Book Reviews

Book Review Editor: Werner Bies

BUDIN, GERHARD (1996). **Wissensorganisation und Terminologie: Die Komplexität und Dynamik wissenschaftlicher Informations- und Kommunikationsprozesse.** [Knowledge Organization and Terminology: The Complexity and Dynamics of Scientific Information and Communication Processes]. (Forum für Fachsprachenforschung, 28). Tübingen: Narr. VI-II, 268 p., 3-8233-4539-7. DM 68.00.

Gerhard Budin has provided a polycentric descriptive approach to the modeling of information and knowledge systems. His model is designed to demonstrate the multilayered nature of the relations that exist among *knowledge*, *information*, and *communication* with respect to the common aspects of *terminology* and *organization* that serve as cognitive and structural links unifying the three systems. This approach reflects the complexity and dynamics inherent in natural communication and information streams and demonstrates the extent to which scientific concepts and their communicative representation, i.e., technical or special language terminology, provide manageable structure for knowledge systems.

Traditional Cartesian approaches to knowledge organization have rendered complex natural knowledge systems understandable and manageable by reducing the degree of complexity characterizing the system, usually by presenting a single narrow structural view of the system. Such reductionist, mono-disciplinary approaches have for the most part failed to reestablish links to other views of multidimensional systems, thus obscuring the inherent complexity of existing relations between elements in natural systems. Budin's objective is to apply system-related theoretical concepts to phenomena such as specialized information, multilingual technical communication, and terminology in an integrated manner and to plot the contours of a theory of knowledge, information, and communicative organization. As a consequence, his book has relevance for a wide range of disciplines, including knowledge engineering, information science, technical writing, standardization, terminology management and planning, and scientific modeling and simulation, to name only a few.

Budin proposes a model for representing complex systems based on a clear definition of their constitutive concepts: organization, system and complexity, specialized knowledge, specialized information, specialized communication, and terminology. For him, organization encompasses the tension between the apparent chaos present in natural systems as well as their underlying inherent order (self-organization). It also accommodates static structures (conditions and the results of processes) as well as dynamic factors (processes themselves, change, and evolutionary mechanisms).

System and *complexity* occur as binary, complementary phenomena inherent in chaotic natural systems. The essential characteristic of a system (as opposed to pure complexity in itself) is that relations between objects or components within a system are stronger and more productive than they are with external elements. Recognition of such systematic relations always represents a relative reduction in complexity. The design of models to represent such systems plays a role not only in general discourse, but also particularly in data modeling, where objects included in the "closed world" of the specific data model are represented together with the relations that link them.

For the purposes of this study, *knowledge* (as opposed to *cognition*) encompasses all aspects of knowledge, but focuses primarily on domain-specific knowledge, i.e., technical or scientific knowledge, with the understanding that "scientific" encompasses the social sciences as well. *Information* consists of knowledge that has been packaged in a structured sort of way so that it can be communicated to the broader community of potential users of that knowledge, and the primary tool for delivering this knowledge package is *terminology*. Thus the array of concepts contributing to Budin's model converge in the definition for *terminology*.

If terminology can be defined as the structured totality of the concepts present in a specialized field viewed together with their respective representations (terms and non-verbal signs), then terminology and terminological structures can be said to embody the self-organization inherent in systems. The danger lurking in such a statement, however, is evident in the fact that the assignment of signs and terms to concepts is a human activity and subject to specific cultural and individual points of view. This factor only underscores the relative increase in complexity associated with multilingual information systems.

