenon of the study" (CORBIN; STRAUSS, 1990, p. 14). And, we plan to identify it by asking questions like:

- What is the main analytic idea presented in this research?
- If my findings are to be conceptualized in a few sentences, what do I say?
- What does all the action/interaction seem to be about?
- How can I explain the variation that I see between and among the categories?
- The core category might emerge from among the categories already identified or a more abstract term may be needed to explain the main phenomenon?

In this round, we delimited our coding to those variables that relate to the core variables in sufficiently significant ways to be the foundation to our analysis and synthesis. Therefore, we selected the codes considering the questions presented above. "The core variable becomes a guide to further data collection and theoretical sampling. The analyst looks for the conditions and consequences and so forth that relate to the core process. His analysis is guided by the core variable" (GLASER, 1978, p. 61).

As a result, we created three attributes families from the selective coding. The attribute families represent the core subject of this dissertation and, they are: the concept of epistemology in KO with two attributes (FIGURE 7); the purpose of epistemology of KO with 11 attributes (FIGURE 8); and epistemic stances influencing the KO domain with 24 attributes (FIGURE 9).

4.2.2.2 Memoing

While coding, we put down theoretical questions, hypotheses, summary of codes, etc, and, that is "a method of keeping track of coding results and stimulating further coding, and also a major means for integrating the theory". We may call it memoing (STRAUSS, 1987, p. 22).

While memoing we must have in mind four important goals cited by Glaser (1978, p. 83). "The four basic goals in memoing are theoretically develop *ideas* (codes), with complete *freedom* into a memo *fund*, that is highly *sortable"*.

By ideas, we mean the insights we have during coding, or the ideational development. Based on Glaser (1978, p. 84) we will memo in this dissertation considering that one memo may have one or more of the following five aspects, but certainly does not require more than one:

> (1) It raises the data to a conceptualization level (2) It develops the properties of each category which begins to define it operationally (3) It presents hypotheses about connection between categories and/or their properties (4) It begins to integrate these connections with clusters of other categories to generate the theory (5) Lastly, it begins to locate the emerging theory with other theories with potentially more or less relevance.

The second goal in memoing is freedom. In this context, we connect the meaning of freedom "to many things which alleviate the usual constraints on writing theory". At this point, we do not care too much about good prose or logical elaboration regarded to the writing process. We consider that "the point of memos is to record ideas, get them out, and the analyst should do so in any kind of language – good, bad or indifferent" (GLASER, 1978, p. 85).

Memo fund is the third goal in memoing, as we generate a lot of memos when developing the research and they represent a unique source of writing and lectures from a grounded theory study. The researcher can return to the memo fund every time he needs and identify ideas, generate insights and even new research.

Memos should be highly sortable as that is the fourth memoing goal. The third and fourth goals are close related, since it is not enough to have a strong memo fund if the research cannot identify the related ideas, even categories and retrieve then properly. Considering that, we followed some memoing rules proposed by Glaser (1978, p. 87):

a) each memo should be introduced by a title or caption which is the category of property that the memo is about;

b) any other category or property which appears in the memo should be highlighted or underlined, so the memo could be sorted for this concept also;

c) if two categories or their properties appear in the memo, the relationship between the two should be discussed and perhaps categorized or highlighted.

As Glaser (1978, p. 87) says "memoing is a constant process that begins when first coding data, and continues through reading memos or literature, sorting and writing papers or monographs to the very end". We created one memo to each paper. Through memoing we could register every thought, idea, insight or question we have regarded the papers or the coding process. The memoing and coding process happened together (APPENDIX C).

Bradley states a memo is "where a researcher writes periodic summaries of an issue or a problem in a memo to himself or herself" (1993, p. 444). Memoing is fundamental in the process of generating theory. It is also considered its true product because they lead, naturally to abstraction or ideation. "Memos are the theorizing write-up of ideas about codes and their relationships as they strike the analyst while coding" (GLASER, 1978, p. 83).

Memos functioned as an essential tool during all the analysis and synthesis process. As we developed the analysis and synthesis of our data, we looked back to the memos seeking for insights and explanations to open questions during the creation process.

4.2.3 Synthesis

After analyzing the 31 papers through different rounds and levels of coding, memoing, connecting different concepts and core categories, we had the material to develop a synthesis in a metatheory. We intended to gain a better understanding (M_u) of epistemology of KO, as suggested by Ritzer (1991b). The core categories, created from coding and memoing, are analyzed in chapter 5.

5 THE CONCEPTION OF EPISTEMOLOGY ON THE KNOWLEDGE ORGANIZATION DOMAIN

5.1 SUMMARIES OF ARTICLES

This section briefly presents the 31 articles that the metatheoretical research analyzed for this study.

Table 1 - SUMMARY OF ARTICLES

ARTICLES	OVERVIEW
GARCIA MARCO, F. J.; ESTEBAN NAVARRO, M. A. On some contributions of the cognitive science and epistemology to a theory of classification. **Knowledge Organization**, v. 20, n. 3, p. 126–132, 1993.	Garcia Marco and Estevan Navarro conduct a review on the implications of Cognitive Psychology and Epistemology to the Theory of Classification focusing on both information work and research. They also analyze the scientific connection among IS, Epistemology and Cognitive Science. Classification is the central subject being discussed as an activity that is present in daily and scientific activities.
KIEL, E. Knowledge organization needs epistemological openness: a reply. **Knowledge Organization**, v. 21, n. 3, p. 148–152, 1994.	Kiel presents a discussion about the theses of Peter Jaenecke differentiation of knowledge as: core knowledge, peripheral knowledge and pseudo knowledge. The author states that Jaenecke defend a realist epistemic stance when presenting the concept of knowledge and KO. On the other hand, Kiel presents his though based on an idealist epistemic stance, which he defends as an epistemologically open conception of KO considering KO as a user-supporting but not as a user and producer controlling task.
BIES, W. Thinking with the help of images: on the metaphors of knowledge organization. **Knowledge Organization**, v. 23, n. 1, p. 3–8, 1996.	Bies proposes that metaphors and images play an important role in the literature of KO. He presents an examination of the imagery of KO from the point of view of epistemology, typology of metaphors, discourse analyzes, metaphorology and iconography.
CAMPBELL, G. Queer theory and the creation of contextual subject access tools for gay and lesbian communities. **Knowledge Organization**, v. 27, n. 3, p. 122–131, 2000.	Campbell examines the literary criticism of Herman Melville's Billy Budd, particularly in relation to the theories of Eve Kosofsky Sedgwick in The Epistemology of the Closet (1990) and exposes three tensions that designers of gay and lesbian classifications and vocabularies can expect to face.
HJØRLAND, B.; HARTEL, J. Afterword: ontological, epistemological and sociological dimensions of domains.	Hjørland and Hartel introduce ontological, epistemological and sociological theories and concepts that constitute domain analysis. They also outline their implications for KO.

Knowledge Organization, v. 30, n. 3–4, p. 239–245, 2003.	
HJØRLAND, B. Fundamentals of knowledge organization. **Knowledge Organization**, v. 30, n. 2, p. 87–111, 2003.	Hjørland presents the fundamentals of KO in 10 sections: (1) the concept of KO; (2) the different approaches and traditions of KO; (3) the theoretical distinction between social and intellectual forms of KO; (4) the social perspective of KO; (5) the structure of subject access points (SAPs); (6) subject access points (SAPs)social semiotic point of view; (7) the concept of paradigm; (8) the basic unit of KO; (9) classification; (10) methods for KO and epistemological theories.
ZINS, C. Knowledge organization: an epistemological perspective. **Knowledge Organization**, v. 31, n. 1, p. 49–54, 2004.	Zins essay explores the epistemological foundations of KO and discusses implications for classification research.
TENNIS, J. T. Experientialist epistemology and classification theory: embodied and dimensional classification. **Knowledge Organization**, v. 32, n. 2, p. 79–92, 2005.	Tennis lays out the terms and the intellectual constructs that serves as the foundation for investigative work into experientialist classification theory, a theoretical framework of embodied, infrastructural, and reified KO.
GNOLI, C. Ten long-term research questions in knowledge organization. **Knowledge Organization**, v. 35, n. 2–3, p. 137–149, 2008.	Gnoli discuss Ten Long-Term Research Questions in Knowledge Organization
HJØRLAND, B. What is knowledge organization (KO)? **Knowledge Organization**, v. 35, n. 2–3, p. 86–101, 2008.	Hjørland describes what KO is and presents the theories, methods and epistemologies that influence it. It offers an understanding of KO based on an explicit theory of knowledge.
TENNIS, J. T. Epistemology, theory, and methodology in knowledge organization: toward a classification, metatheory, and research framework. **Knowledge Organization**, v. 35, n. 2–3, p. 102–112, 2008.	Tennis proposes, in a metatheoretical framework, a preliminary classification of KO research, divided among epistemology, theory, and methodology plus three spheres of research: design, study, and critique.
FURNER, J. Interrogating "Identity": a philosophical approach to an enduring issue in knowledge organization. **Knowledge Organization**, v. 36, n. 1, p. 3–16, 2009.	The topic of this paper is the significance for KO of analyses of the concept of identity. Furner questions how well KO systems represent identity.
DOUSA, T. M. Classical pragmatism and its varieties: on a pluriform metatheoretical perspective for knowledge organization. **Knowledge Organization**, v. 37, n. 1, p. 65–71, 2010.	The article reviews three variants of Pragmatism that have been historically influential in philosophy — Charles Sanders Pierce's scientifically oriented pragmaticism, William James's subjectivist practicalism, and John Dewey's socially oriented instrumentalism — and indicates points of contact between them and KO theories propounded by Henry E. Bliss, Jesse H. Shera, and Birger Hjørland, respectively.
SAMUELSSON, J. Knowledge organization for feminism and feminist research: a discourse-oriented study of systematic outlines, logical structure,	Samuelsson's focus in the article is an analysis of the KO systems that index and classify feminist research texts in a Swedish bibliographic context. Feminist perspectives are

semantics and the process of indexing. **Knowledge Organization**, v. 37, n. 1, p. 3–28, 2010.	analyzed through text analysis of PhD dissertations as feminist articulations. I also analyze the possibilities to classify and index feminist research with the national universal knowledge organization systems (KOS): Svenska Ämnesord (SÄ) and Klassifikationssystem för svenska bibliotek (KSB), and one subject specific system: Kvinnohistoriska samlingarnas ämnesord (KvÄ).
GNOLI, C. Metadata about what? distinguishing between ontic, epistemic, and documental dimensions in knowledge organization. **Knowledge Organization**, v. 39, n. 4, p. 268–275, 2012.	Gnoli distinguish between ontic, epistemic, and documental dimensions in KO. All these dimensions can be accounted for in metadata, but are often done so in mixed ways, making indexes less rigorous and interoperable.
HANSSON, J. The materiality of knowledge organization: epistemology, metaphors and society. **Knowledge Organization**, v. 40, n. 6, p. 384–391, 2013.	Hansson discusses the relation between epistemology, social organization and KO.
HJØRLAND, B. Theories of knowledge organization: theories of knowledge. **Knowledge Organization**, v. 40, n. 3, p. 169–181, 2013.	Hjørland presents the theories of knowledge and its relation to the KO domain, by presenting some approaches to KO.
KLEINEBERG, M. The blind men and the elephant: towards an organization of epistemic contexts. **Knowledge Organization**, v. 40, n. 5, p. 340–362, 2013.	Kleineberg demonstrates that an implementation of perspectivism and contextualism in any phenomena-based KOS requires a revision of the underlying concept of phenomenon as a triadic relation between the WHAT, the WHO, and the HOW of knowledge.
CASTANHA, R. C. G.; GRACIO, M. C. C. Bibliometrics contribution to the metatheoretical and domain analysis studies. **Knowledge Organization**, v. 41, n. 2, p. 171–174, 2014.	Castanha and Gracio approaches the bibliometric studies under the light of metatheory and domain analysis within the KO in IS. Domain analysis and metatheory are considered significant contribution to bibliometric studies when emphasizing the need for epistemological, sociological and historical analyzes, as well as other qualitative approaches, encouraging researchers to reflect on the whole composition of the research object, by means of different methodological, theoretical and epistemological approaches.
HJØRLAND, B. Is facet analysis based on rationalism? a discussion of Satija (1992), Tennis (2008), Herre (2013), Mazzocchi (2013b), and Dousa & Ibekwe-SanJuan (2014). **Knowledge Organization**, v. 41, n. 5, p. 369–376, 2014.	Hjørland takes Satija, Tennis, Mazzocchi, Herre and Dousa and Ibekwe-SanJuan' studies as the point of departure and examines the arguments that have been raised in relation to his position that the facet-analytic school is based on rationalism.
MOURA, M. A. Emerging discursive formations, folksonomy and social semantic information spaces (SSIS): the contributions of the theory of integrative levels in the studies carried out by the Classification Research Group (CRG).	Moura focuses on the discursive formations emerging from the Social Semantic Information Spaces (SSIS) in light of the concept of emergence in the theory of integrative levels. The goal was to analyze the effects of that concept on the actions of a sample of

Knowledge Organization, v. 41, n. 4, p. 304–310, 2014.	researchers registered in an emerging research domain in SSIS in order to understand this type of indexing done by the users and communities as a classification of integrating levels.
SALDANHA, G. S. The philosophy of language and knowledge organization in the 1930s: pragmatics of Wittgenstein and Ranganathan. **Knowledge Organization**, v. 41, n. 4, p. 296–303, 2014.	Saldanha proposes a historical-epistemological study of KO focused on the 1930s. The aim is to propose analysis of the dialogue between the visions of Ranganathan and Wittgenstein in the construction of the possibilities of knowing from the use of language within the 1930s.
SANTIS, R. DE; SOUZA, R. F. DE. Classifying popular songs: possibilities and challenges. **Knowledge Organization**, v. 41, n. 2, p. 181–187, 2014.	Santis and Souza consider the different approaches toward popular songs in catalogues and contemporary systems. This way, they identify possible solutions, such as the use of descriptive metadata, the use of collaborative tagging or the creation of an ontology. In discussing the construction of an epistemological foundation used specifically for classifying the popular song, they reflect on the remaining challenges for the KO of complex artistic documents.
MARTELETO, R. M.; CARVALHO, L. DOS S. Health as a knowledge domain and social field: dialogues with Birger Hjørland and Pierre Bourdieu. **Knowledge Organization**, v. 42, n. 8, p. 581–590, 2015.	Marteleto and Carvalho seek to bring together theoretical and methodological constructs developed by Birger Hjørland and Pierre Bourdieu to investigate structures of production, organization and communication of knowledge from a critical point of view, focusing on health.
SMIRAGLIA, R. P. Domain analysis of domain analysis for knowledge organization: observations on an emergent methodological cluster. **Knowledge Organization**, v. 42, n. 8, p. 602–611, 2015.	Smiraglia reports an analysis of the decade-long effort by scholars to respond to the call for the use of domain analysis as a methodological paradigm in KO.
MARTINEZ-AVILA, D.; SEMIDAO, R.; FERREIRA, M. Methodological aspects of critical theories in knowledge organization. **Knowledge Organization**, v. 43, n. 2, p. 118–125, 2016.	Martínez-Ávila, Semidão and Ferreira focus on the methodological configuration of critical theories in the KO domain. They analyze the epistemological stances and methodological implications of three instances of critical theories applied to KO.
MARTÍNEZ-ÁVILA, D.; BEAK, J. Methods, theoretical frameworks and hope for knowledge organization. **Knowledge Organization**, v. 43, n. 5, p. 358–366, 2016.	Martínez-Ávila and Beak analyze the epistemic stances (Hjørland's classification of epistemological stances), research methods and techniques of the thirty-three journal articles that Hope Olson published during the period 1991-2015.
RIDI, R. Phenomena or noumena?: objective and subjective aspects in knowledge organization. **Knowledge Organization**, v. 43, n. 4, p. 239–253, 2016.	Ridi analyses objective and subjective aspects regarded to concepts like: information, document, knowledge, KO and level of reality
SILVEIRA, N. C.; SALDANHA, G. S. "Own name" in knowledge organization epistemology: a philosophical-theoretical	Silveira and Saldanha seek to understand the perspective of authorship from the notion of "own name," with the inflection on the

debate. **Knowledge Organization**, v. 43, n. 4, p. 265–278, 2016.	philosophical discussion effected in this analysis.
HJØRLAND, B. Domain analysis. **Knowledge Organization**, Reviews of Concepts in Knowledge Organization. v. 44, n. 6, p. 436–464, nov. 2017.	Hjørland outlines the domain-analytic approach to KO and to LIS. The article reviews the discussions and proposals on the definition of domains, and provides an example of a domain-analytic study in the field of art studies.
IBEKWE-SANJUAN, F.; BOWKER, G. C. Implications of big data for knowledge organization. **Knowledge Organization**, v. 44, n. 3, p. 187–198, 2017.	Ibekwe-San Juan and Bowker propose a high-level analysis of the implications of big data for KO and KOSs. They confront the debates within the KO community about the relevance of universal bibliographic classifications and the thesaurus in the web with the ongoing discussions about the epistemological and methodological assumptions underlying data-driven inquiry.

SOURCE: The author (2019).

5.2 THE CONCEPT OF EPISTEMOLOGY IN KNOWLEDGE ORGANIZATION

"Epistemology was born in the European Modernity, as a strategic necessity to control others knowledge. Epistemology is a construction of the Modernity and a construction of the symbolic order for establishing ways to legitimate knowledge" (SAN SEGUNDO MANUEL; MARTÍNEZ-ÁVILA, 2014, p. 96).

We presented in chapter 2, Steup's (2018) statement in the Stanford Encyclopedia of Philosophy, that the concept of epistemology is explained in a narrow (the study of knowledge and justified belief) and a broad meaning (epistemology is about issues having to do with the creation and dissemination of knowledge in particular areas of inquiry).

The concept of epistemology is approached in ten papers from the corpus. Therefore, we identify the concept of epistemology in the KO domain, based on Steup's (2018) statement, as we coded the papers from the corpus of this research. This way, we present those concepts in the Figure 6, seeking to identify which approach the KO authors consider in their researches.

