LavaCon 2023

The Content Strategy Conference lavacon.org

Leveraging Semantics to Provide Targeted Training Content: A Case Study

Heather Hedden, Knowledge Manager, Semantic Web Company

Esther Yoon, Senior Data Architect, Google

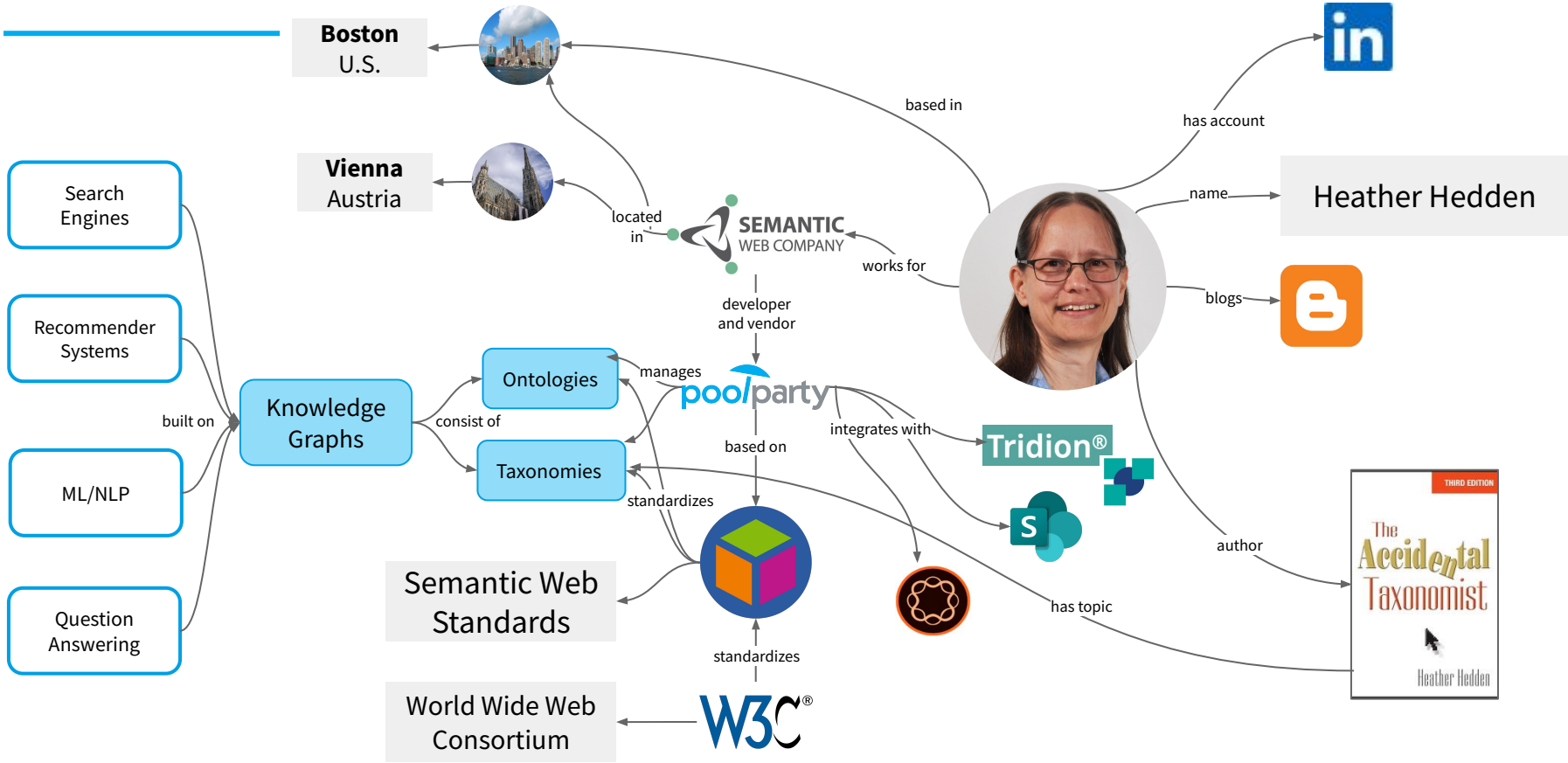
Heather Hedden, Semantic Web Company (vendor of PoolParty):

Part 1: Introduction to Taxonomies and Semantics for Targeted Training Content

Esther Yoon, Google:

Part 2: Case Study: Leveraging Semantics to Improve Discovery of Training Content

Click the Graph—get in contact with us!



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Semantic Web Company (SWC) and PoolParty

SWC is developer/vendor of **PoolParty Semantic Suite**

Most complete **Semantic AI platform** on the market

W3C standards compliant

ISO 27001:2013 certified (since 2019)

PoolParty stands out in the market with a **user-friendly** interface.

Current version **9.0**

On-premises or **cloud-based**

Over **180** **customers world-wide**

Integrations: Microsoft 365, Tridion Docs & Sites, AEM, and many more

Gartner named SWC a Visionary in their **Magic Quadrant** for Metadata Management Systems 2019 and 2020

Semantic Web Company has been recognized by **KMWorld** as one of the **AI Top 100 companies 2023**

Forrester listed SWC as sample vendor in their **report** on *The Document-Oriented Text Analytics Platforms Landscape 2022*

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Part 1 Outline

Introduction to Taxonomies and Semantics for Targeted Training Content

- Search issues in finding training content
- Faceted taxonomies for training content
- Customizing facets
- Semantic relations and recommendation
- Metadata and tagging

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Training Content Scenario

Organizations with large number of employees have large volumes of varied training content:

- For onboarding
- For upskilling
- For compliance
- For achieving efficiency
- For better customer relations
- For personal improvement

Managers and employees can only take advantage of the training if they know it’s there and how to find it.

Is search effective?

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Issues in Searching for Training Content

- Too many results on some searches:
  - such as “communication”
- Training course titles may be vague:
  - *“Bringing out Your Voice”*
    Does that mean in speaking or writing?
  - *“The Painstorm Model”*
    The instructor’s invention of brainstorming “pains” in order to resolve them.
- Training course titles might omit the key word:
  - *“Use Plain Language”* omits the word “writing”

Solution: Have a **taxonomy** of topics to tag the training content by topic.

- It brings together synonyms/alternative labels for the same concept.
- It arranges concepts in a hierarchy, so narrower concepts can be identified.
  - E.g., specific types of communication are narrower concepts to Communication.

