VSR | EDU

Current Trends
in
Web Engineering

# Current Trends in Web Engineering

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# SECTION://2

- Advanced Backlog Concepts

# Alignment Map as Backlog Creation Tool

| | Stage 1 | Stage 2 | Stage 3 | Stage N |
|---|---|---|---|---|
| Stage Purpose | | | | |
| Actions | | | | |
| Thoughts | | | | |
| Feelings | ☺ | ☹ | | |
| Pain Points | | | | |
| Touchpoints | | | | |
| Services and Offerings | | | | |
| Processes | | | | |
| Goals and Opportunities | | | | |
| SWOT eg. | | | | |


# Turning Alignment Maps into Backlogs

| Goal | Overall Objective the user/customer wants to achieve (broken down in stages and corresponding stage purposes) | | | |
|---|---|---|---|---|
| | Stage 1 | Stage 2 | Stage 3 | Stage N |
| Stage Purpose | | | | |
| … | | | | |
| Touchpoints | | | | |
| Services and Offerings | Epic1.1 | Epic2.1<br>Epic2.2 | | EpicN.1 |
| … | | | | |
| Stage specific Stories | Stage Result1.1<br>Stage Restul1.2 | Stage Result2.1 | Stage Result3.1 | Stage ResultN.1 |
| | Stage Result1.3 | Stage Restul2.2<br>Stage Result2.3<br>Stage Result2.4<br>Stage Restul2.5 | Stage Restul3.2<br>Stage Result3.3<br>Stage Result3.i<br>… | Stage RestulN.2<br>Stage ResultN.3<br>Stage ResultN.j<br>… |

Sprint 1

Sprint 2

# CHAPTER://5

- Design Thinking

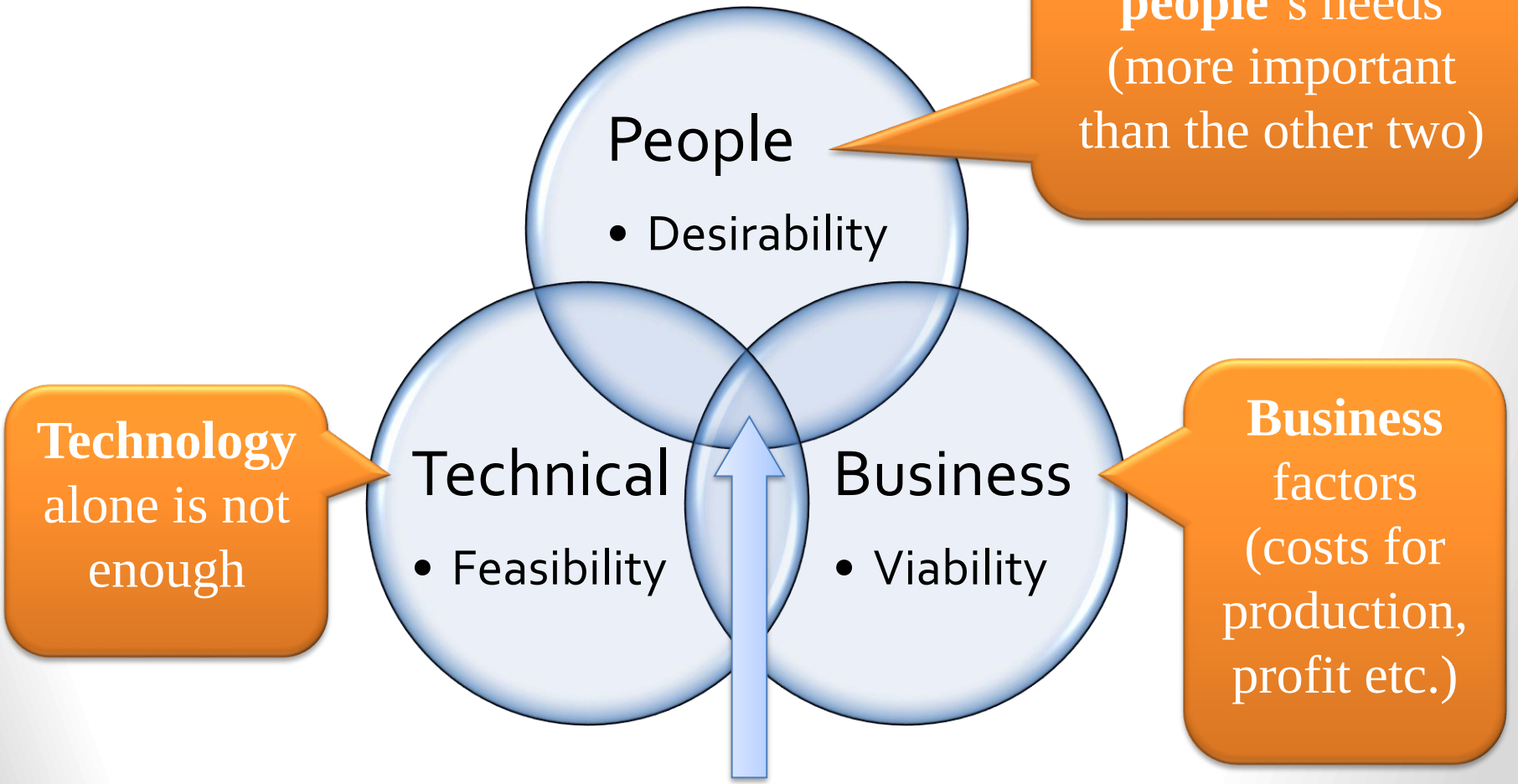
# Introduction

- Human Centered Design (HCD) approach by IDEO (David Kelley and Tom Kelley)
- HCD describes an approach **consisting of a process** and a **set of tools** to create new solutions
  - Called "human-centered" because it focuses on solutions for people's problems
  - HCD process starts by examining the needs, dreams and behaviors of the people trying engage with their problems and feelings – getting a deep understanding
- HCD is about creative confidence and the start of **DESIGN THINKING**

# SECTION://1

- Human Centered Design (HCD)

