Information Architecture vs. Artificial Intelligence in Taxonomies

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Information Architecture for Artificial Intelligence
SWARM Community Event
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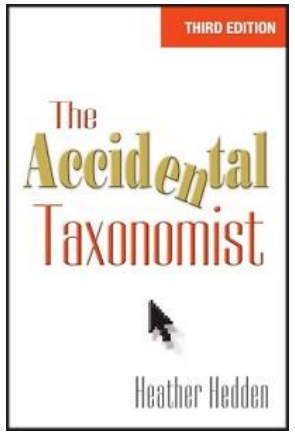
About Heather Hedden

- Independent taxonomy consultant, Hedden Information Management
- Instructor of online and corporate taxonomy courses and workshops
- Previously a taxonomy consultant in consulting firms, Enterprise Knowledge and PPC. Also, a contract consultant for others.
- Former taxonomy-related roles at Semantic Web Company, Gale/Cengage, Viziant, and First Wind.
- Author of *The Accidental Taxonomist, 3rd ed.* (2022, Information Today, Inc.)

Hedden Information Management

Making information findable



Information Architecture vs. Artificial Intelligence

Information architects' goal:

To help people find information
To help people find specific information they seek, through interactive user interfaces

- The goal of information architecture (IA)
- The goal of a lot of artificial intelligence (AI)
  - The goal of AI in the field of information/knowledge management

Are IA and AI in competition,
or do they complement each other?

Outline

- What are taxonomies
- How taxonomies support information architecture

- Taxonomies and information architecture (IA) in the user experience
- Taxonomies and AI in the user experience

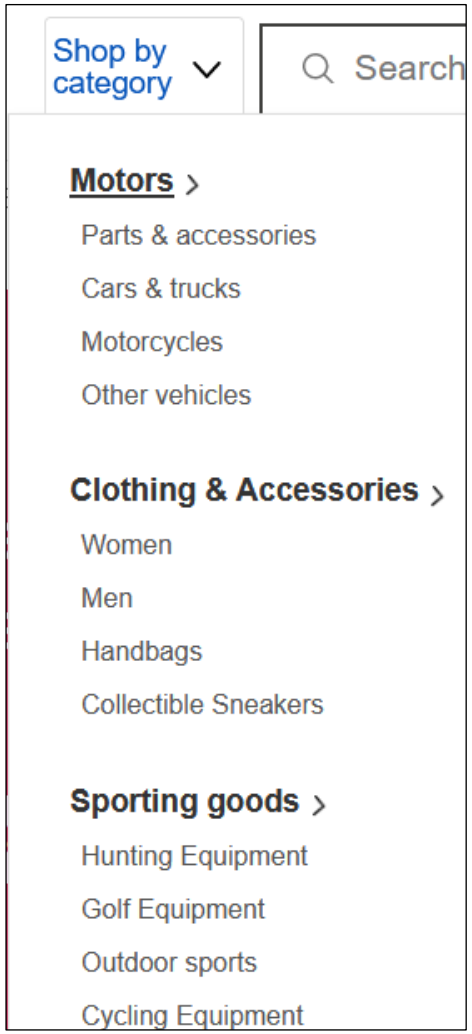
- Information architecture (IA) in taxonomy design and creation
- AI in taxonomy design and creation

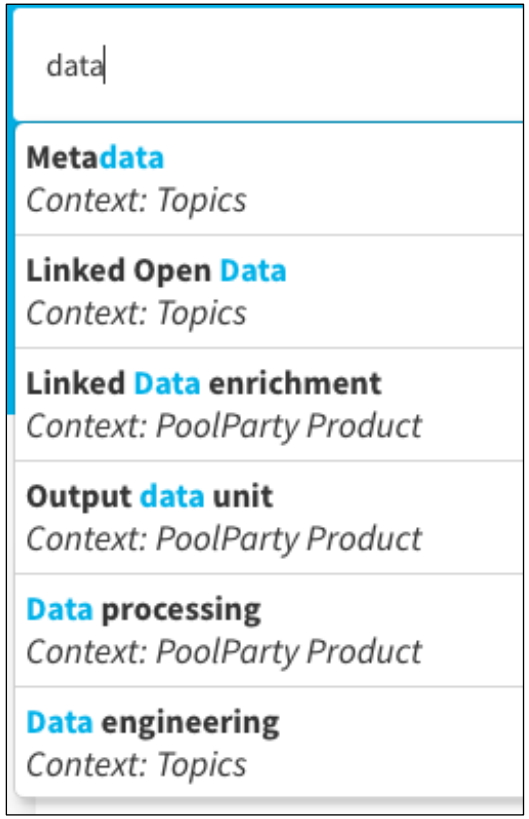
- AI in taxonomy implementation: Tagging