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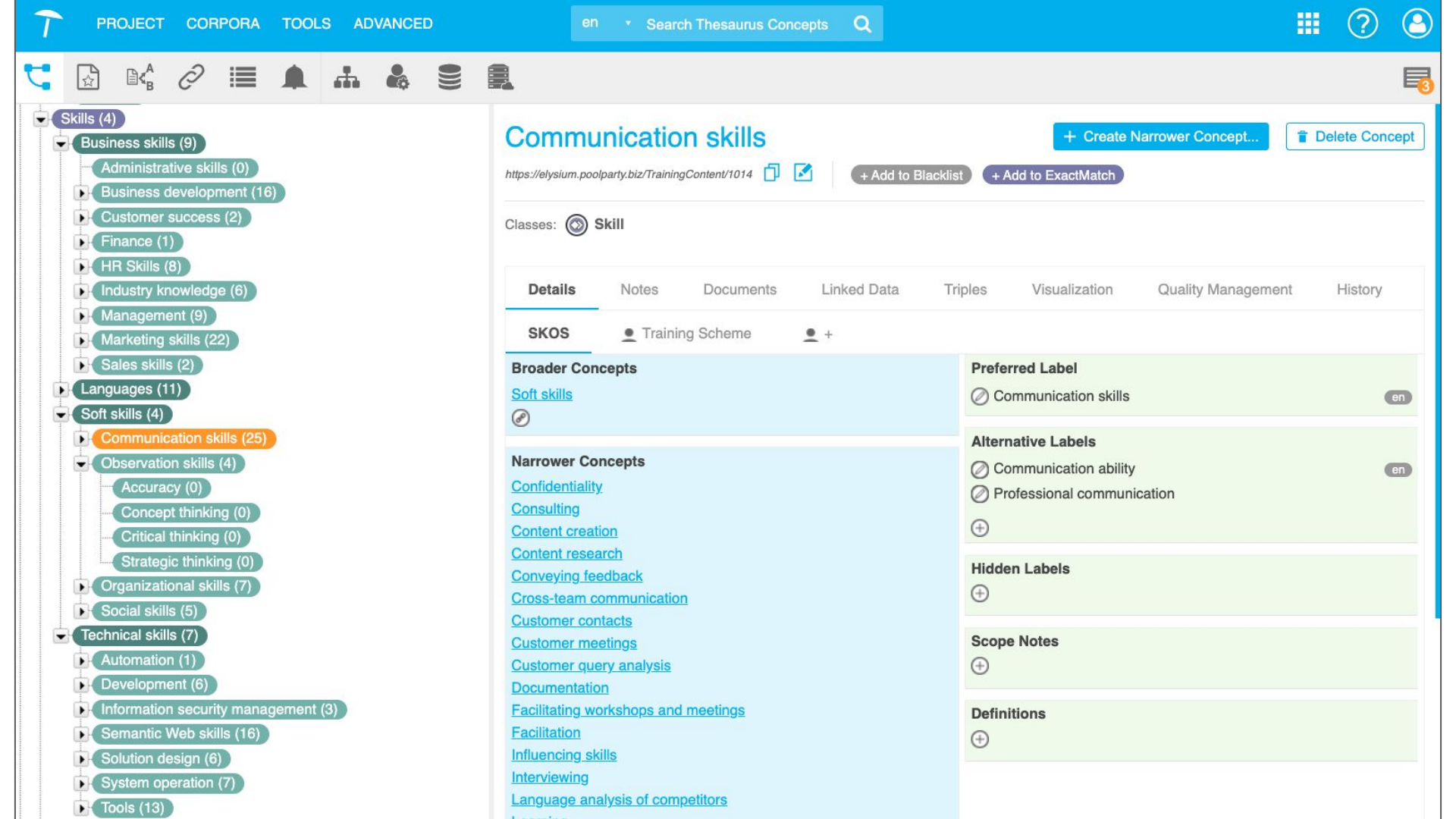
PROJECT
CORPORA
TOOLS
ADVANCED
en
Search Thesaurus Concepts
Skills (4)
Business skills (9)
Administrative skills (0)
Business development (16)
Customer success (2)
Finance (1)
HR Skills (8)
Industry knowledge (6)
Management (9)
Marketing skills (22)
Sales skills (2)
Languages (11)
Soft skills (4)
Communication skills (25)
Observation skills (4)
Accuracy (0)
Concept thinking (0)
Critical thinking (0)
Strategic thinking (0)
Organizational skills (7)
Social skills (5)
Technical skills (7)
Automation (1)
Development (6)
Information security management (3)
Semantic Web skills (16)
Solution design (6)
System operation (7)
Tools (13)
Communication skills
+ Create Narrower Concept...
Delete Concept
https://elysium.poolparty.biz/TrainingContent/1014
+ Add to Blacklist
+ Add to ExactMatch
Classes:
Skill
Details
Notes
Documents
Linked Data
Triples
Visualization
Quality Management
History
SKOS
Training Scheme
+
Broader Concepts
Soft skills
Narrower Concepts
Confidentiality
Consulting
Content creation
Content research
Conveying feedback
Cross-team communication
Customer contacts
Customer meetings
Customer query analysis
Documentation
Facilitating workshops and meetings
Facilitation
Influencing skills
Interviewing
Language analysis of competitors
Preferred Label
Communication skills
en
Alternative Labels
Communication ability
en
Professional communication
Hidden Labels
Scope Notes
Definitions

Issues in Searching for Training Content

For the complexities of training content, a single topical taxonomy is not enough.

- Search on topics does not indicate skill level (beginner, continuing, advanced) or job level (everyone, managers, directors)
  - e.g. “Manager training” - For new managers or all managers?
- Ambiguity between topic and format:
  - e.g. “Presentation slides” - How to create them or the training delivery format?
- Ambiguity between products and productivity tools
  - e.g. “Apps” or “Applications” - Application products our company sells, or applications we use to help us do our jobs?

***Solution*: Design a **faceted taxonomy** for faceted navigation browse or filtering search results.**

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Faceted Taxonomy for Training Content

- Facets are aspects/dimensions/filters/metadata fields.
- Users select a concept from each of several facets to search with in combination to limit the content results by different aspects.

- For example, search on training content for:
  - **Content type:** Video training
  - **Level:** Intermediate
  - **Role:** Customer support
  - **Skill:** Written communication
  - **Training program:** Upskilling
- Training content is very well suited for facets.

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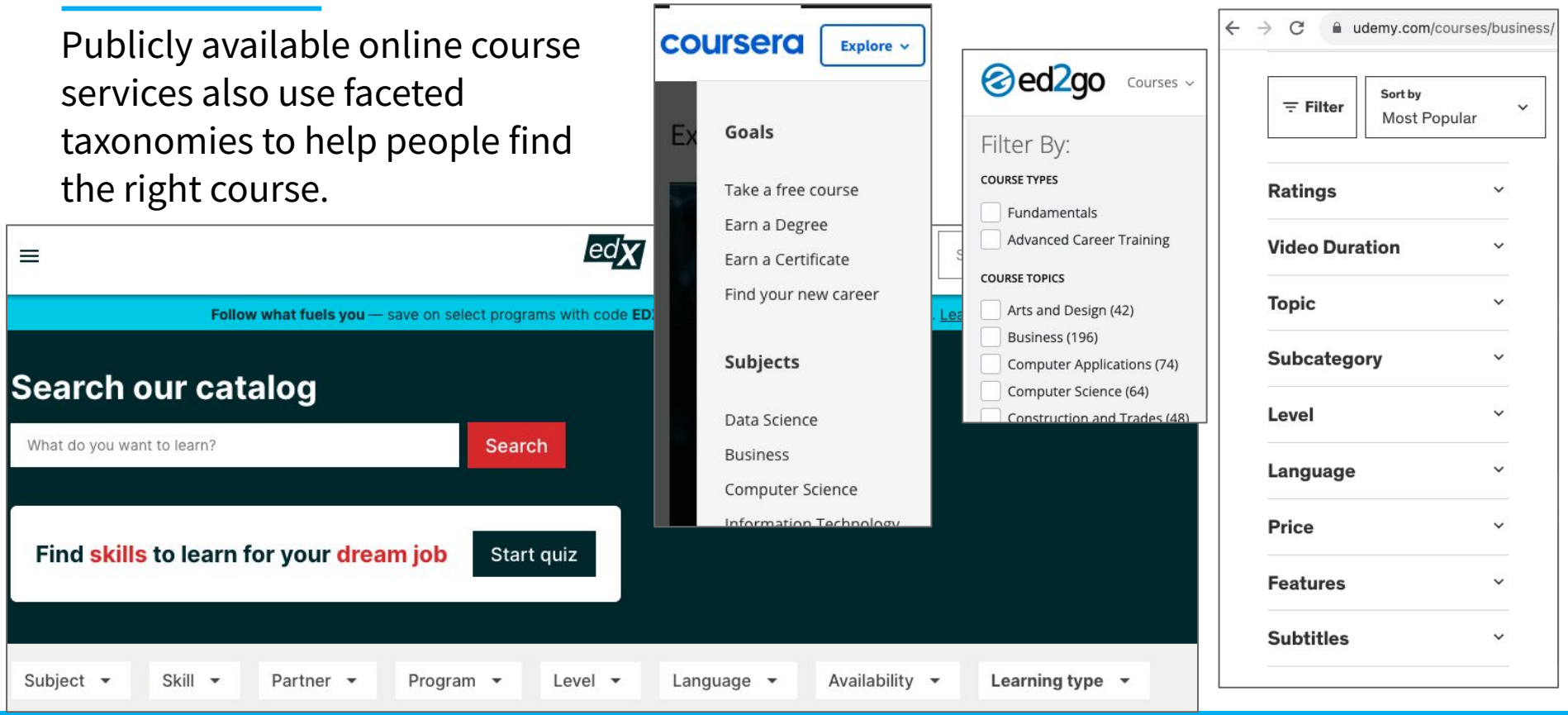
Faceted Taxonomy for Training Content

Publicly available online course services also use faceted taxonomies to help people find the right course.



