

Jonathan Furner – University of California, Los Angeles, USA

New Formats, Shifting Fortunes Late-Twentieth-Century KO in the Wild

Abstract:

Three candidates for the knowledge organization (KO) systems that enjoyed the widest, most popular usage in the late twentieth century are (1) Encyclopædia Britannica's *Propædia* or "Outline of Knowledge," (2) the "Synopsis of Categories" at the heart of HarperCollins' *Roget's International Thesaurus*, and (3) OCLC's *Dewey Decimal Classification*. Surprisingly, given the popularity of these systems (which continues in the latter two cases into the 2020s), only the last has received special attention in the ISKO community. The goal of this paper is to compare the function, form, and content of each of the three systems, in the context of a taxonomy of evaluation methods for KO applications that takes into account similarities and differences in formats and purposes.

1.0 Introduction

Classification involves the identification of "groups of things [that] can then be combined and arranged to make a . . . system" (Beghtol 2010, 1045). In the remainder of this paper, I compare and contrast three cases in which classification has been carried out in the production of a practical system of a different kind. Each system is distinguished by the particular kind of things that make up its groups.

In the first case, the system is a scheme for describing and arranging the subjects (i.e., topics) of entries in a general English-language encyclopedia (and thus for describing and arranging those entries themselves). An encyclopedia is "a literary work containing extensive information on all branches of knowledge, usually arranged in alphabetical order" (*OED Online*, December 2019).¹ The encyclopedia in the case in question is the 15th edition of the *Encyclopædia Britannica* (*EB*; Hoiberg 2010);² the scheme is the "Outline of Knowledge" (OoK), commonly known as the *Propædia*.

In the second case, the system is a scheme for describing and arranging the meanings of entries (i.e., concepts) in a general English-language thesaurus (and thus for describing and arranging those entries themselves). A thesaurus is "a collection of concepts or words arranged according to sense" (*OED Online*, December 2019).³ The thesaurus in the case in question is the 8th edition of *Roget's International Thesaurus* (*RIT*; Kipfer 2019);⁴ the scheme is the "Synopsis of Categories" (SoC).

In the third case, the system is a scheme for describing and arranging the subjects (i.e., topics) of entries in any general English-language library catalog (and thus for describing and arranging those entries themselves, as well as the resources that are themselves described by those entries). A catalog is "usually distinguished from a mere list or enumeration, by systematic or methodical arrangement, alphabetical or other order, and often by the addition of brief particulars, descriptive, or aiding information" (*OED Online*, December 2019). The systematic arrangement adopted for the subjects of

¹ For the history of encyclopedias, see Loveland (2019).

² For the history of the *Encyclopædia Britannica*, see Whiteley (1992).

³ For the history of thesauri, see Hüllen (2009).

⁴ For the history of *Roget's Thesaurus*, see Hüllen (2004).

library resources is typically set down in a library classification scheme.⁵ The scheme in the case in question is the *Dewey Decimal Classification (DDC)*; Mitchell 2011).⁶

2.0 Method of Construction

Each scheme was originally the work of one pioneer, collecting names of items (fields, concepts, subjects) and grouping items into classes and subclasses manually, on the basis of individual experience and self-proclaimed expertise. The first instance of the OoK, published in 1974, revised in 1985, and left to collect dust alongside the rest of the final print edition of *EB* in 2012, was compiled by Mortimer J. Adler (1902–2001). The first instance of the SoC, published in 1852, was compiled by Peter Mark Roget (1779–1869); the version currently in use (Kipfer 2019) was developed by Robert L. Chapman (1920–2002) for the 1992 edition of *RIT*. The first instance of the *DDC*, published in 1876, was compiled by Melvil Dewey (1851–1931); much later, successive editions would be the work of small teams of editorial staff members, each led by a single editor-in-chief and supported by an international advisory board (the Editorial Policy Committee, EPC).

