Today

What is Synthesis, and why is it important?

What are methods I can use?

Let’s try it: Method – Process Flow Diagramming
Let’s try it: Method – Concept Mapping
Let’s try it: Method – Insight Combination
Let’s try it: Method – Reframing

How can I use this in real life?
0/ Rules

We will go extremely fast.

Turn off the inner voice.

Make fun of everything.

Get your money’s worth.
Theory
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
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
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.
Every wicked problem is unique.

Horst Rittel, 1973
Designers solve problems using a process. Design Synthesis is the magical part of the process.
Immersion – gathering data and understanding of a unique situation

- Ethnography
- Synthesis
- Prototyping
Immersion – gathering data and understanding of a unique situation

Hypothesis validation through generative form giving
Immersion – gathering data and understanding of a unique situation

Hypothesis validation through generative form giving

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

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.

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

**inductive**
Gives good evidence that a conclusion is true.

**abductive**
Jon is a Designer.
All Designers are Arrogant Bastards.
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All of the designers I've ever seen wear black t-shirts.
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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.

**deductive**

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

**inductive**

Gives good evidence that a conclusion is true.

**abductive**

The argument from best explanation, depending on circumstances and experience – an inference.
Synthesis is the process of making meaning through **inference-based** sensemaking.
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.”
“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.”
“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.”
Synthesis is the process of making meaning through inference-based sensemaking.
It’s a process of learning.
Making Meaning out of Data

Experience Frameworking

Gaining Empathy

Ethnography

Synthesis

Prototyping

Data

Information

Knowledge

Wisdom
“It would be great if this thing was a lot bigger”

“It's too big, why can't they just make it smaller?”

=:(
Making Meaning out of Data
Experience Frameworking
Gaining Empathy
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.
Making Meaning out of Data

Methods:
- affinity diagramming
- hierarchy creation
- ✓ flow diagramming
- scenario development

Experience Frameworking

Gaining Empathy
Making Meaning out of Data

Experience Frameworking

Gaining Empathy
1. Tell a story
Making Meaning out of Data

Experience

Frameworking

Gaining

Empathy

3. Shift the context

A product, being assembled
A product, being purchased
A product, being unpacked and set up
A product, being used
A product, becoming worn and loved
A product, becoming obsolete
A product, that was misplaced
A product, being upgraded
A product, being passed down to a new generation
A product, becoming another product
A product, being discarded
A product that doesn’t work
Methods:

- concept mapping
- temporal zoom
- semantic zoom
- storyboarding
Making Meaning out of Data

Experience Frameworking

Gaining Empathy
1. Consider a provocation
2. Force a constraint-shift
3.

Walk a mile in their shoes
Methods:

- reframing
- insight combination
- participatory design

Making Meaning out of Data

Experience Frameworking

Gaining Empathy

Data Information Knowledge Wisdom

Experience Frameworking

Methods:
- reframing
- insight combination
- participatory design
Methods
The Story So Far...

Your colleague, Melvin, has abruptly decided to go back to school to fulfill his lifelong dream of becoming a Taxidermist. Melvin had just finished the research phase of a project with a large client, and all of his work on the project – is gone. The only thing left are some insights he’s extracted and a few of his notes, scribbled quickly.

You’ve been assigned to the project, but no one seems to have any background information about what he was doing; it’s up to you to take what Melvin started and then move the project forward.
Process Flow Diagrams
A Process Flow is...

A set of steps, and the sequencing of the steps, intended to produce a desired result.
A **Process Flow Diagram** visualizes behavior, in a representational format, **over time**.

An **informal** scenario flow diagram:

1. Indicates the relationship and order of actions
2. Shows major interface states
3. Helps to visualize the “whole”, as well as proximity to the whole
4. Abstracts logical relationships in favor of linearity

A **formal** process or data flow diagram:

1. Indicates logical decision points
2. Articulates major data containers, and paths in and out of those containers
3. Can be used by engineers as an input into coding and architecture development
An Informal Scenario-Flow Diagram describes progress, steps, relationships, and order.

1. Phone Rings → User Answers → Phone Stops Ringing

2. Phone Rings → Voicemail Answers → Phone Stops Ringing
A formal Process Flow Diagram show logical decision points, accurate flow, and order.

