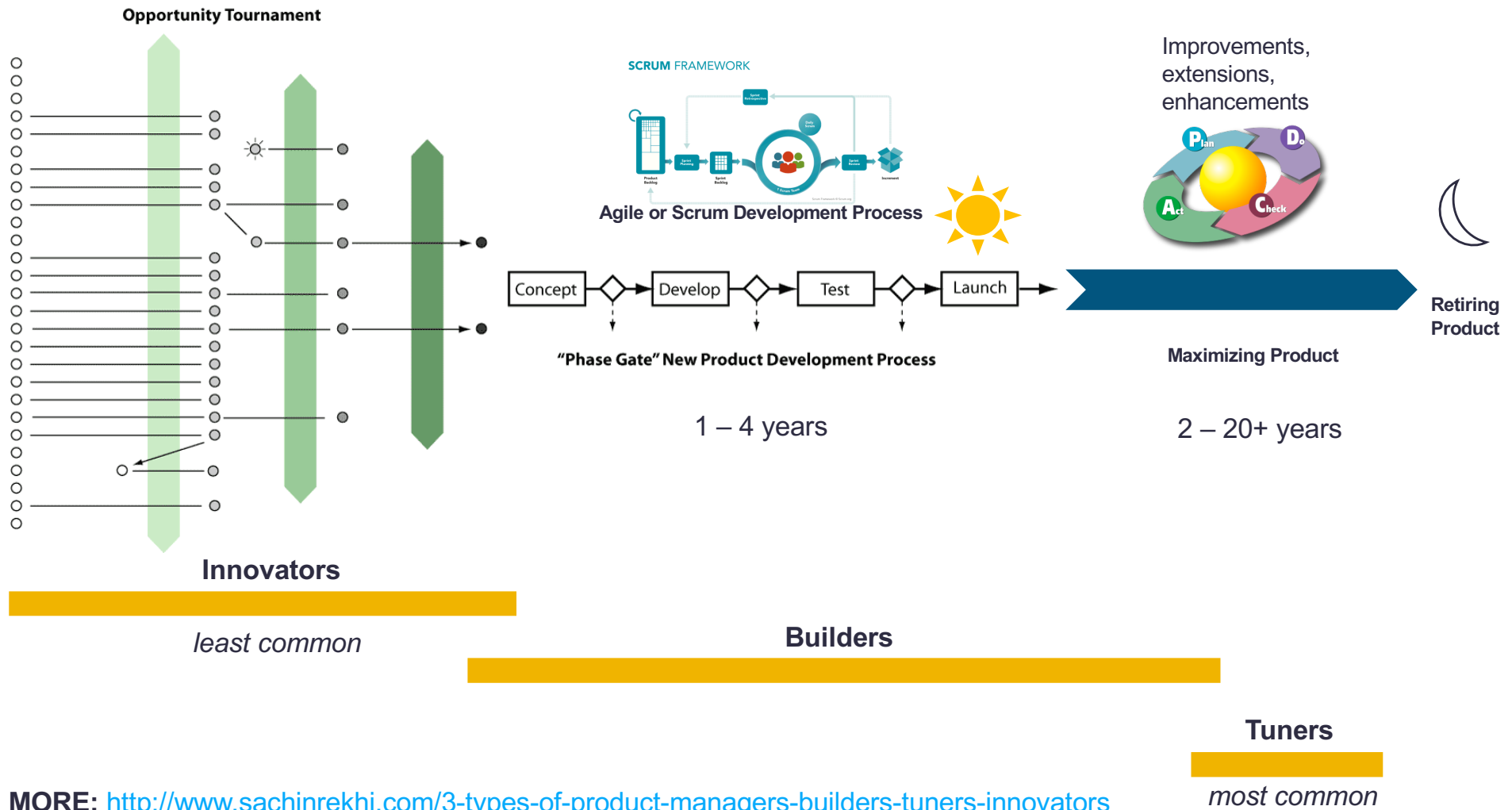# Design and Development for Product Management

Professor Karl T. Ulrich

Vice Dean of Entrepreneurship & Innovation

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# Product Management Roles and the Product Lifecycle

Opportunity Tournament

SCRUM FRAMEWORK

Agile or Scrum Development Process

Improvements, extensions, enhancements

| Concept | ◇ | Develop | ◇ | Test | ◇ | Launch |

"Phase Gate" New Product Development Process

Maximizing Product

Retiring Product

1 – 4 years

2 – 20+ years

Innovators

least common

Builders

Tuners

most common

MORE: http://www.sachinrekhi.com/3-types-of-product-managers-builders-tuners-innovators

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2

Problem Solving

"All life is problem solving." –Karl Popper

Innovation

New match solution and need.
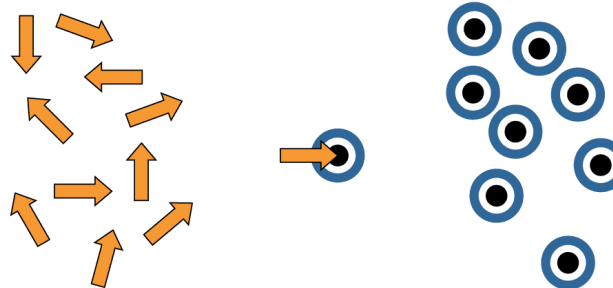
Design

Innovation when pulling from needs.