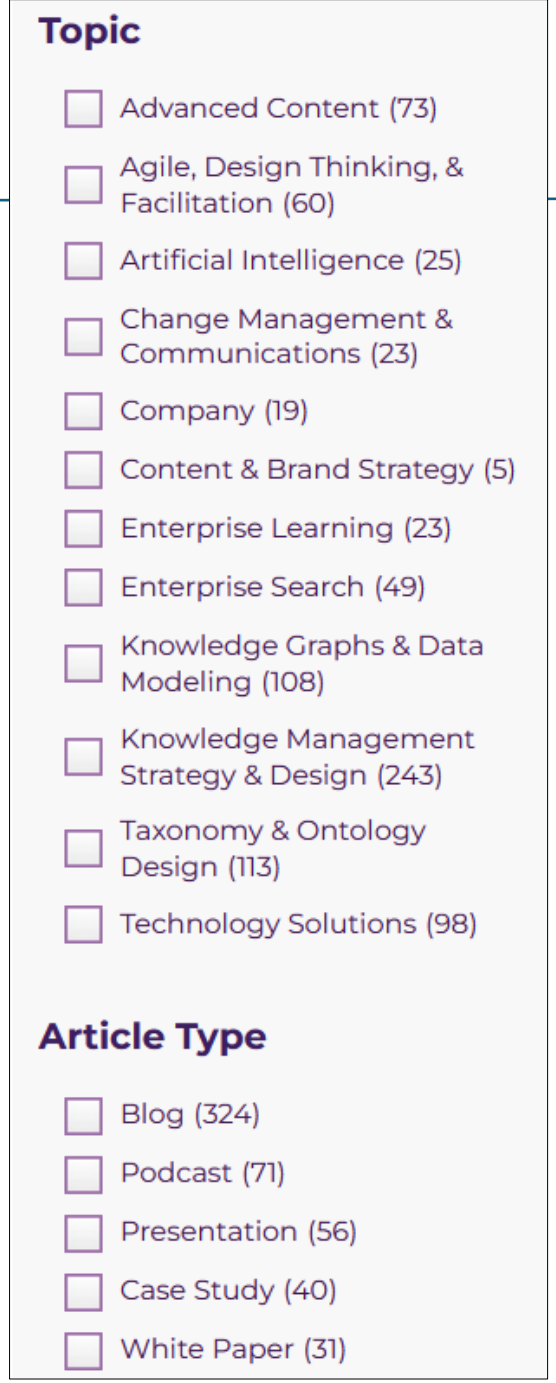
- Future of IA, AI, and taxonomies

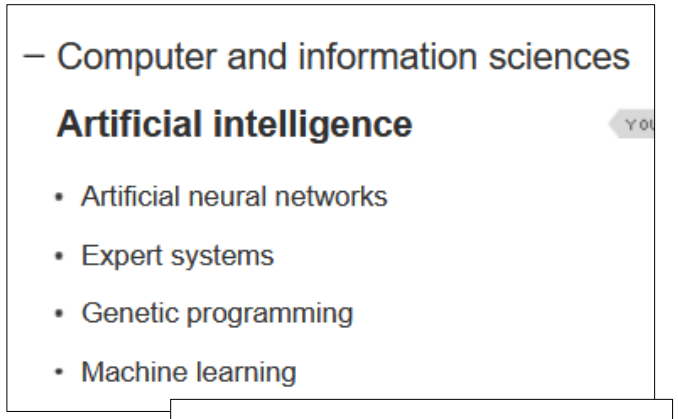
What Are Taxonomies?

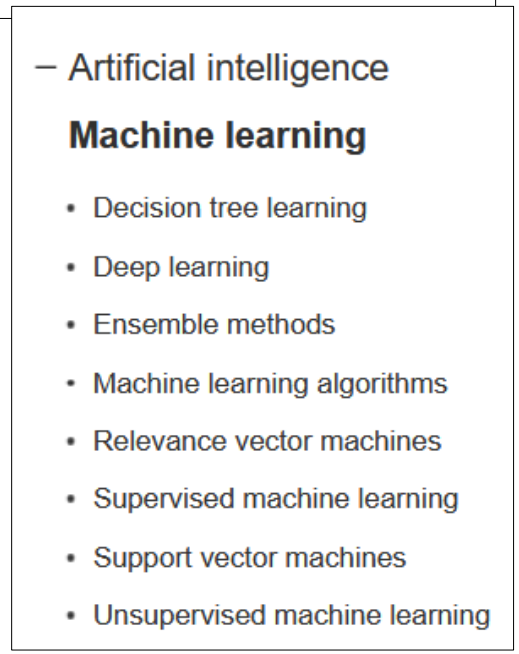
Introduction to Taxonomies









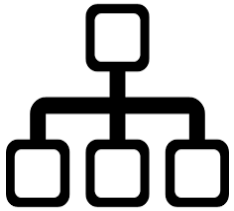


Taxonomies help people find information at a more detailed level than site navigation.

Introduction to Taxonomies

Two major approaches to (or features of) taxonomies

1. A hierarchy of terms/topics/categories arranged with narrower topics/subcategories displayed under their broader/parent categories.



   - To guide users to find the desired topic (and its linked content of pages or documents)
   - Similar to navigation and site maps, but more topical and not just based on page titles

2. A controlled vocabulary of metadata tags/labels to apply to pages, posts, or documents, so that they can be more precisely and comprehensively retrieved (better than by search algorithms alone on keywords in text).

   - Implemented as search suggestion terms, search refinement filters, or related topics and searches

Introduction to Taxonomies

Taxonomy definitions

from the thesaurus standards

a collection of **controlled vocabulary terms organized** into a **hierarchical structure**. Each term in a taxonomy is in one or more parent/child (broader/narrower) relationships to other terms in the taxonomy.

– *ANSI/NISO Z39.19-2005 r2010 Guidelines for the Construction, Format, and Management of Monolingual Controlled Vocabularies, section 4.1 Definitions*

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a scheme of **categories and subcategories** that can be used to sort and otherwise **organize items** of **knowledge** or **information.**

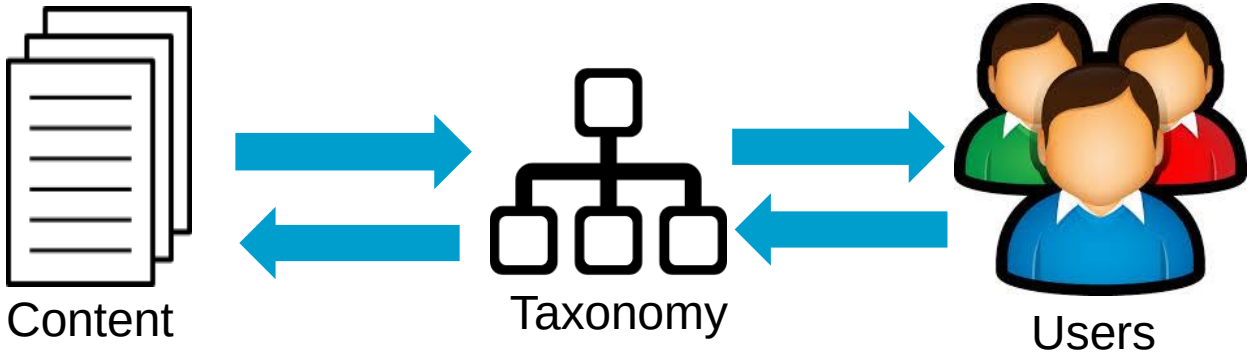
NOTE Taxonomies range from the very simple to the very complex. In the simplest taxonomies the categories are not necessarily divided into subcategories, while in the complex ones, multiple hierarchical levels can be found. Other features too can be present, such as all the thesaurus features described in ISO 25964-1, and/or the features commonly found in classification schemes. Outside of this International Standard, the term is often used loosely to refer to any type of structured vocabulary.

– *ISO 25964-2:2013(E) Thesauri and interoperability with other vocabularies — Part 2: Interoperability with other vocabularies, section 3: Terms and definitions*

Introduction to Taxonomies

What is a taxonomy for?

- Concepts/terms are used to tag/index/categorize content or pages to make them easier to be found and retrieved
  - supporting better findability than search alone
- The taxonomy is an intermediary that links the user to the desired content.
- The taxonomy should suit the **context** of the content and the users.



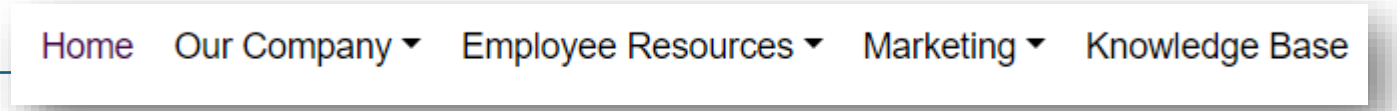
Introduction to Taxonomies

What is a taxonomy not?

