SKOS Tutorial
Catch

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Based on slides by

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http://isegserv.itd.rl.ac.uk/cvs-public/skos/press/dc2005/tutorial.ppt
• **SKOS**
  
  - “Simple Knowledge Organisation System(s)"
  - Simple, extensible, machine-understandable representation for “concept schemes”
    
    • Thesauri
    • Classification Schemes
    • Taxonomies
    • Subject Headings
    • Other types of ‘controlled vocabulary’...
SKOS Development

- Developed by W3C’s Semantic Web Best Practices-WG
- Draft for Working Group Note
- Design: public, consensus-driven, open community, email
- Input from actual vocabulary maintainers
Motivation

Semantic Web technology can help improve search facilities and reuse:

1. Concept-based search instead of text-based search
2. Reuse each other’s concept definitions
3. Search across (institution) boundaries
4. Standard software
1. Concept Search

- Painter Domenikos Theotocopoulos = “El Greco” (nickname)
- Some indexers use “El Greco”, others “D. Theotocopoulos”
- Searching for “El Greco” does not give all results
- Solution: one concept with different lexical labels.
• N.B.: vocabulary with *identifiers* for preferred terms and indexing with *identifiers* accomplishes this
2. Reuse

- Reuse existing concept “El Greco”
  - Req. 1: one “exchange syntax”
  - Req. 2: “point” at other concepts
3. Search Across Boundaries

- Search for concept “El Greco” returns paintings from both institutions
- Same requirements
4. Standard Software

• If all concept schemes use same "exchange syntax" and "structure", standardized software can be built to:
  – Display/browse concept scheme
  – Annotate with concept scheme
  – Integrate data from 2 institutions using standard concept schemes ("search across boundaries")

☞ Req. 3: Similar structures (graphs) in exchange syntax
Why SKOS helps

SKOS uses RDF
- sharing “graphs” in distributed environment (intranet/internet)
- Uses URIs for “pointing” (identifying)
- Easy to extend by anyone for specific purposes

☞ “exchange syntax”
☞ “Point at concept”

SKOS: set of classes and properties to describe concept schemes
- Produce “similar graphs”

☞ “Same structures”/ clear what graph means

Disadvantage: unusual concept schemes don’t fit into SKOS (original structure too complex)
Quick RDF: a ‘Statement’

A.K.A. a ‘Triple’

or...

‘xsdsadadghdafasf’
Quick RDF: a ‘Graph’
Quick RDF: exchange syntax

• RDF Graphs can be exchanged in XML (and other formats)

• Alternative ways to represent & exchange the same graph

• Here we only discuss RDF graphs, exchange syntax is “lower-level” technical issue
Controlled Vocabulary

Love

Strong feelings of attraction towards, and affection for, another adult, or great affection for a friend or family member.

Awe

A feeling of great respect sometimes mixed with fear or surprise.

Joy

A feeling of bliss and great happiness.
Converting into SKOS graph

1. Identify
2. Describe
3. Publish
• Step 1: Identify concepts...

  http://www.example.com/concepts#love
  http://www.example.com/concepts#awe
  http://www.example.com/concepts#joy
• **Step 2: Describe…**

```
ex:love

```

`rdf:type`

```
skos:Concept

```

`skos:prefLabel`

```
‘Love’

```

`skos:definition`

```
‘Strong feelings of attraction towards, and affection for, another adult, or great affection for a friend or family member.’

```
• Step 3: Publish...

  – Put the file on a web server for programs to download & process

  – Put the file on special RDF server on which you can query with SQL-like language:

    • Select * from ... Where ...
Thesaurus (USE/UF)

Love  
UF Affection  
(preferred term)

Affection  
USE Love  
(non-preferred term)

(“USE” directs user from non-pref term to pref-term that should be used in indexing and search)
Thesaurus (BT/NT)

Love
- BT Emotion

Emotion
- NT Love
- NT Awe
- NT Joy

("BT" = Broader Term)

("NT" = Narrower Term)

(BT/NT only between preferred terms)
Broader/Narrower

'Emotion'

skos:prefLabel

ex:emotion

skos:narrower

skos:broader

ex:love

skos:prefLabel

'Love'
Thesaurus (RT)

Love
  RT Beauty

Beauty
  RT Love

("RT" = Related Term)

(RT only between preferred terms)
Story So Far...