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Challenges in Designing Facets

- Facets, to serve as limiting filters, should be mutually exclusive in the concepts they contain.
  - e.g., don't have "Customer support" in both **Roles** and **Skills**.
  - **Roles** and **Skills** in particular may be a challenge to distinguish.
- A facet may contain a hierarchy of concepts, but you cannot have a hierarchy of facets.
- All the facets existing for metadata management may be too many for end-users.
  - Select a subset of all concept schemes/metadata properties to be implemented as end-user display facets.
  - Might not implement all of : **Organizational units**, **Product/Service areas**, **Original sources**, **Tools**, **Regions**, **Access Levels**
  - Some filters can be preset by user role/credentials - for personalization

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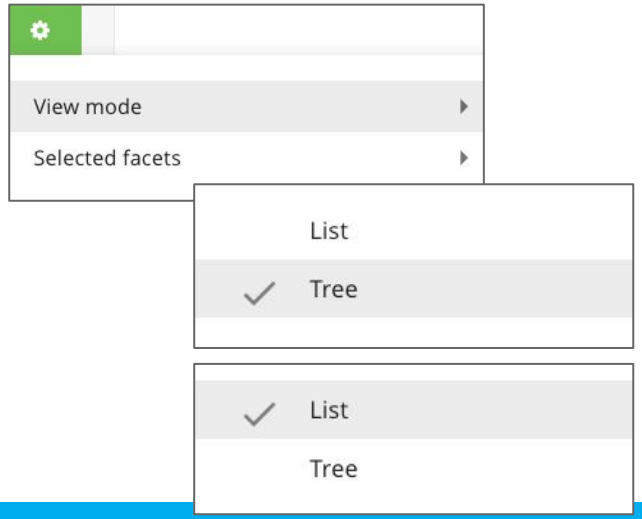
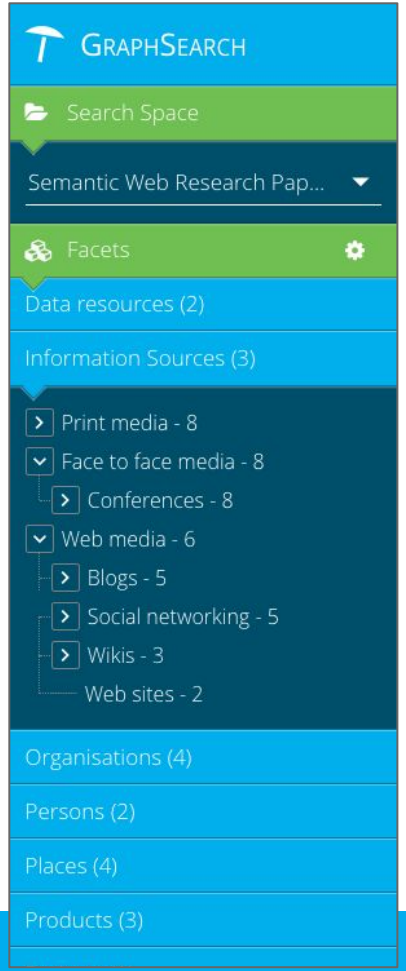
Customizing Facets

Option of displaying concepts in facets, either:

- in their hierarchy (tree view)
- or as a list, ordered by tagged content item count.





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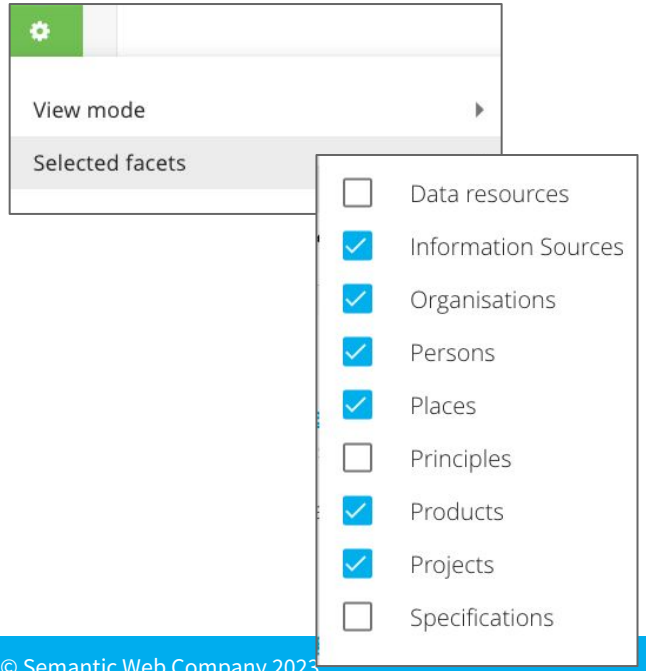
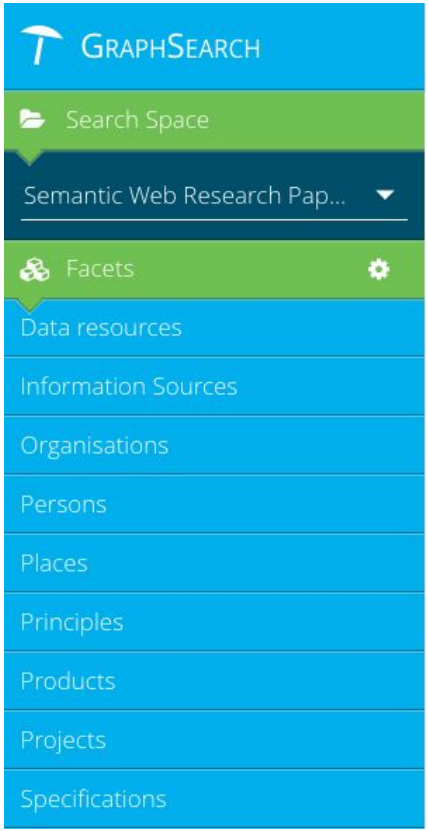
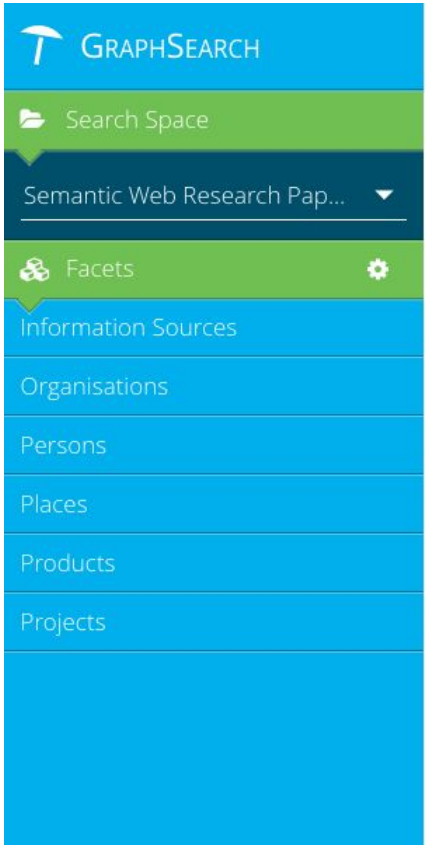
Customizing Facets

Option of selecting different facets for different user audiences.







Public demo: https://vocabulary.semantic-web.at/GraphSearch

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Issues in Finding Training Content not Searched

- Not realizing that a very specific topic exists, so not bothering to look for it.
  - e.g. policy for ads for a specific market
- Specific soft skills and well-being training topics are useful, but not what people usually search for:
  - e.g. “The art of saying no,” “Avoiding burnout,” Energizing your team”
- New topics, people may not think to look for:
  - e.g. “Norms for hybrid work”
- Wanting to excel in one’s role and identify all the training content relevant to one’s specific role.

Solution: **Recommendation** of content based custom **semantic relations** between different sets (classes) fo concepts, especially between roles and skills or topics.

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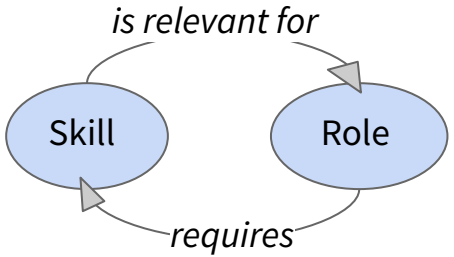
Recommendation Based on Semantic Relations

Semantic Relations

- Relations across classes, concept schemes, or what could be facets
  - E.g. between **Skills** and **Roles**
- Relations are customized with meaning (semantics) for a specific use case
  - Not just broader/narrower and related, but “Is required for”
- Based on a knowledge model known as an ontology
  - Ontologies define classes, semantic relations between classes, and custom attributes for classes (although attributes are not needed in a simple knowledge model.