Industrial design   Graphic design
Product design   Engineering design
Landscape design   Furniture design
                    etc.

Design → gap → plan → Produce → artifact → user experience
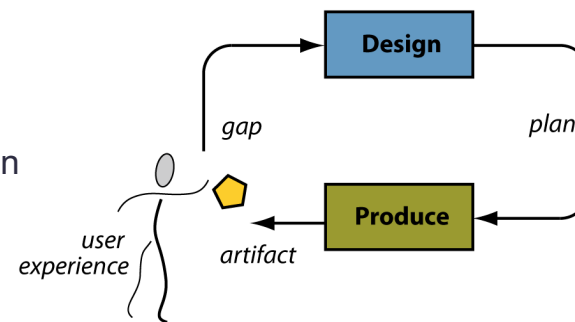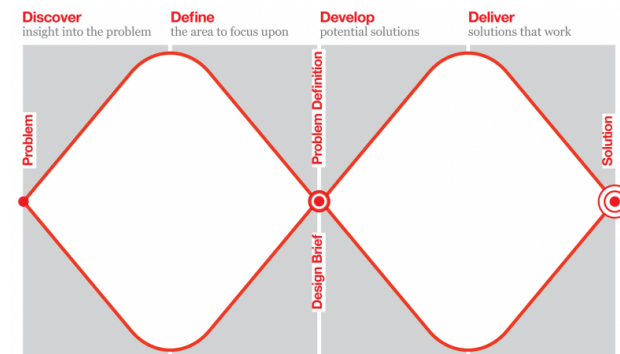
Design Thinking

Design process applied to something other than visible artifacts (e.g., services, processes, business challenges).

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Design Process
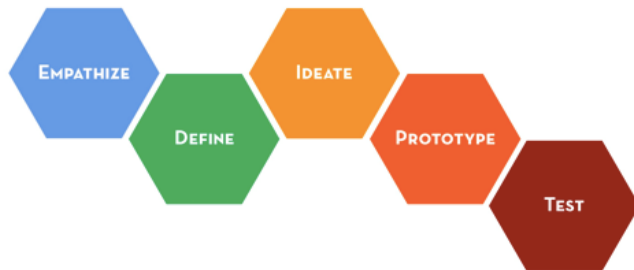
Stanford dSchool

UK Design Council "Double Diamond"
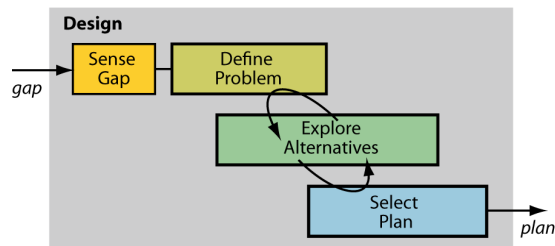
Ulrich book *Design: Creation of Artifacts in Society*
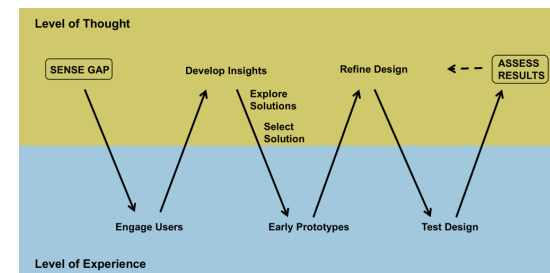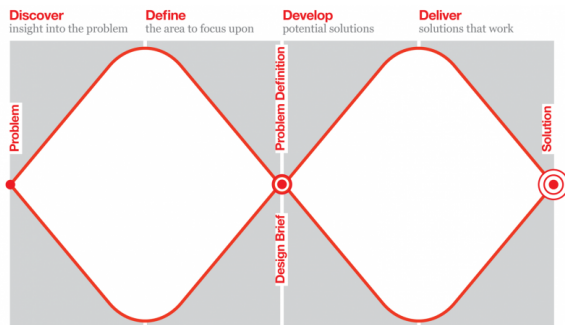
WV Model (Shoji Shiba)

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Hallmarks of "Design Thinking"

- 5 Whys – abstracting problem deliberately

- User orientation, focus on empathy

- Observational methods

- Generating a lot of solution concepts

- Early prototypes

- Iterative refinement

- Visual expression

Plus correlated values

- Culture of "yes"

- Bias for action

- Beauty, elegance, craft, and care
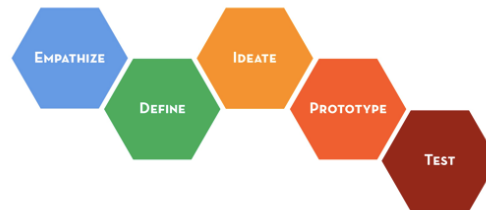
99 Bowls

Something yummy to eat at any time.