- Not just any metadata or tags
- Not business glossary
- Not a classification scheme
- Not a navigation scheme

- ➢ It needs to be controlled, structured, related
- ➢ It’s for finding, not defining
- ➢ It’s for tagging/indexing, not merely classifying
- ➢ It’s also for searching, not just browsing

Introduction to Taxonomies



Site navigation hierarchy vs. a taxonomy

Site Navigation

- Often reflects the site-map structure
- Often includes task-based labels
- Labels based on page titles
- Designed to be browsed hierarchically, top-down
- 1-3 level hierarchy
- One-to-one label-to-page
- Limited size; does not cover all pages
- Biased to emphasize what is important
- Not so flexible for updating
- Paths and links, not metadata

Taxonomies

- Reflect natural relations of the topics
- Based on topics, subjects
- Labels based on terms/topics
- Designed to be browsed, searched, or may not be fully displayed to end-users
- Options for deeper hierarchy and/or facets
- One-to-many concept to multiple pages
- Can be large; covers all pages/content
- Neutral to topic importance
- Can grow and adapt without limits
- Often used as metadata

Introduction to Taxonomies

Features of taxonomies

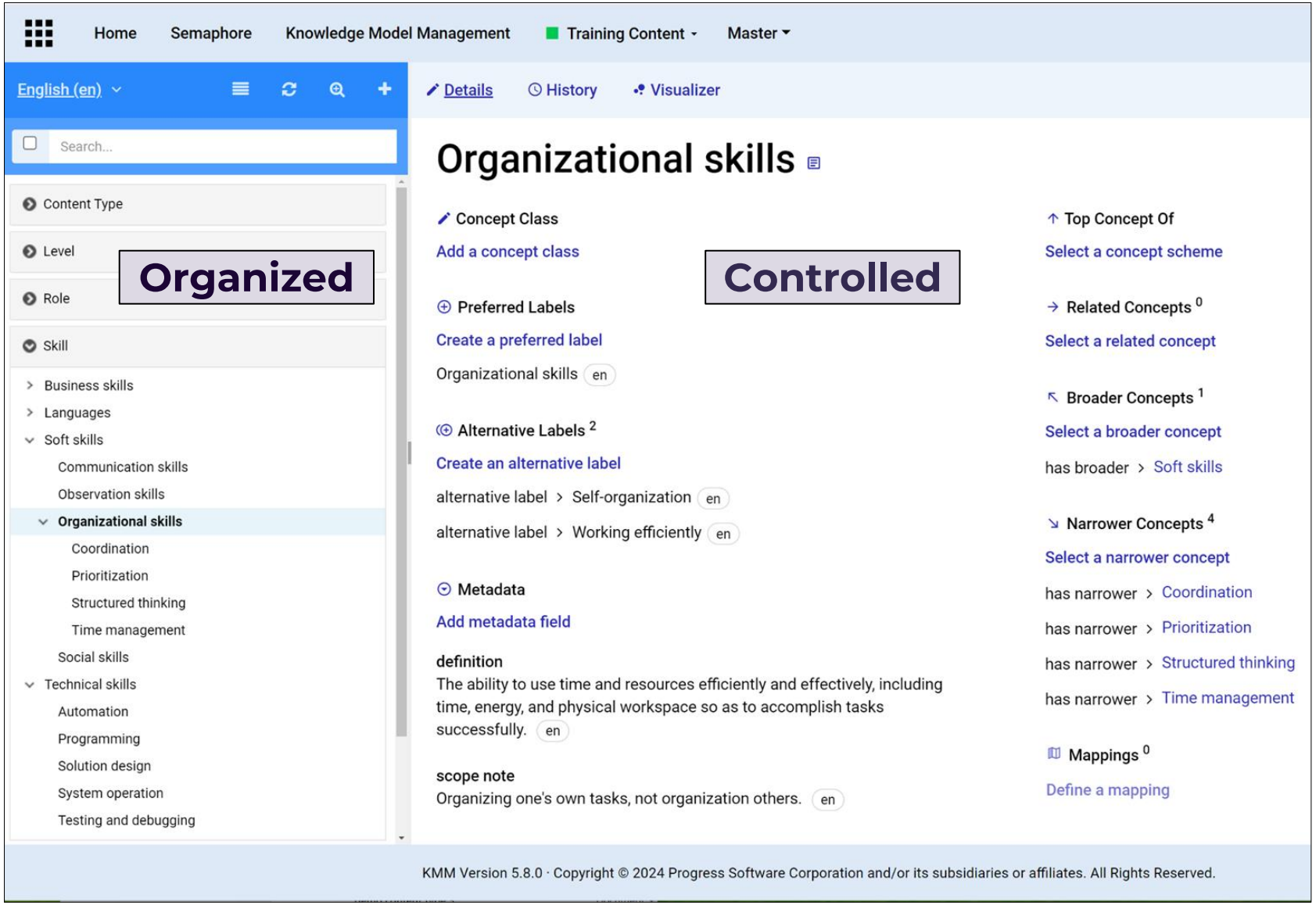
Controlled and ***organized***

1. Controlled:

A kind of controlled vocabulary or knowledge organization system, based on unambiguous concepts, not just words: **things, not strings**