Each scheme is essentially subjective, in that the contents of classes, and the relationships among them, are not somehow “read off” an objective reality; classes are assigned to positions in a tree structure on the basis of an individual’s perceptions and judgments.⁷ These perceptions and judgments are bound to vary greatly in accordance with differences in personal attitudes, preferences, and goals, as well as with differences in the sociocultural contexts characteristic of different times and places. So it is to be expected that schemes developed by different people for different purposes, even if they are intended for general rather than special application, will vary in form at the macro-level, let alone at the micro-level. What is remarkable, given this expectation, is the degree to which the three schemes are in fact similar in certain aspects of their form, as well as in their function.

3.0 Function

The primary functions of the three schemes—threefold in each case—are similar, as demonstrated by the following summary.

The OoK is a scheme for describing, classifying, and arranging the entries in an encyclopedia according to the fields (i.e., the disciplines) to which those entries contribute; the SoC is a scheme for describing, classifying, and arranging the words and phrases in a lexicon according to the meanings of those words and phrases; the *DDC* is a scheme for describing, classifying, and arranging the resources in a collection according to the subjects (i.e., the topics) of the works that those resources instantiate. The results of applying any of the schemes to any given collection of items (entries, words, or resources) are (a) that items with similar characteristics are brought close together, as members of the same class, and (b) that classes with similar characteristics

⁵ For the (pre-1930) history of library classification, see Richardson (1930).

⁶ For the history of the *Dewey Decimal Classification*, see Miksa (1998).

⁷ Note we are not talking here of the assignment of resources, words, or entries to classes, but of the initial assignment of classes to positions that comprises the act of original creation of a scheme.

are brought close together, as proximate classes. In general, similarity among fields, meanings, or subjects is represented in the scheme by proximity among classes.

The other two primary functions of the schemes are (a) indexical and (b) pedagogical. Each scheme provides a means for readers (a) to search for, locate, and access items of interest, and (b) to learn about the world, both by interacting with those items and by studying the scheme itself. In particular, each scheme provides a sense of the shape, size, and structure of the totality of general knowledge.

4.0 Form

Each scheme takes the form of a tree whose lowest level of branches is relatively small in number: The OoK has ten main classes; the SoC has fifteen; the *DDC* has ten. In each case, the main classes are divided into a small number of subclasses, which are in turn divided into sub-subclasses, and so on. The *DDC* in its current form is the odd one out, in the sense that it is several orders of magnitude larger and more complex than the other two; but its basic structuring principle—the hierarchy—is the same. The main classes of each scheme are presented in Tables 1, 2, and 3.

5.0 Content

The “Outline of Knowledge” that formed the bulk of the *EB*’s *Propædia* is a list of 15,000 subject headings, subheadings, sub-subheadings, etc., arranged systematically in a 7-level taxonomic structure. Each part is divided into a number of divisions (42 in total), each of which is divided into a number of sections (189 in total), in which each topic covered is outlined; at the end of each section, a list is given of suggested readings in the *Macropædia* and *Micropædia*. This structure was Adler’s, in his capacity as director of planning for the new *EB*, and had been worked out between 1965 and 1968. The rearrangement reflected Adler’s “love for classification and bringing a unity to knowledge,” and more generally his “interest in self-education” (Whiteley 1992).

Adler was adamant that this structure should be viewed, not as a line or tree, but primarily as a circle. For Adler (1974, 6), the circle is a “powerful metaphor”: “with the circular arrangement of the parts, and with the rotation of the circle, the reader can begin anywhere in the circle of learning and go to adjacent parts around the circle; or, moving along interior transecting lines, the reader can go from any part across the circle to parts that are not adjacent on the circumference.” Moreover, the OoK’s part 10 might be placed in the center of the circle, reflecting a distinction between (a) “what we know about the world . . . by means of the various branches of learning or departments of scholarship” (parts 1 through 9) and (b) “what we know about the branches of learning or departments of scholarship—the various academic disciplines themselves” (part 10). The latter is what Quinton (1974, 9) calls “knowledge about knowledge, or knowledge of the second order”: i.e., the fields of logic, mathematics, science (“conceived as a knowledge-seeking activity, not as a set of findings”), history and the humanities, and philosophy.

Table 1. Main classes of the OoK (2010).

