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Empowering Women in STEM

Design thinking

02 / From observing people to a value hypothesis

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Eight sessions, one *route*

[01]
Startup thinking

[02]
Design thinking
[WE ARE HERE]

[03]
Customer discovery

[04]
Team

[05]
Prototyping

[06]
Comms

[07]
Pitching

[08]
Networking & funding

What you leave with

[01]

Problem statement

one situation we can research

[02]

How Might We

a question open to several solutions

[03]

Solution directions

1–2 worth testing first

[04]

Draft value hypothesis

from the Value Proposition Canvas

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Can Netflix and Bolt be competitors?

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The competitor set depends on the *job*

[01]

Situation

an evening, free time

[02]

Job

spend the evening well

[03]

Alternatives

stay home and binge-watch or go out and get a taxi back

Question for teams: what job is the person trying to get done?

Five stages of *Design Thinking*

[01]

Empathize

understand the person

[02]

Define

frame the problem

[03]

Ideate

create options

[04]

Prototype

make the idea visible

[05]

Test

check with people

An iterative, human-centered approach: at any stage you can go back.

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The same process in three *phases*

[01]

Exploratory

understand what is happening and why

[02]

Generative

create options together with people

[03]

Evaluative

check what works



Today we spend most time on exploratory and generative. Evaluative continues in 03 and 05.

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Assumption is your greatest enemy.

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The customer is an expert in their own *experience*

People know their own behaviour, barriers and workarounds.

The team notices patterns and proposes solutions. Users are not asked to design the product themselves.

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Four ways to see *experience*

Service safari

go through the service yourself as a user

Observation

watch what people do in a real context ('fly on the wall' approach)

Shadowing / work-along

accompany a person while they work

Short interview

ask about a specific past experience

What we *look for*

[01] what the person is trying to do

[02] what they do now

[03] where friction appears and which workarounds they use

[04] what matters to them

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The Mom Test: ask about the *past*

[WE DO NOT ASK]

“Would you use this?”

“Do you like the idea?”

[WE ASK]

“When did this last happen?”

“What did you do?”

“What was hard?”

“What have you already tried?”

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1980

A mouse for Apple Lisa

User testing showed that exact matching between hand movement and cursor distance was unnecessary. People quickly compensate for the difference.

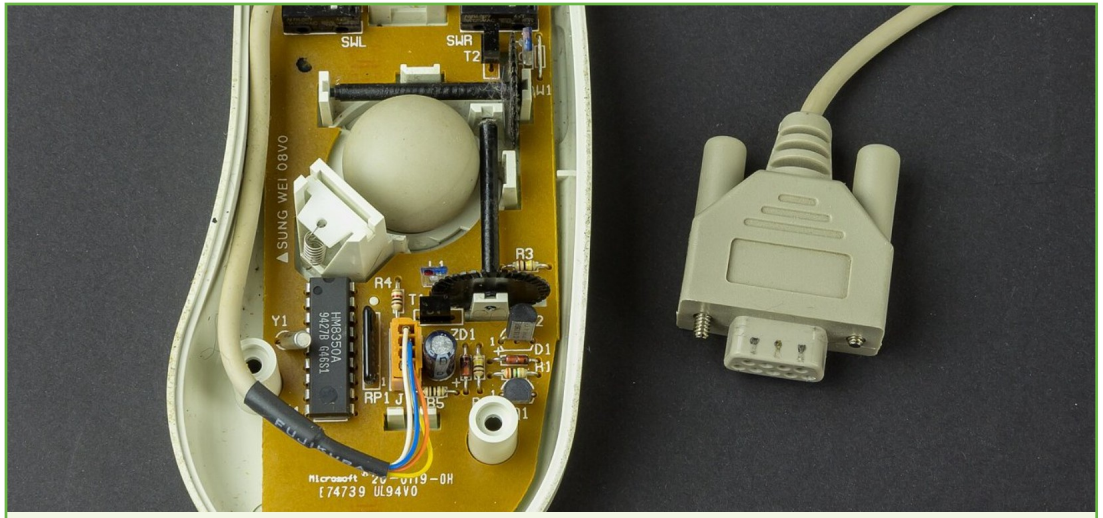
The mechanics were simplified and the cost reduced. An insight about behaviour changed the technical solution.



