



# Design Synthesis

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**ac4d**

**Well-  
Structured  
Problems**

**Ill-  
Structured  
Problems**

**Wicked  
Problems**

# Well- Structured Problems

# Ill- Structured Problems

# Wicked Problems

In a well structured problem, all of these are true:

We can test our solution.

We can identify problem, goal, and interim states.

We can identify solution steps.

We can identify domain knowledge.

We can solve the problem while obeying the laws of nature.

We can solve the problem using only practical levels of effort.

Herb Simon, 1973

# Well- Structured Problems

# Ill- Structured Problems

# Wicked Problems

In an ill-structured problem, some of these are true:

- We cannot test our solution, or cannot test it easily.
- We cannot easily identify problem, goal, or interim states.
- We cannot identify all of the solution steps.
- We cannot identify domain knowledge (it may be tacit).
- We may be constrained by the laws of nature.
- Solutioning may outweigh practical efforts.

Herb Simon, 1973

# Well- Structured Problems

# Ill- Structured Problems

# Wicked Problems

In a wicked problem, the following are true:

Wicked problems have no definitive formulation.

Wicked problems have no criteria upon which to determine “solving”.

Solutions to wicked problems can only be good or bad.

There are no complete list of applicable "moves" for a solution.

There are always more than one explanation for a wicked problem.

Every wicked problem is a symptom of another problem.

No solution of a wicked problem has a definitive, scientific test.

Every wicked problem is unique.

Horst Rittel, 1973

**Well-  
Structured  
Problems**

**Ill-  
Structured  
Problems**

**Wicked  
Problems**

Designers solve problems using a process.  
Design Synthesis is the magical part of the process.

**Ethnography**

**Synthesis**

**Prototyping**

# Ethnography

Immersion – gathering data and understanding of a unique situation

# Synthesis

# Prototyping



# Ethnography

Immersion – gathering data and understanding of a unique situation

# Synthesis

# Prototyping

Hypothesis validation through generative form giving

## Ethnography

Immersion – gathering data and understanding of a unique situation

## Synthesis



## Prototyping

Hypothesis validation through generative form giving

Synthesis is the process of making meaning through inference-based sensemaking.

Ethnography

Synthesis

Prototyping



Synthesis is the process of making meaning through inference-based sensemaking.

deductive

inductive

abductive

Jon is a Designer.

All Designers are Arrogant Bastards.

Therefore, Jon is an Arrogant Bastard.

**deductive**

**inductive**

**abductive**

The output is guaranteed to be true,  
if the premise is true.

Jon is a Designer.

All Designers are Arrogant Bastards.

Therefore, Jon is an Arrogant Bastard.

**deductive**

The output is guaranteed to be true,  
if the premise is true.

All of the designers I've ever seen wear  
black t-shirts.

Therefore, the next designer I will see  
will be wearing a black t-shirt.

**inductive**

Gives good evidence  
that a conclusion is true.

**abductive**

Jon is a Designer.  
All Designers are Arrogant Bastards.  
Therefore, Jon is an Arrogant Bastard.

## deductive

The output is guaranteed to be true,  
if the premise is true.

All of the designers I've ever seen wear  
black t-shirts.  
Therefore, the next designer I will see  
will be wearing a black t-shirt.

## inductive

Gives good evidence  
that a conclusion is true.

When a designer works on a project,  
they often draw diagrams of things. It  
seems to help them learn about a new  
topic.

I've seen grade school students  
struggle to learn complex topics of  
math or science.

I can abduct that students might be  
able to learn better by drawing  
diagrams in a classroom setting.

## abductive

The argument from best explanation,  
depending on circumstances and  
experience – an **inference**.

Ethnography

Synthesis

Prototyping



Synthesis is the process of making meaning through inference-based sensemaking.



Ethnography

Synthesis

Prototyping



Synthesis is the process of making meaning through inference-based sensemaking.



## David Snowden

“We have found that [our sensemaking framework] helps people to break out of old ways of thinking and to consider intractable problems in new ways... it is designed to allow shared understandings to emerge through the multiple discourses of the decision-making group.”



## Karl Weick

“Sensemaking is, importantly, an issue of language, talk, and communication. Situations, organizations, and environments are talked into existence... Sensemaking is about the interplay of action and interpretation rather than the influence of evaluation on choice.”



