ABSTRACT

Interdisciplinarity and its implications for developing a conceptual framework for the Information Field is discussed, and Zhang & Benjamin’s (2007) paper Understanding Information Related Fields: A Conceptual Framework is examined. It is argued that the fundamental components of a framework must be seen as embedded in disciplines, with their theories, concepts, approaches and assumptions. It is argued that a theoretically based distinction between multi-, inter- and transdisciplinarity is important as a foundation for a discussion of a conceptual framework for the Information Field. It is shown how interdisciplinary theory may inform the development of a shared conceptual framework for the Information Field. A continuum of integration from multi- to inter- to transdisciplinarity is useful for a distinction of different degrees of synthesis, as common conceptual frameworks tend to be associated with transdisciplinarity, which represents the greatest synthesis of approach.

Keywords
Interdisciplinarity, Conceptual Framework, Information Field

INTRODUCTION

The purpose of this article is to examine Zhang & Benjamin’s (2007) paper Understanding Information Related Fields: A Conceptual Framework. It presents a conceptual framework to describe the information related fields, which they claim are all interdisciplinary. In their framework, the Information Field contains four fundamental components, which interact and integrate with each other.

While it is recognized that it is important to open up a discussion of the conceptual framework for the Information Field and that we have good reasons to accept their claim for their model’s usefulness for prescribing potential issues and opportunities for information related fields, there are serious deficiencies in their approach to explaining the relations between their fundamental components, the notion of disciplines is absent in their framework, and, in general, the framework seems to build on the assumption that interdisciplinarity is there, but without much discussion of the concept itself or its implications.

A discussion of interdisciplinarity and its implications is important if the aim is to begin to put down some of the foundations for achieving a conceptual framework for the Information Field. I will now attempt to explain why this is the case, and I will relate my discussion to the literature on interdisciplinarity. One of the challenges in discussing conceptual frameworks is to create a shared understanding of the concepts involved. Interdisciplinary theory offers us theoretical concepts to think about relations between two or more different disciplines, and may offer us insights into the mechanisms of multi-, inter- and transdisciplinarity.

First, I will briefly outline and critique the model proposed by Zhang & Benjamin (2007), then I will introduce the foundations of interdisciplinary theory and discuss some requirements for a shared conceptual framework. Next I will address the relationship between material fields and disciplines and conclude with an outline of a problem-based approach which is suggested as focus for developing a conceptual framework.


The context of the Information Model proposed by Zhang & Benjamin (2007) is the discussions of the iSchool Movement in the U.S. (Bruce, Richardson & Eisenberg, 2006; Debons & Harmon, 2006; Dillon & Rice-Lively, 2006; Harmon, 2006; King, 2006; Thomas, Von Dran, & Sawyer, 2006; Zhang and Benjamin, 2007). However, these discussions of the Information Field do not concern themselves with the conceptual and theoretical challenges in doing multi-, inter- or transdisciplinary work. We can see that multiple disciplines are combined or drawn upon in the Information Field, but we know little about the mechanisms of multi-, inter- and transdisciplinarity, and what it takes to create a common conceptual framework.
Zhang and Benjamin (2007) present an Information Model that they suggest provides a unified framework for the information related fields. Zhang and Benjamin’s figure 1 (2007:1936) is reproduced above. The authors posit that information related fields (including the Information Field) are built on a number of other fields but with their own unique foci and concerns, and they propose the Information Model as a possible tool to study the emerging Information Field and to demonstrate the similarities and differences among information related fields. Zhang and Benjamin (2007:1942) use the fields of LIS, MIS and HCI as examples. They state that “these fields are closely related to and starting to influence each other” (p. 1943) and they demonstrate some of the commonalities and differences among the three fields in their figures p. 1936, 1943, and 1944.

In the words of the authors, “Figure 1 depicts the essential idea of the Information Model. It asserts that information with the help of technology can provide capabilities to people and to society in various domains and contexts. (2007:1936, italics in original).

Zhang and Benjamin’s Information Model rests on the following assumptions:

- the Information Field contains four fundamental components: information, technology, people, and organization/society. They are the fundamental components that “function as the pillars or foundations and thus are central to all of these information related fields” (2007:1935).
- that “core components from other fundamental fields interact and integrate with each other to form dynamic and interesting information related fields that all have to do with information, technology, people, and organization/society” (2007:1934).
- that the information related fields are all interdisciplinary and that “each of them presents an interaction, integration, and an equilibrium state of several components that are the core elements in some traditional fields” (2007:1935).