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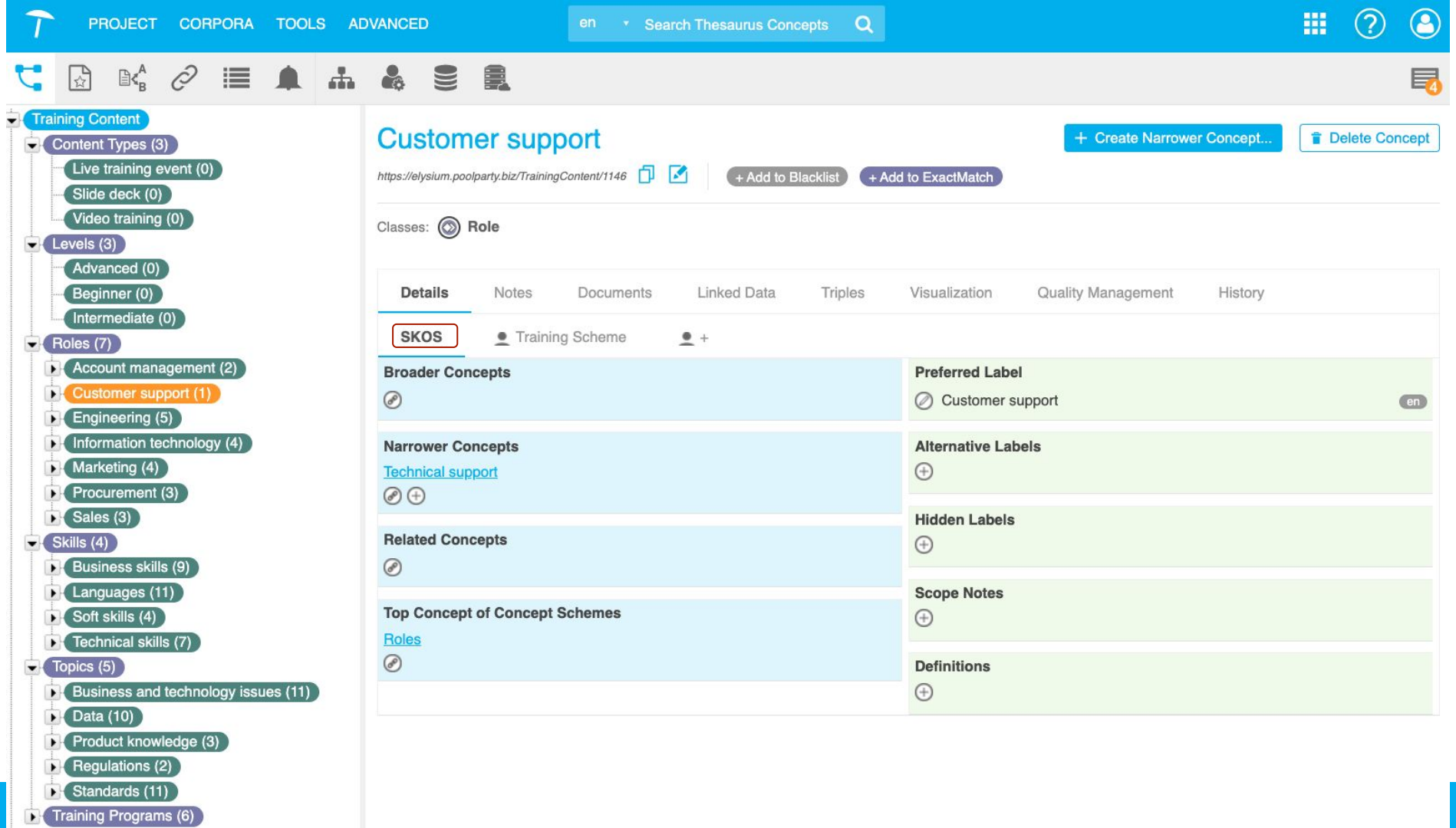
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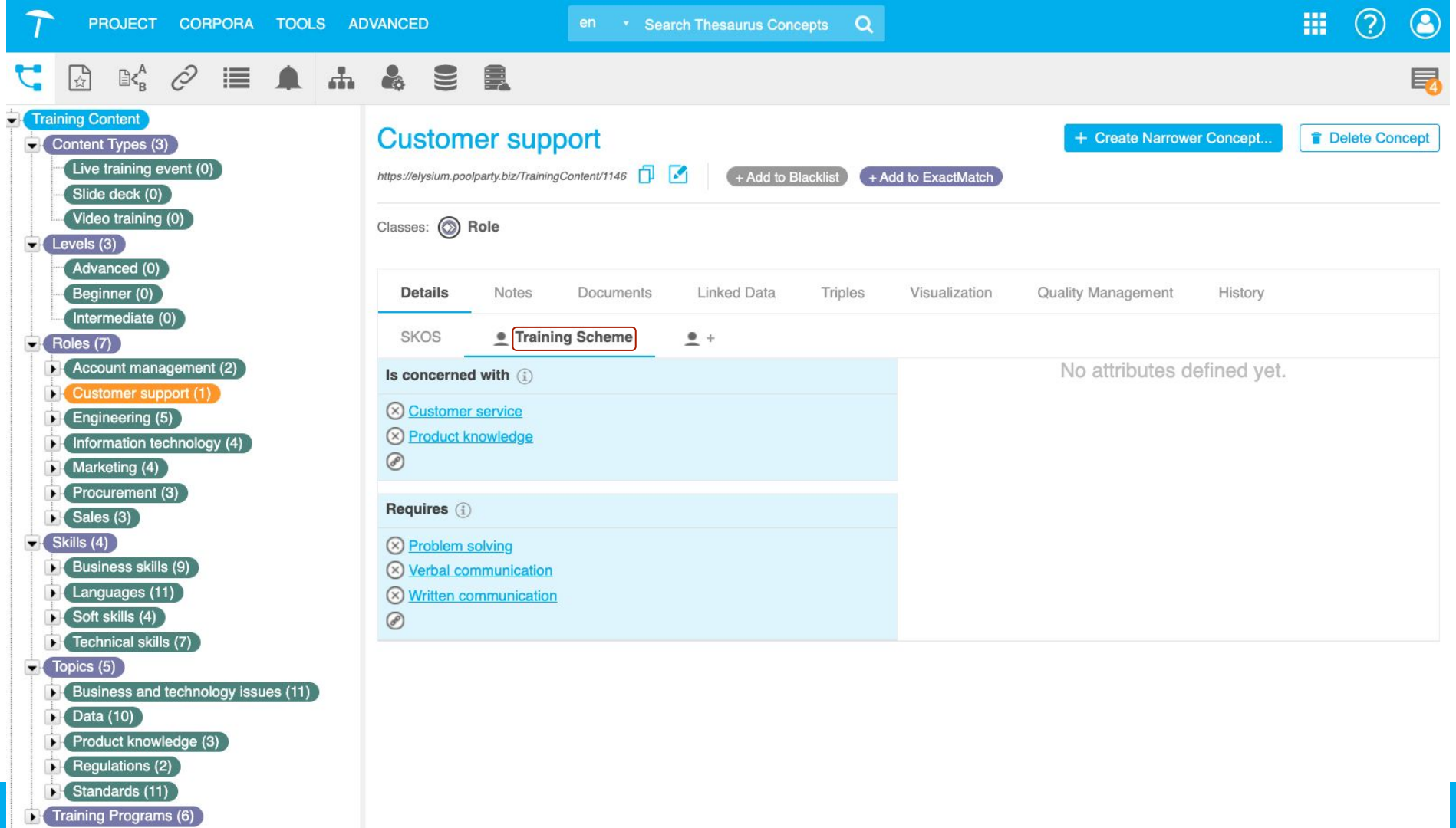
Search Thesaurus Concepts
Training Content
Content Types (3)
Live training event (0)
Slide deck (0)
Video training (0)
Levels (3)
Advanced (0)
Beginner (0)
Intermediate (0)
Roles (7)
Account management (2)
Customer support (1)
Engineering (5)
Information technology (4)
Marketing (4)
Procurement (3)
Sales (3)
Skills (4)
Business skills (9)
Languages (11)
Soft skills (4)
Technical skills (7)
Topics (5)
Business and technology issues (11)
Data (10)
Product knowledge (3)
Regulations (2)
Standards (11)
Training Programs (6)
Customer support
+ Create Narrower Concept...
Delete Concept
https://elysium.poolparty.biz/TrainingContent/1146
+ Add to Blacklist
