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2. PRINCIPLES AND THEORIES OF DESIGN

SERVICE DESIGN

Design Thinking and Collaboration

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30.09.2024

RECAP

▸▸ No single definition of design

▸▸ Many perspectives into design

▸▸ You will develop your own: importance of reflection-in-action

▸▸ 100 lines exercise

▸▸ Any question about the previous lecture or about GR1, GP1, IR1?

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Everyone designs.

The teacher arranging desks for a discussion.

The entrepreneur planning a business.

Dubberly, 2004: How do you design?

SOME OF THE MANY FACETS OF DESIGN

- ⏵ designers are adding to the world: Design has to do with the artificial (in opposition to the natural world)
- ⏵ The purpose of designing is multiple
- ⏵ Everybody designs, but we must cultivate our design capability…
- ⏵ ..for example in the way professional designers work:
  - ⏵ Knowing how to ask the right question
  - ⏵ Being in constant conversation with the material of design
  - ⏵ Being in conversation with the process (reflection in action)
- ⏵ Object(s) of design are not necessarily obvious
- ⏵ Design deals with messy problems
- ⏵ Intuition, tacit knowledge, and creativity are part of design
- ⏵ Designing is for people
- ⏵ Design is about communication
- ⏵ Design is a social activity or designing with others
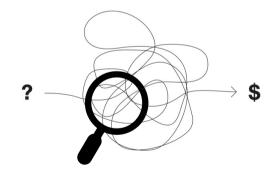
Find all the quotes used last Monday listed under these topics in the Quotes PDF in Moodle
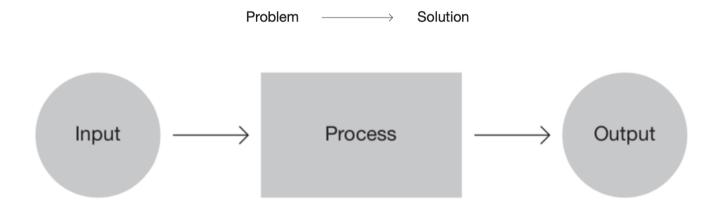
QUOTE READ BY GROUP 2

"At an off-site for Apple Computer's Creative Services department, Tim Brennan began a presentation of his group's work by showing this model. "Here's how we work," he said. "Somebody calls up with a project; we do some stuff; and the money follows."

Hugh Dubberly in How Do You Design
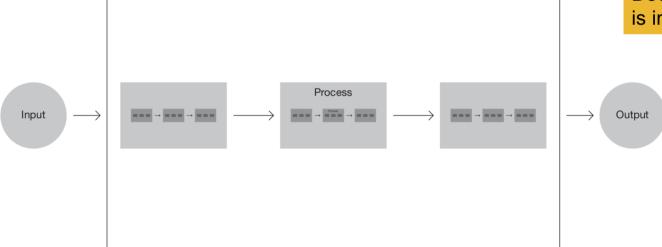
? → $

DESIGN PROCESS

Problem ⟶ Solution

Input → Process → Output

Dubberly, 2004: How do you design? → Check the booklet on Moodle!

DESIGN PROCESS

Zoom in or out

Documentation is important!

Dubberly, 2004: How do you design?

ANALYSIS - SYNTHESIS

Dubberly, 2004: How do you design?
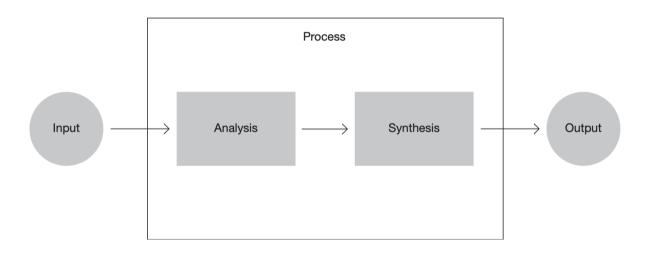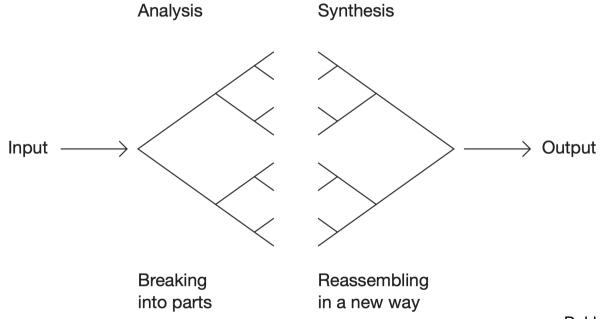
DIVERGENCE-CONVERGENCE MODEL

One model to analysis-synthesis zooming in

Analysis

Synthesis

Input → → Output

Breaking
into parts

Reassembling
in a new way

Dubberly, 2004: How do you design?