It is argued that as a possible tool to study the emerging Information Field, their approach has serious deficiencies. The assumption that the Information Field contains four ‘fundamental components’ seems to disregard the existence of disciplines, disciplinary assumptions and worldviews. It is argued that these ‘fundamental components’ must be seen as embedded in disciplines.

The assumption that it is the ‘fundamental components’ that interact and integrate does not take into account that interaction and integration is a matter of degree along a continuum. Zhang & Benjamin (2007) do not differentiate between multi- or interdisciplinarity nor do they differentiate between interaction and integration or relate these concepts to multi- or interdisciplinarity. As will be
demonstrated below, both interaction and integration are normally seen as defining characteristics of interdisciplinarity, where integration indicates the degree of synthesis along a continuum from the least to the greatest degree of synthesis. It is argued that a theoretically based distinction between multi-, inter- and transdisciplinarity is important as a foundation for a discussion of a conceptual framework for the Information Field.


Furthermore, Zhang & Benjamin’s (2007) assumption that the information related fields are all interdisciplinary, does not address the rationale of interdisciplinarity as a means of solving problems and answering questions that cannot be satisfactorily addressed using single methods or approaches (Klein, 1990:196).

In the following sections I will introduce central concepts from the literature on interdisciplinarity, to examine in more depth the assumptions of Zhang & Benjamin (2007) and to further strengthen my arguments for the foundations for achieving a conceptual framework for the Information Field.

WHAT IS INTERDISCIPLINARITY?
The most widely cited definition of interdisciplinarity is that of the Organisation for Economic Cooperation and Development (OECD) (Aboelela et al., 2007; Franks et al., 2007 p. 169); Klein, 1990 p.36; Klein, 1996; Lattuca, 2002 p. 712; Lattuca, 2003 p. 2):

Interdisciplinary—an adjective describing the interaction among two or more different disciplines. This interaction may range from simple communication of ideas to the mutual integration of organising concepts, methodology, procedures, epistemology, terminology, data, and organization of research and education in a fairly large field. An interdisciplinary group consists of persons trained in different fields of knowledge (disciplines) with different concepts, methods, and data and terms organized into a common effort on a common problem with continuous intercommunication among the participants from different disciplines.

This definition of interdisciplinarity refers to interaction as well as mutual integration between disciplines. On one end of a continuum is the informal communication of ideas, such as might occur in a conversation between colleagues from different disciplines, on the other end is formal collaboration, such as research or teaching teams comprised of one or more faculty from different disciplines (Lattuca 2002:712). Some authors focus specifically on inter- and transdisciplinary science (Aboelela et al., 2007; Klein, 2004, 2006; Rosenfield, 1992 and Stokols et al., 2003; Franks et al. (2007) examine interdisciplinary teaching and learning, whereas more general approaches to interdisciplinarity are represented by Klein (1990, 1996, 2002), by Lattuca (2002, 2003) and by Repko (2008). Klein (2010) offers a synthesis of discussions of “the genus Interdisciplinarity”, including multidisciplinarity, interdisciplinarity and transdisciplinarity.

Zhang & Benjamin (2007) claim that it is the ‘fundamental components’ that interact and integrate (p. 1937), but according to the above definition, interaction and integration, the cornerstones of interdisciplinarity, refer to what happens between disciplines.

Aboelela et al. (2007) conducted a systematic literature review of interdisciplinary research based on interviews and field tests with interdisciplinary researchers. They summarized the key definitional components from their literature review in table I which is reproduced below. Aboelela et al. state that “As the literature review proceeded, the existence of a continuum from multidisciplinary to interdisciplinary to transdisciplinary was apparent. Attempting to define interdisciplinary research without attention to the precursor and subsequent approaches made no sense.” (2007, p. 339). Thus, Aboelela et al. (2007) identify 3 qualitatively different modes of interdisciplinary research represented by different degrees of synthesis along a continuum from the least degree of synthesis, proceeding to a moderate degree and finally arriving at the greatest degree of synthesis. These typologies are categorized in table I below, which is Aboelela et al.‘s typologies of interdisciplinary research (Aboelela et al., 2007:337). For the least degree of synthesis, Aboelela et al. use the term ‘multidisciplinary’, for the moderate degree ‘interdisciplinary’, and for the greatest degree of synthesis ‘transdisciplinary’ although the authors cited in table I use a terminology that is not quite consistent. In this paper I adhere to the terminology of Aboelela et al. (2007).

