

CS449/649: Human-Computer Interaction

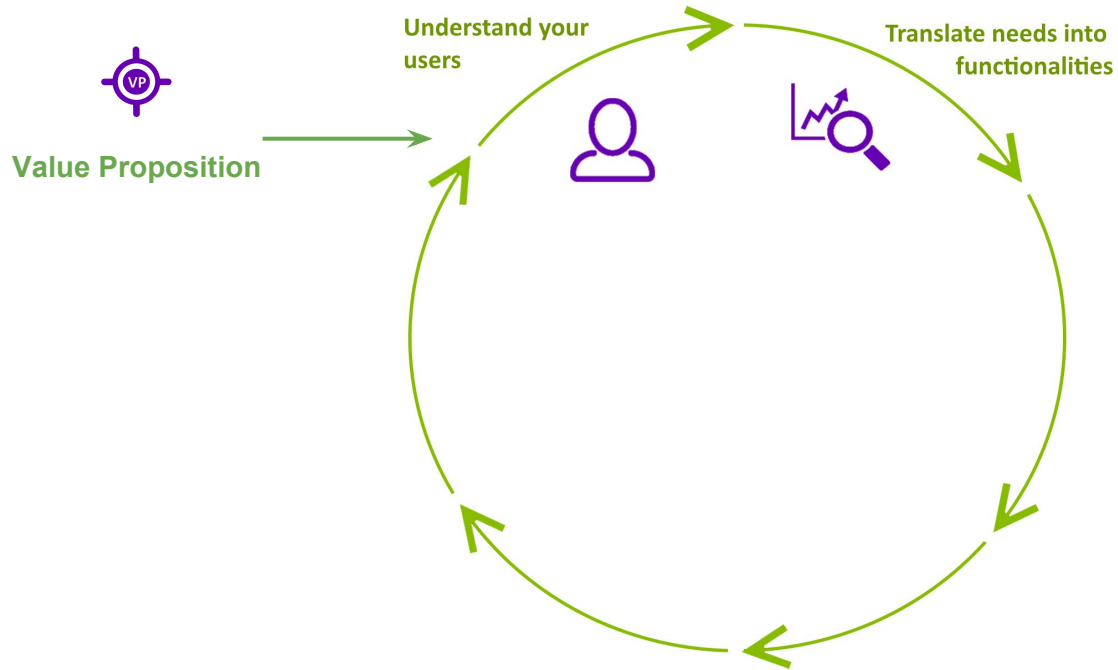
Winter 2018

Lecture XXIII

Anastasia Kuzminykh

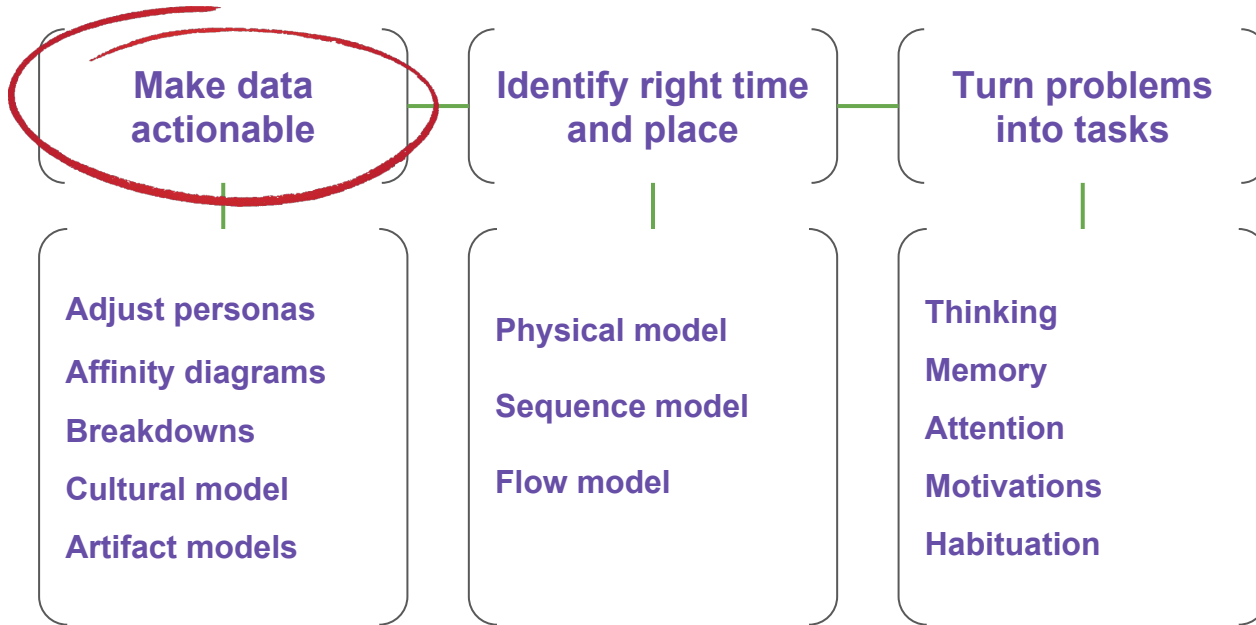


Course Review





Translating Needs Into Functionalities





Translating Needs Into Functionalities

Make data actionable

Adjust personas

Affinity diagrams

Breakdowns

Cultural model

Artifact models

External influences - because:

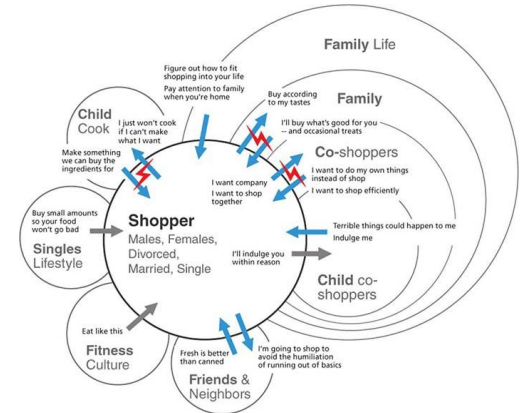
“Work takes place in a culture, which defines expectations, desires, policies, values, and the whole approach people take to work”

Beyer, Hugh, and Karen Holtzblatt.

