THE DISCIPLINE OF ORGANIZING

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Outline

- Project Motivation
- We Organize Things, Documents, Information…
- The Concept of “Organizing System”
- Project Collaboration, Customization, Curation
Since 2005 I have taught the required course for entering professional students at Berkeley’s “Information School”

- The ISchools span the range from traditional library schools to informatics and computer science programs
- They are all “interested in the relationship between information, people and technology” but what do they have in common?

⇒ THE DISCIPLINE OF ORGANIZING

We Organize…

- Things
- Information
- Information about Things
- Information about Information about {Things, Information}
- …
We Organize…

- Most people have a notion of LIBRARY, MUSEUM, BUSINESS INFORMATION SYSTEM, and a few other common institutions that organize collections of various kinds.

Library

Bancroft Library, UC Berkeley
Museum

Louvre, Paris – with Mona

Archive
Human Resource Organization

The Web & Digital Libraries
Retail Store

Web Retail Store
Drop Shipment Business Model: Choreography of Services

Supply Chain

Tier 3

Tier 2

Tier 1

Enterprise

Distributors

Retailers

Customers

Materials

Products
Real-Time Information About Supply Chains

Real-Time Information About Information
We Organize…

• Most people also have a notion of different types of documents that have characteristic content, structures, and presentations.

The “Document Type Spectrum”

from “Document Engineering,”
R. Glushko & T. McGrath, MIT Press 2005
CALL me Ishmael. Some years ago—never mind how long
precisely—having little or no money in my purse, and noth-
ing particular to interest me on shore, I thought I would sail
about a little and see the watery part of the world. It is a
way I have of driving off the spleen, and regulating the
circulation. Whenever I find myself growing grim about the
mouth; whenever it is a damp, drizzly November in my soul;
whenever I find myself involuntarily pausing before coffin
warehouses, and bringing up the rear of every funeral I
meet; and especially whenever my hypos get such an upper
hand of me. that it requires a strong moral principle to pre-
vent me from deliberately stepping into the street, and
methodically knocking people’s hats off—then, I account it
high time to get to sea as soon as I can. This is my substitute
for pistol and ball. With a philosophical flourish Cato throws
himself upon his sword; I quietly take to the ship. There
is nothing surprising in this. If they but knew it, almost
all men in their degree, some time or other, cherish very
nearly the same feelings towards the ocean with me.

<table>
<thead>
<tr>
<th>Industrial Or Light Weight Bags On A Roll</th>
<th>Lay-Flat Poly Tubing Rolls</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bags Per</strong></td>
<td><strong>Part No.</strong></td>
</tr>
<tr>
<td>4 x 6</td>
<td>1000</td>
</tr>
<tr>
<td>4 x 9</td>
<td>1000</td>
</tr>
<tr>
<td>8 x 10</td>
<td>1000</td>
</tr>
<tr>
<td>10 x 12</td>
<td>1000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lightweight Bags On A Roll</th>
<th>Price Per Carton of 2 Rolls</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bags Per</strong></td>
<td><strong>Part No.</strong></td>
</tr>
<tr>
<td>10 x 15</td>
<td>2500</td>
</tr>
<tr>
<td>10 x 20</td>
<td>2500</td>
</tr>
<tr>
<td>10 x 25</td>
<td>2500</td>
</tr>
<tr>
<td>Dispenser</td>
<td>186050.LU</td>
</tr>
</tbody>
</table>

Discount per piece: Loss 3% & 1/8 in., 10% 1/8 in. or more.
We Organize…

- Most people also have PERSONAL COLLECTIONS of things or information

Closet
Stamp Collection

Document Collection
Motivating the Concept of “Organizing System”

- We can emphasize how all of these examples differ… or we can emphasize what they have in common
- They are all “Organizing Systems”
  - A collection of resources
  - Intentionally arranged
  - To enable some set of interactions

The Organizing System [2]

- RESOURCES are “anything of value that can support goal-oriented activity”
- A COLLECTION is a group of resources that have been selected for some purpose
  - A collection is also a resource but because collections are an important and frequently used type of resource we distinguish them as a separate concept
The Organizing System [2]

- INTENTIONAL ARRANGEMENT captures the idea that the system requires explicit or implicit acts of organization by AGENTS – human or computational ones.
- These arrangements follow or embody one or more ORGANIZING PRINCIPLES, “directives for design” that are expressed in an abstract or logical way that does not constrain their implementation.

