Agenda

- What is innovation?
- The innovation process
- Information tasks and KM
- Cognitive computing
- What it is
- How it adds new dimensions to KM
- Re-imagining KM
Innovation ingredients

Problem or Research Direction

Opportunity
Cross-fertilization
Colleagues
Passion
Open mind

Information
Happy accidents
Support
Serendipity
Curiosity

“Fueled by a dangerous combination of coffee and obsession.” - Barack Obama
What is innovation?

• A new idea, practice, or object
• Rarely entirely novel
• Most successful innovation occurs at the boundaries between subjects or organizations
• Group, rather than individual effort—developers, users, partners, colleagues
• Tends to occur at lower levels in an organization
• May disrupt industries or companies
• Risky and rewarding.
Business case for supporting innovation

• Drives economic growth in the economy
• Revenue: increased revenue from being first to market
• Market dominance (e.g., Apple iPhone and ecosystem)
• Attract and keep customers. Build customer loyalty, market buzz
• Avoid disruption, stay competitive, expand into new markets
• Create a fertile environment for R&D
  • Create a pipeline of new ideas to avoid stagnation and being bypassed by competitors
  • Attract outstanding researchers
Innovation process

1. Open discussions, wide reading, input from colleagues, customers, partners => a growing awareness of a need
2. Define the problem
3. Eliminate common, prosaic ideas
4. Simmer
5. Explore broadly
6. Filter, winnow, focus
7. Rethink, iterate, start from the top
8. Develop
## Information tasks

<table>
<thead>
<tr>
<th>Activity</th>
<th>CREATE</th>
<th>FIND</th>
<th>DISCOVER/UNCOVER</th>
<th>ANALYZE</th>
<th>DISCUSS</th>
<th>DECIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>What</td>
<td>Write, Draw, Film, Speak, etc.</td>
<td>Search, Gather, Retrieve</td>
<td>Explore, Traverse, Cluster, Iterate</td>
<td>Interact, Iterate, Reframe Model</td>
<td>Weigh evidence, compare to priorities. Recommend</td>
<td>Select best alternative</td>
</tr>
<tr>
<td>How</td>
<td>Documents, Media</td>
<td>documents, facts, reports</td>
<td>Patterns, Relationships Surprises Unexpected data,</td>
<td>Data sets, visualizations x-rays, films, summaries, lab results</td>
<td>All data</td>
<td>Summarize decision. Report</td>
</tr>
</tbody>
</table>

**How**
- Software or real world media
- Query
- Problem statements, Hypotheses, Visual tools
- Visualize, Categorize, Cluster, Draw, Statistical tools
- Asynchronous or Synchronous discussions, in-person, online
- Reporting tools, collaborative tools
Role of information access and analysis tools

• Improve exploration and discovery
• Introduce related information without superfluous information
• Improve and/or eliminate queries. Help the user frame the question
• Discover unexpected relationships
• Search on concept level rather than keywords
• Unite multiple sources of information including some you may not know
• Collect and share
• Enable information and people interaction in one application
• Save time
Cognitive Systems

Serendipitous Exploration
Cognitive computing

• …makes a new class of problem computable:
• Ambiguous, unpredictable
• Conflicting data
• Require exploration, not searching
• Need to uncover patterns and surprises
• Shifting situation, goals, information
• Best answers based on context
• Problem solving: beyond information gathering
Context: Jeopardy!

• Rules
• Other players
• What everyone has won already
• What confidence do I have in my answer?
• How much do I need to win?
Context: a patient

• Individual profile (context):
  - Genetic makeup
  - Age
  - Sex
  - Medical history: allergies, other conditions, etc.

• Location
• Health services available
• Possible treatments and confidence scores
Context: an investor

- Portfolio
- Personality:
  - Conservative? Adventurous?
    Depends on friends’ advice
- Wants a lot/little data?
- Influencer?
- Age
- Previous investment history
- Market trends
- Investment strategy
Context: sales

- Profile of successful sales:
- Industry sector, finances
- Buying behavior
- Profile of best contacts
- Position in company
- Relationship to salesperson
- Current company news
- Confidence scores
- Action recommendations: strategic usefulness/importance score
Tama the cat, Japan's cutest stationmaster, has died.
Cognitive computing is

• Meaning-based
• Probabilistic
• Iterative and conversational
• Interactive
• Contextual
• Learns and adapts based on interactions, new information, users
• Big data knowledge base—multiple sources, formats
• Analytics
• Highly integrated set of technologies
Cognitive systems:

• Act as an intelligent partner:
• Analyze BIG data
• Understand human language on multiple levels
• Analyze and merge all formats and sources of information
• Uncover relationships across sources
• Understand and filter by context
• Find patterns in the data that are both expected and unexpected
• Learn from new information, new interactions
• Are there new drugs that might be MORE effective for controlling diabetes?

• Who is funding this terrorist organization and how are the funds delivered? IS THIS ORGANIZATION A THREAT?

• Can I identify the MOST RISKY product or customer problems before they blindside our company?

• Which company would be the MOST PROMISING M&A target?
Cognitive computing is

• More than big data or AI
• Not robotics.
• Not drones.
• Not humanoids
• Not entirely autonomous
• Not the singularity

A cognitive system is an aid, not a replacement for humans
Cognitive Systems

Overview
The BEST cognitive system
Traditional information systems
Innovation elements

- **People**, from diverse groups and backgrounds
- **Collaboration** tools and a common environment to share and discuss information
- **Access tools** to find, forage, browse, sort, analyze, visualize information
- **Information**: external and internal sources, integrated into a useful work environment
- **Work environment** designed for cross fertilization in a distributed environment
Barriers to innovation

- Lack of organizational support
- Party line thinking
- No time to think
- Wasted time on repetitive tasks or because of poor tools
- Too-rigid innovation systems
- Lack of encouragement of innovation from the bottom up (where the best ideas bubble)
- Poor or limited information
- Information overload
Reimagining KM
Informed Serendipity
Recombinant Knowledge
Recombinant knowledge
Sue Feldman is founder and CEO of Synthexis, a consulting firm that provides business advisory services to vendors and buyers of cognitive computing, search and text analytics technologies. Since 1990, she has been instrumental in shaping market research and understanding in search and text analytics. She speaks frequently at industry events on topics such as trends in computing, conversational systems, big data technologies, and the hidden costs of information work.

In her book, The Answer Machine (Morgan & Claypool, 2012), Sue discusses the technologies behind information seeking and analysis, and their central role in the future of computing. Before founding Synthexis, Sue was Vice President for Search and Discovery Technologies at IDC (International Data Corporation), where she directed research on the technologies and markets for search, text analytics, categorization, translation, mobile and rich media search. Ms. Feldman holds degrees from Cornell University in linguistics and from the University of Michigan in information science.

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