

# Integrating Digital Libraries within Work Task ▶ Systems

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Information Processes  
Enterprise Search Systems  
Content Management Systems  
Information Systems

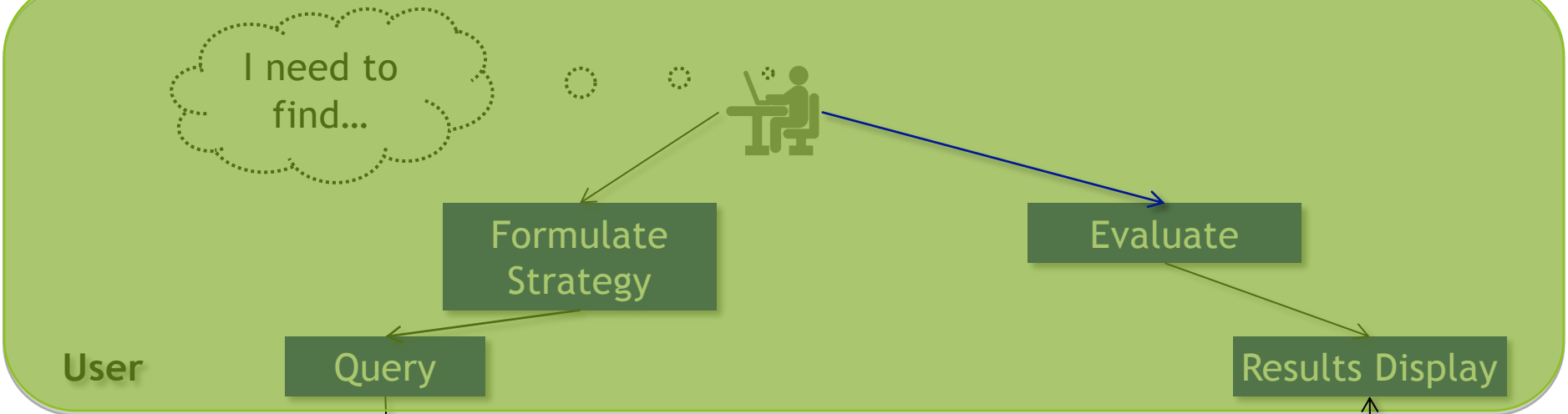
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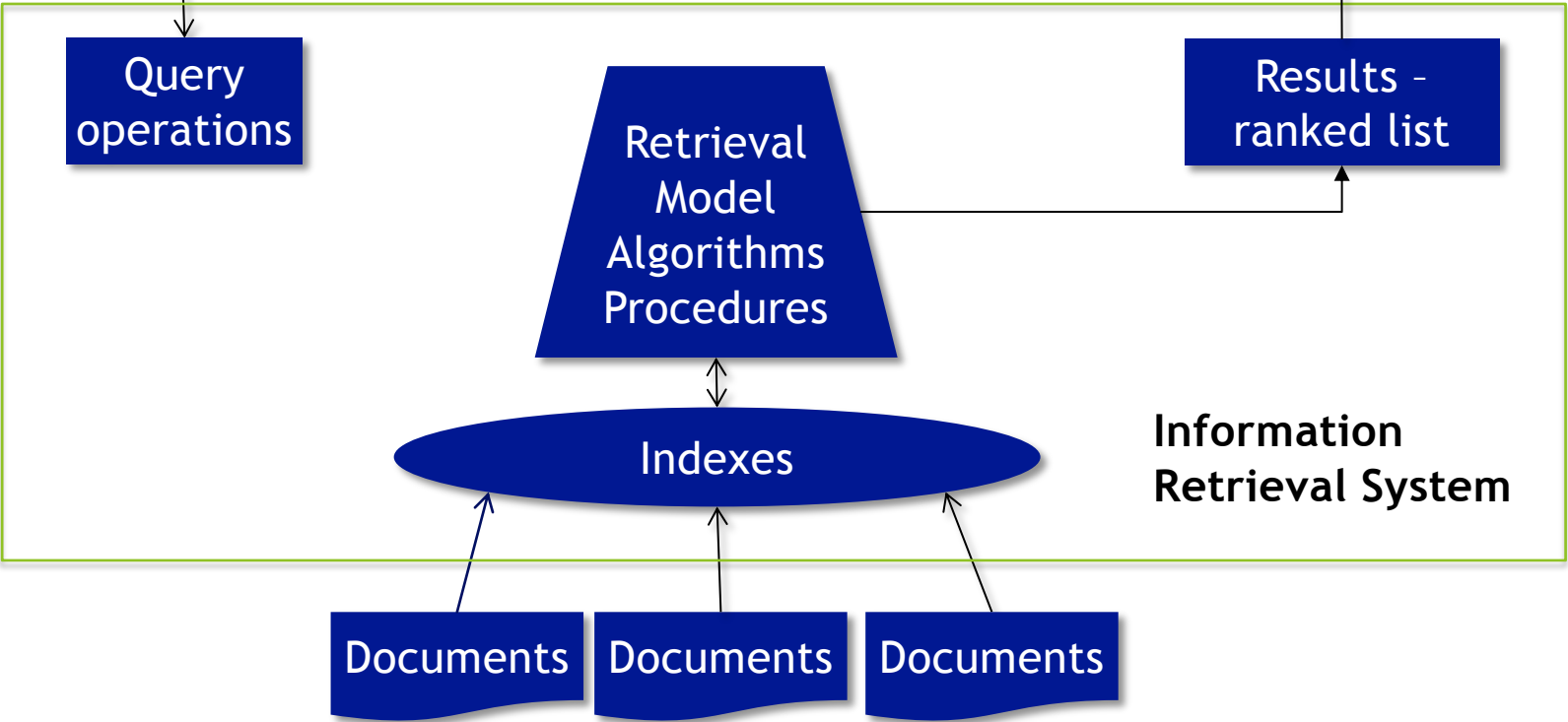
# Information has value! But...