# The Three Lenses of HCD

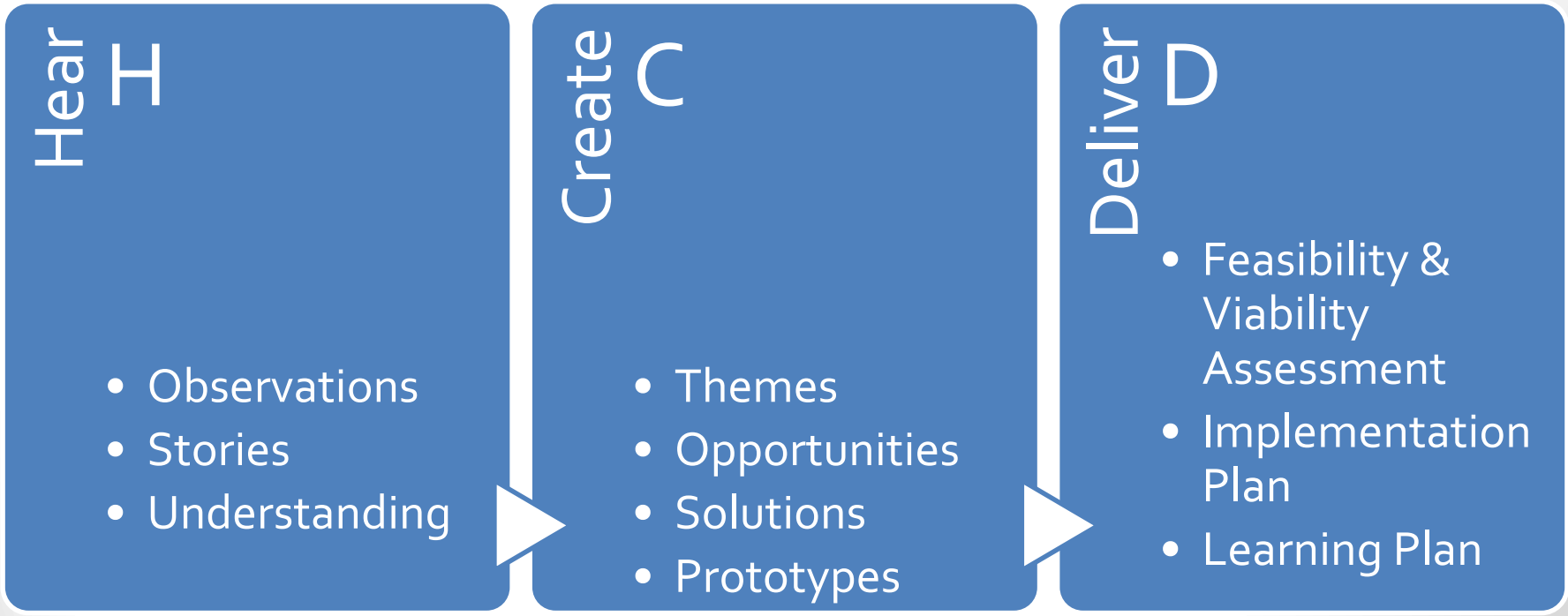



Finding the sweet spot: Create solutions which are **Desirable, Feasible and Viable**.

# HCD and …

- IDEO´s approach adapts and evolves continuously
  - Inspiration for many different interpretations
  - Inspiration for many new tools for better understanding
- The key elements remain stable and are applicable for many aspects
  - yes, it is about solving problems, humand needs, and the border of technology and business
  - In other words again: To create solutions, which are desirable, feasible and viable

# IDEO´s HCD approach




# Hear

- Goals
  - Who to talk to
  - How to gain Empathy
  - How to capture Stories
- Outputs
  - People's Stories
  - Observations of Reality
  - Deeper Understanding of Needs, Barriers & Contraints

# Hear

1. **Identify a Design Challenge**
2. **Recognize Existing Knowledge**
3. **Identify people to speak with**
4. **Choose Research Methods**
5. **Develop an Interview Approach**
6. **Develop your Mindset**

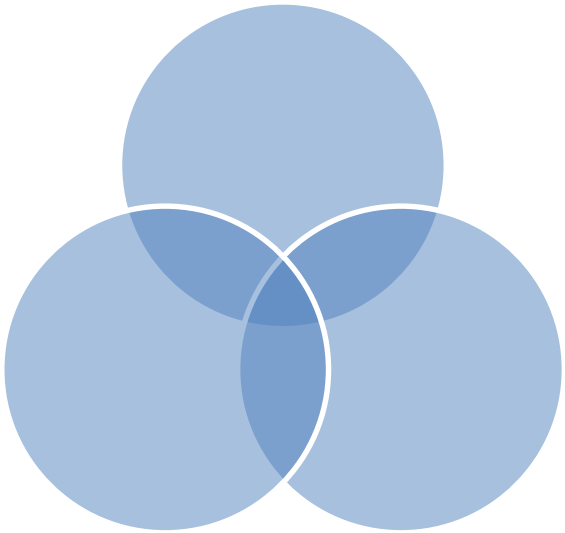
# Create

- Goals
  - Making Sense of Data
  - Identifying Patterns
  - Defining Opportunities
- Outputs
  - Opportunities
  - Solutions
  - Prototypes

# Create

1. **Develop the Approach**
2. **Share Stories**
3. **Identify Patterns**
4. **Create Opportunity Areas**
5. **Brainstorm New Solutions**
6. **Make Ideas Real: Prototyping**
7. **Gather Feedback**