## Robert Hoffman

“By sensemaking, modern researchers seem to mean something different from creativity, comprehension, curiosity, mental modeling, explanation, or situational awareness... Sensemaking is a motivated, continuous effort to understand connections (which can be among people, places, and events) in order to anticipate their trajectories and act effectively.”

**Ethnography**

**Synthesis**

**Prototyping**



Synthesis is the process of making meaning through inference-based sensemaking.

Ethnography

Synthesis

Prototyping



It's a process of learning.

**Ethnography**

**Synthesis**

**Prototyping**



**Data**

**Information**

**Knowledge**

**Wisdom**

?

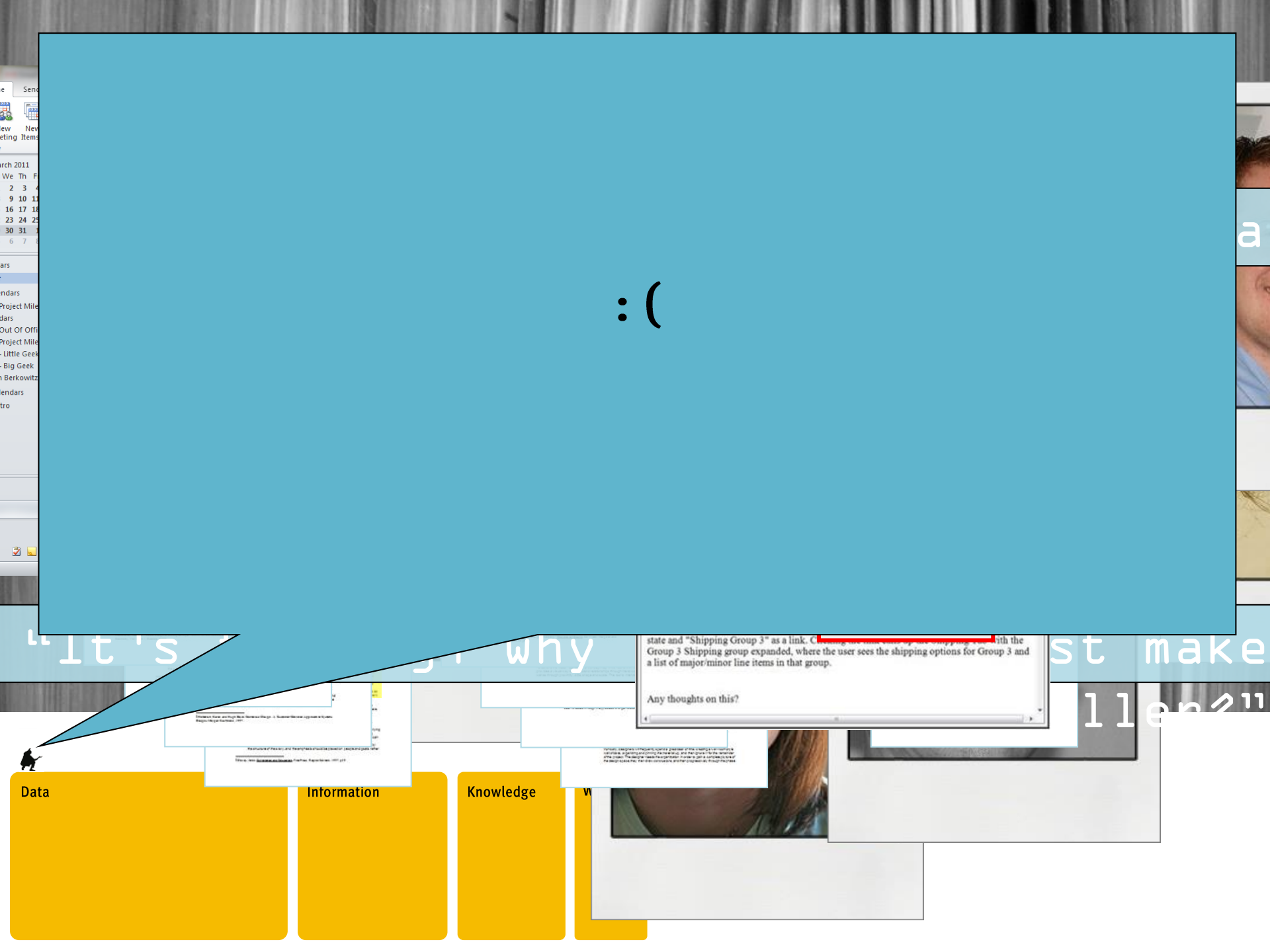
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**Making Meaning  
out of Data**

