An Analysis of Some Trends in Classification Research

Birger Hjørland* and Hanne Albrechtsen**

*Royal School of Library and Information Science, Copenhagen, 6 Birketinget, DK - 2300 Copenhagen S, Denmark. Email: bh@db.dk

**Risoe National Laboratory, P.O. Box 49, DK - 4000 Roskilde, Denmark. Email: hanne. albrechtsen@risoe.dk

Birger Hjørland is Head of Department of Science and Humanities Information Studies, Royal School of Library and Information Science in Copenhagen. He earned his Ph.D. from the University of Gothenborg in 1993 in Information Science and a MA in psychology from the University of Copenhagen in 1974. He has been a research librarian at the Royal Library in Copenhagen 1978-1990 (subject specialist in Psychology) and the coordinator of the library's computer based reference services.

Hanne Albrechtsen is scientist at Risoe National Laboratory, Denmark, Centre for Human-Machine Interaction. Special emphasis on the design and evaluation of classification schemes for knowledge sharing, work domain analysis, social studies of science and social informatics. Hanne was chair of the 4th International ISKO Conference in Copenhagen.

Hjørland, B., Albrechtsen (1999). **An Analysis of Some Trends in Classification Research.** *Knowledge Organization, 26(3).* 131-139. 41 refs.

ABSTRACT: This paper takes a second look at three prevailing main themes in knowledge organization: i) the academic disciplines as the main structural principle; ii) the fiction/non-fiction distinction; and iii) the appropriate unit of analysis in online retrieval systems. The history and origin of bibliographic classification [Dewey, Bliss, Mills, Beghtol] are discussed from the perspective of pragmatist philosophy and social studies of science [Kuhn, Merton, Reich]. Choices of structural principles in different schemes are found to rely on more or less implicit philosophical foundations, ranging from rationalism to pragmatism. It is further shown how the increasing application of faceted structures as basic structural principles in universal classification schemes [DDC, UDC] impose rationalistic principles and structures for knowledge organization which are not in alignment with the development of knowledge in the covered disciplines. Further evidence of rationalism in knowledge organization is the fiction/non-fiction distinction, excluding the important role of artistic resources for, in particular, humanistic research. Finally, for the analysis of appropriate bibliographic unit, it is argued that there is a need to shift towards a semiotic approach, founded on an understanding of intertextuality, rather than applying standard principles of hierarchical decomposition of documents. It is concluded that a change in classification research is needed, founded on a more historical and social understanding of knowledge.

1. Introduction

In Knowledge Organization, the new president for ISKO, Clare Beghtol, claims "that a paradigm shift in bibliographic classification research is needed and may be developing" (Beghtol, 1998, p. 8). We strongly agree in this point, and would like to have a closer view on her main arguments.

Beghtol formulates "Three closely interrelated problems [which] exist for bibliographical classification systems:

1) the academic disciplines as the main structural principle;
2) the fiction/nonfiction distinction as one secondary structural principle; and
3) information retrieval techniques that call into question whether a whole document (e.g. book, article) is the most appropriate unit of analysis in online retrieval systems".

In this article, we will analyze and discuss Beghtol's three issues from an epistemological point of view.[1]

https://doi.org/10.5771/0943-7444-1999-3-131 https://www.inlibra.com/de/page/agb - Open Access - (cc) BY

This view is framed within our current work on philosophical and sociological perspectives for classification research, as formulated in Albrechtsen & Hjørland (1997), Hjørland (1998c), and elsewhere.

The article starts out by an in-depth discussion of Beghtol's first claim that the academic disciplines provide the main structural principle or fundamental division for classification schemes. The discussion addresses the following main points: previous claims regarding disciplines as structuring principle, in particular Mills & Broughton (1977) and Melvil Dewey (1979), where we will demonstrate how these views are linked to particular underlying philosophies, ranging from rationalistic to historicist/pragmatist points of view. In the following section termed "Some Consequences of the pragmatic epistemology", our discussion departs from views developed by social studies of science. The aim is to demonstrate how classifications of a knowledge field more or less inherently express and support particular epistemologies or build on more or less explicit cultural foundations and biases.