99bowls.com

What is the job to be done?

"5 Whys"
"Abstraction Ladder"

"People don't want to buy a quarter-inch drill, they want a quarter-inch hole."

Theodore Levitt
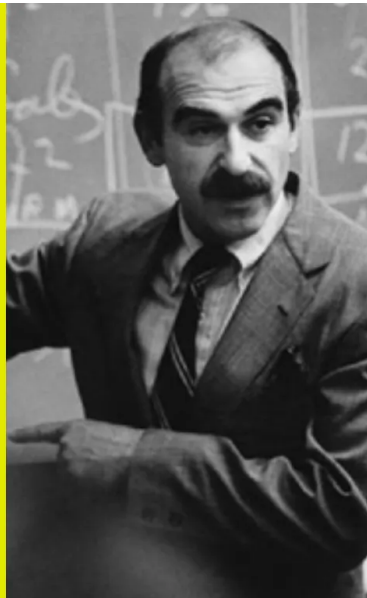
Theodore Levitt – *Marketing Myopia*

Clayton Christensen – *Jobs-to-be-Done* "theory" of innovation

provide for ourselves and our families?

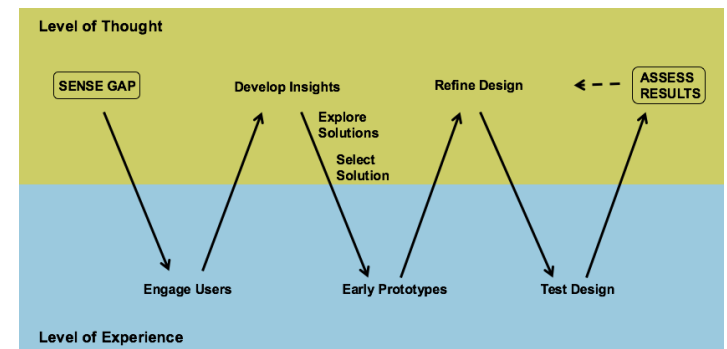increase our economic value to society?

educate ourselves?

archive information?

store books?

Why
broader

fasten a book shelf to the wall?

make a 6mm hole?

In what way might we...

drive a 6mm drill bit at 1000 rpm?

connect an electric motor to a replaceable drill bit?

more focused

convert electrical energy to rotational mechanical energy?

How

Sense Gap - What problem are we really trying to solve?

Five whys technique (aka what-how ladder, abstraction hierarchy)

How might we…

- ?

- ?

- ?

⭐ • Ship to individual consumers weekly/monthly supply of prepared soup-like meals.

- ?

- ?

KU Video on the 5-Whys Technique
https://upenn.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=cb073a45-de1a-4c5a-a618-ab9401038aa0

Wharton

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Problem Definition / Job to be Done / "Sense Gap"

How might we…

provide always available nearly ready-to-eat delicious food matching nutritional preferences of our customers.

Insight from Users (4 min + 4 min in pairs)

- Observe; "Show me" and "Tell me."

- Look for "open doors" and step through them.

- List of key unmet needs, *latent* needs.

- Look for user "bandaids" (solutions users create for themselves).

⭐ • **Look for an "aha" insight about a need.**

A interviews B for 4 minutes
B interviews A for 4 minutes

A good insight is…

1. Authentic
   (rooted in your observations)

2. Non-obvious

3. Significant
   (related to a meaningful opportunity to improve experience)

Problem Definition / Job to be Done / "Sense Gap"

How might we…
provide always available nearly ready-to-eat delicious food matching nutritional preferences of our customers.

Develop Insights / Identify User Needs

Allows me to specify the characteristics of my meal.
Lets me follow 4-hour body "slow carb" diet.
Lets me follow keto diet.
Lets me follow paleo diet.
Lets me eat gluten free.
Lets me eat vegan diet.
Lets me eat vegetarian diet.
Lets me specify total calories in meal.
Lets me identify allergens.
Lets me avoid ingredients I don't like.

Insight is around customization… potential for significant differentiation.

What is a Solution Concept?
The how.