Contextual design: defining customer-centered systems.

Includes:

- Influencers (represented as bubbles)
- Extent of influence (overlap of bubbles)
- Influences (as arrows - mind direction)
- Breakdowns





Translating Needs Into Functionalities

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Cultural model

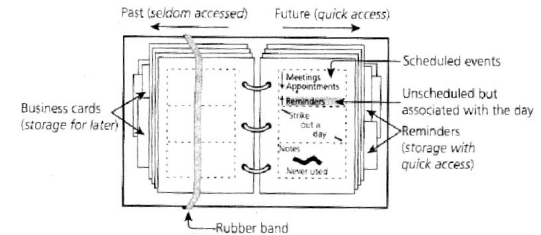
Artifact models

Physical objects that support the work (created and/or used in the process) - because you want to know what objects people need and interact with

Sketch or photo

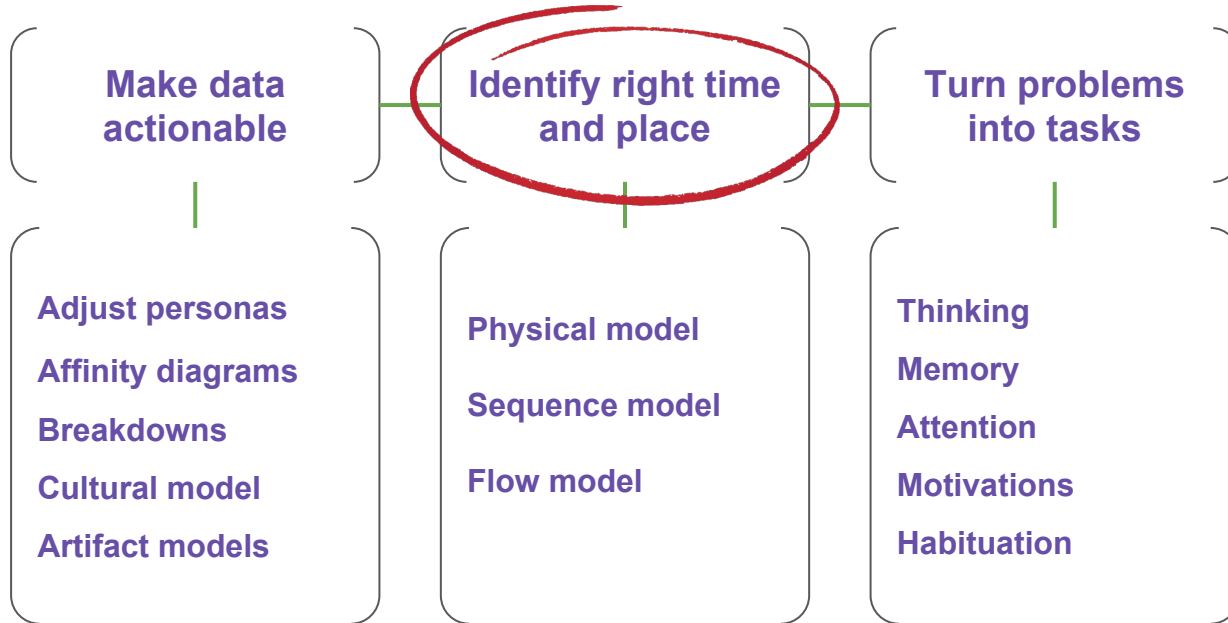
Complete with comments and notes on:

- Structure
- Related purpose and tasks
- Functionality





Translating Needs Into Functionalities





Translating Needs Into Functionalities

Identify right time
and place

Physical model

Sequence model

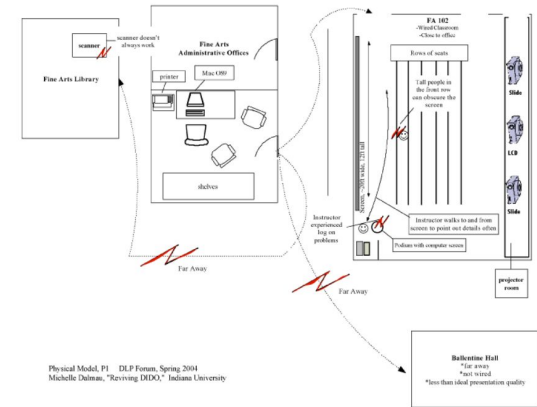
Flow model

Physical work environment (plan) -
because you want to know how people adapt their
environment to accomplish work

Includes:

- Structures that limit and define space
- Walls, desks, file cabinets, etc.
- Hardware, software, communication tools
- Artifacts and their location in relation to each other

Complete with comments and notes





Translating Needs Into Functionalities

Identify right time
and place

Physical model

Sequence model

Flow model

Sequence of work steps and the intention behind steps - because you want to know how work is organized in stages

Includes:

- Intent behind step
- Triggers, that initiate sequence
- Steps, at a high level of details (actions, not movements)
- Loops and branches showing order and iteration
- Breakdowns (where things go wrong)

Intent: Needs to prepare 4 lectures for A214: Life and Art of Ancient Rome – Roman Religion	
	Trigger: Class meets tomorrow afternoon, need to have first lecture ready
Note: In progress: PPT, Netscape 4.x and file Finder windows open before we arrived. Loyal MAC (OS 9.x) user.	Prompted by syllabus – topic for this week, Roman Religion
Intent: Recycle PPT – use a base PPT rather than start from scratch	Find existing PowerPoint (PPT) lecture on similar topic
Note: Keeps all the existing images/PPT slides	Copies (Saves As) PPT as A214 for Roman Religion Lecture
Intent: Colleague normally teaches this class (A214)	Goes to Classical Art Historian's course web page (A210) – Bookmarked
Intent: Colleagues usually has good images (from DIDO)	Browses "Roman Gods" link (see Artifact A210 home page)
Note: Image quality assessment is automatic and very subjective	Identifies desired image /assesses quality
Intent: Expand lecture with reliable resource	*Downloads image (CTRL+Click) to "Download Image to Disk"
Note: Knows keyboard shortcuts	
Intent: Dynamically builds own image collection	*Saves image to "Roman Art" folder
	<i>No sub-folders – many, many, many unique images in one folder</i>
	*Renames image (long, descriptive names)
Note: Steps identified with * are done fluidly and repetitively while preparing lecture. Steps will not be represented for every image found as such but in shorthand: Integrates image	*Copy and Paste image into PPT slide
	*Resizes/Positions image in PPT