ITERATIVE MODEL

Problem ——————→ Solution

vs

Problem – solution models

vs

Problem

Solution

Dubberly, 2004: How do you design?
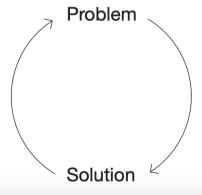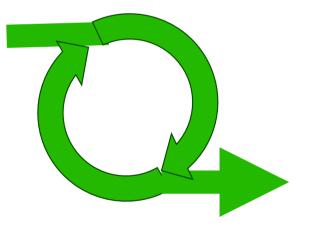
SOFTWARE ENGINEERING

›› Software-lifecycle models

›› Waterfall model

›› Iterative models
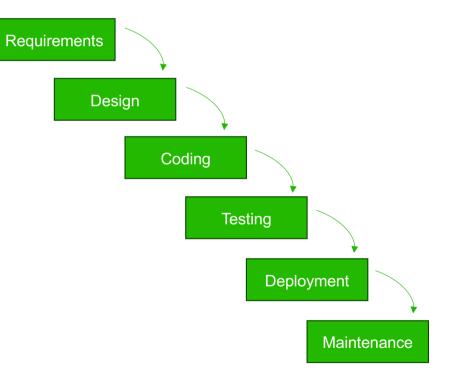
WATERFALL MODEL

» Rational process

» The design process is plan-driven

» The design process is understood in terms of a discrete sequence of stages: get one stage right before moving to the next

» Often aims at "freezing" the requirements – works well for procurement processes but often doesn't match reality

» May mask the real risks to a project until it is too late to do anything meaningful about them.

Requirements

Design

Coding

Testing

Deployment

Maintenance
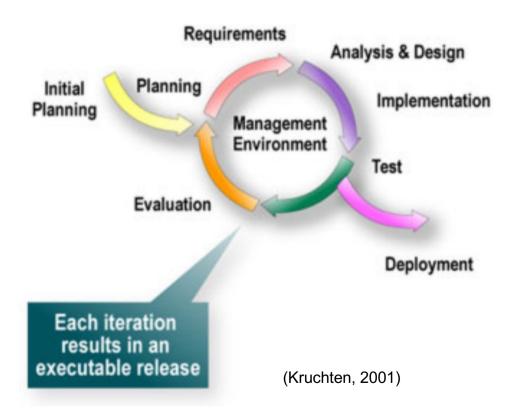
ITERATIVE MODELS

▶▶ Action-centered process

▶▶ Analysis, design and implementation are contemporary and inextricably linked

▶▶ Agile processes

Requirements

Analysis & Design

Planning

Initial Planning

Management Environment

Implementation

Test

Evaluation

Deployment

Each iteration results in an executable release

(Kruchten, 2001)
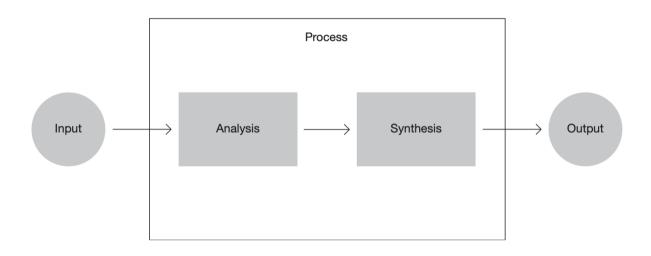
ITERATIVE MODELS: SOME BENEFITS

▸ Serious misunderstandings are made evident early in the lifecycle, when it's possible to react to them.

▸ It enables and encourages user feedback, so as to elicit the system's real requirements.

▸ The development team is forced to focus on those issues that are most critical to the project, and team members are shielded from those issues that distract them from the project's real risks.

▸ Continuous, iterative testing enables an objective assessment of the project's status.

▸ Inconsistencies among requirements, designs, and implementations are detected early.

▸ The workload of the team, especially the testing team, is spread out more evenly throughout the lifecycle.

▸ This approach enables the team to leverage lessons learned, and therefore to continuously improve the process.

