### Data Modeling and Data Categories for Terminology Management

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# **Terminology Management**

There is unfortunately no cure for terminology; you can only hope to manage it.

(Kelly Washbourne)





### Overview

- Data modelling principles
  - 1) Concept orientation
  - 2) Data categories (datcat)
  - 3) Term autonomy & datcat repeatability
  - 4) Elementarity
  - 5) Dependencies (combinability)
  - 6) Data modelling variance
  - 7) Granularity
  - 8) Shared resources



# 1) Concept Orientation

- All terminological information belonging to <u>one</u> concept, including all terms in all languages and all termrelated and administrative data are be stored (or displayed) in <u>one</u> terminological entry
- \$1 concept = 1 (real or virtual)
  terminological entry



# **Concept Orientation**

- Modern Terminology Management Systems (TMS)
  - Sellow the concept-oriented approach
  - Support features for consistent concept entries.
  - Discourage doublettes ("double entries") for the same concept
  - Solution Allow for homographs (different concepts represented by the same term)



# 2) Data Categories

Prior to computerization, data categories were not discussed in detail in terminology theory.

Initial approaches to data categories involved describing "fields" in paper forms for recording terminological data offline.



2) Data Categories

Fachgebiet(c)	Sprache								
Teilbestand	Projektcode	Notation	Klassifikations schlüssel						
Benennung	Benennung								
(Kurzformen, A	bkürzungen, orthog	raphische Varian	ten) Grammatische Angaben						
Definition(en)	Quelle(n)								
Kontext(c)			Quelle(n)						
Bemerkungen									
Synonyme (falls Angabe der Que	Quelle(n)								
Erfacear Dobu	n Bearbeiter - Dau		Einter altreat						

#### TEAM-Datenbank / TermPC

	• 00	Eintragsadresse
243	• 01	frei
	• 02	frei
	• 03	Qualitätskennung
38.5	• 04	Zeitpunkt der Eingabe
	• 05	Bestandskennung
	<u>^ 06</u>	Fachgebietskennung
8.0	<b>•</b> 07	frei
	e 18	frei
	• 09	frei
	- 10	De la destructura de la
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9.52	• 11	wortart
24	• 12	Quellenangaben
682	• 13	frei
	o 14	Definition
	• 15	Kontextbeispiele
	• 16	Synonyme
	• 17	Quasisynonyme, Schlagwörter
12-0	• 18	Sachgebietsangabe
-50	• 19	frei
	• 20 - 29	Sprachblock Englisch
250	• 30 - 39	Sprachblock Französisch
	40-49	Sprachblock Spanisch
	• 50 - 59	Sprachblock Katalanisch / Russisch
	▲ 60 - 69	Sprachblock Italienisch
	• 70 - 79	Sprachblock Portugisisch
1940	80.89	Sprachblock Niederländisch

### **Paper Fiche**

#### 2) Data Categories

Fachgebiet(e) S	Sprache Language			
Teilbestand	Klassifikations-			
Subset	schlüssel			
Benennung Term	Inotation	Quelle Source		
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<b>Definition</b>	Source			
Kontext(e)	Quelle(n)			
Contexts	Source			
Bemerkungen Comments (note)				
Synonyme (falls n	Quelle(n)			
Angabe der Quelle	Source			
Erfasser – Datum	Eintragsklasse			
Creator/Date	Entry Class			

# **Packaging Data**

- Model for visualizing information
  - Section 2014 An amorphous flow of undifferentiated "stuff"
  - Solution An aggregate of individual elements (little packages, components) that can be identified, delimited, organized (modeled), stored, retrieved, manipulated, and reused
  - Stuff people can figure out if they think about it
  - Stuff a computer program can automatically recognize and process



# **The Shopping Basket Model**

- A shopping basket is a container to put stuff in.
- The stuff in the basket can be tossed in loose without packaging.
- Stuff gets lost.Stuff gets mixed up.





