Hierarchies & Polyhierarchies

Is More Better?

Heather Hedden
Senior Taxonomy Analyst
About Project Performance Corporation

**Energy/Environment**
Green strategies for government and industry:
- Air quality and climate change
- Greenhouse gas reduction
- Carbon management
- Environmental risk mitigation
- Environmental impacts of transport
- Information and data management

**Infrastructure**
- Systems Engineering and Technical Assistance (SETA)
- Capability Maturity Model Integration (CMMI)
- Earned Value Management
- Configuration Management
- Technical and Advisory Support
- Independent Verification & Validation (IV&V)

**Information Management**
- Program and Project Management
- Earned Value Management
- Performance Measurement
- Program Assurance and Evaluation
- Business Process Improvement
- Security Policy and Compliance
- Communications/Outreach and Facilitation

**1,200-person multi-disciplinary team of scientific & technical experts**
- Scientific subject matter experts
- Systems engineers and architects
- Policy and regulatory specialists
- Project management professionals
- Certified Information technology experts
- Security professionals

**Enterprise Solutions**
- Master Data Management and Data Governance
- Business Intelligence
- Adaptive Data Warehousing
- Enterprise Architecture
- Infrastructure Systems Engineering
- Knowledge Management
- Portal Solutions
- Enterprise Content Management
- IT Optimization/Virtualization

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About Heather Hedden

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• Continuing Education Instructor, “Taxonomies & Controlled Vocabularies,” Simmons College Graduate School of Library & Information Science


• Previously taxonomist with First Wind, Viziant Corporation, Hedden Information Management, and Information Access Company/Thomson Gale (now Cengage Learning)
Agenda

1. Review of Hierarchical Relationships
2. Review of Polyhierarchies
3. Polyhierarchies – Pluses
4. Polyhierarchies – Minuses
5. Polyhierarchy Recommendations
Hierarchical Relationships

Hierarchical Relationships:
Asymmetrical reciprocal relationships

Broader term

SOME \(\downarrow\) \(\uparrow\) ALL

Narrower term

Three types:
1. Generic - Specific
2. Common noun - Proper noun (instance)
3. Whole – Part

Fruits

NT Apples
Hierarchical Relationships

1. Generic - Specific:
   Category or class
   – members
   – more specific types

Examples:

Plants
   NT Trees

Financial services
   NT Investment services

Romance languages
   NT Italian

Narrower term “is a”/ “are a kind of” broader term
Hierarchical Relationships

2. Instance:

Common noun
– Proper noun

Examples:

National parks
    NT Grand Canyon

Children’s writers
    NT Rowling, J.K.

Holidays
    NT Thanksgiving

Narrower term “is an example of” broader term
Hierarchical Relationships

3. Whole - Part:

Concept or Entity
– *integral* part
– *subentity*

Examples:

U.S. Congress
NT U.S. Senate

Colorado
NT Denver

Digestive system
NT Stomach

Narrower term “is in” broader term
Polyhierarchies

• Based on generic relationship
Polyhierarchies

- Based on different kinds of hierarchical relationships, different means of categorizing

```
Bodies of Water
  /       \
/         \
Lakes     United States
          /           \
         /             \
        Great Salt Lake
        /               \
       /                 \
      Utah
```
Polyhierarchy - Pluses

Polyhierarchy is useful when...

• It is obviously logical for select terms (cross-overs/hybrids, e.g. Music teachers or Light Trucks)
• It is indicated by different stakeholder views
• Indexers/taggers browse the taxonomy hierarchically
• End-user testing/input (e.g. card-sorting) indicates users are split as to where in the hierarchy a term belongs
Polyhierarchy - Pluses

Retail website case study example:

Health & Fitness
› Portable Fitness Electronics
› Fitness GPS Watches

Car, Marine & GPS
› GPS Navigation
› Handheld GPS
› Fitness GPS Watches

Sports taxonomy case study example:

Back Exercises
› Dead Lifts

Hamstring Exercises
› Dead Lifts
Polyhierarchy - Minuses

Polyhierarchy is *not* so good when...

- It violates hierarchical relationship standards
- It becomes excessive, perhaps more common than mono-hierarchies
- It is the result of different kinds of a categorization, and the presence of different kinds of categorization is confusing
- It is a small taxonomy and the user doesn’t need or expect polyhierarchy
Polyhierarchy - Minuses

Violating hierarchical relationship standards: Illogical parent-child relationships could result.

Paintbrushes does not belong under a hierarchy of Home Decorators’ Tools.
Problems with excessive polyhierarchies:

- Familiar tree structure is lost. Users cannot see the logical hierarchy.
- Users spend too much time clicking through categories.
Polyhierarchy - Minuses

Logical polyhierarchies, if done consistently, could become extensive.

Example: creating polyhierarchies for products based on different classifications

- Glass Products
  - Wine Glasses
- Tableware
- Balls
  - Soccer Balls
- Soccer Equipment
Multiple, potentially confusing categorizations:

- Place names in hierarchies for both geographic location and for place type
- Products in hierarchies for both material and for use
- Exercises in hierarchies for both body part and purpose/type (strength, endurance, etc.)

- “It’s OK, we can have polyhierarchies”
  This is not always the best solution.
- Maybe facets should be used instead.
Polyhierarchy Recommendations

Violating hierarchical relationship standards

• Might be OK in some cases in some taxonomies
• But avoid overuse in polyhierarchies

Case study example:

– **Accessories** as a narrower term to a product category
– **Services** as a narrower term to a product category

<table>
<thead>
<tr>
<th>Computers &amp; Tablets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laptop &amp; Netbook Computers</td>
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<tr>
<td>Tablets, iPads &amp; E-Readers</td>
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<tr>
<td>Desktop &amp; All-in-One Computers</td>
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<td>Monitors</td>
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<td>Mice &amp; Keyboards</td>
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<td>Video Cards &amp; PC Components</td>
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<td>Software</td>
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<tr>
<td><strong>Computer Accessories</strong></td>
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<tr>
<td><strong>Computer Setup &amp; Services</strong></td>
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</tbody>
</table>
## Polyhierarchy Recommendations

### Violating hierarchical relationship standards within limits

<table>
<thead>
<tr>
<th>Computers &amp; Tablets</th>
<th>Laptop &amp; Netbook Computers</th>
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<tbody>
<tr>
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<td>MacBooks</td>
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<td><strong>Computer Setup &amp; Services</strong></td>
<td><strong>OK</strong></td>
</tr>
</tbody>
</table>

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Polyhierarchy Recommendations

Do not create a polyhierarchy to both a “parent” and a “grandparent.”

- Cameras
  - Camera Accessories
    - Camera Lenses
      - Are lenses accessories or not? Make the decision one way or other, not both.
Polyhierarchy Recommendations

Might be better not to have polyhierarchies when the taxonomy is small and the number of top-level categories are few.

Case study: Client management documents of a financial services company has 114 topical terms categorized with just five broader terms:

- Account Information
- Client Information
- Client Status
- Disclosures & Notifications
- Approvals/Guidance

Decided against polyhierarchies.

Reason: Repeat users can memorize the small hierarchy. They don’t expect polyhierarchy here.
Polyhierarchies Conclusions

Some is good. More isn’t necessarily better.

• Polyhierarchies are best for isolated terms that can fall into two categories.
• Polyhierarchies can become too many in cases of overlays of two different categorization methods for numerous terms. (Facets may be better.)
• Polyhierarchies are useful, no matter how extensive, in term-focused thesauri.
• Polyhierarchies should be more limited in hierarchically displayed taxonomies.
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