▸ Stakeholders in the project can be given concrete evidence of the project's status throughout the lifecycle
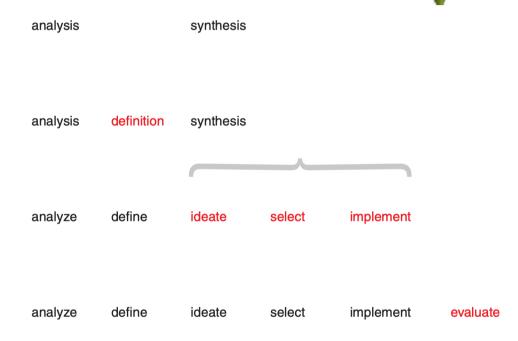
(Kruchten, 2001)

ANALYSIS - SYNTHESIS
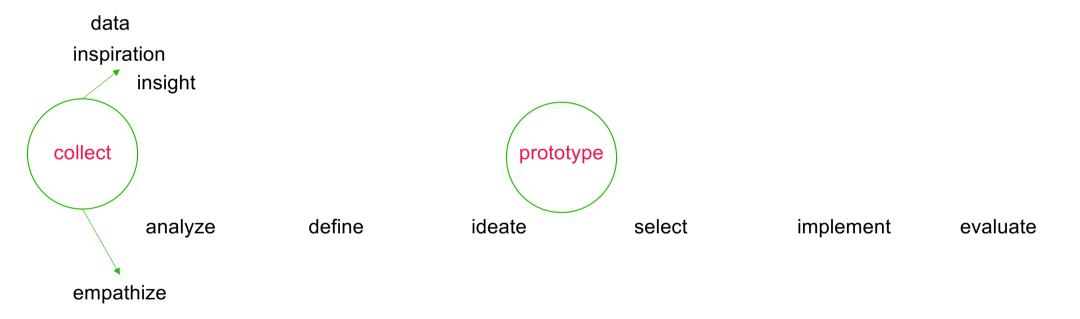
Dubberly, 2004: How do you design?

analysis   synthesis

analysis   definition   synthesis

analyze   define   ideate   select   implement

accept   analyze   define   ideate   select   implement   evaluate

Dubberly, 2004: How do you design? → Check the booklet on Moodle!

DESIGN THINKING

data

inspiration

insight

collect

prototype

analyze   define   ideate   select   implement   evaluate

empathize

DESIGN THINKING (DT)

▶▶ 1920's -> Science of design / design as a science

▶▶ 1950's -> first use of term "design thinking"

▶▶ 1960's -> Design methods as DT

▶▶ 1960's as the design science decade

▶▶ 1970's -> backlash / Design as a discipline

▶▶ 2000's -> "new" DT / outside field of design / IDEO

▶▶ 2010's -> DT popularised / wide update but also criticism

(Cross, 2023; 2001)
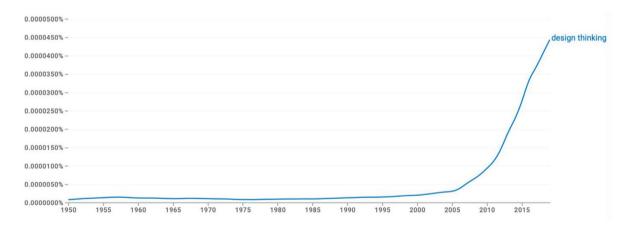
Figure 1 Google N-gram of the use of the phrase 'design thinking'

said, "[This is the] first time I've ever made it out of here at the end of my shift."

Thus did a group of nurses significantly improve their patients' experience while also improving their own job satisfaction and productivity. By applying a human-centered design methodology, they were able to create a relatively small process innovation that produced an outsize impact. The new shift changes are being rolled out across the Kaiser system, and the capacity to reliably record critical patient information is being integrated into an electronic medical records initiative at the company.

What might happen at Kaiser if every nurse, doctor, and administrator in every hospital felt empowered to tackle problems the way this group did? To find out, Kaiser has created the Garfield Innovation Center, which is run by Kaiser's original core team and acts as a consultancy to the entire organization. The center's mission is to pursue innovation that enhances the patient experience and, more broadly, to envision Kaiser's "hospital of the future." It is introducing tools for design thinking across the Kaiser system.

How Design Thinking Happens

The myth of creative genius is resilient: We believe that great ideas pop fully formed out of brilliant minds, in feats of imagination well beyond the abilities of mere mortals. But what the Kaiser nursing team accomplished was neither a sudden breakthrough nor the lightning strike of genius; it was the result of hard work augmented by a creative human-centered discovery process and followed by iterative cycles of prototyping, testing, and refinement.

