

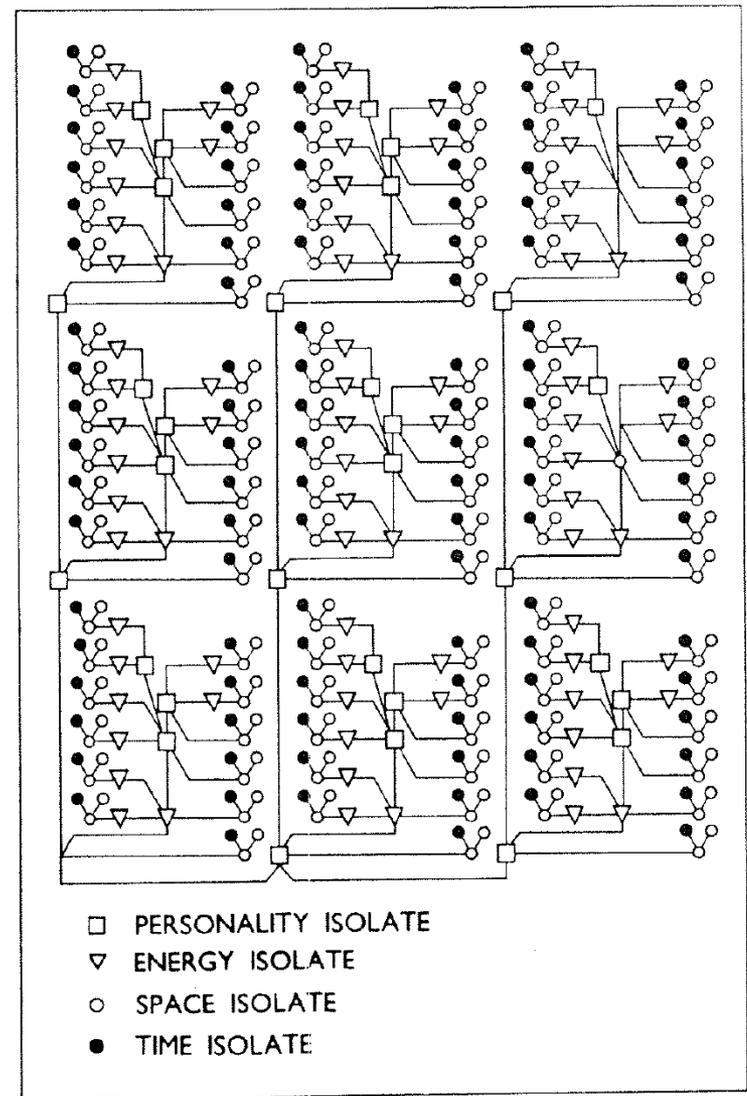
# Facets and change: Design requirements for analytico-synthetic schemes in light of subject ontogeny research

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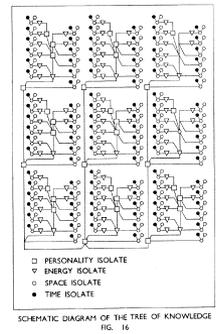
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Associate Dean for Faculty Affairs

# 1. Introduction

S. R. Ranganathan defined facets as “any component—be it a basic subject or isolate—of a Compound Subject, and also its respective ranked forms, terms, and numbers,” (Ranganathan, 1967: 88).



SCHEMATIC DIAGRAM OF THE TREE OF KNOWLEDGE  
FIG. 16



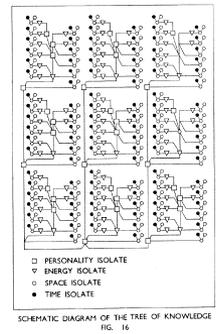
# 1. Introduction

In this context, subjects are “organized or systematized bodies of ideas, whose extension and intension are likely to fall coherently within the field of interest and comfortably within intellectual competence and the field of inevitable specialization of a normal person,” (Ranganathan, 1967: 82).

While an isolate is “an idea... fit to form a component of a subject, but not by itself fit to be deemed a subject,” (Ranganathan, 1967: 83). Ranganathan’s examples of isolates in this context are child, gold, structure, India, and the year 1950.

# 1. Introduction

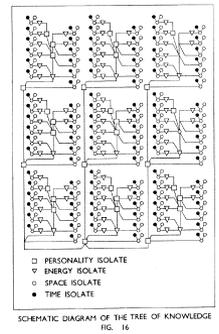
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For those familiar with Ranganathan's work, we recognize that facets, while instrumental to his contributions to classification theory, are not to be fetishized. Facets are one component, of many, that are designed to accommodate an ever-expanding universe of knowledge through fully expressive representation of subjects (i.e., coextensive representation).