• **Basic Structure**
  – skos:Concept

• **Lexical Labelling**
  – skos:prefLabel, skos:altLabel

• **Documentation**
  – skos:definition

• **Semantic Relations**
  – skos:broader, skos:narrower, skos:related
More Documentation Properties

• **skos:note**
  e.g. ‘I’m going bananas’

• **skos:definition**
  e.g. ‘A long curved fruit with a yellow skin and soft, sweet white flesh inside.’

• **skos:example**
  e.g. ‘A bunch of bananas.’

• **skos:scopeNote**
  e.g. ‘Only use for the western family of bananas’

• **skos:historyNote**
  e.g. ‘Introduced 1986.’
Concept Schemes

- Organise a set of concepts into a **concept scheme**

- Add metadata about the scheme
  - Title
  - Rights
  - creator
Concept Scheme

http://www.ukat.org.uk/thesaurus

skos:ConceptScheme

rdf:type

dc:title 'The UK Archival Thesaurus'

dc:description 'All rights reserved…'

dc:rights 'UK Archival Thesaurus project'

dc:creator
Subject Indexing

• One of the main uses of concept scheme is to index documents, pictures, ...

• skos:subject
Spotted Bowerbird
Node Labels in Hierarchy

milk
  <milk by source animal>  (node label)
  buffalo milk
  cow milk
  goat milk
  sheep milk

(Organize terms into “subcategories” to help users find relevant term; “guide terms”; node label itself not meant for indexing)
Representation in SKOS
Story So Far...

• **Documentation Properties**
  – skos:note, skos:definition, skos:example, skos:scopeNote, skos:historyNote

• **Concept Schemes**
  – skos:ConceptScheme, skos:hasTopConcept,

• **Subject Indexing**
  – skos:subject

• **Node Labels**
  – skos:Collection, skos:member

• More properties not shown here
Extensions

• SKOS Core can be extended by refining the classes and properties of the SKOS RDF Schema

• E.g. North-Holland BT Netherlands is a part-of relationship
Example

- ex:Netherlands
- skos:broader
  - rdfs:subPropertyOf
    - ex:broaderPartitive
    - ex:North-Holland
Exercise

• Groups of six, separated into group A and group B
• Given a “concept scheme” (text), create SKOS graph for it
• Groups A: give SKOS graph (not the text) to group B (and vice versa)
• Re-create “concept scheme” (text) from SKOS graph
SKOS Graph Legend

Concept in concept scheme

String

Arrow types:
• broader, narrower, related, broaderPartOf, ...
• prefLabel, altLabel, scopeNote, definition, historyNote, ...

• Introduce new “arrow types” if required
Possible Exercise Solution
(Brinkman)

- geneeskunde
- geneesmiddelen
- medicijnen
- kindergeneeskunde
- kinderen ouder dan 12 vallen niet onder kindergeneeskunde
- kinderoncologie
- neonatalogie
Possible Exercise Solution (NBC)

- nbc:0200
  - skos:narrower
  - skos:prefLabel: Wetenschap en cultuur in het algemeen

- nbc:0214
  - skos:related
  - skos:prefLabel
  - skos:example: Organisatie van Wetenschap en cultuur
  - skos:scopeNote: organisaties en instellingen, academies van wetenschappen
  - Verwijzing: voor organisaties of instellingen die zich met afzonderlijke vakgebieden bezighouden...

- nbc:0230
  - skos:narrower

- nbc:0220
  - skos:prefLabel
  - skos:example: wetenschaps journalistiek
  - skos:example: Museologie
  - skos:scopeNote: Verwijzing: voor algemene musea, zie 02.14
  - Verwijzing: voor musea van afzonderlijke vakgebieden zie de betreffende vakgebieden
Conclusions from exercise

• Different syntax/structures cause problems
• SKOS graph makes graphs for concept schemes more uniform

• Not trivial how to convert original source into SKOS graph
• But once agreement on that interoperability
Last Point

• Do we expect everyone to change to SKOS?
• No, internal formats and SKOS can co-exist
• Export to SKOS RDF for interoperability
• Right tool for the right job!
Links

SKOS Core Homepage
http://www.w3.org/2004/02/skos/core

SKOS Core Guide
http://www.w3.org/TR/swbp-skos-core-guide

SKOS Core Vocabulary Specification
http://www.w3.org/TR/swbp-skos-core-spec

Mailing list
mailto:public-esw-thes@w3.org
http://lists.w3.org/Archives/Public/public-esw-thes/