The design process is best described metaphorically as a system of spaces rather than a predefined series of orderly steps. The spaces demarcate different sorts of related activities that together form the continuum of innovation. Design thinking can feel chaotic to those experiencing it for the first time. But over the life of a project participants come to see – as they did at Kaiser – that the process makes sense and achieves results, even though its architecture differs from the linear, milestone-based processes typical of other kinds of business activities.

Design projects must ultimately pass through three spaces (see the exhibit at right). We label these "inspiration," for the circumstances (be they a problem, an opportunity, or both) that motivate the search for solutions; "ideation," for the pro-

cess of generating, developing, and testing ideas that may lead to solutions; and "implementation," for the charting of a path to market. Projects will loop back through these spaces – particularly the first two – more than once as ideas are refined and new directions taken.

Sometimes the trigger for a project is leadership's recognition of a serious change in business fortunes. In 2004 Shimano, a Japanese manufacturer of bicycle components, faced flattening growth in its traditional high-end road-racing and mountain-bike segments in the United States. The company had always relied on technology innovations to drive its growth and naturally tried to predict where the next one might come from. This time Shimano thought a high-end casual bike that appealed to boomers would be an interesting area to explore. IDEO was invited to collaborate on the project.

During the inspiration phase, an interdisciplinary team of IDEO and Shimano people – designers, behavioral scientists, marketers, and engineers – worked to identify appropriate constraints for the project. The team began with a hunch that it should focus more broadly than on the high-end market, which might prove to be neither the only nor even the best source of new growth. So it set out to learn why 90% of American adults don't ride bikes. Looking for new ways to think about the problem, the team members spent time with all kinds of consumers. They discovered that nearly everyone they met rode a bike as a child and had happy memories of doing so. They also discovered that many Americans are intimidated by cycling today – by the retail experience (including the young, Lycra-clad athletes who serve as sales staff in most independent bike stores); by the complexity and cost of the bikes, accessories, and specialized clothing; by the danger of cycling on roads not designed for bicycles; and by the demands of maintaining a technically sophisticated bike that is ridden infrequently.

This human-centered exploration – which took its insights from people outside Shimano's core customer base – led to the realization that a whole new category of bicycling might be able to reconnect American consumers to their experiences as children while also dealing with the root causes of their feelings of intimidation – thus revealing a large untapped market.

The design team, responsible for every aspect of what was envisioned as a holistic experience, came up with the concept of "Coasting." Coasting would aim to entice lapsed bikers into

Implementation

3

Move on to the next project – repeat

Make the case to the business – spread the word

Inspiration

1

Expect Success
Build implementation resources into your plan

What's the business problem? Where's the opportunity? What has changed (or soon may change)?

Ideation

2

the midst of everything; describe their journeys

Build creative frameworks (order out of chaos)

Make many sketches, concoct scenarios

Brainstorm

Are valuable ideas, assets, and expertise hiding inside the business?

How can new technology help?

Organize information and synthesize possibilities (tell more stories!)

Tim Brown (was CEO of IDEO)

Design thinking "uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity. "

Brown (2008)

LUT University

said, "[This is the] first time I've ever made it out of here at the end of my shift."

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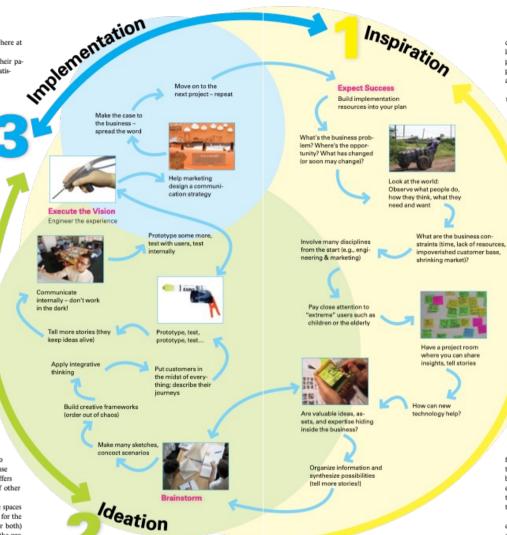
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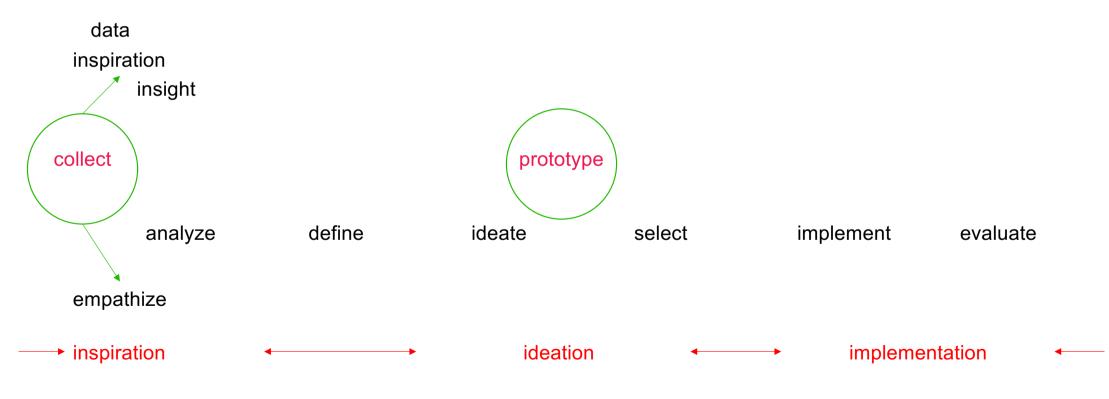
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Diagram (center):

