Domain Analysis for Interdisciplinary Knowledge Domains

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Abstract: Domain analysis is a theoretical model to be applied to discourse communities in relation with knowledge domains that call for disciplinary knowledge, understanding that this feature has been recognized as one of the main characteristics of disciplinarity. On the other hand, interdisciplinary knowledge has been produced since the middle of the last century, and is today a considerable part of all knowledge that is produced. The characteristics of both kinds of knowledge are different and it suggests that a reflection on the role of interdisciplinarity in domain analysis is needed. The aim of this paper is to call attention on this issue and it is a first approach to this matter. To do this, I have analyzed both the main features of domain analysis and methods proposed to carry it out.

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1.0 Introduction

Domain analysis represented an effort to synthesize previous contributions. Part of the founding article is devoted to analyze the main predecessors that were latent and explicit in the formulation of this new theory and its relationship with other theories (Hjørland and Albretchsen 1995). In fact, the established methods for domain analysis include several of those approaches (Hjørland 2002). Finally, the authors came out with a general proposal that has been functioning since then as a theoretical referent to address numerous studies in library and information science (LIS) in general and in knowledge organization (KO) in particular.

Domain analysis was conceived for finding out the knowledge structures, dynamics, language and communication patterns and cooperation behavior of specialized domains. The domain analytic approach was considered "the best way to understand information in LIS" (Hjørland and Albretchsen 1995, 400). An important issue in domain analysis theory is that related with the concept of knowledge domains that are clearly understood as (400): "thought or discourse communities which are part of society's division of labor." This claim takes us to consider that the authors were mainly thinking of disciplines when they formulated their postulates, although the expression interdisciplinarity comes along later in the article. Discourse communities in relation with knowledge domains calls for disciplinary knowledge, because this feature has been recognized as one of the main characteristics of disciplinarity (Sugimoto and Weingart 2015).

The domain analysis proposal was completed several years after its publication with an article by Hjørland (2003) where he wrote about the methods to be used to approach the analysis of knowledge domains with the general recommendation of using more than one method simultaneously. If the authors of the domain analysis model had in mind mainly disciplines when developed their theory, the

proposed methods are supposed to be oriented to the same direction. This paper is intended to explore a little further these assumptions. It will be organized around two main nuclei: a reflection on the nature of interdisciplinary knowledge and the role of domain analysis in this environment, and a reflection on domain analysis methods in relation to interdisciplinary knowledge.

2.0 Domain analysis for interdisciplinary knowledge

In the foundational article of domain analysis, we can find indications about the need to incorporate more theoretical studies about sciences (Hjørland and Albretchsen 1995, 403): "IS therefore needs to occupy itself with general theories of knowledge … but also to incorporate more specific theories about the nature of different domains such as humanities, applied sciences and interdisciplinary studies." In the same article, we can read (419) that "the problems of interdisciplinarity and the problems of interdisciplinary borrowing and the overlapping of different disciplines" are of direct interest to the field of information seeking and representation. On the other hand, it can be said that this theory, at least in its origins, was discipline-oriented as was argued in the introduction of this paper. However, this orientation did not hinder the acknowledgement of the importance of interdisciplinarity and the need to get to know it deeper, according to domain analysis theory, as can be seen above. These facts are an invitation to reflect more deeply about inter- and transdisciplinarity with the aim of contributing to the exploration of the role of interdisciplinarity in domain analysis. This section is not intended to be an exhaustive account of opinions and tendencies regarding the concepts and characteristics of interdisciplinariy, but rather to bring the essentials of it. In my view, that allows, at the same time, relating them to the main features of domain analysis.

2.1.1. Main features about the nature of interdisciplinary knowledge

It is not an easy task to talk about interdisciplinarity (ID) because its conceptualization is neither clear nor consensual. Even when we talk about disciplines, which is necessary in order to have a referent to with which to compare, we also find that, depending on the author, the definitions may differ though it the idea of a discipline is a much more established concept. ID denominations are widely accepted, but are far from being completely clear even in the minds of their first theorists. The debate about terminology and the conceptualization of this new knowledge is still open. Nicolescu (2010) recently talks about the war of definitions. For the purposes of this article, there is no need to get into a detailed account of distinctions, but rather to look at ID from a meta-view that enables the identification of its common features. By doing so, it will be easier and clearer to see how ID fits into domain analysis.