# 1. Introduction

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However, facets alone are not enough for the purpose of subject classification. This becomes clear if we study the evolution of Ranganathan's thought on classification. In the later stages, he supports the use of facets only through laws, canons, postulates, principles, and devices. Facets, combined with these normative principles (his overarching term for all of these design and implementation guides), are what make Analytico-Synthetic schemes for classification and fully faceted class numbers (Ranganathan, 1967: 109-110).

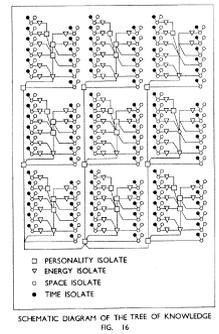
# 1. Introduction

These are schemes and numbers that are different than their predecessors – namely rigidly-faceted classification (Ranganathan, 1967: 106-108).

Transformed Title (See Sec SB24)	CC Number	UDC Number
Agriculture (BF). Rice plant [1P1]. Stem [1P2]. Disease [1M1]. Virulence [1M2]. Prevention [1E]. Chemicals [2M1].	J381.4;4 ;0c7*:5 ;3*	633.18 :581.44-2 -7*-2934
Agriculture (BF). Rice plant [1P1]. Stem [1P2]. Disease [1M1]. Virulence [1M2]. Prevention [1E]. Chemicals [2M1]. Dry period [T1].	J381.4;4 ;0c7*:5 ;3*el	633.18 :581.44-2 -7*-2934 "3951**"
Agriculture (BF). Rice plant [1P1]. Stem [1P2]. Disease [1M1]. Virulence [1M2]. Prevention [1E]. Chemicals [2M1]. Madras [S1]. Dry period [T1].	J381.4;4 ;0c7*:5 ;3*.4411 'el	633.18 :581.44 -2-7* -2934 (548.1) "3951**"
Agriculture (BF). Rice plant [1P1]. Stem [1P2]. Disease [1M1]. Virulence [1M2]. Prevention [1E]. Chemicals [2M1]. Distribution [2E]. Sprayer [3M1]. Madras [S1]. Cauveri / Delta [S2]. 1967 [T1]. Dry period [T2].	J381.4;4 ;0c7*:5 ;3*:7*;5 .4411 .e50c'N67 'el	633.18 :581.44 -2-7* -2934-7* -5*(548.1) :282.6 (Cauveri) "1967 :3951**"