# Frameworks

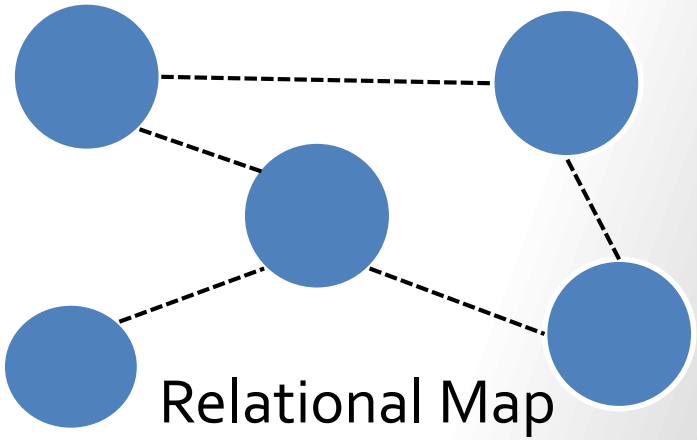


Venn Diagram



Two-by-Two Matrix

Process Map



Relational Map

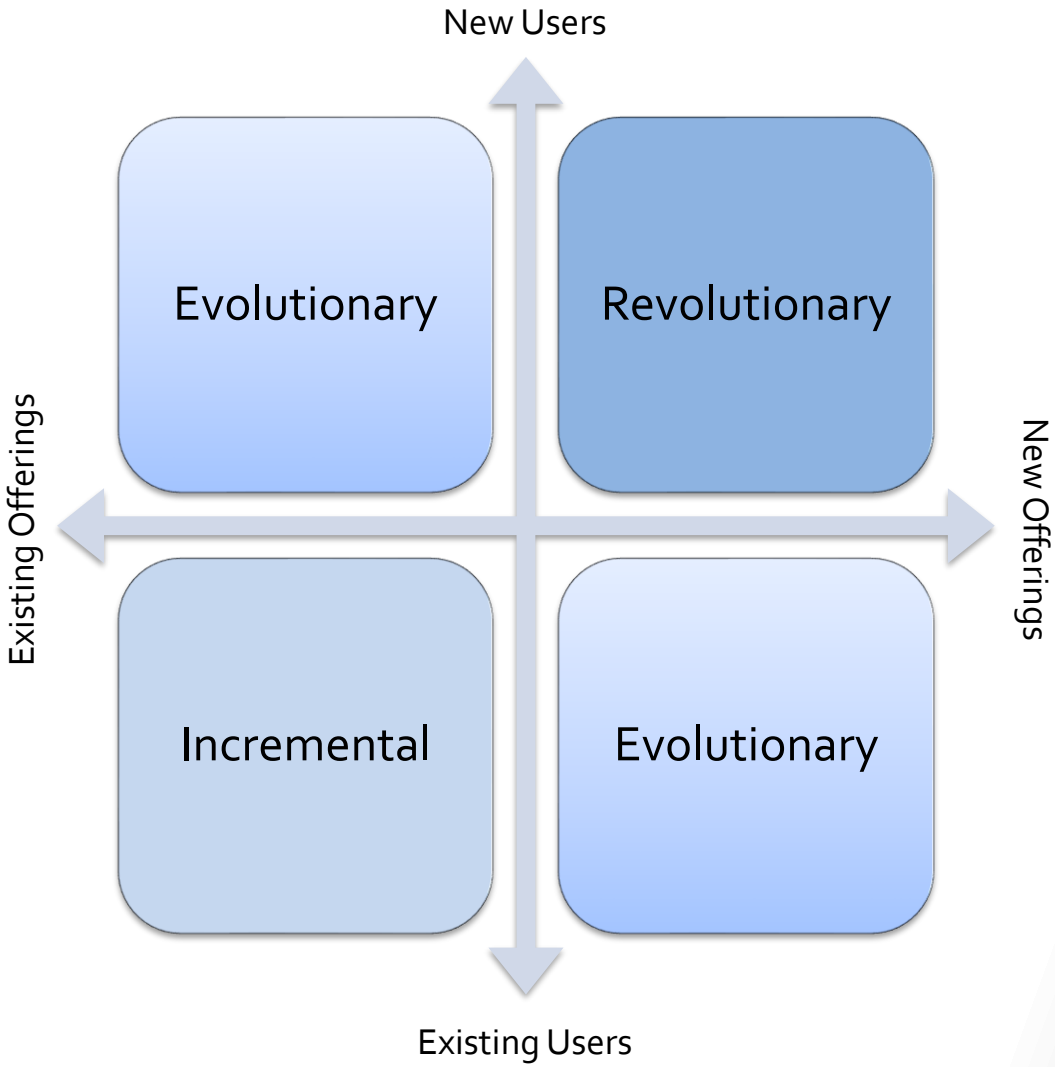
# Deliver

- Goals
  - Identify required Capabilities
  - Create a model for Financial Sustainability
  - Develop an Innovation Pipeline
  - Plan Pilots & Measure Impact
- Outputs
  - Feasibility & Viability Assessment
  - Innovation Pipeline
  - Implementation Plan
  - Learning Plan

# Deliver

1. **Develop a Sustainable Revenue Model**
2. **Identify Capabilities Required for Delivering Solutions**
3. **Plan a Pipeline of Solutions**
4. **Create an Implementation Timeline**
5. **Plan Mini-Pilots & Iteration**
6. **Create a Learning Plan**

# Solution Matrix



# IDEO´s Design Driven Innovation

- Design Driven Innovation
  - Inspiration
    - look to other industries, get inspiration „customer service in restaurant“ versus „customer service in hospital“
  - Synthesis
    - sense making → recognize patterns, identigy themes, create empathy maps, categorize type of solutions
  - Ideation and Experimentation
    - Generate countless ideas, and advance and iterate over the most promising ones → quick and dirty exploring of solutions for very fast early feedback
  - Implementation
    - Prepare a roadmap to the marketplace, live in beta, iterate through new launched-product improvements loops

# IDEO´s Design Thinking

- Design thinking is a way of finding human needs and creating new solutions using the tools and mindsets of design practitioners.

**[Creative Confidence: Unleashing the Creative Potential Within Us All, David Kelley, Tim Kelley]**

# SECTION://2

- Applying Design Thinking With Some Typical Tools

**[based on "Designing for Growth", Liedtka and Oglivie]**

# Four Questions...

- What is?
- What if?
- What wows?
- What works?

# Four Questions: What is?

- **What is? (Engage)**
  - Explore the present and develop a deep understanding of the user/customer (of their lives and problems)
  - Understand how value for the user/customer could be created (explore to asess the potential for value capture (i.e. profit)
  - Find patterns and make sense of all the data collected and explored – to create new ideas for the customer/user
- What if?
- What wows?
- What works?

# Four Questions: What if?

- What is?
- **What if? (Ideation)**
  - ▶ Generate masses of new ideas based on the data collected (there are no limits – only possibilities and pure creativity)
  - ▶ Formulate hypotheses about new possibilities
  - ▶ Develop concepts based on most primissing ideas
- What wows?
- What works?

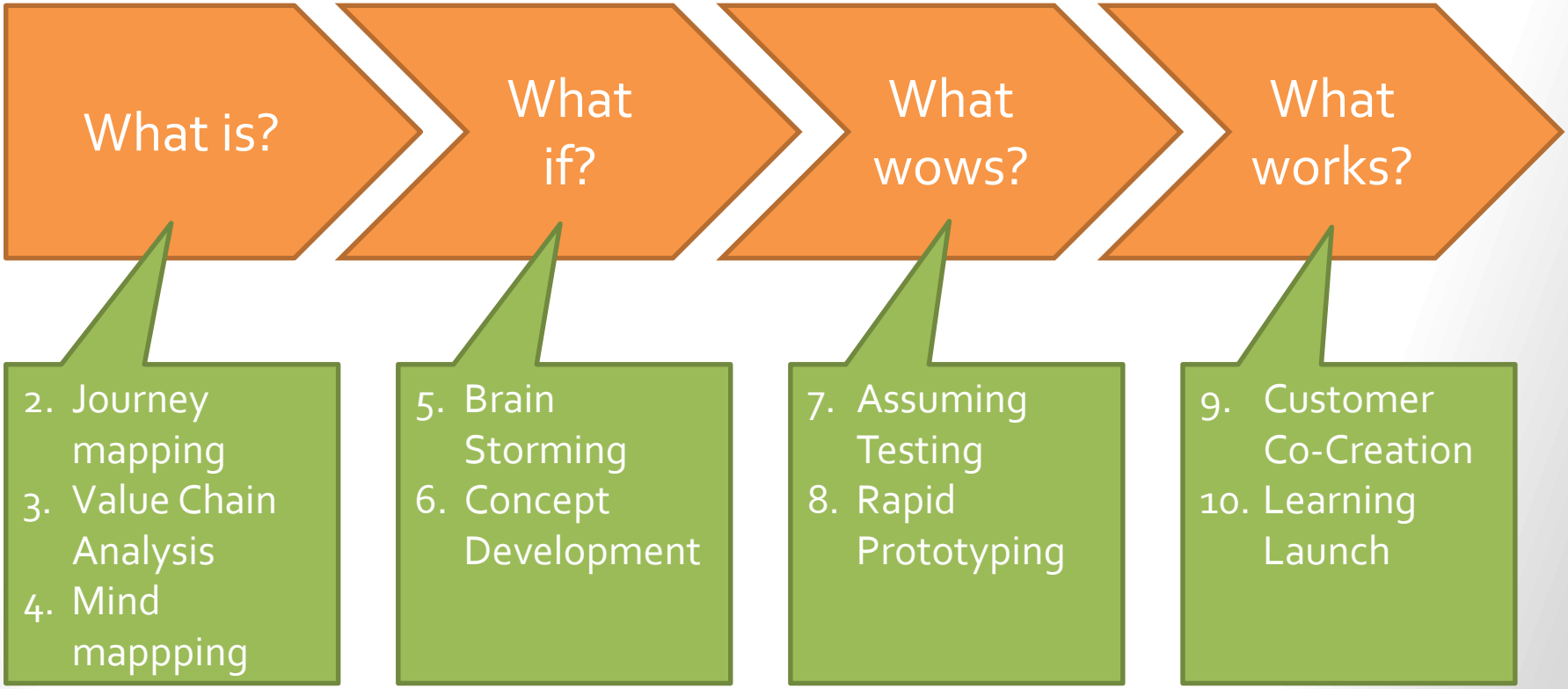
# Four Questions: What wows?

- What is?
- What if?
- **What wows? (Find the sweet spot)**
  - ▶ Test the assumptions underlying each hypothesis, i.e. not finding the truth but making better choices under conditions of uncertainty
  - ▶ Translate the finding into something actionable – something that you can feel, touch, see, talk about, i.e. create prototypes (not products!) to better understand
- What works?