+ Add to ExactMatch
Classes:
Role
Details
Notes
Documents
Linked Data
Triples
Visualization
Quality Management
History
SKOS
Training Scheme
Broader Concepts
Narrower Concepts
Technical support
Related Concepts
Top Concept of Concept Schemes
Roles
Preferred Label
Customer support
en
Alternative Labels
Hidden Labels
Scope Notes
Definitions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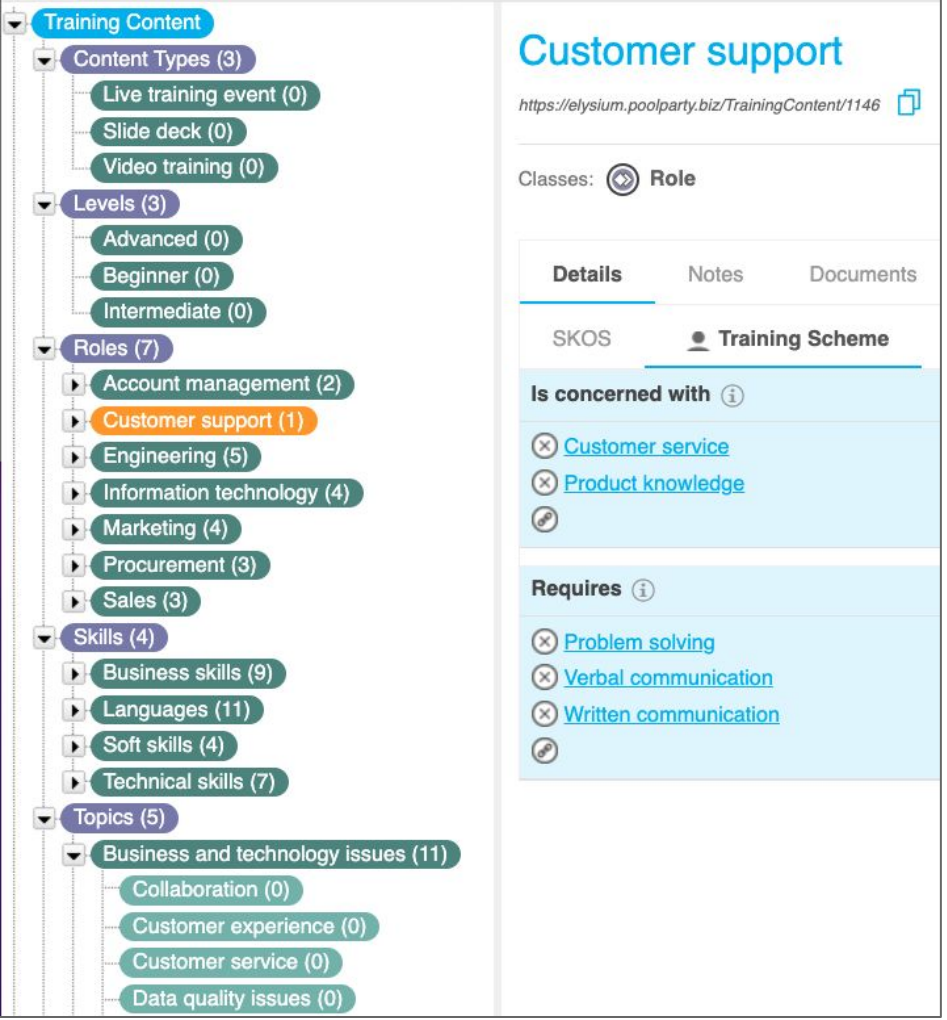
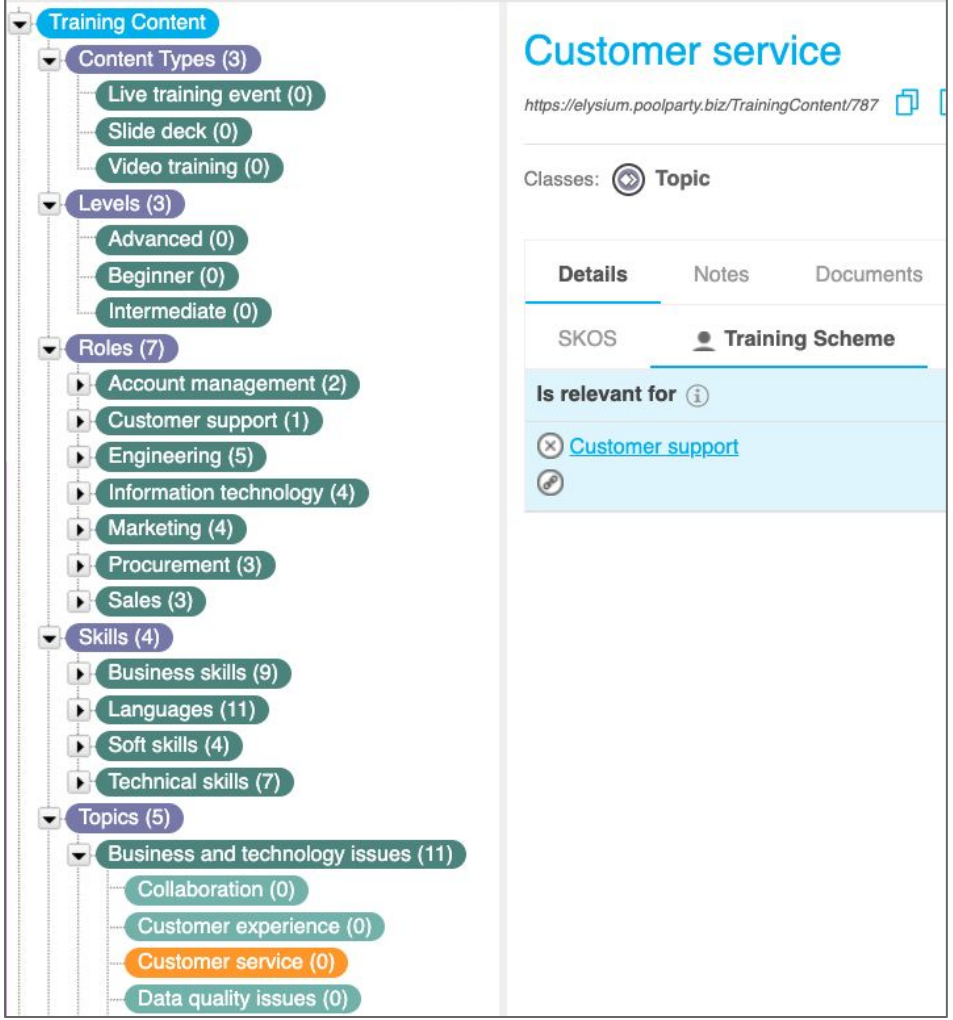
+ Add to Blacklist
+ Add to ExactMatch
+ Create Narrower Concept...
Delete Concept
Classes: Role
Details
Notes
Documents
Linked Data
Triples
Visualization
Quality Management
History
SKOS
Training Scheme
Is concerned with
Customer service
Product knowledge
Requires
Problem solving
Verbal communication
Written communication
No attributes defined yet.