#	Caption	f	$f/\Sigma f$
1	Matter and Energy	39	8%
2	The Earth	25	5%
3	Life on Earth	44	9%
4	Human Life	24	5%
5	Human Society	46	10%
6	Art	39	8%
7	Technology	34	7%
8	Religion	35	8%
9	The History of Mankind	132	28%
10	The Branches of Knowledge	45	10%

f = count of pages for each class

Σf = total count of pages = 464

Table 2. Main classes of the SoC (2019).

#	Caption	f	$f/\Sigma f$
1	The Body and the Senses	92	9%
2	Feelings	65	6%
3	Place and Change of Place	86	8%
4	Measure and Shape	57	5%
5	Living Things	12	1%
6	Natural Phenomena	8	1%
7	Behavior and the Will	196	18%
8	Language	42	4%
9	Human Society and Institutions	77	7%
10	Values and Ideals	68	6%
11	Arts	20	2%
12	Occupations and Crafts	20	2%
13	Sports and Recreation	17	2%
14	The Mind and Ideas	256	24%
15	Science and Technology	59	5%

f = count of categories in each class

Σf = total count of categories = 1075

Table 3. Main classes of the *DDC* (2011).

#	Caption in 2011	Caption in 1876	<i>f</i>	<i>f</i> / Σf
000	Computer science, information & general works	[no caption]	97	4%
100	Philosophy & psychology	Philosophy	67	3%
200	Religion	Theology	158	7%
300	Social sciences	Sociology	602	25%
400	Language	Philology	58	2%
500	Science	Natural Science	307	13%
600	Technology	Useful Arts	527	22%
700	Arts & recreation	Fine Arts	239	10%
800	Literature	Literature	91	4%
900	History & geography	History	281	12%

f = count of pages for each class

Σf = total count of pages = 2427

The 8th *International* edition's 15 main classes into which its 1,075 categories of words and phrases are grouped are outlined in a "Synopsis of Categories" (Kipfer 2019, xix–xxxix), just as Peter Mark Roget's 6 main classes were in his 1st edition of 1852. The current structure was introduced by Robert L. Chapman (emeritus professor of English, Drew University, Madison, NJ) as editor of the 5th *International* edition of 1992. Prior editions had retained Roget's original structure with remarkably little change, as have all U.K. editions to date. Chapman should be credited for the most far-reaching of all revisions made since 1852. In his work on the *Thesaurus*, Chapman acknowledges the help of the philosopher Charles Courtney (Drew University), and the cognitive psychologist George Miller (Princeton University), well known for his work on WordNet, the lexical database of English.⁸

Somewhat remarkably, the ten main classes in the *DDC* have survived into the twenty-first century in essentially the same form that they had in Melvil Dewey's original plan of 1876. Precursors of Dewey's scheme include Nathaniel B. Shurtleff's *Decimal System for the Arrangement and Administration of Libraries* (1856) and William Torrey Harris's scheme for the classification of books in the St. Louis Public School Library (1870), as well as the systems of Bacon (in *The Advancement of Learning*, 1605) and Hegel (in *Enzyklopädie der philosophischen Wissenschaften*, 1817) for the classification of the sciences, whose influences on Dewey have been much debated down the years.⁹ Wiegand (1998, 189), for example, concludes that Dewey chose Harris's hierarchy for his own scheme "because it fit the Anglo-Saxon world into which he was born, a world further refined by the ... tradition, curriculum, and faculty" of the tiny Amherst College where Dewey had studied and worked. Given its widespread use around the world, "it is probably also fair to say that for the past century [the *DDC*] has quietly—almost invisibly—occupied an influential position as one of the

⁸ See <http://wordnet.princeton.edu/>.