# Four Questions: What works?

- What is?
- What if?
- What wows?
- **What works? (Time for action)**
  - ► Now, with prototypes at hand - Find out what user/customer really want – engage them to design your solution
  - ► Move to the market and start learning and improve as quickly as possible

# Four Questions, One set of tools/methods




1. Visualization (apply for all questions in all phases)*

* Check the many books out there about learning to visualize things. Try it at home.
(Some Books: "Gamestorming", "Unfolding the napkin", "Visual Meetings", "Sketchnote Handbook“ etc.)

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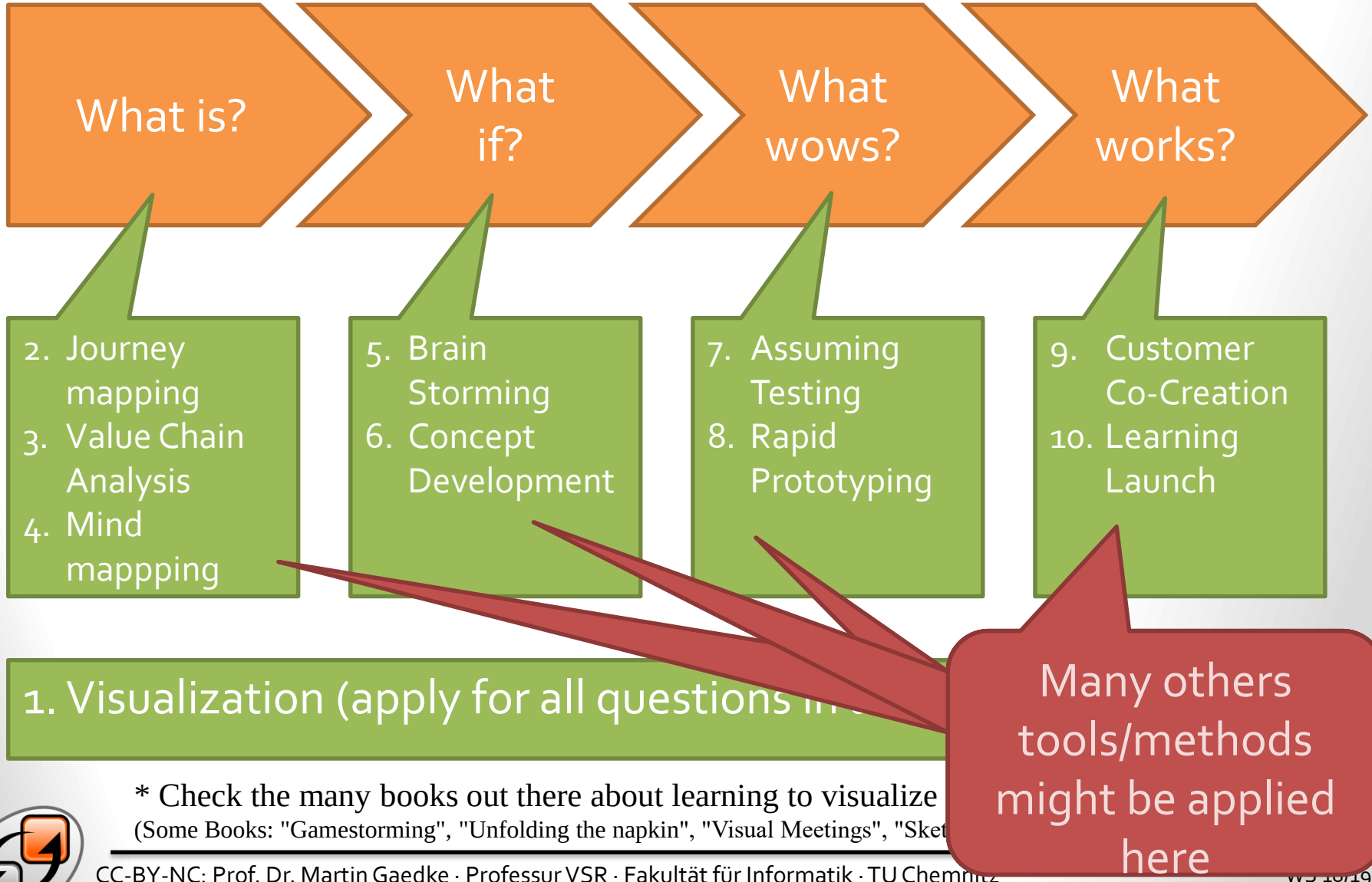


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# Project Management Aid

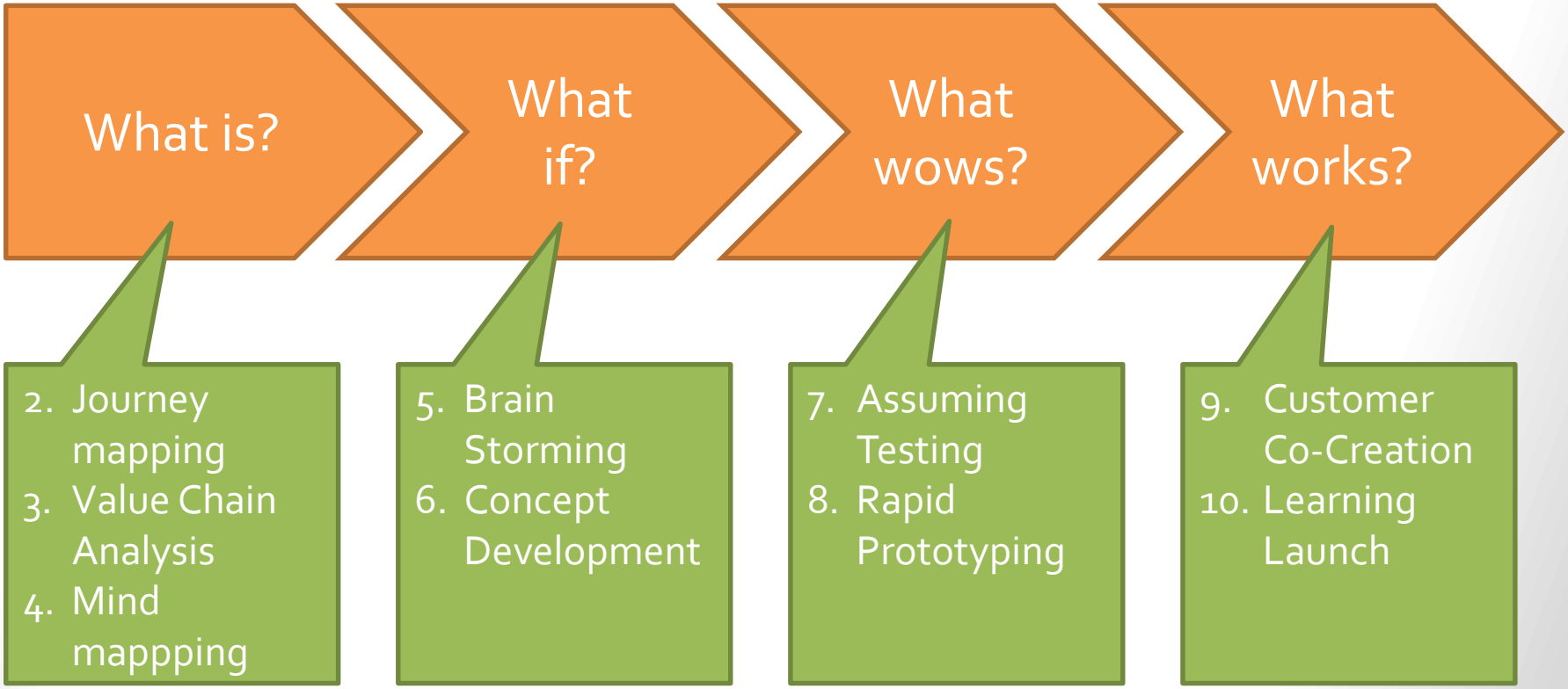
- What is? **Design Brief**
  - Formalize the project
  - Define goals, resources, timelines etc.
  - Serves as north star throughout the project
- What if? **Design Criteria**
  - Sets critera to evaluate alternative designs
  - Becomes part of the design brief
- What wows? **Napkin Pitch**
  - Crystalizes communication of solution concepts
  - Describes each of the best few (3-5) solutions that meet the design criteria in a template that allows for comparing each solution
- What works? **Learning Guide**
  - Defines affordable level of resources to invest in learning, i.e. wether the 2-3 top concepts are feasable

# SECTION://3

- What is?