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Metadata and Tagging

Terms displaying in facets (for filtering in the user interface) may be based on either:

1. **Pre-assigned metadata** on structured content, or
2. **Concepts tagged** to the content, coming from the taxonomy

1. Course content, as structured content, already has some metadata
   - Examples: **Content Type**, **Level**, **Training Program**, **Organizational Unit**
   - Assigned by content creators
   - This can be mapped to taxonomy facets
2. Descriptive topics of course content needs to be tagged with **Topics**, **Skills**, etc.
   - Manually tagged, or
   - Auto-tagged (preferred method)

Solution: Set up a **pipeline** to **extract** (ETL) metadata for the values of some taxonomy facets and to auto-tag topics for the terms in other taxonomy facets.

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Semantic Web Company's POC for Google gTech

SWC:

- Consulted on faceted taxonomy and simple ontology for learning content.
- Provided PoolParty server infrastructure.
- Set up UnifiedViews ETL pipeline for extraction and automated tagging of content.
- Set up GraphSearch faceted search user interface (with API) to support search and recommendation of content.

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Case Study:
Leveraging Semantics to Improve Discovery of Training Content

estheryoon@google.com

Oct 2023

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Background

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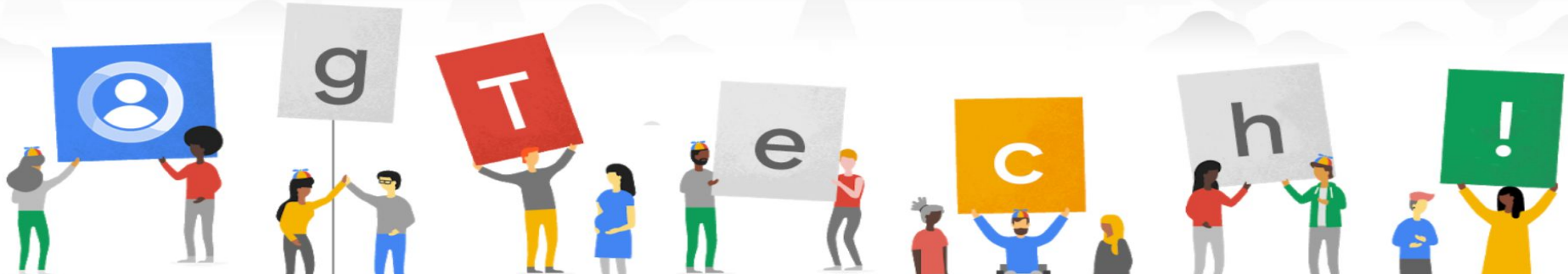
about: gTech

Goal: Provide **customer support** throughout the entire customer lifecycle via troubleshooting, consulting, optimizing, & implementing solutions

Roles: Customer Support Agents, Consultants, Product Ops Managers, Data Analysts/Scientists etc.



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01

Problem Statement

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50% of gTechers saw **learning paths as a critical gap** and 22% reported having **content discovery issues**

Google

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02

User Journey Walk-Through

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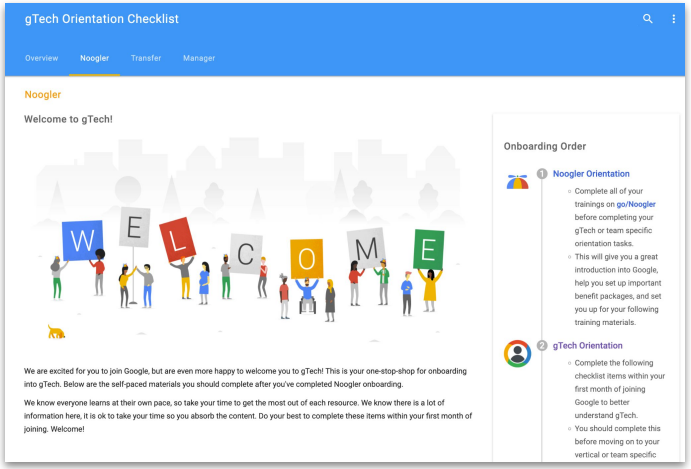
Let’s take a look at an example...

User: Bob is new to gTech and wants to find introductory trainings for the ramp-up.



Desired Outcome: “gTech Orientation Checklist” which has a page specifically for gTech Nooglers.

Google

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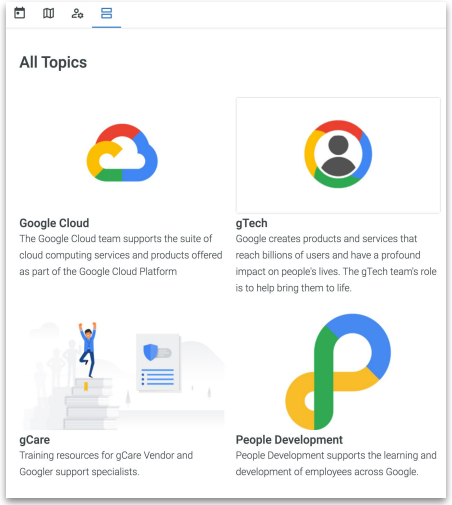
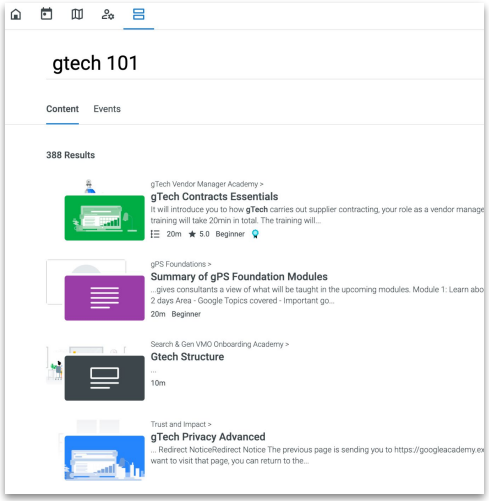
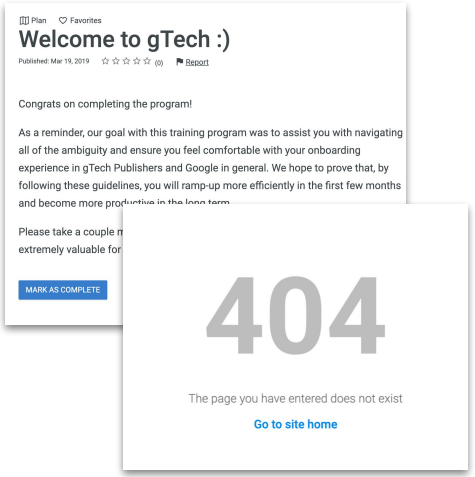
Bob's Search Experience on Platform A







✖ Does not find the desired content under the "gTech" Topic in the "Browse" tab.

✖ Tries the following searches but still cannot find the desired content:

- "gTech 101"
- "gTech Noogler"
- "gTech Noogler Training"
- "gTech New Hire"
- "gTech Onboarding"

✖ Runs into dead-ends or irrelevant content due to misleading title.

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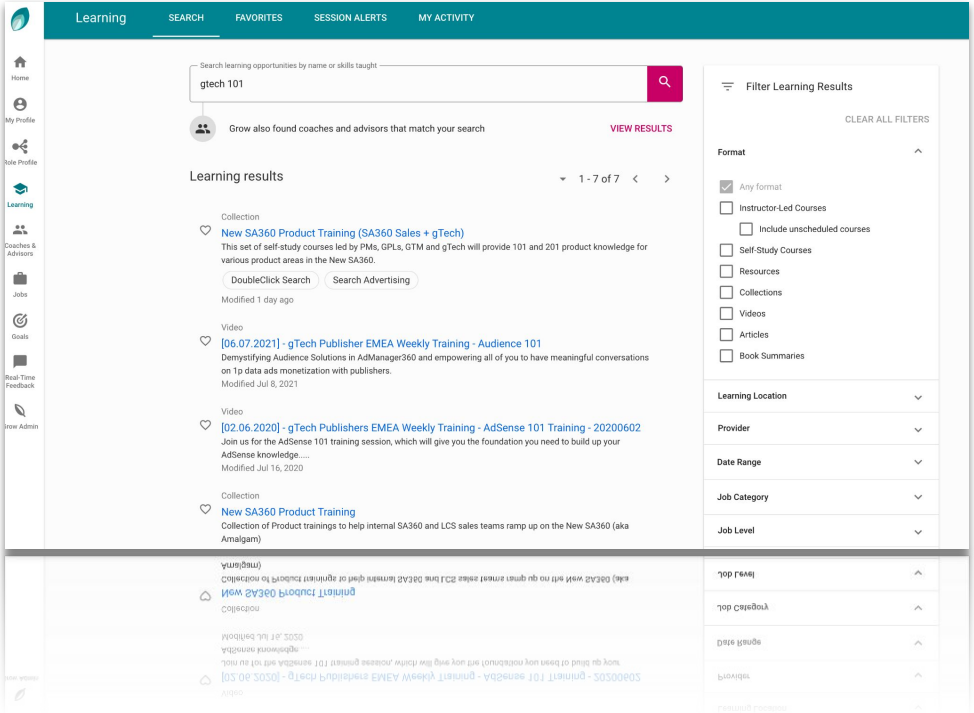
Bob's Search Experience on Platform B



Tries the same set of searches:

- ✗ "gTech 101"
- ✗ "gTech Noogler"
- ✗ "gTech Noogler Training"
- ✗ "gTech New Hire"
- ✓ "gTech Onboarding"

Desired content was found after the 5th keyword search.