It is first necessary for this study to clear up the conceptualization of ID. Among all distinctions made by different authors (Apostel 1972; Gibbons 1994; Morin 1995; Salter 1997; Klein 2000; Nowotny 2001; MacNichols 2003; Repko 2008), among others, the concept of ID considered here will be one that meets the four characteristics described below.

2.1.1.1 Integration and interaction among specialties in which it is recognized to be the main issue

Both integration and interaction must take place in order to finally get something organically new and different from the original concurrent disciplines. The higher level of integration and interaction would be required in order to get fundamental questions redefined by integrating the approaches of all participants in the research design (Klein 2010). These features are also related to the division of labor (Apostel 1972, 152), which is "at the core of the problem of interdisciplinary research." Interaction and integration are closely bound to communication and agreement on terminology, theories, methods, etc. among specialties about a specific object. In the process of ID research, a new common language should emerge that would guarantee a high level of communication and integration. Beers and Boots (2009) analyze the problem from three perspectives: community of practice, knowledge modeling and web science oriented to information technology to facilitate knowledge sharing. The ID that meets this feature is called by some authors instrumental interdisciplinarity (Repko 2008) and conceptual or theoretical interdisciplinarity (Klein 2010).

Interaction has another interpretation according to Nowotny et al. (2001). In her view, interaction is that which occurs between science and society. This is a quite new, interesting approach that has to be understood at the light of what she calls contextual ID that is considered to be the most evolved one, the one that responds to the main issue of science today: sensitive to the context, real integration of specialties, concern about societal and human welfare, reflexibility and two way interaction. She claims that knowledge is strong, medium or weekly contextualized in relation with its higher or lower interaction with the social context.

2.1.1.2 Kind of knowledge to be integrated

Scientific knowledge is not the only knowledge source for interdisciplinary research. Knowledge resources are not only circumscribed to science, but, on the contrary, it has

to be expanded to other kinds of knowledge that will enrich the final product. This trend, which is an important one, is linked to the idea of integrating society in research in order to get a "real" interdisciplinarity. Social demands and the participation of society in research should be looked for in ID (Nowotny et al. 2001; Gibbons et al. 1994). Repko (2008) calls it knowledge formation.

2.1.1.3 Actors in the research process

The change of context brought by interdisciplinary research makes it more asymmetric regarding norms, functions and status. The researchers' status or identity is now connected to new norms and practices that are not exclusive of scientists but also of non-scientists. Science is not only produced in universities. In fact, any pertinent person could and should take part in a research project (López-Huertas 2013a). The main issue is the integration of participants and this mainly will be influenced by the team's selection, the agreement on the research objects and methods and the role assigned to participants.

Societal representatives as participants in research projects are expected in ID projects. Some authors have investigated this aspect concluding that results are improved with the inclusion of social partners (Pereira and Rodriguez 2009; Cooper, Dickinson and Bonney 2009). Non-scientific participants, increase the quality of the results. This characteristic is connected with the idea of including other forms of knowledge in ID, as noted above. Considering the scholars' side, there are different opinions about what makes research interdisciplinary from the scientist's participatory point of view. In general, there is the belief that the number of scientists does not guarantee at all that research is interdisciplinary. A common belief is that the specialties that are relevant for the research problem at hand must be represented and integrated in the project.

2.1.1.4 Origin of the research problem

The research problem in interdisciplinary work can be generated within science in which case it is called endogenous interdisciplinarity, or it can originate with actual problems of the community and demands that universities meet in their pragmatic social missions. In this latter case, it receives the name of exogenous interdisciplinarity.

2.1.2 Main characteristics of disciplines and comparison with ID features

Since the main idea of the first part of this study is to reflect on domain analysis in relation to ID knowledge, it is unavoidable to talk about disciplines as a referent in order to find out the place of ID in domain analysis theory. To do it, a contribution by Sugimoto and Weingart (2015) will be used as a reference. It is an exhaustive revision of contributions on disciplinarity that has the advantage of being very schematic. They arrange the characteristics of disciplines in three categories: conceptualization, narratives and measurement and within each of them they locate individual features. Table 1 below shows this scheme.

This table obviously shows only the key words of the paper that are interesting for this study. It deserves some comment regarding the social need feature as shown in the table. Though it can be assumed that social needs cannot be divorced from the emergence of some disciplines, it is also true that social needs in this context differ from what is understood in ID. In fact, the example given by the authors under social needs is women's studies, which is said not to be a "typical" discipline.