- ▶ Gartner: 64% of companies invest or plan to invest in big data, but see the biggest problem as **deriving value** from that data
- ▶ Gartner predicts that enterprise data will grow by 800% in next 5 years with 80% of it **unstructured**.
- ▶ IDC: 90% of the time knowledge workers spent in creating new reports is spent in **re-creating information** that already exists
- ▶ McConnell's digital workplace scorecard: "enterprise search remains **stuck at a low level of satisfaction** with results"
- ▶ Technology Services Industry Association: "87% of respondents said they are **not even close to getting the most from all of their knowledge assets**, across systems, the web and social media"

...the value is not always realised.



**System**



**Information Retrieval System**

# Context

**Environment**

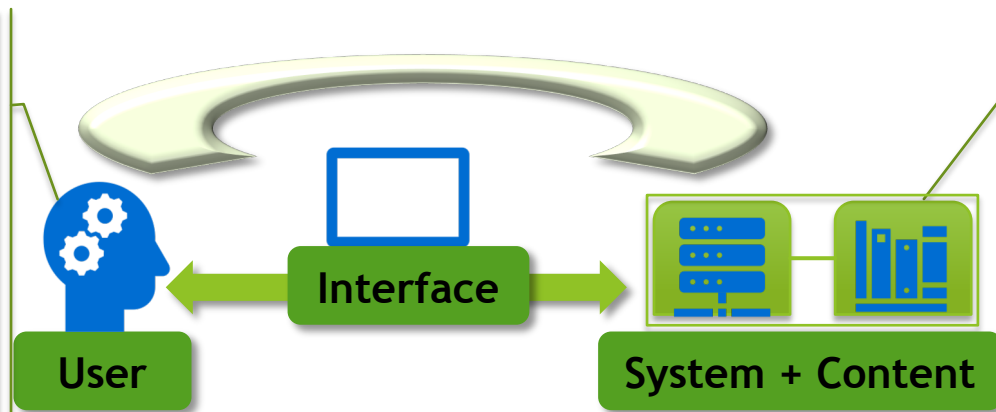
*Domain  
Workplace Culture  
Managerial factors  
Organizational factors*

**Task**

*Objective  
Motivation  
Type*

**Situation**

*Knowledge  
Experience  
Motivation  
Physical ability  
Cognitive ability  
Learning style  
Mental Model*