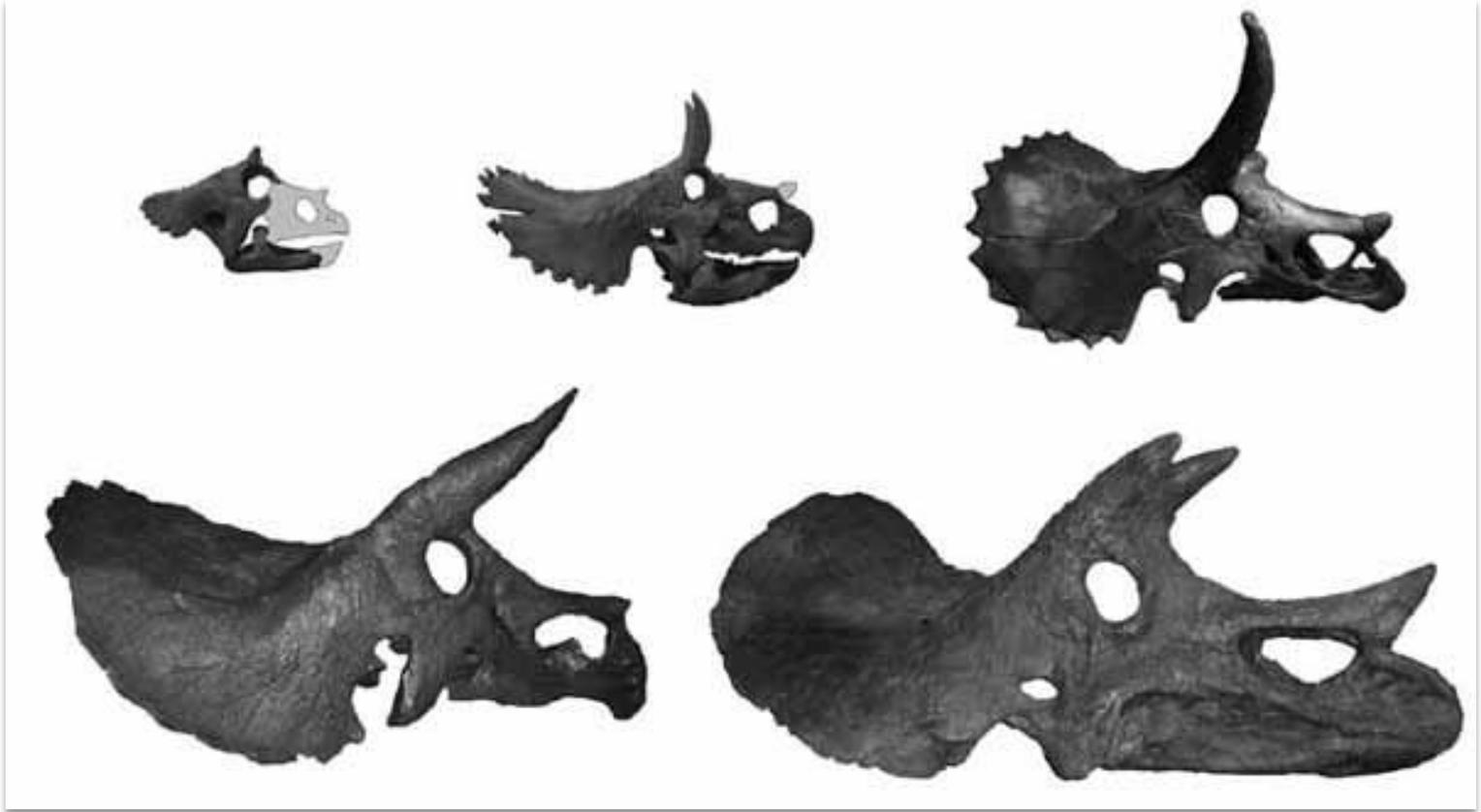
# 1. Introduction



It is through examining these normative principles and their deployment in classification that we can see areas of research emerging at the intersection of subject ontogeny research and classification theory. There are at least three emergent research areas at this intersection: (1) scheme revision issues particular to facets, (2) extension and intension of warrant as reflected in facets, and (3) Coextensive notation and subject scope. I address each in turn below, after I introduce subject ontogeny research.

## 2. Subject ontogeny research

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Ontogeny of the triceratops



## 2. Subject ontogeny research

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Classification schemes undergo revision, whether they are faceted or not. This is a long-lived and well-documented phenomenon (e.g., Bliss, 1933; Green, 2015). Much of the early classification theory scholarship focused on how to identify best practices around building durable (if not stable) systems for users. From this we get discussions of Canons of Past and Present Knowledge and Essential Characteristics (cf., Sayers, 1915: 42), claims that ideas are things that occupy space (Richardson, 1901).



## 2. Subject ontogeny research

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These early twentieth century classificationists were well aware of the inevitable future revision of classification schemes designed by their lights, so their work sought to stave off or mitigate change. Broadfield takes a less conservative approach when he says,

“The incorporation of radio-activity, for example, is not merely a matter of finding some place for it under molecular physics. In changing classifications a structural rebuilding should be periodically undertaken, so the second product is more balanced than the first. All classifications in their existing forms are destined to become dust; sensitive adjustment should enable the classifier to consign them to dust himself, instead of allowing the common enemy Time to do so,” (Broadfield, 1946: 65-66).



## 2. Subject ontogeny research

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However, what if we understood how change happens in schemes so we could accommodate those changes incrementally, thereby allowing professionals options in preserving the extant class marks in their long-lived systems? That is the motivation for subject ontogeny research, which seeks to document the nature and variety of change in classification schemes in order to inform design ameliorations. This area of research has focused primarily on the larger installed schemes like UDC and DDC (e.g., Furner, 2007; Fox, 2016; Higgins 2016; Scharnhorst et al., 2016). However, other schemes have been studied (e.g., Lee, 2016; Graf and Smiraglia, 2012; Turner, 2015).



## 2. Subject ontogeny Research

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In all of these cases we now better understand the nature of change in classification schemes. However, there do remain some open questions about change in analytico-synthetic schemes. I have begun to address these questions, with the a few case studies (Tennis, 2012; Tennis, 2013). But there is still more work to do along theoretical lines. I outline three of those areas below.