**Experience  
Frameworking**

**Gaining  
Empathy**



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Data

Information

Knowledge

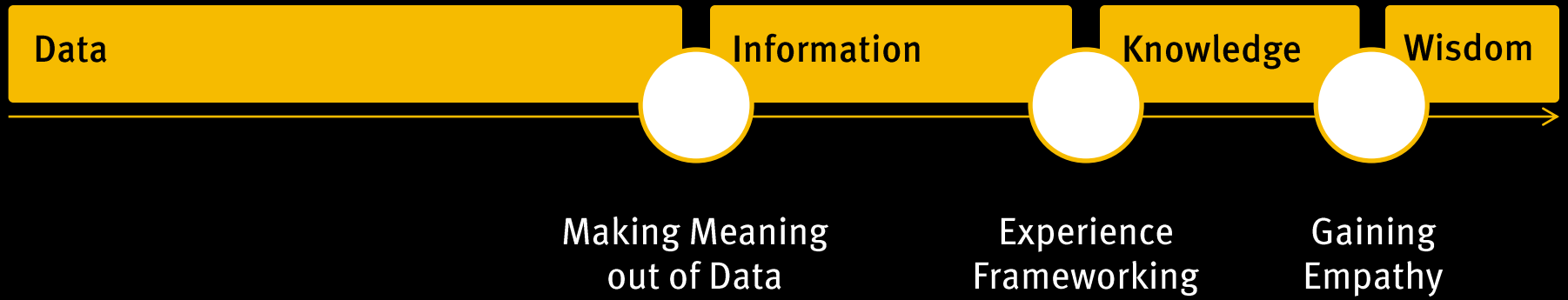
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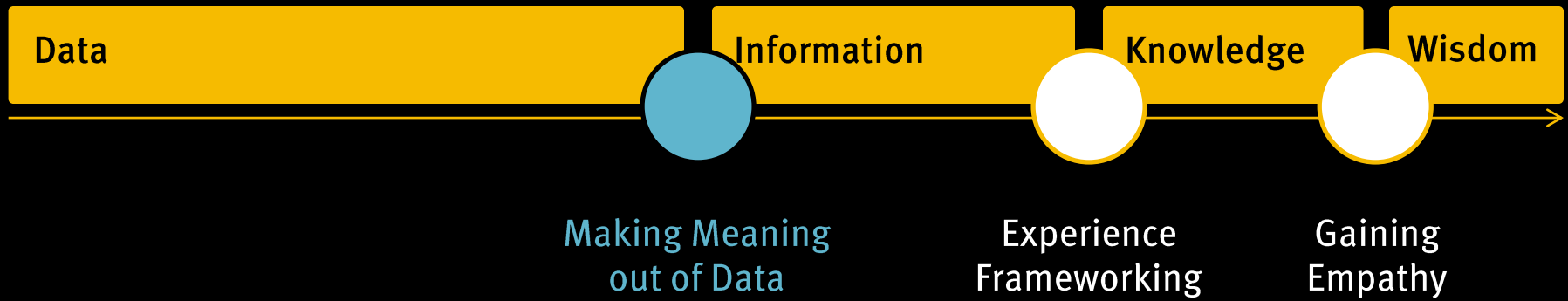
state and "Shipping Group 3" as a link. **Clicking on the shipping group shipping** with the Group 3 Shipping group expanded, where the user sees the shipping options for Group 3 and a list of major/minor line items in that group.

Any thoughts on this?

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llen?"