1. Call is placed
2. Is ringer turned on?
   - Yes: Phone rings (ring+1)
   - No: Voice mail picks up
3. Phone rings (ring+1)
4. Is ring = #4?
   - Yes: Call is over
   - No: Does user answer?
5. Does user answer?
   - Yes: Call is over
   - No: Go back to Is ring = #4?
Creating a Process Flow Diagram is an f’in pain in the ass.

1. List entities (objects, people – the “nouns” of the system) and operators (actions – the “verbs” of the system) (2 hours)
2. Define things to be counted or incremented (1 hour)
3. Define boundary conditions (beginning and ending, as well as sub-flows or sub-processes) (1 hour)
4. List primary actions necessary to achieve boundary condition (3 hours)
5. Begin with a walkthrough, sketching each step in a high-level flow (10 hours)
6. Fill in the rest of the structure, revising the main flow as necessary (20 hours)
7. Reorganize, visually, to create a coherent overall structure (20 hours)
8. Use visual design to clarify and make the content more accessible (10 hours)
Create a formal process flow diagram.

1. List entities (objects, people – the “nouns” of the system) and operators (actions – the “verbs” of the system)

2. Define things to be counted or incremented

3. Define boundary conditions (beginning and ending)

4. List primary actions necessary to achieve boundary condition

5. Begin with a walkthrough, sketching each step in a high-level flow

6. Fill in the rest of the structure, revising the main flow as necessary
Concept Mapping
A Map is...

A representation of a system,
intended to help someone find their way
A Concept Map is a representation of a system. It sacrifices accuracy for comprehensibility.

1. Visualizes both the forest and the trees (breadth and depth)
2. Rarely has a “beginning” and “end”
3. Helps people find their way (it’s a map, after all): provides direction and instruction
4. Forces selectivity, abstraction, prioritization and hierarchy
5. Is visual (a tool for perception)
6. Is semantic (a tool for cognition)
7. Frequently represents the user’s mental model of how a system might work
8. Can also represent the designer’s manifest model of how a system might appear
Nodes (nouns) are main branches
Innings

2-Team Sport

Offensive Team

Defensive Team

Infield

Baseball

played in nine sections called

played by

supervised by

Actions (verbs) link the nodes
"Baseball Deconstructed"
Explaining the regulations, structure and intricate activities involved in a game of baseball to a novice.
Creating a Concept Map should be rigorous – after all, you are taming complexity!

1. Create a matrix showing the relations of terms:
   (10 hours)
   - List terms. Identify the main elements that make up the system; lean on your contextual research to understand the words that matter to the users the most.
   - Create empty matrix, plotting the words against themselves.
   - Identify relationships; these are qualitative and require interpretation.

2. Decide on main branches of the map, based on frequency of connections as well as common sense (2 hours)

3. Fill in the rest of the structure, in order to represent all of the elements in the system (5 hours)

4. Use visual design to clarify and make the content more accessible (10 hours)
For example...
Making a concept map of AC4D.

- Social Entrepreneurship
- Founders
- Confidence
- Project Management
- Sketching
- Branding
- Roadmaps
- Strategist
- Behavior
- Impact
- Sarcasm
- Visual Design
- Creativity
- Theory of Change
- Jon Kolko
- Wicked Problems
- Fun
- Beer
- Whiteboards
- Mobile
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AC4D teaches Social Entrepreneurship, where students become Founders to drive Impact in the context of Wicked Problems.
AC4D teaches Social Entrepreneurship where students become Impact to drive Wicked Problems in the context of Sketching, Roadmaps, Theory of Change, Confidence, Built through Beer, Fun, Sarcasm, which require Using methods like Confidence built through Fun, Sarcasm.


Impact is based on changing Visual Design, Project Mgmt, Strategy, Behavior.
Create a concept map.

1. Create a matrix showing the relations of terms:
   A. List terms. Identify the main elements that make up the system.
   B. Create empty matrix, plotting the words against themselves.
   C. Identify relationships.

2. Decide on main branches of the map, based on frequency of connections.

3. Fill in the rest of the structure, in order to represent all of the elements in the system.
Insight Combination
An insight is a clear, deep, meaningful perception into human behavior in a particular design context.