PHOTO: BENOÎT PRIEUR · CC0 · WIKIMEDIA COMMONS

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The same approach in consumer tech and *health*



Microsoft ergonomic mouse

shape and mechanism position were tested through human factors research



Lilly insulin pens

the design built on how people live with self-injection and what makes daily use easier

PHOTOS: RAIMOND SPEKKING · CC BY-SA 4.0 · WIKIMEDIA COMMONS

From observation to *problem*

[01]	**Observation**	what we saw or heard
[02]	**Insight**	what it may mean about a need or barrier
[03]	**Problem statement**	a specific situation we can research and solve

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[who] is trying to [do what] in [context], but faces [barrier], which leads to [consequence].

[FILL IN THE BRACKETS BEFORE YOU FALL IN LOVE WITH THE SOLUTION]

Job and *alternatives* before the problem

[01]

Job

what the person is trying to get done in this situation

→

[02]

Current alternatives

how they already do it

→

[03]

Problem statement

a situation we can research

→

[04]

HMW

a question open to several solutions

Solutions change, needs stay. (Oleg Koss)

Technology-first start: a water *sensor*

[TECHNOLOGY] low-cost sensor for continuous water quality monitoring



Greenhouses

[WE PICK ONE]



Aquaculture



Laboratories

PHOTOS: KEN LUND (CC BY-SA 2.0) · MOHSEN87TAHA (CC BY-SA 4.0) · U.S. EPA (PUBLIC DOMAIN)

Problem and *HMW* for a greenhouse

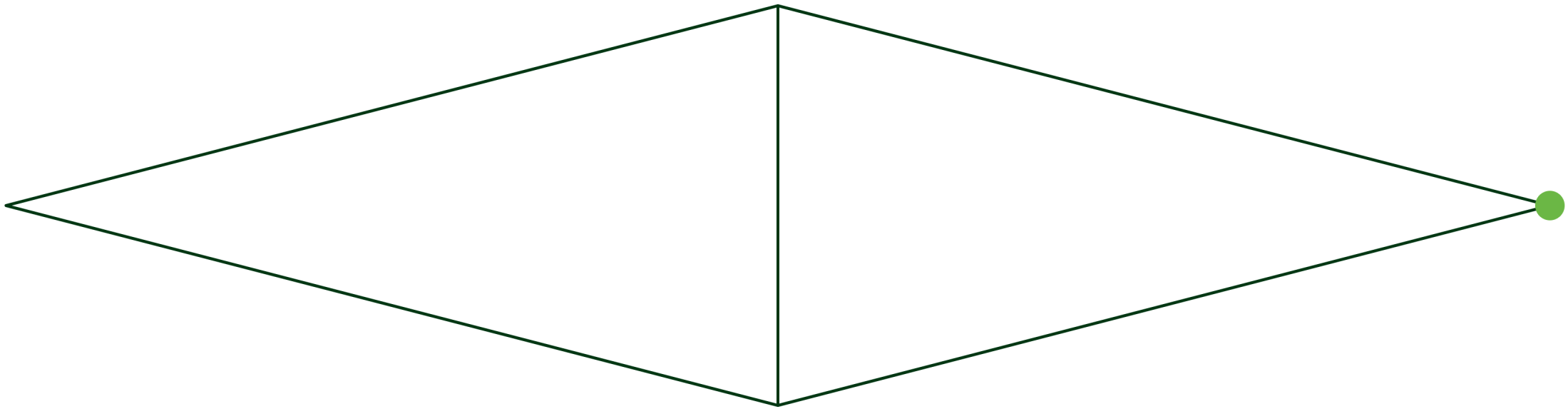
[PROBLEM]

Workers check the water by hand and irregularly, so they notice changes late and react after the consequences appear.

[HOW MIGHT WE]

How might we help greenhouse workers notice changes earlier without one more manual check?

First *expand*, then narrow



[DIVERGE · MORE OPTIONS, INCLUDING NON-TECH ONES]

[CONVERGE]

Dreamer, Critic, *Realist*

[01]

Dreamer

generates without limits

[02]

Critic

looks for weak points

[03]

Realist

picks 1–2 options to test first

Six directions for one *HMW*

Sensor with deviation alerts	**Colour indicator by the bed**	**Scheduled round with a checklist**
Dashboard for the shift lead	**Automatic correction at thresholds**	**Shift-to-shift handover in a messenger**

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Build crappy prototypes to get quick feedback.