Taking these features as a basis, the next step is to compare them with those identified for ID. The reason for doing this is to find out whether domain analysis theory could be implemented in some way if there are conceptual spaces that are not covered by this theory. Table 2 below shows a comparison between disciplinary and ID features.

Table 2 deserves an explanation. I have arrived at the qualitative data on the scheme, regarding disciplines, after reading the article by Sugimoto and Weingart (2015). The data related to ID have been estimated from the ID main features explained in this section above. The features representing the conceptual facet: cognitive, social, communicative, separatedness, tradition, institutional and the great man, which have a strong presence in the disciplines, are quite absent in the case of the interdisciplines. However, the cognitive characteristic needs further comments. Sugimoto and Weingart (2015, 778) claim that cognitive means that: "there is a shared body of content, theories, and methods that define the field …. Disciplines, therefore, are units of intellectual content, coherently organized." If we look for the cognition feature in the interdisciplines, it can be found that there is not an a priori cognitive coherence, but it is gotten along the research because it is the result of the interaction and the integration of knowledge required to carry out interdisciplinary research. In principle, this coherence would affect only a particular research and cannot be compared with the concept of cognition referred to disciplines. If we think of interdisciplinary subjects such as environment, health, etc., many individual research projects fall within these areas. If each one is expected to have cognitive coherence, I believe that by studying the individual coherences, it might be possible to arrive at a common cognitive coherence for a particular ID field. This is the reason why it has been written weak on the ID column.

On the ID column, the asterisk mark on Getting strong* in the feature Societies and Publications means that this feature is not weak neither strong yet in ID, but

