

Fringe Types and KOS Systematics: Examining the Limits of the Population Perspective of Knowledge Organization Systems

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Introduction

We find ourselves, after the close of the twentieth century, looking back at a mass of responses to the knowledge organization problem. Many institutions, such as the Dewey Decimal Classification (Furner, 2007), have grown up to address it. Increasingly, many diverse discourses are appropriating the problem and crafting a wide variety of responses. This includes many artistic interpretations of the act and products of knowledge organization. These surface as responses to the expressive power or limits of the Library and Information Studies institutions (e.g., DDC) and their often primarily utilitarian gaze.

One way to make sense of this diversity is to approach the study from a descriptive stance, inventorying the population of types of KOS. This population perspective approaches the phenomenon of *types* and *boundaries* of Knowledge Organization Systems (KOS) as one that develops out of particular discourses, for particular purposes. For example, both DDC and Martianus Capella, a 5th Century encyclopedist, are KOS in this worldview. Both are part of the population of KOS. Approaching the study of KOS from the population perspective allows the researcher a systematic look at the diversity emergent at the constellation of different factors of design and implementation. However, it is not enough to render a model of core types, but we have to also consider the borders of KOS. Fringe types of KOS inform research, specifically to the basic principles of design and implementation used by others outside of the scholarly and professional discourse of Library and Information Studies.

Four examples of *fringe types* of KOS are presented in this paper. Applying a rubric developed in previous papers, our aim here is to show how the conceptual anatomy of these fringe types relates to more established KOS, thereby laying bare the definitions of domain, purpose, structure, and practice. Fringe types, like Beghtol's examples (2003), are drawn from areas outside of Library and Information Studies proper, and reflect the reinvention of structures to fit particular purposes in particular domains. The four fringe types discussed in this paper are (1) Roland Barthes' text *S/Z* which "indexes" a text of an essay with particular "codes" that are meant to expose the literary rhythm of the work; (2) Mary Daly's *Wickedary*, a reference work crafted for radical liberation theology – and specifically designed to remove patriarchy from the language used by what the author calls "wild women"; (3) Luigi Serafini's *Codex Seraphinianus* a work of book art that plays on the trope of universal encyclopedia and back-of-the-book index; and (4) Martianus Capella – and his *Marriage of Mercury and Philology*, a fifth century encyclopedia. We compared these using previous analytic taxonomies (Wright, 2008; Tennis, 2006; Tudhope, 2006; Soergel, 2001; Hodge, 2000).

Rationale

This work is important because as more and more individuals and groups come to the problem of knowledge organization, they demonstrate innovation and creativity in a singularly discrete activity we consider our expertise – namely knowledge organization. Understanding the emerging discourses around activity that grows and matures outside the core work of LIS will shed light on our own assumptions of design, implementation, and evaluation of KOS. Fringe types are especially instructive as they push the boundaries of our analytical rubrics and as a result allow us to question our assumptions.

KOS Systematics

KOS systematic is not new. It is the case that many researchers have compared different KOS in the twentieth century. Usually the comparisons are between different KOS used for displaying and retrieving sets of documents. However, this has not always been the case. Notable exceptions are Kwasnik's (1999) view of discovery in KOS and Beghtol's work with naïve classification (2003). Even Hjørland (1997) identifies *ad hoc* classification as beyond retrieval in his tripartite scheme. What follows is a brief review of work done to date in this area. This review will build toward a synthesis which we will use to explore novelties in the fringe types.

Ranganathan's Species of Classification for Subjects (1967)

S. R. Ranganathan in his *Prolegomena to Library Classification* identified five kinds of classification of subjects. These were directly relevant to his work on creating a method of classification to handle the addition of new subjects to the universe of knowledge, and for these new additions to find their appropriate place in the arrangement of classes. The five types he listed are usually reduced to two in most discussions of classification, and even then, there is often misunderstanding about what constitutes faceted classification. His five types of classification for subjects are: Enumerative, Almost-Enumerative, Almost-Faceted, Rigidly-Faceted, and Freely-Faceted. These are all hierarchical structures, differing only in the method and supporting sources used to create the classes. That is, Freely-Faceted classification is as hierarchical as Enumerative Classification in Ranganathan's typology. The difference is that the classifier builds a coextensive class number representing every aspect (facet) of the subject and in so doing assembles a notation that will place that class (and all documents so marked) in an umbral arrangement - in helpful and filial sequence with other classes in the classification whether the subject is new or established in the universe of knowledge. See his schematic diagram of the tree of knowledge below.