Table 2 - THE CONCEPT OF EPISTEMOLOGY IN KO

AUTHORS	NARROW MEANING	BROAD MEANING
García-Marco; Esteban-Navarro (1993, p. 128–129)		"Epistemology is traditionally considered to be that branch of philosophy devoted to the study of the processes of human knowledge, its logic, origins and basis. Actually the study of this process is performed by a number of disciplines which emanate from it, for example psychology, logic and linguistics. Therefore today, the meaning and field of study of epistemology is more restrictive. It is the science centered on tile study of the characteristics of scientific discourse and on the evolution of scientific paradigms. Thus it appears to be a more systematic and methodological reflection on the principal resources used by humans to pursue valid knowledge about reality. Psychology is mainly devoted to common and ordinary knowledge (personal and social). Epistemology is devoted specifically to scientific knowledge". […] "Finally, from a historical perspective, epistemology is also the study of reflections made by philosophers and theorists of science in an abstract and conceptual network, traced between man (subject) and nature (object) in the process of research and knowledge, within the limits and possibilities of understanding reality and its linguistic expression".
Hjørland; Hartel (2003, p. 240)	"Epistemology is the study of knowledge and how to obtain knowledge, e.g., the roles of observation, theoretical analysis, languages, traditions, sex and values in the production of knowledge. If knowledge is defined, following Plato, as "verified, true belief," then knowledge must reflect parts of reality. Knowledge is true if there is a correspondence between a claim and reality. Knowledge (and science) is seen as a verified system of true claims corresponding to reality. The implication is that our	

	knowledge (as represented in scientific literature) should map ontological structures.	
Zins (2004, p. 49)	"Epistemology is the branch of philosophy that is focused on the theory of knowledge. It explores the possibility of knowledge. The study delves into the construction of knowledge".	
Gnoli (2008, p. 139)	"Epistemology, instead, is about how humans know the world through their sense organs, and how they process knowledge according to categories both innate and culturally biased".	
Tennis (2008, p. 103–104)		"Epistemology is how we know. In KO we make implicit epistemic statements about knowledge of concepts, acts (such as representation), entities, and systems. In so doing, we create knowledge, and our epistemic stance dictates what kind of knowledge that is". […] "Epistemology in sum is, the claim on what knowledge is valid in research on organizing knowledge, and therefore what constitutes acceptable sources of evidence (presenting that knowledge) and acceptable end results of knowledge (findings from KO research)".
Gnoli (2012, p. 271)	"Perspectives can be studied by epistemology, the science of the ways and means by which knowledge is acquired".	
Kleinberg (2013, p. 349)	Epistemology (Greek: ἐπιστήμη, epistéme = "cognition," "knowledge") is the study of knowledge and how it is acquired and influenced.	
Hansson (2013, p. 385)		This presupposes a very fundamental assumption; that epistemology is a sort of 'key' with which it is possible to unlock the ontological level of reality, whether natural, social, or spiritual. The fact is that, turning back to Machlup, only two categories of knowledge make ontological claims: intellectual and spiritual. It is also within these that we find struggles of epistemology.
Hjørland (2013a, p. 179)	Epistemology is, however, the best general background it is possible to teach people within IS. It is the best general preparation we can provide for people in order to study any domain. The same kinds	

	of philosophical problems seem to show up in all domains, and, if the limitations of a certain position have been understood in one domain, it is probable that the same position can also be turned down in another domain. A general lesson from epistemology is that knowledge is created by humans for some specific purposes and serves some interests better than others. Concepts and semantic relations are not a priori or neutral, but should be examined in relation to their implications for the users they are meant to serve.	
Ibekwe-San Juan and Bowker (2017, p. 194)	Epistemology is a philosophical account of what knowledge is and what knowing is. This is of particular import to the field of KO, a field which deals with the classification of existing knowledge accumulated over thousands of years of scientific inquiry.	

SOURCE: The author (2019).

We understand that epistemology and theory of knowledge are different concepts, as Lalande (1993) states. That argument is taken for granted, since the concepts of science and knowledge had the same meaning, historically. Because of that, episteme and gnosis were considered the same concept for a period. From modern sciences on, the concept of science was transformed, it was more specific, and it was considered a systematic and methodic type of knowledge. Consequently, theory of knowledge or gnoseology were then described as the study about knowledge, its possibility and the focus on the subject or the object. On the other hand, epistemology focus on the scientific knowledge (BACHELARD, 2006; HESSEN, 2012).

Therefore, Figure 7 represents the first attribute family identified through the coding process, "the concept of epistemology":

Figure 5 - THE CONCEPT OF EPISTEMOLOGY
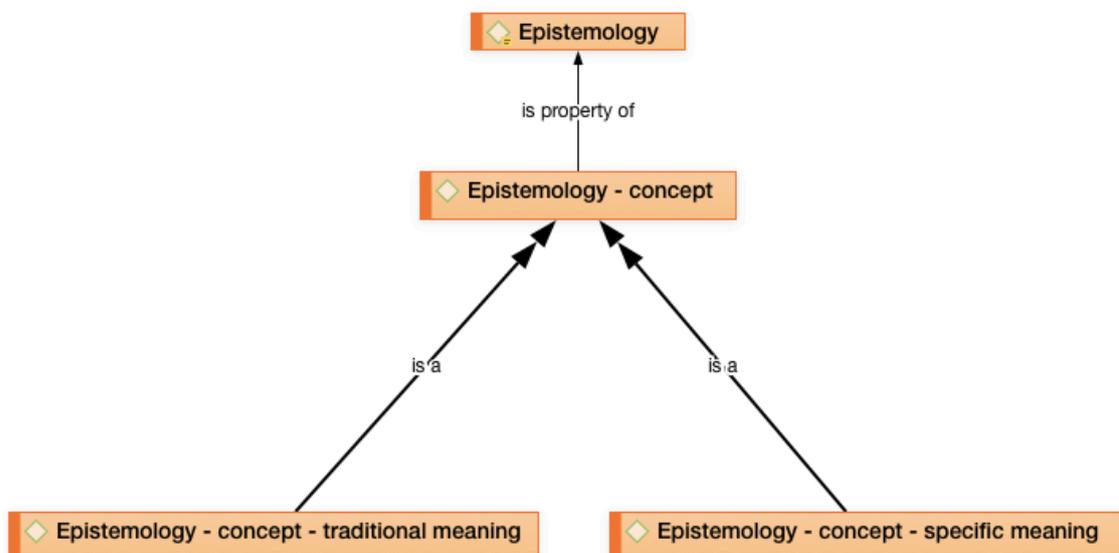
SOURCE: The author (2019).

By analyzing the table 1, we acknowledge that Hjørland; Hartel (2003, p. 240); Zins (2004, p. 49); Gnoli (2008, p. 139); Gnoli (2012, p. 271); Kleinberg (2013, p. 349) and Hjørland (2013a, p. 179) take the narrow meaning of epistemology in their studies. We identify that statement in Hjørland; Hartel's (2003, p. 240) argument that epistemology is the study of knowledge and how to obtain knowledge, in general. Zins (2004, p. 49) thought is explicit when he states that "Epistemology is the branch of philosophy that is focused on the theory of knowledge".

Gnoli's (2012, p. 271) declaration is also pretty close to the theory of knowledge: "perspectives can be studied by epistemology, the science of the ways and means by which knowledge is acquired". Kleinberg (2013, p. 349) describes epistemology as "the study of knowledge and how it is acquired and influenced", clearly, related to the theory of knowledge.

Hjørland (2013a, p. 179) says that epistemology "is the best general preparation we can provide for people in order to study any domain" but, his definition of epistemology is not so clear. Nevertheless, Hjørland (2011a, 2011b) argues that epistemology is considered synonymous with theory of knowledge in other studies. Ibekwe-San Juan and Bowker's (2017, p. 194) definition of epistemology is also related to the narrow meaning: epistemology is a philosophical account of what knowledge is and what knowing is.

García-Marco and Esteban-Navarro (1993), Tennis (2008) and Hansson (2013) understand the concept of epistemology more broadly, regarded to the scientific knowledge. We may confirm that, looking at Garcia-Marco and Esteban-Navarro's (1993, p. 128–129) acknowledgement that epistemology is the science centered on tile study of the characteristics of scientific discourse and on the evolution of scientific paradigms.

The same knowledge can be identified on Tennis' (2008) discussion on the connection between theory, epistemology and methodology and, on Hansson's (2013) thoughts regarded to the connection between ontology and epistemology. It is even more evident, when Tennis (2008, p. 103–104) indicates that "epistemology in sum is, the claim on what knowledge is valid in research on organizing knowledge, and therefore what constitutes acceptable sources of evidence (presenting that knowledge) and acceptable end results of knowledge (findings from KO research)".

Some common expressions when approaching epistemology are: "clearly define, rigorously classifying, argue consistently and with precise language, verify hypotheses inductively and, validate results reliably (GARCÍA GUTIÉRREZ, 2011). As we alluded to above, the texts examined here expressed the concept of epistemology regarded to two different approaches. In this dissertation, we acknowledge that epistemology seeks the critical thought about science through its evolution and history.

In order to describe the conception of epistemology in the KO domain, we coded the papers from the corpus of this research and identified the concept of epistemology,

describe the purpose of epistemology and the epistemic stances influencing the KO domain. We approach the purpose of epistemology in the next section.

5.3 THE PURPOSE OF EPISTEMOLOGY OF KNOWLEDGE ORGANIZATION

"Science is the mode of production of knowledge that is subject to conditions of obtention ruled by epistemology, and epistemology is the nuclear discipline in the construction of scientific knowledge" (SAN SEGUNDO MANUEL; MARTÍNEZ-ÁVILA, 2014, p. 96)

Epistemological theories provide us with the most generalizable mental models (HJØRLAND, 2002a). Smiraglia (2013, p. 3) states that "epistemology is an essential tool of knowledge organization and a dimension is an expression of the extent of a space". He adds that "in knowledge organization, epistemology represents one dimension, because it is how we can measure or express the space within our domain ranging from the empirical to the rational, the two primary epistemological stances".

Discussing epistemology and KO as complementary domains, Smiraglia argues:

> Epistemology is the science of knowledge. Knowledge organization is the science of the order of knowledge. The domain of knowledge organization is a discourse community in which inquiry takes place concerning knowledge, and its various orderings or sequences. The products of the domain are ordered segments of knowledge, and the rules either for discovering their natural orders, or the rules for imposing a useful sequence (SMIRAGLIA, 2013, p. 2).

Following the same thought, Mai (1999, p. 547) considers that "any theory of knowledge organization must further involve considerations regarding the epistemological basis of the theory and regarding the practical utilization of the theory". Furthermore, "a knowledge organization cannot be epistemological neutral" and, because of that, "the epistemological basis should address the problems of how knowledge is generated and realized, the practical level should regard how knowledge is organized and represented".

San Segundo Manuel and Martínez-Ávila (2014, p. 96) acknowledge that approaching KO from the epistemological perspective, "one must take into consideration that this discipline deals with the foundations, criteria and validation by which scientific knowledge is justified, including the historical, political, economic, social, etc. circumstances". Epistemology is understood as "the nuclear discipline in

the construction of scientific knowledge although it is not capable to overcome its status of beliefs, interests and cultural objectives, and therefore it is not capable to require itself what it requires to other disciplines".

Considering the arguments presented until here and the analysis of the corpus of this dissertation, we may bring to light some purposes of epistemology of KO that are represented in Figure 8 as the second attribute family, "the purposes of epistemology of KO":

Figure 6 - THE PURPOSES OF EPISTEMOLOGY OF KO
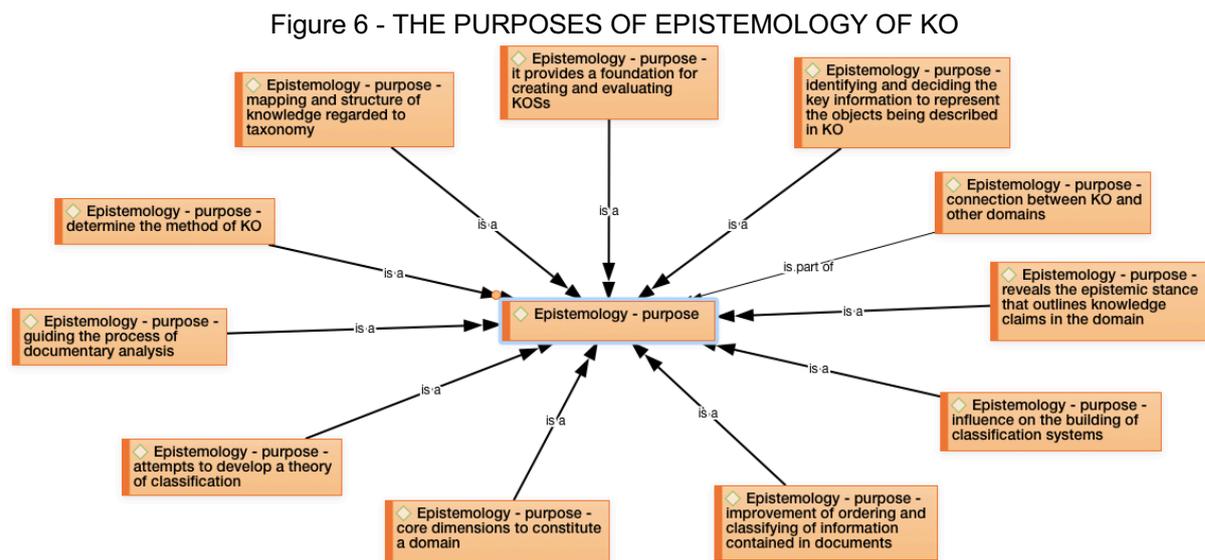
SOURCE: The author (2019).

Since Garcia-Marco and Esteban-Navarro (1993, p. 128) acknowledge that epistemology is "devoted to the study of the processes of human knowledge, its logic, origins and basis", they state that "the study of epistemology is, therefore, essential for the design and implementation of better cognitive strategies for guiding the process of documentary analysis, particularly for indexing and abstracting scientific documents".

Epistemology is also described as the "science centered on the study of the characteristics of scientific discourse and on the evolution of scientific paradigms" (GARCIA MARCO; ESTEBAN NAVARRO, 1993, p. 128). Therefore, it may influence the improvement of the ordering and classifying of information contained in documents, thus allowing their effective retrieval only, if it is possible to discover the conceptual framework (terms, concepts, categories, propositions, hypotheses, theories, patterns, and paradigms) of their authors from the discursive elements of texts (words, sentences and paragraphs) (GARCIA MARCO; ESTEBAN NAVARRO, 1993).

Hjørland and Hartel (2003) recognize the connection between ontological, epistemological and sociological dimension. If we take into account that various epistemological views influence the definition of a domain, its culture and practices, and its information forms, we may remember that epistemology is concerned about the evaluation of scientific paradigms as we discussed before. We know that each paradigm tends to develop, to some extent, its own terminology, theoretical view, methods and concepts. Specially, because "different epistemologies are connected to the different schools of thought that populate academe" (HJØRLAND; HARTEL, 2003, p. 242).

Furthermore, epistemology is concerned with the mapping and structure of knowledge, what is regarded to the study of the historical evolution of scientific paradigms. Garcia Marco and Esteban Navarro (1993, p. 128) consider that "it is crucial that emphasis be given to the analysis of scientific methodology and the classification strategies of nature through a branch of epistemology called taxonomy".

One could ask why taxonomy is so relevant to IS research, the answer is because taxonomy is as aspect of documentary classification "because it shows the relationship of a scientific text to other texts and within its scientific context". More than that, taxonomy "helps to maintain universal classification systems, thesauri, and terminological databases according to the general evolution of science and of each particular scientific discipline" (GARCIA MARCO; ESTEBAN NAVARRO, 1993, p. 128).

Garcia Marco and Esteban Navarro (1993) add another role, or contribution from epistemology to IS and KO, the development of a theory of classification. "This is because documentary classification systems are in close relationship with the two principal contemporary Western approaches to human knowledge - rationalism and logical positivism". They believe the influence of these philosophical thoughts on the building of classification systems has not usually happened in a conscious way.

> Philosophical theories of knowledge are usually a synthesis of the dominant characteristics present in a given historical period and proposals to explore new fields. As a consequence, the relationship between epistemology and information science is usually the result of the unconscious impregnation of information theorists with the principal epistemological approaches of their age and sometimes conscious efforts to adopt and adapt these ideas to the field of documentation (GARCIA MARCO; ESTEBAN NAVARRO, 1993, p. 129).

Hjørland and Hartel (2003, p. 240) explain that "different epistemologies have different views about the roles of, for example, observation, theoretical analysis, languages, traditions, sex and values in the production of knowledge". They recognize its importance for library and IS, and acknowledge it is a central concern of domain analysis. They state that epistemology shapes information phenomena, for example, relevance. Hjørland (2002a) provides a simplified point of view of four epistemological schools regarded to "relevance criteria" and he explains what is relevant, non-relevant and low priority to empiricist, rationalist, historicist and pragmatist epistemologies.

Another role of epistemology of KO is related to methods of KO, which are methods of constructing systems of KO such as classifications, thesauri, and processes like indexing and classifying. Every method of KO (standardization, computer based KO, quantitative methods, qualitative methods, text based methods, bibliometric methods, pragmatic, epistemological and critical methods, etc.) is connected to fundamental theories of epistemology (HJØRLAND, 2003). The two fundamental methods of classification (scientific classification and bibliographical classification) are analyzed through the eyes of empiricist, rationalist, historicist and pragmatist epistemologies in Hjørland (2003).

Tennis (2008, p. 106) discusses epistemology, theory and methodology in the KO domain, its connection and he states that they represent the driving force behind argument and findings in much of the conceptual work of KO. His research also shows the role of epistemology regarded to methods of KO. He states that epistemology shapes theory and methodology and that fact lies in the importance of labeling the kind of knowledge claims made through research narrative or research techniques". Methodology is the combination of epistemic stance and the methods of investigation. It is also the machine used to create knowledge.

Echoing the same argument, Martínez-Ávila and Beak (2016) present methodological aspects as a fundamental part of Hope Olson's papers since they were interested in epistemology. It is evident the connection between epistemology and methodology in the statement that epistemic assumption is linked to the method and the method is determined by the epistemology. Furthermore, Olson (1995) stated that "methodology develops from the researcher's ontological and epistemological stance". In this case, we refer specifically to research methods and not methods of construction KOSs.