Data

Information

Knowledge

Wisdom

Making Meaning  
out of Data

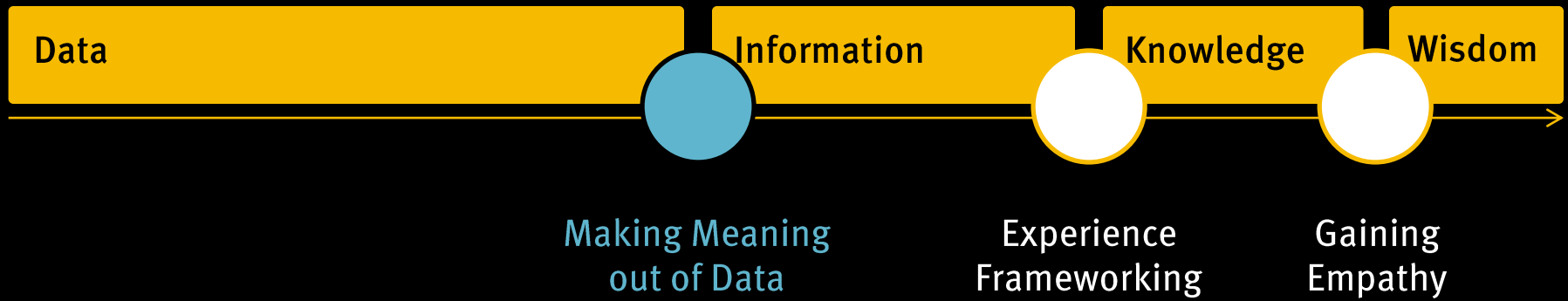
Experience  
Frameworking

Gaining  
Empathy

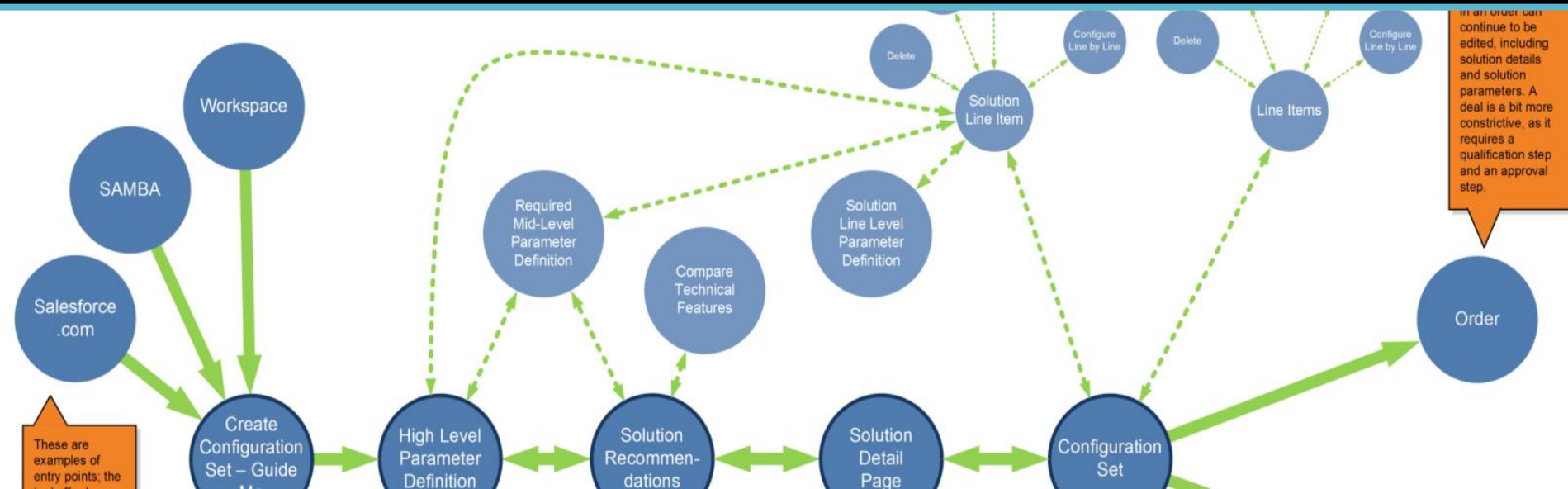
1.