For "Tech":

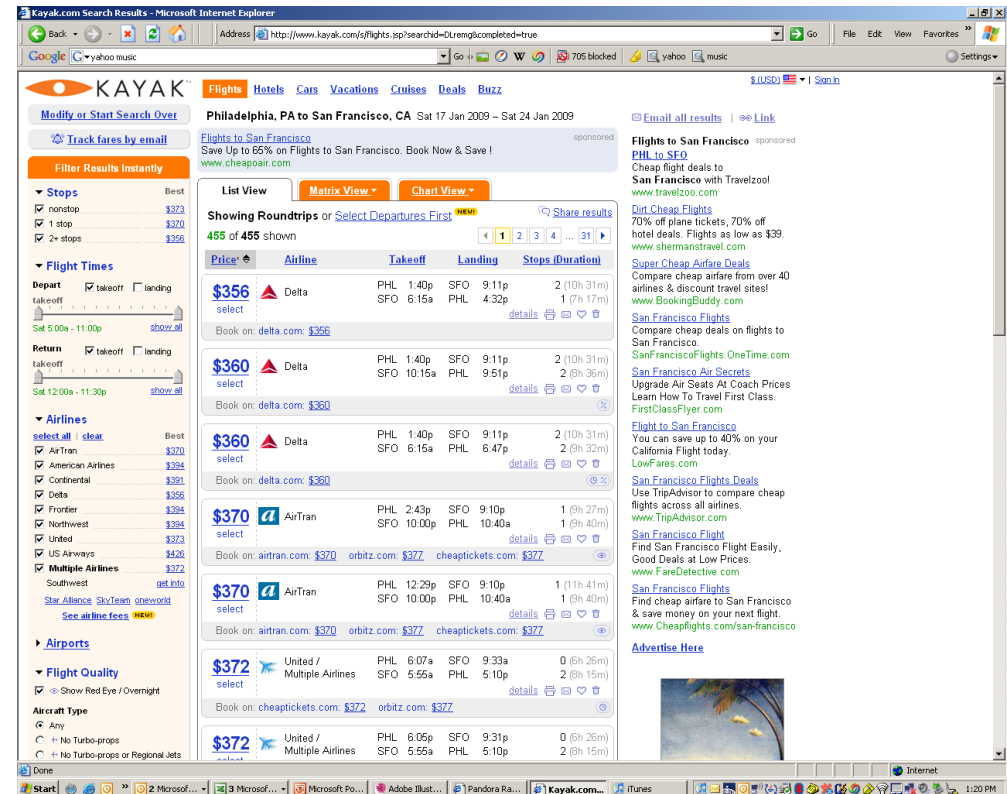Domain (service, hardware, software)
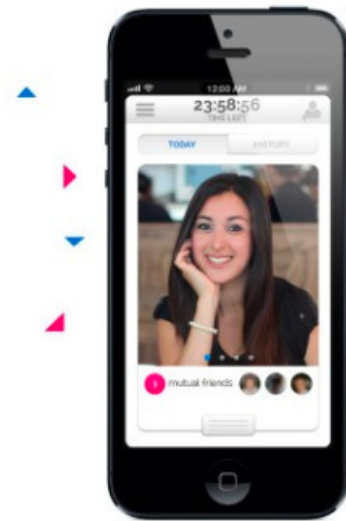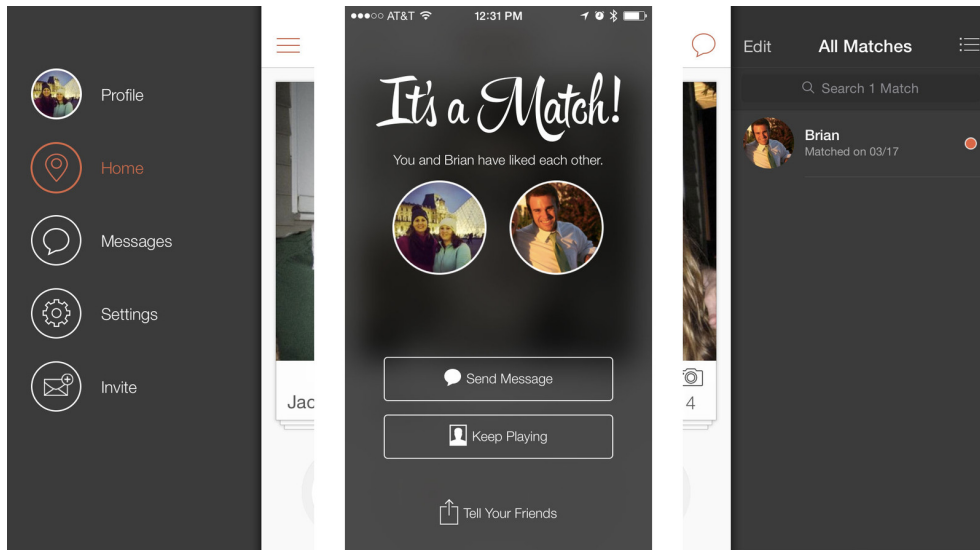
Platform (mobile, desktop)

Use metaphor (folders, play lists, menu)