Ranganathan had a limited scope for his typology: approaches to constructing classes for subject classification in libraries.

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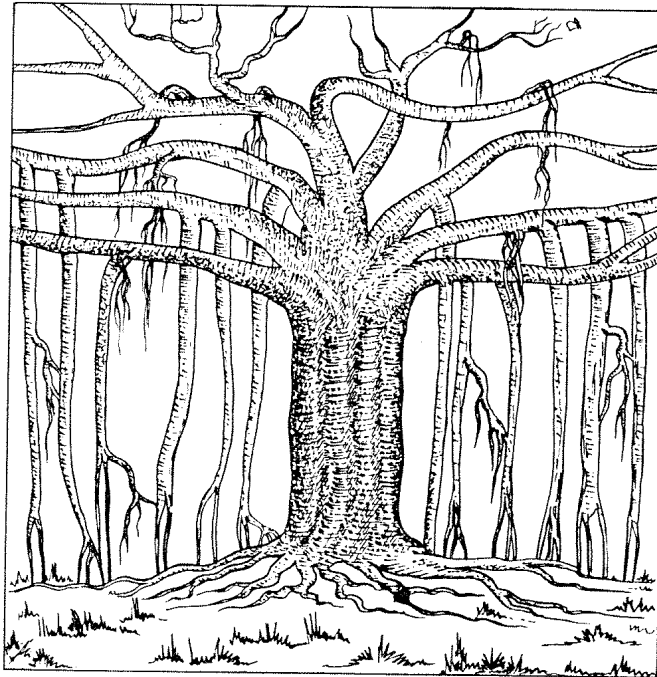
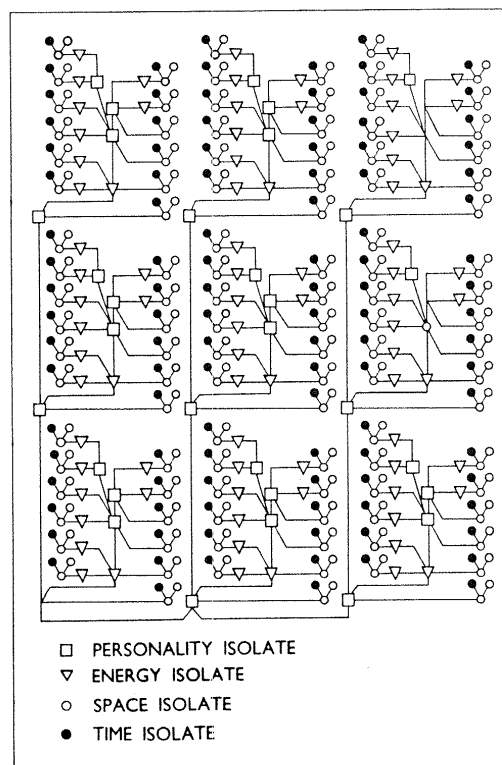


Figure 1. The Banyan Tree – Ranganathan's metaphor for the true tree of classification (Ranganathan, 1967 p. 368).



SCHEMATIC DIAGRAM OF THE TREE OF KNOWLEDGE

Figure 2. Ranganathan's illustration of the hierarchy and systematic order of the tree of classification (Ranganathan, 1967 p. 367).

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The Wright Typology (2008)

The Wright Typology (Wright, 2008), divides the universe of KOS into systematic, non-systematic, and hybrid. For her, systematic is defined as a structure with explicit relationships, such as "parent-child relationships, meronymy and metonymy, sequentiality, defined edges in logical triads (RDF), etc." (Wright, 2008 p. 8). Non-systematic are either not ordered or conventionally ordered (e.g., alphabetical, non-mnemonic numerical sequences). Her examples of non-systematic KOS are author lists, title lists, and language codes used in metadata applications.