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03

Gap Analysis

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Key Gaps with the Existing Ecosystem

User cannot search across platforms

Hinders discovery of content and may result in users giving up

User must use exact keywords found in the metadata

Searching using similar words instead of exact words will result in lack of discovery of such content

Contents with limited description gets buried

Too generic description will lead to low discovery of such content

Role Profiles Integration Does Not Exist

User cannot filter for training content relevant to their role

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04

Vision & Goals

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Empower **employees** to upskill by providing them with a personalized and easy-to-use training platform.

based on role & interests

Empower **content creators** to reach their target audience by automating metadata management and boosting content discoverability.

via relevant metadata tagging

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Goals | Employee Upskilling

One-Stop-Shop Search & Discovery Platform

Augment content discovery by providing a centralized platform that populates learning resources across platforms

Discovery of similar and related content

Enable discovery of similar and related content by semantically mapping the contents and exposing them as relevant search results

Personalization on Role & Interests

Enable relevant recommendations based on the user's role and their required skills

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Goals | Streamline Content Tagging

Automated or assisted content tagging

Streamline the content creator's content management experience with automated or assisted content tagging

Tagging with custom vocabularies

Empower content creators to organize and tag the trainings using custom vocabularies based on business need

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05

Proof-of-Concept

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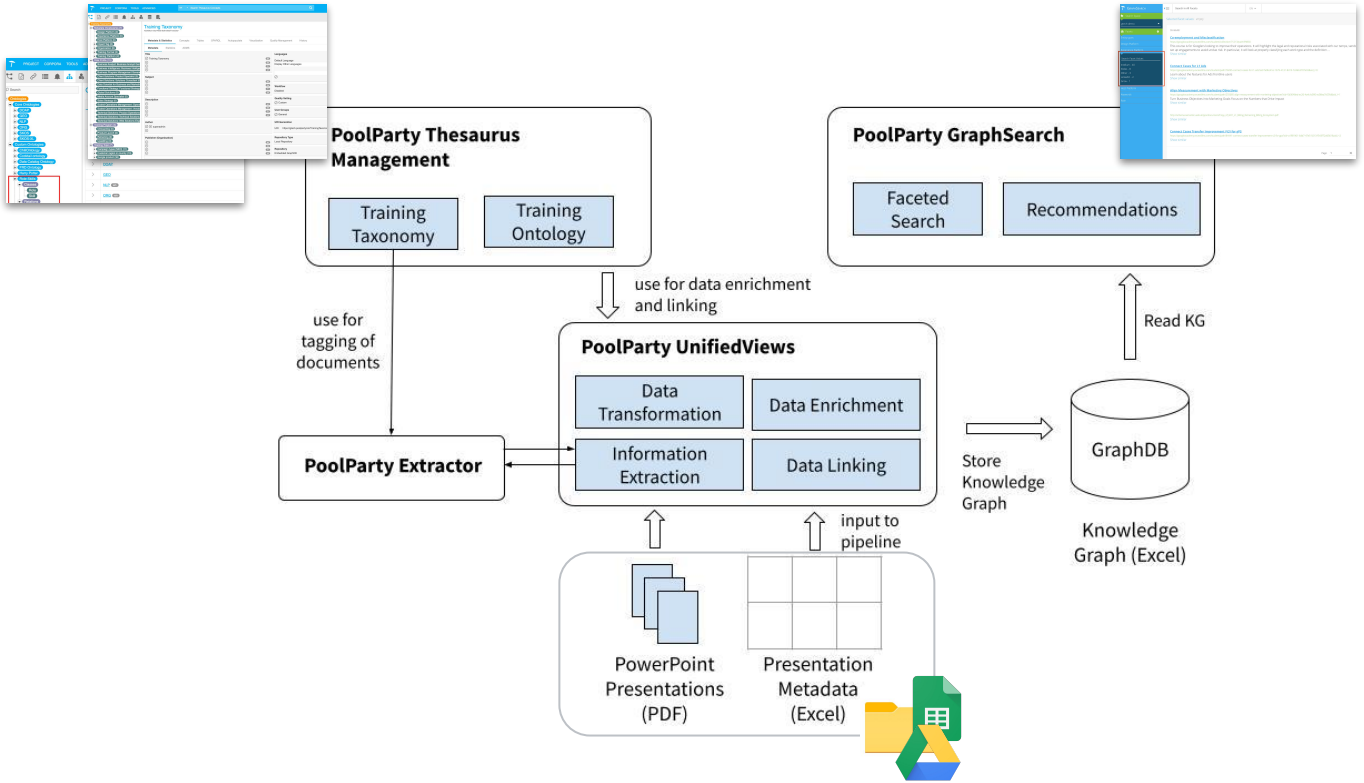
Proof-of-Concept Design



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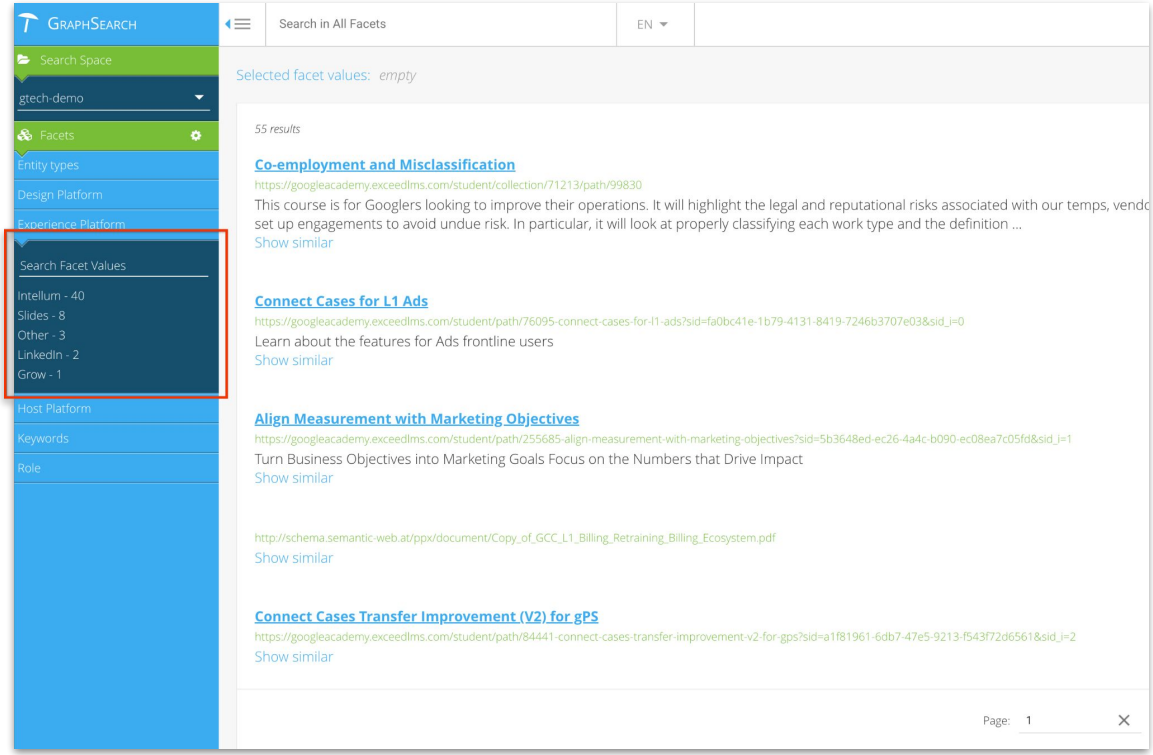
Preview: Cross-platform Searchability

Search across Platforms

Augment content discovery by searching across multiple platforms



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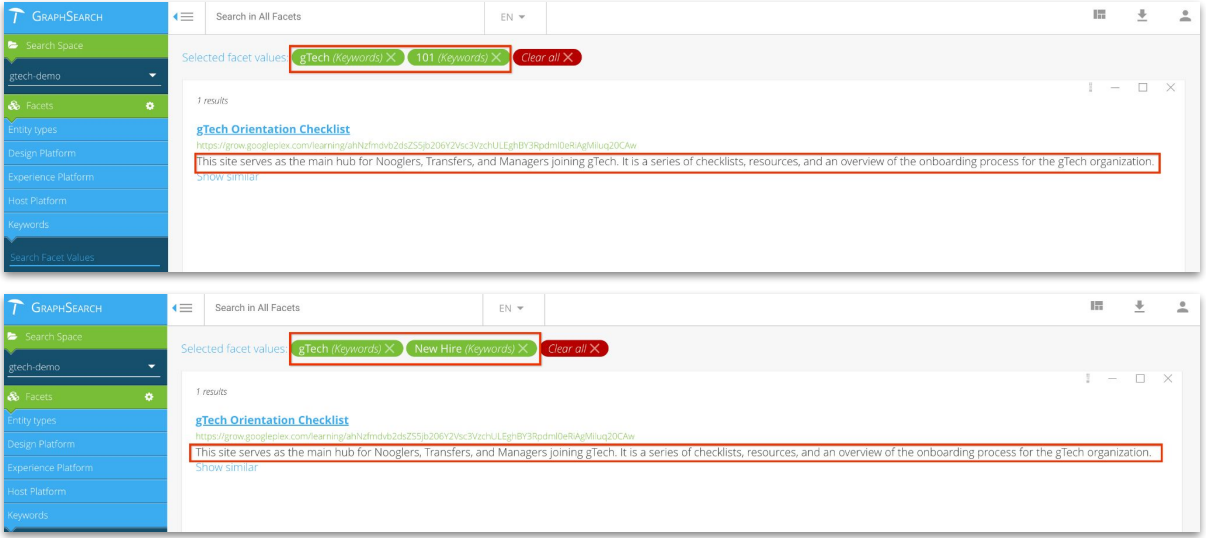
Preview: Enhanced Taxonomy with Synonyms