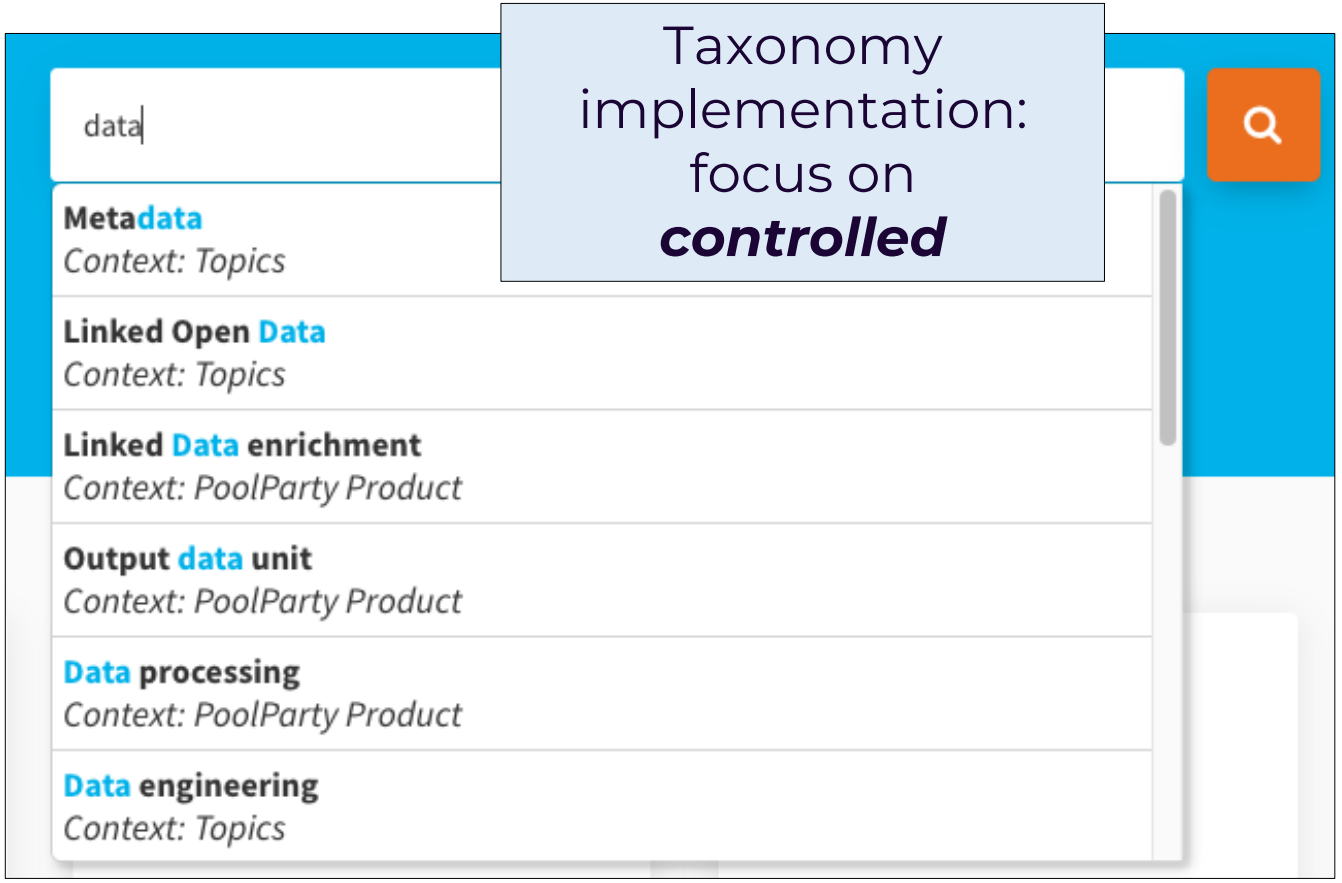
2. Organized:

Concepts are arranged in a structure of hierarchies, categories, or facets to organize them.



Introduction to Taxonomies

Features of taxonomies



Taxonomy implementation: focus on ***controlled***

Taxonomy implementation: focus on ***organized***

How Taxonomies Support Information Architecture

Taxonomies in Information Architecture

Information architecture definitions

1. The structural design of shared information environments.
2. The synthesis of organization, labeling, search, and navigation systems within digital, physical, and cross-channel ecosystems.
3. The art and science of shaping information products and experiences to support usability, findability, and understanding.
4. Organizing and labeling web sites, intranets, online communities, and software to support findability and usability.
5. An emerging discipline and community of practice focused on bringing principles of design and architecture to the digital landscape.

-- Louis Rosenfeld, Peter Morville, and Jorge Arango, *Information Architecture*, 4th ed., O'Reilly, 2015, p. 24

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Taxonomies in Information Architecture

Information architecture components

1. Organization systems
2. Labeling systems
3. Navigation systems
4. Searching systems

- Taxonomies are knowledge organization systems
- Taxonomies provide labels for concepts
- Many taxonomies can be navigated by browsing
- Taxonomies support search

-- Louis Rosenfeld, Peter Morville, and Jorge Arango, *Information Architecture*, 4th ed. , O'Reilly, 2015, p. 90

Taxonomies and Information Architecture in the User Experience

Taxonomies and IA vs. AI in the User Experience

What do user prefer to do?

- to explore topics and interact to find information (provided by IA)
- to have answers and information served to them (provided by AI)

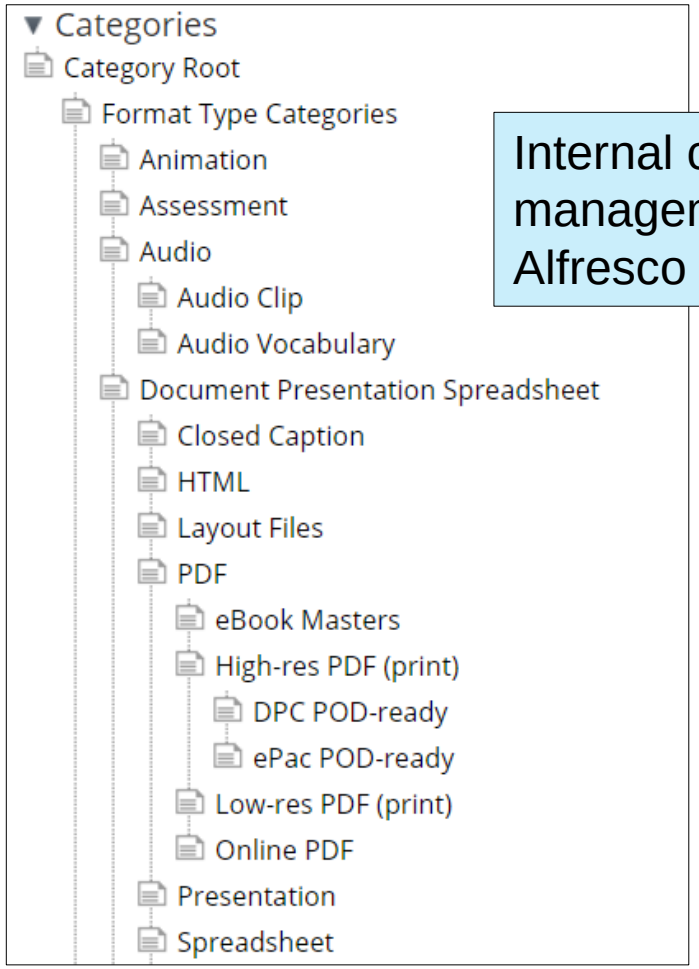
It depends on the user, the information, and the context.

A taxonomy can support either capability.