2) Data Categories

### **Bulk Product Loading**

Unpackaged rat poison **Loose flour** 200cUnwrapped foodstuffs 2) Data Categories

# **Packaging Stuff**

Keeps products clean and uncontaminated
Makes them easy to identify
Makes them easy to store
Makes them easy to reuse







03.02.1997 - 18:16:50 Walther 25.01.2000 - 18:56:54Wright 34 Network management alias 97/02/10 -10:29:28 Walther 97/02/10 - 10:29:28 Walther noun Main Entry Term shorter form of a long name, such as an email address, a directory, or a command Fahey:7 Actually, all text-type addresses, long or short, are aliases of the IP address which is numerical only. Fahey: 7 Aliases in real-time chat are usually referred to as nicknames and handles nickname noun Synonym When you start an IRC session, you specify a nickname, up to nine characters, which you can also change at any time. Osborne94: 413 handle noun The nickname you assign yourself when conversing in discussion groups. Falcón: 94 Use only in colloquial situations. alias noun m un nombre corto o apodo que se utiliza para enviar mensajes a aquellas direcciones de uso más frecuente. Carballar94:122 Un alias representa a un grupo de pe: que se envía un correo a un alias Unpackaged Data todo el grupo de personas que lo rorman. Carballar94: 112 2) Data Categories



## **TC 37 Definitions**

- Data elements and categories are strictly defined.
- \*data element
  - unit of data that in a certain context is considered indivisible
  - one unit of information in a data entry
- \*data category / data element type result of the specification of a given data field



# **Specifying the Data Category**

\*/term/ is a data category

- \*/xml:lang/ (xml language representation) is a data category
- We specify what /term/ is with a definition: verbal designation of a general concept in a specific subject field
- We can also constrain the /term/ category: terms are reported as plain text and not as graphics or numbers (although a number can be used as a term).
- We use the word *constrain* to mean that we limit what the something can do.



2) Data Categories

### **Kinds of Data Categories**

- complex data category (MultiTerm: index, text, picklist)
  data category that has content of some sort
- open data category (MultiTerm: index, text)
   complex data category whose conceptual domain is not restricted to a set of values (non-enumerated CD)
- Closed data category (MultiTerm: picklist)
  - Complex data category whose conceptual domain is restricted to a set of identified simple data categories making up its value domain (enumerated conceptual domain)
- simple data category (MultiTerm: picklist value)
   data category with no conceptual domain; a member of a value domain



### **Data Categories**

\*open data category Scomplex data category whose content (conceptual domain) is not restricted to a set of values (non-enumerated conceptual domain) Sexample: /term/, /definition/, /note/ Sopen data categories are still constrained by their specifications and definitions. <sup>©</sup>Only a term should go in a term field. Only a definition should go in a definition field But no one can say precisely what terms or definitions there are



2) Data Categories

# **Sample Open Data Category**

Data categories can be combined: Sen:term = a term in English An instance of a data category is a data element.

\*en:term = external collateral ligament is an individual data element.

\*en:term = fibular collateral ligament is an another individual data element.



2) Data Categories

### **Picklists: Closed Data Categories**

- \$\grammatical gender/ is a data category
- \*/grammatical gender/ has defined values: %masculine %feminine %neuter
  - Sother
- Image: m/f/n/o are also called picklist values, permissible values or permissible instances.



### **Permissible Values**

Together, permissible values comprise a value domain.

No other values are allowed unless a change is made in the system.

Terminologists sometimes call these values simple data categories. They are values, but they do not themselves have dependent values.

Each has its own value meaning.



### **Data-Element Related Features**

Data Element Autonomy (repeatability) Elementarity of data elements Dependency (combinability) Data Modeling Variance **Elementarity Granularity** Shared Resources Metamodel issues **Standards** 





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## **Constrained Data Categories**

- Some data categories can hold only certain kinds of data.
  - Sexample: We can create a data category called *Graphic* and set the data type of that datcat to *Media*
  - Example: We can create a data category called Date and set the data type of the datcat to Date



### **Term Autonomy & Repeatability**

- All terms should be managed as autonomous (repeatable) blocks of data categories without any preference for a specific term
  - Seach term documented with the relevant term-related data categories
  - Term autonomy applicable for preferred term, synonyms, variants, & short forms
     Term autonomy not explicitly discussed in other theoretical literature



3) Autonomy

### **Term Autonomy**





3) Autonomy

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### **Embedded or Hidden Terms**

- \*en:term=external collateral ligament
- definition=ligament that bla bla ...
- \*note=bla,bla, bla, also sometimes called the "fibular collateral ligament".
- ✤Problem:

You can't look up the buried term.
It doesn't become part of any concept system.
It ends up in a /note/ element instead of a /term/ element.