Intentionality in Organizing Systems

- The Grand Canyon contains information in its organization but is not an organizing system.
- Organizing systems exist because of some intentional acts to enable interactions … where we can identify the agent(s).
The Organizing System [3]

- INTERACTIONS include any activity, function, or service supported by or enabled with respect to the resources in a collection or with respect the collection as a whole.
- Interactions can include access, reuse, copying, transforming, translating, comparing, combining… anything that a person or process can do with the resources… but we should focus on those that are designed into or directly supported by the organizing system.

The Activities of Organizing Systems

- We can identify four activities in the lifecycle of every organizing system:
  - Selecting resources
  - Organizing resources
  - Supporting resource-based interactions and services
  - Maintaining resources
For Your Closet Organizing System...

- **Selecting**: *Should I hang up my sweaters in the closet or put them in a drawer?*
- **Organizing**: *Should I sort my shirts by color, sleeve type, or season?*
- **Supporting Interactions**: *Do I need separate places for laundry or dry cleaning?*
- **Maintaining**: *Should I toss out my clothes based only on stains and tears, based on how long I’ve owned them, or based on whether I’m tired of them?*

Stop and Reflect...

- Does the definition of “Organizing System” apply to all of the types of collections, documents, and information services we’ve seen?
- Is it OK to use more abstract terms like “resource,” “interaction,” and “maintenance” instead of more specific and domain-specific terms?
- Collection development, Appraisal vs. Selecting
- Cataloguing, Indexing vs. Organizing
- Curation, governance vs. Maintenance …
Resources…

In the Library?  

In the Zoo?

On the Web:  
Universal Resource Identifiers (URIs)

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Organizing Organizing Systems [1]

• We can classify organizing systems by:
  • resource type
  • dominant purpose
  • creator
  • size of intended user community
  • or many other ways

• But these classifications overlap and don’t have clear boundaries
Organizing Organizing Systems [2]

- "Memory institutions" - libraries, archives, and museums
- Enterprise collections - business content, business data and knowledge management, web-based services
- Collections of structured information
- Collections of unstructured or semi-structured information
- Personal collections vs. institutional collections
- …

A Library
A Library?

Wikipedia

The Free Encyclopedia
3,081,000+ articles

English

Deutsch
Die freie Enzyklopädie
1,355,000+ Artikel

Español
La enciclopedia libre
884,000+ artículos

Français
L'encyclopédie libre
1,208,000+ articles

Polski
Wolna encyklopedia
874,000+ articles

Italiano
L'enciclpaedia libera
886,000+ voli

Português
A enciclopédia livre
712,000+ artigos

日本語
フリー百科事典
790,000+記事

Сибирь
Самый популярный
817,000+ статьи

Русский
Natural History Museum

*Museum national d'histoire naturelle, Paris*

Is a Zoo an Animal Museum?
Is an Animal Theme Park a Museum?
Is it A Zoo?

Sea World, San Diego - with “Shamu” [ARKS]

“Design Space” or “Dimensional” Perspective

• Instead of thinking in terms of categories like Library or Museum or Business Information System, consider a specific organizing system as a point in a multidimensional design space and these categories as regions in that space...
The 5 Dimensions of an Organizing System

- What Is Being Organized?
- Why Is It Being Organized?
- How Much Is It Being Organized?
- When Is It Being Organized?
- Who (or What) is Organizing It?

What Is Being Organized?

- Identifying the unit of analysis is a central problem in every intellectual or scientific discipline - and in every organizing system.