For Wright, KOS is just a part of a larger universe of knowledge representation resources (KRRs). KRRs are resources that contain "knowledge that we can: manipulate, mine or use to enrich other resources, analyze and reuse (leverage), or use to interact with various tools, either based on common environment planning (or not)." (Wright, 2008 p. 7). This definition is broad, perhaps too broad. We say this because if we scope our systematic work to KRRs, by her definition, it means anything that has knowledge we can mine has to be part of our taxonomy. Her chart, presented below, provides us a glimpse at a smaller universe. We do not see just any resource that we can mine for knowledge listed here. For examples, we don't see resources like the fringe types discussed in this paper or Beghtol's naïve classification. So we must reconcile her definition, which is quite broad, with what seems to be the representative extension, if not actual or true extension of KRRs in her tree.

This helps inform our understanding of KOS systematics. Namely, we want to scope our universe of KOS so that the constraints of that universe allow us to make meaningful statements about its characteristics.

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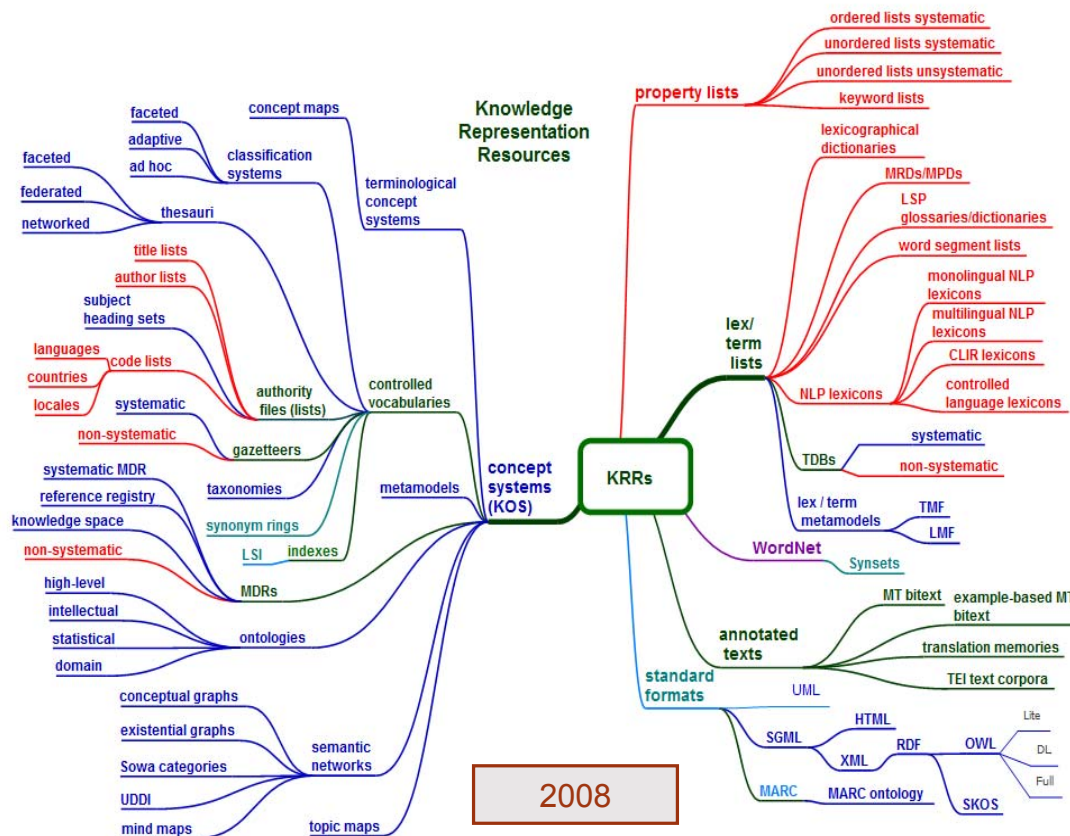


Figure 3. 2008 Wright Typology

The Kwasnik Representative Sample (1999)

Barbara Kwasnik provides a representative sample of common approaches and structures to classification. Like Ranganathan's (1967) above, Kwasnik is only concerned with one particular activity: classification. This is in contrast to what we might find as a complete inventory of KOS in the majority of LIS literature. Her taxonomy includes four things: Structures: (1) Hierarchies, (2) Trees, (3) Paradigms and Approaches: (4) Faceted Analysis.