Aboelela et al.’s typologies of interdisciplinary research (Aboelela et al., 2007:337) identified in table I, are based on their literature review of interdisciplinary research. For a general overview of defining characteristics of interdisciplinarity, see Klein (2010) who provides “A taxonomy of interdisciplinarity”.

The literature on interdisciplinarity has been brought to bear upon issues of interest to information science (Holland, 2008; Szostak, 2008). Holland (2008) investigates the nature of collaboration within information science and he makes a case for distinct meanings for interdisciplinary and multidisciplinary research on the basis of a philosophic analysis of the terms. Holland (2008) invokes the challenge to engage in more interdisciplinary research and practice within information science.

I concur with Holland (2008:10) in that “There is a challenge to engage in more interdisciplinary research and
practice within information science”, and in that within information science the terms interdisciplinarity and multidisciplinary “are either intentionally used synonymously or inadvertently interchanged based on implicit assumptions of meanings. Such interchanges ignore distinct meanings of the terms, thereby overriding the nuances and subtleties of each”. It is argued that these nuances are essential if the aim is to put down some of the foundations for developing a conceptual framework for the Information Field. On the basis of Aboelela et al.’s (2007) key definitional components of interdisciplinary research, as depicted in table I, it is possible to develop a more nuanced understanding of the differences between multi-, inter- and transdisciplinarity.

**Table 1. Typologies of Interdisciplinary Research (Aboelela et al., 2007:337)**

<table>
<thead>
<tr>
<th>Author</th>
<th>Lattuca (2001)</th>
<th>Typology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of synthesis</td>
<td>Least</td>
<td></td>
</tr>
<tr>
<td>Informed disciplinarity:</td>
<td>disciplinary questions may be informed by concepts or theories from another discipline</td>
<td>Instrumental interdisciplinarity: bridge building between fields. Problem-solving activity, does not seek synthesis or fusion of different perspectives</td>
</tr>
<tr>
<td>Synthetic disciplinarity:</td>
<td>questions that link disciplines (question either belongs to both or neither disciplines)</td>
<td>Multidisciplinary: teams work in parallel or sequentially from their specific disciplinary base to address a common problem</td>
</tr>
<tr>
<td>Moderate</td>
<td>Synthetic disciplinarity</td>
<td></td>
</tr>
<tr>
<td>Greatest</td>
<td>Transdisciplinary:</td>
<td></td>
</tr>
<tr>
<td>the application of theories, concepts, or methods across disciplines with the intent of developing an overarching synthesis</td>
<td>Transdisciplinary: a movement toward a coherence, unity, and simplicity of knowledge</td>
<td></td>
</tr>
<tr>
<td>Conceptual interdisciplinarity:</td>
<td>questions without a compelling disciplinary basis</td>
<td>Transdisciplinary: teams work using a shared conceptual framework, drawing together discipline-specific theories, concepts, and approaches to address a common problem</td>
</tr>
</tbody>
</table>

TOWARDS A SHARED CONCEPTUAL FRAMEWORK

In general, Zhang & Benjamin’s (2007) discussion that addresses the need for developing a general framework for the Information Field, assumes interdisciplinarity but does not draw on interdisciplinary theory. Zhang & Benjamin (2007) suggest that their Information Model provides a unified framework of the Information Field but they fail to indicate how such a framework could be developed.