Translating Needs Into Functionalities

Identify right time
and place

Physical model

Sequence model

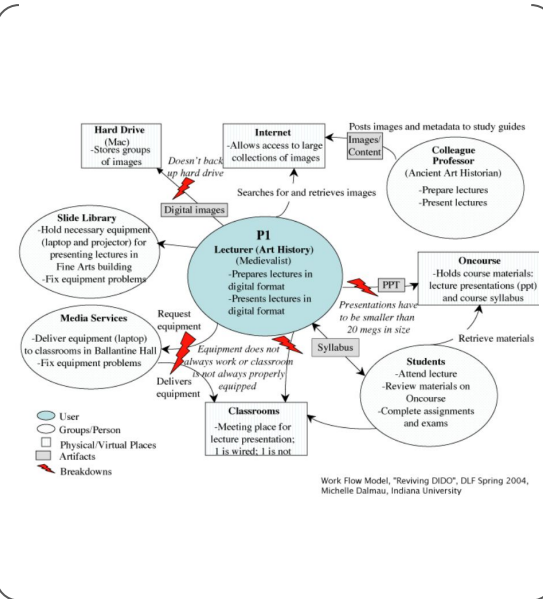
Flow model

Directions of communication and
coordination

Defines how work is broken up across
people and how people coordinate

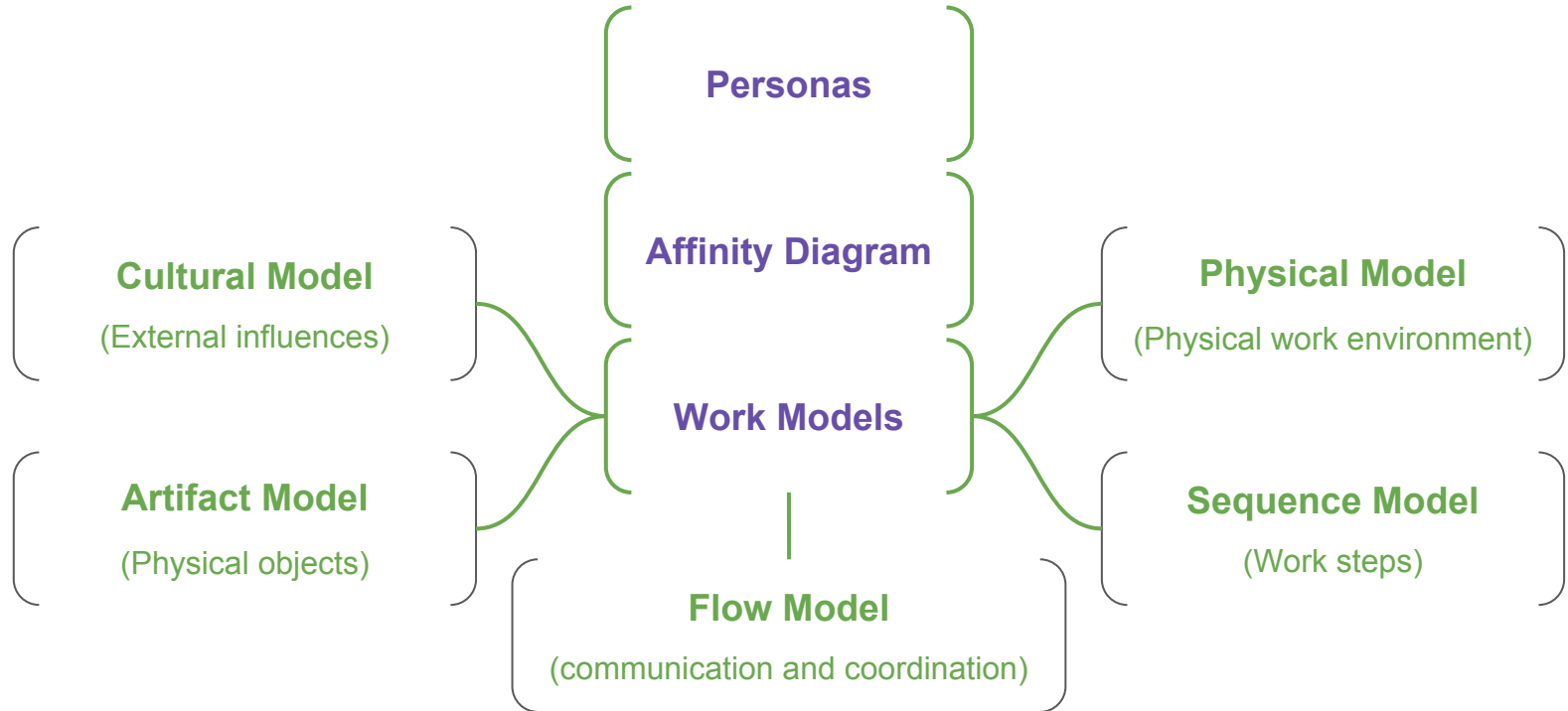
Includes:

- Interviewee (in the middle - circle)
- Other groups/people (circles)
- Physical/virtual places (usually rectangles)
- Artifacts as they pass between people
- Breakdowns (where things go wrong)



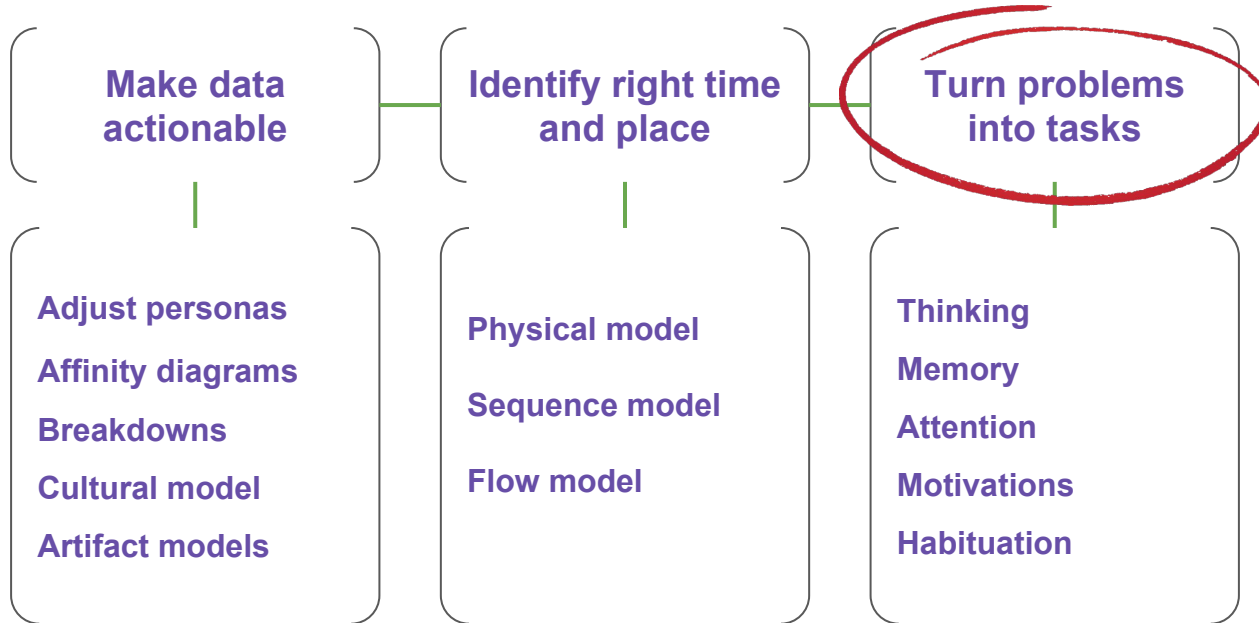


Translating Needs Into Functionalities: Preparation





Translating Needs Into Functionalities





Translating Needs Into Functionalities

**Turn problems
into tasks**

Thinking

Memory

Attention

Motivations

Habituation

Dual process theory

Cognitive load

Anticipate mistakes

(should be easy to undo, avoid error-prompt tasks)

Perception biases

(expectations determine perception)

**Age, socioeconomic status, cognitive
abilities influence decision making**



Translating Needs Into Functionalities

Fast

Effortless

Emotional

Stereotypic

System 1

Can do:

- Roughly assess distance
- Localize the source of a specific sound
- Complete famous expressions
- Do 2+2 sort of calculations
- Well-automated activities in easy conditions (drive a car on an empty road)
- Read and understand simple sentences

System 2

Can do:

- Roughly assess distance
- Point your attention where needed
- Dig into your memory
- Determine the desired behaviour in a social setting
- Tedious cognitive tasks
- Activities in unusual conditions
- Complex logical reasoning

Slow

Effortful

Logical

Calculating



Translating Needs Into Functionalities

**Turn problems
into tasks**

Thinking

Memory

Attention

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Dual process theory

Cognitive load

Anticipate mistakes

(should be easy to undo, avoid error-prompt tasks)