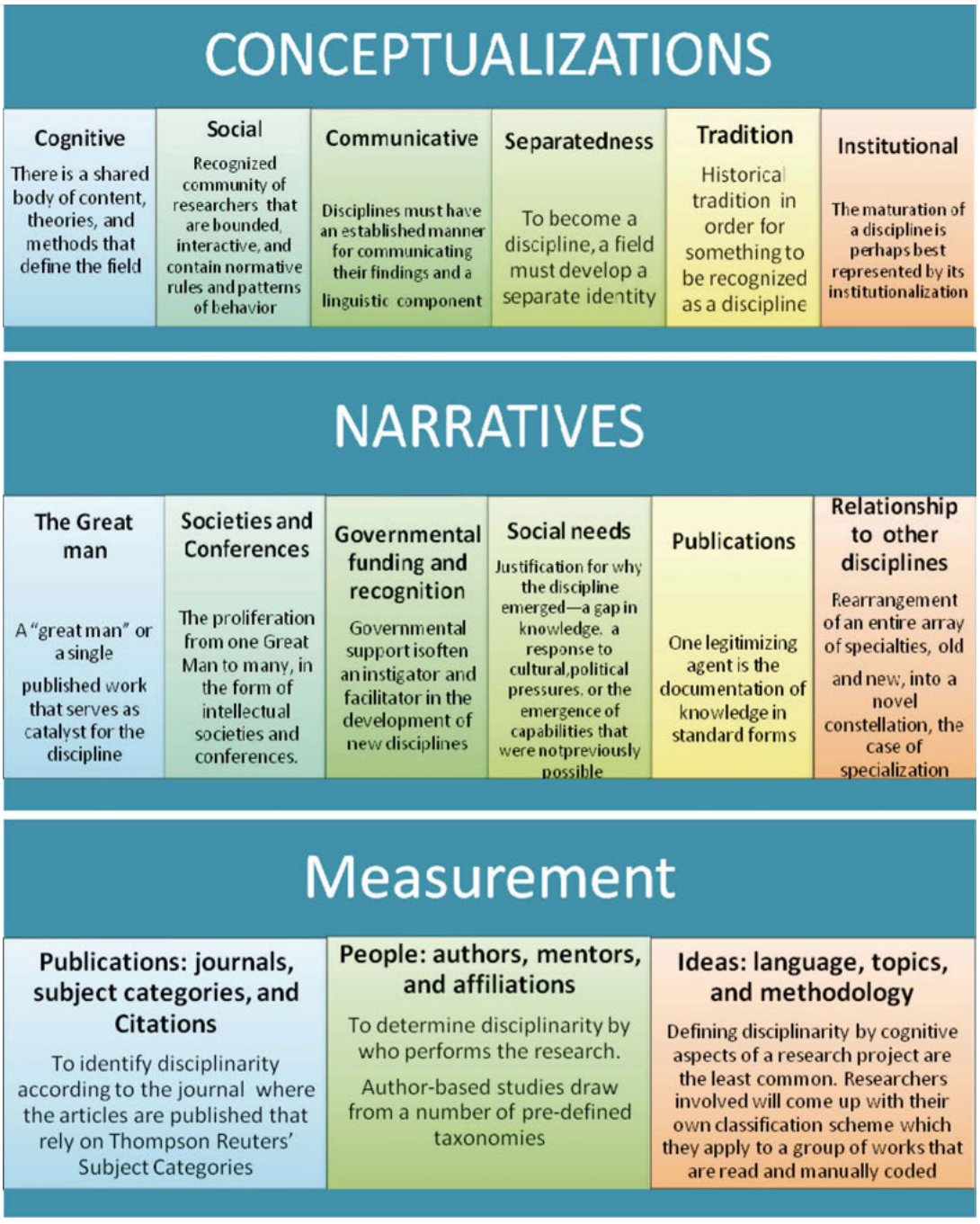

Table 1. Schematic representation of the most important features of the disciplines, according to Sugimoto and Weingart (2015).

there is a trend on the rise. ID researchers are getting more and more concerned with the importance of having ID journals where to publish and where to find a support and a reference for ID research. The asterisk mark on Getting strong* in Governmental funding and recognition and in Publications means that this feature is not strong yet but there is a rising trend. Strong* in Measurement of Publications is reflecting that bibliometrics and scientometrics studies are more devoted to ID research. Even when they measure disciplines, they finally come up talking about the ID side of them (Sugimoto and Weingart 2015). On the discipline column, the asterisk mark on Weak* in Measurement of Publications: journals, subject categories, and citations has been assigned because publications is not much representative of disciplines compared with ID, according to the article of reference (Sugimoto and Weingart 2015).

As was expected, ID is not well represented by disciplinary features in Table 2. This fact takes us to consider that domain analysis should extend its initial scope by in-

		Disciplines	Interdisciplines
CONCEPTS	Cognitive	Strong	Weak
	Social	Strong	—
	Communicative	Strong	—
	Separatedness	Strong	—
	Tradition	Strong	—
	Institutional	Strong	Weak
NARRATIVES	The Great Man	Strong	Weak
	Societies and Conferences	Strong	Getting strong *
	Governmental funding and recognition	Strong	Getting strong*
	Social needs	Weak	Strong
	Publications	Strong	Getting strong*
	Relationships to other disciplines. Relationships to other disciplines	Weak	Strong
MEASUREMENT	Publications: journals, subject categories, and citations	Weak*	Strong*
	People: authors, mentors, and affiliations	Weak*	Strong
	Ideas: language, topics, and methodology	Weak	Strong

Table 2. Comparative scheme between disciplinary categories and ID

cluding features that are representative of ID knowledge, in special those related to the conceptual characteristics.

In order to get this done, it should be necessary a reformulation of the claims of domain analysis theory affected by the different nature of ID. To put an example, let us take the first paragraph of its seminal paper: "The domain-analytic paradigm in information science (IS) states that the best way to understand information is to study the knowledge domains as thought or discourse communities, which are part of the society's division of labor" Hjorland and Albertchen (1995, 400). In this case, the identification between knowledge domains and thought or discourse communities could be widened in order for ID to be fully represented, because in many instances ID knowledge is not the result of established, formalized discourse communities. It could be suggested something like this as an example: "to study the knowledge domains as thought or discourse communities, which are part of the society's division of labor, and the new production of knowledge that is an expression of a process of integration and interaction of different specialties toward a research object in close relationship with society." Somewhere else, it should be also convenient to say that knowledge in interdisdisciplines is not only the result of the scientific contribution and that participants are expected to come from the non-scientific side as well. In my view, this is an important feature because they play a twofold role, one as participant of a research project and as such their input is integrated in the research, and second they can be seen somehow as a representation of potential final users of a given system because their opinions are taken into account previously and these can be unveiled once the domain analysis is carried out. The users issue is a hot potato in the configuration of the information systems, but the incorporation of nonscientific participants in research projects, which means that representatives of society are integrated, can be seen as an indirect way of getting a representation of them.