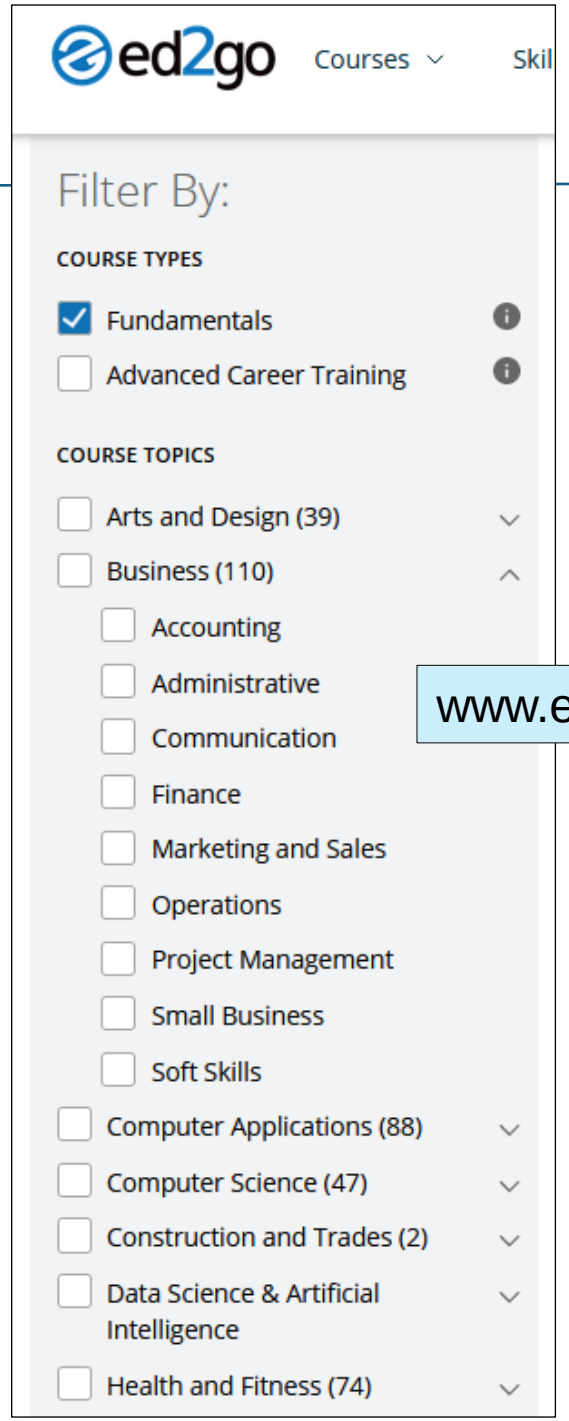
The same taxonomy can have both implementations.

Taxonomies and IA in the User Experience

With IA: Explore topics and interact
to find information via hierarchies and facets

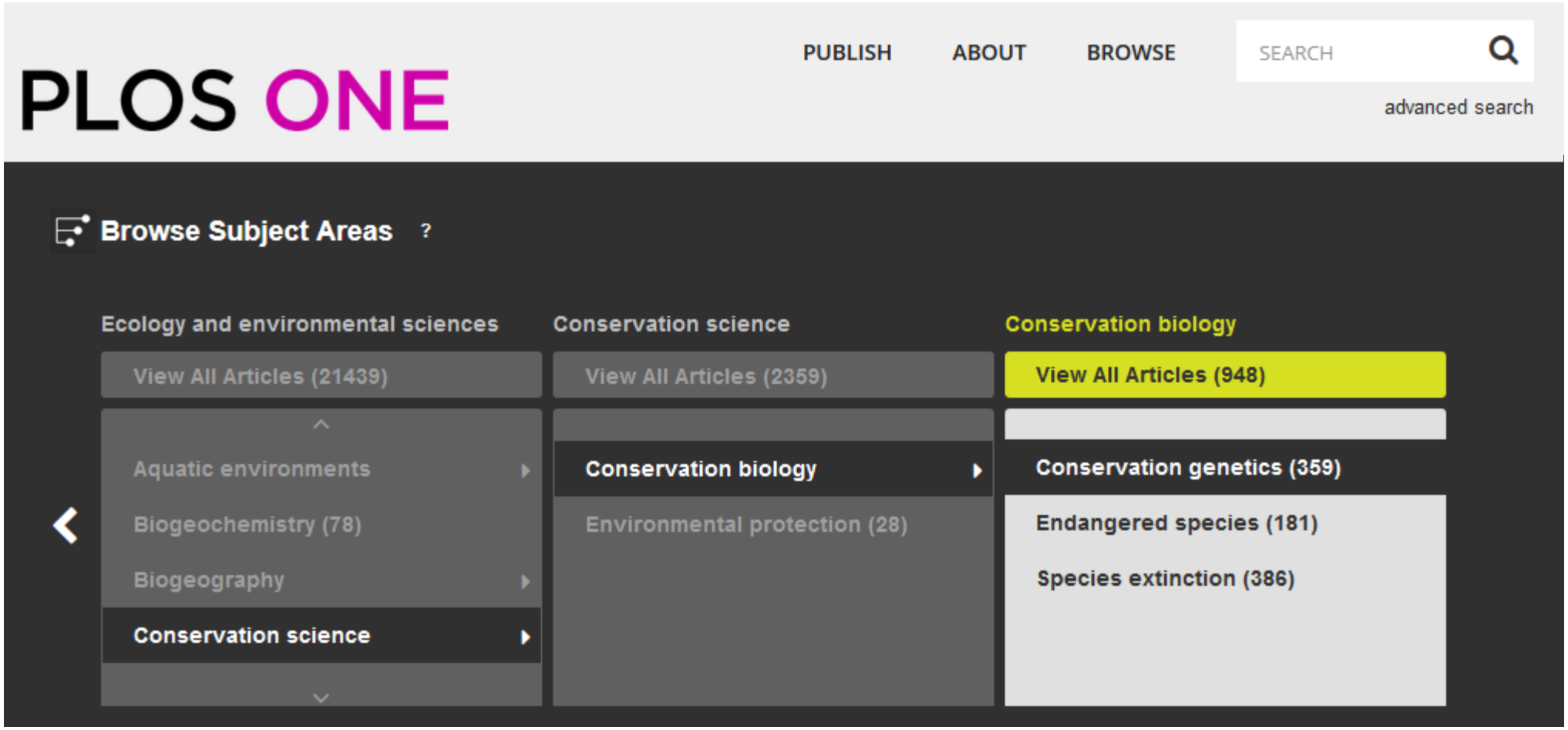


Internal content management in Alfresco CMS



www.ed2go.com

Taxonomies and IA in the User Experience



Fly-out subcategories: PLOS ONE scholarly articles https://journals.plos.org/plosone/

All Categories

- eBay Motors
- Fashion
- **Books, Movies & Music** ✓
- Electronics
- Collectibles & Art
- Home & Garden
- Sporting Goods
- Toys & Hobbies
- Business & Industrial
- Health & Beauty
- Others