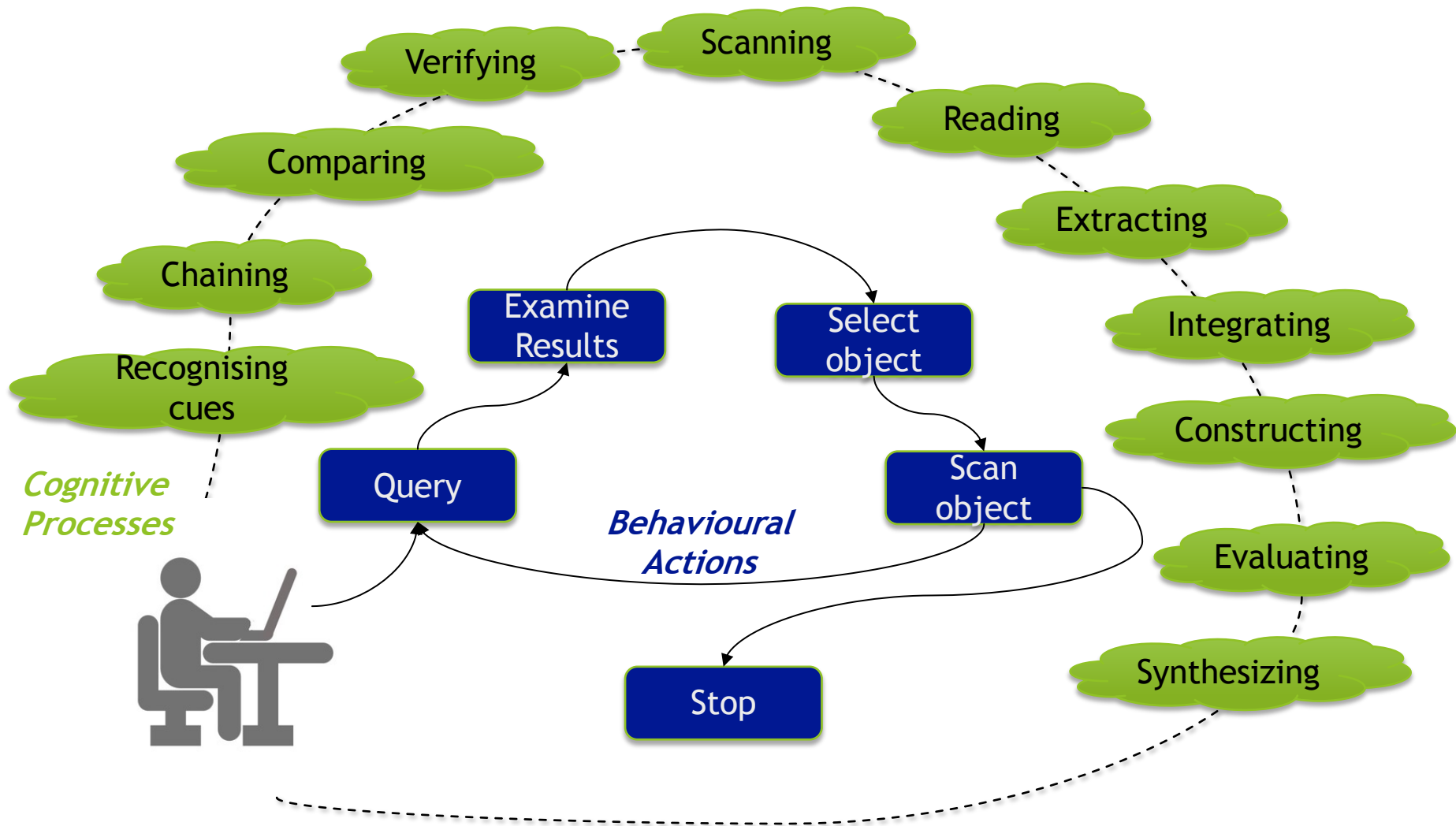
*Date  
Format  
Language  
Genre  
Authenticity  
Topic  
Domain*