- Resources that are aggregates or composites of other resources, or that have internal structure, pose questions about the granularity of their “thingness”.

- We might need to organize and manage the granular resources, the composite resources, and the relationships between them - all at the same time.
How Many Things?

SAN FRANCISCO'S WORLD CHAMPIONS

1981

How Many Things?

THE CARPET-BAG

I STUFFED a shirt or two into my old carpet-bag, tuck ed it under my arm, and started for Cape Horn and the Pacific. Quitting the good city of old Manhatto, I duly arrived in New Bedford. It was on a Saturday night in December. Much
How Many Things?

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Primary Resources and Description Resources

• We often designate some resource as primary because it is the focus of our attention

• We often create other resources that are descriptions of or otherwise associated with the primary resource

• We call these “Description resources” (a more general term than “metadata”)

• Primary and description resources can be either physical or digital…. So there are 4 combinations
A Collection of Physical Description Resources of Physical Resources
A Card from a Card Catalog

Z671
L6
v.14
Phillips, David Rhys, 1868-
The monastic libraries of Wales, fifth to sixteenth centuries (Celtic and mediaeval periods).

A Digital “Catalog Card”

Search results: 2 Item(s)

Item 1 of 2 Total

In the monastic libraries of Wales, fifth to sixteenth centuries (Celtic and mediaeval periods)
"Augmented Reality" – Digital Descriptions for Physical Resources

Search Results are Digital Description Resources for Digital Resources
Printed QR “Quick Response” Codes are Physical Descriptions of Digital Resources

Why Is It Being Organized?

• The essential purpose of an Organizing System is to "bring like things together and differentiating among them"

• But there are always more precise requirements and constraints to satisfy and more specific kinds of interactions to support
Some interactions can be enabled with any type of resource, while others are tied to resource types.

Interaction can be direct, mediated or indirect, or limited to interactions with resource copies or descriptions.
Physical manipulation is an intrinsic interaction with collections of physical resources.

Physical manipulation and interpersonal contact might be required to interact with information resources in physical form like the printed books in libraries.

With digital resources, neither physical manipulation nor interpersonal contact is required for interactions, and the essence of the interaction is information exchange or symbolic manipulation of the information contained in the resource.

So we often interact with physical resources through associated digital resources.
Principles of Organization

- The organization of physical resources is strongly influenced by their material manifestation, and this organization often persists when digitized resources are organized.

- The simplest organizing principle is co-location.

- Almost any property of a resource might be used as a basis for its arrangement, and multiple properties are often used simultaneously.

- Properties of the collection as a whole can also be used in organizing principles.
**Principles of Organization**

**Collection Level - Resource Properties**

<table>
<thead>
<tr>
<th>Governance</th>
<th>Standard Centralized</th>
<th>Ad hoc Centralized</th>
</tr>
</thead>
<tbody>
<tr>
<td>definition: governmental authority that imposes principles, or standard algorithm like tf / idf</td>
<td>definition: different, variations to standard domain, idiosyncratic</td>
<td>examples: Proprietary schemas, Google Page Rank algorithms</td>
</tr>
<tr>
<td>examples: National biographical, industry standards</td>
<td>examples: company wide standards, OASIS, W3C</td>
<td>Google Page Rank algorithms</td>
</tr>
</tbody>
</table>

**Standard Decentralized**
- definition: Authority from multiple organizations, interest groups.
- examples: company wide standards, OASIS, W3C

**Ad hoc Decentralized**
- definition: autonomous arrangement of physical / informational resources.
- examples: Web 2.0 applications

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**Organizing System: Home Kitchen**
Principles of Kitchen Organization

• **Intrinsic static properties**: If you store your pots, frying pans, and baking pans in different cabinets and nest each set by size

• **Extrinsic static properties**: A spice rack with the spices arranged in alphabetical order

• **Intrinsic dynamic properties** if you arrange your milk and other perishable goods by expiration date, a “useful life remaining” property that decreases to zero as the expiration date approaches

• **Extrinsic dynamic properties** if you put the most frequently used condiments or spices in the front of a refrigerator or pantry shelf.