Books, Movies & Music

Musical Instruments & Gear

- Guitars & Basses
- Pro Audio Equipment
- Percussion Instruments
- Wind & Woodwind Instruments
- String Instruments
- Pianos, Keyboards & Organs

View all in Musical Instruments & Gear →

DVDs & Movies

- DVDs & Blu-ray Discs
- VHS Tapes
- Movie Film Stock
- Other Movie Formats
- LaserDisc Movies
- DVD & Movie Wholesale Lots

View all in DVDs & Movies →

Books

- Nonfiction Books
- Fiction & Literature Books
- Antiquarian & Collectible Books
- Magazines
- Textbooks, Educational & Referenc...
- Children & Young Adult Books

View all in Books →

Music

- Music CDs
- Vinyl Records

Top Brands

- Fender
- Gibson
- Ibanez
- EMG
- Roland

Popular Topics

- DVDs
- Nonfiction Books
- Gibson Les Paul Electric Guitars
- Antiquarian & Collectible Books
- Fiction & Literature Books

https://www.ebay.com/n/all-categories

Musical Instruments & Gear

Shop by Category

Brass
- See all in Brass
- Alto Horns
- Baritones
- Bugles
- Cornets
- Euphoniums
- Flugelhorns
- French Horns
- Mellophones
- Other Brass Instruments
- Parts & Accessories
- Sousaphones
- Trombones
- Trumpets
- Tubas

DJ Equipment

Equipment

Guitars & Basses

Shop by Category


Electric Guitars


Acoustic Guitars

Guitar Amplifiers


Guitar Parts & Accessories


Percussion Instruments


Pro Audio Equipment


DJ Equipment


Brass Instruments


Pianos, Keyboards & Organs

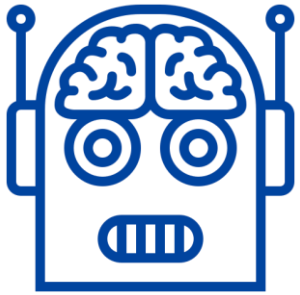

Vintage Musical Instruments

Taxonomies and AI in the User Experience

Artificial Intelligence (AI)

Why AI?

- Computers perform tasks to save human effort and time
- Humans can spend more time on other tasks requiring critical thinking.
- IA/taxonomy tasks require varying degrees of critical thinking.



AI in information management

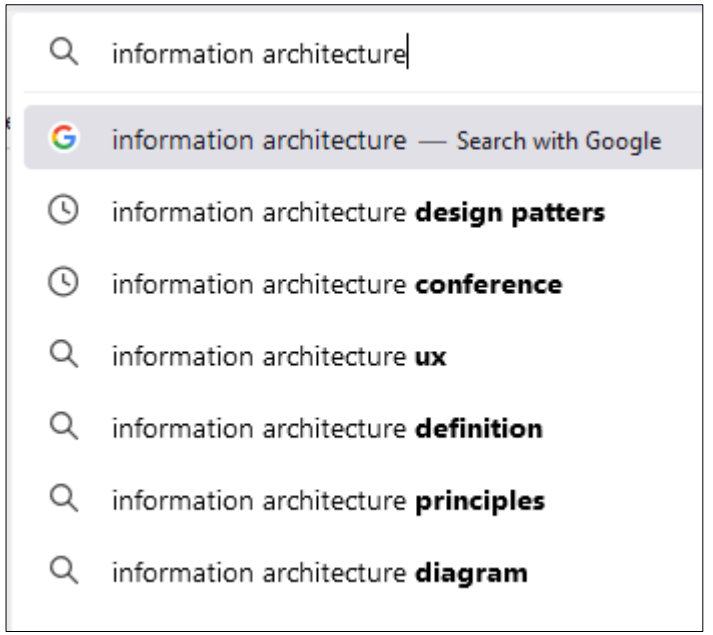
- Summarize a document
- Translate text into another language
- Label a piece of content
- Answer a question
- Recommend similar content
- Predict the completion of text

Taxonomies and AI in the User Experience

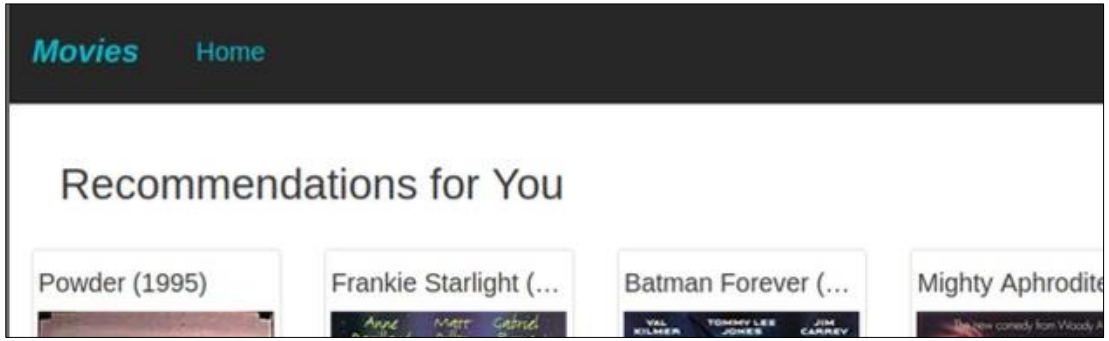
With AI: Search support

Question answering

Auto-complete, auto-suggest



AI-based recommendation systems

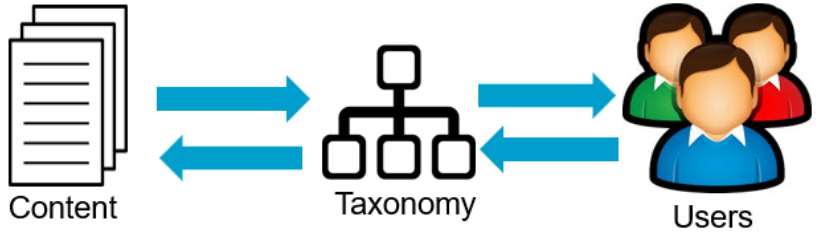


Taxonomy works with AI to provide **context** for search terms.
Taxonomy improves AI results.

Information Architecture in Taxonomy Design and Creation

Taxonomy Design and Creation

The taxonomy is an intermediary that links the users to the desired content.



The taxonomy should be designed for the users and for the content.

To suite the users, IA methods are used in taxonomy design.

To suit the content, manual *and* automated (AI) content analysis are used.