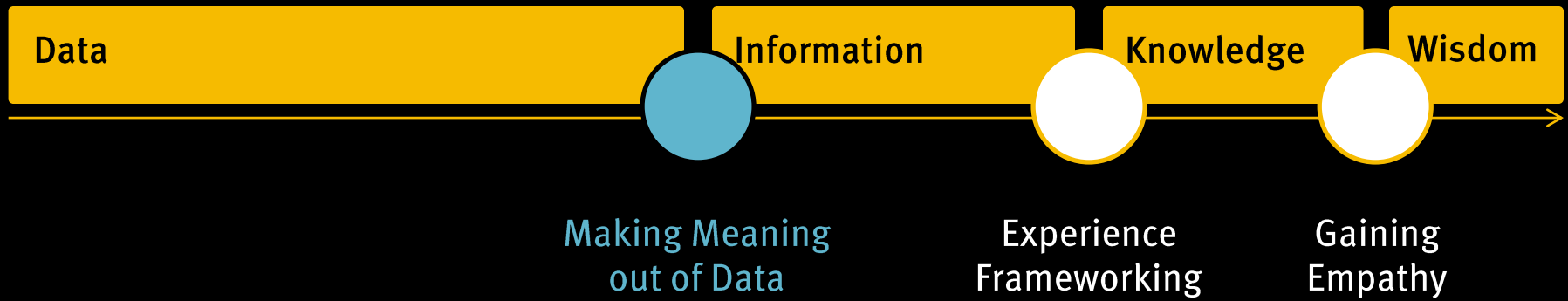
Externalize the Process – Get out of your laptop.



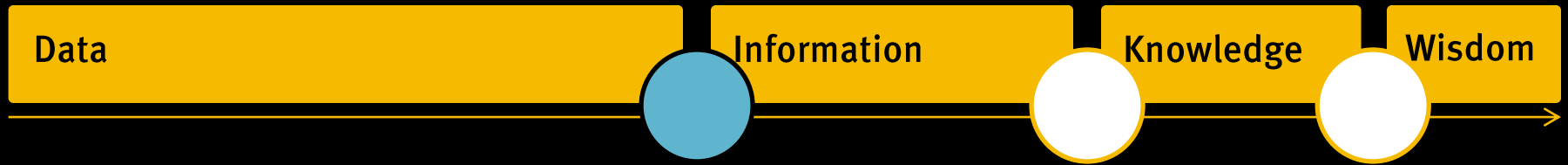


## 2. Make diagrams.





3.  
Interpret. Heavily.



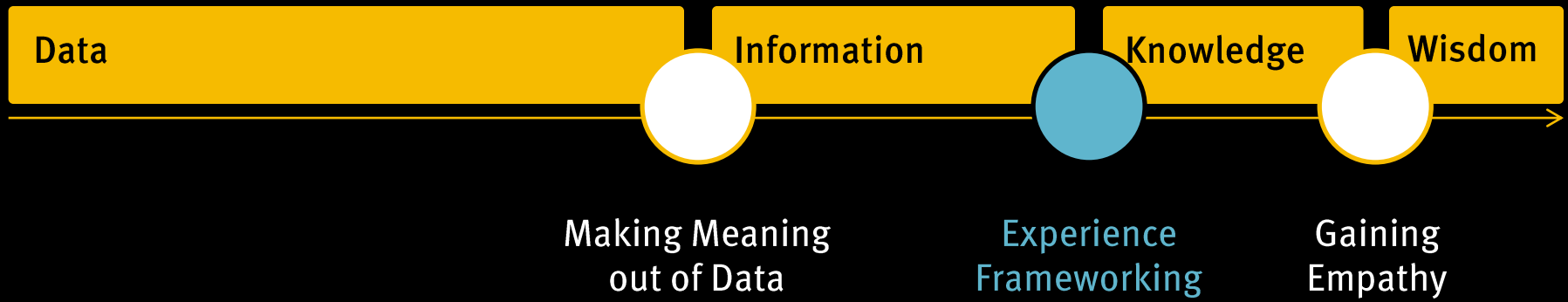
Making Meaning  
out of Data

Experience  
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Gaining  
Empathy

Methods:

affinity diagramming  
hierarchy creation  
flow diagramming  
scenario development