There is a need for further investigation that provides more accurate information on these matters. This contribution is only a first approach that intends to call attention to the need for extending the parameters of the theory. Of course, it would be necessary to make a deep analysis of the theory in order to find out where other changes are also needed which is not the aim of this study. In this regard, Smiraglia (2015) can be seen for a reflection of the components of domain analysis.

3.0 Domain analysis methods for ID knowledge

The methods to carry out domain analysis came up several years after the seminal paper (Hjørland 2002) and it was a great advance to make accessible to scholars the necessary

tools to carry it out. Lately, Smiraglia (2015) contributes with a detailed account of the methods that have been used in domain analysis since the theory was formulated. However, for the purpose of this study Hjørland (2002) will be used as reference. As was claimed in the introduction, if domain analysis model was intended mainly for disciplinary knowledge when it was developed, the eleven methods that came after it are supposed to be oriented to the same context. As a general frame, we have to bear in mind that actual interdisciplines are not equally developed, the more defined they are there will be more methods out of the eleven that will fit their nature. What follows is a reflection on the said methods, considering the nature of ID knowledge. The methods addressed here are those considered more effective and or used for ID: indexing and retrieving specialties, terminological studies, constructing special classifications and thesauri, bibliometrical studies, empirical user studies, document and genre studies and epistemological and critical studies.

3.1 Indexing and retrieving specialties

One of the problems that we encounter when representing and organizing ID knowledge is that of the undefined borders, implicit in the nature of this knowledge. Even the most developed ID has its borders more or less blurred. So, one primary question is which knowledge has to be included. In my view, indexing primary documents is one of the best and more reliable methods to do it, because, after processing the corpus of documents that should be in all relevant formats for an ID in particular, we can get the knowledge that we are looking for, or, at least, a safe pool of knowledge to start working with. In any case, it is known that documents in any specialty reflect the state of knowledge of that discipline (Hjørland 2002), and that they shed light on its epistemology. On top of this, the literary warrant is granted by following this method.

There are some examples in the literature that have used this method successfully (López-Huertas 2006; 2008). In both cases, knowledge representing women's studies was extracted from specialized documents by indexing. This technique allowed not only delineating the knowledge of this area but also approaching the weight of the concepts in that knowledge. It has been shown that is appropriate to use this method jointly with the terminological studies.

3.2 Terminological studies

Terminology is an important matter for all knowledge domains, but it becomes a key issue in the case of ID knowledge. One of the main differences between disciplines and interdisciplines is that the former have more stable, normalized and agreed terminology than the later. In fact, ID domains are characterized by having loose, unstable terminology, and that deciding which terms are really representing the domain is a hard stage in the process of organizing the knowledge of that domain (López-Huertas 2004; Kobashi et al. 2002). This issue is close connected with that of indexing, mentioned above. As it was claimed there, indexing helps to delimit the ID area of knowledge by means of the identification of its relevant concepts which, in turn, leave us a set of terminology. Besides, considering that interdisciplinary knowledge organization systems (KOSs) are not often constructed and that there are not many ID dictionaries, indexing seems to be one of the best sources for collecting terminology. For these reasons, in my view, the terminological method is one of the best to be applied in ID domain analysis (López-Huertas 2009). To give an example in the case of women's studies, the analysis of the terminology coming from indexing showed that there were two dynamics: a) a small set of terms generated by the interdiscipline, considered the core vocabulary, and b) a large set of terms that the ID took borrowed from different disciplines, coming from the interaction of the ID with them. There was a deep difference between the two sets. The nuclear set (terms created by the ID) represented 32% of the total number of terms and it behaves quite unambiguously, so membership of interdisciplinarity is unquestionable. The larger set (terms borrowed from outside disciplines) represented 68% of the total terms and it is formed by terms that were incorporated from other specialties without any apparent transformation. These findings provided essential information to build the conceptual structure, based on a representative, literary guaranteed terminology, that is a core nucleus of terms and an identification of the subject areas integrated in women's studies. A quantitative analysis of the integrated subject areas, showed the weight of each in the whole set of and allowed to know the depth of description required for each subject area. Table 3 below shows the internal composition and weight of external specialties in women's studies.

The thematic composition and weights of this structure, representing the Uruguayan culture, is different if we consider another culture. While it is true that there may be a significant coincidence in the themes, what varies fairly is the weight that these themes have in the whole of the domain (López-Huertas 2008). The weights are conditioned by societal values, and, for this reason, they are heavily influenced by culture which, in turn, would lead to different citation orders of the concepts in the structure, giving the final result of different knowledge organizations (López-Huertas 2013b).