**[based on "Designing for Growth", Liedtka and Oglivie]**

# Four Questions, One set of tools/methods

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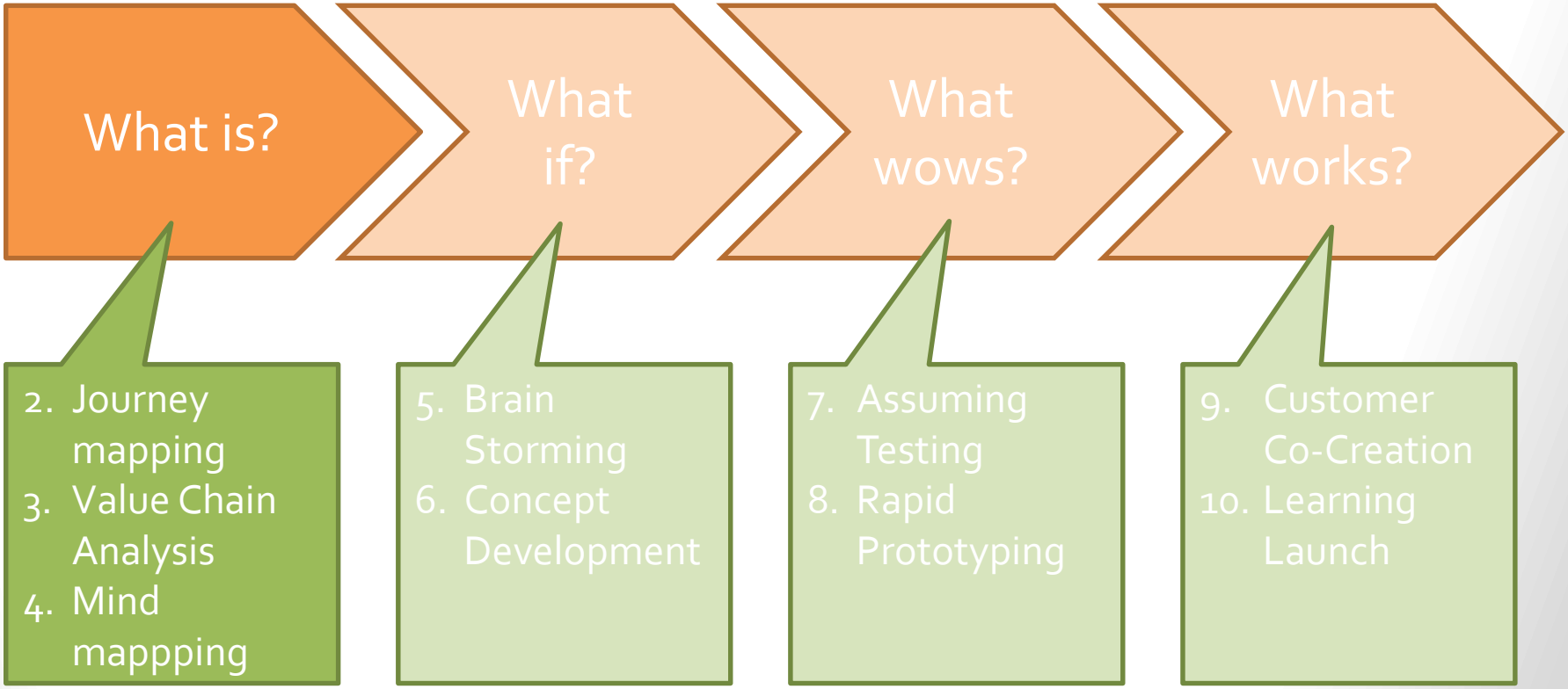


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# Design Brief

- Project Description
- Intent/Scope
- Exploration Questions
- Target Users
- Research Plan
- Expected Outcomes
- Success Metrics
- Project Planning

# Design Brief - Example

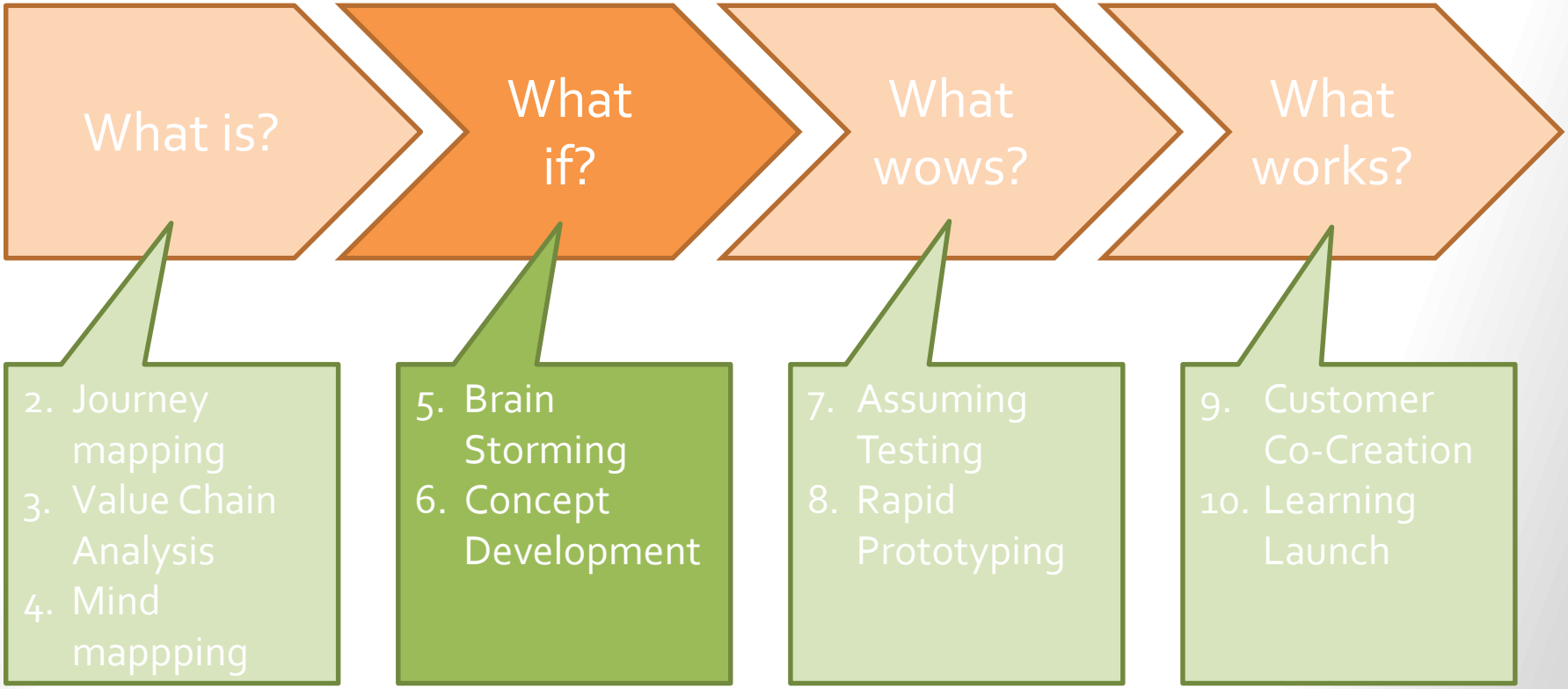
- **Project Description**
  - Dep. of CS wants to increase number of students
- **Intent/Scope**
  - Initial Scope will focus on better understanding the needs of potential students in the three years before studying
- **Exploration Questions**
  - Strategic questions to address: What does the Dep. of CS has to do to be more attractive for students?
  - How can we help potential students to make their choice for the Dep. of CS?
- Target Users
  - Potential students for Computer Science Bachelor, DWE Master
- Research Plan
  - We will ask students in the lecture
- Expected Outcomes
  - We expect to discover high-potential opportunities
- Success Metrics
  - Did we find any high potential needs or demographic/psychographic segments
- Project Planning
  - A 3 students team will conduct the exploration phase of 6 month time frame