The next two sections address Beghtol's second and third claims where we briefly discuss the fiction/non-fiction distinction and the appropriate unit of analysis in IR-systems. In the conclusion we draw some important implications from our discussion in order to formulate the need for a paradigm shift in classification research.

2. Disciplines as structuring principle in knowledge organization (KO)

The question regarding disciplines as structuring principle in classification is not new. Mills & Broughton (1977, p. 37) made a very clear argumentation in the introduction to the Bliss II system. They wrote:

> "5.55 Disciplines and phenomena
>
> 5.551 It should be clear from the last section (5.542) that although the disciplines reflect discrete systems of knowledge they yet share to some degree the same phenomena studied. The implication of this for a general classification is that the basic organization of information will subordinate material on a given phenomenon to the discipline or subdiscipline from whose viewpoint it is being regarded. So documents on the subject of the phenomenon "Color" for example, will not be kept together insofar as they will be assigned to the different disciplines (Physics, Art, etc.) their treatment reflects.
>
> 5.552 However, it should be recognized that there is, theoretically, a quite different way of organizing a general classification. This would be to make the first division of the field of knowledge into phenomena (from subatomic particles to planetary bodies and stars, from single cells to particular organisms and particular societies, and so on) and to subordinate to each phenomenon the disciplinary aspects from which it may be treated; e.g. Color – in Optics, in biology, in Art, etc.; or, Food – in Agriculture, in Nutrition, in Cookery, in Economic resources, etc.; or, Water – in Chemistry, in Geology, in Biology, in Engineering, in Transport, etc.
>
> 5.553 Such an arrangement would run counter to the way we usually study things and the way most information is marketed, which reflects the division of labor by discipline. There are relative few persons, if any, specializing in a given phenomena from all its aspects. Indeed, such a specialized study would require a training, which is at present hard to envisage.
>
> 5.554 Nevertheless, a growing number of documents do reflect a multi-disciplinary approach, although authorship of such works is usually, and not surprisingly, also multiple, as in the case of symposia. Such material poses a special problem for the older general classifications, which are sometimes called "aspect" classifications in that their basis of arrangement is by aspect or "discipline", not by phenomena. This does not, however, invalidate the general correctness of the decision they all reflect, which is to treat classification by discipline as being on the whole more helpful to users. It may be noted that the factual literature for children has always shown a strong tendency to concentrate on phenomena rather than discipline – e.g., "the big book of trains" which considers most aspects of the railway system".

In a similar way The Dewey Decimal Classification (DDC) states that "a work on water may be classed with many disciplines, such as metaphysics, religion, economics, commerce, physics, chemistry, geology, oceanography, meteorology, and history. No other

https://doi.org/10.5771/0943-7444-1999-3-131 https://www.inlibra.com/de/page/agb - Open Access - (cc) BY

feature of the DDC is more basic than this: that it scatters subjects by discipline" (M. Dewey, 1979, p. xxxi; emphasis added).

Organization of knowledge "from subatomic particles to planetary bodies and stars, from single cells to particular organisms and particular societies, and so on" reflects in our view a systems theoretical and rationalist perception (or ideal) of knowledge (cf., Ryan & Bohman, 1998; Markie, 1998), whereas an organization reflection disciplinary organization and thus human interests reflects historist and pragmatic views on knowledge. In our view, the illumination of strong and weak points in the two alternative solutions are closely related to strong and weak parts in respectively rationalistic and historistic/pragmatic philosophy. Further argumentation for the historical and pragmatic view are given in Hjørland (1997).