As we move forward, we realize that one of the most important purposes of epistemology to the KO domain is regarded to its nature of discovering the origin of knowledge. By observing different key subjects of KO and considering the various epistemologies, we may present the similarities and differences among their methods, theories, thoughts and epistemic stances.

Thinking of that, Tennis (2008, p. 104) discusses that epistemology in the KO domain "results in an epistemic stance that outlines knowledge claims. In the case of KO we are concerned with assumptions about language, and how we can work with it in harmony with our conceptions of reality, how we know it, and what it means". That is an important contribution from epistemology to the KO domain, since we may understand the way that knowledge was created and applied to a specific domain. More than that, we understand the foundations and how the domain is constituted.

The same way, Hansson (2013) and Kleineberg (2013) discuss the connection between ontology and epistemology. Hansson explains that "knowledge organization systems normally presupposes some kind of ontology, […] they are thought to be reproducing some sort of structure, which refers to an equivalent in the world as such". Considering that he acknowledges "a very fundamental assumption; that epistemology is a sort of 'key' with which it is possible to unlock the ontological level of reality, whether natural, social, or spiritual" (2013, p. 385).

Kleineberg (2013) also presents an integrative approach based on a combination of ontology, epistemology, and methodology which he calls "constructive realism", a metatheoretical standpoint. Based on that view, knowledge is seen as both a human construction and, to some extent, a reflection of reality which is partially independent from human observers. It is proposed a parallel between a modernist (classification as ontology) and a postmodernist approach (classification as epistemology).

Ridi (2016) agrees with Keineberg (2013) when he presents the synthesis of objectivism and subjectivism that consists in recognizing that reality is neither completely given nor completely built and that it constitutes beyond too much marked pseudo-oppositions, the paradigm today de facto dominant both in epistemology studies and in KO studies. He states that his approach may share the same aspirations to the synthesis between the ontological and epistemological needs expressed by Kleineberg (2013).

In this scenario, epistemology influence a revision of the underlying concept of phenomenon, since "these epistemologically oriented theories (postmodernist approach) consider phenomena not merely as pre-given but as constructed by knowing subjects (the WHO of knowledge) […]" (KLEINEBERG, 2013, p. 341). On the other hand, there is the claim on a primacy of ontology, which point of departure "is that reality itself underlies a certain structure which can be adopted as organizing principle for KOS's based on entities or phenomena" (KLEINEBERG, 2013, p. 342). Nevertheless, we recognize that both Hasson and Kleineberg seek the combination of ontology and epistemology "which would implicate a multidimensional knowledge concept" (KLEINEBERG, 2013, p. 352).

When Hjørland (2008) proposes to approach the fields contributing to KO, he cites computer science, linguistics and natural language processing, theory of knowledge, theory of social organization etc. Hjørland (2008, p. 98) recognizes that "an understanding of the nature of knowledge, cognition, language and social organization is decisive for the understanding of KO and thus for the ability to design, evaluate and use knowledge organizing processes and knowledge organizing systems.

Approaching the connection between linguistics and LIS, Hjørland (2008) acknowledges that epistemology is a deeper way to understand both fields. Furthermore, linguistics, LIS and KO are influenced by changing epistemological views and interdisciplinary trends. We may state that epistemology has a role on the recognition of a satisfactory metatheory to better understand the relationship between KO and other domains.

Seeking to understand the perspective of authorship from the notion of "own name," with the inflection on the philosophical discussion, Silveira and Saldanha's (2016) research also demonstrates an implicit role of epistemology in the KO domain. Own name is understood as "the name of an individual objectively representing his work". Furthermore, "the "author" in a bibliographic record presupposes the meaning "own name," since it personalizes and organizes knowledge through standardized access points" (SILVEIRA; SALDANHA, 2016, p. 266).

We believe that the action of identifying authorship, establishing, and standardizing access points in a bibliographic record, is part of KO and, sometimes, represents a subjective decision that is epistemologically influenced. In that manner, Silveira and Saldanha state that "the document being represented may provide data

for information organization referring to authorship in a clearer manner than that of the organization of authorship knowledge, the latter being directly related to the philosophical issue of "own name" and knowledge organization" (2016, p. 270).

Domain analysis is a new approach to IS or library and information science (LIS). Hjørland and Hartel (2003, p. 239) suggest that three theories and concepts interact in the constitution of a domain: ontological, epistemological and sociological. The second dimension is "epistemological theories and concepts about knowledge and the ways to acquire knowledge, implying methodological principles about the ways objects are investigated". Hjørland (2017, p. 444) understands that "domain analysis without epistemological analyses tends to be superficial because epistemology provides insight into the assumptions of theories about user behavior".

Therefore, to Hjørland (2017) any ontology is based on epistemological assumptions. He considers that classification systems, for example, are best grounded in both ontology and epistemology. "Epistemology is of particular import to the field of KO, a field which deals with the classification of existing knowledge accumulated over thousands of years of scientific inquiry" (IBEKWE-SANJUAN; BOWKER, 2017, p. 194). Epistemology provides a foundation for creating and evaluating KOSs. This way, our observations and classifications are theory-laden.

> The idea of describing things in the world in an atheoretical way is therefore naïve. All classification depends on the methodology used, which is again connected to epistemology (see further in Hjørland 2017b). Epistemology is therefore not just a requisite for discipline-based classifications, but also for phenomena-based classifications (HJØRLAND, 2017, p. 448).

Knowledge is created by humans for some specific purposes and serves some interests better than others. If we consider epistemology of KO, concepts and semantic relations are not a priori or neutral, but should be examined in relation to their implications for the users they are meant to serve (HJØRLAND, 2013a).

In summary, we may list the main roles of epistemology of KO:

- it is essential to the design and implementation of better cognitive strategies for guiding the process of documentary analysis (GARCIA MARCO; ESTEBAN NAVARRO, 1993);

- it influences the improvement of the ordering and classifying of information contained in documents through the discover of the conceptual framework of their authors from de discursive elements of texts (GARCIA MARCO; ESTEBAN NAVARRO, 1993);

- it is concerned with the mapping and structure of knowledge regarded to taxonomy, an aspect of documentary classification (GARCIA MARCO; ESTEBAN NAVARRO, 1993, p. 128);

- since its close relation to theory, epistemology has a role in the development of a theory of classification (GARCIA MARCO; ESTEBAN NAVARRO, 1993);

- every method of KO is connected to fundamental theories of epistemology. Epistemic assumption is linked to the method and the method is determined by the epistemology ((HJØRLAND, 2003; MARTÍNEZ-ÁVILA; BEAK, 2016; TENNIS, 2008);

- it influences the discovery of the origin of knowledge and reveals the epistemic stance that outlines knowledge claims in the domain;

- it influence a revision of the underlying concept of phenomenon, based on an integrative approach between the ontological and epistemological level (HANSSON, 2013; HJØRLAND, 2017; KLEINEBERG, 2013; RIDI, 2016);

- it recognizes a satisfactory metatheory to better understand the relationship between KO and other domains (HJØRLAND, 2008);

- it has a role on identifying and deciding the key information to represent the objects being described in KO, for example, when the cataloger chose the author access point of a document (own name) (SILVEIRA; SALDANHA, 2016);

- it provides a foundation for creating and evaluating KOSs (HJØRLAND, 2017);

- domain analysis without epistemological analyses tends to be superficial. So, epistemology is fundamental to domain analysis studies since it provides insight into the assumptions of theories and it is one of the eleven approaches of domain analysis. It is one of the core dimensions to constitute a domain (HJØRLAND, 2017; HJØRLAND; HARTEL, 2003) .

We believe that to have a complete conception of epistemology in the KO domain, we may describe the concept of epistemology of KO, the purposes of epistemology and the epistemic stances that influence the KO domain. Until now, we have presented the concept (section 5.2) and purposes of epistemology (section 5.3). This is leading the study to approach the guiding role of epistemology on the KO domain. In section 5.4, we describe the epistemic stances influencing the KO domain considering the corpus of analysis of this dissertation.

5.4 EPISTEMIC STANCES INFLUENCING THE KNOWLEDGE ORGANIZATION DOMAIN

We are inclined to talk about knowledge (pre)understanding, theories, paradigms, and epistemologies, specially concerning to domain analysis. Regarded to KO domain, we know that each person is influenced by different theories, epistemologies, and paradigms, even if it is partly unconscious or neglected by the individual, (HJØRLAND, 2002a). Domain analysis also presupposes the looking to the theoretical development of the domain and it seeks to identify different paradigms, major theoretical views and epistemologies (DOUSA; IBEKWE-SANJUAN, 2014).

We deeply agree with Richard Smiraglia when he states that "a very important component of the science of KO then must be epistemology, which is the science of knowledge itself (SMIRAGLIA, 2013, p. 3). How people interpret the texts to be organized, how they search for the information they need, for example, are connected to theories of interpretation that are epistemologies and ideas that are historically, culturally, socially, and scientifically developed. That way, from a socio-cognitive view, we see individual knowledge in a historical, cultural, and social perspective (HJØRLAND, 2013a).

"Epistemology is the interpretation and generalization of scientists' own collective experience" (HJØRLAND, 2013a, p. 263). Epistemological knowledge forms an interdisciplinary foundation for general theories about KO (HJØRLAND, 2002a, p. 268). We acknowledge that epistemology influences KO as a discipline but also KO activities (classification, indexing, cataloging, etc), and the creation and design of KOS.

Campbell (2000, p. 122) explains that "determining the subject content of a document is an inherently subjective process, which is difficult if not impossible, to replicate from one indexer to another". Furthermore, the tools that aim to provide universal access to information (DDC, UDC, LCSH, etc) provide inadequate access to marginalized groups.

> The terms appearing in these tools to represent communities defined by gender, race and sexual orientation are frequently inadequate; the placement of these terms in classification categories reflects ideologies and assumptions that are archaic or invalid, and these tools frequently do not provide the fine-grained distinctions that would satisfy the information needs of a member of that community (CAMPBELL, 2000, p. 122)

We understand that different epistemologies imply in various views about the roles of observation, theoretical analysis, language, tradition, gender and values in the production of knowledge (HJØRLAND; HARTEL, 2003). The makers of new classification systems, for example, are not bias free. However, they are expected to articulate their position relative to the community for whom the system is designed. "This position will make a fundamental part of the tool's nature, and will become the means whereby readers, users and critics of the system will rebel, and find their own provisional categories" (CAMPBELL, 2000, p. 129).

Hjørland (2013a) argues that subject knowledge has been and still is extremely neglected in KO. In general, KO shares "with other metadisciplines, such as the philosophy of science, the sociology of science, and the history of science, dependence on subject knowledge and at the same time a unique focus" (HJØRLAND, 2013a, p. 179).

Epistemic stances (pragmatic, positivistic, operationalist, referential, instrumental, empiricist, rationalist, realist, etc.) make claims to what kind of knowledge can be created through research, and how it is gathered and how it is presented. Through epistemic stances we have a systematic view on reality, our knowledge of it, and the meaning we can ascribe to it (TENNIS, 2008, p. 103).

The general theories about how valid and useful knowledge is produced (or should be produced) are epistemological theories (HJØRLAND, 2002a). Considering that, we propose in this research to look at KO scientific literature published on the Knowledge Organization journal on epistemology of KO and to describe the epistemological influence on the domain. We may visualize the attribute family "epistemic stances influencing the KO domain" through the representation in Figure 9:

Figure 7 - EPISTEMIC STANCES INFLUENCING THE KO DOMAIN
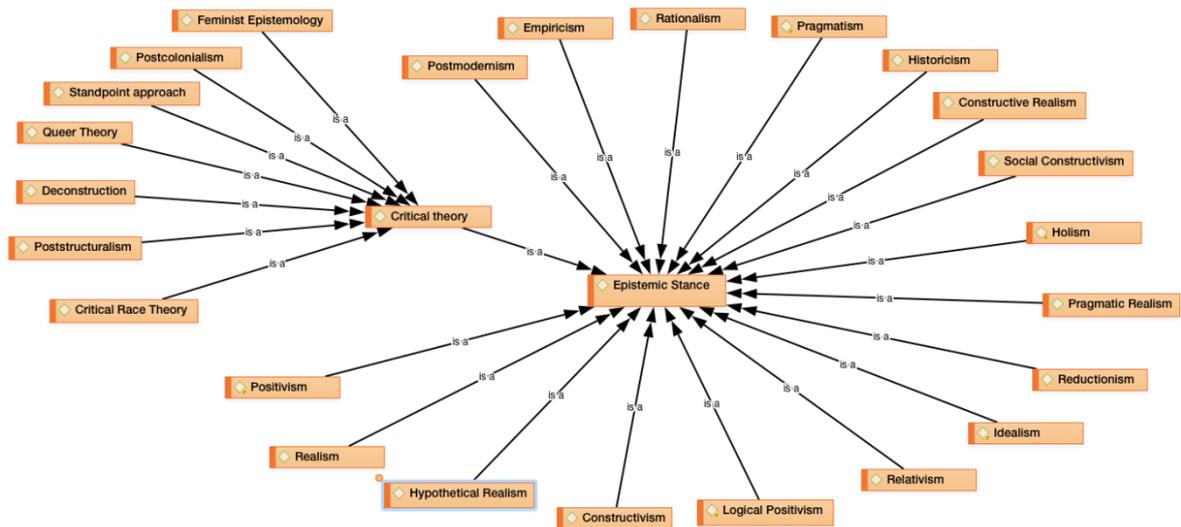
SOURCE: The author (2019).

We describe, in the following sections, the epistemic stances that influence the KO domain indicated by the author that are part of the corpus of this dissertation. Our analysis is based on Hjørland's classification of epistemic stances on the KO domain: empiricism, rationalism, historicism and rationalism. And, in chapter 6 we make a synthesis presenting the epistemic stances that influence the thought of the same authors in the researches that compose the corpus of this dissertation.

5.4.1 Empiricism

"Empiricists claim that sense experience is the ultimate source of all our concepts and knowledge" (MARKIE, 2017). "All concepts, even the most universal and abstract, come from experience (HESSEN, 2012, p. 55, our translation). Empiricism take for granted concrete facts and, in order to justify that point of view, it indicates the development of human thought and knowledge that prove the importance of experience to create knowledge (HESSEN, 2012).

Most empiricism thinkers come from the natural sciences, which can be explained since in natural sciences experience has an important role (HESSEN, 2012). They believe the truth knowledge is based only on experience (LALANDE, 1993).

The statement that all knowledge derives from the senses comes from classical empiricism, which leads to phenomenalism, or the understanding that only observations exist. "Consequently, empiricism can be taken to an extreme ontological

view known as "subjective idealism" or "solipsism." In this perspective the only thing that really exists is in one's own mind, all other things are subjective constructions" (HJØRLAND; HARTEL, 2003, p. 241)

Benton and Craib (2001, p. 14) characterize the empiricist view of science in terms of seven basic doctrines:

> 1. the individual human mind starts out as a "blank sheet". We acquire our knowledge from our sensory experience of the world and our interaction with it; 2. any genuine knowledge-claim is testable by experience (observation or experiment); 3. this rules out knowledge-claims about beings or entities which cannot be observed; 4. scientific laws are statements about general, recurring patterns of experience; 5. to explain a phenomenon scientifically is to show that it is an 'instance' of a scientific law. This is sometimes referred to as the 'covering law' model of scientific explanation; 6. if explaining a phenomenon is a matter of showing that it is an example or 'instance' of a general law, then knowing the law should enable us to predict future occurrences of phenomena of that type. The logic of prediction and explanation is the same. This is sometimes known as the thesis of the 'symmetry of explanation and prediction'; 7. scientific objectivity rests on a clear separation of (testable) factual statements from (subjective) value judgements.

Those basic doctrines can be identified as we look at the process and at the research on the KO domain, and some characteristics related to those doctrines are described by other authors. Hjørland (2014, p. 370), for example affirms that empiricism and rationalism are based on common assumptions, such as: – individualism/atomism (rather than on holistic, collectivistic, social epistemologies); – ahistorical thinking (rather than on historicism/evolutionary epistemology); – claimed neutrality (rather than on engagement, political interests, partisanship, values, pragmatic enterprises).

Hjørland (2005) describes the concepts of empiricism, positivism and rationalism and he also examines their influence in LIS. These concepts are important "for how library and information researchers approach their objects of research (e.g. by preferring quantitative or qualitative research methods). Much more relevant is, however, their importance for how those objects themselves are constituted". Following the same thought, we may identify the empiricist influence on the KO domain, as we describe them in the following paragraphs: information retrieval, indexing process, classification, user studies, numeric taxonomist approach and bibliometric studies.

Since, the concept of KO is connected to the development of classification and indexing systems in libraries, bibliographies, and electronic databases, Hjørland (2003) presents five technology driven phases in the development of KO. The third phase is

Information Storage and Retrieval by Computers. This stage has been influenced by experimental approaches in which recall and precision are well-known measures. They are well-known by extensive use of statistical models of the properties of the document representations, by approaches that try to automate KO using Artificial Intelligence (AI) and expert systems, by applying natural language processing (NLP) techniques and the like (HJØRLAND, 2003).

Empiricism has been the underlying philosophy in that stage in different senses: the attempt to measure the efficiency of subject retrieval points empirically (recall and precision); its avoidance of metaphysically based classification; its favor of atomist subject access points such as the Uniterm System and similar systems depending on specific words from the document themselves (HJØRLAND, 2003, p. 90).

The characteristics of the physical paradigm is evident. We see the connection between information retrieval and KO and how that paradigm influences it. Recall and precision related to the indexing process, for example, are seen as measures that can be controlled in laboratories. The physical paradigm excludes the active role of users in the information retrieval process (CAPURRO, 2003).

Zins (2004) claims that epistemological analysis helps us to distinguish between two kinds of structures: conceptual cognitive pre- experiential structures and external recorded or documented structures. In that context, he adds that there are two major structuring approaches: rationalistic structuring methods, and empirical structuring methods. The author (2004) believes that identifying and formulating these methods set an agenda for classification research.

Any empirical perception is the product of the synthesis of a multiplicity of sensory data based on Kant. "He identified in any perception a priori components, which gives meaning to the diversified sensory raw material and constructs it into one unit" (ZINS, 2004, p. 51). Based on the philosophical literature that followed Immanuel Kant's "Critique of Pure Reason" (1781), Zins (2004) states that "knowledge as a state of mind is a product of a synthesis".