# 3. Scheme revision issues particular to facets

CHAPTER 1  
MAIN CLASS

z	Generalia	Δ	Spiritual Experience and Mysticism
✓ 1	Universe of Knowledge	✓ μ	Humanities and Social Sciences
2	Library Science	✓ ν	Humanities
✓ 3	Book Science	N	Fine Arts
✓ 4	Journalism	NZ	Literature and Language
✓ A	Natural Sciences	O	Literature
✓ β	Mathematical Sciences	P	Linguistics
B	Mathematics	Q	Religion
✓ Γ	Physical Sciences	R	Philosophy
C	Physics	S	Psychology
D	Engineering	✓ Σ	Social Sciences
E	Chemistry	T	Education
F	Technology	U	Geography
G	Biology	V	History
H	Geology	W	Political Science
HZ	Mining	X	Economics
I	Botany	Y	Sociology
J	Agriculture	✓ YZ	Social Work
K	Zoology	Z	Law
KZ	Animal Husbandry		<i>Illustrative</i>
L	Medicine	(i g)	Criticism technique
LZ	Pharmacognosy	(p)	Conference technique
M	Useful Arts	(r)	Administration report technique
		(P)	Communication theory
		(X)	Management

1	Introduction
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3	Scheme revision issues particular to facets
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99	Faceted Classification
100	Faceted Classification

### 3. Scheme revision issues particular to facets

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In the extant research on subject ontogeny and scheme versioning, we see many cases of enumerative and what Ranganathan would call almost faceted schemes (Ranganathan 1967: 97-101). These are schemes that allow for notation creation using some form of synthesis - for example the Tables in the DDC. There are, however, particular characteristics of faceted classification schemes that demand attention, as they may affect the way change is represented in both the schedules and in the classes created from them.

1	Introduction
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### 3. Scheme revision issues particular to facets

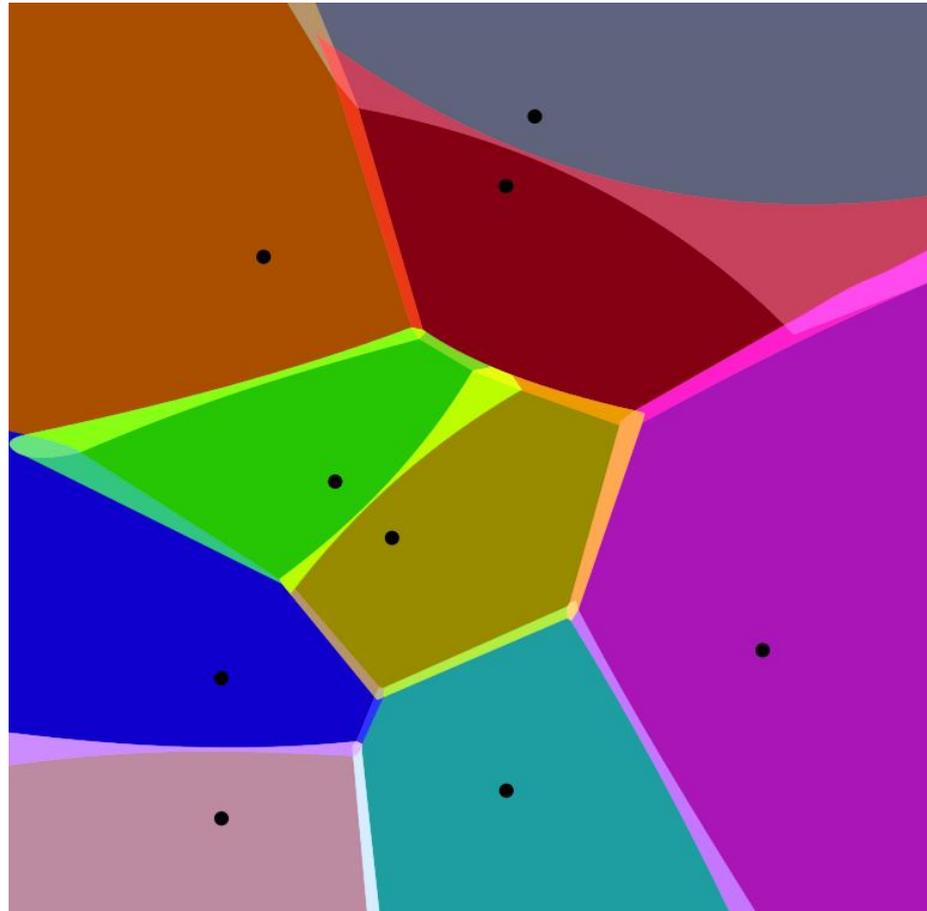
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Since facets are component parts of compound subjects they are separable from one another. However, in most cases of faceted classifications, and especially in the Colon Classification (e.g., Gopinath, 1989), there are hierarchies that fix particular inheritances into the semantics of the notation. See the table below for an example.

