Chapter 7

Relationships in Classificatory Structure and Meaning

Clare Beghtol

Faculty of Information Studies, University of Toronto, Toronto, ON Canada

Abstract:
In a changing information environment, we need to reassess each element of bibliographic control, including classification theories and systems. Every classification system is a theoretical construct imposed on "reality." The classificatory relationships that are assumed to be valuable have generally received less attention than the topics included in the systems. Relationships are functions of both the syntactic and semantic axes of classification systems, and both explicit and implicit relationships are discussed. Examples are drawn from a number of different systems, both bibliographic and non-bibliographic, and the cultural warrant (i.e., the sociocultural context) of classification systems is examined. The part-whole relationship is discussed as an example of a universally valid concept that is treated as a component of the cultural warrant of a classification system.

1. INTRODUCTION

The concept of "relationship," like those of "classification," "taxonomy," "ontology," and indeed "concept" itself, is transdisciplinary. No discipline or domain can claim these metalevel abstractions as its own. At the same time, the complexities of the world of knowledge mean that we may no longer consider any knowledge area to be unified or stable. The premise of this paper is that changing knowledge structures and the increased globalization of information exchange require rethinking of all aspects of bibliographic classification systems, including the kinds of relationships we habitually include in the systems. This paper builds on previous research (e.g., Beghtol, 1997b, 1998). Its general purpose is to raise questions, identify issues, and suggest potentially useful research areas. This broadly exploratory perspective is designed to help discern patterns in the treatment of relationships in bibliographic classification theory and systems, that is, how relationships are expressed and what types of relationships are commonly used. One potentially useful kind of exploration is the detailed discussion of specific kinds of relationships in order to assess their suitability for bibliographic classification. As an example of this kind of exploration, the part-whole relationship is examined. Some of the implications of these exploratory endeavors are described.

As many authors point out, "relation" was one of Aristotle’s ten fundamental categories of existence, and it has been further asserted that "information is a relationship" (Barlow, 1994, p. 13). All possible relationships, however, have not been discovered or utilized in
information retrieval systems (Weinberg, 1995), and no taxonomy of all kinds of relationships has been published (Soergel, 1998). In his major study of general types of relationships, Perreault identified 120 relationships grouped and notated in a triad structure. For example, his Subsumptive triad contained Type-Kind, Whole-Part, and Subject-Property (1994, p. 193, fig. 6). Perreault based his study on writers in various fields from Aristotle to the present (p. 191, fig. 3). One of his objectives was to supply potentially useful relationships that could replace the non-specific relationship expressed by the colon in Universal Decimal Classification (UDC) notation and that could be used for electronic information retrieval.

A number of other studies of kinds of relationships and their various potential uses for information retrieval have been carried out, and a few examples can be given. Coates identified twenty relationships that could obtain between the three components Thing, Material, and Action and tabulated how these compounds were usually described in subject headings (1960, ff. 54, Relationship Table). Stephens (1991) developed a classification of semantic relations for 5100 relations identified in the CYC system, which attempts to encode common sense knowledge about the world for computer manipulation. Byrne and McCracken (1999) broke down the usual hierarchical, equivalence, and associative relations found in thesaural systems into various subtypes, and added the capability of "relational inheritance" in order to increase retrieval precision. Four relations could be inherited: has_semantic_role, has_measurement, has_subject_category, and has_component.

In a working draft, the Relations Working Group of the Dublin Core Metadata Initiative (1997) identified six relationship pairs: Part-Whole relations, Version relations, Format relations, Reference relations, Creative relations, and Dependency relations. Some pairs are reciprocal. For example, the Reference relation contains two sub-relations (References and IsReferencedBy) designed to express the referral relationship from either of the two resources to the other. In this case, it is possible for one resource both to cite and to be cited by another, so the relation is potentially symmetrical as well as reciprocal. In other cases, however, the relationship is not normally symmetrical. For example, values for Creative relations are IsBasedOn and IsBasisFor. It seems unlikely that two resources would both be based on and the basis for each other at the same time, although it is possible that over time a kind of "dialogue relation" might obtain between two such resources if each was used by the other either consecutively or simultaneously. The Cross-Domain Working Group of the Dublin Core Metadata Initiative noted that a relation might have a semantic qualifier to clarify the relationship of one resource to another (LeVan, 1998), but these qualifiers were not specified. The difficulty of identifying and expressing relationships has thus been recognized in recent metadata work, which exploits only a few of the variety of relationships that we can find in natural and artificial languages. Nevertheless, these and other studies are valuable and may prove productive for information retrieval in general.

2. STRUCTURE AND MEANING IN BIBLIOGRAPHIC CLASSIFICATION SYSTEMS

It is usually said that classification systems show topics and their relations, but research into the nature(s) and purpose(s) of these relationships has been undertaken less often than