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The question of "reality" and its relation to perception, cognition, knowledge, and communication conjures up the eternal debate on the relation of sentient beings to reality as exemplified by such extreme positions as (neo)-logical positivism and radical constructivism. While recognizing the impossibility of resolving such conflicts in the context of the current work (or in any other venue, for that matter), Budin chooses to view the question from the familiar position of unit-oriented analysis, i.e., knowledge units, information units, etc. Fortunately, however, he mercifully spares the reader by NOT introducing yet another version of the omnipresent object-concept-term triangle. Instead, he describes the generative relation that exists between ontological units, the perception of which gives rise to pre-scientific cognitive units, then to epistemological units (i.e., knowledge units), which in turn become reference points for communication or discourse units. He notes the relation between mundane cognition and the critical, analytical level of scientific knowledge and sees this transition as analogous to the relation between everyday general language and scientific/technical special language.

Budin has dubbed his model *WIKO*, thus creating a German acronym based on the initials **W**issenschaft, **I**nformation, **K**ommunikation, and **O**rganisation. The model is designed to provide an overview of his holistic, polycentric approach. Knowledge, information, communication, and terminology all manifest themselves both at the system level and at the organizational level. They can all be viewed from a static perspective (i.e., from the standpoint of conditions and units - of knowledge, information, communication, terminology) and in terms of dynamic criteria (processes and procedures).

Viewed from a global perspective, the elements *scientific knowledge*, *information*, *communication*, and *terminology* exist in a socio-pragmatic context that is dynamically informed by such factors as concept formation, semiosis, discourse, organization, (information) storage and retrieval, utilization, knowledge processing, cognition, and the like. The interdisciplinary essence of these processes is underscored by links that join the system to such apparently divergent subject fields as the philosophy of science, terminology science, special language research, information science, the sociology of science, computer science, and cognitive science.

The main body of the book provides a rich overview of discussions and models that have treated various knowledge, information, communication, and terminological systems. It goes beyond the purview of a short review to attempt to introduce all the lines of thought he follows in his presentation, but certain features stand out as particularly important to further discussions of knowledge and information organization.

Perhaps most critical for the overall discussion is the recognition that the formation of concepts constitutes a reduction in the complexity of the overall knowledge system, but it is important to recognize the fact that the formation of a concept also represents a concentration of information, which in turn shifts complexity as such to another system level. This observation rests soundly on de Beaugrande's observation that the reduction of complexity at one level in a system results in an increase in complexity at another level. Consequently, different degrees of complexity will be expressed at different levels, and a high degree of complexity at the knowledge organization level does not necessarily have to lead to high complexity at the communicative level. In fact, proper modeling at the information level to reduce apparent complexity should ideally lead to more manageable structures at the communication level.

The importance of concepts as categorizing elements is equally important for information management as for knowledge management. While recognizing the failure of all attempts to arrive at a single universal system for imposing order on all information, the author underscores the inefficiency and ineffectiveness of currently popular all-word search mechanisms. His examination of sophisticated thesaurus-based hypertext knowledge organization systems constitutes his answer to the problems inherent in information retrieval. In considering the relative merits of different forms of information organization, it is critical to consider whether the information exists prior to and separate from the classification system used to order or to retrieve information, or whether the information system (documentary language, thesaurus) is developed and integrated into the presentation of the information or knowledge making up the information base. Needless to say, the dynamics of the latter model are going to be different from those of the former.

In examining the nature of organization on the communication level, Budin directs his attention first to *language* as a medium for communication (*langue* in the Saussurian sense) and then to the manifestation of language in *discourse* (*parole*). Despite the invocation of Saussure, he is quick to point out that scientific and technical (i.e., subject-field-specific) language does not, however, represent a closed system, but rather functions on the basis of ongoing interaction between external reality and language. Here again we see the intimate intertwining of the key elements in Budin's model: special knowledge provides the *content* for special information, communication, and terminology, but subject-specific communication introduces the dynamic, generative forces that change and renew

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knowledge systems, whereas *terminology* and the conceptual forms on which it is based provide the structure that facilitates organization at all levels. Critical to his treatment of discourse as a function of communication is his analysis of *writing* and *spoken discourse*, not just as embodiments of knowledge and information systems, but rather as integral components of the thought process. Rather than being a product of the knowledge system, writing changes, develops, and systematizes knowledge structures.