Grocery Store: Multiple Organizing Principles
Closet

An Individual’s Book Classification System
A DJ Organizes His Record Collection

• Alphabetical - Arrange resources according to the spelling of their names or identifiers

• Chronological - Arrange resources according to some time-related property or descriptor

• Geographical - Arrange resources according to location information

Rosenfeld & Morville, Information Architecture for the World Wide Web (the “Polar Bear” book)
How Much Is It Being Organized?

• Not every resource needs the same amount of organization
• Not everything is equally describable
• A controlled vocabulary can yield more consistent organization
• The scope and size of a collection shapes how much it needs to be organize
• Are you organizing the resources you have, or do you need to create an organizing system that can apply to resources that you have not yet collected?

When Is It Being Organized?

• When the resource is created
• When it is added to some collection
• Just in time
• Never
• All the time - continuous or incremental
"Just in Case" Organization

Postponing Organization
Who or What Is Organizing?

• Authors or creators
• Professional organizers
• Users “in the wild”
• Users "in institutional contexts“
• Automated or computerized processes
Summary

- The concept of Organizing System unifies a vast body of design and analysis practice from many disciplines
- Thinking in terms of design dimensions overcomes the limitations and inertia of the traditional categories
- It is a generative, forward-looking approach that encourages and accommodates innovation while preserving conventional theory and practice as design patterns
- It enables intelligent conversations between people who didn’t have much common language before

Project Collaboration

- This book began as the lecture notes from my Berkeley course, but I soon realized that it was more ambitious than I could do on my own
- So I enlisted numerous collaborators, and the book is now the product of countless discussions with students and faculty colleagues at Berkeley and other schools
- Manuscript has been used at Berkeley (2x), UNC, and Humboldt, and other schools will soon try it
What We Are Publishing

“The Discipline of Organizing” will be published by MIT Press in early 2013 (R. Glushko, editor) simultaneously in several different formats:

- As a traditional printed book
- As pdf files, freely available for anyone to use (starting Fall 2012)
- In one or more ebook formats, integrated into a content repository to enable continued collaboration among the ISchools, who will collectively maintain and evolve the content and who can generate customized ebooks on demand

Customization

- We have devised an approach that lets the book focus on core ideas while enabling it to satisfy different topical emphases

  Solution: “Lean text” + tagged “endnotes”

- [LIS], [Technology], [Business], [Healthcare Informatics], [Berkeley], [2012], etc.

- Ebook “dials” can adjust the number and categories of endnotes that are seamlessly incorporated into the text
Example of Tagged Notes: Main Text

The Organizing System for a small collection can sometimes use only the minimal or default organizing principle of “co-location” – putting all the resources in the same container, on the same shelf, or in the same email inbox. If you don’t cook much and have only a small number of spices in your kitchen, you don’t need to alphabetize them because it is easy to find the one you want.

The Associated [Technology] Note

- For collections of non-trivial size the choice of searching or sorting algorithm is a critical design decision because they differ greatly in the time they take to complete and the storage space they require. For example, if the collection is arranged in an unorganized or random manner (as a “pile”) and every resource must be examined, the time to find a particular item increases linearly with the collection size. If the collection is maintained in an ordered manner, a binary search algorithm can locate any item in a time proportional to the logarithm of the number of items. Analysis of algorithms is a fundamental topic in computer science; a popular textbook is "Introduction to Algorithms" by Thomas Cormen et al (2009).
Curation

- The repository of book content and shared course materials (lecture notes, assignments, etc.) will be hosted at Berkeley as DisciplineOfOrganizing.org
- I will serve as curator for at least two years
- We will also provide technical guidance and support for authoring and customization
- Most of the publishing system will be available through dita4publishers.sourceforge.net/
Comments, questions?

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