Therefore, we acknowledge that empiricism "is the epistemological standpoint that observation and (sensory) experience should be regarded the most important or only method to gain knowledge and the all controversies should ideally be reduced to claims that can be verified by observation" (HJØRLAND, 2005, p. 134).

Zins (2004) takes an empiricist stance to argue in his research, and he clarifies it saying that he follows Kant's principle of a priori knowledge, without adopting his

suggested a priori categories. He acknowledges that every empirical perception is composed of two basic components: the empirical sensory impressions, namely what we perceive through our senses, and the a priori concepts, by which these impressions acquire meaning and are composed into one unified thematic unit.

Another characteristic of the empiricist point of view can be noticed when Zins (2004) argues about knowledge maps and schemes, like classification systems, as objective and universal knowledge. He believes they "help to shape our cognitive maps, and thus influence the way we perceive the knowledge domain and act in the real world". Furthermore, Zins (2004) explains that the research agenda for KO is "to establish scientific methodologies aimed at designing scientific knowledge maps applicable to all fields of knowledge.

User-based and cognitive classifications are described as an approach to KO by Hjørland (2013a). Therefore, user-based and cognitive approaches are not appropriate ways to answer trivial questions in KO like: Should document A be classified in class X? Is term A synonymous with term B? Regarded to that approach there is the tendency to ask users and to consider the user´s study better research than the scholarly studies of knowledge domains. This way, Hjørland (2013a, p. 175) states that "the user- based tradition thus represents one among other examples of how empiricism as a theory of knowledge has influenced KO".

Behaviorism is a dominant form of empiricism in user-studies in IS. That view implies that users are responding to stimuli in mechanical ways following universal laws that are common for all human beings. Both empiricism and behaviorism tend to neglect the role of culture and language in cognitive processes (HJØRLAND, 2003, 2005).

The statements presented through this section show that for the empiricism approach, the knowledge we have about one subject is a posteriori, dependent upon sense experience. Empiricism also deny that we have innate ideas in the subject area. Sense experience is the only source of ideas (MARKIE, 2015).

Hjørland (2013a) considers KO researchers need to take numeric taxonomic approaches very seriously. The school of numeric taxonomy would classify animals on the basis of as many properties as possible and then, use some kind of similarity coefficient to classify similar animals. If we consider an empiricist approach, it would state that such properties must be selected on a basis which is not biased by the researchers' stances.

"However, what the numeric taxonomist has to work with are the descriptions of the objects made by themselves or by other (former) researchers" (HJØRLAND, 2013a, p. 176). Thinking of numeric taxonomic approach (statistical methods such as cluster analysis, factor analysis, etc.), what need to be analyzed is that "in order to apply or interpret the results of similarity coefficients we have to give up the empiricist doctrine of "non-biased" descriptions (and collections of such)" (HJØRLAND, 2013a, p. 176).

Even the empiricism is present in the discussion about numeric taxonomist approach, Hjørland (2013a, p. 176) recognizes that:

> The empiricist doctrine of non-biased descriptions of documents is non-tenable (this goes for the use of descriptors, titles, text or bibliographical references and any other element or combination thereof). Any choice will make a difference with regard to the classification of documents, and how can we decide which choice is best? Well, if we assume that cladistics taxonomy is the best scientific evidence about the classification of animals, then this theoretical view should also inform our evaluations of document descriptions and similarity measures.

Furthermore, Hjørland (2013a) indicates that even there are many expressions about the importance of substantial theory, the tendency in IS studies and numeric taxonomy has been committed to the empiricist ideal. We see the empiricism influence in IR and user studies, for example. Classical empiricism is visible in studies collecting information on user behavior, in which users are selected in ways that are neutral in respect to the hypotheses of the researcher (HJØRLAND, 2014, p. 370).

Smiraglia (2002, p. 339) approached empiricism in KO and cited important empiricist approaches to the advancement of the catalog as a tool of the modern age, like questions of file design, record construct, and entity-relationship definition. He states: empiricism, represented by scientific research in the positivist paradigm, was clearly called for if the cause of KO was to advance".

Another approach of the KO domain that has some research committed to the empiricist epistemology is bibliometric study (HJØRLAND, 2013a). For a long time, bibliometric study was made without considering the context, theories, and epistemological influence which put them closer to the empiricist stance. Hjørland (2002) proposes bibliometric studies as one of the eleven approaches of domain analysis. By doing that, he acknowledges that, in order to interpret bibliometric analyses properly, one needs some knowledge of other kinds too, including historical studies, epistemological and critical studies.

Therefore, there are new understanding about the role of bibliometric studies. Hjørland (2013b, 2013d) believes that bibliometric may provide KO with a new a valuable epistemological perspective. Castanha and Grácio (2014) furnish a new approach by presenting domain analysis and metatheory as important contributors to bibliometric studies.

We may also consider some empiricist theories influencing the classification and indexing process, since they are based on the idea that similar objects share a large number of properties. Those properties dictate the way they are classified based on neutral criteria, "not on the selection of properties from theoretical points of view, as this introduces a kind of subjective criteria, which is not approved by empiricism" (HJØRLAND, 2014, p. 370).

Hjørland (2014) also states that there are also empiricist theories in KO that search for consensus among indexers. It is understood that "the correct indexing is the one that indexers agree on, and empirical studies of inter-indexer agreement are believed to reveal correct indexing […]". We consider that as a questionable assumption, because the indexing process depends on people, even it is used automatic indexing someone is responsible by the design of the system. The indexers have different points of view, and they are influenced by different epistemic stances during they lives, which certainly influences he decision making during the indexing and classifying process.

Hope Olson's research was investigated in order to identify the epistemic stances influencing her research regarded to the methods used. Martínez-Ávila and Beak (2016) analyzed eight papers that follow an empiricist stance. The epistemological stance identified in the papers are directly related to the methodology used by the authors. Olson (2006), for example, applies a quantitative and thematic content analysis of the KO literature in the journal Library Quarterly.

Another empiricist article classified by Martínez-Ávila and Beak (2016) is the one published by Olson and Wolfram (2007) where they examine inter-indexer consistency to determine if group consensus is reached by larger numbers of indexers and what, if any, relationships emerge between assigned terms. The authors applied basic data modeling and the exploratory statistical techniques of multi-dimensional scaling (MDS) and hierarchical cluster analysis to determine whether relationships exist in indexing consistency and the cooccurrence of assigned terms by 64 Master of Library and IS students.

Regarded to that study, it seems they "expect that there is one correct way of indexing documents and that indexers who differ from other indexers are wrong. The last expectation is problematic because indexers may be consistently wrong in their indexing" (HJØRLAND, 2005, p. 146). Therefore, the empiricist stance is noticed in Olson and Wolfram's research as they seek to measure the consistency among indexers, which has a close relation to one of the basic empiricist's doctrines presented by Benton and Craib (2001, p. 14): "scientific laws are statements about general, recurring patterns of experience".

Martínez-Ávila, Semidão and Ferreira (2016) present the methodological configuration of critical theories on the KO domain. Sandra Harding is one of the first authors to approach feminist epistemology in her research in 1982 (GRASSWICK, 2018). They follow Harding's categories to feminist epistemologies: empiricist/positivist approach, standpoint approach, and poststructuralist approach, "from the greatest objectivity to the greatest subjectivity in the relationship between the knowing subject (the knower) and the known object".

The empiricist/positivist approach, on the objectivity extreme, "considers a common material and objective reality that can be studied by scientists to generate universal scientific truths". There is a focus on the neutrality of scientific method, context is rarely considered, and bias is considered something negative that should be removed from universal classification for the sake of neutrality and equality between women and men (MARTÍNEZ-ÁVILA; SEMIDÃO; FERREIRA, 2016, p. 120).

We have seen until now that "empiricism is the view that experiences, observations or sense data are the only or the most important way of acquiring knowledge" (HJØRLAND, 2005, p. 130). What differentiates empiricism from other epistemologies is that what we see (or what we describe as our experiences) is independent of our theories, conceptualizations, culture and political interests […]" (HJØRLAND, 2005, p. 134).

The coding process in this dissertation brought to light the empiricist influence on the KO domain regarded to process like information retrieval, indexing process, classification, user studies, numeric taxonomist approach, and bibliometric studies.

5.4.2 Rationalism

Different from empiricism, "rationalists claim that there are significant ways in which our concepts and knowledge are gained independently of sense experience" (MARKIE, 2015). Rationalism (ratio = reason) is the epistemological point of view that understands the thought and reason the main sources of human knowledge (HESSEN, 2012).

We may cite two main rationalist views: - "first, they argue that there are cases where the content of our concepts or knowledge outstrips the information that sense experience can provide"; - "second, they construct accounts of how reason in some form or other provides that additional information about the world" (MARKIE, 2015).

Furthermore, to rationalists a knowledge only deserves that name if it is necessary and has universal validity. Rationalists also believes that every genuine knowledge depends on thought. It is the thought, therefore, the true source and foundation of human knowledge (HESSEN, 2012, p. 49, our translation)

Most of rationalism thinkers come from mathematics. The most ancient philosopher is Plato, and he believes the sense never would be able to produce a genuine knowledge. Because the experience world is in permanent change, it is uncapable of transfer any genuine knowledge (HESSEN, 2012, p. 50, our translation).

Rationalism implies in adopting at least one of the three rationalist's claims:

> *The Intuition/Deduction Thesis*: Some propositions in a particular subject area, S, are knowable by us by intuition alone; still others are knowable by being deduced from intuited propositions. *The Innate Knowledge Thesis*: We have knowledge of some truths in a particular subject area, S, as part of our rational nature. *The Innate Concept Thesis*: We have some of the concepts we employ in a particular subject area, S, as part of our rational nature (MARKIE, 2015)

René Descartes (1596-1650), Benedict de Spinoza (1632-1677) and Gottfried Wilhelm Leibniz (1646-1716) are classical rationalists. For rationalists, the most important knowledge is given a priory. The model science for rationalism was geometry, which demonstrated that it is possible to build a whole science without making any observation. "In all its forms rationalism is an epistemology that emphasizes the role of conceptual clarity and evidence and which prefers deductive methods rather than inductive methods" (HJØRLAND, 2005, p. 135).

Dousa and Ibekwe-SanJuan (2014, p. 152) state that rationalism "posits that knowledge is formed through the rational intuition of general categories and the

structuring of classes within those categories on the basis of rules of logical definition and division". And Hjørland (2005, p. 135) argue that "rationalism tends to use a "top-down" analysis in the processing of information, I.e. to approach a given set of data from some preestablished categories".

From the analysis of the corpus of this dissertation, we identify the rationalist influence specially in classification systems. García Marco and Estebán Navarro (1993, p. 129) believe epistemology is very important to the develop of IS, especially regarded to a theory of classification. "This is because documentary classification systems are in close relationship with the two principal contemporary Western approaches to human knowledge - rationalism and logical positivism".

As Hjørland and Hartel (2003, p. 244) explain, the complex interaction of ontological, epistemological and sociological factors influencing the development of fields of knowledge, they recognize that "it is an old rationalist dream to uncover the structure of the world as well as the structure of our knowledge in an a priori way, once and for all". There is a connection to the aim to achieve a perfect language and perfect system of KO.

When Hjørland (2003) approaches the two kinds of organization that KO embraces, the intellectual and the social organization of knowledge, he states there are different theories or conceptual frameworks regarded to both of them. He acknowledges that the rationalist conceptual framework sees scientific concepts, theories and fields as reflecting a neutral and objective reality.

Furthermore, Hjørland (2003, p. 105) recognizes that some "systems are mostly based on rational rules and deductions (while often ignoring empirical issues). Facet-analytic systems in the tradition of Ranganathan may provide the best examples".

Hjørland (2003) indicates facet analysis as one of the approaches to KO and he states it is based on the epistemology of rationalism. Universal Decimal Classification is considered an early manifestation of facet classification. However, it is the work of W. C. Berwick Sayers that transformed facet classification a research-bases approach within the KO domain (HJØRLAND, 2013c).

S. R. Ranganathan, an Indian mathematician and library scholar, was a Sayers' student and, from his background in mathematics and the influence from Hindu thought, he developed the axiomatic approach much broader and deeper compared to Sayers (HJØRLAND, 2013c).

We know that facet classification has a relation with logic and that is evident in Sayers work as Miksa (1998, p. 64) acknowledges that "the most striking correlation that he made in this respect was to adopt definitions, relationships, and operations that arose from Aristotle's five predicable – i.e., genus, species, difference, property, and accident". Interestingly, the logical principles and the way it provides structures in KOSs ae the strength of facet-analytic approach (HJØRLAND, 2013c).

On the other hand, Hjørland (2013c) indicates two main weaknesses of the facet-analytic approach: 1) its lack of empirical basis and 2) its speculative ordering of knowledge without basis in the development or influence of theories and socio-historical studies.

Furthermore, he criticizes that the rationalist point of view of the facet-analytic approach "seems to be based on the problematic assumption that relations between concepts are a priori and not established by the development of models, theories, and laws" (HJØRLAND, 2013a, p. 175). Hjørland's criticizes is understandable if we consider that he has a more pragmatist and historicist point of view, which considers every KOS and research is influenced by theories, methods and epistemologies.

Tennis (2008, p. 108) recognizes a pragmatic rationalist stance in Ranganathan's facet-analytic approach, that postulates the fundamental categories: personality, matter, energy, space, and time, known as PMEST. Ranganathan claims that all categories of subjects could be reduced to those five, therefore, all distinct components of any subject could be represented by them. And, "in his unique style of design research firmly postulated the categories (in a way rationalist), and claimed they existed until proven otherwise linking the ontological status of his PMEST to a more pragmatic concept of usefulness".

Even Tennis (2008) recognize a rationalist stance in Ranganathan's thought, he acknowledges it is not a strict rationalist stance. Tennis (2008) states that for "Ranganathan utility was the final judge. His fundamental categories were used to classify in order to save time for the reader".

On the other hand, Hjørland (2014) disagrees with Tennis (2008). He says he would not consider Ranganathan a pragmatic philosopher, because there is a sharp distinction between "pragmatism" and "practicalism". Hjørland believes Ranganathan probably made many practicalist decisions, and he is considered a practicalist classificationist researcher.

Hjørland (2013c) recognizes in facet analysis, the methodological principles sometimes mention empirical elements (such as examining a representative sample of texts) and pragmatic criteria (such as producing the most helpful classification). Nevertheless, "these elements are so vaguely peripherally described that they do not change the general conclusion of facet analysis as a rationalist approach based on a priori knowledge, not on empirical knowledge or on historical or pragmatic methods" (HJØRLAND, 2013a)

Satija (1992) analyses Ranganathan's contributions an considers verifiable facts were the basis of his theory. Those facts would be obtained by observations. This way, Satija considers some empiricist characteristics in Ranganathan's approach. Mazzocchi (2013) believes Ranganathan's thoughts cannot be restrained within the limits of rationalist-empiricist debate because it involves conceptual elements which are extraneous to the Western tradition. Dousa and Ibekwe-SanJuan (2014) show that Julius Otto Kaiser's method of systematic indexing, as well as Brian Vickery's method of facet analysis, combine classical features of rationalism with elements of empiricism and pragmatism.

Hjørland (2014) contradicts all of them. Regarded to Satija (1992) oppinion, Hjørland (2014, p. 372) explain that facet-analysis has not developed an empirical methodology. When approaching Mazzocchi (2013) belief, Hjørland (2014, p. 374) describes it as a rationalist argument: "it is precisely the idea of concepts and categories fixed to the human cognitive system (and thus not empirical or culturally relative) that for me, define rationalism in classification".

When discussing Dousa and Ibekwe-SanJuan (2014) point of view, Hjørland (2014) assumes that it is not surprising that they identify some empirical and pragmatic elements in rationalist systems, since facet analysis has an elaborate rationalist methodology, while its empirical and pragmatic methodology is almost absent and not specified in a way that can be considered to provide design principles for KOS.

Hjørland (2014) makes a strong statement regarded to facet-analysis approach:

> "Rationalist theories of KO" suggest that subjects are constructed logically from a fundamental set of categories. The basic method of subject analysis is then "analytic-synthetic," to isolate a set of basic categories (=analysis) and then to construct the subject of any given document by combining those categories according to certain rules (=synthesis). Also, the applications of other rules, such as logical division, are by principle part of the rationalist view.

Furthermore, Hjørland (2014) argue that facet-analysis is based on rationalism because it has not a well-developed empirical methodology, and it ignores the theory-laden, cultural and value-based aspects of classification.

By analyzing the papers of the corpus of this dissertation, we also found some traces of rationalism in Zins's research. He claims that the epistemological analysis helps us to distinguish between two kinds of structures: conceptual cognitive pre-experiential structures and external recorded or documented structures. The pre-experiential constitutive concept sets the boundaries of the knowledge domain. And, the pre-experiential structure represents logical, linguistic, explanatory or probabilistic relationships among relevant related concepts and their sub-concepts (ZINS, 2004).

Three examples are presented to explain his theory, Zins (2004) states that when we look to a, for example, a graphical design that shows two crossing triangles, we recognize the Star of David and intuitively connect it with concepts like Jewish religion, Judaism, Synagogue and Israel. He affirms: "note that none of these terms appears in the graphical design itself. They exist in my mind prior to seeing the images". The belief that our knowledge can be structured in an a priori way reveals the rationalist influence.

Zins (2004, p. 54) acknowledges his rationalist stance as he concludes his paper: "I foresee that scholars and practitioners will make a joint effort to explore and practice what I call "scientific knowledge mapping," namely the development of knowledge maps based on scientific as well as critical rationalistic methodologies".

Another rationalist approach is described by Jonathan Furner (2009) when presenting the concept of identity and also its significance for KO. The study questions: how well do KO systems represent identity? Furner (2009) cites the rationalist philosopher Gottfried Leibniz's Law and the two modern metaphysicians' principles or theories that have derived from it: the principle of the identicality of indiscernible, and the principle of the indiscernibility of identical.

> The principle of the identity of indiscernible states that, if x and y are qualitatively indiscernible, then they are numerically identical. This statement is logically equivalent to the statement that only if x and y are identical are they indiscernible. In other words, indiscernibility is a sufficient condition for identicality, and identicality is a necessary condition for indiscernibility. Correspondingly, the principle of the indiscernibility of identical is that, if x and y are numerically identical, then they are qualitatively indiscernible. Taken together, the two principles imply that x and y are identical if and only if they share all and only the same properties (FURNER, 2009, p. 6).