Key inputs/outputs and process
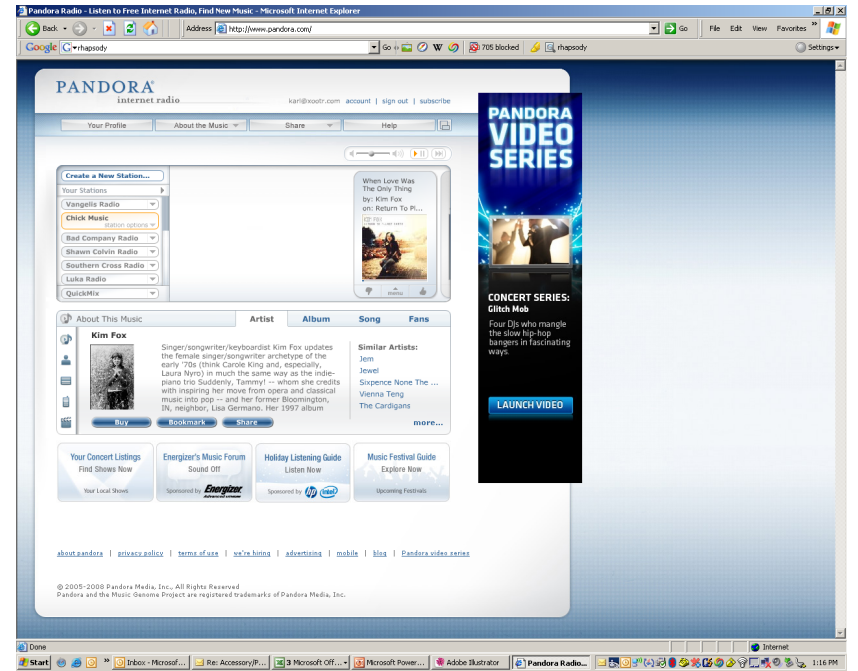
Architecture / wire frame

Design elements

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iTunes File Edit View Controls Store Window Help   (3:18) Mon 9:19 AM Karl Ulrich

Music ⌄ | Songs Albums Artists Genres Playlists Radio Match   iTunes Store

PLAYLISTS

- Purchased
- Genius Mixes
- Crossfire
- Mr. Know It All
- Set Fire to the Rain
- 90's Music
- Classical Music
- Music Videos
- My Top Rated
- Recently Added
- Recently Played
- Top 25 Most Played
- Dec13
- fresh list
- Guilty Pleasure
- list
- mellow
- not stale
- Oct-SF
- rockin'
- shows
- Utah House
- Voice Memos

Oct-SF ▶ ⤨
37 songs, 2 hours 35 minutes   View Add To...

✔	#	Name	Time	Artist	Album	Genre	Rating	Plays
✔	1	What I've Done (Acoustic Version)	3:25	Marie Digby	Start Here - EP	Pop		196
✔	2	Just Give Me a Reason (feat. Nat...	4:03	P!nk	The Truth About Love	Pop		167
✔	3	Set Fire to the Rain	4:02	ADELE	21	Pop		159
✔	4	Changeless	5:08	Carbon Leaf	Indian Summer	Rock		150
✔	5	Where I Stood	4:17	Missy Higgins	On a Clear Night	Pop		139
✔	6	To Be Alone With You	2:45	Sufjan Stevens	Music from The O...	Soundtrack		130
✔	7	Crossfire	4:16	Brandon Flowers	Flamingo	Alternative		128
✔	8	Lay Down (Candles In the Rain)	3:53	Melanie	Candles In the Rai...	Singer/So...		122
✔	9	Son's Gonna Rise	4:02	Citizen Cope & Sa...	The Clarence Gree...	Rock		120
✔	10	Please Don't Tease	2:51	The Donnas	Spend the Night	Rock		120
✔	11	Umbrella (Single Version)	3:47	Marie Digby	Umbrella - Single	Alternative		110
✔	12	Southern Cross	4:43	Crosby, Stills & Nash	Daylight Again	Rock		106
✔	13	Under the Wire	3:53	Carbon Leaf	Carbon Leaf - EP	Rock		91
✔	14	Lucky Now	2:52	Ryan Adams	Ashes & Fire	Rock		91
✔	15	Freedom	6:31	George Michael	Listen Without Prej...	Pop		89
✔	16	Change	5:04	Tracy Chapman	Change - Single	Pop		88
✔	17	Stuck in a Moment (Acoustic)	3:42	U2	Exclusive	Rock		87
✔	18	In the Mirror	3:02	Rachel Fuller	Cigarettes & House...	Vocal		84
✔	19	Live and Learn	4:16	The Cardigans	Long Gone Before...	Alternative	★★★★	77
✔	20	Oh Very Young	2:37	Cat Stevens	Buddha and the C...	Rock		77
✔	21	All Apologies (Live)	4:23	Nirvana	MTV Unplugged in...	Alternative		77
✔	22	He Reigns	4:55	Newsboys	Adoration: The Wor...	Inspirational		75
✔	23	Baby Don't Go	3:21	Karla Bonoff	Restless Nights	Rock		74
✔	24	What It Is	4:58	Mark Knopfler	Sailing to Philadelp...	Rock		73
✔	25	The Long Way Around	4:33	Dixie Chicks	Taking the Long Way	Country	★★★★★	72
✔	26	Free	3:33	Cat Power	You Are Free	Alternative	★★	63
✔	27	Benzedrine	3:00	Thea Gilmore	Rules for Jokers	Rock		62
✔	28	Can't You See (Live)	6:26	The Marshall Tucke...	Searchin' for a Rai...	Rock		61
✔	29	Grace Is Gone	4:12	Dave Matthews &...	Live At Radio City (...	Rock		59
✔	30	Maybe I'm Amazed	4:43	Jem	Music from The O...	Soundtrack		58
✔	31	\vof Grey	5:49	Grateful Dead	In the Dark	Rock		57
✔	32	What Makes You Happy	3:37	Liz Phair	Whitechocolatespa...	Rock		54