Taxonomy Enriched with Synonyms

Surface the most relevant content with taxonomy enriched with synonyms



Google

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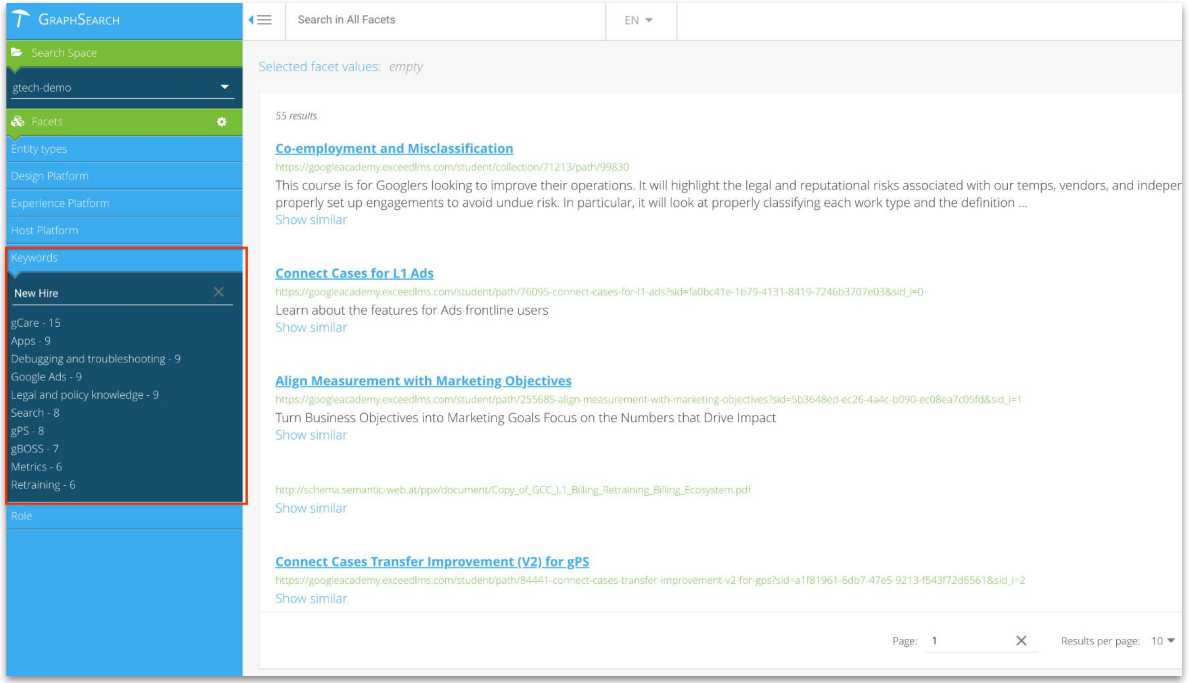
Preview: Automated Content Tagging

Automated Content Tagging

Boost search results with automated content tagging



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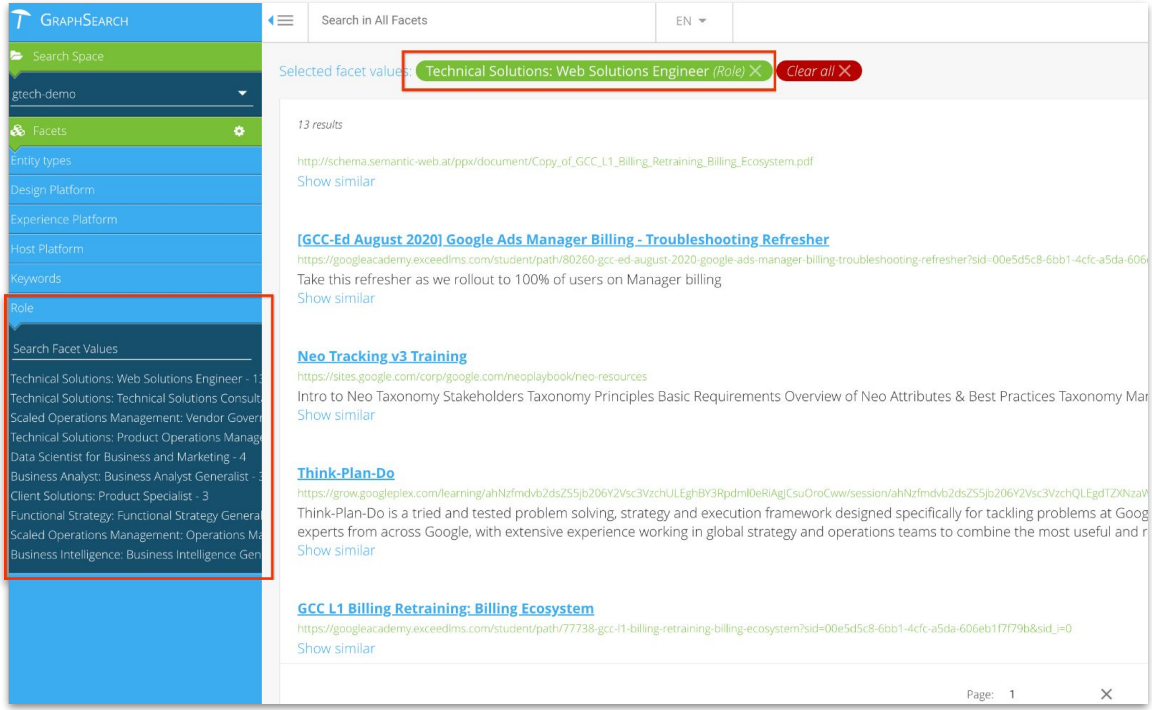
Preview: Role Profiles Integration

Role Profiles Integration

Find relevant trainings to your role with taxonomy integrated with role profiles



Google

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06

Evaluation

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Proof-of-Concept Final Evaluation: Criteria

Discoverability evaluation rubric was created with questions focused on 3 key criteria that impact the user's ability to:

1. Perform the search dynamically using various **keywords and filters**
2. Identify the **relevant content quickly** while having the option to browse through a **sufficient pool** of contents
3. **Complete the search** without needing to explore other platforms

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Proof-of-Concept Final Evaluation: Results

Evaluation Category	Evaluation Criteria	Platform A	Platform B	MVP Module
Cross-Platform Searchability	Does the search platform support cross-platform searchability?	0	0.5*	1
Dynamic Search Experience	Does the search platform support full text search (i.e. exact text match)?	1	1	1
	Does the search platform support faceted search (i.e. filters)?	0	1	0.5**
	Does the search engine support semantic search (i.e. similar word search)?	0	0	1
Relevant Content Identification	Does the search engine support crawling of the content in addition to the content metadata (i.e. title, description, tags)?	0	0	1
	Does the search platform provide a recommendation engine to find related or recommended content?	0	1	1
Total Discoverability Score		**1**/6	**3.5**/6	**5.5**/6

**Grow search populates content from external platforms (i.e. LinkedIn) but does not pull all contents available in LMS*

*** PoolParty's GraphSearchUI used for the demo only supports single faceted search but multi-faceted search in the search bar can be enabled for the final frontend UI.*

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Metrics: gTech Noogler's Search Experience

A **reduction of 87.5% in total time spent on search** was noted when conducting the search using the PoolParty module.

Evaluation Metrics	Current Search Experience (Platforms A&B)	Test Search Experience (MVP Module)	% Change
Number of steps taken until the desired content was found	12	1	**-91.7%**
Number of platforms utilized until the desired content was found	2	1	**-50%**
Total time spent on search (min)	8	1	**-87.5%**

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07

Next Steps

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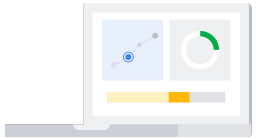
What's Next?

Prod Integration

We will explore ways to integrate PoolParty with the training content management systems



Front-End UI Development

We will design a user-friendly front-end UI for the search experience

Data Governance

We will explore best practices for taxonomy / ontology / knowledge graph data governance

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Q&A

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