[THE FIRST ONE IS SUPPOSED TO LOOK LIKE THIS]

Enough for a person to *interact*

Paper screen

Storyboard

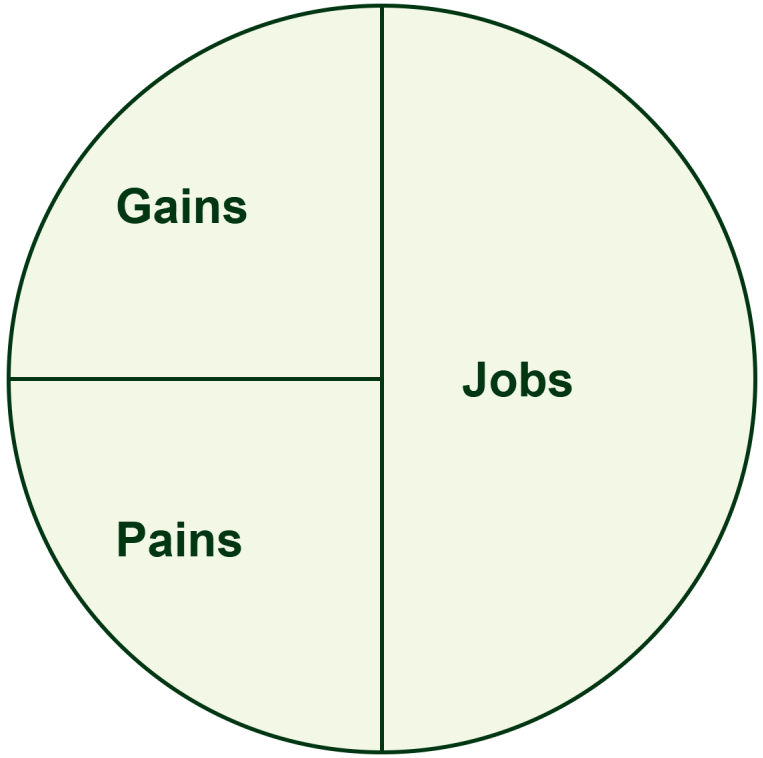
Cardboard model

Role-play



We watch reactions and behaviour. Low fidelity early on helps us learn faster.

Customer Profile: what matters to the *person*



Jobs

what the person is trying to get done in a specific situation

Pains

what gets in the way or creates costs

Gains

the result that has value for them

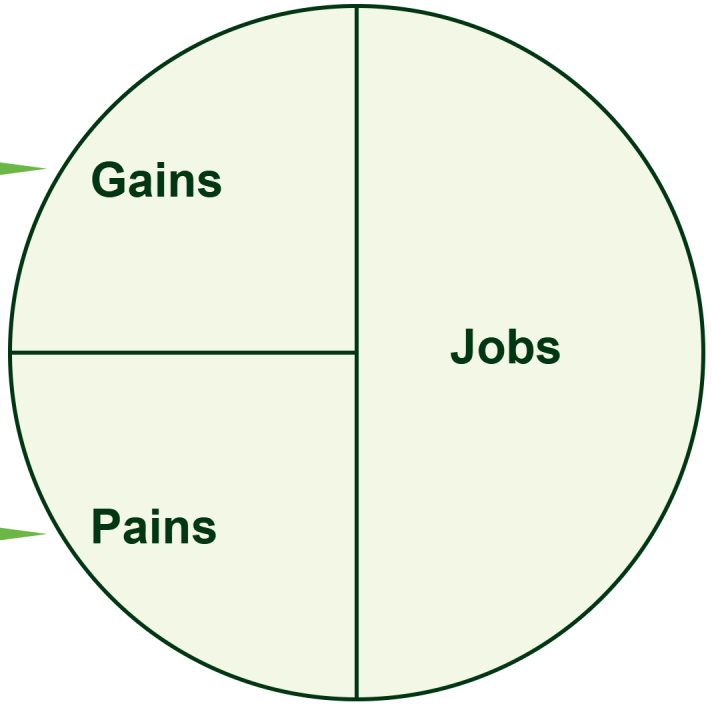
We do not phrase the job as “use our product”.

Value Map meets Customer *Profile*

[VALUE MAP]



[CUSTOMER PROFILE]



Fit: pain relievers and gain creators answer the pains and gains that matter most. It stays a hypothesis until people confirm it.

A free evening: the *job* and its alternatives

[01]

Job

decide how to spend a free evening

[02]

Alternative: stay home

Netflix

[03]

Alternative: go out

a meeting or an event, with Uber

Netflix and Uber here are ways to do the job. Which pains and gains shape the choice?

