

## WHAT DOES A DOMAIN ANALYSIS LOOK LIKE IN FORM, FUNCTION, AND GENRE?

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### ABSTRACT

This article presents an inventory what theorists describe as the definition of domain analysis. Survey writings on and of domain analyses for their distinct attributes and arguments. Compile these components and attributes, linking them to their function, and from there. Describe a proposed ideal form of domain analysis. Evidence that while the debate about the substance and form of the epistemic and ontological character of domain analysis will continue, some might find it useful to give shape to their ideas using a particular form that follows function. If our purpose is to delineate and communicate what it is that we are analyzing when we engage in domain analysis, then I hope this small contribution can be of use.

**Keywords:** Domain Analysis; Domain Analysis Conceptions; Domain Analysis Types; Analysis Domain Genre.

### 1 INTRODUCTION

Domain analysis has always been a professional concern for Library and Information Science. Literary warrant being an early twentieth-century form of it. At the beginning of the twenty-first century it grew to be a more formal area of study for the field. It was coherently stated in 1995 (HJØRLAND; ALBRECHTSEN, 1995), and reinvigorated by the work of Birger Hjørland (HJØRLAND, 1998; 2002), many worked both on the theory of domain analysis and on applying domain analysis principles.

Now at the beginning of the second decade of the twenty-first century we can take stock in domain analysis. The basic question this paper addresses is *what does a domain analysis look like?* Researchers have prescribed various methods, and have published numerous papers. What, then is the *ideal type* of the domain analysis genre, what can we see as trends in domain analysis as a genre, and what can we advise as ways this genre can advance?

In order to address this question, we will (1) inventory what theorists describe as the definition of domain analysis, (2) survey writings on and of domain analyses for their distinct attributes and arguments, (3) and compile these components and attributes, linking them to their function, and from there (4) describe a proposed ideal form of domain analysis.

## **2 THEORISTS' CONCEPTION OF DOMAIN ANALYSIS**

Hjørland and Albrechtsen (1995) are often cited as the first description of domain analysis. In this work, they define a domain-analytic paradigm as:

[...] firstly a social paradigm conceiving of IS [information science] as one of the many social sciences, promoting a social psychological, a sociolinguistic, a sociology of knowledge, and a sociology of science perspectives [sic] on IS. The domain-analytic paradigm is secondly a functionalist approach, attempting to understand the implicit and explicit functions of information and communication and to trace the mechanisms underlying information behavior from this insight. Thirdly it is a philosophical-realistic approach, trying to find the basis of IS in factors that are external to the individualistic-subjective perceptions of the users as opposed to for example the behavioral and cognitive paradigms (HJØRLAND; ALBRECHTSEN, 1995, p.400).

They go on to say, “[...] the domain-analytic view has neither hitherto been formulated as one theoretical approach, nor been compared and evaluated in the literature together with other views (e.g., the cognitive view). You can say that the domain-analytic viewpoint has had a kind of quasi-existence: It has both been existing and nonexisting [sic]. An important job is to make this view more explicit, to explicate its theoretical consequences, and to formulate a comprehensive research agenda” (HJØRLAND; ALBRECHTSEN, 1995 p.401).

Reactions to this conceptualization follow a wide range of forms. Some authors have used the spirit and references from Hjørland and Albrechtsen’s 1995 work (White and McCain, 1996). In so doing they have positioned themselves alongside or in the same vein as Hjørland and Albrechtsen. Others have argued for a refinement of the ideas presented by Hjørland’s 1998 example (FEINBERG, 2007).

In his 1998 Birger Hjørland described the classification of psychology. To serve his purpose he engages in a domain analysis from various perspectives. This is both an applied and theoretical work because Hjørland reflects on the method of analysis and classification. In Hjørland's work we see him describing what he considers the domain to be from different epistemic stances. This is his primary concern, and it shapes part of what he claims in the paper. In other places we see an anecdotal critique of extant systems in relation to the author's conception. Feinberg puts it this way:

In Hjørland's [sic] domain analysis of psychology, for example, the connections between his analysis of the discipline of psychology itself and his comments on existing classifications of psychology are not clearly drawn. Hjørland notes, for example, that how it is surprising that the PsycINFO system doesn't contain classes for children, adolescents, or adults, while it does for older people. It's not apparent how this observation pertains to the concerns of domain analysis (paradigms, epistemological commitments). Does this omission in PsycINFO reveal a particular paradigm? Does it indicate that a paradigm has not been well or fully described in the classification? And if either of those are indeed the case, what is the significance of these observations in terms of the classification's overall purpose, utility, or the effects that it produces? ... In essence, although domain analysis could represent a powerful way to interpret classifications and their properties, it does not yet incorporate a comprehensive enough structure to effectively facilitate rigorous, systematic critical interpretation and design (FEINBERG, 2008, p.278).

It is precisely this concern, voiced by Feinberg that we take up the question: what does a domain analysis look like? Let us look at types, definitional methodologies, and functions of domain analysis. Then we can provide a more well-formed, even if still partial, answer to this question.