*Distraction  
Interruption  
Time*

**Outcome**

*Orientation  
Overview  
Evidence  
Explanation  
Instructions  
Definition*

# Supporting Human Information Interaction



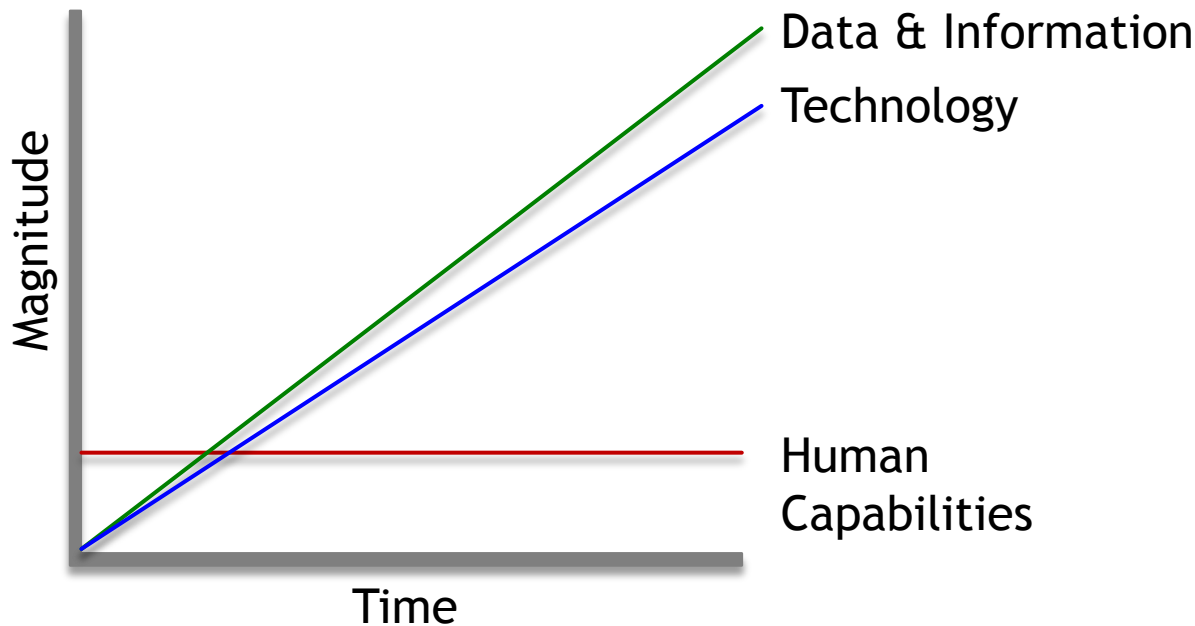
# Work... and the Change in Work

*From mostly brawn to  
almost completely  
brain*



*Raw material* = data & information  
*Output* = more information +  
knowledge & insights.

# The Paradox



*Data, Information and Technology have had extensive growth, but **human capability** has remained about the same*

**Humans need help!**



# Work? What exactly do Knowledge Workers do?

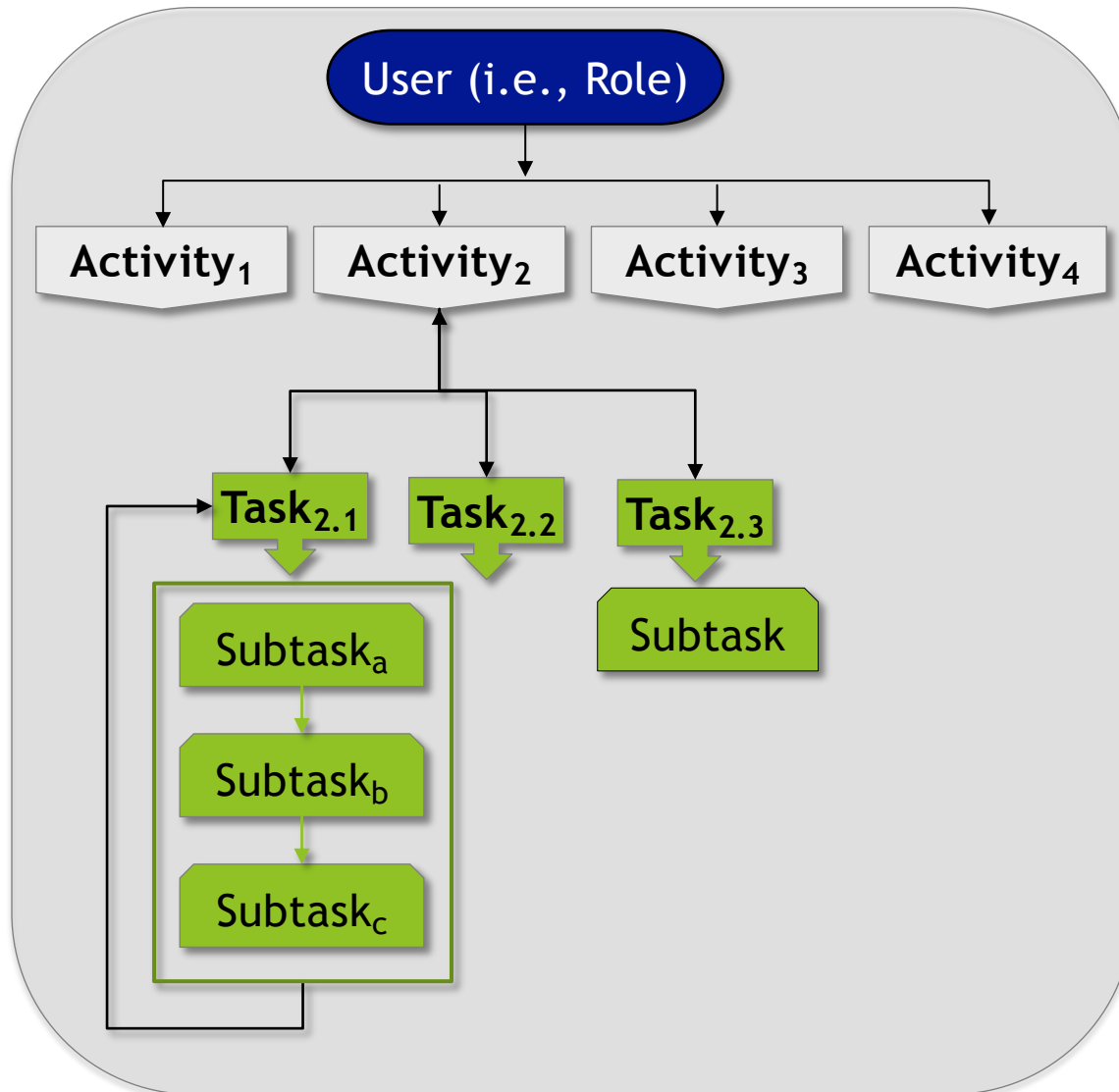
- ▶ Surprisingly, no one knows!
- ▶ Often defined by job role, education, economic returns, work in a sector or institution, particular level, e.g., managerial, professionals, associates, assistants
- ▶ Also
  - ▶ “non-standardized problem solving” (Reich, 1992)
  - ▶ “intellectual work” (Amar, 2002)
  - ▶ produce new knowledge (Chen & Dahlman, 2005)
  - ▶ produce intangible ‘intellectual’ assets (Webster, 1999)