Data

Information

Knowledge

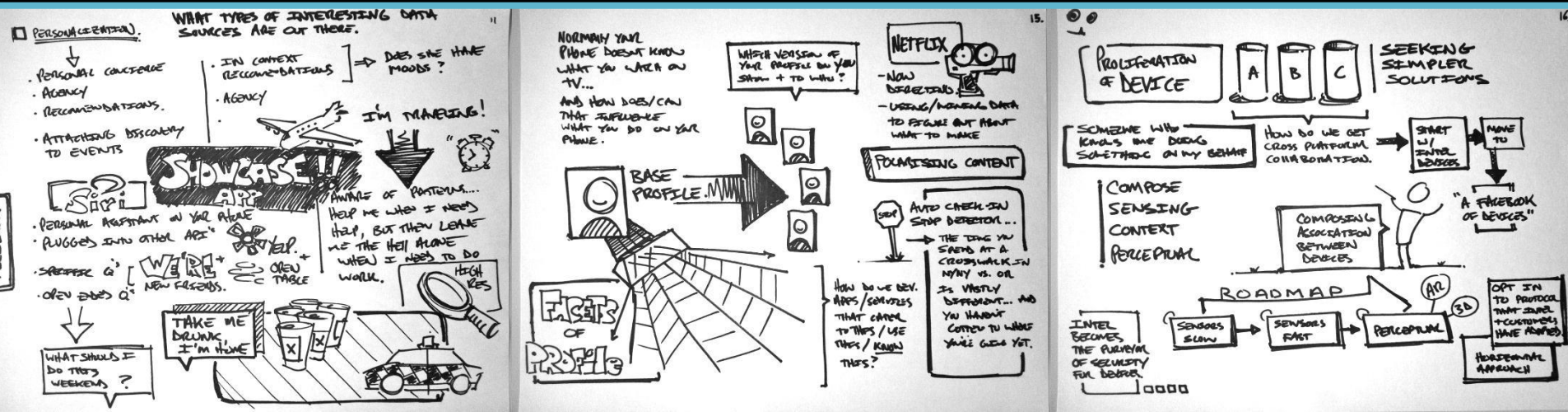
Wisdom

Making Meaning  
out of Data

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# 1. Tell a story





Data

Information

Knowledge

Wisdom

Making Meaning  
out of Data

Experience  
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Empathy

2.