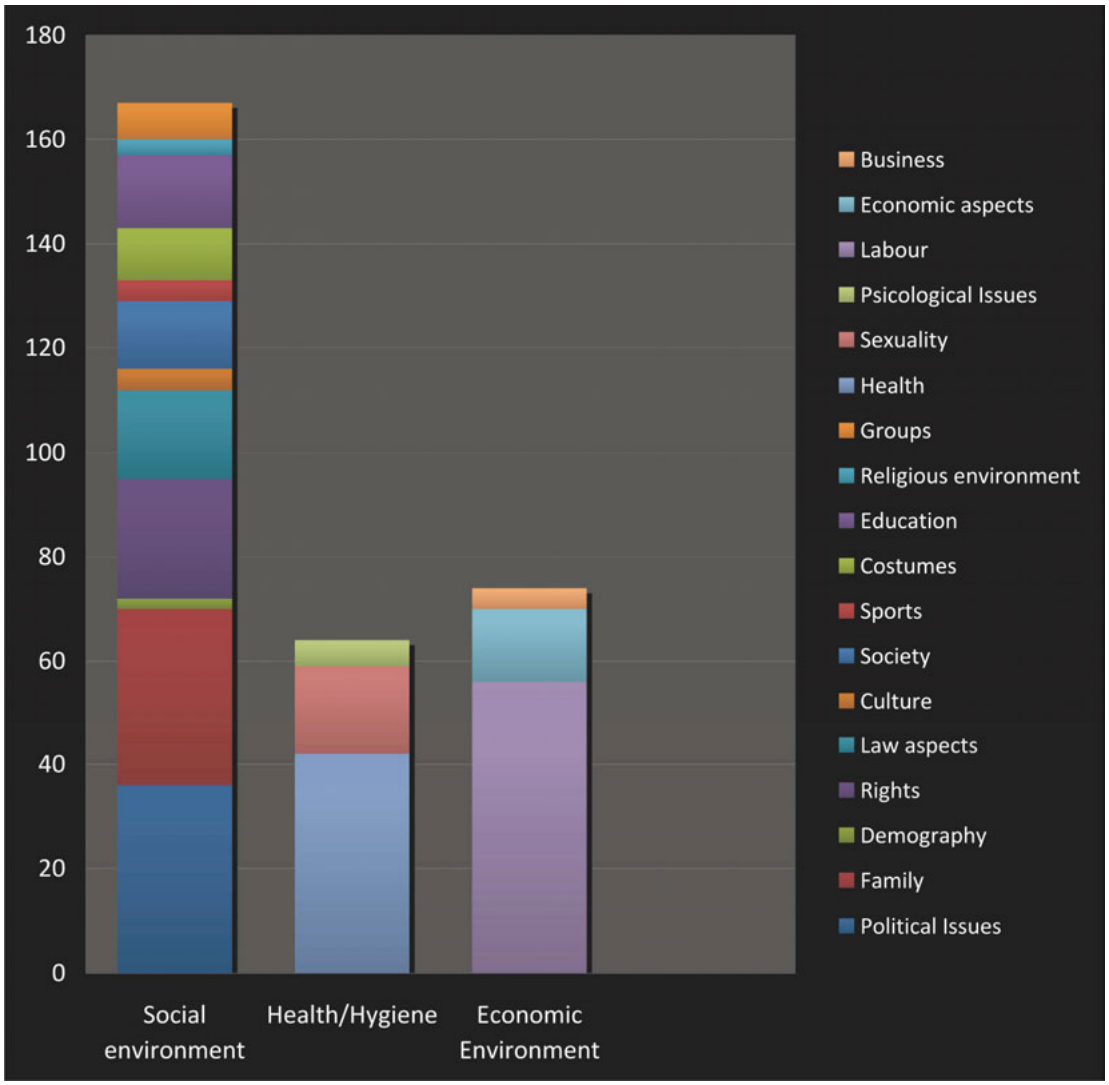

Table 3. Thematic composition of external specialties in women's studies domain

3.3 Constructing special classifications and thesauri

An opportunity to use domain analysis is when building a specialized classification or a thesaurus, as indicated by Hjørland (2002). In fact, it has been shown a little example of this above when talking about the methods of indexing and terminological studies. However, I would like to draw attention here to the use of specialized KOSs in the analysis of the ID domains. This would also help to reflect on how these tools have been designed already. In fact, the analysis of interdisciplinary KOSs could shed light on how the ID knowledge domain is like.