Notation	1950 Edition	3 <sup>rd</sup>	1952 Edition	4 <sup>th</sup>	1960 (1969) Edition	6 <sup>th</sup>	1987 (1989) Edition	7 <sup>th</sup>
7	Ontogeny		Ontogeny		Development (ontogeny)		Development (Ontogenesis)	
71	<u>Fertilisation</u>		<u>Fertilisation</u>					
715	<u>Artificial fertilisation</u>		<u>Artificial fertilisation</u>					
7192	Twins		Twin					
72	Germination		Germination					
73	Embryology		Embryology					
75	Growth after birth		Growth after birth					
751	New born		New born					
752	Toddler		Toddler					
755	Infant		Infant					
76	Pre- adolescent		Pre-adolescent					
77	Adolescent		Adolescent					
78	Old age		Old age					
791	Death		Death					

Table 1: Sample Isolate Notation in Four Editions of Colon Classification

## 4. Extension and intension of warrant as it relates to facets





## 4. Extension and intension of warrant as it relates to facets

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Another observation that can be made about faceted classification is found its assumption that a facet of a subject will always possess the same extension and intension as originally prescribed. For example engineering. The warrant that supported the facet in 1937 (the date of Ranganathan's first Prolegomena to library classification) is substantially different than the warrant today. This means, for the study of subject ontogeny, that the meaning associated with that facet has changed over time.



## 4. Extension and intension of warrant as it relates to facets

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By extension, you can also say the use of this notation to mark aspects of subjects in books has changed as well. As identified in Tennis (2007), this kind of textual change has implications for the efficacy of collocation since new facets added to represent new aspects of this discipline could alter the original extension and intension of Engineering as a facet. The same could hold true for many facets that are long-lived these schemes.



## 4. Extension and intension of warrant as it relates to facets

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The research question then surfaces: what is the extent of this phenomenon? What do the current design ameliorations look like? And how does it affect the design decisions made by classificationists since the purpose of faceted classification was to accommodate new subjects, not new senses of existing subjects?

## 5. Coextensive notation and subject scope

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As mentioned above, one major benefit of deploying a scheme for faceted classification scheme is coextensive notation for subjects. Building out a number that can adequately represent all aspects of the subject of a text helps users. However, the nature of classification schedules seems to be to under-specify the definition of classes. This is exacerbated by changes in the titles of facets. In table 2 below, we can see this kind of change.

## 5. Coextensive notation and subject scope

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Date and Edition Number	Isolate Number	Isolate Heading
1950 3 <sup>rd</sup> Edition	6	Genetics, phylogeny
1952 4 <sup>th</sup> Edition	6	Genetic, phylogeny
1960 (1969) 6 <sup>th</sup> Edition	6	Genetics (phylogeny)
1987 (1989) 7 <sup>th</sup> Edition	6	Genetics

Table 2: Biology Isolate Numbers in a Sample of Editions of the Colon Classification

## 6. Classification schemes

923	
.3	American
.4	English
.5	French
.55	Spanish
.6	Italian
	A 3 - Aldine
	T 6 - Torresanus
.7	Germanic
.8	Slavonic
.9	Greek <del>Other</del>
.95	<i>other</i>
924	XVII-XVIII CENTURY PRINTING (Divide like 923)

Morgan Library Reference Book Classification

## 6. Classification schemes

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923	
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Whether faceted or not, classification schemes follow the same design requirements. Classification schemes are hierarchically ordered, systematically arranged, mutually exclusive, and jointly exhaustive. The degree to which schemes meet these requirements is a matter for evaluation or decision-making on the part of the classificationist (Feinberg, 2011).

## 6. Classification schemes

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The fact that things change affects the semantic placement of subjects in these schemes. This is different for faceted classification schemes as partially outlined above. The analysis of subjects into parts (facets), while expedient to the purposes of representing the content of documents that communicate compound subjects, is also open to similar kinds of change as documented in the enumerative or almost-faceted schemes.

## 6. Classification schemes

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The future of faceted classification lies in our ability to design for these kinds of change. In fact, it is imperative, if we buy into the benefits of the design requirements of classification schemes, that we also design for change in order to preserve our semantics in our hierarchically ordered, systematically arranged, mutually exclusive, and jointly exhaustive faceted schemes.

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# Thank you

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