Pandora Radio - Listen to Free Internet Radio, Find New Music - Microsoft Internet Explorer

Back | Address http://www.pandora.com/ | Go File Edit View Favorites

Google rhapsody | Go | 705 blocked | rhapsody | Settings

PANDORA internet radio   karl@xootr.com account | sign out | subscribe

PANDORA VIDEO SERIES

Your Profile | About the Music | Share | Help

Create a New Station...
Your Stations
Vangelis Radio
Chick Music Station options
Bad Company Radio
Shawn Colvin Radio
Southern Cross Radio
Luka Radio
QuickMix

When Love Was The Only Thing
by: Kim Fox
on: Return To Pl...

CONCERT SERIES:
Glitch Mob

Four DJs who mangle the slow hip-hop bangers in fascinating ways.

LAUNCH VIDEO

About This Music   Artist Album Song Fans

Kim Fox

Singer/songwriter/keyboardist Kim Fox updates the female singer/songwriter archetype of the early '70s (think Carole King and, especially, Laura Nyro) in much the same way as the indie-piano trio Suddenly, Tammy! -- whom she credits with inspiring her move from opera and classical music into pop -- and her former Bloomington, IN, neighbor, Lisa Germano. Her 1997 album

Similar Artists:
Jem
Jewel
Sixpence None The ...
Vienna Teng
The Cardigans
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Done   Internet

Start Inbox - Microsoft... Re: Accessory/P... 3 Microsoft Off... Microsoft Power... Adobe Illustrator Pandora Radio...   1:16 PM
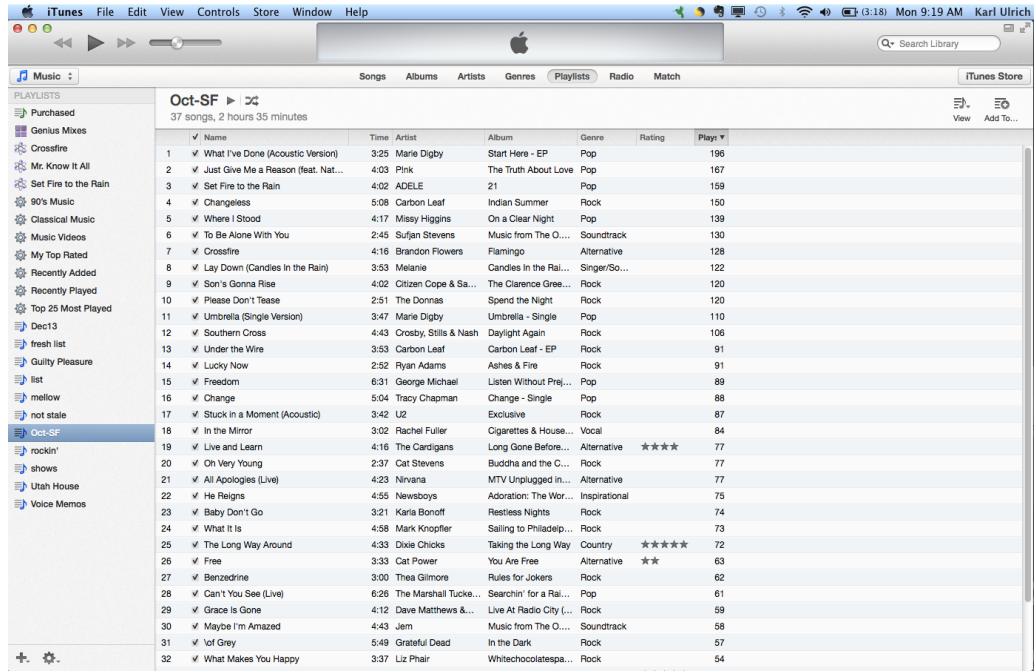
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Photo: http://commons.wikimedia.org/wiki/File:Lancaster,_California_desert.jpg

Photo:
http://commons.wikimedia.org/wiki/File:M%C3%A9l%C3%A9e_st_ASM_clermont.jpg

Groups vs. Individuals in Idea Generation

Group Approach

Hybrid Approach

30 minutes
4 people working together

10 minutes
20 minutes

4 people working alone

4 people working together

- 2.5 x more ideas
- Better quality ideas

Explore Solutions (5 minutes working individually, goal 3-5 solutions)

Independent parallel exploration.