According to Hjørland (1998b) the basic methods of classifying knowledge reflect basic theories in epistemology: EMPIRISTIC, RATIONALISTIC, HISTORIST, AND PRAGMATIC VIEWS AND METHODS (see fig. 1). Specific systems, such as the DDC, are not explicitly related to these views and methods, but are more or less influenced by all of them. As researchers in classification it is our job to try to illuminate the methodological and theoretical assumptions behind given systems and point out the weak and strong parts of these different methods.[2]
Miksa (1998) shows that since 1950 the DDC has increasingly been based on the facet-analytic classification theory, and he recommends, that those responsible for the system should adapts a much more open and questioning stance towards the assumptions in this theory. Hjørland (1997) has analyzed the school of Facet analysis (Ranganathan, the Classification Research Group, and others) as being closely related to rationalism. To the degree, that the DDC is influenced by this theory, it is related to rationalism – according to Miksa (1998) this influence tends to increase in the DDC. However, the most important feature of the DDC is – again according to our analysis – that it scatters subjects by discipline, which we see as an expression of a pragmatic, historistic and realistic philosophy of knowledge, because disciplines are historically developed structures which determine the way in which subjects are interpreted and organized. This is in our opinion a basic quality of systems like the DDC, and consequently what they in our opinion should regard as their primary strength.

3. Interdisciplinarity and multidisciplinarity

Beghtol rightly call attention to the importance of interdisciplinarity as a phenomenon. "Multidisciplinarity in all areas of knowledge has become the norm rather than the exception, but 'the established academic disciplines do not always explicitly represent newer territories and the interdisciplinary associations that link them' (Palmer, 1996, p. 129-130)" (Beghtol, op.cit., p. 2).

This statement, that established disciplines do not always represent newer territories is, in our view, an understatement. The subject matter of disciplines is a theory-dependent and also a highly political question, where each discipline can be seen as an imperialistic power. The Danish anthropologist Jan Ovesen (1989) has shown and sharply criticized how the discipline of anthropology is very bad represented in the Danish Decimal Classification System (DK5). Most anthropological literature is placed in other disciplines. In his opinion this can be explained by the fact that anthropologists have had very little power and influence in Danish libraries. Thus, the question is not only whether classifications should be based on disciplines, but also who should have the authority to define the subject matter of the disciplines?

It is important to realize that the similarities between disciplines and interdisciplinary areas are much more important than their differences. Both disciplines and interdisciplinary areas are very dynamic and very differentiated structures. What begins as a multidisciplinary area may develop into an interdisciplinary are and end as a discipline. Both disciplines and interdisciplinary fields are social units, or kinds of "discourse communities". Since Kuhn's famous work (1962, 1970) the question of the cognitive organization of knowledge has increasingly been interwoven into questions concerning the social organization of knowledge, and the historist view of knowledge has gained ground. In classification theory the alternatives to disciplines as basic units has mostly been kinds of rationalistic structures without reference to the social world of knowledge producers and users or to the historical developments in knowledge organization.

Beghtol quotes Kern (1983, p. 6-7) for the view that authors find it necessary to forego disciplinary-based organization. "This circumstance provides a compelling isomorphic argument against discipline-based bibliographic classification systems. If a discipline-based structure is inadequate for one book, then it seems likely to become increasingly deficient for the whole of knowledge" (Beghtol, 1998, p. 3).

https://doi.org/10.5771/0943-7444-1999-3-131 https://www.inlibra.com/de/page/agb - Open Access - (cc) BY

However, every organizing principle must necessarily serve some purposes better than others. What alternative does Beghtol suggest? To the degree, that Beghtol wants to change more towards real or critical organization at the expense of formal, disciplinary organization, we wholly agree. However, if giving up disciplines as organizing units imply a turning towards more rationalistic models, where knowledge is seen as isolated from its social contexts, we disagree. We find it important to view the basic organization of knowledge in society determined by the division of intellectual labor (not just empirically, also critically). In her speech at the ASIS-conference 1998, Beghtol introduced the concept of "cultural warrant".[3] This concept is very much in line with our view.

Information systems cannot be designed to serve each and all individual user's many different projects and purposes. We agree that classification should reflect new developments both regarding interdisciplinary areas and regarding the identities in and relations between disciplines. Disciplines are not static or homogeneous.[4] There is no neutral way to do this. A classification always reflects some values, priorities and views of what is classified and what goals the classification is intended to support.