3) Autonomy, SEW



### **Data Element Elementarity**

- Only one of a *thing* can occupy a data element
- e.g., only one term in a term field
- Only one kind of thing can occupy a data element
- Se.g., no terms or synonyms listed as such in definition fields





4) Elementarity

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# **Common Elementarity Errors (1)**

### ♦ Error:

en:term = United Nations (UN)

### Correct:

- the en:term = United Nations
  - term type = full form
- ∜en:term = UN
  - term type = acronym
- Combinability enables us to identify individual units of content: /term/ combines here with /term type/.



# **Common Elementarity Errors (2)**

✤Error:

 definition = international organization that ... (Merriam Webster, 10th. Edition 2004, p. 256)

### Correct:

♥ definition = international organization that ...

source = Webster2005, p. 256

Webster2005 points to a shared resource (bibliographical entry)

Combinability: Source can be used with a term or any text or graphics field.



# **Common Elementarity Errors (2)**

✤Error:

 definition = international organization that ... (Merriam Webster, 10th. Edition 2004, p. 256)

### Correct:

♥ definition = international organization that ...

source = Webster2005, p. 256

Webster2005 points to a shared resource (bibliographical entry)

Combinability: Source can be used with a term or any text or graphics field.



### **Modelling Dependencies (Combinability)**

- Dependencies between data categories
  ISO 12620:1999 provides a "simple
  - hierarchy" of data categories
    - rightharpoonup grammar = term-related:
      - grammar is dependent upon term
- Other dependencies
  - Source is dependent upon definition
    - Individual source indicated for different items (term, definition, context, etc.)



5) Dependency

# **Data Modelling Variance**

The same data category can be modeled in multiple ways (some of them not too bright!)

\*gender
value = m, f, n
value = masculine, feminine, neuter
\*gender

\* gender masculine = yes/no feminine = yes/no neuter = yes/no



6) Variance

# **Modelling variances**

Complex example term: ink jet printer superordinate concept: non-impact printer subordinate concept: bubble jet printer coordinate concept: laser printer ink jet printer \* term: related concept: non-impact printer type of relation: superordinate related concept: bubble jet printer type of relation: subordinate

related concept: type of relation: laser printer coordinate



6) Variance

### Granularity

- The degree of detail that can be achieved by using the available data fields (data categories) to document terminological information
- Low granularity:
  - Sex: /grammar/ m,n,s (masculine noun singular)
- High granularity
- ⟨ /part of speech/ = noun
  - ⟨grammatical gender/ = masculine
  - ♥/number/ = singular





7) Granularity

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### Granularity

- Advantage of granularity: retrievability
- Disadvantage: more work
- Best practices:

 General agreements on what constitutes an acceptable level of effort in order to achieve a desired level of granularity makes it easier to share data.
 How can you automatically convert low granularity to high granularity?



# **Minimum Granularity**

Data Element	Content
Name	John Doe
Address	267 Prospect Street Kent, Ohio 44240



# **Increased Granularity**

Data Element	Content
Last name	Doe
First name	John
Street address	345 North Prospect St.
City	Kent
State	Ohio
Zip Code	44240



# **Power of Granularity**

- \*/zip code/ (postal code) can be searched and manipulated
- Extra effort in entering a separate field yields search power later, and in this case functionality.
- Sorting by postal code makes mail delivery more efficient & saves money.
- Know ahead of time what you want to do with your data when deciding on granularity.