It is argued that the continuum of integration from multi- to inter- to transdisciplinarity is useful for a distinction of different degrees of synthesis, as common conceptual frameworks tend to be associated with transdisciplinarity, which represents the greatest synthesis of approach. From Aboelela et al.’s (2007) overview in table I, we can get an indication of the conceptual foundations for discussing degrees of integration that might lead to shared conceptual frameworks. From Aboelela et al.’s (2007) table I we can see that ‘defining a field’, ‘developing an overarching synthesis’ and ‘using a shared conceptual framework’ are classified as either interdisciplinary or transdisciplinary endeavors, between moderate to greatest synthesis. According to Aboelela et al.’s (2007) literature review, interdisciplinary research may result in the development of a new field, but at the same time they find that transdisciplinary endeavors that set out to create synthesis between disciplines, are the most likely to result in the development of a new field (p. 339).
For the greatest synthesis of approach, transdisciplinarity, they state (2007:339), “In this mode, teams not only share a common question but also often share and borrow methods, create a common conceptual framework, and either learn each other’s disciplinary language or create a new common language” as opposed to modes with a moderate degree of synthesis where team members will often share a research problem “but still employ their respective disciplinary methods, conceptual frameworks, and languages.” (p. 339).

What is significant is that for modes of interdisciplinary research with a moderate degree of synthesis, team members will typically employ their respective conceptual frameworks, whereas creation of ‘a shared conceptual framework’ is associated with transdisciplinarity, the greatest synthesis of approach. Therefore, if the aim is to develop a shared conceptual framework for the Information Field, and defining a new field requires transdisciplinarity, the whole continuum with the precursors multi- and interdisciplinarity must be included in a foundation of a conceptual framework for the Information Field. In a process towards transdisciplinarity, it is important that we know our respective points of departure, our respective disciplinary approaches, underlying disciplinary assumptions and conceptual frameworks. The continuum of integration may help us create a shared understanding of where we are, discuss our disciplinary assumptions and decide which type of common conceptual framework we are striving for.

**MATERIAL FIELDS AND DISCIPLINES**

Disciplinary assumptions are especially important if two or more disciplines are involved. However, the notion of disciplines is absent in Zhang & Benjamin’s (2007) framework. Although a discussion of what a discipline is might in itself be questionable, as an analytic construct it may help us differentiate between different levels of analysis.

As Klein (1990) points out, a discipline is not a clean-cut category. She states:

> The term discipline signifies the tools, methods, procedures, exempla, concepts, and theories that account coherently for a set of objects or subjects. Over time they are shaped and reshaped by external contingencies and internal intellectual demands. In this manner a discipline comes to organize and concentrate experience into a particular “world view”.

(Klein, 1990, p. 104, emphasis in original).

This means that we need at least two different dimensions to describe a discipline, we need both ‘a set of objects or subjects’ as well as what may ‘account coherently for’ those objects or subjects. And one dimension does not make much sense without the other. To describe this ‘set of objects’, Klein (1996) uses the notion of material field:

Material field comprises a set of objects that presumably reside within a discrete domain. Physicists and chemists study material objects, botanists study plants, anthropologists study humans, and so on. Because material fields overlap, though, the notion of a field of objects must be supplemented by recourse to how objects are defined and treated. (p. 46).

Klein (1996:46) states that the simplest way to mark distinctions between disciplines is by pointing to the different objects that are examined and the subjects that are studied. However, she concludes on a general level that “boundaries are determined more by method, theory and conceptual framework than by subject matter.”

Zhang & Benjamin’s (2007) model builds on the assumption that ‘fundamental components’ interact. These ‘fundamental components’ solely focus on subject matter, and it is therefore argued that the ‘fundamental components’ reflect only the material objects or subjects in the understanding of Klein (1996): ‘information’, ‘technology’, ‘people’ and ‘organization/society’ in the Information Field. The examples of fields Zhang and Benjamin(2007:1942) use, LIS, HCI and MIS, focus on the distinctive substantive concerns of those fields, i.e. the objects of scientific inquiry that are studied in those fields. Zhang and Benjamin mention (p. 1943) that “the nature of information as a fundamental component is different in these three fields”. However, they do so in emphasizing what LIS “is about”, what its “subject domains” and “application domains” are, and for MIS and HCI they emphasize what these fields are “concerned with” (p. 1943).

The authors do not provide any insights into how these fields relate to their fundamental components; which are the theories about the fundamental components that make it possible for scholars to combine or integrate disciplinary elements and approaches? And how do the experts in the respective fields construe their objects of inquiry, and what are their underlying assumptions? See for instance Orlikowski & Iacono (2001), who analyze various views of information technology evident in the information systems research literature, and identify 14 specific conceptualizations of information technology which they cluster into five broad metacategories, each representing a common set of assumptions about and treatments of information technology in information systems research.