# SECTION://4

- What if?

**[based on "Designing for Growth", Liedtka and Oglivie]**

# Four Questions, One set of tools/methods

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# Design Criteria

- Extends the information related to the design brief
- Specifies in more detail project´s scope and direction
- Structure
  - Design Goal
    - Create a scalable web site that fits well for desktop and mobile devices for the customer pain point:
      Searching for the University
  - User Perception
    - Easy to use
    - Trustable – because of transparency regarding source of data
  - Physical Attributes
    - -- Usually not applicable in our case --
  - Functional Attributes
    - Responsive Design
    - Should allow to compare universities
  - Constraints
    - Proof-of-concept model possible in 6 months

# Tools/Methods

- **Start creating MANY IDEAS**
  - Brainstorming (cf. Gamestorming)
  - Create more ideas
  - Ideally done by a diverse group
- **Concept Development** – choosing the best ideas to make ideas real
  - Build a set of concepts to offer a choice to the audience
  - E.g. 12 concepts, test 3 with customers, finally implement 1
  - Ideally done by a core team

104 H C D

Create
Brainstorm New Solutions

**Facilitator Notes**

**Time:**
45-60 mins.

**Difficulty:**
★★★★☆

Step 1. Prepare 3-5 "How Might We...?" opportunity statements from those generated previously. Place each statement on a separate wall or board. Give each person post-it notes and a marker.

Step 2. Remind people of the rules of brainstorming. Tell them to be very specific about the ideas they are proposing. Use big markers (not pens) so everyone can see what the idea is. Write only one idea per post-it.

Step 3. Begin by asking the group to generate a list of barriers related to the opportunity statement.

Step 4. Protect all participants by enforcing the Rules of Brainstorming. If ideas slow down, prompt the group to think about one of the barriers listed during the warm-up. Or share a story from the research to spark thinking (i.e. "So what ideas would encourage Shashu to adhere to her medication?")

Step 5. When the ideas really slow down, switch to a new opportunity area. This might be 15-30 minutes per HMW.

STEP 5

## BRAINSTORM NEW SOLUTIONS

Brainstorming gives permission to think expansively and without any organizational, operational, or technological constraints.

Some people think of brainstorms as undisciplined conversation. But conducting a fruitful brainstorm involves a lot of discipline and a bit of preparation.

The practice of generating truly impractical solutions often sparks ideas that are relevant and reasonable. It may require generating 100 ideas (many of which are silly or impossible) in order to come up with those three truly inspirational solutions.

TIP

**SEVEN BRAINSTORMING RULES**

- **Defer judgment**
  There are no bad ideas at this point. There will be plenty of time to judge ideas later.
- **Encourage wild ideas**
  It's the wild ideas that often create real innovation. It is always easy to bring ideas down to earth later!
- **Build on the ideas of others**
  Think in terms of 'and' instead of 'but.' If you dislike someone's idea, challenge yourself to build on it and make it better.
- **Stay focused on topic**
  You will get better output if everyone is disciplined.
- **Be visual**
  Try to engage the logical and the creative sides of the brain.
- **One conversation at a time**
  Allow ideas to be heard and built upon.
- **Go for quantity**
  Set a big goal for number of ideas and surpass it! Remember there is no need to make a lengthy case for your idea since no one is judging. Ideas should flow quickly.

(Source: Human Centered Design Toolkit, 2nd Edition, by IDEO)

# And now that we have 3+ concepts?

- We need to compare them…

# SECTION://5

- What wows?

**[based on "Designing for Growth", Liedtka and Oglivie]**

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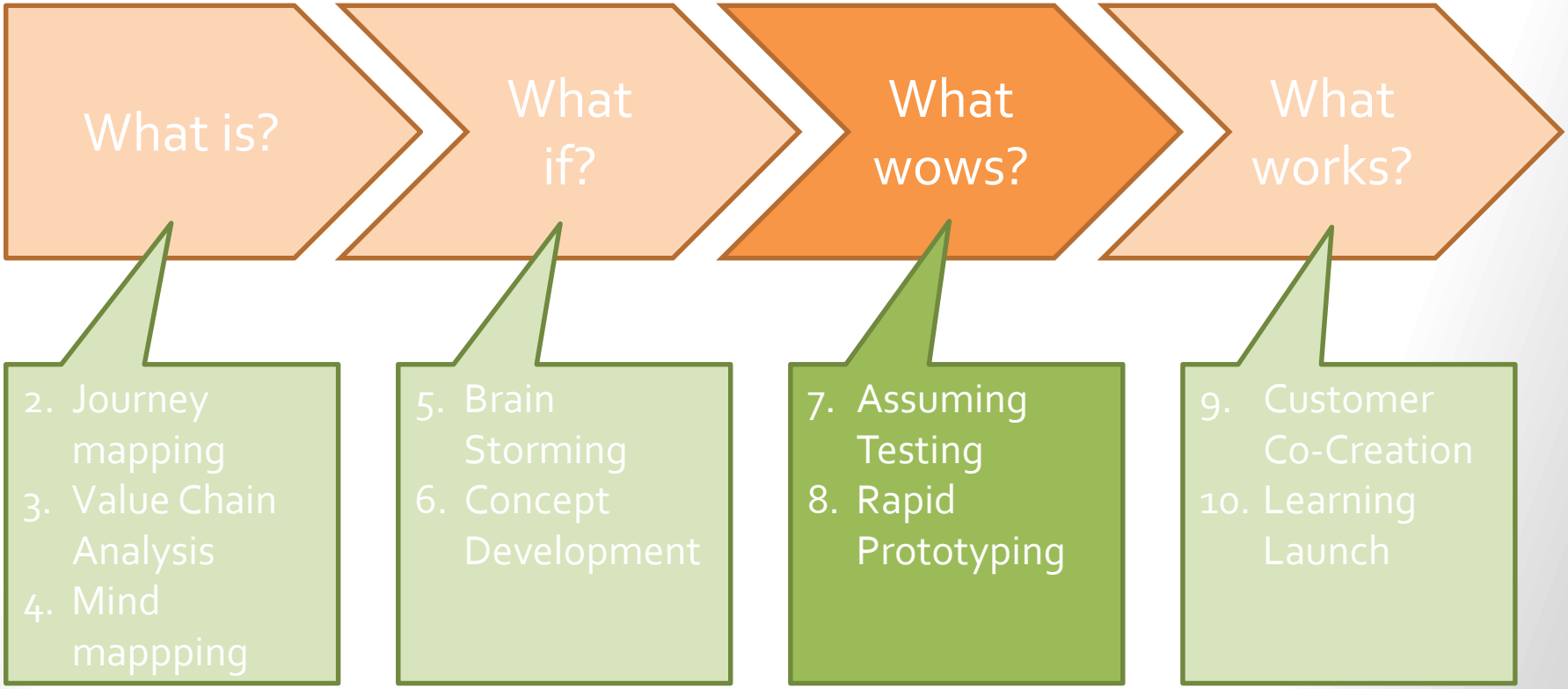