Implementation

3

1 Inspiration

Expect Success
Build implementation resources into your plan

Move on to the next project – repeat

Make the case to the business – spread the word

Help marketing design a communication strategy

What's the business problem? Where's the opportunity? What has changed (or soon may change)?

Execute the Vision
Engineer the experience

Look at the world: Observe what people do, how they think, what they need and want

Prototype some more, test with users, test internally

Involve many disciplines from the start (e.g., engineering & marketing)

What are the business constraints (time, lack of resources, impoverished customer base, shrinking market)?

Communicate internally – don't work in the dark!

Prototype, test, prototype, test...

Pay close attention to "extreme" users such as children or the elderly

Have a project room where you can share insights, tell stories

Tell more stories (they keep ideas alive)

Put customers in the midst of everything; describe their journeys

Apply integrative thinking

Build creative frameworks (order out of chaos)

Are valuable ideas, assets, and expertise hiding inside the business?

How can new technology help?

Make many sketches, concoct scenarios

Brainstorm

Organize information and synthesize possibilities (tell more stories!)

2 Ideation

Brown (2008)

DESIGN THINKING

data
inspiration
insight

collect

prototype

analyze   define   ideate   select   implement   evaluate

empathize

inspiration   ideation   implementation

IDEO (2004)

1. Observation
IDEO's cognitive psychologists, anthropologists, and sociologists team up with corporate clients to understand the consumer experience.

Some of IDEO's techniques:

Shadowing Observing people using products, shopping, going to hospitals, taking a train, using their cell phones.
Behavioral mapping Photographing people within a space, such as a hospital waiting room, over two or three days.
Consumer journey Keeping track of all the interactions a consumer has within a product, service, or space.
Camera journals Asking consumers to keep visual diaries of their activities and impressions relating to a product.
Extreme user interviews Talking to people who really know—or know nothing—about a product or service, and evaluating their experience using it.
Storytelling Prompting people to tell personal stories about their consumer experiences.
Unfocus groups Interviewing a diverse group of people: To explore ideas about sandals, IDEO gathered an artist, a bodybuilder, a podiatrist, and a shoe fetishist.

2. Brainstorming
An intense idea-generating session analyzing data gathered by observing people. Each lasts no more than an hour. Rules of brainstorming are strict and are stenciled on the walls.

Defer judgment Don't dismiss any ideas
Build on the ideas of others No "buts," only "ands."
Encourage wild ideas Embrace the most out-of-the-box notions because they can be the key to solutions.
Go for quantity Aim for as many new ideas as possible. In a good session, up to 100 ideas are generated in 60 minutes.
Be visual Use yellow, red, and blue markers to write on big 30-inch by 25-inch Post-its that are put on a wall.
Stay focused on the topic Always keep the discussion on target.
One conversation at a time No interrupting, no dismissing, no disrespect, no rudeness.

3. Rapid prototyping
Mocking-up working models helps everyone visualize possible solutions and speeds up decision-making and innovation.

Some guidelines:

Mock-up everything It is possible to create models not only of products but also of services such as health care and spaces such as museum lobbies.
Use videography Make short movies to depict the consumer experience.
Go fast Build mock-ups quickly and cheaply. Never waste time on complicated concepts.
No frills Make prototypes that demonstrate a design idea without sweating over the details.
Create scenarios Show how a variety of people use a service in different ways and how various designs can meet their individual needs.
Bodystorm Delineate different types of consumers and act out their roles.