"Even though these principles may appear, on face value, to be reasonable— tautologous even—each of them has actually turned out to be fairly controversial" (FURNER, 2009, p. 6). Many questions are raised on that subject, and they are of interest of many people in KO, because they are related to the design of systems that can determine mechanically whether one document is an instance of the same work, or class, or kind, or type, as another document (FURNER, 2009).

The authors of the papers we analyze in this dissertation, demonstrate so far that different epistemologies influence all KO activities in a different way, considering their beliefs and assumptions. The analysis of the corpus of this research shows that rationalism influences the design and development of KOSs, specially, classification systems. We may state that facet classification is the most cited example to demonstrate that.

5.4.3 Historicism

Historicism is a philosophical method that attempts to explain systematically through history, namely by the circumstance of the evolution of ideas and habits or through the transformation of economic structures, all the relevant event from law, moral, religion and all the forms of progression of consciousness (JAPIASSU; SOUZA FILHO, 1990).

> Historicism seeks to describe and interpret the unsystematic variety of the reality of society and history, for the concept of individuality not only embraces individual persons but also includes the variety of historical forms, such as different peoples, customs, cultures, institutions, nation-states and the like; and the concept of development includes the historical process—at a particular time and place—within which individuality manifests itself not by abstract, general laws or principles but by the living expressions of the multiplicity of these unique historical forms (HOLMES, 2017).

Thornton (2018) describes historicism as the "belief that history develops inexorably and necessarily according to certain principles or rules towards a determinate end […]". Thomas Kuhn, Imre Lakatos, Paul Feyerabend, and Larry Laudan, José Ortega y Gasset are some important historicists we know.

"Kuhn is generally considered a philosopher associated with historicism and pragmatism, and he brought an end to logical positivism (which combined empiricism and rationalism)" (HJØRLAND, 2014, p. 374). The book "Structure of Scientific Revolutions" written by Thomas Kuhn, "was the original manifesto of historicist

philosophy of science and remains the primary reference point. His work thus provides the most useful platform for recounting early historicist efforts—and the difficulties they faced" (NICKLES, 2017).

"Historicism, understood as an outlook on the world (*Weltanschauung*), emphasizes the historical quality of human existence; as an interpretation of history and life, it concerns itself with concepts of individuality and with individual development" (HOLMES, 2017). We may cite some statements made by Kuhn from a historicist and pragmatist point of view: - the data are not theory-neutral, hence not cumulative from one period of science to another; - observation is theory laden to say that *all* major aspects of a science are laden by the others. Substantive data and theoretical claims, methodological standards, goals, and even the social institutions of science are all bound up in mutual dependence; - there are different historical scales in play: individual theories, paradigms, and the still longer-term perspective of a succession of paradigms (NICKLES, 2017).

The KO domain has begun to turn increasingly to the tools of qualitative analysis to explain the complexities of phenomena surrounding knowledge and its documentary record. There is an attempt to move beyond empiricism, to bring a historicist epistemology to bear on the problem of KO (SMIRAGLIA, 2002, p. 342)

Considering a historicist stance, it is on the basis of pre-understand and holistic perception that concepts are formed in a historical process. We recognize a "circularity between the forming of simple and complex concepts. The relations between simple and complex concepts are relative in relation to interests. Traditions and social communities play important roles for the forming of concepts" (HJØRLAND, 2003). From a historicist stance, the development of meaning is made in a social context. This view about concepts on the KO domain is the closest to the pragmatist stance, as we will see in the next section.

We may recognize some historicist influence in bibliometric studies the same way as Hjørland (2013a) did when he cited Small's statement (1973, p. 265): "co-citation patterns change as the interests and intellectual patterns of the field change". Hjørland (2013b, p. 177) acknowledges that Small's statement opens the door to a historicist epistemology, "which considers the relation between papers and concepts in the light of research traditions and paradigms". Bibliometrics provides KO with a new and valuable epistemological perspective.

In general, Hjørland (2014) describes that historicist theories of KO "suggest that the subject of a given document is relative to a given discourse or domain and, by implication, the classification should reflect the need of a particular discourse or domain". The KOSs are developed and interpreted from a particular horizon. Furthermore, "any question put to such a system is put from a particular horizon. All those horizons may be more or less in consensus or in conflict. To index a document is to try to contribute to the retrieval of "relevant" documents by knowing about those different horizons" (HJØRLAND, 2014, p. 371).

Both pragmatic and critical theories of KO emphasize that subject analysis should support given goals and values and should consider the consequences of indexing. From a historicist point of view, classification and indexing cannot be neutral. Classification, indexing and all the library and information services serve human goals, and all those activities should be done in a way that best supports these goals (HJØRLAND, 2014).

As Hjørland (2017) advocates about domain analysis, he states that the theoretical assumptions of the field are very important and that we need to take theory seriously in KO. Historicism, hermeneutics and pragmatism are the theories which assumptions are closer related to domain analysis beliefs. That is true considering that historicism "emphasizes the historical, developmental, and, generally, broader contextual factors involved in the shaping of knowledge" (DOUSA; IBEKWE-SANJUAN, 2014, p. 152), the same way domain analysis approaches is applied.

We may find many researches that follow a historicist stance. Martínez-Ávila and Beak (2016) identified three historicist's papers (MARTÍNEZ-ÁVILA; SAN SEGUNDO; OLSON, 2014; OLSON, 2004, 2010) written by Hope Olson. Olson (2010), for example, addresses the question of whether or not the twelfth-century classification of knowledge by Hugh of St. Victor's Didascalicon, is part of the Aristotelian tradition of classificatory structure. By applying the method close reading, Olson attempts to explain systematically the impact of the historical, religious, and intellectual aspects of his cultural context on the classification, which make clear the influence of historicist epistemology.

Considering what we presented so far, we may state that the historicist stance is very important for the development of domain analysis in KO. Historical studies of information structures and services in domains are one of the eleven approaches to domain analysis presented by Hjørland (2002b). Furthermore, domain-analytic view

acknowledges that all KO activities and process are influence by theories, methods and epistemologies. Every analysis of a domain presupposes some knowledge about the domain background, its conception, development, key actors, theoretical, methodological and epistemological influences. All of that make clear the necessary application of the historicist and pragmatic thought regarded to that knowledge.

5.4.4 Pragmatism

The pragmatist thought believes the individual is not a theoretical and thinking being, but a practical being. People´s intellect has not the function to inquire and to know, but to guide the individual in reality. "The truth of knowledge consists in the agreement of thought with the practical goals of man" (HESSEN, 2012, p. 40, our translation). And, "the final criteria of truth are connected to human goals and activities" (HJØRLAND, 2003, p. 106).

Charles Sanders Peirce (1839–1914), William James (1842–1910) and John Dewey (1859–1952) are the most important classical pragmatists in history. The raise of pragmatic philosophical tradition was originated in the United States around 1870. Pragmatist´s thoughts declined during the first two thirds of the twentieth century, but in the 1970s some philosophers were willing to use the writings and ideas of the classical pragmatists. By that time, "pragmatist ideas were recognized as able to make a major contribution to philosophy" (HOOKWAY, 2016, p. 1).

Pragmatism is a metatheoretical perspective that has received considerable attention among KO researchers. It also constitutes a North American contribution to the metatheory of KO, even much impulse comes from Scandinavian researchers, too. "The core defining feature of Pragmatism is the epistemological tenet that the meaning of a concept or the truth of a statement is to be evaluated with reference to the experiential or practical consequences of its application" (DOUSA, 2010, p. 65).

Hjørland (2008, p. 99) discusses the fields that influence the KO domain, such as linguistics, computer science, natural language processing, theory of knowledge, theory of social organization, for example. When he approaches the connection between linguistics and KO, he also recognizes pragmatism as a satisfactory metatheory to draw from those related fields, since we must understand that both are influenced by changing epistemological views and interdisciplinary trends.

The pragmatic view acknowledges "knowledge and KO as something constructed to deal with some human needs and interests" (HJØRLAND, 2008, p. 97). Dousa (2010) describes the following features of pragmatism based on Jacob (2000):

- **antifoundationalist**: it claims no absolute epistemic certainty vis-à-vis the validity of any single concept or belief;

- **fallibilism**: concepts and beliefs are always open to challenge, revision, and improvement;

- **contingent**: any new experience can trigger revision of one's concepts and beliefs;

- **socially embedded**: knowledge claims are evaluated within the framework of a community of inquirers;

- **pluralist**: different individuals and (sub)communities within a single social framework may hold differing knowledge claims with respect to a given phenomenon;

Regarded to fallibilism, one of the characteristics of pragmatism, Hjørland (2008, p. 98) explains that we cannot not understand documents as representing knowledge. "We should not talk about knowledge or KO, but about knowledge claims and the organization of knowledge claims" (HJØRLAND, 2008, p. 98). Following that thought, we understand that "each knowledge claim is supported by and connected with arguments, theories and world views. If this is recognized by the people performing KO, then the activity is not based on positivism" (HJØRLAND, 2008, p. 98).

When approaching studies in KO adopting a pragmatist perspective, Dousa (2010) states they have tended to incline towards the socially pluralist model articulated by Dewey and championed by Hjørland. "Such a tendency perhaps represents the confluence of certain KO traditions — cf. the production of special classifications, indexes, and subject bibliographies geared towards particular user communities —with a postmodern Zeitgeist […]". This postmodern tendency "endorses a view of knowledge as formed by active interaction between people and the world […] and valorizes multiple perspectives on what counts as knowledge while rejecting notions of an absolute Truth" (DOUSA, 2010, p. 69).

We may indicate the influence of pragmatism in different instances of the KO domain, such as: Hjørland's thoughts on concept theory, experientialist approach to

classification, indexing process, domain analysis, classification, domain analysis, Ranganathan's thoughts, and big data, as we will discuss in the next paragraphs.

Concept is one of the fundamental subjects of the KO domain. Hjørland (2003, p. 100) acknowledges that "the theory of concepts (meaning, semantics) is, however, probably one of the most difficult and muddled research fields today". Ingetraud Dahlberg created the Concept Theory in the 1970s. Her theory has its origin in the General Theory of Terminology from Eugene Wüster and the Theory of Facet Classification from Ranganathan.

Dahlberg (1993, p. 211) states that concepts are the basic knowledge unites that any organization of knowledge must be based. "Concepts consist of concept elements, also called concept characteristics and exactly there are the factors by which concept systems – and classification systems are such concept systems – can be constructed".

"The concept theory grounded the determination of concepts and the connections between them in a conceptual knowledge organization system" (MELO; BRÄSCHER, 2014, p. 71, our translation). Hjørland (2003) believes that "it is important to understand the different views between traditional theories based on logical positivism and alternative views based on pragmatic theories", when we are talking about concept theory.

> Pragmatism understands concepts as a way to fixate parts of reality in thought, language, and other symbolic systems. These parts of reality are not fixated just by similarity (as assumed by empiricism), by logical division (or similar rules as assumed by rationalism), or by genealogy (as supposed by historicism), but by what is considered to be functional equivalent classes of things (HJØRLAND, 2009, p. 1526).

We acknowledge that Hjørland's (2003) view about the concept theory is related to pragmatism. He abandons the idea of a definitive notion of information and shows that information is an action witch meaning is constructed from social and cultural contexts of knowledge in different discursive communities. We find evidence of that statement when Hjørland (2009) argue that "historicist and pragmatist understandings of concepts are the most fruitful views and that this understanding may be part of a broader paradigm shift that is also beginning to take place in information science".

From the corpus of analysis of this dissertation, we may indicate the presence of a pragmatist influence on Tennis' proposal of an experientialist classification theory,

a theoretical framework of embodied, infrastructural, and reified KO. That statement is evident in the following assertion:

> Relationships between concepts in a classificatory structure can be expressed in many ways, and more importantly, they can be experienced in many different ways through the embodied mind, through an infrastructural boundary object, or because of social reification. However, these relationships are represented, they are not represented once and for all. Classification happens in time and for a purpose. Times change and purpose changes, and so too must classificatory structures (TENNIS, 2005b, p. 91).

The experientialist approach to classificatory structures proposes that being able to manipulate the structures is an integral part of classificatory structure design, since the purpose of classification is to represent concept in relationships among one another that can help a user find information (TENNIS, 2005b, p. 91). This way, we see that the concepts and the classificatory structure are open to revision and improvement when the people's experience demand the necessity of change. And, that express one of the fundamental characteristics of pragmatism.

Another pragmatic influence on the KO domain was cited by Tennis (2008, p. 108) as he states that "theory is a set of propositions used to explain some phenomena; it is a narrative". In order to present an example, he cites the Peircean view on the study of signs, informed by a particular pragmatic epistemic stance.

> Peirce has been used by KO researchers, as have a number of thinkers in semiotics (a related body of theory to semiology). In this case the phenomena are signs. The constructs are the different types of signs (icon, index, and symbol) and different parts of signs (object, interpretant, and representamen) (Sonesson 1998a, 1998b). The propositions are, in this case, the coordination of the phenomena and the constructs, that once assembled in a particular order, tell the story of different types of signs, according to Peirce. Mai, interested in this theory, took the Peircean constructs, and applied them to the indexing process (Mai 2000, 2001). In so doing, he constructed a story about that process, that we could expect to find unlimited semiosis in it (TENNIS, 2008, p. 104).

Mai's research on Peircean semiotics and KO has an expressive importance in the domain. Mai (2001) offers semiotics as a framework for understanding the interpretative nature of the subject indexing process. This way, a more detailed description of the process is offered which shows that the uncertainty generally associates with this process is created by the fact that the indexer goes through a number of steps and creates the subject matter of the document during this process.

The most important assertion about that process is that the semiotic analysis of the subject indexing process demonstrates that the first step, the analysis of the

document, involves a kind of interpretation that is highly dependent upon the social and cultural context of the indexer and the indexing process, (MAI, 2001). This way, from a pragmatist stance regarded to the subject process, Mai (2001, p. 620) states that "any study of information seeking, information retrieval, evaluation of information systems and so on should take the fundamental and inescapable interpretative nature of the subject indexing process into account".

The same way, Almeida (2011, p. 111, our translation) seeks to discover the theoretical and applied connections between KO, philosophy and Peircean semiotics. One contribution from Peircean Semiotics to KO is the criticism to the indexing processes as types of inference or dependent of it. "Thinking of indexing process as an inferential activity implies in assuming that the reasoning of the indexer reasoning is formed by three distinct and interdependent arguments: abductive, deductive and inductive" (ALMEIDA, 2011, p. 111, our translation).

"The pragmatic tradition presents language as action and therefore as transmission". The professional working with KO is an interpreter, and its main concern is related to the contextual transmission of signs, presenting analysis of narratives and of discourses, as a method to understand the possibilities of the organization of knowledge. Furthermore, meaning is understood as the use of a term, or its experience. From a pragmatist point of view, "we can understand the world and its social relations in order to organize its heritage from deconstructing understanding of social uses, which gives meaning to artifacts, and to words" (SALDANHA, 2014, p. 298).

The indexing process is based on the indexer's social and cultural context, and that statement is related to the pragmatist features. More than that, Mai's example rests on a Wittgensteinian pragmatism. That epistemology has a role in the ability to create committed theory, and it "is partly because of the knowledge claims laid out by this kind of pragmatism, one based on Svenonius's Instrumental Theory, and committed to situational knowledge and working within the rules of contextual language" (TENNIS, 2008, p. 106).

Dousa (2010) also presents the connection between the scientifically oriented Percian pragmatism and Bliss' thoughts. Bliss posited the existence of a unitary "scientific and educational consensus" derived from the results of scientific investigation and held that the classification of sciences that he had developed on the basis of his understanding of this consensus was consonant with the order of nature.

We may remember by this point that Bliss is one of the first researchers to study the concept of KO, as Dahlberg (1993) recognizes.

"Bliss and Peirce thus both envisioned that the body of scientific beliefs ratified by scientific consensus could offer a true account of the way the external world is—a view born of a shared confidence in the efficacy of scientific method". We may state that the basic parallel between their views is regarded to the nexus between scientific consensus and external reality (DOUSA, 2010, p. 67).

Besides discussing Peirce's thoughts related to KO, Dousa (2010) also reviews the two other variants of Pragmatism that have been influential in philosophy: Willian James' subjectivist practicalism and John Dewey's socially oriented instrumentalism.

William James pragmatist influence is present in Jesse Shera studies, specifically in the KO discourse about classification. Shera (1965, p. 90–91) held that our conceptions of objects and their interrelations are conditioned by the purposes to which we want to put them, fully endorsing the argument that "[n]o one conception invariably represents its reality independent of a particular purpose".

Shera (1965, p. 119) also believes that there are some basic patterns in classification, but the classification can differ from individual to individual. Classifications must be flexible, and that will be achieved by providing multiple approaches to the concepts being related. Shera finds in Jamesian Pragmatism the support to that thought (DOUSA, 2010).

Domain analysis is deeply influenced by John Dewey's pragmatist perspective. The pluralist vision of multiple communities sustained by Dewey, for example, is easily connected to the idea that the universe of knowledge consists of different domains correlated to different epistemic communities. Furthermore, Hjørland's claim that the pragmatic approach is essential to LIS and KO because its connection to the social role of LIS (DOUSA, 2010).

Marteleto and Carvalho (2015, p. 586) recognize the pragmatist stance in the theoretical approach of domain analysis, proposed by Hjørland, who seeks to answer practical questions focused on the demands and the needs of users of information. Thus, it is important to state that domain analysis emphasizes the importance of subject knowledge, and it also combines sociological and epistemological perspective to approach the issues of Knowledge Organization Process (KOPs) and KOSs (HJØRLAND, 2017).

We also acknowledge the pragmatist view on Hansson's (2013) thoughts when discussing the relation between epistemology, social organization and KO. There is a crescent shift in paradigm related to the design and creation of KOS. Hansson indicates that there is a turn of belief, which proposes that reality only exists in relation to our ability to express it. Folksonomy is cited as an example present in that paradigm shift, because it enhances the use of web-based social communities to develop and aggregate tagging practices, providing some form of ontology. That kind of initiative bring together people of different cultural and sociopolitical contexts. Hansson states that it corresponds well to the pragmatics of postmodern thought.