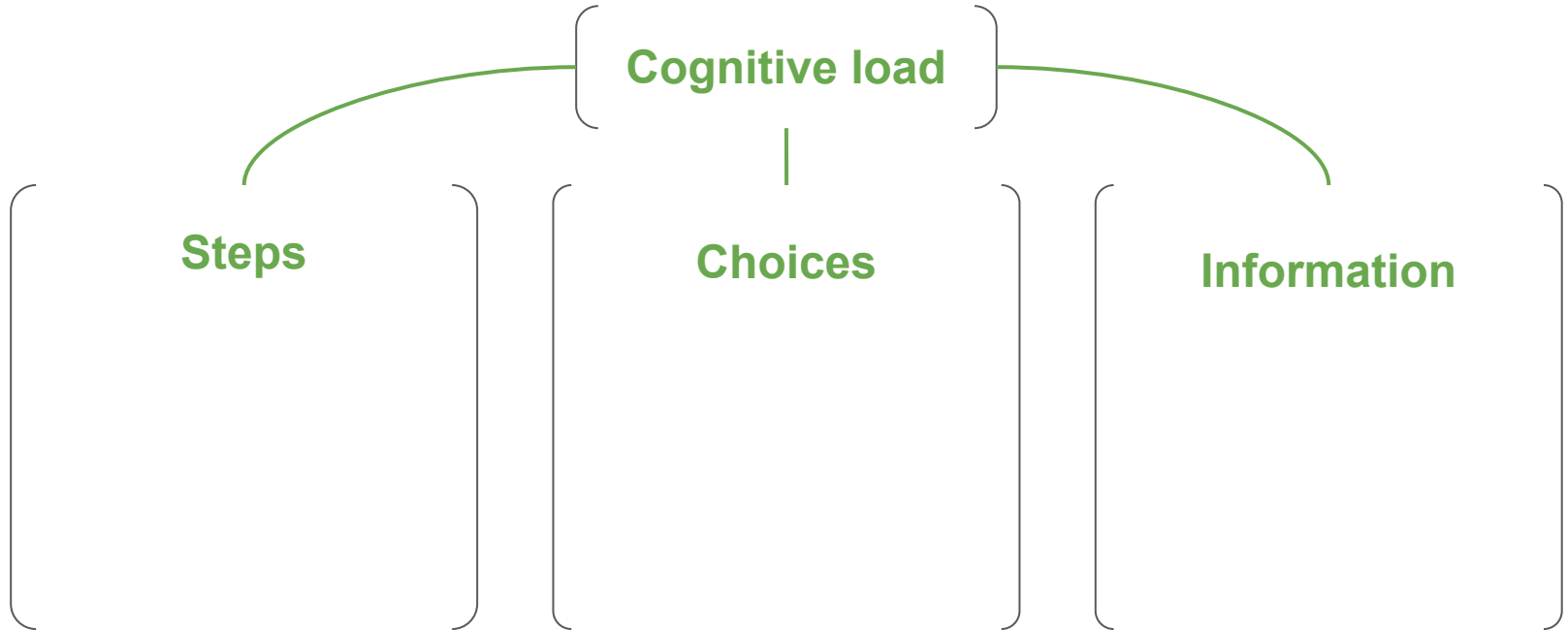
Perception biases

(expectations determine perception)

**Age, socioeconomic status, cognitive
abilities influence decision making**



Translating Needs Into Functionalities





Translating Needs Into Functionalities

Cognitive load

Steps

- Least amount of work possible
- Homogeneous
- People can't multitask!
- Break error-prone tasks into smaller steps.

Choices

- Clear differences
- Limit number of choices
- Support with information

Information

- Progressive disclosure
- Provide examples
- Make it easy to scan
- Presentation matters
(hard to read = hard to do)