Nowadays it is quite obvious that there is an absence of contributions, a lack of models and methodologies in the construction of KOSs. Hjørland (2002) complains of similar problems referred to disciplinary ones, but the situation is deteriorating fairly in the case of the ID KOSs. Some have a general belief that a thesaurus, for instance, is interdisciplinary if it includes several disciplines in order to represent a knowledge domain. If this would be all, many disciplinary thesauri are interdisciplinary because their thematic nucleus always needs other specialties in order to complete the description of the domain. In the case of musical instruments, for instance, we would also need for the inclusion of musical genres, costumes, ethnic characteristics, etc. So, what makes them different? When one examines ID thesauri, women's thesauri for example, and looks at the structure, they seem much like disciplinary, as it will be shown later. Some claim that sometimes ID KOSs are tools designed and structured in accordance with the model of disciplinary scientific knowledge (López-Huertas et al. 2004; Mazzoocchi and Plini 2005). In any case, no clear way of addressing the problem can be found.

However, there are some contributions that have studied and compared various thesauri of women's studies in order to get information about the knowledge domain

(López-Huertas et al. 2004). After the analysis of the terminology and the conceptual structure, it has been concluded that there was scarce consensus regarding the terminology belonging to the domain, the co-occurrence of terms was around 12% of average which is very low, even considering the impact of cultural differences. This fact raised also a question: where the terms come from in the studied thesauri? It cannot be explained only based on the cultural differences. Regarding the structure, it was concluded that there was a severe conceptual dispersion of the models used to represent the domain. Furthermore, there was not only lack of consensus in the scope of the domain but also in its structural representation. Putting together the four thesauri, they sum up to 34 different main classes or subject areas. Out of them, only eight main areas (23.5%) co-occurred in the thesauri twice (2 hits), making us question the convenience of the exclusive use of this type of source to identify the thematic structure of an ID domain. The qualitative study of main subject areas showed that the four thesauri were conceived, at least formally, as universal or hybrid systems with a broad thematic spectrum, rather than as specific structures for gender systems. As said before, cultural differences are not enough explanation so that there is this lack of consensus on terminology and on the conceptual structure. Other studies have demonstrated this claim (López-Huertas 2013b).

It is quite obvious that a methodology for building ID KOSs is needed and that this should put special emphasis on terminological aspects and names that must be assigned to the categories and classes, so both are really representative of the domain. The paper by Lam (2011) shed some light on this side when she insisted on the importance of the vocabulary and the use of meaningful categories to represent the music domain, such as appreciation of music for instance. When we have such tools, thesauri and classifications can be a good method for ID domain analysis. For these reasons, this approach must be complemented with other methods, such as that of indexing of documents.

3.4 Bibliometrical studies

Bibliometrics and scientometrics are well known methods to analyze knowledge domains. They provide valuable information about the composition of the thematic map that forms the domain, which is of great importance when we are dealing with inter and transdisciplinary knowledge. In addition, these maps represent another kind of conceptually relevant relationships for the domain but which are not based on the content of the documents, for instance the citation behavior (Rorissa and Yuan 2012, Eggers et al. 2005), which helps to expand the perception of the domains. In fact, these methods have been used to know inter-, and transdisciplinary spaces in many more cases than in the case of disciplines, as claimed by Sugimoto and Weingart (2015). An example of approaching ID domain analysis by using the bibliometric method is that of Larievière et al. (2012). This paper examines a century of library and information science contributions by using a set of bibliometic variables such as "knowledge production in the field, shifts in subject coverage, the dominance of particular publication genres at different times, prevailing modes of production, interactions with other disciplines" (Larievière et al. 2012, 997).

Within this group, it should be noted that other quantitative techniques, such as multivariate analysis and neural networks, can be used to approach domain analysis. Both leave behind the discovery of the structure and dynamics of the studied domain (Moya and López-Huertas 2000). The main idea of this contribution is to study an ID field, biotechnology, in order to know its structure, its evolution almost in real time and thus become a method of automatic update of classification. These few examples show the popularity and importance of the quantitative techniques to analyze ID knowledge domains. However, these approaches should be complemented with other methods, such as indexing and terminological studies.