Another similar proposition is presented by Kleineberg (2013). Traditional subject indexing of documents often relies on the organizing principle "levels of being" (WHAT), or classification-as-ontology. For a future context indexing, two novel principles are proposed. An implementation of perspectivism and contextualism in any phenomena-based KOS requires a revision of the underlying concept of phenomenon as a triadic relation between the WHAT (ontology), the WHO (epistemology), and the HOW (methodology) of knowledge.

A pragmatic stance is recognized by Tennis (2008) and Saldanha (2014). Ranganathan explanation about the five-fundamental ideas is seen by Tennis (2008, p. 108) as a more pragmatic stance than a strict rationalist one, "if it is useful, do not worry about real or true. For Ranganathan utility was the final judge. His fundamental categories were used to classify in order to save time for the reader".

On the other hand, Hjørland (2014, p. 372–373) does not consider Ranganatham a pragmatic philosopher. He explains that for him there is a sharp distinction between pragmatism and practicalism, and that Ranganathan probably made many practicalist decisions.

By connecting the development of language in the 1930s and the construction of an epistemology of KO, Saldanha (2014) approximates Wittgensteinian pragmatism to the Ranganathanian vision about the knowing process, its products, and about the organizing process.

There are some aspects coming from a pragmatic-oriented reading related to Wittgenstein's thought that are evidences of the influence of pragmatism on Ranganathan's thought:

> – The idea of a relationship among science, society, and culture that can be applied within information science; – The change from the point of view of the scientificity of information science—from the question: "what is science?" which is unfolded in "social science or humanities;" to the question: "when and how are we useful and responsible in the condition of specialists?;" and,– The debate about the long line of thought in information studies, which is unilaterally structured in a representational philosophy of language (SALDANHA, 2014, p. 298).

Ranganathan "deductively postulated the laws of librarianship and, in the context of theoretical elaboration, of mystical justification, and of the applied demonstration of his deductions he conceived of an intrinsically pragmatic perspective of librarianship" (SALDANHA, 2014, p. 300).

If on one hand, Tennis (2008) approaches Ranganathan thoughts about categories, on the other hand, Saldanha (2014) is concerned with the viewpoint supported by the "use" of books (information). The pragmatic perspective noticed by Saldanha's acknowledges that it is grounded "in posteriori view-point of relations between bibliographic artifacts and the users of these artifacts". This way, "the concept of "library," is thus stated from a viewpoint supported by its "use," as announced in his first law, and not by its previous condition as institution, which "keeps" the "knowledge" (SALDANHA, 2014, p. 300).

Most of Hope Olson's researches are indicated as pragmatists by Martínez-Ávila and Beak (2016, p. 360). They analyzed the epistemic stances and research methods and techniques of the thirty-three journal articles Olson published during the period 1991-2015. "This finding is consistent with the overtly stated feminist and postcolonial approaches (that set the goals of her research)".

Ibekwe-SanJuan and Bowker (2017, p. 193) propose an analysis of the implications of big data for KO and KOSs. They acknowledge that data gathering is not a neutral nor an objective endeavor. "It is governed by pragmatism (the goals of the study) and bound by technical constraints imposed by the data providers. This limits possibilities in terms data sources and content".

We can see that a relatively new field related to KO is bringing different discussions to the domain. It is approached a concern about the principles of falsifiability and fallibilism of scientific theories, two important pragmatism features. There is that concern because, "the sheer size of data and their dynamic and heterogeneous nature (e.g., image, text, sound) make it difficult to subject big-data driven inquiries to rigorous scientific verification" (IBEKWE-SANJUAN; BOWKER, 2017, p. 194). Falsifiability would become obsolete, if we consider that rapidly changing

ontologies (characteristic of big data) are creating incommensurabilities on the fly. In fact, we are moving into a more to Kuhn's perspective of the world in which old theories just cannot be compared with new.

Something that we learn from the arguments presented until here is that pragmatism is based on the assumption that knowledge cannot be neutral. We should look at the knowledge claims, conception, classification, KOSs and uncover the inherent values, consequences, and stances (HJØRLAND, 2009).

We also acknowledge that concepts, beliefs, classifications, KOSs, etc., are always open to challenge, revision and improvement if we consider the pragmatic approach to the KO domain. The socio-cognitive paradigm of KO is also embedded by the pragmatist point of view. Furthermore, when we approach the activity of KO professionals, from a pragmatic perspective, we believe in the pluralism of epistemic stances considering their different theoretical, epistemological e methodological influences. And, different classifications, thesauri, catalogs, taxonomies, etc., serve different foals and values. The same happens to the KO research, this way, it is important to discuss which values and goals they should serve.

6 METATHEORETICAL SYNTHESIS ON EPISTEMOLOGY OF KNOWLEDGE ORGANIZATION

As we identify the epistemic stances that influence the KO domain, described by the researchers from the corpus of this dissertation, we also acknowledge that it is important to describe the epistemologies that influence their own thoughts. We acknowledge that pragmatism is the most prominent metatheory on the KO domain.

Our first look at Garcia Marco and Esteban Navarro's (1993) paper shows a historicist stance, since they think about the background of classification to improve and clarify information specialists or librarians' practical tasks. However, we also identify some traces of empiricist thought, because the authors focus on cognitive science and they acknowledge that

> […] understanding nature implies collecting experiences through senses which are later processed and formalized into concepts and discourses by means of a process that includes, firstly, classifying, by distinguishing among elements, grouping them by relevant dimensions and building criteria for comparison. Secondly it implies ordering by placing, connecting and relating elements along spatial, temporal and other dimensions. Thirdly it involves organizing, through storing, conserving and deleting elements and establishing relationships according to different criteria, and building a knowledge system which becomes more and more complex. From these three cognitive processes result three corresponding types of concepts, which are respectively taxonomic, comparative, and quantitative or measurable.

That description of understanding reality has empiricist features related to, for example, the belief that any genuine knowledge-claim is testable by experience. Some pragmatist approach is revealed through the text, too. Garcia Marco and Esteban Navarro (1993) state regarded to the process of representation that it "can be formalized in terms of the correspondence between the perceptive elements of the environment as effective elements of the system and the perceptive interactions of the environment as effective interactions among elements of the system".

Pragmatist approach is identified in that statement because there is the concern about information and knowledge representation considering the effective communication by understanding the different points of view. Therefore, the context is important in its relationship with the system. Even we identified three different epistemic stances influencing Garcia Marco and Esteban Navarro (1993) research, the empiricist stance is predominant through the paper.

Looking forward, the introduction of the concept of imagery of KO by Bies (1996) presenting the importance of metaphors and images such as "tree of knowledge" and "map of knowledge", demonstrate the influence of semiotics and more specifically pragmatism in KO research. Bies's (1996, p. 7) pragmatic approach considers that "not only knowledge as such, but also its organization, representation, condensation and communication are an essential part of the cultural memory". Furthermore, he acknowledges that "not only ideas and subjects, but also their ordering and organization belong to our cultural heritage".

Domain analysis and the three constituted kinds of theories and concepts are approached by Hjørland and Hartel (2003): ontological theories, epistemological theories and sociological concepts. They recognize philosophical realism and social constructivism influencing the relationship among those theories.

Hjørland and Hartel (2003) follow a pragmatic and historicist approach in their research. They believe epistemological dimensions may be uncovered by studying historical developments in a domain and that classification and other KO process may consider different paradigms and their influence in society and different contexts. Furthermore, "as knowledge develops and evolves, the view of structures of the world and the relations between different concepts changes symbiotically".

In fact, all Hjørland's papers analyzed in this dissertation express a pragmatic and/or historicist stance (2003, 2008, 2013b, 2014, 2017). In two of them he approaches the conception of KO (HJØRLAND, 2003, 2008). Hjørland (2003) acknowledges that the basic unite of KO are semantic relation between concepts. He also explains that those "semantic relations cannot primarily be established by universalistic assumptions, but much primarily be understood as domain specific, as uncovered by (and constructed by) scientific disciplines" (HJØRLAND, 2003, p. 107). Those are assumptions made based on pragmatist theory.

Furthermore, when Hjørland proposes a socio cognitive paradigm based on epistemological assumptions he also shows the pragmatic influence. Hjørland (2008, p. 99) states that "domains are influenced by changing epistemologies views and interdisciplinary trends and, epistemology is a simply and deeper way to understand the connection between KO and other domains, like linguistics". He advocates that a satisfactory metatheory to make and explain those connection is pragmatism.

Following the same thought, Castanha and Grácio (2014) propose that domain analysis and metatheory are considered significant contribution to bibliometric studies

when emphasizing the need for epistemological, sociological and historical analyzes as well as other qualitative approaches. Even bibliometric studies is mostly considered a empiricist method, Castanha and Grácio (2014) believe that epistemological, sociological and historical analysis can be applied by domain analysis and metatheory approaches connected to bibliometric studies, making evident the presence of a pragmatic stance.

The assumption that knowledge is fallible and KO has to consider different theories/views, their foundations, and different epistemologies (e.g. empiricism, rationalism, historicism, or pragmatism), also makes evident the pragmatist stance on Hjørland's thoughts (HJØRLAND, 2013b, 2014).

Smiraglia (2015b) uses the bibliometric study to analyze application of domain analysis as a methodological paradigm in KO. From a interpretative point of view, Smiraglia (2015b) considers there is a vibrant domain around domain analysis in KO for KO. Thus, there is a discourse in the group that is applying domain analysis. The discourse takes place between the pragmatic need for a specific KOS for different domain, and the classical ontological and epistemological positions in KO represented by concept theory. We may consider that Smiraglia's pragmatic stance can be identified in assumptions like: "domain analysis for KO is a very vibrant field of research and development not only for KO as a science but for humanity at large".

Following the identification authors epistemic stances, we state that in both Tennis' (2005b, 2008) researches, we find a pragmatic approach. As Tennis (2005b, p. 81) states that the experientialist approach to classificatory structures "seeks to build a multidimensional classificatory structure that accounts for the intersections of individual and social meaning, and an intersection of formal and associative structures", for example, it is easy to identify two characteristics of pragmatism, the socially embedded and pluralist approach.

Moura's (2014, p. 304) paper is based on Foucault's discursive formation, and there is connection to social-cognitive approach of KO. The paper aimed to "identify the opportunities and challenges of incorporating epistemological considerations in the act of acquiring knowledge into the consolidation of KO and mediation processes and devices in the emergence of phenomena". The author states the study conducted allowed the observation of a collective effort to settle a semantic interoperability model for the labeling of contents based on best practices regarding the description of the objects shared in Social Semantic Information Spaces (SSIS).

It brings to light the importance of collaborative approaches on the KO domain. She states that the social semantic information spaces represent good perspectives of consolidation of procedures that can represent dynamically the emerging knowledge shared in a network. We may consider that "this theoretical and technological approach may help to improve semantic tools, classifications, navigation taxonomies and methodologies for the construction of a language of indexation in collaborative digital environments" (MOURA, 2014, p. 309–310).

Gnoli (2012) questions the traditional kind of KOSs based on academic disciplines. He presents the three dimensions of KO and differentiates them: ontic, epistemic, and documental. Therefore, the author acknowledges that there is a need for distinguishing between the different dimensions of knowledge items and for treating each dimension separately in an appropriate way.

Many pragmatic features are noticed in Gnoli's (2012) assumption regarding to the León Manifesto (ISKO Italia 2007), which are: - there is a frequent trend towards an increasing interdisciplinarity of knowledge calls for essentially new KOSs and this innovation is feasible; - instead of disciplines, the basic units of the new KOS should be phenomena; - the new KOS should allow users to shift from one perspective or viewpoint to another; - the connections can be expressed and managed by analytic-synthetic techniques.

There has been an increasing interest in the context-dependent nature of human knowledge. And, the same ways as Gnoli (2012), other authors seek the integration between ontological and epistemological theories. Therefore, Kleineberg (2013) explains that contextualism knowledge is not available in a neutral and objective way, but is always interwoven with the process of knowledge production and the prerequisites of the knower. Thus, the author proposes an integrative approach which one might label as "classification-as-ontology/epistemology", what it is named constructive realism. That approach is based on a triadic phenomenon concept and on three fundamental organizing principles: the "levels of being" (ontology), the "levels of knowing" (epistemology), and the "integral methodological pluralism" (methodology). Kleineberg (2013) seeks to avoid the common fallacy that epistemic pluralism implies epistemic relativism.

Kleineberg's (2013) assumption that human knowledge is always knowledge in context and a systematic organization of epistemic contexts is mandatory for KO theory, in particular, for any phenomena-based approach, also reveals his pragmatic

thought. Ridi (2016) follows the same thought and establish a parallel between objective and subjective aspects regarded to the concepts of information, document, knowledge, KO, and levels of reality.

The same way Kleineberg does, Ridi advocates for the constructive realism stance, seeking for a theory of synthesis of objectivism and subjectivism. The theory consists in recognizing that reality is neither completely given nor completely built and it constitutes the paradigm dominant both in epistemology and in KO studies.

Complementary to that approach, we find Hansson (2013) discussing the relation between epistemology, social organization, and KO. Therefore, he assumes a materialistic analysis perspective in a neo-Marxist sense. He believes that "relations between social structure, economic power and division of labor govern the way in which claims of epistemological legitimacy for knowledge organization systems are made" (HANSSON, 2013, p. 385). Among his analysis and propositions, Hansson states that society is the basic unit of KO, which demonstrates a pragmatic perspective.

Santis and Souza (2014) also approach the representation of music, and they discuss about the construction of an epistemological foundation used specifically for classifying the popular song. Since the commercial changes influence the way music is represented, the authors discuss collaborative tagging as an alternative. Hansson (2013) also proposes the practice of social tagging and folksonomies in contemporary society as an examples to show how the relation between epistemology, social organization and KO has proven to be historically stable.

Therefore, in a certain point, Santis and Souza (2014) acknowledge that semiotics establishes criteria to study complex thinking. And, from a semiotic perspective the author considers the influence of phenomenological view lead to the need of a pragmatic approach to artistic classification.

A pragmatic stance is also present in Marteleto and Carvalho (2015) paper that aims to bring together theoretical and methodological constructs developed by Birger Hjørland and Pierre Bourdieu to investigate structures of production, organization and communication of knowledge from a critical point of view, focusing on health. The connection between KO and the sociology of knowledge may favor the generation of new and renovating theoretical and methodological elements for IS to study and understand complex knowledge domains and social fields like health.

Authorship is related to philosophy and KO in Silveira and Saldanha's (2016) research. From their point of view, "studies integrating philosophical, conceptual and

cultural questions in documentary representation allow for a more critical reflection on the deployment of the use of authoring in informational practices" (SILVEIRA; SALDANHA, 2016, p. 265).

Silveira and Saldanha (2016) pragmatic approach considers that the debate about "own name" lacks critical attention from KO, responsible for thinking and implementing ways to identify, order, and access contents and continents, activities that now recognize, now establish, now efface the "own name" as a sociocultural element, prior to an "access point".

Martínez-Ávila and Beak's research studied the methods and theoretical frameworks analyzing Hope Olson's research. The authors state their analysis has its foundations on the poststructuralist stance adopted by Hope Olson throughout her career. We state the authors take a critical position to interpret the methods, theories and epistemologies present in Olson's research, which make evident the pragmatist view on author's arguments.

We also find in the corpus of this dissertations, the implications of big data for KO, addressed by Ibekwe-SanJuan and Bowker (2017). Therefore, looking at their research we may state they also follow a pragmatic thought to approach a new subject. The authors recognize there is the need for humanly-constructed KOSs and they confront the debates within the KO community about the relevance of universal bibliographic classifications and the thesaurus in the web with the ongoing discussions about the epistemological and methodological assumptions underlying data-driven inquiry.

Ibekwe-SanJuan and Bowker (2017, p. 196) propose that the challenge for KO is therefore "to reinvent itself in an information ecosystem filled with algorithms that are continuously crunching data and delivering digital content tailored to users' profiles rather than focusing on one-size-fits-all knowledge bases constructed a priori". It is proposed the integration of traditional KOSs with participatory/collaborative systems, determining how both approaches can be combined in designing KOSs for specific applications and categories of users. Looking at the propositions presented by Ibekwe-SanJuan and Bowker (2017) we identify some pragmatist features: contingent, socially embedded, and pluralist.

Also following the pragmatic thought, Martínez-Ávila, Semidão and Ferreira (2016) analyze the methodological configuration of critical theories on the KO domain. They also criticize neutrality in KO processes and the design of universal KOSs. They

present critical theories as a response to the ethical problems that affect particular groups in those systems. For them, "critical theory influences the epistemological, conceptual, methodological, axiological and even rhetorical spheres".

Martínez-Ávila, Semidão and Ferreira (2016) research is so important for the field, since we recognize the strong presence of critical theory studies on the KO domain. In this dissertation, Campbell (2000), Furner (2009), Samuelsson (2010), Martínez-Ávila, Semidão and Ferreira (2016) show different approaches that are relevant to KO studies and practice.

Campbell (2000) approaches the theoretical distinction between the concepts of aboutness and meaning in KO and regarded to homosexual studies. As the papers explores the literary debate and its implication for the design of subject access systems for gay and lesbian communities Campbell acknowledges that designers of subject access systems can expect to work in a context of intense scrutiny and persistent controversy.

From a Queer Theory stance, Campbell (2000) indicates two problems that challenge our experience on the KO domain: - determining the subject content of a document is an inherently subjective process; - we have come to realize that tools purporting to provide "universal" access provide inadequate access to marginalized groups.

As Campbell recognize the KO activities as a subject process, we identify the pragmatist approach throughout the text, what is justified considering that queer theory and all the critical theories are related to pragmatism. When approaching classification theory and the design of KOSs, the author always refers to contextual, socially determined and culturally relative systems and processes.

When Furner asks "how well do KO systems represent identity", that question is embedded with meaning. One of the concerns on the KO domain is the knowledge representation of racial, ethnic, gender, sexual, national, linguistic, and religious identity. Approaching a pragmatic stance, Furner (2009, p. 14) proposes that "we want our KO systems to represent all identities-as-subjects in a just manner that respects everyone's rights". Therefore, that approach combine the premises of different critical theories seeking to better represent identity in the KOSs.

Furner (2009, p. 15) is claiming that we need to find a new kind of structure for representing the relations among documents. He is not saying that all we have done so far is bad work. Otherwise, he is encouraging people to look at different kinds of

relationships, looking carefully at the similarities between those relationships, and determining the implications of those discoveries of similarity for the design of representational structures. And it is about engaging seriously with the challenges for KO that are presented by analyses of identity and identity-forming processes.