### **3 TYPES OF DOMAIN ANALYSIS**

It seems to me that there are at least two major types of domain analysis: descriptive and instrumental. The former is used and useful only in basic research and the latter, instrumental, to be used to create knowledge organization systems.

The two types serve different functions, and as a consequence different audiences. This means we should expect that they look different – that they are different genres.

### **3.1 Descriptive Domain Analysis**

A descriptive domain analysis is used and useful to researchers. This means the evidence for what constitutes a domain is governed by the researchers' interests.

The predominant heuristic to construct descriptive domain analysis, following Hjørland's *approaches* is to create bibliometric maps (SMIRAGLIA, 2007; 2009) and (JANK, 2010). And of course Hjørland's 1998 work is an example of this kind of domain analysis as well. There are other examples Abrahamson (2003), Ørom (2003), Fry (2006), Hartel (2007), Robinson (2009) and Tanaka (2010).

### **3.2 Instrumental Domain Analysis**

An instrumental domain analysis is used and useful to designers of knowledge organization systems. These very rarely see the light of day, because they are used and useful to system designers and are rarely considered valuable to the public. However, there are available different *records* of domain analysis. For instance the Dewey Decimal classification does account for *why* it changes its scheme, and logs (internally) desiderata and rationales for future changes.

But whether a domain is descriptive or instrumental it has particular components.

## **4 ELEMENTS IN THE GENRE OF DOMAIN ANALYSIS**

With the above considerations, and now that we have some practice at domain analysis from different disciplinary, epistemic, and ontological views, what can we say is the *genre* of domain analysis? And if we were interested in being helpful to the budding domain analyst how could we guide them? What are the elements of form that aid in the function of domain analysis?

It seems clear that no matter what approach we want to take we need to *lay bare the device* that is, make clear our definitions, our scope and reach, and our purpose. These are at least the basic elements of the genre of a domain analysis. Thus, we would expect every domain analysis to have a section on definitions, scope and reach, and purpose. We can look at what these mean below.

#### 4.1 Definitions

What is a domain? What is your domain? What is your form of analysis? What are your limits? In the case of these questions we must be clear to set the expectations of our audience. The naming, defining of the domain, and providing examples from the domain, are important here in order to offer the opportunity for comparison and critique. In the case of defining the form of analysis we

#### 4.2 Scope and Reach

This follows directly on arguments made in Tennis (2003), and the subsequent responses (HJØRLAND; HARTEL, 2003) and (FEINBERG, 2008).

The upshot of Tennis 2003 is that we can clarify the scope and reach of a domain by specifying the extension and intension of the domain under consideration. To specify the extension we must *name* the domain, as specifically as possible, and in so doing, *detail the extension* and the *exclusions* of the domain. Naming a domain is of course labeling it, say for example, *Religion*, but then to detail the extension and the exclusions is important to communicating the value of the activity, that is, the value of the domain analysis. What are you considering and not considering in your analysis of Religion? These three things: name, extension, and exclusions are *areas of modulation* and it is the first axis to consider in specifying scope and reach of a domain when engaging in domain analysis.

In order outline the structure of a domain and what the analyst sees as its component parts the reach and scope of a domain analysis should also account for a

domain's *degrees of specialization*. This grows from the basic truism that the closer one looks at a problem the more complex it becomes. That is, were any one of us to look at a domain without restrictions on how *specialized* of a view we were taking, we would construct an arbitrary, or at least *post hoc*, criterion for stopping. That is, the specificity of our analysis would be communicated via stream of consciousness methods rather than by design. Perhaps this related to what Hjørland and Hartel call *fusion of horizons* (2003 p.242). However, it is unclear in this particular work how that differs from what I am claiming, or how one might operationalize a fusion of horizons in a domain analysis. They say:

People in general, as well as researchers, tend to find the dominant view as the natural and the only possible or serious view. It is important to consider different horizons. What we are claiming here can be seen as a kind of hermeneutical approach to ontology and to the research process: That the most informed way of construing ontologies is by the fusing of horizons, considering the different views of the field (cf. FONSECA; MARTIN, 2004) [...] (HJØRLAND; HARTEL, 2003 p.242).

Their claims are:

In our view, quality research in the spirit of domain analysis should begin with a high-level interpretive study of a subject or community of interest. An early requirement is to uncover the interests underlying different conceptions of that area and then negotiate for an ideal definition of the domain. In this process, the researcher entertains various contemporary notions of the domain, as well as their recent histories, before coming to a conclusion of the domains substance and boundaries," (HJØRLAND; HARTEL, 2003 p.242).

The problem for these authors seems to be order of work rather than whether one defines scope and reach or not. They claim that work should go on *before* a "[...] conclusion of the domains [sic] substance and boundaries" (HJØRLAND; HARTEL, 2003 p.242). The boundaries and substance are still necessary to define. This they admit, even in the rejoinder.



### **4.3 Purpose**

Finally, the genre of domain analysis should make clear what the purpose of carrying out the analysis is. As mentioned above it seems that there are at least two kinds of reasons why you would carry out a domain analysis. The first is to for basic research the other for designing and information system. The first we call *descriptive domain analysis* the second we call *instrumental domain analysis*.