It’s a provocative statement of truth.

* And it may be wrong.
Design patterns describe...

“possible good solutions to a common design problem within a certain context, by describing the invariant qualities of all those solutions”

Tidwell
Insight Combination is a method of building on insights and established design patterns in order to create initial design ideas.

1. Forces a detailed examination, and organization, of each individual insight
2. Is divergent, in that it actively produces new ideas and expands the entire set of insights
3. Pushes ideas forward in a nonlinear fashion, jumping over the expected to arrive at the unexpected
4. Allows for the combination of existing paradigms with new and novel ideas (it’s a generative design activity)
5. Takes advantage of the personal experiences of the designers and investigators
6. Takes advantage of established design patterns
I saw this + I know this = Insight
I saw this + I know this = Insight

Data gathered through ethnography, contextual inquiry, questionnaires, and interviews
I saw this + I know this = Insight

Data gathered through ethnography, contextual inquiry, questionnaires, and interviews

Guided by ethics & morals, intellectual prowess, and the accumulation of world view and breadth of experience
I saw this + I know this = **Insight**

Data gathered through ethnography, contextual inquiry, questionnaires, and interviews

Guided by ethics & morals, intellectual prowess, and the accumulation of world view and breadth of experience

Clear, deep, meaningful perception into human behavior in a particular design context
I saw this + I know this = Insight + Design Pattern = Design Idea

Data gathered through ethnography, contextual inquiry, questionnaires, and interviews

Guided by ethics & morals, intellectual prowess, and the accumulation of world view and breadth of experience

Clear, deep, meaningful perception into human behavior in a particular design context
I saw this + I know this = Insight + **Design Pattern** = Design Idea

Data gathered through ethnography, contextual inquiry, questionnaires, and interviews

Guided by ethics & morals, intellectual prowess, and the accumulation of world view and breadth of experience

Clear, deep, meaningful perception into human behavior in a particular design context

A trending paradigm that describes invariant qualities, referencing history and similar solutions
I saw this + I know this = Insight + Design Pattern = Design Idea

Data gathered through ethnography, contextual inquiry, questionnaires, and interviews

Guided by ethics & morals, intellectual prowess, and the accumulation of world view and breadth of experience

Clear, deep, meaningful perception into human behavior in a particular design context

A trending paradigm that describes invariant qualities, referencing history and similar solutions

A new, creative concept, somewhat facilitated by existing design paradigms
Insights go on yellow cards.

People are expanding their understanding of "appropriate" human to human interactions, as they search for meaning in the minutia of their daily lives. (#14, 15)

Unique insight number 22

Provocative statement of truth

Evidence from a transcript (citation)
Patterns go on blue cards.

Reality TV has moved from realistic, to surreal, to “car-crash-in-slow-motion”.

Pattern, or trending piece of culture and society

Unique pattern letter

G
Design ideas go on green cards.

A dating site that puts people into finite situations of absurdity, which is live-streamed to the internet and open to online commentary.

Unique insight and pattern identifier 22-G

Design idea, built on the combination of an insight and a pattern.
Insight Combination...

... with boring old enterprise configuration software ...
Support the increasingly detailed nature of a configuration.

As a configuration moves through the sales cycle, it will become increasingly detailed and complicated. The tool should afford all levels of detail in the configuration process. (#14, 15)

22

Allow for an iterative configuration process.

Even a simple configuration will exist in multiple states throughout the configuration process, and the user will try several variations before identifying an ideal and final solution. The configuration tool should support this. (#44, 123)

17

Provide both offline and online access.

Salespeople work in disconnected environments – like airplanes – and the tool should work in those environments too. (#98, 99)

87

Allow users to create multiple “what if” scenarios.

Salespeople frequently work through multiple configurations in parallel, in an attempt to understand all of the possible solutions to their problems. (#123-144)

Allow for a visual configuration.

Salespeople frequently sketch out a configuration on a whiteboard or a piece of paper during the sales cycle; allow the tool to help them work in a visual manner. (#123-144)
Support the increasingly detailed nature of a configuration.

As a configuration moves through the sales cycle, it will become increasingly detailed and complicated. The tool should afford all levels of detail in the configuration process. (#14, 15)

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87

Direct manipulation, drag and drop tools on the web are increasingly prevalent.