3.5 Empirical user studies

The cognitive model of information science (IS) included the user as an active element of information systems, able to interact with it and to modify the message obtained from it. After this, some scholars claimed a paradigm shift in IS from the system to the user (Watters and Shepherd 1994). Since then, many papers on this matter have been published with uneven success. In my view, the active incorporation of this element in information systems is necessary. By active I do not mean designing IS only according to the user model but incorporating users to the systems by integrating terminology and conceptual structures from them to those coming from the documental sources. So, IS would have two main sources for their construction: users and documents (López-Huertas 1997). There have also been some attempts in this direction that have shown evidence that the system enriched using this model (Lykke-Nielsen 2001; 2002; 2004). There are other contributions that study the interactions of ID users with an INSPECT classification codes system. Transaction logs were used to explore users' search behavior. The authors "emphasize the importance of thinking about and developing methodological models for investigating interdisciplinary knowledge organization practices" (Shiri 2009). Should have we KOSs designed in this way, they could be a source for including users of a given domain in the structure of this domain. User studies

should be complemented with indexing studies, terminological studies and thesauri and classification construction at least.

3.6 Document and genre studies

This approach is interesting because it gives a kind of information about the domains that is not offered by other methods. It is much related to the different discourses that may coexist in a knowledge domain. Depending on the type of document generated by a specific domain, a different discourse could be expected. The inclusion of possible types of documents will give a more complete perspective of the domain and it will offer a more varied terminology and, for this, enriched structures. The identification of types of ID documents might not be easy in interdisciplines because the lack of a long history behind ID knowledge makes that they are not well-defined. In any case, this method should be considered, although it should be taken as complementary to other methods, as those studied above.

3.7 Epistemological and critical studies

As pointed out by Hjørland (2002), the knowledge of the epistemologies that are at the basis of disciplines is an important requirement to know knowledge domains, for representing this knowledge in conceptual structures and for information retrieval. 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. They share, let us say, a homogeneous knowledge, a common discourse, although interdisciplinary zones may exist. The case of ID knowledge is quite different. Inter- and transdisciplines do not usually have a tradition behind, they usually originate and evolve in a different way, and interdisciplines do not have a corpus of knowledge that has been consolidated with the passage of time, and, therefore, do not share the established, consensual paradigms. It is true that not all ID are in the same stage of evolution and that the more consolidated they are the more predictable are its theoretical models. However, considering the concept of ID defined in this paper, and considering that the integration of knowledge and methods required by interdisciplinary research will result in a new melted knowledge and methods, special attention should be pay to this matter. Can we be guided by the standard classification of epistemologies in these cases? From where can we get and identify the theoretical models and methods used in the ID knowledge production since we cannot count on a tradition behind? In my view, the study of research projects themselves and the resulting publications can shed light on these issues. This is why I think that a careful analysis of both, publications and research projects, can help to know the paradigms and theories behind the interdisciplines and what names must be assigned to them. It is easy to see that this fact is much connected with potential identification of relevant terminology for interdisciplines.

Within this context, it is convenient to stress the importance of the actors implied in ID research that are not only coming from science but also from the social sector and that are active members in the research process. A nice example of this can be found in Fuchs (2008) where society actors are integrated in information and communication technologies research.

Interaction and consensus among all participants are expected in ID research. As a result, the research design or the theoretical basis and the methodology used might have changes in the process of defining the final procedure to be followed. What changes are we referring to? Changes of the primary ideas occur when scientists from different specialties start interacting with projects. This happens in the actors' interaction stage and along the research process. This situation can modify previous models and the question is: how can we call to the model or theories behind the emerging research? In my view, this situation, which is usual in ID knowledge, should be explored in order to a) understand the nature of the integrated knowledge, b) explore the theoretical models and theories behind it and c) try to establish, if possible, some patterns of behavior by specialties (health, environment, etc.).

4.0 Conclusions

After reflecting on the role of interdisciplinary knowledge domains within the scope of the theory and methods of domain analysis, the following conclusions arose:

- Domain analysis has been a successful theory and methodology in the field of library and information science and for that many studies have been based either on its model or on its methods or both. However, it was intended mainly for disciplinary domains, and it is necessary to reflect on the role of inter- and transdisciplinarity within the model and methodology of domain analysis.
- Interdisciplinary knowledge has notable differences if compared to the disciplinary knowledge. These differences should be addressed in order to extend the scope of domain analysis
- The methods of domain analysis should be extended in order to incorporate the peculiarities of the ID and to incorporate additional methods if needed.

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