Consider a *single* latent need (your "aha insight") – consider solutions that focus on that need.

Solutions from analogous domains.

How would Google do it? How would Apple do it? How would Toyota do it?

www.planetbox.com

http://maximus-minimus.com/

Concept Development (Teams of 3 - 4) – 15 minutes

- Share your solutions with your team.

- Get some feedback.

- Select one of the concepts and refine it for testing. (One concept per team.)

- Be ready to pitch a "visualization" of the solution to the group via screen sharing (e.g., story board, app screen, product sketch)

- **45 second pitch: (a)** What's the insight? (b) What's the solution?

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"Soup Bot"

- Typical constraints
  - Gluten free
  - No peanuts
  - No cilantro
  - Vegetarian
- Macro nutrient preferences
  - Total calories
  - Carbohydrate grams/%
  - Protein grams/%
  - Fat grams/%
- Flavor profile
  - Spiciness (1-5)
  - Saltiness (1-5)

Base Recipes

- Hearty beef
- Chicken noodle
- Tomato
- Cream of X
- Chili
- Black bean
- Chowder

For example:
Custom Chili

Base includes tomato, mirepoix, garlic, chili powder.

Create macro profile by adding these items:
- Pre-cooked [impossible burger, ground beef, ground turkey]
- Pre-cooked [black beans, chickpeas, navy beans, corn]
- Olive oil
- Salt
- Red pepper
- [Cilantro, Scallion]
- Sides [tortilla chip, sour cream, guacamole]

Hallmarks of "Design Thinking"

- 5 Whys – abstracting problem deliberately
- User orientation, focus on empathy
- Observational methods
- Generating a lot of solution concepts
- Early prototypes
- Iterative refinement
- Visual expression
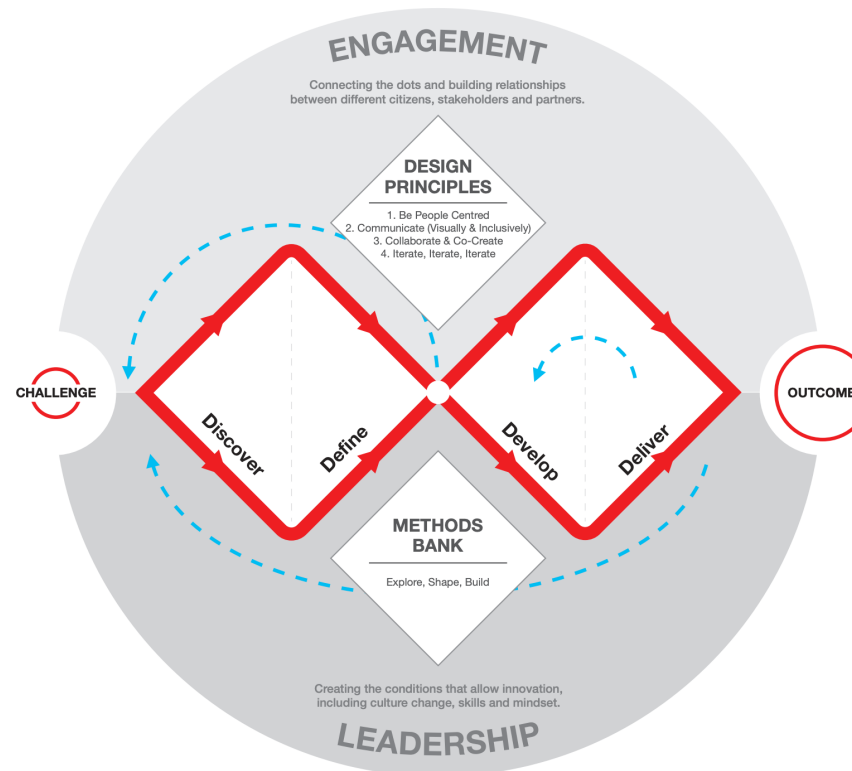
Plus correlated values

- Culture of "yes"
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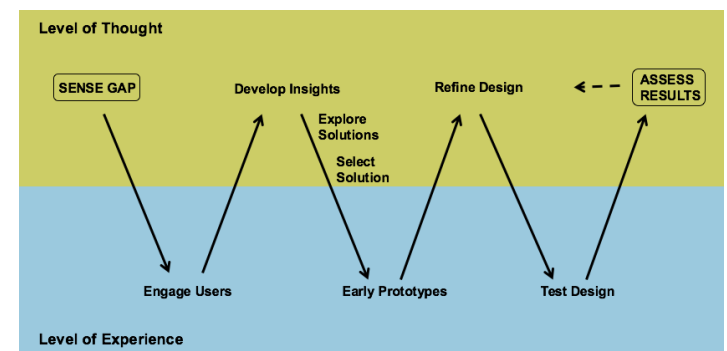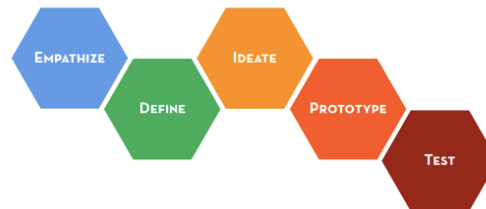
Learning More (Design / Design Thinking)