IA Methods in Taxonomy Design and Creation

Information architecture methods:

Information gathering from **users** for taxonomy design involves:

- Stakeholder interviews
- Questionnaires
- Focus groups
- Persona or use case definition
- Taxonomy design workshops
- Card sorting exercises

Information gathering from **content** and other sources for taxonomy design involves:

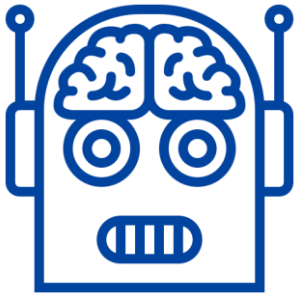
- Content analysis
- Search log review
- Tagging statistics

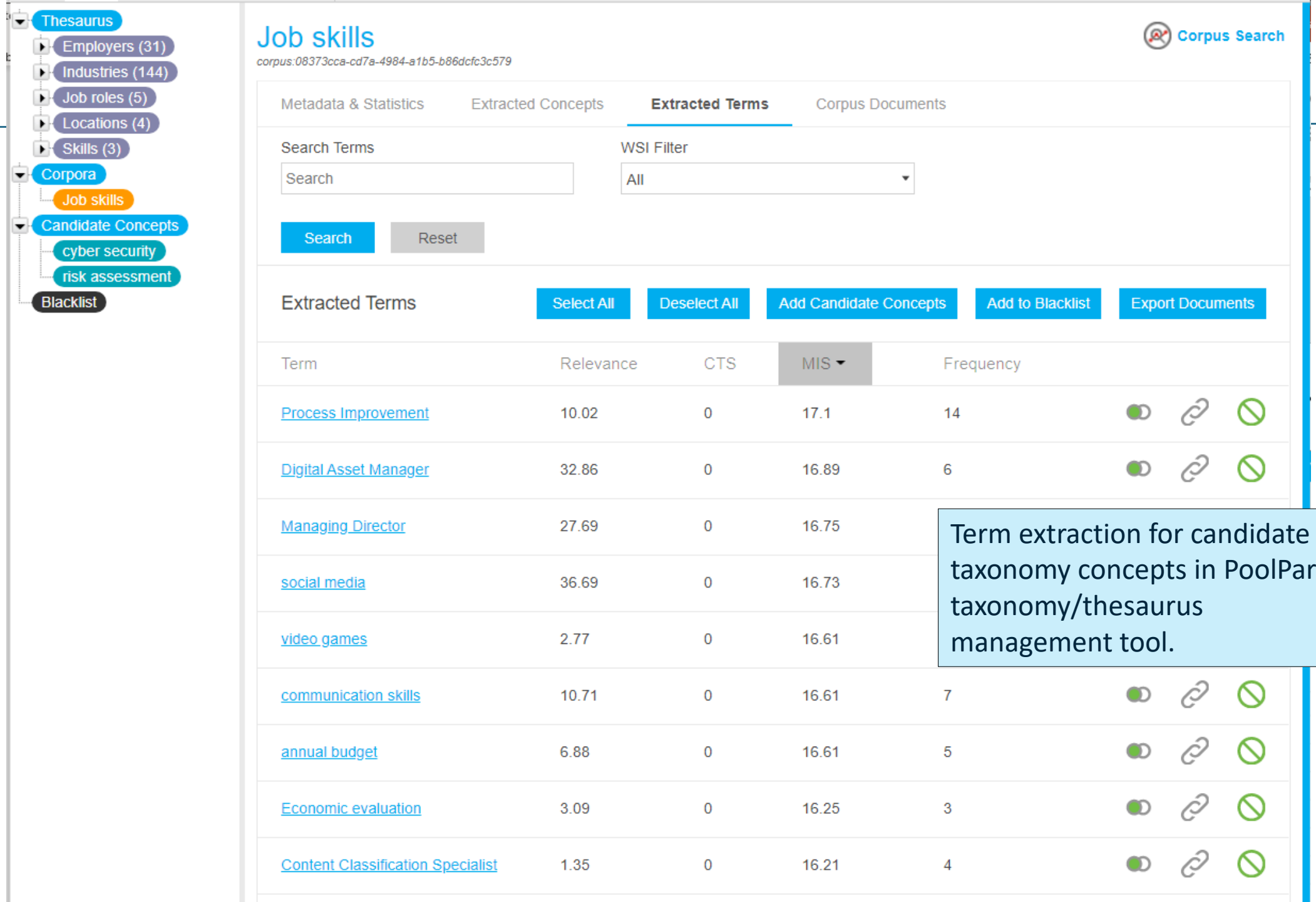
Artificial Intelligence (AI) in Taxonomy Design and Creation

AI in Taxonomy Design and Creation

With AI:

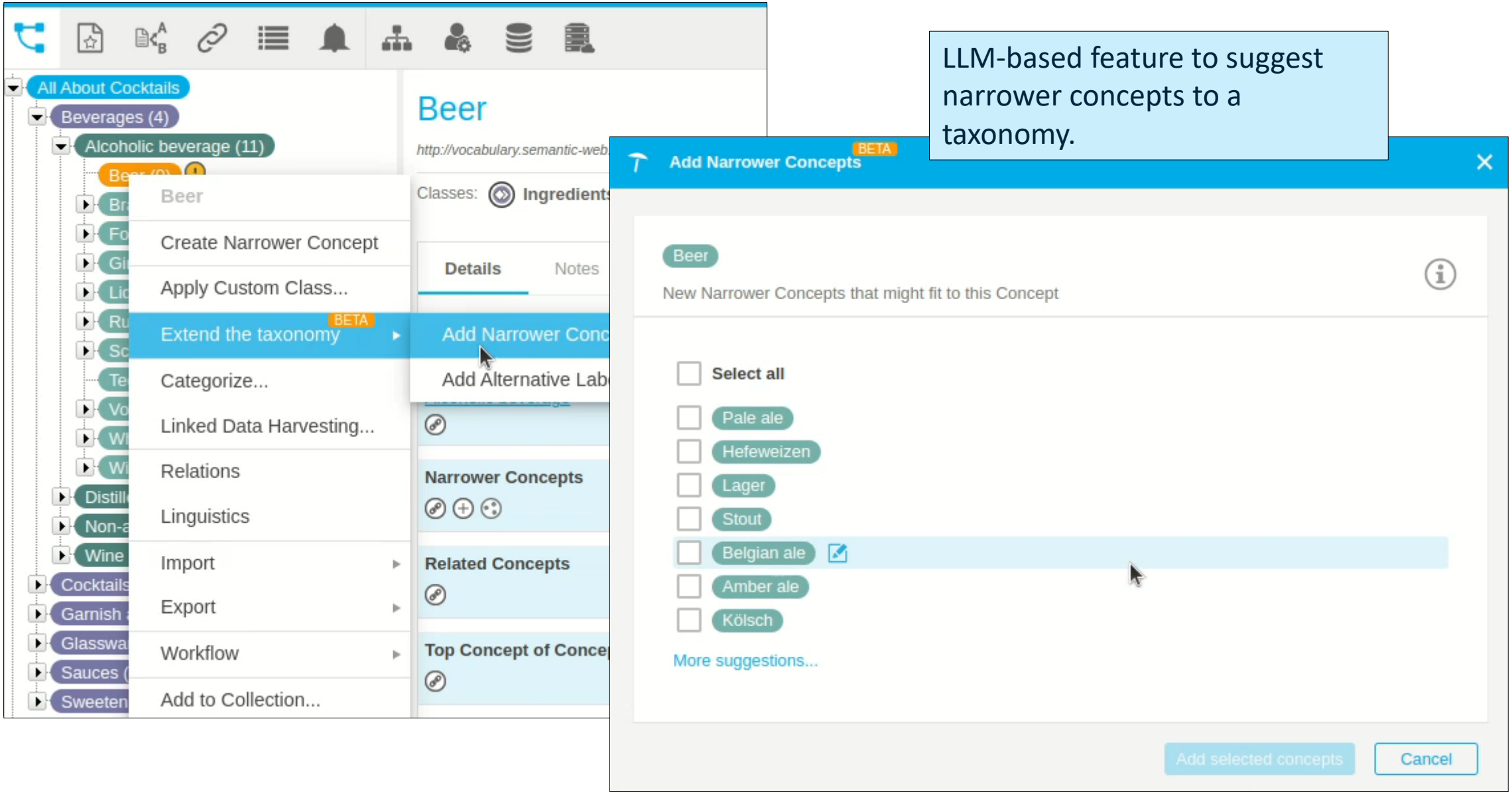
- Extraction of candidate terms from a body of text
  - Using text analytics technologies, such as natural language processing (NLP)
- Suggestions of narrower terms, alternative labels, and definitions
  - Using generative AI and internal LLMs
  - May be a feature of taxonomy management software
- Formulating SPARQL queries to analyze SKOS-based taxonomies
  - Using generative AI and web LLMs