⁹ For the history of classification of the sciences, see Flint (1904).

forces sustaining the discursive formations of a Eurocentric patriarchy” (Wiegand 1998, 190). Hope Olson and others have criticized the DDC hierarchy for its marginalization and exclusion of “groups and topics outside of canonical knowledge” (Olson 1996, 302). Meanwhile, calls to “ditch Dewey” on account of its perceived user-unfriendliness have multiplied in an age of instant keyword searching and browsing.¹⁰

6.0 Evaluation

Quinton (1974, 10) asserts that there are “two kinds of need” which KO systems must serve. “The first is sternly practical. . . . Classification by subject-matter is essential to the reader with access to the [library] shelves to show him what there is on the subject he is interested in.” Quinton continues: “. . . [T]here also exists a theoretical interest in attempting to find some ideal, or at least proper, order for the various fields of knowledge.”

Taking the “theoretical interest” first: There are at least three different aspects of a KO system that we might consider when conducting our test of propriety. These are (a) the extent of the range covered by the entire set of main classes; (b) how and where the boundaries of individual classes are defined; and (c) the ways in which individual classes are related to one another. Simultaneously, there are at least four different kinds of criteria that we might choose to use to test the propriety of a KO system. These are (a) correspondence with some objective reality or ground truth; (b) internal consistency or coherence; (c) utility: i.e., ease, efficiency, and effectiveness of use; (d) morality: i.e., construction in accordance with some code of ethics. In at least the case of utility, then, the theoretical question devolves to the practical one, on the pragmatic assumption that the ideal system is the one that works best.

How should a program of evaluation of the practical utility of these three KO systems proceed? It would be impractical to compare one scheme (or even one version of a scheme) with another, regardless of whether or not the comparison were for the same application context (encyclopedia entries, concepts, library resources). Yet a common evaluation program would be good, if only for the sake of efficiency. Information retrieval (IR) evaluation, based on measurements of query–document relevance, could potentially provide a model;¹¹ but (a) limitations on the kinds of tasks and goals that are involved in IR tests, and (b) a lack of pools of relevance judgments in the contexts in question, mean that other methods should be explored.

One simple plan might be to observe real users engaged in meaningful tasks, and to ask them to rate their success—a test, in other words, of user satisfaction. Given the sense that “going digital” has too often involved throwing the baby out with the bathwater—e.g., OoK’s demise with *EB*’s move to fully-digital in 2012; SoC’s absence from implementations of online thesauri—an effective design could be to compare “print with KO scheme” vs. “print without” vs. “digital with KO scheme” vs. “digital without.” If such a program were to provide warrant for the reinstatement of “digital with” as a vital part of users’ knowledge-seeking routines, so much the better.

Our fourth criterion, the ethics of scheme construction and usage, has come more and more to the fore in considerations of KO evaluation. Apparently attempting to deflect

¹⁰ See, for example, Chiavaroli (2019).

¹¹ See, for example, Harman (2011).

the kind of criticism that has in recent years increasingly been leveled at the *DDC*, Adler (1974, 6) asks how the OoK can avoid “tendentiousness or arbitrariness.” Does it not “reflect, perhaps even conceal, a commitment to one set of organizing principles rather than another? Does it not embody biases or preconceptions that are not universally acceptable?” Adler provides two immediate responses: (a) that the OoK was constructed “in the light of detailed recommendations, directions, and analytical contributions from scholars and experts in all the fields of knowledge represented”; and (b) that it was conceived, not as a hierarchy, but as “a circle of learning.”

Dorothy Auchter (1999, 295) notes that many of the early reviewers of the 15th edition of the *EB* were “simply bewildered” by its tripartite structure. The decision to retain the alphabetical arrangement of *Macropædia* entries, rather than to follow the topical arrangement adopted in the *Propædia* was widely interpreted as a failure of nerve, one that “seriously undermines” the ability to browse among entries of related interest (Auchter 1999, 295), and that leads to frustration and scepticism. Samuel McCracken (1976, 63) describes the “dismembering” of the *EB* into “mini- and maxipædias” as “devoid of benefits” with “nothing to recommend it.”