Hierarchies are sets of classes that are built on generic relationships which mean the classes are inclusive, transitive, and inheritance of attributes. Trees are hierarchies without rules of inheritance. They are not built on generic relationships. Rather, trees have attributes that distinguish subclasses, but these are not is-a, or generic relationships. Finally, paradigms are the intersection of two hierarchies – thus classes are generated at the combination of two attributes. Facet analysis, the fourth species in Kwasnik's representative sample is not a structure, but an approach to creating structures. It is akin to work practice (Tennis, 2006a, 2006b; Tennis and Jacob, 2008), where professionals use KOS. But always informed by the affordance and constraints of structures.

The Main Stream and Fringe Types: Scoping KOS Systematics

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From earlier systematic work we can create an analytical rubric to move forward the categorization of KOS. It is clear that discussions of KOS, a single element, like structure for instance, cannot happen in isolation. Every researcher to date as looked at a typology of KOS with either an eye to factors other than structure (like work practices, approaches, contexts, or communities of practice), or constrained their comparison to a single practice and a single context (e.g., Ranganathan's comparison of subject classification in libraries). In turn, the composite comparative rubric created here should also account for other elements relevant to KOS, not only their structure.

Another factor that must be taken into account is the range of entities covered in the taxonomy. What exactly is a KOS, and if we have a clear definition, what are examples of things that are in, out, and on the fringe? To this end we can propose a tentative definition of core KOS and fringe KOS

Finally, the analytical rubric created to speak about the population of KOS as a systematic phenomenon, should tell us something about our professional practices, and lend us insight into the creation, implementation, maintenance, and evaluation of these structures. It should offer us a faithful representation of what we see as KOS as well as shed light on creativity in KOS. Both are important, in our view. Design is an inherently creative process, and if we are to understand the contemporary landscape of KO research as a design space (c.f., Feinberg, 2007), then we must look for creativity in the phenomenon of KOS.

In order to create this rubric, we can take extant research on the topic (partially reviewed above), and lay against it, individual works that seem to occupy the borderlands (at best) of KOS. What follows are such individual works: Roland Barthes, Mary Daly, Luigi Sarafini, and Martianus Capella.

Barthes and Starred Text

In an effort to understand the way texts convey meaning, Roland Barthes undertakes an in depth indexing exercise in his *S/Z* (1974/1998). In this case, we see something like depth classification of Ranganathan's work (1953). However, Barthes does something different from what the documentalist would do. In this exercise Barthes is not indexing, or starring (to use his words) the text for the purposes of retrieval, but rather to map the contours of signs used by an author of a classic text; signs that move meaning forward in a special literary way. He talks about his process of starring the text this way.

"We shall therefore star the text, separating, in the manner of a minor earthquake, the blocks of signification of which reading grasps only the smooth surface, imperceptibly soldered by the movement of sentences, the flowing discourse of narration, the 'naturalness' of ordinary language. The tutor signifier will be cut up into a series of brief, contiguous fragments, which we shall call *lexias*, since they are units of reading. The text in its mass, is comparable to a sky, at once flat and smooth, deep, without edges and without landmarks; like the soothsayer drawing on it with the tip of his staff an imaginary rectangle wherein to consult, according to certain principles, the flight of birds, the commentator traces through the text certain zones of reading, in order to observe therein the migration of meanings, the outcropping of codes, the passage of citations. The *lexia* is only the wrapping of a semantic volume, the crest line of the plural text, arranged like a berm of possible (but controlled, attested to by a systematic reading) meanings under the flux of discourse: the *lexia* and its unites will thereby form a kind of polyhedron faceted by the word, the group of words, the sentence or the paragraph, i.e., with the language which is its 'natural' excipient." (Barthes, 1974/1998 p. 14).

An example of the starred text follows.

(258) *On the following day, he sent his valet to rent a box next to the stage for the entire season.* ★ REF. Chronology ("the following day"). ★★ ACT. "Will-to-love": 3: to rent a theater box. In Sarrasine's case, the amorous undertaking is based on pure impulse: what he plans is not the conquest of La Zambinella but the repetition of his first solitary pleasure; thus, once its beginning has been proclaimed ("*be loved by her or die*"), the sequence has only two dilatory terms: to draw, to contemplate; after which the progress of events is no longer in Sarrasine's hands, and it is his *will-to-die*, which is engaged. ★★★ Proximity to the stage—whose great advantages to pleasure the subject discovered by chance—is now deliberately sought, for this pleasure must now be repeated, organized every evening throughout the entire season (ACT. "Pleasure": 12: conditions for repetition).