Terminology, like the other elements in the model, is polycentric and polyfunctional in its organization. Although "common wisdom" would view terminology as a tool for representing knowledge and information, it should not be seen as a mere reflection of existing systems. Instead it comprises an element that constantly reorganizes and regenerates existing knowledge, giving rise to new knowledge elements and structures. Rather than representing a subsystem of any of the other elements, it more specifically constitutes a connective element that effectively permeates and links all layers in the system.

Having examined existing theoretical and methodological approaches to the primary components that comprise the system model and examined the role of modeling in modern scientific work (e.g., in physics, biology, engineering, and information science), Budin presents guidelines for implementing the theoretical modeling concept within the framework of an applied philosophy of science. In order to support a methodology for knowledge modeling, he provides a detailed checklist of general, structural, graphical, and holistic attributes that can be defined as components in a systematic model. In conclusion, Budin reviews current efforts to use computer applications for global knowledge modeling, specifically the creation of methods for metamodeling and the creation of data element dictionaries along the lines of the Basic Semantic Repository project.

The broad scope of this work is both a great strength and a potential danger. The many concrete examples of complex system models from all levels of the information and knowledge model, together with the two primary examples of complex, multilayered models offered by the author himself, offer the readers pragmatic guidance in developing their own models. In many respects, the book itself mirrors the multilayered, multifaceted knowledge organization that it describes, which may pose challenges for some readers. The recursion of overlapping views of the system shifts the focal plane to create a dynamic, kaleidoscopic panorama of ideas. The reviewer looks forward to the author's future development of practice-oriented methodologies for representing knowledge, particularly with respect to fields that are less easily approached than those subjects (such as engineering and constitutive models) where computer-generated mathematical simulation has long provided graphic representation of complex systems.

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Dewey, Melvil. **Dewey Decimal Classification (Edition 21)** and relative index. Devised by Melvil Dewey. Editor, Joan S. Mitchell, et al. Albany, NY: Forest Press/OCLC, 1996. 4 Vols. ISBN 0-910-608-50-4. References: Chan, Lois Mai, et al: Dewey Decimal Classification: A Practical Guide. 2nd ed., revised for DDC-21. Albany, NY:Forest Press, 1996 XVI, 246p.

Dewey Goes Hi-tech

The 21st edition of the Dewey Decimal Classification (DDC-21) was released in July 1996. This, despite the fact that the post of the chief editor remained vacant from November 1991 to March 1993 until Joan S. Mitchell took over in April 1993. Joan S. Mitchell is the 9th editor since Melvil Dewey (1851-1931), and succeeded John P. Comaromi (1937-1991), who died in November 1991. Well versed in the use of information technology, Mitchell is the former director of Educational Technology at Carnegie Mellon University. Prior to that she held a position at AT&T Bell Laboratories. Her first contact with the DDC organization dates to 1985 when she became a member of the DCEPC then held the position of chairperson from January 1992 to April 1993. The release of the DDC-21 has been possible due to the increasing use of information technology (IT) during the editing and production phase. As in the case of DDC-20 (1989), the editorial work for the DDC-21 was completed in electronic format with the Editorial Support System (ESS), a UNIX-based system developed by Inforonics, Inc. For more information, the OCLC/Forest Press home page http://www.oclc.org offers information on the DDC, including Dewey news, Dewey ALA report, and 'hot' classification topics.

For the first time the DDC-21 has been released simultaneously in two formats: the traditional print version (in 4 volumes), and the CD-ROM version now named Dewey, a LAN based compatible version of the electronic Dewey. In the CD-ROM version the hierarchy can be displayed and every class number is linked to four or five possible LC subject headings. The electronic edition has an augmented index with natural language terms taken from other thesauri to provide enhanced access to the expanded, relocated and discontinued numbers. The DDC-21, in the print format, offers four volumes with a total of 4126 pages

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