“The *Propædia*, at least, is harmless,” reckons McCracken (1976, 63). Others are less kind. Suzanne Selinger (1976, 440) is concerned about “the problem of bias or subjectivity,” noting (441) that it is no coincidence that “[t]he *Propædia*, the circle of learning that can theoretically begin anywhere, chooses to begin in its printed appearance with science.” Moreover (442), “it is clear from the weighting of topics that the values of the *Propædia* . . . are [preponderantly scientific].” This bias towards science is ironic given (442) that “[o]bjectivity and neutrality were among the great goals of the scientific method,” and (444) that “objectivity, absolutism, and the unity of truth” are [Adler’s] ideals and beliefs.” In sum (445), the *Propædia* is “grounded in and inseparable from the values, approaches, and presuppositions of scientism.” As a result (445), “The two cultures are not reconciled; one has been opted for at the expense of the other.”

Anthony Quinton (1974, 9) is fairly suspicious of Adler’s credentials: “Adler’s long association with the movement in Chicago . . . which has sought to restore to learning unity of a kind exemplified in the work of Aristotle and with a pronounced neo-Thomist inflection” might reasonably raise questions about potential bias in the structuring of OoK. Nevertheless, Quinton (10) admits, “One would have to be very suspicious to think that this [conception of learning as a circle or “old-fashioned pie”] concealed some deep, ideological design and that perfectly sound and straightforward reasons had not been given for it.”

Educator Robert McClintock (1976), meanwhile, is sharply critical of the 15th edition of the *EB* for its “inadequacy as an educative instrument.” Firstly, a “cult of authority, objectivity, and neutrality” is “embodied” in the *EB*, making it impossible for articles to be included “in which the author concretized and spoke directly to the curiosity and intelligence” of the layperson; secondly, most articles speak in an authoritative voice about fields of established knowledge, rather than in an educative voice about the questions that readers have; and thirdly (and most importantly, in the present context), the OoK, while “impressively complete in its range and detailed in its elaboration,” is arranged in an authoritative rather than a pedagogical order. “In working out an authoritative order, one starts with a body of knowledge and asks what order do

the authorities see in it . . . In working out a pedagogical order, one starts with a student and asks what order he should follow if he is best to apprehend the subject at hand . . .” Whoever takes the OoK at face value and follows it from its beginning, as a guide to self-study, “will be sent first to a long article on the ‘Nucleus, atomic’ . . . written entirely in the authoritative voice . . . simply not a feasible point at which to begin his study.”

Quinton concludes his 1974 review by calling OoK “an immensely thorough and detailed piece of work.” For Quinton (11), “It embodies in its general form no striking innovations and does not conceal within it any principles likely to provoke controversy. Free from architectonic Procrusteanism it seems, for all its elaboration, a practical answer to a practical problem. Only the most exquisitely fastidious could think that they are somehow being got at.” Nevertheless, by the early 1990s, it was uncontroversial for Whiteley (1992, 84) to assert that “There is no index to the *Propædia* and it is difficult for the unsophisticated reader to use. This volume appears to be the least-used part of the encyclopedia.”

7.0 Conclusion

With the publication of the final print edition of *EB* in 2010, Adler’s OoK seems to have died a largely unlamented death. Whether or not the OoK, or anything like it, will ever be resurrected and pressed into service online is a matter for Encyclopædia Britannica, Inc.’s accountants to consider. That there remains a market, however shrunken, for authoritative KO systems like the OoK to serve as guides for knowledge-seekers is demonstrated by the publication in 2019 of an 8th print edition of *RIT* (in the face of a plethora of online thesauri offering instant keyword searching), and biannual print versions of the *DDC* (in addition to the continuously updated WebDewey service to which thousands of libraries around the world subscribe). Whatever the ultimate fate of the OoK itself, perhaps the simple concept of the “circle of learning” that distinguished the OoK from its predecessors may profitably be salvaged, and used in response to critiques of line- and tree-based systems that necessarily have tops and bottoms, firsts and lasts, beginnings and ends.

One additional function of KO schemes that has so far gone unremarked, and that goes beyond even the pedagogical function mentioned above, is one that we might call the generative function. What does one get out of reading the OoK, the SoC, or the *DDC*? A sense of one particular view—perhaps fundamentally mistaken—of the shape, size, and structure of the totality of knowledge, for sure; but also, potentially, ideas about new fields, new concepts, new subjects that are not currently part of that totality, and ideas about new ways of organizing that totality. The generative function is what continues to make the future of KO system design so exciting.