A *hypothesis* for the water sensor

Job

keep the right water parameters for the plants

Pain

manual checks are easy to postpone, problems can be noticed late

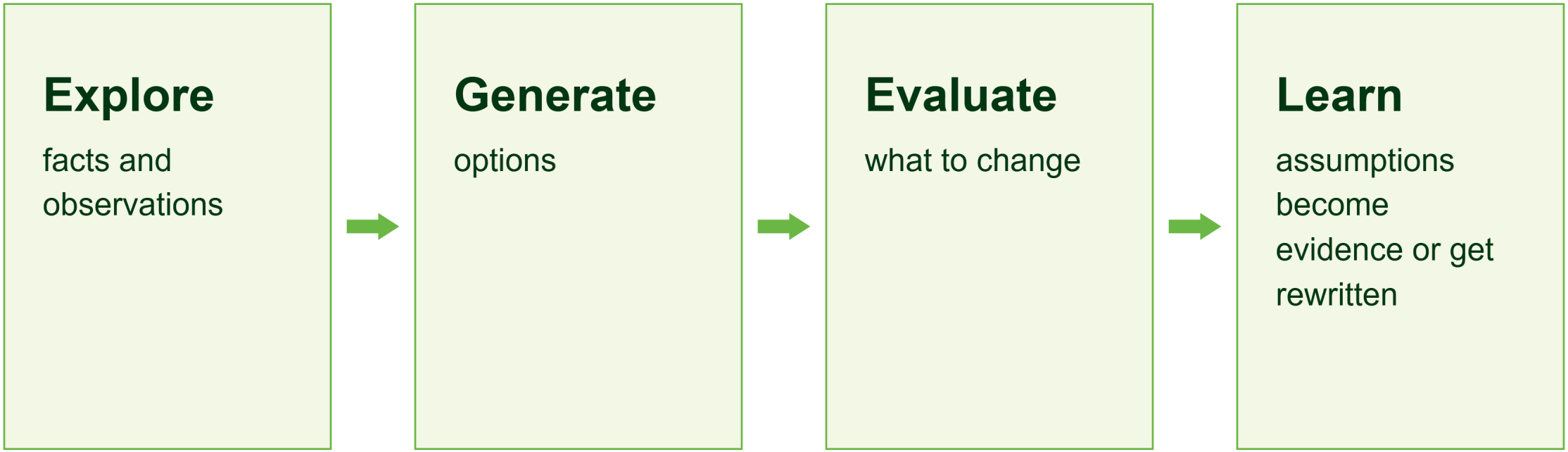
Gain

a signal while there is still time to react

Value hypothesis

a sensor and a simple deviation message reduce dependence on manual control

Assumption, evidence, next *iteration*



In 03 we test problem and user hypotheses through conversations. In 05 we work on a prototype and a test.

Assumptions that *changed*

[OBSERVATION]

[our assumption]

[what we saw that changed it]

[INTERVIEW]

[our assumption]

[what we heard that changed it]

[PROTOTYPE TEST]

[our assumption]

[what the prototype test showed]

One *situation*, four steps

[01]

Empathy Snapshot

[02]

Problem Statement

[03]

How Might We

[04]

Idea Sprint

Output: one problem statement, one HMW, 1–2 solution directions and a draft value hypothesis.

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Questions to *discuss*

“What if I already have a technology?”

“How do I know if observation is enough?”

“Can design thinking be applied to a service or a city solution?”



Self-study before *03*

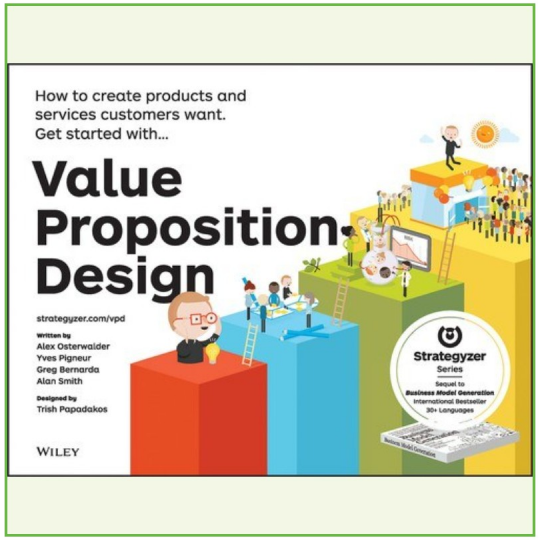
[01] Observe 2–3 situations where the problem appears in life, studies, a lab or work