	"Scientific Classification"	"Bibliographic Classification"
Empiricism (Observations and induction)	Classification provided by Statistical analysis (such as factor analysis) Based on "resemblance". Examples: Classification of mental illness in psychiatry or kinds of intelligence in psychology based on statistical analysis of test scores.	Documents clustered on the basis of some kind of similarity, e.g. common terms in traditional IR or bibliographical coupling. Examples: "Atlas of science" & visualizing disciplines (White & McCain, 1998); "research fronts in SCI", algorithms for information retrieval.
Rationalism (Principles of pure reason)	Classification based on logical, universal divisions, e.g. classification of people in age groups. Examples: Frame-based systems in AI; Chomsky's analysis of deep structure in language & cognitive models of the mind in psychology	Facet analysis built on logical divisions and/or on "eternal and unchangeable categories" Examples: Ranganathan, BlissII & Langridge; semantic networks. (According to Miksa, 1998, the DDC have increasing used this approach).
Historicism (Study of contexts and development)	Classification based on natural development Example: The theory of evolution: Biological taxonomies	Systems based on the development of knowledge producing communities (the division of scientific labor) Example: That feature by the DDC that it distributes subjects by discipline
Pragmatism (Analysis of goals, values and Consequences)	Classification based on analysis of goals and consequences. "Cultural warrant" and "critical classification"	Systems built on critical analysis of "cultural warrant" and the development and state of knowledge. Examples: Francis Bacon, The French Encyclopead-ists, the Marxists etc.

Fig. 1 Fundamental Methods of Classification (based on Hjørland, 1998b)

4. Some consequences of pragmatic epistemology

An important development in modern epistemology is the giving up the neutral role or theory independence of observations (see, for example, Chalmers, 1982, chapter 3). Phenomena does not just exists to be classified outside human activities or interests. This insight is in contradiction to the theories of classical empiricism/positivism and rationalism. The consequence of this is that every classification is *theory-dependent (in a very broad meaning of the word "theory").* The job for library and information science is to organize knowledge for optimizing human learning and utilization of knowledge. In order to fulfill this purpose, library and information science (LIS) must built on a historical and pragmatically oriented epistemology. We must consider knowledge in its historical, social and cultural context. *To suggest a classification of a knowledge field (or knowledge as a whole) is – in one*

https://doi.org/10.5771/0943-7444-1999-3-131 https://www.inlibra.com/de/page/agb - Open Access - (cc) BY

way or the other – to support given theoretical viewpoints at the expense of other views.

We see the social organizations of knowledge (in disciplines as well as in interdisciplinary fields and "discourse communities") as fundamental units in knowledge organization. However, as we have already demonstrated, a very important modification must be made: Classification is not only descriptive or neutral regarding the definition and organization of disciplines and other "discourse communities" and their mutual relations. Every time a decision is made (e.g., to place social psychology with psychology or with sociology) a priority is made at the expense of another. It is not necessarily the dominant view or the self-understanding of a discipline, that must be the basis of classification. Such dominant view or self-perception often contains a lot of professional ambition and self-interest (ideology), which is not necessarily also in the interest of the users. (See Hjørland, 1998c, for a discussion of the subject matter and classification of psychology). Analytic and historical methods such as *social constructivism* are important tools for classification research. Its epistemological basis must be related to pragmatism and critical realism.

In our view Beghtol's concept of cultural warrant is a critical activity and can be used to evaluate both classification schemes and knowledge fields. This kind of analysis is related to "epistemology" and "science studies" and can be general or domain specific (e.g., the philosophy of psychology) or oriented towards institutions or work groups.

If, for example, classification of labor does not reflect the needs to analyze the new international competition, this is a critical analysis that can be used bot to analyze classifications and the discipline of economics. It can happen that the scientific community does not serve the kind of human actions that you would like your categorizationclassification to serve. In economics, Robert B. Reich (1993) criticizes the standard way to classify jobs as being unfruitful in helping to solve the problems of unemployment. He then makes a new categorization of types of work: (1) routine production services, (2) in-person services, and (3) symbol analytics. Reich's classification is an alternative to the traditional, "scientific" classifications of jobs in economics. However, it is not an unscientific classification, but rather one that contains a critique of the traditional science of economics and its classification (Reich uses the expression "the perils of vestigial thought").