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# Napkin Pitch

- It is not elivator pitch
- Helps to compare different concepts with more depth, focusing on
  - Need
    What is the customer's unmet need we are addressing
  - Approach
    What is our approach to address the need and what is novel about it
  - Benefit
    How does the customer and we benefit
  - Competition
    What competition will we face and what are our advantages

| Napkin Pitch: Search Support Web Site | |
|---|---|
| Need<br>• Finding information about a dedicated university program<br>• Want to feel safe (well informed) before drawing decision | Approach<br>• Web Site registered with 5 most influential study-sites<br>• Pay-to-be-found<br>• 1 Single site with all necessary information<br>• Easy to navigate (including mobile devices) |
| Benefit<br>• Candidates are supported on their devices (smartphone)<br>• A/B Testing of future programs<br>• Getting contact details | Competition or Other Service Providers<br>• …<br>• … |

# Tool/Method: Assumption Testing

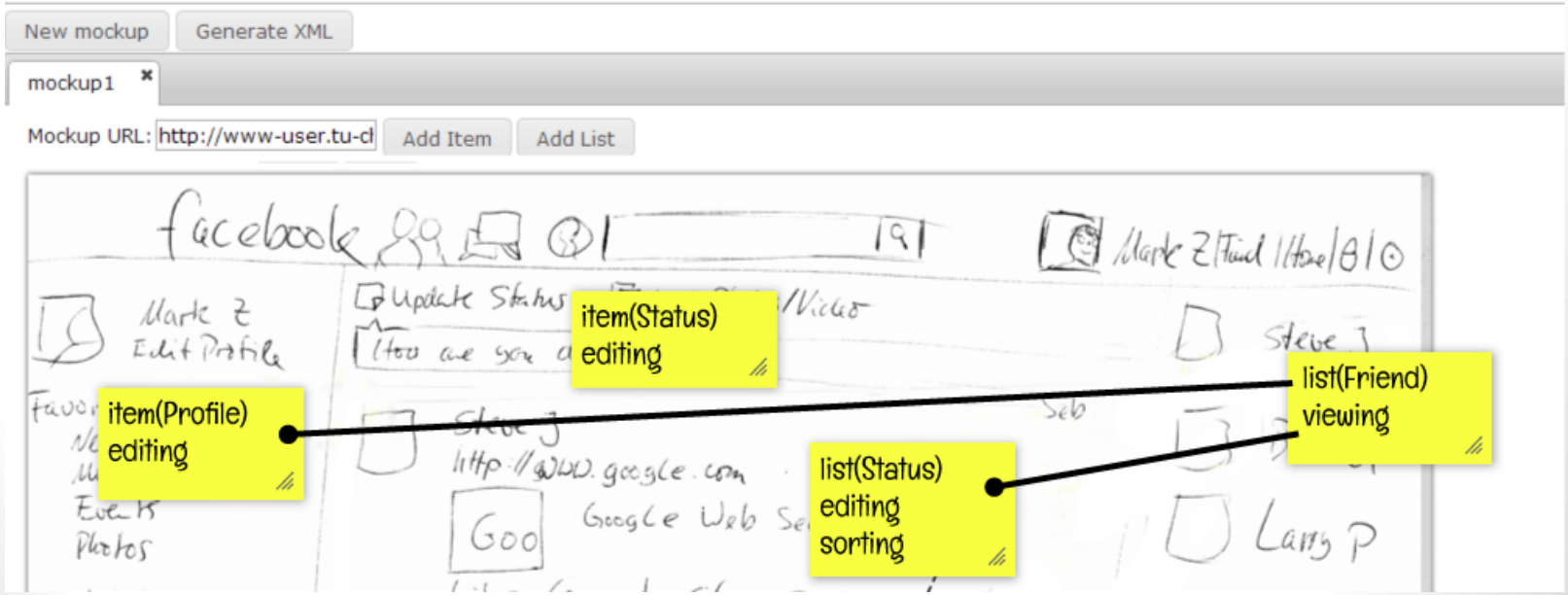
- Introduction to the tool:
  - Any new business concept is acutally a hypothesis, i.e. a well-informed guess about what customers desire and what they will value
  - The hypothesis is built on some assumptions – so, it is necessary to proof if these are valid
- When to use it:
  - Apply when concepts defined
  - Might even be applied earlier in the process

# Tool/Method: Assumption Testing

- How:
  1. Define generic business tests your new concept must pass
  2. Define specific business tests your new concept must pass
  3. Make sure assumptions addressed in each individual test are as explicit as possible
  4. Determine which assumptions are most critical/important to attractiveness of the new concept
  5. Identify required data to test assumptions (include these of the doubting colleagues)
  6. Sort data you need (e.g. by what you know, don't know, can't know, and don't know but could
  7. Figure our how you could quickly get data
  8. Design experiment to prove assumptions

# Tool/Method: Rapid Prototyping

- Develop first prototypes to better understand your solution – focus on time and costs
- Developing code is usually a bad approach