Change your perspective

Warmth

Multisensory

Atmosphere and Culture

Sitting on a Comfy Couch

Comfortable Living Room

A Cup of Coffee

Freshly Ground Coffee

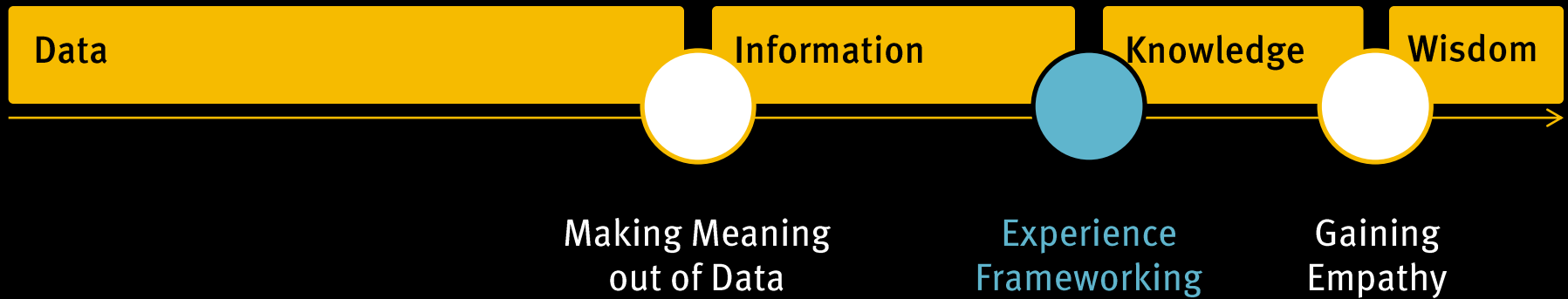
Grinder

Roasted Coffee Beans

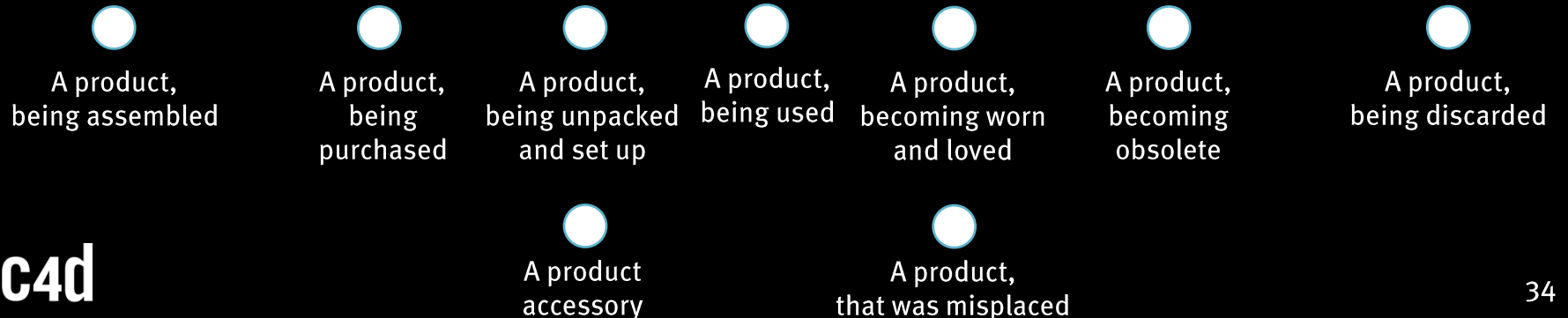
Green Coffee Beans

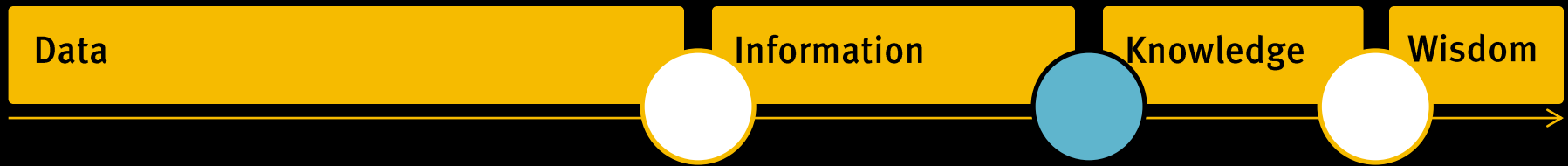
Coffee Tree





### 3. Shift the context





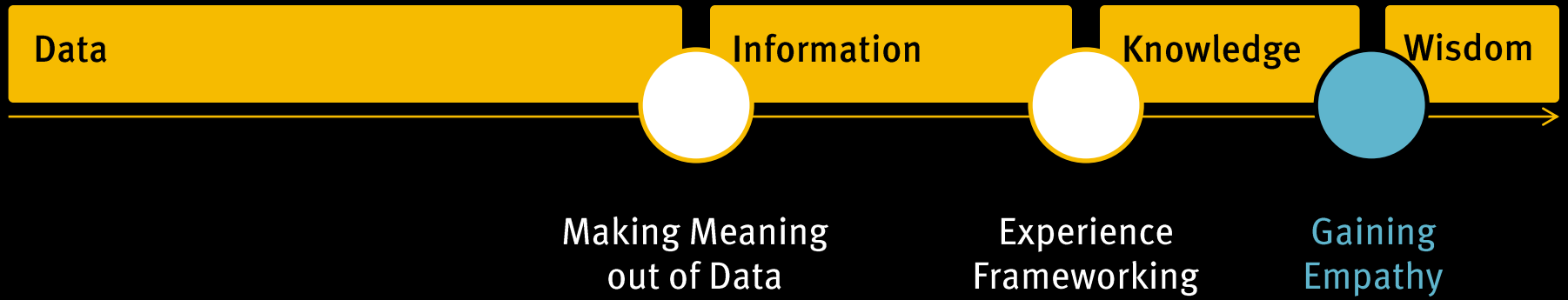
Making Meaning  
out of Data

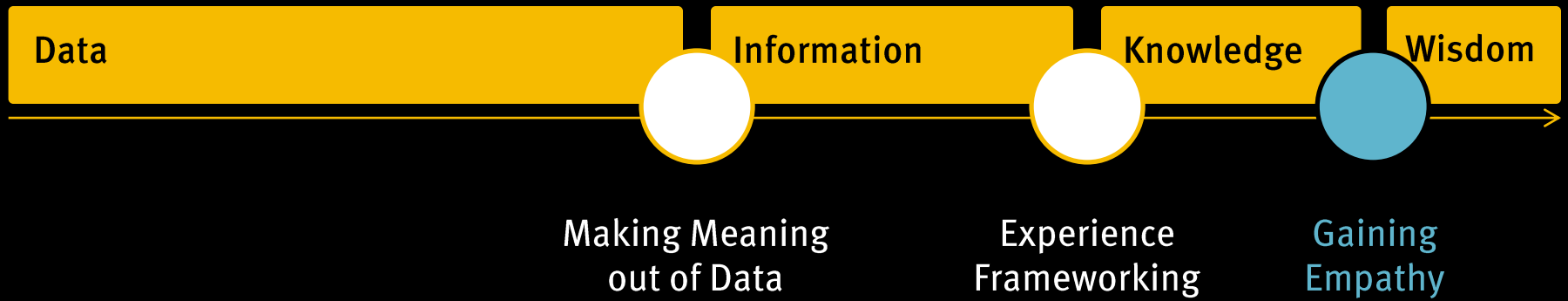
Experience  
Frameworking

Gaining  
Empathy

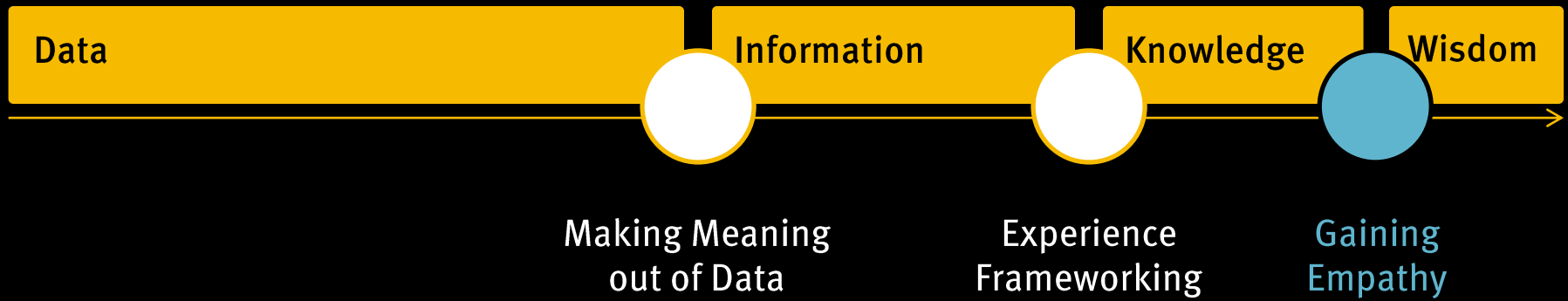