In a classical theory on the sociology of science Merton, 1968, pp. 614-615), science is understood as organized skepticism. The problem with disciplines as classifications units is – as also shown by R. B. Reich – that they often has built into themselves a conservative way of looking at reality. Science is not only a reflection of reality, but also a social institution with its own ideology, which can have difficulties in its self-image and in open dialog about its self-image. Unfruitful principles of methodology or classification can be a part of such an ideology. To classify a knowledge field is thus to take part in the dialog and evaluation of the goals, values, and consequences of doing science in one way or another. It is to examine the "cultural warrant" of both knowledge production and its organization.

Disciplines and discourse communities can be more or less "applied" or "fundamental" in their orientation. If the applied view is important, then classifications tend to be dominated by pragmatism in the ordinary understanding of this word (e.g. classifying chemicals according to their use, e.g. in drugs, fertilizers, preservatives, etc.). An important new trend in classification research is the study of such work-based classifications, which suggest a trend toward applied classifications. If the fundamental view is important, then classifications tend to be more "realistic", which mean they classify in ways, which are not directly related to some application (e.g. chemical elements and biological taxonomies). However, such fundamental classifications can also be understood as "pragmatic" from an advanced pragmatic position (pragmatic realism).

5. The Fiction/nonfiction distinction as a structuring principle in KO

According to logical positivism, the only meaningful sentences are those of (natural) science! From this epistemological position it makes sense to make a fundamental distinction between fiction and nonfiction. From the perspective of pragmatism, however, "Knowledge can be unarticulated or articulated. Unarticulated knowledge is, for instance, tacit knowledge, familiarity, knowledge by acquaintance. Knowledge can be articulated in everyday language, science, and art." (Sarvimäki, 1988, pp. 58-59).

Because we consider logical positivism as outdated, whereas pragmatism seems a fruitful philosophy, we agree with Beghtol that forms of knowledge, including the form "fiction" and "non-fiction" should not be considered as fundamental. In many cases (for example in psychology), it should be useful to consider the same phenomena (e.g., divorce) from both a scientific and an artistic point of view. The same consideration could be given to other forms of knowledge, for example, theoretical and empirical knowledge, pure and applied knowledge, and so on.

https://doi.org/10.5771/0943-7444-1999-3-131 https://www.inlibra.com/de/page/agb - Open Access - (cc) BY

However, in many situations, it may be very relevant to use these distinctions. This should not, however, be a problematic issue in modern electronic systems where polyrepresentations is the norm.

6. Appropriate unit of analysis in online retrieval systems

Beghtol's third question was: "information retrieval techniques that call into question whether a whole document (e.g. book, article) is the most appropriate unit of analysis in online retrieval systems".

Indexing separate chapters and articles has for a long time been well established in LIS. Beghtol's examples are primarily about collections of a non-homogenous nature. We consider it a well established fact that users need access to documents on the chapter/article level.[5]

It is, however, quite another question whether information should be extracted from documents, or whether documents should remain the "documentary units" the authors and publishers intended them to be. Modern semiotic theory may be relevant to illuminate this problem.

The semiotician Julia Kristeva (1974, pp. 59-60) has formulated a theory about intertextuality, which is rooted in the works of Bakhtin (1981 and 1986). According to this theory a text cannot be regarded as something given, with a definite meaning. It is nothing but a mosaic which can be understood only through its absorption and transformation of the other writings to which it is related. No text can ever be free of other texts. Some kinds of relationships between texts are echo, allusion, acceptance, rejection, and so on. A particular text is a confluence of many writings: by the author, the historical contexts, and so on. The concept of text is applied by Kristeva – like other semioticians – to everything capable of signifying.