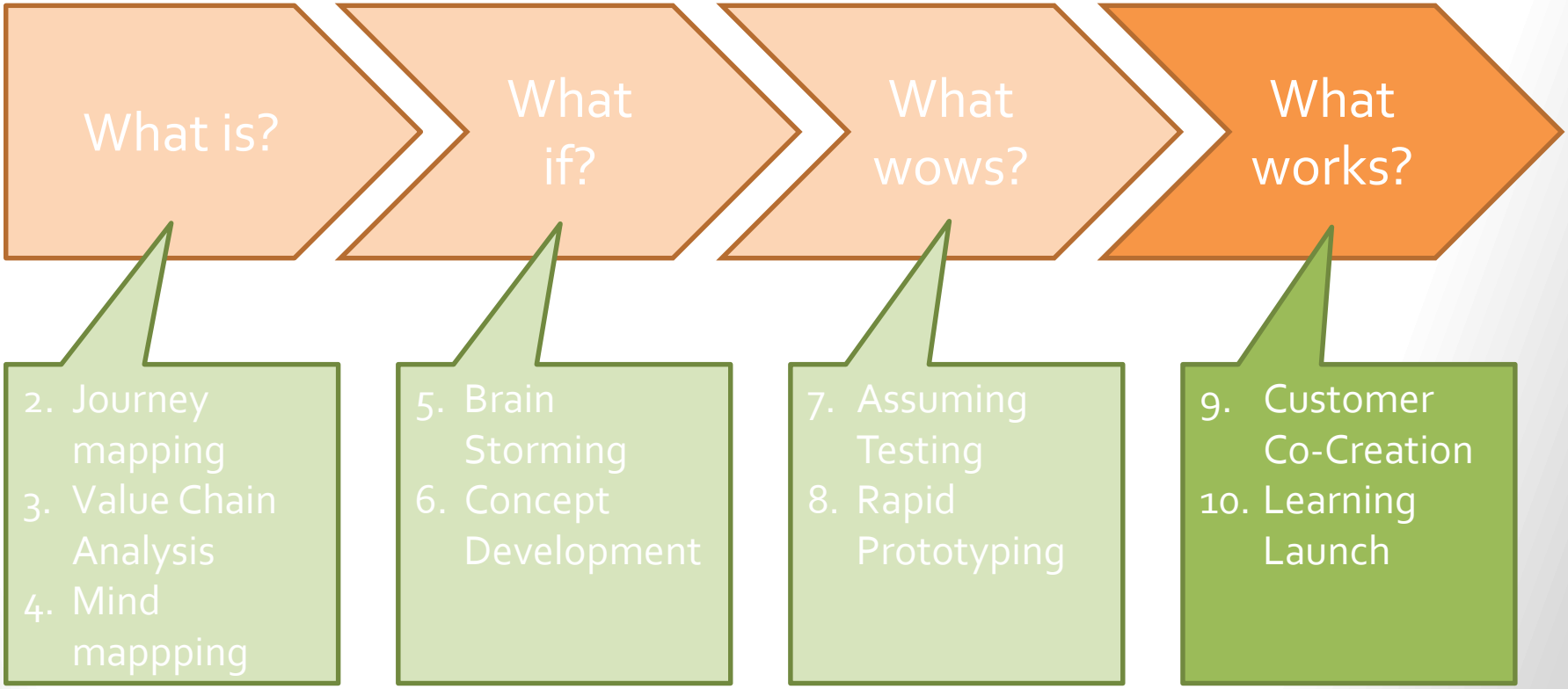

José Matías Rivero, Sebastian Heil, Julián Grigera, Martin Gaedke, Gustavo Rossi: "MockAPI: An Agile Approach Supporting API-first Web Application Development", in LNCS Spring "Web. Engineering - 13th lntemational Conference"

# SECTION://6

- What works?

**[based on "Designing for Growth", Liedtka and Oglivie]**

# Four Questions, One set of tools/methods

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# Time to get real

Get in touch with the market place

Check Your **Invention versus** (…is it also an) **Innovation**

Does the invention create economic value

Time to check with reality and customers

# Not a pilot – customer co-creation

- Learn from potential customers
  - Enroll customers you care about
  - Enroll customers that would find you via dedicated sources (e.g. based on adwords)
- Make some prototypes available and observe reactions, regarding
  - Missing functionality
  - Questions about Potential Price Offerings
  - Etc.
  - And your assumptions
  - The more you learn the better – ask questions if face-to-face testing
- Co-creating is also possible without any prototype: A/B testing of potential product/service announcements

# After all that…

- Stop or plan your launch.

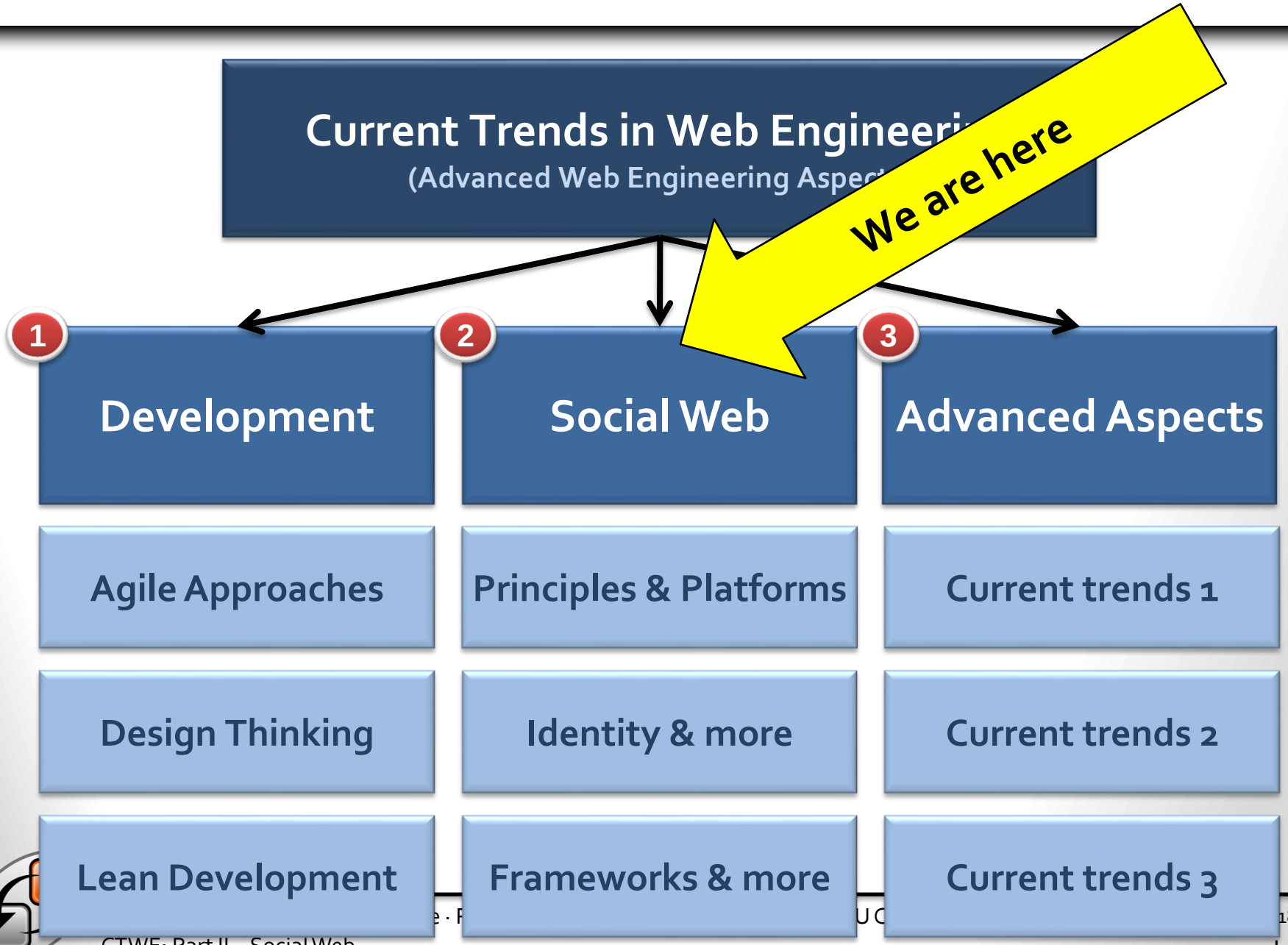
# Demo

- A Quick View at HCD for more sources about methods/tools

# PART II

- Social Web

# Lecture Outline



# Important MUST-DO Homework

- Goal is to discuss the technologies, architecture, principles, methods, and processes used in the new trend defined by the project **solid**, which focuses on giving users control over their data back in a revolutionary way.
  - Introduced by Tim-Berners Lee
  - https://medium.com/@timberners_lee/one-small-step-for-the-web-87f92217d085
- This is a MUST-READ document
  - https://solid.inrupt.com/docs/getting-started
- Please also check out and read the corresponding documents of the solid community for discussing in the next lectures:
  - https://solid.mit.edu
  - https://solid.inrupt.com