(259) *Then, like all young people with lusty souls,* ★ REF. Psychology of ages.

Figure 4. An example of Barthes's starred text (1974/1998 p. 123)

In this example we can see how much Barthes adds to the single line (258). His analysis points to cultural codes (in this case Chronology in 258 and Psychology of ages in 259). In this example he also points to actions made by characters that move the plot forward ('will-to-love' and 'pleasure'). With the eyes of a Knowledge Organization researcher we can see a kind of indexing here. If we define indexing as the analysis of documents for their significant characteristics in order to represent those characteristics in an information system for some users, then with a liberal definition of information system we see Barthes work fit nicely.

If we accept that starring can be considered a form of indexing, then we might see Barthes work as a kind of KOS. This effort at starring or indexing tells us something novel about the population of KOS. That is, it tells us what constitutes the frames of reference for indexing terms. Traditionally, we would not feel as comfortable referencing large bodies of cultural knowledge, without citation. We would justify inclusion of concepts like the psychology of ages using literary warrant, and though we would acknowledge that was an editorial decision in the concept record (Tennis, 2007), we can see here that Barthes does not need to do that. His use of language in the act of indexing is different, in part due to his frame of reference for indexing terms. From this example of a fringe type we can learn about literary warrant, and the range or limits of discursive foundations of terms used to as significant characteristics in documents – represented in information systems.

Daly's Wickedary

Mary Daly, a radical feminist liberation theologian, crafted a work – a web of words – to use her terms, that was meant to provide a women-only space in words. The *Websters' New Intergalactic Wickedary* is a work organized in skeins, like a flock of wild geese in flight, and in webs, woven primarily by Daly in some instances with the help of Jane Caputi. The structure of the Wickedary is as follows:

Preface

Explanatory Notes (on capitalization, pronouns and nouns, meta-etymologies, cross-referencing, and citations to earlier work by Daly.

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The First Phase – Preliminary Webs

- Preliminary Web One (The Wickedary: Its History/Metamystery)
- Preliminary Web Two (Spelling: The Casting of Spells)
- Preliminary Web Three (Grammar: Our Wicked Witches Hammer)
- Preliminary Web Four (Pronunciation: Denouncing, Pronouncing, Announcing)
- Preliminary Web Five (Guides to the Wickedary)

The Second Phase – The Core of the Wickedary: Word-Webs

- Word-Web One (Elemental Philosophical Words and Phrases and Other Key Words)
- Word-Web Two (The Inhabitants of the Background, Their Activities and Characteristics)
- Word-Web Three (The Inhabitants of the Foreground, Their Activities and Characteristics)

The Third Phase – Appendicular Webs

- Appendicular Web One (Exposing Elementary Terms and Phrases: Mummies, Dummies, Anti-Biotics, and Reversals)
- Appendicular Web Two (Be-Laughing: Nixing, Hexing, and X-ing)
- Appendicular Web Three (Spinning Beyond the Compass: Regaining the Sense of Direction)
- Appendicular Web Four (Jumping Off the Doomsday Clock: Eleven, Twelve...Thirteen)

The Wickedary is a complex trove of epistemology and knowledge organization. It builds on two rich sources: Daly's own work and the structures (implicit and explicit) in organizing knowledge in a patriarchal system. In combining these two sources, Daly attempts to reclaim the tools of order, but deployed and used to empower women.