The feminist epistemology is approached by Samuelsson (2010). The author states that her theoretical and methodological approach is poststructuralist and discourse-oriented. Samuelsson (2010) acknowledges she espouses a social constructionist, anti-essentialist perspective. Furthermore, as Samuelsson analyzes the KOSs that index and classify feminist research texts in a Swedish Bibliographic context we identify a research concerned with the KO of feminist research.

We identify the traces of the stance Samuelsson (2010) takes in her researcher in the argumentation about universal KOSs. She states that "feminist knowledge is marginalized and rendered invisible by general knowledge organization systems. This marginalization may in turn be interpreted as a consequence of a putative objectivistic and universalistic epistemology and ontology embodied in these systems".

Samuelsson (2010) acknowledges a close link between KO and power, since indexes, classifications, and feminist texts can always be traced back to the social interests of groups or individuals, and these interests have in turn various social consequences. The author questions: who benefits from the invisibility of feminist material? And why the insistence on working with universal KO systems which continue to render feminist materials invisible? Why the lack of investment in specific KOSs for feminist and gender-related materials?

That criticim, the same way as Campbell's and Furner's, is present on the KO domain and many other researches that seek to propose new approaches to KO and a different way of facing knowledge representation, being more coherent with the nature of KO. We may not continue to neglect those discourses and the representation of identity and the visibility of those subjects.

Another stance that is vibrant in KO is historicism, and it is pretty close to pragmatism. We have already cited Garcia Marco and Esteban Navarro (1993), Hjørland and Hartel (2003), and Hjørland (2003, 2008, 2013b, 2014, 2017) as influenced by the historicist stance. Therefore, other articles also have the features of that stance.

Gnoli (2008) had the task to address ten basic questions in the 21st century regarded to the KO domain. His approach was based on both currently available

literature and reflection, some relevant questions that look more general and far-reaching interest.

We acknowledge the historicist stance in Gnoli's approach, since he looks back in time and tries to delineate the expectations for the future of the domain, considering the context and, specially, the epistemological studies. We also find in Dousa (2010) research on classical pragmatism and its varieties the historicist stance, considering the author look back through KO history to draw the features of different pragmatist approaches on the KO domain.

Another historicist approach is identified in Saldanha (2014) proposition of a historical-epistemological study of KO focused on the 1930s. He develops a thought-oriented pragmatics of language in the philosophical scene of the period. There is also the influence of pragmatism on his though, what is present in his assertion: "we demonstrate how pragmatics, today a common discourse in the epistemology of IS, may receive consideration originating from other demarcations of our thought, highlighting the need for a philosophical revision of KO".

We also find the idealist stance represented in Kiel's (1994) research. In modern philosophy there have been two fundamental conception of idealism, ontological and epistemological idealism:

> 1- something mental (the mind, spirit, reason, will) is the ultimate foundation of all reality, or even exhaustive of reality, and; 2- although the existence of something independent of the mind is conceded, everything that we can *know* about this mind-independent "reality" is held to be so permeated by the creative, formative, or constructive activities of the mind (of some kind or other) that all claims to knowledge must be considered, in some sense, to be a form of self-knowledge (GUYER; HORSTMANN, 2018)

Kiel's (1994) contradicts Jaenecke's differentiation of knowledge as: core knowledge, peripheral knowledge and pseudo knowledge. He explains that Jaenecke's approaches is realist and, on the other hand, he states that "knowledge cannot be separated from individual or cultural subjectivity". Kiel (1994, p. 151) acknowledges his stance as idealist. "In the idealist's framework, properties, entities and relations do not exist independent of our mind or our ability to reason. So observation is thought to be dependent on our mind".

Lastly, we turn back to Zins (2004) and describe his empiricist and rationalist stance. Since Zins (2004) considers that "knowledge as a state of mind is a product of a synthesis". He acknowledges that any empirical perception is the product of the synthesis of a multiplicity of sensory data. Zins (2004, p. 54) acknowledges his

rationalist stance, and he identifies "in any perception a priori components, which gives meaning to the diversified sensory raw material and constructs it into one unit.

Throughout the analysis of the studies, we acknowledge that pragmatic thought is present in most of studies. The pragmatic stance is underlined by the arguments related to the integration of epistemological, methodological, sociological and historical approaches to improve the process and systems on the KO domain. There is also the stimulus to think rethink the design of universal systems in KO and to take for granted the socially and cultural environment and its influence on the KO process and tools. In next chapter we present the concluding remarks of this research.

7 CONCLUSION

Epistemological studies and the influence of epistemology on the KO domain are acknowledged by the KO community. However, there is a lack of studies on that subject. We understand that epistemology has an important role regarded to the theoretical and methodological question both in KO research and the development of KOSs.

This dissertation presented a metatheoretical study on 31 articles across 32 thinkers in epistemology of KO. We collected the papers, analyzed them using some instruments from grounded theory: codes and memos. Then, we synthesized those codes and memos into a metatheory of conception of epistemology on the KO domain.

We aimed to describe the conception of epistemology in the journal Knowledge Organization through metatheory. We collected our data from Knowledge Organization Journal, since it is the most representative information source for scholarly communication on the KO domain.

The first objective was to analyze the scientific literature on epistemology of KO, published in the Knowledge Organization journal. To achieve that objective we did the exploratory study, the coding and memoing process.

The second objective was to discuss the concept of epistemology on the KO domain. We achieved that objective by coding and memoing each quotation that referred to the concept of epistemology. Then, we created the first attribute family called "concept of epistemology". That attribute family generated two different types of concepts: the narrow meaning and broad meaning.

Most authors believe epistemology is the study of knowledge and justified belief. They describe epistemology from a narrow meaning perspective, even the features of their studies show that epistemology is about the creation and dissemination of knowledge in different domains. We believe that epistemology, is the critical study of the principles, hypotheses and knowledge production of the various sciences. Furthermore, scientific knowledge features, delimitations and methodological process in each domain are of epistemology interest.

We understand that to recognize the conception of epistemology it is also necessary to identify its purposes on the KO domain. That was the third objective we achieved in this research. We acknowledge that epistemology is fundamental in the

construction of scientific knowledge and it represents a dimension in KO. Thus, we must connect epistemology, as a science, to KO as a science of ordering knowledge.

In summary, we identified in this dissertation the purposes of epistemology on the KO domain. Epistemology is essential to the design and implementation of KOSs, it guides de KO process since it highlights the conceptual level, it also makes clear the epistemic stances influencing KO, and helps to apply domain analysis since it provides insight into the assumptions of theories and it is one of the eleven approaches of domain analysis.

The fourth objective is to present a deeper understanding on the main epistemological influences on the KO domain. Through the coding and memoing processes we were able to identify the third attribute family, "epistemic stances influencing the KO domain". The epistemic stances (attributes) that form the attribute family "epistemic stances influencing the KO domain" are: empiricism, rationalism, historicism, pragmatism, constructive realism, social constructivism, holism, pragmatic realism, reductionism, idealism, relativism, logical positivism, constructivism, hypothetical realism, realism, positivism, postmodernism and critical theories (poststructuralism, deconstruction, feminist epistemology, postcolonialism, critical race theory, and queer theory).

As we analyzed each attribute, we decided to describe the influences indicated by the authors from the corpus of this dissertation using the four main epistemic stances in the KO domain based on Hjørland classification: empiricism, rationalism, historicism and pragmatism. We identify all four epistemologies influence on the KO domain, however, the pragmatic thought is the more expressive.

The analysis of the authors epistemic stances on chapter 6 also shows the prominence of pragmatist thought on the domain, followed by critical theories and historicism. That may happen because the reality in KO is regarded to the sociocognitive paradigm. Knowledge and KO deal with human need and interests. Besides, knowledge is constructed in various scenarios and lead to different knowledge claims. We understand that KO research and practice is inclined towards the socially pluralist model which may be related to the postmodern thought on the relation among people, knowledge as a social construction and the influence of various perspectives.

If we go back to the most expressive viewpoints and thoughts presented in the papers from the corpus of this dissertation, we may have a prospect of the KO domain. It was noticed in different researches the concern related to the connection between epistemological, theoretical, methodological, sociological and historical context and approaches. The acknowledgement about the importance of those connections has to do with the understanding that those approaches constitute the driving force delineating the argument in the conceptual work of KO.

Another frequent subject on the papers from the corpus that are influenced by the various epistemic stances is the design and update of KOSs. The KOS designers must consider the context in which they are created and its purposes. It is stated that classificatory structures, for example, must have malleable and fulfill the user needs, considering the cultural and social context.

It is part of the KO research now, the multiplicity and community identity. Considering that, there is the intention to rethink about an access tools and to develop new ones considering the new paradigm. That approach is regarded to assumptions that consider the KOSs culturally based and biased.

That discussion leads to another important subject that was present in the researches. The criticism to universal systems and the arguments on neutral and biased systems, objectivism X subjectivism. Regarded to universal systems, the main criticism is that they provide inadequate access to marginalized groups. Moreover, universal schemes privilege mono-disciplinary knowledge at the cost of interdisciplinary knowledge. They are also conceptually closed, since they privilege thematic topics at the cost of conceptual perspectives.

The objectivist and subjectivist viewpoint are approached specially when it comes to do with KO process like classification and indexing. Those two actions are no neutral or objective activities. KO and its process are a social construction that has its bias and are influenced by different epistemologies. The KO professional and even the KO researcher have their ontological and epistemological stances and they cannot be separated from them. Beyond that, subjectivity cares about the collective views shared by many users which also had a connection with epistemological positions.

Domain analytic approach is a strong paradigm on the KO domain with a strong pragmatist and historicist influence. It is also a subject present in many discussions in the papers that compose the corpus of this dissertation. We know that the development of domain analysis raised the question about the subjectivity and objectivity of KO in a

systematic way, since domain analysis carries in its nature a sociological and epistemological standpoint. Thus, domain analytic approach states that subjectivity, the sociological and cultural influences are very important to the development of the KO domain.

Therefore, what we want to highlight, concerning to the influence of epistemic stances on the KO domain, is the expressive presence of studies approaching critical theories to delineate the research and practice in KO. If these researches are present in the corpus of this dissertation, we are sure that they are related to the existing debate in the society. We know that the representation of oppressed groups in society in general is an issue today, and in KO it is not different. Our KOSs have many deficiencies regarded to the representation of those groups.

In that context, we realized that there is a claim for the building of domain-specific KOS, since the universal systems we have are deficient and its remodeling would not be enough. We also came to know the need for the representation of identity in KOS, which leads to think about common concepts on the KO domain like aboutness and meaning because the distinction among those concepts has impact on the homosexual concerns and its representation in the KOSs.

All those concerns are influenced by epistemic stances that we have already discussed in this dissertation. We highlighted the presence of critical theories in the corpus of this dissertation, even in one research that analyzes those theories, because we understand that is a trend on the KO domain, which is directly related to the cultural studies in KO.

We got to this point of the research understanding that we cannot put each research or author's thought in a specific box. Our attempt in this dissertation was to recognize the influences from different epistemic stances through time and KO history to understand the KO process and research considering the corpus we elected to this study. We do not state that one epistemology is better of more efficient than other. We believe that the process, KOSs, and activities on the KO domain demand different approaches, theories, methodologies and epistemologies because they complement each other.

Considering that any research is a work in construction, we indicate some future studies that may contribute to the development of the domain: - a citation analysis of the corpus of this dissertation to understand the connection among authors and the theoretical foundation; - a metatheoretical study focusing on the two others types of

metatheory: metatheory as a prelude to produce new theory (M_p) and metatheory to produce a perspective that overarch some part or all the domain; and - a metatheoretical study based on ISKO proceedings on epistemology of KO domain using the same method presented in this study.

As a concluding remark, we state that the conception of epistemology on the KO domain is the critical study of principles, hypothesis and knowledge production in the domain. Epistemology is concerned with the scientific knowledge produced by the KO domain, as well as with the application of that knowledge to design the KOSs and to support the KO process.

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APPENDIX A – PAPERS ON ATLAS.TI

Francisco Javier Garcia Marco
Miguel Angel Esteban Navarro
University of Zaragoza, Spain

On Some Contributions of the Cognitive Sciences and Epistemology to a Theory of Classification*

Garcia Marco, F.J., Esteban Navarro, M.A.: **On some contributions of the cognitive sciences and epistemology to a theory of classification.**

Knowl.Org. 20(1993)No.3, p.126-132, 22 refs.

Intended is first of all a preliminary review of the implications that the new approaches to the theory of classification, mainly from Cognitive Psychology and Epistemology may have for information work and research. As a secondary topic the scientific relations existing among Information Science, Epistemology, and the Cognitive Sciences are discussed. Classification is seen as a central activity in all daily and scientific activities, and, of course, of knowledge organization in information services. There is a mutual implication between classification and conceptualization, as the former moves in a natural way to the latter and the best result elaborated for classification is the concept. Research in concept theory is a need for a Theory of Classification. In this direction it is of outstanding importance to integrate the

ledge is mainly a result of organizing informational perception and representation. Furthermore, knowledge becomes information when it is transmitted in the form of actions and messages, to be transformed after reception and processing by other individuals.

Our perception of the world is the result of the actual status of at least two factors - first the outer world, and secondly the human sensory system aided by more and more efficient and artificially developed devices. On the other hand, representation of knowledge and therefore intelligent communication, which permits our entrance into the real world, depends on the status of two factors - our conceptual and linguistic systems. These four factors model the whole of the human cognitive and communication structure. Moreover, it is the work of the human

APPENDIX B – CODING IN ATLAS.TI

APPENDIX C – MEMOS IN ATLAS.TI

Within the screenshot, the following memo text is visible:

Memo list (left panel):

- 1993_Garcia_Marco_Esteban_Navarro
- 1994_Kiel
- 1996_Bies
- 2000_Campbell
- 2003_Hjørland
- 2003_Hjørland_Hartel
- 2004_Zins
- 2005_Tennis
- 2005_Tsai_Chou
- 2008_Gnoli
- 2008_Hjorland
- 2008_Tennis.pdf
- 2009_Furner
- 2010_Dousa
- 2010_Samuelsson
- 2012_Gnoli
- 2013_Channon
- 2013_Hansson
- 2013_Hjorland_Theories_of_knowledge
- 2013_Kleineberg
- 2014_GutierresCastanha_Grácio
- 2014_Hjorland
- 2014_Moura
- 2014_Saldanha
- 2014_Santis_Souza
- 2015_Marteleto_Carvalho
- 2015_Smiraglia
- 2016_Martinez-Avila_Semidao_Ferreira
- 2016_Martinez_Avila_Beak
- 2016_Ridi
- 2016_Silveira_Saldanha
- 2017_Hjorland
- 2017_Ibekwe-SanJuan_Bowker

33 Memo(s)

Memo content (right panel):

Garcia Marco e Esteban Navarro

O tema central do artigo é a Teoria da Classificação e os autores identificam as contribuições da Epistemologia, Ciências Cognitivas (psicologia cognitiva) e Ciência da Informação. Também analisam a relação científica existente entre Ciência da Informação, Epistemologia e Ciências Cognitivas. A classificação está no centro da discussão como uma atividade comum para o dia a dia das pessoas e para diferentes áreas do conhecimento. É estabelecida uma relação entre Teoria da Classificação e a Teoria do Conceito.

Functionalism in the philosophy of mind is the doctrine that what makes something a mental state of a particular type does not depend on its internal constitution, but rather on the way it functions, or the role it plays, in the system of which it is a part. This doctrine is rooted in Aristotle's conception of the soul, and has antecedents in Hobbes's conception of the mind as a "calculating machine", but it has become fully articulated (and popularly endorsed) only in the last third of the 20th century. Though the term 'functionalism' is used to designate a variety of positions in a variety of other disciplines, including psychology, sociology, economics, and architecture, this entry focuses exclusively on functionalism as a philosophical thesis about the nature of mental states.

Há diferença entre Ciência Cognitiva (a general science of both artificial and natural intelligence postulating the same principles) e Ciências Cognitivas (a federated or confederated group of sciences).

Para os autores "[…] information science and cognitive psychology are both cognitive sciences in a broad sense".

Conceito de epistemologia:

"The contribution of epistemology to the development of information science and its practice i.s very important. Epistemology is traditionally considered to be that branch of philosophy devoted to the study of the processes of human knowledge, its logic, origins and basis. Actually the study of this process is performed by a number of discipli nes which emanate from it, for example psychology, logic and linguistics. Therefore today, the meaning and field of study of epistemology is more restrictive. It is the science centered on tile study of the characteristics of scientific discourse and on the evolution of scientific paradigms. Thus it appears to be a more systematic and methodologi cal retlection 011 the principal resources used by humans to pursue valid knowledge aboutreality. Psychology is main ly devoted to common and ordinary knowledge (personal and social). Epistemology is devoted specifically to scien tific knowledge". (p. 128)

Epistemology + Cognitive paradigm = tools to guide the process of documentary analysis

"As epistemology studies the historical evolution of scientific paradigms, it is concerned with a key clement of these paradigms - tile mapping and structure of knowledge, as it exists in each particular age".

"Finally, from a historical perspective, epistemology is also the study of reflections made by philosophers and theorists of science in an abstract and conceptual network, traced between man (subject) and nature (object) in the proces◆ oJ'research and knowledge, within the limits and possibilities of understanding reality and its linguistic expression". (p. 128-129)

"These authors believe that the advances in epistemology in this field make an important contribution to the development of information science, especially in its attempts to deve lop a theory of classitication. **This is because documentary classification systems are in close relationship with the two principal contemporary Western approaches to human knowledge - rationalism aod logical positivism.** (p. 129)

Conceito de Classificação

"Thus, classification is a perceptive compromise that helps us to survive and must be based on real properties of tJle univer se, otherwise it would be completely inefficient. Such is not Ule casc. Classification means setting limits2. Limits are set as to what something is and what it is not".

There is a relation between the Cognitive approach and the KO.
There is a appeal to a epistemological point of view regarded to the Cognitive Paradigm.
The author establish a relationship between cognitive approach and classification.

Considerações da Prof. Leilah

Prof. Leilah, tudo bem?

Gostaria de esclarecer uma dúvida, caso você tenha um tempinho. Estou analisando o texto em anexo para a minha tese e, gostaria de saber se na sua opinião há uma influência pragmática indicada, por exemplo, na seção 3.1.2 do artigo, destaquei em amarelo.