In this way "units" are already taken out of text/documents and are put into other texts in a never-ending stream of communication. The most explicit used can be traced via references (and citation indexes). In principle, library and information scientists can also take out parts of documents and use this information to produce new documents (especially "secondary literature"). This is already the case with "abstract journals" and "citation indexes".

A related research question is to develop a better understanding of how different "subject access points" in bibliographical or full-text databases can be used optimally during retrieval interaction.[6] Such knowledge presupposes that we have a detailed knowledge on the conventions used in producing documents and value added information. Such connections may differ from domain to domain and from time to time (cf., Hjørland, 1998a). Theoretical progress in this field may help illuminate Beghtol's third question.

7. Conclusions and implications

In our analysis of Beghtol's claims we have demonstrated that the idea of disciplines as structuring principle for knowledge organization has been formulated early on by the designers of two important classification schemes, BlissII (cf., Mills & Broughton, 1977) and DDC (cf., Dewey, 1979). In both cases, we discussed how the choice of fundamental structure reflected underlying epistemologies. Both systems have an important and explicit argumentation for a disciplinary structure, even if this seems in some ways to be in contradiction with rationalistic tendencies in the design principles of those systems.

Developments in classification research are to an increasing degree founded on facet analysis where knowledge is ordered according to underlying universal principles that are claimed to go across individual disciplines. This approach is gradually being implemented in DDC and UDC as well. We shall not argue against the application of logical principles and facetted structures as *supplementary methods* in the design of classification systems. What we would like to emphasize is that rationalistic methods have limited potentialities in classification and that it is urgent to try to develop methods based on broader and more realistic epistemologies. The basic problem with facet analysis and other rationalistic principles is that they neglect and indirectly suppress the more important principles. Classification research is much too narrow if it does not address such issues as the development and consequences of knowledge organizations.

The division of knowledge into fiction/non-fiction implies that some types of knowledge are less applicable for knowledge development than others. However, for many humanistic disciplines, such as psychology, the area of fiction may provide important cases that are applicable to illustrate particular theoretical points of view. Although it would be extreme to have a total mix of fiction and non fiction in most cases, a flexible system with the possibility for the user to both include and exclude fiction could sometimes be desirable.

Finally, we have argued that there is a need to reconsider what the appropriate unit of analysis for IR systems should be whole documents or units of documents. Semiotic text theory, in particular

https://doi.org/10.5771/0943-7444-1999-3-131 https://www.inlibra.com/de/page/agb - Open Access - (cc) BY

Kristeva and Bakhtin, building on the notion of *intertextuality*, is forwarded as an important approach to arrive at a unit of analysis, where each unit is defined according to its relation to other units. Thus, the unit of analysis is not defined according to hierarchical decomposition of documents, but rather according to analysis of how an entire document or a section of a document relates to other units addressing the same topic or a similar point of view etc.

Our experiences can confirm Beghtol's view that a paradigm shift in classification research is needed and may be developing. This is related to overall changes in both information science and interdisciplinary developments. Central in this change are tendencies toward more historical, cultural and social understandings of knowledge, its production, organization, and use.

Acknowledgements:

Some of the key ideas in this article were at ASIS Annual Meeting held October 24-29, 1998, Pittsburgh, PA, USA in a session on *International Trends and Issues in Classification and Subject Analysis Research*, moderated by Clare Beghtol. We gratefully acknowledge the support the Royal School of Librarianship, Copenhagen, Denmark, Risoe National Laboratory, Denmark, and the Danish National Research Foundation, Denmark.

Notes:

1 It is beyond the scope of this paper to introduce the different epistemological theories and points of view. For concise introductions see the new *Routledge Encyclopedia of Philosophy*, e.g. the following articles: Alston, 1998 (Empiricism); Code, 1998 (Feminist epistemology); Collier, 1998 (Critical realism); Downes, 1998 (Constructivism [or Social Constructivism]); Ermarth, 1998 (Postmodernism); Fine, 1998 (Scientific realism and antirealism); Friedman, 1998 (Logical positivism); Gutting, 1998 (Post-structuralism in the social sciences); Hoyningen-Huene, 1998 (Kuhn, Thomas Samuel, 1922-96); Inwood, 1998 (Hermeneutics); Jarvie, 1998 (Popper, Karl Raimund, 1902-94); Keat, 1998 (Scientific realism and social science); Kincaid, 1998 (Positivism in the social sciences); Markie, 1998 (Rationalism); Rorty, 1998 (Pragmatism); Thornhill, 1998 (Historicism).