Term extraction for candidate taxonomy concepts in PoolParty taxonomy/thesaurus management tool.

AI in Taxonomy Design and Creation



LLM-based feature to suggest narrower concepts to a taxonomy.

Artificial Intelligence (AI) in Taxonomy Implementation: Tagging

AI in Taxonomy Implementation: Tagging

Unlike navigation menu labels, taxonomy concepts need to be tagged to all content and constantly tagged to new content.

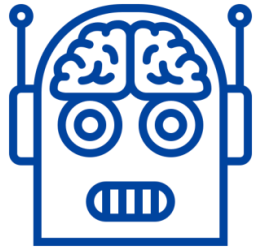
- Manual tagging/classification is not scalable for large backlog or large workflow.
- AI methods, existing since the 1990s, have become more common.
- Not all “auto-tagging” uses AI. Rules can also be written to auto-tag.
- Human review remains a option.

AI in Taxonomy Implementation: Tagging

AI-based auto-tagging and auto-classification makes matches
based on a linguistic, logical, or a mathematical profile it expects and recognizes.

Technologies Include:

- **Machine learning (ML)**: Use mathematical analysis to find patterns that match known properties.
- **Named entity recognition (NER)**: Matches proper nouns mentioned in text.
- **Semantic analysis**: Locates concepts referenced within the content.
- **Natural language processing (NLP)**: Analyzes sentences.



Future of IA, AI, and Taxonomies

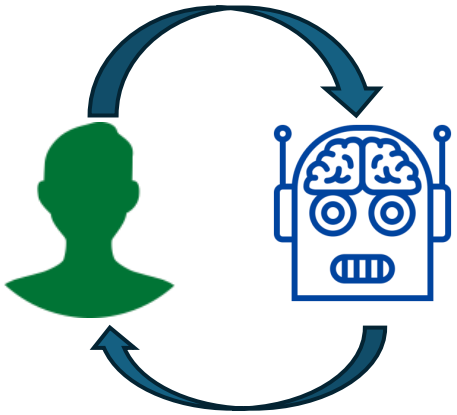
Future of IA and AI with Taxonomy

In user interface implementations:

- As long as users want to explore, browse, filter, refine topics with their own control, there will also be IA for user interface design.
- Advances in AI will further improve search querying results and recommendations.
- IA also provides **understanding**, where AI does not.

In the development of taxonomies:

- There will always be user-focused IA research methods in taxonomy creation to make the taxonomy suitable for its users.
- AI can facilitate some taxonomy creation tasks, but human review is necessary. Remember: “Human in the Loop”



Conclusions

IA and AI don’t have to be in competition.

They complement each other, such as in the case of taxonomies,

both in their design and development and in their implementation.

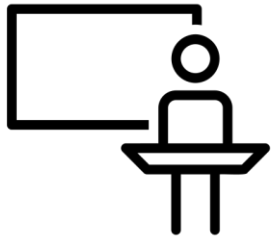
Information architects should learn to work with AI.

Taxonomy Resources

- ANSI/NISO Z39.19-2005 (2010) *Guidelines for Construction, Format, and Management of Monolingual Controlled Vocabularies*
  www.niso.org/publications/ansiniso-z3919-2005-r2010
- The Accidental Taxonomist Blog
  http://accidental-taxonomist.blogspot.com
  - "Taxonomy and Information Architecture Compared," 31 March 2023
- Accidental Taxonomist book websites
  www.hedden-information.com/accidental-taxonomist/websites
- Hedden Information Management past presentations
  www.hedden-information.com/presentations
- Hedden Information Management taxonomy training
  www.hedden-information.com/taxonomy-courses-workshops
- Taxonomy Talk, taxonomists community on Discord
  https://discord.com/invite/3qyMVYCAsw

Upcoming Taxonomy Presentations and Workshops

- "Taxonomies to Ontologies: How, When and Why to Connect and/or Extend" HS Events' Semantic Data, October 23, New York, NY
- "Building Taxonomies to Leverage Content" half-day pre-conference workshop, LavaCon content strategy conference, October 27, Portland, OR
- "The Complete Guide To Sourcing Terms" Taxonomy Boot Camp, November 18, Washington, DC
- "Taxonomy Design Best Practice for Knowledge Graphs" 2-hour masterclass, Connected Data London, December 11, London, UK, on online
- Virtual Bite-Sized Taxonomy Boot Camp London (3 hours each time) March 12, June 18, and October 8, 2025



Questions/Contact

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Hedden Information Management
Making information findable

Hedden, Heather. (2022) *The Accidental Taxonomist, 3rd edition.* Medford, NJ: Information Today Inc.
www.hedden-information.com/accidental-taxonomist