- Core77.com (pretty good general design blog, mostly industrial design)
- Remarkable films (all on Netflix)
  - *Objectified* (includes some nice Apple stuff)
  - *Eames* (Ray and Charles Eames – life and work)
  - *Helvetica* (great overview of graphic design, not just about typeface)
- Stanford dSchool open resources (workshop materials and so forth)
  https://dschool.stanford.edu/resources/
- John Maeda's Design in Tech Report
  https://designintech.report/
- If you're really into this stuff:
  - *My Architect* (film about Louis Kahn)
  - *The Sketches of Frank Gehry* (film about Gehry)
  - *Design and Thinking* (film – I haven't seen it, but plan to soon)
  - *Maya Lin: A Strong Clear Vision* (film about Vietnam War Memorial designer, Maya Lin) Free via Penn Libraries
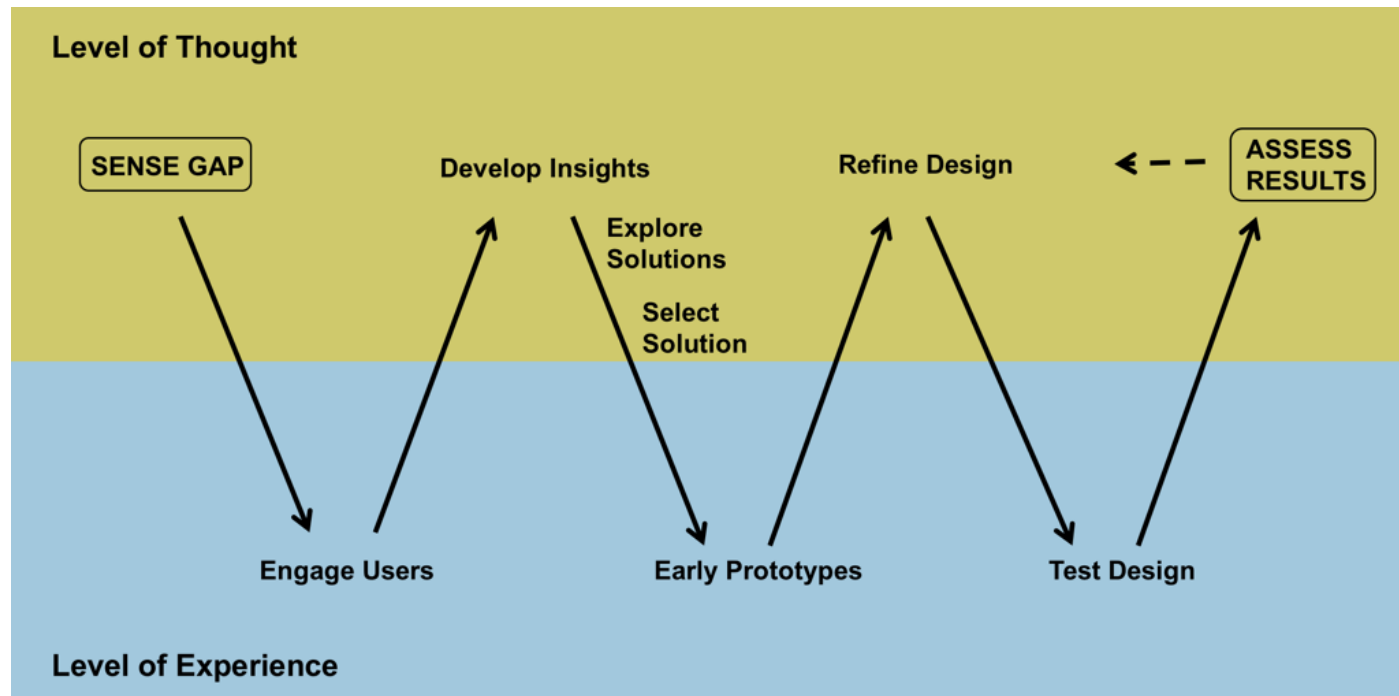
Double Diamond

https://www.designcouncil.org.uk/news-opinion/what-framework-innovation-design-councils-evolved-double-diamond
https://medium.com/design-leadership-notebook/the-new-double-diamond-design-process-7c8f12d7945e

Design Process & The W-V Model of Problem Solving

- Emphasizes iterative experiential process.
- Developed and articulated within Total Quality Management movement in 1980s.
- Is "design thinking" just good problem solving process in high-uncertainty environments?

Reference: Shoji Shiba and David Walden, Four Practical Revolutions in Management: Systems for Creating Unique Organizational Capability, 2nd Edition.