2 For a detailed discussion of the application of these methods to a specific field of knowledge, see Hjørland, 1998c.

3 Clare Beghtol: Reading Classifications: Society, Values, and Classification. October 26, 1998.

4 Mathematics is an example of a discipline where the information used is mostly produced within the discipline itself. Agricultural research on the hand depends much more on knowledge produced in other disciplines (such as chemistry). Within the same discipline (e.g. psychology), the knowledge used depends very much on the "paradigm" (Kuhn, 1962, 1970). Humanistic psychologists and psychoanalysts make much use of fiction and knowledge from the humanities, whereas cognitive psychologists make much use of knowledge produced in computer science. Also the individual researchers use can vary much. Often creative scientists use of non-traditional sources of information changes the future direction of the whole discipline.

5 The indexing of journal articles and other "documentary units) was initiated by *the Documentation Movement* in the beginning of the 20th century, which saw itself as somewhat opposed to the library communities.

6 Not only the use of subject points, but also how different subject access points should be produced in the beginning to facilitate information retrieval is of course a central issue in information science.

References:

Albrechtsen. H. & Hjørland, B. (1997). Information seeking and knowledge organization. The presentation of a new book. *Knowledge Organization*, *24*(3), 136-144.

Alston, W. P. (1998). Empiricism IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 3, pp. 298-303.

Bakhtin, M. M. (1981). The dialogical imagination: Four essays. Ed. by M. Holquist. Austin: University of Texas Press.

Bakhtin, M. M. (1986). Speech genres and other late essays. Ed. by C. Emerson & M. Holmquist. Austin: University of Texas Press.

Beghtol, C. (1998). Knowledge Domains: Multidisciplinarity and Bibliographical Classification Systems. *Knowledge Organization*, *25*(1/2), 1-12.

Chalmers, A. F. (1982). *What is this thing called Science? An assessment of the nature and status of science and its metbods. 2. Ed.* Indianapolis, Indiana: Hackett Publishing Company, Inc.

Code, L (1998). Feminist epistemology. IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 3, pp. 597-602.

Collier, A. (1998). Critical realism. IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge., Vol. 2, p. 720-722.

https://doi.org/10.5771/0943-7444-1999-3-131 https://www.inlibra.com/de/page/agb - Open Access - (cc) BY

Dewey, M. (1979). *Dewey Decimal Classification and relative index.* (19th ed., Vol. 1). Albany, NJ: Forest Press.

Downes, S. M. (1998). Constructivism. IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, vol. 2, p. 624-630.

Ermarth, E. D. (1998). Postmodernism IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 7, pp. 587-590.

Fine, A. (1998). Scientific realism and antirealism. IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 8, pp. 581-584.

Friedman, M. (1998). Logical positivism. IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 5, pp. 789-795.

Gutting, G. (1998). Post-structuralism in the social sciences IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 7, pp. 600-604.

Hjørland, Birger (1997): *Information Seeking and Subject Representation. An Activity-theoretical approach to Information Science.* Westport & London: Greenwood Press.

Hjørland, B. (1998a). Information retrieval, text composition, and semantics. *Knowledge Organization, 25*(1/2), 16-31.

Hjørland, B. (1998b). Theory and Metatheory of Information Science. A New Interpretation. *Journal of Documentation, 54*(5), pp. 606-621.

Hjørland, B. (1998c). The Classification of Psychology. A Case Study in the Classification of a Knowledge Field. *Knowledge Organization, 25(4), 162-201.*

Hjørland, B. (1999a). Review of Francis L. Miksa: The DDC, The Universe of Knowledge, and the Post-Modern Library. *Journal of the American Society for Information Science, 50*(5), 475-477.