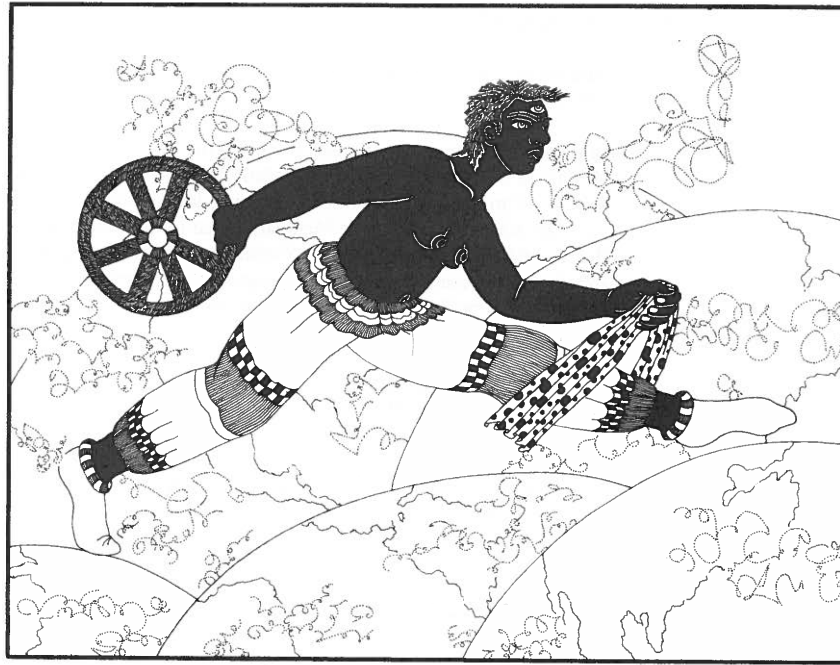
Daly's prose is rich and playful. Because she approaches this work from a radically different epistemic stance we see her redefine words using hyphenated spellings and a poetic license on connotation. For example:

¹**re-search** *n* : a function of patriarchal scholarship (including pseudofeminist scholarship): circular academized game hide-and-seek: pseudosearch for information which, in fact, has been systematically hidden by previous re-searchers, and which, when found, is then ritually re-covered by succeeding investigators, only to be re-discovered and re-covered endlessly: syndrome often described by Canny Crones as the "kitty litter box syndrome of patriarchal scholarship." See **re-covering** (W-W 3).
Compare Hag-ography; Searcher (W-W 2)

²**re-search** *n* : "search" for the screamingly obvious which is then paraded as the latest scientific information. *Example*: the experiments of scientific re-searcher Harry Harlow, who induces mental disorders in infant monkeys by putting them into *complete* isolation for up to twelve months. Such experiments "prove" that touch and companionship are necessary for normal social development (Daly, 1987 p. 222).

Beyond the prose, though it is not something you want to go beyond because it is so evocative and crisp in its pronouncement of a different epistemic stance, we see the characteristics of a cross-referenced dictionary. Though not an information retrieval KOS, dictionaries are often used to support other KO activities like thesaurus construction. Here we can see how Daly invites us to question the epistemic foundations of literary warrant. Words are loaded with a history and operate in a social milieu that may, at best, requiring questioning, and feel oppressive at worst. Upon reflection, we can see, through fringe types of KOS like this one, that to some, the very idea of becoming more fully realized is linked intimately if not ultimately with words and their order and relationship to other words in a system.

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*NEMESIS: participation in the powers of the Goddess Nemesis;
Elemental disruption of the patriarchal balance of terror*

Figure 5. A Nemesis from the *Wickedary*

The Codex Seraphinianus

Luigi Serafini, a visual artist, took as his trope, the universal encyclopedia. He constructed a two volume book art interpretation of the form of the encyclopedia depicting an imagined world in color pictures each element of which is described in a made-up script. This particular expression of knowledge organization is at least a fringe type. It is a fringe type, and not out of scope of consideration because it fosters a sense of pastiche in structure and authorial voice in the reader of the encyclopedia. The goal of the author was not like the goal of the editors of an *Encyclopaedia Britannica*.

The whimsy of the *Codex Seraphinianus* functions as a mirror on the objects considered relevant for the purposes of retrieval. This, in turn leads us to consider it a KOS. However, on closer examination this "fringe type" displays certain, but perhaps not essential characteristics of a KOS. It may be mimicking a KOS. And if this is the case, mimicry may be a characteristic that distinguishes KOS from non-KOS – that is, beyond fringe.