4. Refining
At this stage, IDEO narrows down the choices to a few possibilities.

Here's how it's done:

Brainstorm in a rapid fashion to weed out ideas and focus on the remaining best options.
Focus prototyping on a few key ideas to arrive at an optimal solution to a problem.
Engage the client actively in the process of narrowing the choices.
Be disciplined and ruthless in making selections.
Focus on the outcome of the process—reaching the best possible solutions.
Get agreement from all stakeholders. The more top-level executives who sign off on the solution, the better the chances of success.

5. Implementation
Bring IDEO's strong engineering, design, and social-science capabilities to bear when actually creating a product or service.

Tap all resources Involve IDEO's diverse workforce from 40 countries to carry out the plans.
The workforce Employees have advanced degrees in different kinds of engineering: mechanical, electrical, biomechanical, software, aerospace, and manufacturing. Many are experts in materials science, computer-aided design, robotics, computer science, movie special effects, molding, industrial interaction, graphic and web information, fashion and automotive design, business, communications, linguistics, sociology, ergonomics, cognitive psychology, biomechanics, art therapy, ethnology, management consulting, statistics, medicine, and zoology.

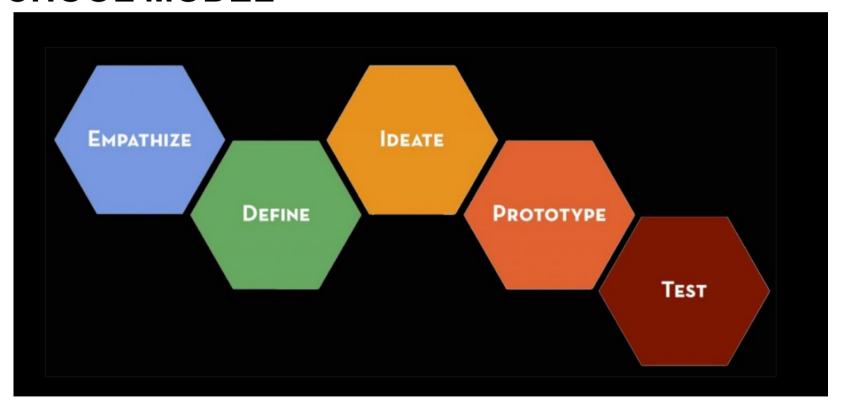LUT University

HUMAN-CENTERED DESIGN

DESIGN KIT
brought to you by
IDEO·ORG

MINDSETS   **METHODS**   CASE STUDIES   RESOURCES

Methods

Human-centered design is a practical, repeatable approach to arriving at innovative solutions. Think of these Methods as a step-by-step guide to unleashing your creativity, putting the people you serve at the center of your design process to come up with new answers to difficult problems.

FILTER METHODS

INSPIRATION   IDEATION   IMPLEMENTATION   BY QUESTION   **VIEW ALL**

Tips & Tricks

https://www.designkit.org/methods.html
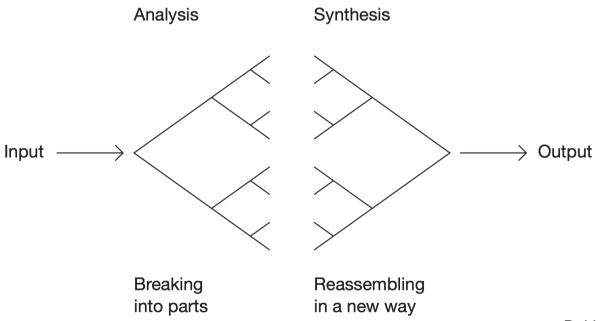
D.SCHOOL MODEL
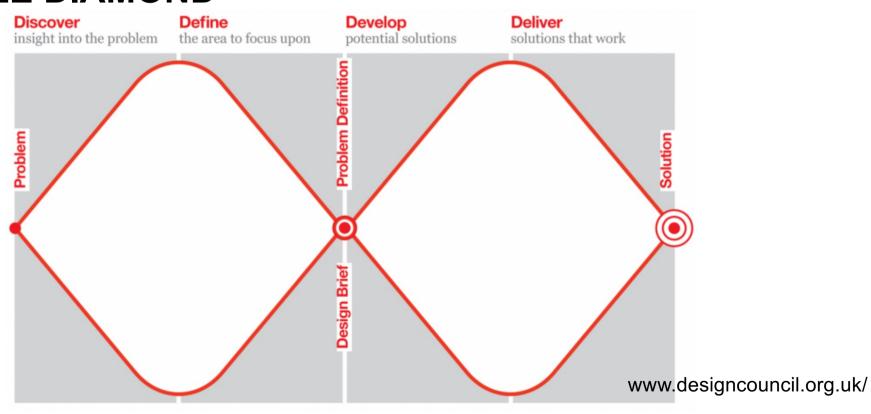
CONVERGENCE-DIVERGENCE MODEL

Analysis

Synthesis

Input →

Output

Breaking
into parts

Reassembling
in a new way

Dubberly, 2004: How do you design?