[02] Add at least 5 alternative solution ideas

[03] Mark in the VPC what is still an assumption

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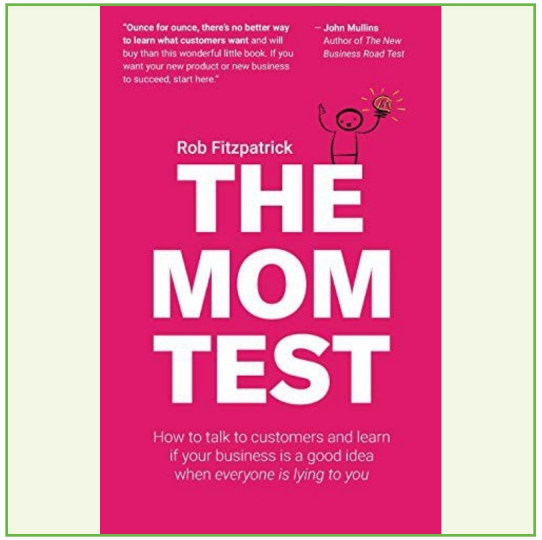
Books *worth reading*



Value Proposition Design

Osterwalder, Pigneur, Bernarda, Smith

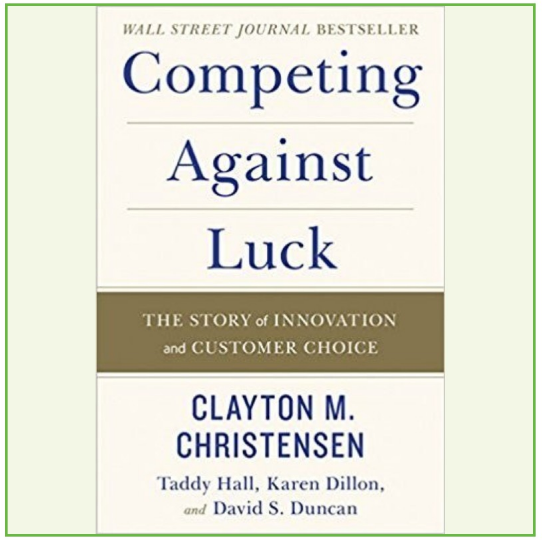
The whole canvas, with exercises for filling it in.



The Mom Test

Rob Fitzpatrick

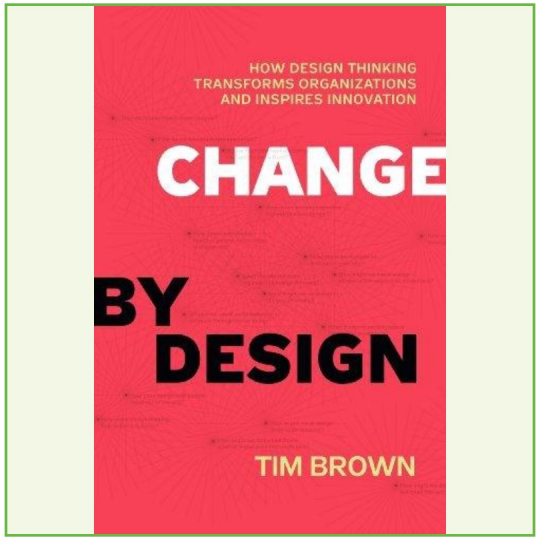
A short read. Session 03 leans on it.



Competing Against Luck

Clayton Christensen and co-authors

Jobs to Be Done from the source.



Change by Design

Tim Brown

Design thinking told by the person who led IDEO.

COVER IMAGES: OPEN LIBRARY · BELONG TO THEIR PUBLISHERS

Also *worth a look*

[01]

Stanford d.school · Design Thinking Bootleg

The five modes in practice, with methods for each.

[02]

IDEO · case studies

The Apple mouse, the Microsoft mouse and the Lilly pens in more detail.

[03]

Strategyzer · Value Proposition Canvas

The official canvas and how to fill it in.

[04]

Taavi Tamm, University of Tartu · Design Thinking

The lecture behind exploratory, generative and evaluative.

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Thank you!

Any questions? You can reach out to

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