**Still does not explain what KWers *do!***

Typically described as:

- ▶ Anything but computerisation for routine tasks (Levy & Murnane, 2003)
- ▶ Depends on cognitive complexity of the task
  - ▶ 30-30-40 of knowledge used in task such as
    - ▶ Data processing & analysis
    - ▶ Leadership & development
    - ▶ Administrative task
    - ▶ Perceptual/precisions tasks
    - ▶ People management

# Deconstruct Work -- From Activities to Tasks



A user has multiple roles (e.g., mother, football coach, middle manager);

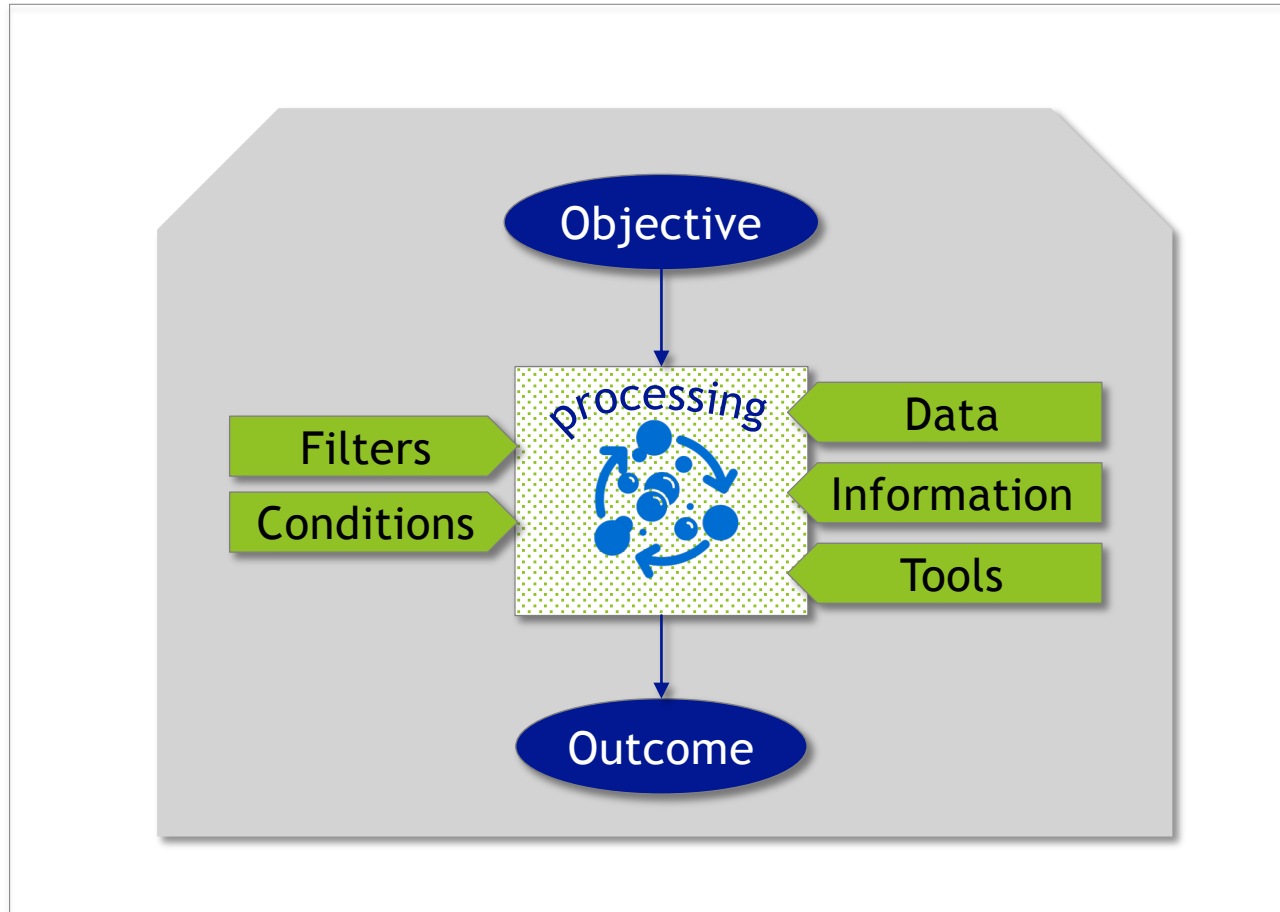
Each role has multiple activities.