Methods:

concept mapping  
temporal zoom  
semantic zoom  
storyboarding  
process flow  
customer journey mapping

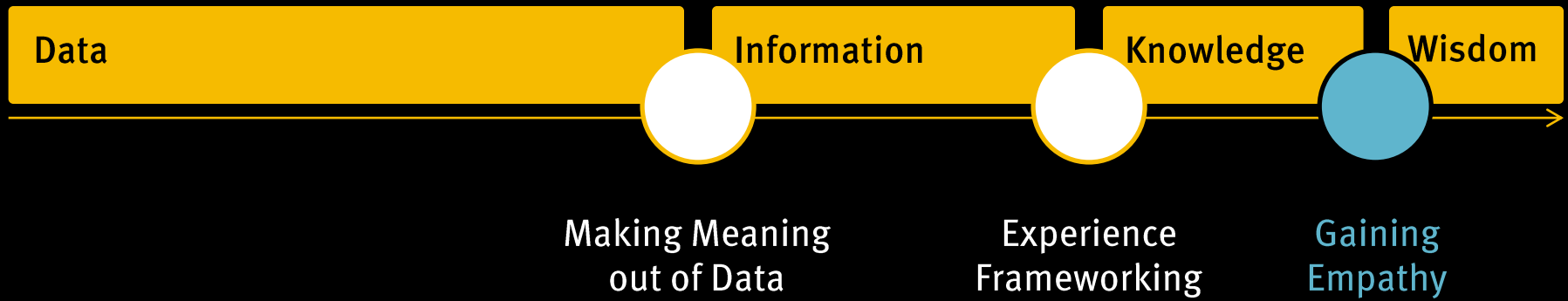




# 1. Consider a provocation



## 2. Force a constraint-shift



### 3. Walk a mile in their shoes



Making Meaning  
out of Data

Experience  
Frameworking

Gaining  
Empathy

Methods:

reframing  
insight combination  
participatory design



# ac4d

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Download our free book,  
Wicked Problems: Problems Worth Solving,  
at <http://www.wickedproblems.com>