Parece-me que sim, pois, dentre as características do pragmatismo, destaca-se a construção de representações da informação e do conhecimento, a ênfase na comunicação efetiva, pela compreensão dos diferentes pontos de vista em detrimento de um único e prioritário para representar uma realidade complexa e heterogênea. O estudo das relações semânticas é crucial nessa comunicação, entre o usuário a partir do seu ponto de vista inicial e os instrumentos de representação. Parte-se do entendimento de que os significados variam de acordo com o contexto e isso importa para a compreensão das relações hierárquicas, uma vez que se forem estabelecidas apenas a partir de premissas universalistas podem se tomar demasiadamente rígidas. Creio ser a partir desse entendimento que os autores afirmam que representar não significa controlar interações, pois o controle pode ser entendido como simples termo de feedback entre o sistema e o ambiente. Ao adotar princípios da abordagem pragmática, os tesauros podem contribuir para uma

APÊNDICE D - RESUMO EXPANDIDO EM PORTUGUÊS

EPISTEMOLOGIA DA ORGANIZAÇÃO DO CONHECIMENTO: um estudo metateórico

INTRODUÇÃO

Organização do conhecimento (OC), para os propósitos desta tese, é o campo de estudo preocupado com a natureza e qualidade dos processos de organização e representação do conhecimento, uma vez que estuda a epistemologia da OC. Estudos epistemológicos são considerados uma das onze abordagens propostas por Hjørland (2002b, 2017) no domínio da OC, e eles se relacionam a pelo menos dois propósitos. Primeiro, reconhecer como diferentes posturas epistêmicas influenciam a prática da representação do conhecimento. Segundo, melhor compreender os fundamentos, teorias e métodos que influenciam a pesquisa no domínio.

Nesta pesquisa, o conceito de epistemologia é "como nós sabemos" (TENNIS, 2008, tradução nossa). Considerando o segundo propósito da epistemologia da OC, nós entendemos assim como Hjørland (2002b, p. 438, tradução nossa), que: "todos os tipos de pesquisa (também todos os tipos de comportamentos) são governados por diferentes tipos de suposições, conhecimento, 'teorias', etc". Nesse contexto, estudos epistemológicos servem para analisar as suposições explícitas e implícitas por trás das tradições de pesquisa (HJØRLAND, 2002b).

Tennis (2008, p. 103, tradução nossa) "considera que as diferentes interpretações da epistemologia, posições epistêmicas, e de seus gêneros, tornam a definição e o uso da epistemologia um problema difícil para os pesquisadores de OC".

Nesse contexto, nós apresentamos a pergunta central de pesquisa para esta tese: qual é a concepção de epistemologia no domínio da OC? Esta pergunta nos leva a perguntas secundárias que são também respondidas ao longo da tese: quais são os conceitos e propósitos da epistemologia na OC? Quais epistemologias influenciam a pesquisa no domínio da OC?

Nós acreditamos que posições epistêmicas influenciam tanto questões relacionadas à representação do conhecimento (critérios de relevância, necessidade de informação, classificação, indexação, recuperação da informação, etc) quanto a pesquisa em OC. Assim sendo, o objetivo geral desta tese é descrever a concepção

de epistemologia no domínio da OC por meio da metateoria. E, apresentam-se os seguintes objetivos específicos:

a) Analisar a produção científica sobre epistemologia da OC publicada no periódico *Knowledge Organization*;

b) Discutir o conceito de epistemologia no domínio da OC;

c) Identificar os propósitos da epistemologia da OC; e

d) Apresentar um entendimento mais profundo das principais influências epistêmicas no domínio da OC.

Nós consideramos o periódico *Knowledge Organization* uma publicação que representa o pensamento no domínio, uma vez que é considerado o principal periódico no campo da *International Society for Knowledge Organization (ISKO)* (ISKO, 2019). Por isso, o corpus desta pesquisa é formado por 31 artigos publicados no periódico *Knowledge Organization*.

A justificativa científica para desenvolver a pesquisa proposta nesta tese vem do segundo propósito dos estudos epistemológicos, melhor compreender os fundamentos, teorias e métodos que influenciam a pesquisa no domínio. Nós acreditamos que teoria e prática estão conectados, e ambos influenciam a construção do conhecimento. Se nós identificarmos e descrevermos as epistemologias que influenciam o domínio, nós podemos também relacionar e analisar as posições epistêmicas que influenciam o desenvolvimento de Sistemas de Organização do Conhecimento (SOC), bem como seu uso.

A epistemologia da OC é um dos eixos de estudo do grupo de pesquisa do qual faço parte, o grupo Formação e Atuação Profissional em Organização da Informação (FAPOI) da Universidade Estadual Paulista Júlio de Mesquita Filho (UNESP) liderado pelo professor José Augusto Chaves Guimarães que é o orientador desta tese. Dessa forma, esta é a justificativa institucional para o desenvolvimento desta pesquisa.

REFERENCIAL TEÓRICO

Dahlberg (1993) reconhece que a necessidade de organizar o conhecimento em tempos antigos foi sempre relacionada aos bibliotecários e filósofos. Outros profissionais tem se engajado nessa atividade ao longo dos anos. O termo e o campo de OC tem sua origem no campo da biblioteconomia. Pessoas como Charles A. Cutter, W. C. Berwick Sayers e Ernest Cushington Richardson estabeleceram o campo

"organização do conhecimento" como um importante campo acadêmico por volta de 1920 (HJØRLAND, 2008, 2016).

Hjørland (2008, p. 97, tradução nossa, 2016) considera que o livro de Bliss (1929) *"The organization of knowledge and the system of the sciences"* representa uma das principais contribuições intelectuais do campo.

Sales (2015a, 2015b, 2016) estuda o conceito de OC no contexto da ISKO. Ele reconhece que há pelo menos duas perspectiva relacionadas à natureza da OC: OC como uma atividade de natureza operacional e como um campo de estudo que busca seu desenvolvimento teórico, metodológico e prático.

Ele também apresenta uma compreensão mais profunda do conceito relacionado ao domínio de Ciência da Informação (CI). O autor ainda aborda três diferentes perspectivas do conceito de OC: - primeira perspectiva: OC como uma disciplina científica independente e um subcampo da ciência da ciência, da mesma forma que é afirmado por Dahlberg (1993, 1995, 2006); - segunda perspectiva: OC usa, às vezes, assuntos da CI aplicados à OC, o que se relaciona ao pensamento de Hjørland; - terceira perspectiva: OC como um campo de pesquisa que lida com o desenvolvimento da teoria, métodos e práticas que conectam o contexto de produção e uso da informação. Esta perspectiva considera OC como parte da CI (SALES, 2015a, 2015b, 2016).

Hjørland afirma que há um significado restrito e um amplo para explicar a OC. O significado restrito é relacionado à abordagem cognitiva. Atividades como descrição de documentos, indexação e classificação em biblioteca, bases de dados bibliográficas, arquivo e outros tipos de memória institucional para biblioteca, arquivos, especialistas de informação, especialistas de assunto, bem como por algoritmo de computadores e leigos, são parte do paradigma cognitivo (HJØRLAND, 2008, 2016).

Da distinção entre a organização cognitiva do conhecimento (significado restrito) e a organização do conhecimento sociocognitiva (significado amplo), nós concordamos com Hjørland que "não há universo do conhecimento fechado que possa ser estudado pela OC isoladamente das outras ciências, estudo da realidade" (2008, p. 87, tradução nossa).

Com características que relacionam o conceito ao paradigma sociocognitivo (HJØRLAND, 2002b, 2008, 2013a; HJØRLAND; ALBRECHTSEN, 1995), Esteban Navarro e Garcia Marco (1995, p. 149) apresentam uma definição completa e organização do conhecimento e, como foi afirmado por Guimarães (2008, p. 86), uma

definição que fortalece a dimensão social, materializada e cíclica do conhecimento. Esteban Navarro e Garcia Marco (1993, p. 149) afirman que OC é uma:

> [...] disciplina devotada ao estudo e desenvolvimento dos fundamentos e técnicas de planejamento, construção, gerenciamento, uso e avaliação dos sistemas de descrição de, catalogação, organização, classificação, armazenamento, comunicação e recuperação de documentos criados pelos homens para testificar, preservar e transmitir seus conhecimentos e suas ações, do seu conteúdo, para assegurar sua conversão em informação capaz de gerar novo conhecimento.

OC trabalha com conhecimento, indivíduos e níveis sociais. Portanto, nós podemos olhar para a proposta de Hjørland and Albrechtsen (1995) relacionada à análise de domínio. Eles afirmam que o indivíduo em um domínio tem sua própria compreensão sobre o mundo, seu próprio conhecimento e comportamento cognitivo, o que influencia o desenvolvimento do domínio. Além disso, análise de domínio não implica na inexistência da absoluta verdade, não há universalismo ou essencialismo. Hjørland não concorda com teorias e métodos baseados no positivismo, racionalismo e cognitivismo (AMORIM; BRÄSCHER, 2016).

Mais tarde, em seus estudos da abordagem sociocognitiva na OC, Hjørland apresentou argumentos sobre a importância do estudo da epistemologia da OC. Ele compreende que o "conhecimento epistemológica forma um fundamento interdisciplinar para teorias gerais sobre OC, recuperação da informação, e outras questões básicas de CI (HJØRLAND, 2002a, p. 268, tradução nossa).

Portanto, Hjørland explica que os pesquisadores devem conhecer as epistemologia, eles devem interpretar os padrões de influências históricas e reconhecer as diferentes posições tomadas ao longo da história da ciência. Hjørland (2002a, p. 263, tradução nossa) define epistemologia como "a interpretação e generalização das experiências coletivas dos cientistas".

Pessoas tem opiniões diferentes e tomam diferentes decisões baseadas em suas crenças e pensamentos. No que diz respeito à representação do conhecimento, criação de SOC, etc, não é diferente. Cada posição epistêmica determina qual conhecimento é criado. Por isso, Tennis (2008, p. 103, tradução nossa) afirma que "epistemologia é como nós sabemos".

O conceito de epistemologia é explicado a partir de um significa restrito e outro amplo, como Steup (2018, tradução nossa) afirma na *Stanford Encyclopedia of Philosophy*:

> Definida de forma restrita, epistemologia é o estudo do conhecimento e das crenças justificadas. Como o estudo do conhecimento, a epistemologia está preocupada com as seguintes questões: quais as condições necessárias e suficientes do conhecimento? Quais são seus recursos? Qual é sua estrutura, e quais são seus limites? Como o estudo das crenças justificadas, a epistemologia busca responder questões como: como nós compreendemos o conceito de justificação? O que torna as crenças justificadas, justificadas? A justificação é interna ou externa para a mente de cada um? Entendida de forma amplas, epistemologia é sobre questões relacionadas à criação e disseminação do conhecimento em áreas particulares de investigação.

Da mesma forma, Araújo (2012) reconhece que há pelo menos duas diferentes abordagens relacionadas ao conceito de epistemologia. Ambos são oriundos da palavra grega *episteme*. Considerando a abordagem tradicional, epistemologia é o estudo do conhecimento ou gnosiologia. Por outro lado, há uma abordagem específica, que apresenta a epistemologia como o estudo crítico dos princípios, hipóteses e produção do conhecimento de várias ciências, olhando mais de perto para a estrutura cognitiva do conhecimento científico, valores e objetivos. Mais do que isso, epistemologia preocupa-se com as características do conhecimento científico, delimitações e processos metodológicos em cada domínio (ARAÚJO, 2012).

Epistemologia é considerada por Hjørland "o mais importante campo relacionado à ciência da informação"; "o melhor conhecimento geral que é possível ensinar as pessoas na ciência da informação" (HJØRLAND, 2013a, p. 179, tradução nossa) e ele também enfatiza que "qualquer questão teórica em ciência da informação é no final baseada em suposições epistemológicas" (HJØRLAND, 2002b, p. 439, tradução nossa).

Nós sabemos que as posições epistêmicas influenciam a OC e, qual tipo de conhecimento é criado. "Uma organização do conhecimento não pode ser epistemologicamente neutra" (MAI, 1999, p. 547, tradução. nossa). Nós concordamos com Mai que as pessoas que estão no campo da organização e representação do conhecimento devem fundamentar seu trabalho prático e discussão em uma tradição epistemológica" (1999, p. 547, tradução nossa).

A afirmação de Mai de que "qualquer teoria da organização do conhecimento devem envolver considerações relacionadas às bases epistemológicas da teoria e relacionadas à utilização prática da teoria", reforçando a importância dos estudo epistemológico na OC para um entendimento melhor do domínio (1999, p. 547, tradução nossa).

Buscou-se desenvolver um entendimento mais profundo sobre o domínio da epistemologia da OC por meio da literatura estudada a analisa nesta pesquisa. A discussão teórica apresentada no referencial teórico da tese fundamentou o desenvolvimento da pesquisa por meio da metateoria.

TRAJETÓRIO METODOLÓGICA

Considerando o propósito da pesquisa, ela é classificada como descritiva, já que foram analisados e descritos os dados buscando apresentar a metateoria de epistemologia da OC. Buscou-se reconhecer a concepção da epistemologia na OC e entender as posições epistêmicas que influenciam os estudos de epistemologia da OC no domínio da OC.

Nós desenvolvemos uma pesquisa metateórica baseada na metateoria de Ritzer. Dessa forma, buscou-se alcançar, por meio do estudo metateórico, uma compreensão profunda do domínio. Aplicaram-se métodos da teoria fundamentada em dados (codificação e memorando) na análise do corpus. O corpus da pesquisa é composto por 31 artigos sobre epistemologia da OC publicados no periódico *Knowledge Organization*.

A pesquisa metateórica seguiu três passos para alcançar o objetivo geral: coleta, análise e síntese (TENNIS, 2005a). Para desenvolver esta pesquisa, considerando esses passos, primeiro fez-se um estudo exploratório e a coleta de dados é parte dessa etapa. Então, nós utilizamos a teoria fundamentada em dados para a análise e síntese.

Sabe-se que a epistemologia é importante para a construção do conhecimento. Posições epistêmicas influenciam a organização e representação do conhecimento (classificação, indexação, etc.) e a criação do conhecimento por meio da pesquisa. Além disso, os valores dos pesquisadores, crenças e posições epistêmicas ditam a forma que eles criam e compartilham conhecimento e, este é o comprometimento ontológico desta tese.

Hermenêutica é diretamente relacionada à metodologia e filosofia da ciência; é também uma importante forma de reflexão e resultado de interpretação. A epistemologia é estudada sob uma perspectiva hermenêutica nesta pesquisa (ALVESSON; SKÖLDBERG, 2009; TENNIS, 2005a). "Hermenêutica como uma metodologia da interpretação preocupa-se com problemas que surgem quando

relacionadas com ações humanas significativas e os produtos dessas ações, e mais importante, textos (MANTZAVINOS, 2016, p. 1, tradução nossa).

O comprometimento ético nesta pesquisa está relacionado a ser fiel às ideias dos autores, expressas nos artigos que nós analisamos como parte do corpus da pesquisa. Dessa forma, poderemos construir um argumento válido e confiável.

EPISTEMOLOGIA DA ORGANIZAÇÃO DO CONHECIMENTO

Esta tese apresentou um estudo metateórico de 31 artigos publicados por 32 autores da epistemologia da OC. Nós coletamos os artigos, analisamos e usamos algumas ferramentas da teoria fundamentada em dados: códigos e memorandos. Então, nós sintetizamos os códigos e memorandos em um metateoria da concepção de epistemologia no domínio da OC.

O primeiro objetivo foi analisar a literatura de epistemologia da OC, publicada no periódico *Knowledge Organization*. Para responder a este objetivo, fez-se um estudo exploratório envolvendo os processos de codificação e memorando.

O Segundo objetivo foi discutir o conceito de epistemologia do domínio OC. Nós alcançamos este objetivo por meio da codificação e memorando de cada parte do texto que se referia ao conceito de epistemologia. Então, nós criamos a primeira família de atributos chamado: "conceito de epistemologia. Essa família de atributo gerou dois diferentes tipo de conceitos: o significado restrito e o significado amplo.

Entende-se que para reconhecer a concepção da epistemologia foi necessário identificar seus propósitos no domínio da organização do conhecimento. Esse foi o terceiro objetivo que nós alcançamos nesta pesquisa. Em resumo, nós identificamos nesta tese os propósitos do domínio da OC. Epistemologia é essencial para desenhar e implementar os SOC, guia o processo de OC e destaca o seu nível conceitual, também torna claras as posições epistêmicas que influenciam a OC e ajuda a aplicar a análise de domínio já que provê ideias relacionadas às suposições das teorias e é uma das onze abordagens da análise de domínio.

O quarto objetivo foi apresentar uma compreensão mais profunda das influências epistemológicas no domínio da OC. Por meio do processo de codificação e memorando foi possível identificar a terceira família de atributos: "posições epistêmicas influenciando o domínio da OC. As posições epistêmicas (atributos) que formam esta família de atributos são: empirismo, racionalismo, historicismo,

pragmatismo, realismo construtivista, construtivismo social, holismo, pragmatismo realista, reducionismo, idealismo, relativismo, positivismo lógico, construtivismo, realismo hipotético, realismo, positivismo, pós-modernismo e teorias críticas (pós-estruturalismo, desconstrução, epistemologia feminista, pós-colonialismo, teoria crítica racial e teoria *queer*).

Por meio da análise de cada atributo, nós descrevemos as influência indicadas pelos autores do corpus desta tese usando as quatro principais posições epistêmicas do domínio da OC baseado na classificação de Hjørland: empirismo, racionalismo, historicismo e pragmatismo. Nós identificamos que o pragmatismo é a epistemologia mais expressiva influenciando o domínio. A análise das posições epistêmicas dos autores nos artigos do corpus também demonstram a predominância do pragmatismo. Além disso, percebeu-se também a forte presença das teorias críticas influenciando o domínio.

Como uma consideração final da pesquisa, afirma-se que a concepção de epistemologia no domínio da OC é o estudo crítico dos princípios, hipóteses e produção do conhecimento no domínio. Epistemologia preocupa-se com a produção do conhecimento científico pelo domínio da OC, bem como com a aplicação desse conhecimento para o desenvolvimento dos SOC e para dar suporte aos processos de OC.