Each activity may take one or more tasks.

A complex task may need to be decomposed into multiple subtasks.

Each of these tasks/subtasks may need different types of data & information from different sources.

# Anatomy of a Task



# Example of Activity and its Generic Tasks

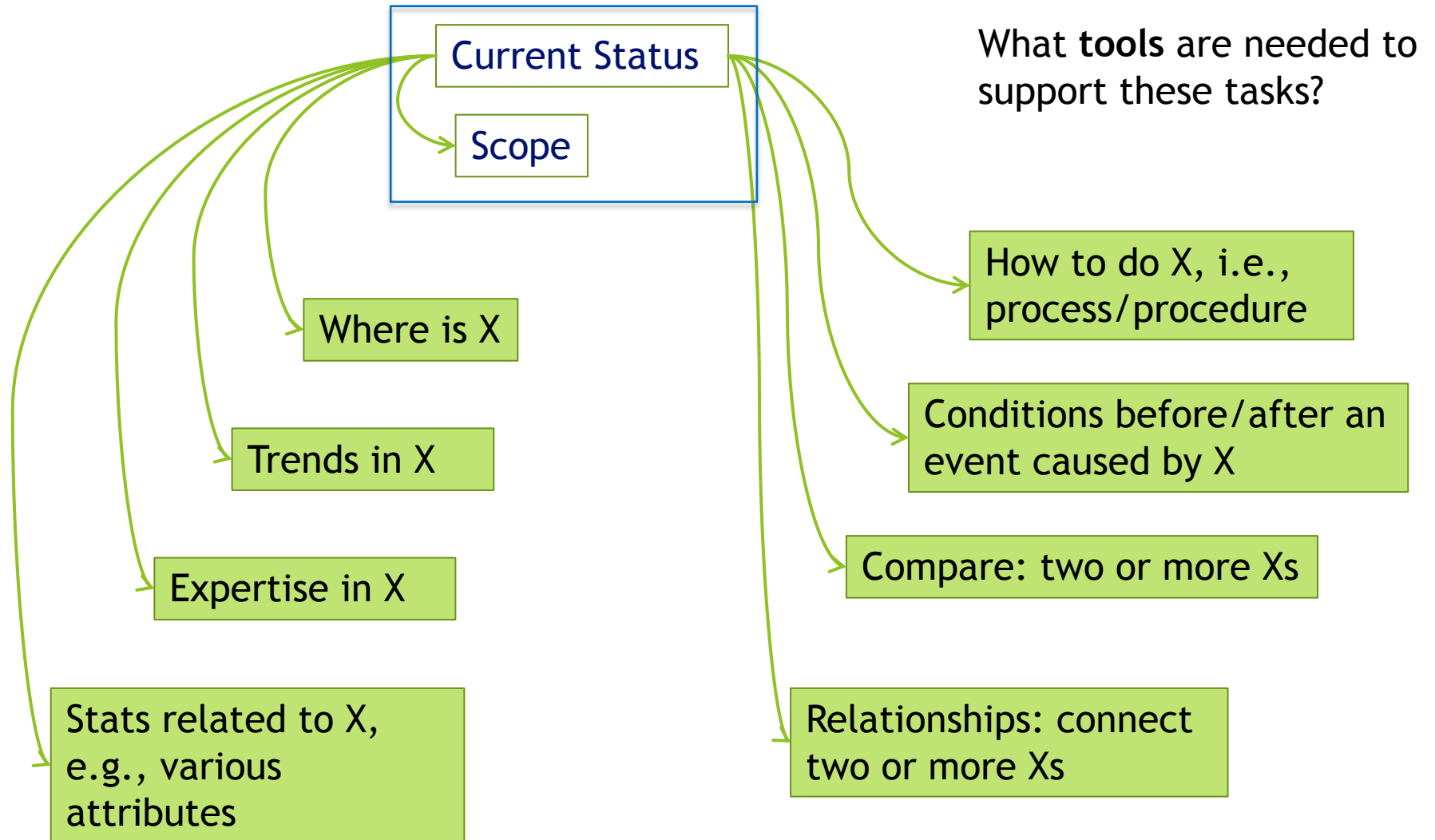
## Research Scientist (P4)

- Impact of tidal energy extraction on local environment.
- Sedimentation patterns and fish behavior in the area
- Collected past data from the historic data and new satellite technology for estimating surface sediment concentration
- Used data to validate models of how turbines affect sedimentation pattern and fish behaviour.
- Compare with other areas and estuaries with energy extraction