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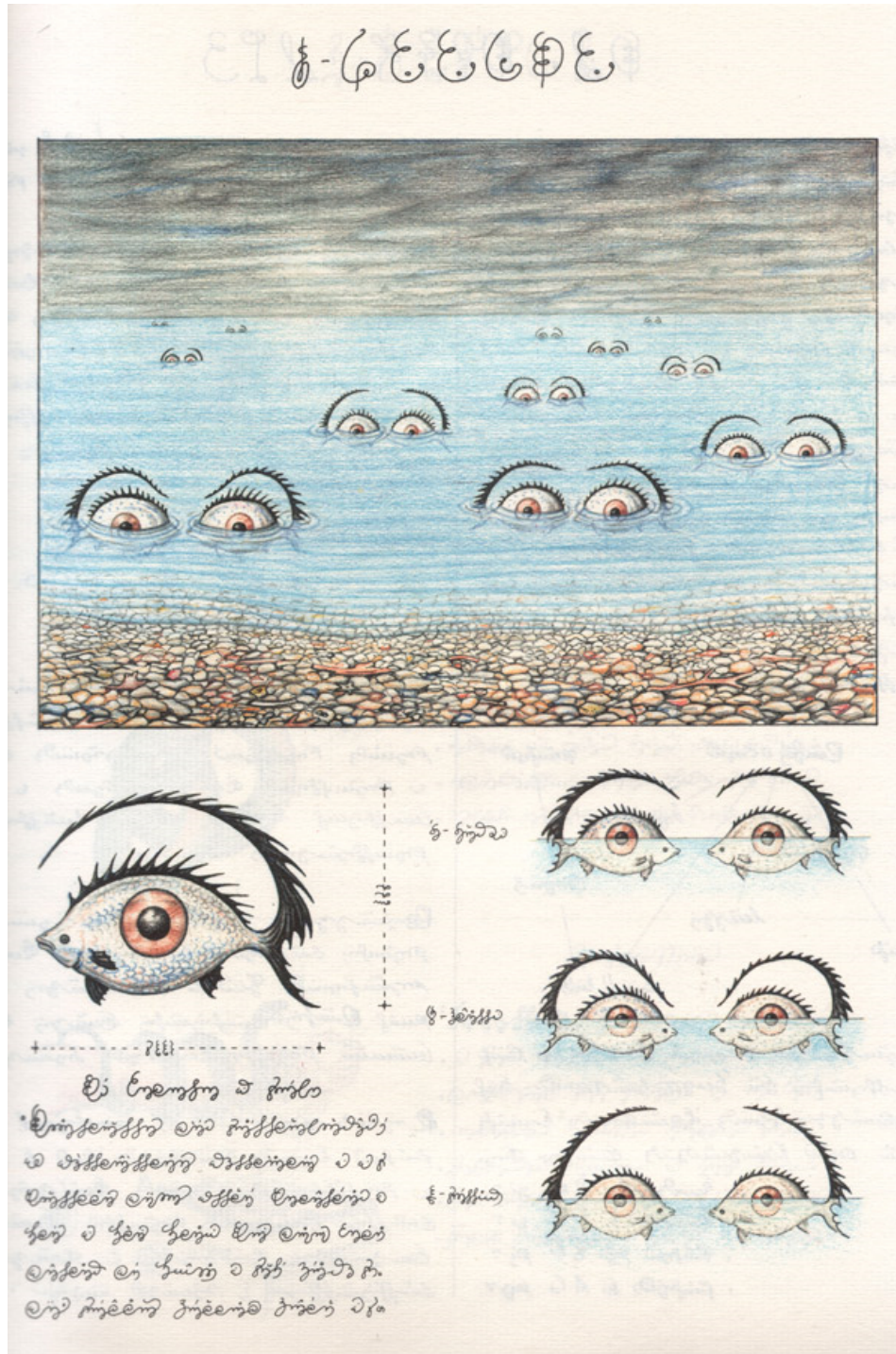


Figure 6. A page from the Codex Seraphinianus

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Figure 7. Another page for the Codex Seraphinianus

Martianus Capella

Martianus Capella, a fifth century encyclopedist, constructed a text that is the oldest extant subject encyclopedia, which is effectively a classification of knowledge. His system of the sciences was indebted to Greek thought on education (mathema) and transcribed in medieval European monasteries. In some ways it was used as a bibliographic classification scheme (Richardson, 1901), even though it is primarily a narrative text. It is a story of the marriage of mercury (the word) and philologie (the lover of words).

Though we may call this a form of classification it is distinctive because of its presentation as a narrative. That is the structure of classification is a story. The narrative does two things for the classes. The structure of the classes is supported and enhanced by narrative. The classes are supported by a narrative justification of their sequence from first to last and in their extension and intension. They are enhanced by narrative because the classes are given histories, personalities, and rationales. The status of Martianus's work as a fringe type is due more to history than to the basic structure of the scheme of liberal arts. We simply no longer use or find useful this form of KOS. However, it may be time to reconsider.