DOUBLE DIAMOND

ENGAGEMENT

Connecting the dots and building relationships between different citizens, stakeholders and partners.

DESIGN PRINCIPLES

1. Be People Centred
2. Communicate (Visually & Inclusively)
3. Collaborate & Co-Create
4. Iterate, Iterate, Iterate

CHALLENGE

Discover   Define   Develop   Deliver

OUTCOME

METHODS BANK

Explore, Shape, Build

Creating the conditions that allow innovation, including culture change, skills and mindset.

LEADERSHIP

www.designcouncil.org.uk/

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3 PILLARS OF POPULARISED DT

▸▸ Collecting inspiration/insights from users and building empathy with them → **user-centric**

▸▸ Prototyping for testing and communicating design propositions → **making-driven**

▸▸ Problem exploration through divergent and convergent modes of thinking combined with iterative approach → **divergent/convergent and iterative**

→ This is what we will follow in this course!

Kolko, 2018

THERE ARE NO RIGHT OR WRONG MODELS

» Different designers will work in different ways

» But you need to be aware of the consequences of your choices

» Service design mostly makes use of iterative models, design thinking, and double diamond BUT even those need to be continuously questioned!

» You build your design skills by engaging in design activities and building experience – however, you need to continuously and actively reflect on what you are doing and learn from that ☺

» **"The point of a design methodology is not to have a recipe to follow, but rather to have a structure to fall back on - a set of reference points."** Hartfield and Winograd (1996)

WICKED PROBLEMS

- 60's interest in design methodology → linear, step-by-step models offering variations on the problem/solution model and its division into analysis and synthesis phases

- Horst Rittel sought for an alternative because
  1. the actual sequence of design thinking and decision making is not a simple linear process
  2. the problems addressed by designers do not, in actual practice, yield to any linear analysis and synthesis designers deal with wicked problems, beyond linear processes of problem definition and problem solving

- Most design problems are "wicked problems"

- Wicked problems are ill-defined, involve conflicting values, with confusing ramifications

- Designers shape a design situation, identify the views of all participants, their issues of concern, and provide a working hypothesis for exploration and development.

- Wicked problems have no definitive formulation, but every formulation of a wicked problem corresponds to the formulation of a solution.
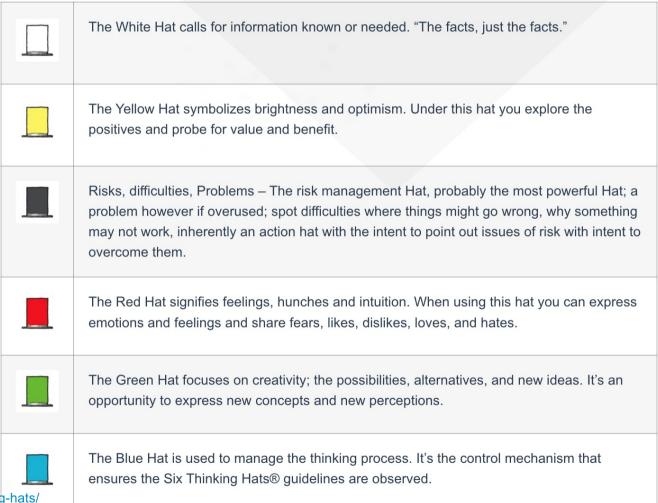
(Buchanan, 1992)

LATERAL THINKING

» Using reasoning that is disruptive: thinking outside the box and see problems from a new angle

» DeBono's 6 Thinking Hats is an example of a technique to promote lateral thinking: https://www.debonogroup.com/services/core-programs/six-thinking-hats/

» 4 known techniques are:

» **Provocation**: This involves disrupting conventional thinking patterns with unusual ideas.

» **Challenge**: The challenge is about questioning the status quo. It's about looking at things as if they might be wrong, even if they seem right. This approach encourages deeper analysis and alternative viewpoints.