## Tasks/Subtasks

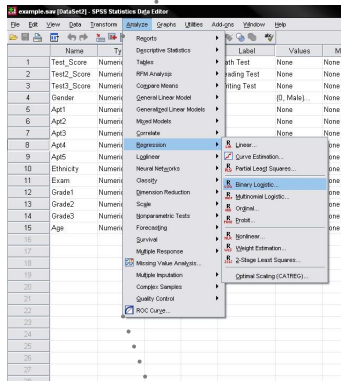
1. Current status for [geog] based on x Variables
2. [Pre or Post] condition before/after [date, event, threshold]
3. Where does [Variable X] occur
4. Comparisons of incidence of [variable X]

# Knowledge Work Tasks



# Structure vs. Unstructured Information?

Tools?

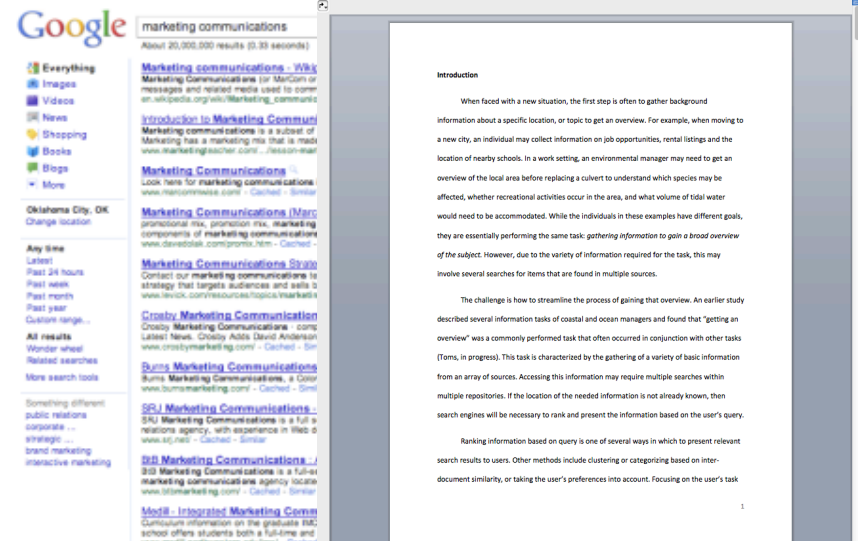


How many ways can we examine and interpret numbers & codes?

- Reports
- Descriptive Statistics
- Tables
- RFM Analysis
- Compare Means
- General Linear Model
- Generalized Linear Models
- Mixed Models
- Correlate
- Regression
- Loglinear
- Neural Networks
- Classify
- Dimension Reduction
- Scale
- Nonparametric Tests
- Forecasting
- Survival
- Multiple Response
- Missing Value Analysis...
- Multiple Imputation
- Complex Samples
- Quality Control
- ROC Curve...

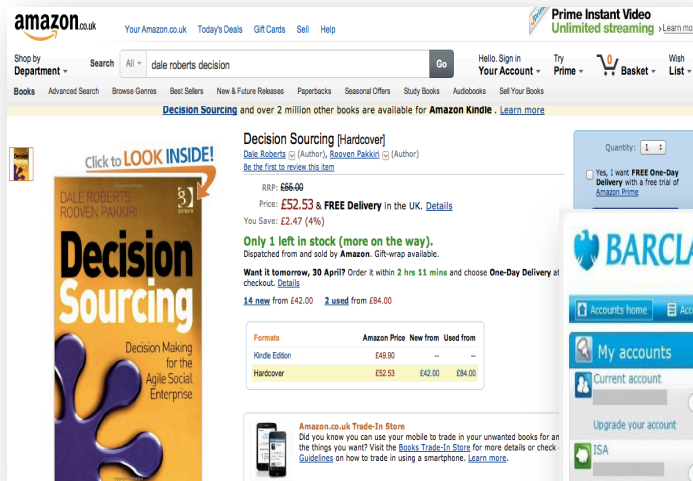
Tools?

How many ways can we examine text, audio, video, illustration?