Findings

We have said that Barthes, Daly, Seraphini, and Martianus (BDSM) are examples of fringe types of KOS. If we understand a KOS to be *a selective semantically constrained structure that is the key instrument used in a work practice of routinized selective representation for purposes of intentionally designed surrogated sense-making which is preliminary to further action (like retrieval or display)*, then we can learn about our definition and the phenomena of KOS, not only by looking at what are canonical examples of KOS (schemes for classification, thesauri, and subject heading lists, for instance), but also by looking at how BDSM compares to our idea of KOS. It will help us with the work in KOS systematics.

So, how do we do KOS systematics? Where do we draw the line at what is in and what is out of scope for our discussions, lectures, and classrooms? What then are the limits of systematics in KOS? And what species of KOS occupy the fringes? And what are their characteristics?

Work is ongoing in NKOS, KO, and in other venues to look at these issues (Beghtol, 2003; Kwasnik, 1999; Wright, 2008; Tudhope, 2006; Soergel, 2001; Hodge, 2000; Zeng, 2008). But this work is focused primarily on document retrieval KOS, when other types continue to emerge. And though social tagging is one example of KOS that seems out of the mainstream because it is not used solely for document retrieval, it is, in our opinion, *not* fringe. It lacks the alien quality exemplified by the examples listed above. This intuition is supported when we analyze the emergent characteristics of the set of these fringe types. The fringe types above (BDSM) show us what more to look for. What then do we look for when we survey the perimeter? We see four things: (1) structural mimicry in fringe KOS (FKOS), (2) new purposes/repurposing, (3) while FKOS may be useful, but far removed from the discourse of "effective retrieval", and (4) rich narratives that go into and support organizing knowledge. I will briefly expand on these below.

We see structural mimicry in Serafini's work. He uses the encyclopedia as a guiding trope for creating an imagined world described in an imagined language. Given our definition of KOS above, we cannot see how, beyond this mimicry, the Codex can be considered a KOS. We might say that it is an artistic critique of KOS or perhaps the structure is merely a frame for what the artist wants to depict – his imagined world. As far as fringe goes, this instance is beyond the borderland.

Daly's work in the *Wickedary* can be seen as an example where a KOS (albeit not commonly considered KOS by LIS), a dictionary is dramatically repurposed and transformed into a tool for emancipation. The structures are familiar to us, but Daly reinvigorates them by establishing a different epistemology and then deploying the consequent perspective consistently throughout the text. The case of re-search is an example of this. We can see how it looks like a dictionary definition – in format, but upon reading it we see that it is a *Wickedery* definition. This calls into question the role of language in KOS and how our purposes are dependent on it to represent our epistemology. We expect language to serve one purpose, and here Daly shows us another purpose, in the form, but not the traditional form, of a KOS.

Useful, but not used for retrieval is the Barthes example. The lexias deployed as they are in his *S/Z* are not primarily for retrieval. It does help us make sense of the text, at least from the *indexer's* point of view. To a point, social tagging could be seen as fringe in this regard. The caveat here would be that social tagging is not one thing, whereas Barthes's construction is.

Finally the narrative as KOS is a fringe type because the dominant mode of expression assumes there is no need for a narrative in prose. The dominant, and hence non-fringe, way of constructing and implement KOS assumes we can break apart concepts, place them into a singular position in a hierarchy or association, and use only parsimonious scope notes. The narrative on the other hand is a different conceptualization; one that requires the reader to see multiple relationships, histories, and definitions of a single concept through a story – either fictionalized or not.

These emergent characteristics are just a sample of what could be used to examine the limits of KOS, and therefore make more robust our attempts at KOS systematics.

Limits of KOS Systematics

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What's next is to combine this work with a more thorough understanding of the characteristics of KOS – both structurally and beyond. KOS systematics must wrestle with and come to some resolve about what is a representation of organized knowledge. Key to this is the acknowledgement of a discourse around the otherwise similar structures we see in fringe types (Tennis and Jacob, 2008; Tennis 2006a, 2006b). In so doing we will gain a deeper and richer understanding of our work and its place in the sense-making in the production, collection, and preservation of knowledge.

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