References

- Adler, Mortimer J. 1974. “The Circle of Learning.” In *The New Encyclopædia Britannica in 30 Volumes* 30. Chicago: Encyclopædia Britannica, 5–7.
- Auchter, Dorothy. 1999. “The Evolution of the Encyclopædia Britannica: From the Macropædia to Britannica Online.” *Reference Services Review* 27, no. 3: 291–299.
- Beghtol, Clare. 2010. “Classification Theory.” In *Encyclopedia of Library and Information Sciences*, 3rd ed., edited by Marcia J. Bates and Mary Niles Maack. Boca Raton, FL: CRC Press, 1045–1060.

- Chiavaroli, Melissa. 2019. "Ditching Dewey: Take Your Collections from Enraging to Engaging and Position Your Library for 21st Century Success." *Public Library Quarterly* 38, no. 2: 124–146.
- Flint, Robert. 1904. *Philosophy as Scientia Scientiarum; and, A History of Classifications of the Sciences*. New York: Charles Scribner's.
- Harman, Donna. 2011. *Information Retrieval Evaluation*. San Rafael, CA: Morgan & Claypool.
- Hoiberg, Dale H., ed. 2010. *The New Encyclopædia Britannica in 32 Volumes*, 15th ed. Chicago: Encyclopædia Britannica.
- Hüllen, Werner. 2004. *A History of Roget's Thesaurus: Origins, Development, and Design*. Oxford: Oxford University Press.
- Hüllen, Werner. 2009. "Dictionaries of Synonyms and Thesauri." In *The Oxford History of English Lexicography: Vol. II, Specialized Dictionaries*, edited by A.P. Cowie. Oxford: Clarendon Press, 25–46.
- Kipfer, Barbara Ann, ed. 2019. *Roget's International Thesaurus*, 8th ed. New York: Collins Reference.
- Loveland, Jeff. 2019. *The European Encyclopedia: From 1650 to the Twenty-first Century*. Cambridge: Cambridge University Press.
- McClintock, Robert. 1976. "Enkyklios Paideia: The Fifteenth Edition of the Encyclopædia Britannica: A Review." *Proceedings of the National Academy of Education* 3: 179–216.
- McCracken, Samuel. 1976. "The Scandal of 'Britannica 3,'" *Commentary* 61, no. 2: 63–68.
- Miksa, Francis L. 1998. *The DDC, the Universe of Knowledge, and the Post-Modern Library*. Albany, NY: Forest Press.
- Mitchell, Joan S., ed. 2011. *Dewey Decimal Classification and Relative Index*, 23rd ed. Dublin, OH: OCLC.
- Olson, Hope A. 1996. "Dewey Thinks Therefore He Is: The Epistemic Stance of Dewey and the DDC." In *Knowledge Organization and Change: Proceedings of the Fourth International ISKO Conference 15-18 July 1996 Washington, United States*, edited by Rebecca Green. Advances in Knowledge Organization 5. Frankfurt/Main: Indeks, 302–312.
- Quinton, Anthony. 1974. "The Organisation of Knowledge." *Times Literary Supplement* (May 17): 9–11. Reprinted in: Quinton, Anthony. 1982. *Thoughts and Thinkers*. London: Duckworth, 57–64.
- Richardson, Ernest Cushing. 1930. *Classification: Theoretical and Practical*, 3rd ed. New York: H.W. Wilson.
- Selinger, Suzanne. 1976. "Encyclopedic Guides to the Study of Ideas: A Review Article." *Library Quarterly* 46, no. 4: 440–447.
- Whiteley, Sandy. 1992. "The Circle of Learning: Encyclopædia Britannica." In *Distinguished Classics of Reference Publishing*, edited by James Rettig. Phoenix, AZ: Oryx Press, 77–88.
- Wiegand, Wayne. 1998. "The 'Amherst Method': The Origins of the Dewey Decimal Classification Scheme." *Libraries & Culture* 33, no. 2: 175–194.