# Elemental Nature of Data Elements (Violation)

Data Element	Content
Last name	Doe
First name	John and Jane
Street address	345 North Prospect St.
City	Kent
State	Ohio
Zip Code	44240



### **Shared Resources**

Index	Oxford1990	
Editor1	Fowler, H.W.	Entry 1 Source ID: Oxford1990
Editor2	Fowler, F.G.	Entry 2
Editor3	Allen, R.E.	Source ID: Oxford1990
Location	Oxford	R
Press	Clarendon	
Year	1990	
Press Year	Clarendon 1990	



8) Shared

Bill

### **Shared Resources**

**Graphics** \* Charts \* Audio \* Video Drawings Disk Archives Responsibility Records













8) Shared

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### **Advantages of Shared Resources**

- Data category configured as a link or with a link
- Shared items stored only once
- Multiple references linked to same resource
- Change or update only one file or entry
- File formats (images, audio, etc.) preserved externally and objects linked
- Terminology files of manageable in size





# **Concept Entry Level**

Concept level
 Subject field(s)
 Administrative information
 Graphic (option)
 Definition & related info (option)
 Note (repeatable anywhere)



9) Metamodel

# Language Level

Object language info
Graphic (option) & related info
Definition (option) & related info
Administrative info
Note (repeatable anywhere)



# **Term Information Group Level**

Term
 Term-related info
 Descriptive info
 Definitions, other concept description
 Graphic
 Administrative info



9) Metamodel

### **Term-Related DatCats**

\* Term Part of speech Srammatical gender Scrammatical number (use when necessary) Plural form Sterm type (Type) (see next slide) Status Regional label **Pronunciation** Register (usage register)



9) Metamodel + "Vocabulary"

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### **Term Type**

Main entry term \*Synonym Abbreviation Full form ✤Variant \* Phrase Collocation





9) Metamodel + "Vocabulary"

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### **Definition-Related Info**

- Definition
- Source ID
   (Points to shared resources)
   Definition type
   Translation?



- Choice of levels
  - Sconcept (one def for all languages)
  - Scheme (Scheme Scheme S
    - Sterm (one def for each term in descriptive work)



9) Metamodel + "Vocabulary"

### **Context-Related Info**





9) Metamodel + "Vocabulary"

### Administrative Information Administrative info Responsibility <sup>C</sup>Date Authorization Role Various sorting subsets - Business unit - Customer Computing environment - Product class, etc. Applicable at multiple levels



9) Metamodel + "Vocabulary"

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### **Other Data Categories**

- Concept relations
- Notes
- Other administrative information
- Bibliographical information
- Special categories, e.g.:
   For standardization
   For inventory control





9) Metamodel + "Vocabulary"

# **Data Category Types**

- Graphics (link to multimedia file)
- Terms
  - Sy language
  - Synonyms
    - STerm-related information
- Text fields
  - Sefinitions, Contexts, Notes, etc.
- Automatically inserted administrative data
- ✤ Links



### **MultiTerm Levels & Types**

\* Index **S**Terms STerm-like elements (collocations, boilerplate) Text (definitions, contexts, notes, etc.) Sector Free-form data entry Picklist Multimedia file Number \* Date





G\_Source http://www.zimmer.co.za/web/images/patient\_education/colligtears01.jpg

collateral

ligament

Medial

Tibia

meniscus

(shinbone)

#### 🖪 English

Lateral

meniscus

Anterior

cruciate

ligament

Fibula

Definition A strong, rounded, fibrous cord, attached, above, to the back part of the lateral condyle of the femur, immediately above the groove for the tendon of the Popliteu lateral side of the head of the fibula, in front of the styloid process.

to the various terms cited on the image.

Note the inclusion of the source of the

D\_Source http://en.wikipedia.org/wiki/Fibular\_collateral\_ligament

Note The ligament connects the lateral epicondyle of the femur with the lateral side of the head of the fibula and that helps to stabilize the knee by preventing <u>lateral dislocation</u> N\_Source http://www.http://www2.merriam-webster.com/cgi-bin/mwmednlm?book=Medical&va=lateral%20collateral%20ligament

#### external collateral ligament

Part of Speech Noun Status Admitted Type Full form Usage register Technical Grammatical Number Singular Context We will discuss reconstruction of external collateral ligament of the knee with tantalum mesh. C. Source http://www.ncbi.nlm.nih.gov/entrez/guery.fcgi?cmd=Retrieve&db=PubMed&list\_uids=13451410&dopt=Abstract

graphic.

#### fibular collateral ligament

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