» **Random Entry**: This technique generates new ideas using a random word or idea as a starting point. It creates connections that may not be immediately noticeable.

» **Alternatives**: It focuses on shifting thinking patterns by exploring various directions and possibilities.

https://www.interaction-design.org/literature/topics/lateral-thinking

6 THINKING HATS

	The White Hat calls for information known or needed. "The facts, just the facts."
	The Yellow Hat symbolizes brightness and optimism. Under this hat you explore the positives and probe for value and benefit.
	Risks, difficulties, Problems – The risk management Hat, probably the most powerful Hat; a problem however if overused; spot difficulties where things might go wrong, why something may not work, inherently an action hat with the intent to point out issues of risk with intent to overcome them.
	The Red Hat signifies feelings, hunches and intuition. When using this hat you can express emotions and feelings and share fears, likes, dislikes, loves, and hates.
	The Green Hat focuses on creativity; the possibilities, alternatives, and new ideas. It's an opportunity to express new concepts and new perceptions.
	The Blue Hat is used to manage the thinking process. It's the control mechanism that ensures the Six Thinking Hats® guidelines are observed.

https://www.debonogroup.com/services/core-programs/six-thinking-hats/

DESIGNING TOGETHER

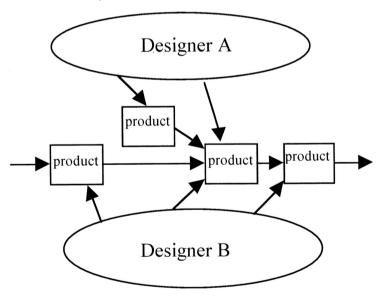▶▶ Designing is rarely done individually, it is most often an act that involves others

▶▶ Complex design problems require more knowledge than any single person possesses: the knowledge relevant to a problem is usually distributed among stakeholders

▶▶ Process gain: accomplished something together which could not be accomplished by an individual

▶▶ Success of group:

　▶▶ Task interdependence (how closely group members work together)

　▶▶ Outcome interdependence (whether, and how, group performance is rewarded),

　▶▶ Potency (members' belief that the group can be effective).

▶▶ Collaboration vs. cooperation?

(Arias et al., 2000; Kvan, 2000)

COOPERATION

» Informal relationships exist without a commonly defined mission, structure or effort.

» Information is shared as needed

» Authority is retained by each stakeholder

» Resources are separate

» Rewards are separate

(Kvan, 2000)

Fig. 2. Loosely coupled design process.

COLLABORATION

>> More durable and pervasive relationship.

>> Full commitment to a common mission

>> Authority is determined by the collaborative structure

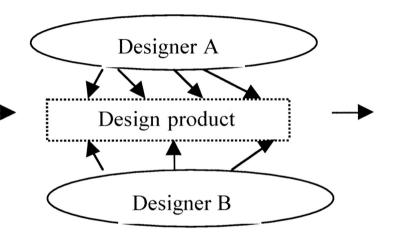>> Risk is much greater

>> Higher levels of trust are needed

→collaboration requires a greater commitment to a common goal than co-operation

Fig. 1. Close coupled design process.

(Kvan, 2000)

IN DESIGN THERE CAN BE BOTH

›› Working together in design is episodic and cyclical

›› There may be moments of intense collaborations and moments of cooperation and individual contributions – the length of these moments varies

›› Each designer in a team brings their own expertise, but expertise can change during a design session as new knowledge is formed

›› Collaboration can be mutual (busy working together), exclusive (work on separate parts but negociate together-> cooperate), or dictatorial (one person in charge)

›› Compromise takes place: this is not (necessarily) bad as the basis for the satisfied solution goes beyond superficiality and is often a truly innovative solution.

›› Compromise is different than decision by consensus!

(Kvan, 2000)

INVITING OTHERS TO THE DESIGN PROCESS

➤➤ Codesign

➤➤ Participatory design

→ You will tackle these in UX design course next semester ☺

DISCUSS IN YOUR GROUP

1. How does each one of you understand design? What design process is each of you familiar with? Which models are you interested in or have experience with?

2. Are you familiar with design cooperation or collaboration practices, e.g. from your previous studies or work experience? Share them with your group and reflect together on how you would like to work together in the forthcoming group project work. What might be the challenges? How might you overcome these challenges?

NEXT THURSDAY

» Group exercise on collaboration in design

» Lots of fun if you come to class for it!

» The tutorial can only be done in groups of 3 (doesn't need to be with your own group), BUT submission will be individual

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