Hjørland, B. (1999b). Review of F.W.Lancaster: Indexing and Abstracting in Theory and Practice. London, 1998. *Journal of Documentation*, 1999, Vol. *55*(3), 345-351.

Hjørland, B. (2000). Relevance Research: The Missing Perspectives: "Non-relevance" and "Epistemological Relevance". Vol. 51 (2), pp. 209-211.

Hoyningen-Huene, P. (1998). Kuhn, Thomas Samuel (1922-96) IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 5, pp. 315-318.

Inwood, M. (1998). Hermeneutics. IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 4, pp. 384-389.

Jarvie, I. C. (1998). Popper, Karl Raimund (1902-94). IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 7, pp. 533-540.

Keat, R. (1998). Scientific realism and social science. IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 8, pp. 584-587.

Kern, S. (1983). *The Culture of Time and Space 1880-1918.* Cambridge, Massachusetts: Harvard University Press.

Kincaid, H. (1998). Positivism in the social sciences. IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 7, pp. 558-561.

Kristeva, J. (1974). *La révolution du language poétique.* Paris: Seuil.

Kuhn, T.S. (1962, 1970) *The Structure of Scientific Revolutions*, Chicago, IL: University of Chicago Press. (The second edition contains an important Postscript.)

Markie, P. J. (1998). Rationalism. IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 8, pp. 75-80

Miksa, F. L. (1998). *The DDC, the Universe of Knowledge, and the Post-Modern Library.* Albany, NY: Forrest Press.

Mills, J. & Broughton, V. (1977). *Bliss Bibliographic Classification. Second Edition. Introduction and Auxiliary Schedules.* London: Butterworths.

Ovesen, J. (1989). Classificare Necesse Est. Lidt om klassifikation i antropologien og også ellers. I *Orden i Papirerne – en hilsen til J. B. Friis-Hansen.* Red. af Ole Harbo og Leif Kajberg. Copenhagen: Royal School of Library and Information Science, pp. 117-122.

Palmer, C. L. (1996). Introduction. In Navigating Aming the Disciplines. The Library and Interdisciplinary Inquiry. *Library Trends, 45*(2), 129-133.

Reich, Robert B. (1993): *The Work of Nations. Preparing Ourselves for 21st Century Capitalism.* Vintage Books.

Rorty, R. (1998). Pragmatism IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge, Vol. 7, pp. 633-640.

Ryan, A. & Bohman, J. (1998). Systems theory in social science. IN: *Routledge Encyclopedia of Philosophy, Version 1.0*, London: Routledge

Sarvimäki, A. (1988). *Knowledge in interactive practice disciplines: An analysis of knowledge in education and health care.* Helsinki: University of Helsinki, Department of Education.

Thornhill, C. (1998). Historicism. In: *Routledge Encyclopedia of Philosophy, version 1.0*, London: Routledge, Vol. 4, pp. 443-446.

Volosinov. V. N. (1930). *Marksizm i filosofija jazyka.* Leningrad (Translated edition: Marxism and the Philosophy of Language. New York: Seminar Press, 1973).

https://doi.org/10.5771/0943-7444-1999-3-131 https://www.inlibra.com/de/page/agb - Open Access - (cc) BY

White, H. D., & McCain, K. W. (1998). Visualizing a discipline: An author co-citation analysis of information science, 1972-1995. Journal of the American Society for Information Science, 49(4), 327-355.

Birger Hjørland,
Royal School of Library and Information Science, Copenhagen, 6 Birketinget, DK - 2300 Copenhagen S, Denmark, email: bh@db.dk

Hanne Albrechtsen,
Risoe National Laboratory, P.O. Box 49, DK - 4000 Roskilde, Denmark., email: hanne.albrechtsen@risoe.dk

https://doi.org/10.5771/0943-7444-1999-3-131 https://www.inlibra.com/de/page/agb - Open Access - (cc) BY