R

More and more portable devices allow file management and employ some sort of data-synchronizing.

G

There seems to be a push towards online backup and recovery tools for large datasets.

D

Progressive disclosure with AJAX is an effective way to provide increasingly more granular levels of detail.

A

Allow users to create multiple "what if" scenarios.

Salespeople frequently work through multiple configurations in parallel, in an attempt to understand all of the possible solutions to their problems.

(#123-144)

Allow for a visual configuration.

Salespeople frequently sketch out a configuration on a whiteboard or a piece of paper during the sales cycle; allow the tool to help them work in a visual manner.

(#123-144)

People are increasingly familiar with visual and playful configuration tools that allow for side by side comparison of similar items.

F

Small screens are used in tandem with broad operating systems.
I saw this + I know this = Insight + Design Pattern = Design Idea

Data gathered through ethnography, contextual inquiry, questionnaires, and interviews

Guided by ethics & morals, intellectual prowess, and the accumulation of world view and breadth of experience

Clear, deep, meaningful perception into human behavior in a particular design context

A trending paradigm that describes invariant qualities, referencing history and similar solutions

A new, creative concept, somewhat facilitated by existing design paradigms

Salespeople work in disconnected environments – like airplanes – and the tool should work in those environments too. (#98, 99)

Direct manipulation, drag and drop tools on the web are increasingly prevalent.

More and more portable devices allow file management and employ some sort of data-synching.

Provide an HTML drag and drop tool that looks like an application.
Allow it to run when disconnected from the server, and provide a clear and cohesive mechanism for synching (and for displaying when things are out of synch).
This method takes time, and more importantly, takes emotional energy and focus.

1. Begin to identify insights in the data you’ve gathered by combining an observation (I saw this) with your knowledge (I know this); write the insights on yellow post-it notes. Reference the line numbers from any applicable transcripts, and give each yellow post-it note a unique numeric ID. *(10+ hours)*

2. Identify design patterns that are relevant to the discipline you are designing for. Ideally, you begin to keep a design pattern library. Write the patterns on blue post-it notes. Give each blue post-it note a unique letter ID. *(2+ hours)*

3. Start to combine insights and design patterns to create design ideas by mingling the blue and yellow post-its, moving them around physically, and actively reflecting on potential combinations. When a combination makes sense and generates a design idea, write it in a green post-it note. Give each green post-it note a unique design idea ID (referencing both the yellow and blue notes above). *(40+ hours)*

4. Once you are almost “done” (usually when you’ve nearly run out of time and money), log the entire set into a spreadsheet. *(3 hours)*

5. Finally, pick the top ideas and start to sketch them. *(3 hours)*

Now, you can always trace any design idea back to an insight, and ultimately, back to a nugget of user data.
Perform an insight combination.

1. Read the insights Melvin has gathered (yellow notes).
2. Quickly free-associate 10 patterns, based on trends in culture (blue notes).
3. Combine an insight – at random – with a pattern – at random, to create a new design idea.
4. Draw or write the design idea on a green card.
5. Repeat.
Reframing
A frame is a perspective or viewpoint:

“Even though frames define what count as data, they themselves actually shape the data (for example, a house fire will be perceived differently by the homeowner, the fire fighters, and the arson investigator).”

Klein, Moon & Hoffman
Reframing is a method of shifting semantic perspective in order to see things in a new way.

1. “Re-embeds” a product, system or service in a new (and not necessarily logical) context
2. Explores associations and hidden links to and from the center of focus
3. Posits a “what if” scenario implicitly
4. Is primarily semantic (a tool for cognition)
5. Encourages empathy
6. Forces understanding of the various touchpoints
7. Identifies implications and insights
Consider a toothbrush ...
environment

in the bathroom

domestic

embodiment

consumer object
<table>
<thead>
<tr>
<th>environment</th>
<th>perspective</th>
<th>embodiment</th>
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</thead>
<tbody>
<tr>
<td>in the bathroom</td>
<td>consumer</td>
<td>object</td>
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reframed in a new environment:

<table>
<thead>
<tr>
<th>primary user goal:</th>
<th>implications and insights:</th>
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</tbody>
</table>
environment | perspective | embodiment
---|---|---
in the bathroom | consumer | object

reframed in a new environment:
- In the kitchen
- In an airplane
- At a conference

primary user goal:

implications and insights:
### Environment

**In the bathroom**

**Reframed in a new environment:**

- In the kitchen
- In an airplane
- At a conference

**Primary user goal:**

- Remove food
- Remove smells
- Remove lettuce before giving a talk

**Implications and insights:**

- Teeth cleaning should allow for a way to quickly get pieces out of hard to reach places, and shouldn’t require a mirror
- Provide a way to quickly and nonchalantly freshen breath in close quarters and without being offensive to other passengers
- Teeth cleaning should include some form of sharp picking object, and should clearly indicate when you missed a chunk
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<thead>
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<th>Perspective</th>
<th>Embodiment</th>
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</thead>
<tbody>
<tr>
<td>in the bathroom</td>
<td>primary user goal:</td>
<td>object</td>
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</table>

Reframed from a new perspective:

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Primary user goal:

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Implications and insights:

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In the bathroom consumer object reframed from a new perspective:

- dentist
- hotel housekeeper
- Blind date

Primary user goal: implications and insights:
environment perspective embodiment

in the bathroom consumer object

reframed from a new perspective:

dentist

hotel housekeeper

Blind date

primary user goal:

Clean teeth & prevent future problems

Clean the hotel room

Look attractive

implications and insights:

Teeth cleaning should be as rigorous as possible, and should be “future proof” for some period of time

Teeth cleaning should have as small a disposal footprint as possible, and shouldn’t generate any extra work, trash, or waste

There should be a way to casually alert the date that they have something nasty in their teeth.
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reframed as a new embodiment:

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<th>implications and insights:</th>
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</table>
environment
in the bathroom
perspective
consumer
embodiment
object

reframed as a new embodiment:

A Plant

primary user goal:

implications and insights:

A Spray

A Service
reframed as a new embodiment:

- A Plant
- A Spray
- A Service

primary user goal:

- Clean teeth while feeling closer to nature
- Clean teeth quickly without friction
- Gain “dentist visit” cleanliness in between visits

implications and insights:

- There should be a plant with teeth cleaning properties, that can live peacefully in one of the aforementioned environments
- A portable spray should freshen breath but should also clean teeth; instant or quick acting timeframe, through a fine mist.
- Provide a quick-stop for interim dentist appointments – at the mall. Should be trustworthy and clean; legal implications...
Reframing is easy, and easier in teams – but requires that you perform an abduction

1. Identify the product, service or system that is being reframed. It's not always what your client asked for. (1+ hour)

2. Create blank reframing charts on paper, one each for environments, users, and embodiments. (5 minutes)

3. Free associate new items for the left column of each chart; work on all three charts at once. There are no bad ideas: criticism is completely suspended. (1+ hour)

4. Begin to fill in Primary Goal for all items in all charts. Try to paint a picture of a credible story; judge responses and add criticism as appropriate, but only in relationship to the primary goal column. (2 hours)

5. Begin to fill in the Implications and Insights column in all charts. There are no bad ideas; criticism is completely suspended. An item can generate more than one implication or insight; if it does, create a new row to capture it. Try to generate thirty-fifty items for each list. (4 hours)

6. Extract implications and insights that are relevant based on the specific constraints of your project, and list them: these can then be integrated with the rest of your design criteria. (1 hour)

7. Select the best ideas, and sketch them. (3 hours)
Reframe.

1. Create 3 blank reframing charts, one each for environment, perspective, and embodiment.

2. Starting with environment:
   A. Free-associate new items for the left column.
   B. Fill in the users’ primary goal, based on the left column.
   C. Fill in new design insights, based on the left column.

3. Repeat with perspective.

4. Repeat with embodiment.
Summary
Synthesis is the process of making meaning through inference-based sensemaking.
Methods:

Making Meaning out of Data

- affinity diagramming
- hierarchy creation
- flow diagramming
- scenario development

Experience Frameworking

- concept mapping
- temporal zoom
- semantic zoom
- storyboarding

Gaining Empathy

- reframing
- insight combination
- participatory design