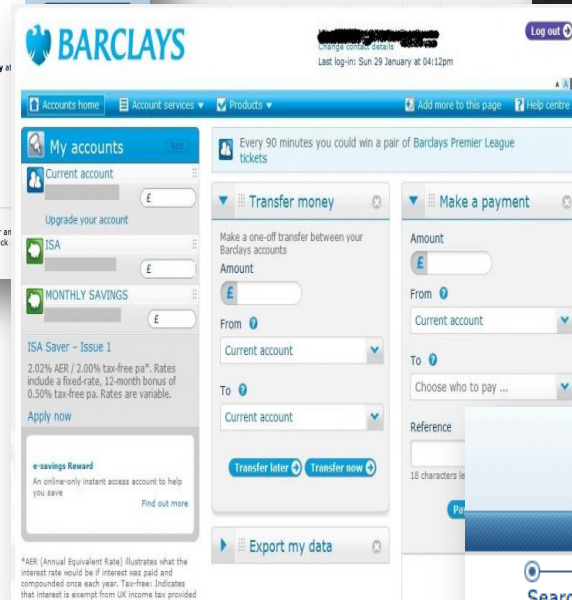


# Existing Tools for Specific Tasks

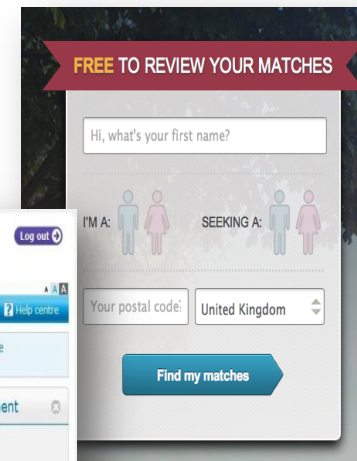
## Shopping



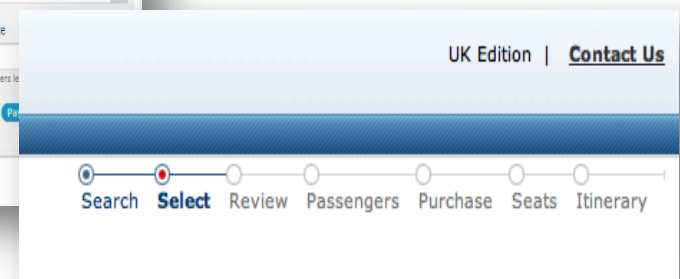
## Banking



## Online Dating



## Travel

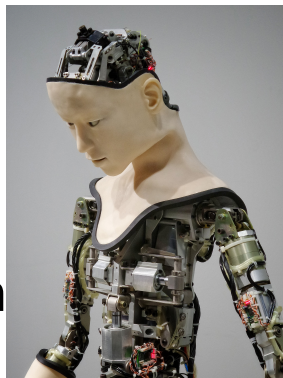


*Cognitive prostheses of sorts!*

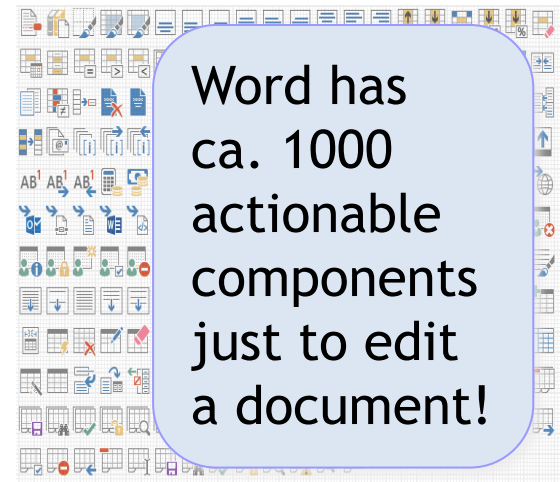
# Tools as “Cognitive Prostheses”

- develop cognitive prostheses to support a worker in filtering, comparing, extracting useful chunks of information, and gaining insights from those chunks
- intended to *augment* human cognition

Not physical prostheses that aid physical actions, or brain implants to support/augment cognitive activity



In parallel...





# Tools to support Knowledge Work

Typical workplace tools used today:

Email or Texting

Word processor

Spreadsheet app

Presentation app

Search engines

(Work Foundation, 2009)

*How work is done is limited by the tools available today.*

*Common integrated interface for knowledge work - think Microsoft Office ribbons on steroids*

*Room for a “dashboard” that includes Search + eDiscovery + Text Analytics + Data Analytics + ...*

# The Iceberg Analogy

User's View

System



# The Iceberg Analogy - Revisited

Use ~~X~~ View

System

~~X~~ System

Context, e.g.,  
Task,  
Environment,  
Situation

# No Conclusion - Many Questions!

- ▶ What is the nature of knowledge work? This is much like Taylor's question: *how does one do this job?* What is the pattern or structure to knowledge work?
- ▶ How to extract real value from all those zettabytes of data and information so that we can be the most productive?
- ▶ What tools are required to augment and enhance how the worker does the job? What *cognitive prostheses* should we be creating? There are many.
- ▶ Ultimately, where should the user stop and the machine start? How to seamless workflow between and among humans and machines for more effective decision making?

The information retrieval system is key to the job, but not the end solution

# Acknowledgements

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## Post-session comments or questions? Please contact:

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