In Zhang & Benjamin’s model (2007), ‘Information’ is seen as a ‘fundamental component’. They also claim (p. 1943) that ”the nature of information as a fundamental component is different in these three fields”. It is suggested, considering the aim for developing a conceptual framework for the Information Field, that ‘information’ should be seen at different levels of abstraction. In Zhang & Benjamin’s model, figure 1, ‘information’ as a ‘fundamental component’ is depicted just like the other three ‘fundamental components’, ‘people’, ‘technology’, and ‘org. & society’. It is suggested that this homogeneous depiction of what
Zhang and Benjamin denominate ‘fundamental components’ renders their model arguable as an illustration of the Information Field as ‘information’ is used both as a ‘fundamental component’ but implicitly also as an overarching concept in the denomination of the field. On one hand the authors do not get “into the debate on what information is” (p. 1935). On the other, they “take primarily the view that information is semantic and influential. That is, information has meanings, purposes, and abilities to transform. In other words, we are concerned with information that has social purposes.” (p. 1935).

My reading of their model is that the keywords attached to ‘information’ in the model, cf. figure 1, (Info. lifecycle, Info. Organization, Info. representation, Classification, Cataloging/indexing, Metadata, etc.) stem from traditional Library and Information Science (LIS) e.g. based on what the authors state (p. 1937) as comments to their figure 1 “for example information organization, form, structure, classification, cataloging, and indexing, among other topics are about the intrinsic nature of information.” (1937, italics added). However, in an interdisciplinary research process, no concepts are intrinsic or overarching per se, but only become so after a problem has been defined, and the relevant disciplines to solve that problem have been identified. It is therefore suggested that Zhang and Benjamin’s “information with a social purpose” could be seen as an overarching concept in their model and thus, at another level of abstraction than ‘information’ as in LIS.

I would like to suggest that, in an Information Model, it is not the 'fundamental components' that interact, it is the disciplines. The fundamental components should be seen as embedded in disciplinary approaches and the disciplines’ ways of thinking. It is the theories about and approaches to the fundamental components that may provide the ground for interaction or integration. The assumption in Zhang and Benjamin’s model (2007) that fundamental components interact and that they have something in common in the Information Field, fails to acknowledge that the disciplines represent what Klein calls independent matrices of thought (Klein 1996, p. 222).

The lack of disciplinary assumptions and worldviews in Zhang and Benjamin’s model to frame their ‘fundamental components’, reduces their model’s usefulness as a tool for studying the Information Field. The fundamental components may be a good starting point for studying the Information Field, but represent only one level of analysis among many. We must also study the disciplines, the underlying disciplinary assumptions and worldviews to be able to forge an integrative framework, drawing from multiple theories, methods, disciplines and disciplinary perspectives. In such a process, the continuum of integration from multi- to inter- to transdisciplinarity, may be useful.

**THE WHY OF INTERDISCIPLINARITY**

In the theoretical framework of multi-, inter- and transdisciplinarity, as summarized in table I, ‘a common problem’ is a constituent part. This ‘common problem’ reflects the rationale of interdisciplinarity as a means of solving problems and answering questions that cannot be satisfactorily addressed using single methods and approaches (Klein, 1990:196).

Compared to the theoretical framework presented in this paper, and based on the above table of Aboelela et al., (2007), the Information Model presented by Zhang and Benjamin (2007) does not include a problem focus, neither does their model relate to a continuum of integration from the least to the greatest degree of synthesis, nor does it address the relationship between material fields and disciplines. It is therefore concluded that Zhang & Benjamin’s (2007) model does not lend itself to being a model of the Information Field.

While I agree with Zhang and Benjamin (2007) that “there is a need for developing a general framework that can depict the fundamental elements and concerns of the I-field”, it is further suggested that a problem-focus should be addressed in future discussions of a conceptual model of the Information Field. A problem based approach, when identifying an emerging field, can provide the rationale behind a need for combining, integrating or creating synthesis between disciplines. Dillon (2007) discusses the big research questions facing the information domain and suggests that we should “ask and attempt to provide robust answers to the big, important information questions of our time” (The sources of the problem section, para. 5). Accordingly, it is suggested that discussions of a conceptual framework for the Information Field, instead of focusing on material fields, should focus on the information-related problems we need to solve.

**REFERENCES**