### **4.4 Descriptive Domain Analysis**

In the 1995 conception of domain analysis there are three *descriptive* imperatives: (1) follow social science methods, (2) through observing functions of social actors (3) in a collective that is external to subjectivist stances. Thus we are discovering something when we do domain analysis (cf. HJØRLAND; ALBRECHTSEN, 1995, p.400) quoted verbatim above.

As Feinberg claims, “It seems that, in Hjørland’s writings, the domain analyst’s role is to describe a domain, and not to define one; there “is” a single domain of, for example, psychology, and not multiple possibilities for how such a domain might be constructed” (FEINBERG, 2007).

The debates then ensue about how we might describe (bibliometrically or not?) or what we are really describing (ontologically), but the purpose remains the same. We are not building an information system; we are simply describing a domain for basic research purposes.

### **4.5 Instrumental Domain Analysis**

A different kind of domain analysis follows from a need to understand a domain in order to construct or revise an information system. For example, the editors revise the Dewey Decimal Classification in response to changes in the domain represented in this universal classification. The sources often cited by the editors are literary warrant (both the terms present in the literature and the quantity

literature produced), feedback from users (both librarians and patrons of libraries), and structural warrant of the scheme itself (i.e., how the classes fit together).

Of course it is possible to use the products of either kind of domain analysis for the other, but if we know the author's purpose, then we are not lead to think one substitutable for the other.

*Summary: Elements of the Form of Domain Analysis*

To summarize, we can say that a coherent domain analysis offers its readers a clear statement about its definitions, scope and reach, and its purpose. The elements of a domain analysis support this. Now let us look at one example of how a this genre might look.

**Example: Shakerism**

If we pick a constrained domain, like Shakerism, we can see perhaps what the definitions, scope and reach, and purpose might be of one of its domain analyses.

*Shakerism*

Definition of Shakerism: The church is official called United Society of Believers in Christ's Second Appearing. It is a religious movement founded by the Wardleys of England, by recognizing Ann Lee as the second coming of Christ in 1747. From that time 'til 1990s with the publication of Stephen Stein's *The Shaker Experience in America* (Yale University Press) in 1992.

Scope and Reach: For the purposes of this domain analysis I will use Stein's 1992 work and sources cited in that work. These comprise some 300 resources, both primary and secondary resources. *Extension*: All concepts I can identify in these texts, and their relationships. *Exclusion*: I am not considering anything after 1992 and not considering other sources for this domain analysis. *Name*: Shakerism according to Stein. *Focus and Specialization*: Specifically looking at theological and architectural terms, not focused on the music or art.

Purpose: The purpose of this domain analysis is descriptive. I hope it will serve as a starting point to create an ontology of early American theological terminology in relation to the built environment, but that is not the primary concern.



The primary concern is to take stock of Stein's perspective of Shakerism given the constraints above.

It is perhaps by following these outlines that we can see more clearly the core, the scope the reach, and the purpose of a domain analysis, from one perspective and at one particular point in time.

## **5 Context-Oriented Domain Analysis (CODA): Everything Changes**

What we hope to make clear in this text is that we must understand the limits of our own analyses. The reason why this is important is linked, intimately, with the fact that everything changes. Our view of the domain changes and the domains themselves change. That is, we might reconsider the

A concrete example might be in the *domain* of Human Eugenics from 1910-1935. Were we to define it in the terms of its contemporaries of the 1930s we might find a different conceptualization of the domain compared with its literature and concepts today. For example today we have to account for different beliefs about eugenics in relation to science (e.g., ANONYMOUS, n.d.) and as a consequence different beliefs about science. This is clear from subject ontogenies in classification schemes (TENNIS, 2002) and (FURNER 2007).

This is the heart of what Hjørland advocates, when he is concerned with different epistemic stances on domains (e.g., HJØRLAND, 1998). However, the point I want to emphasize here is that we must account for the function of time in relation to the evidence of concepts in a domain, as well as, its potentially varied epistemic stances. Further, both my concerns and Hjørland's must be accounted for in the context of discussions of agency on the part of the domain analyst, following Feinberg (2007).

Likewise, the White and McCain article takes a long view of the discipline of information science, but one wonders if there are multiple information sciences that could be teased out from segmenting their data. We get the impression that it might be possible to read the data that way, given the way they break out their tables

(WHITE; MCCAIN, 1996). However, their concern is with one discipline, not many, even if their one discipline has many subfields.

What is clear is that while the debate about the substance and form of the epistemic and ontological character of domain analysis will continue, some might find it useful to give shape to their ideas using a particular form that follows function. If our purpose is to delineate and communicate what it is that we are analyzing when we engage in domain analysis, then I hope this small contribution can be of use.

In their 1995 work Hjørland and Albrechtsen, anticipating their readers ask: “I domain-analysis really new? Or is it old wine in new bottles?” My comment now sixteen years out is that we have just begun to understand the composition of the fluid and the boundaries established by our analytical pursuits. It seems we still have much to bottle and much to uncork in domain analysis.

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