Translating Needs Into Functionalities

**Turn problems
into tasks**

Thinking

Memory

Attention

Motivations

Habituation

Focused attention is limited and selective

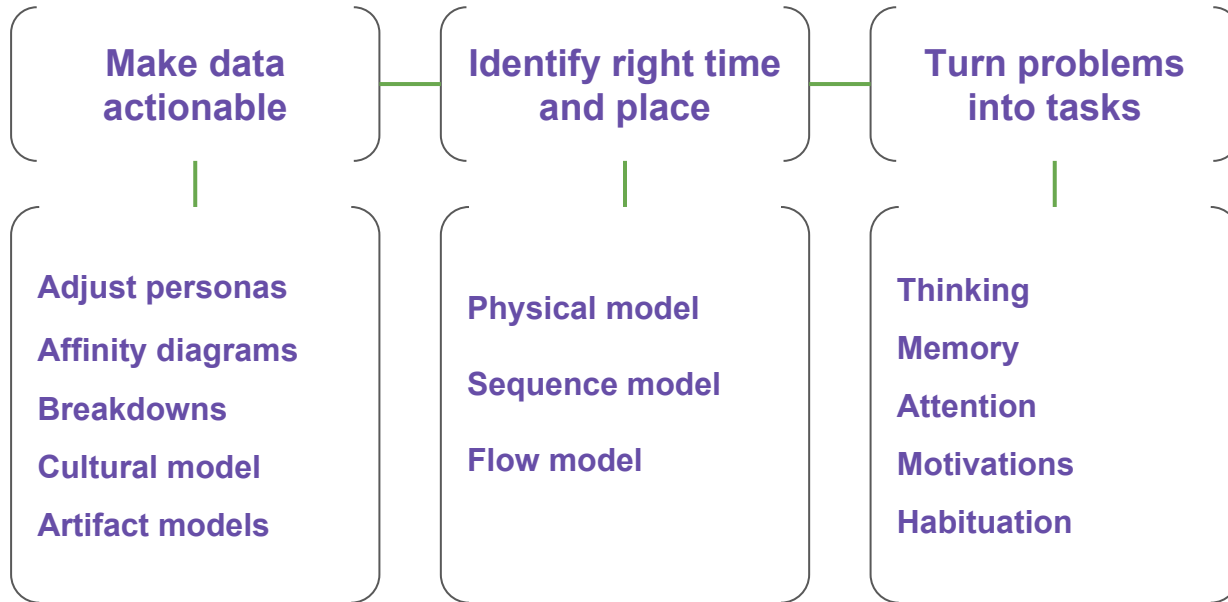
Inattentional blindness

Surface (awareness of features) **and content attention** (awareness of information)

Attention is dynamic - allow hierarchy

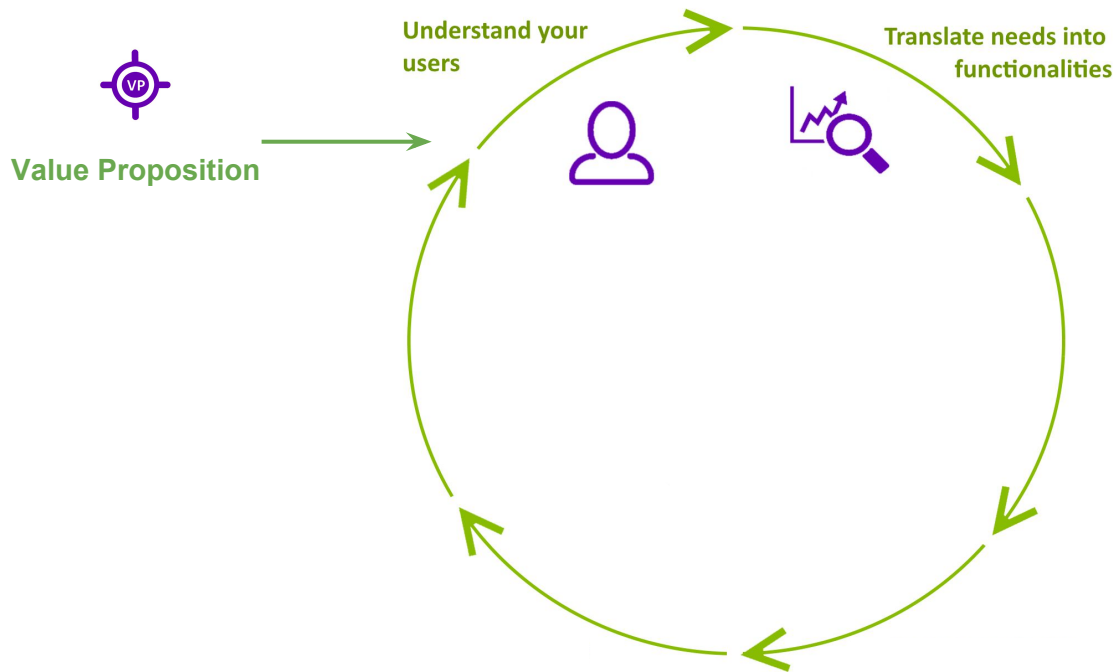


Translating Needs Into Functionalities



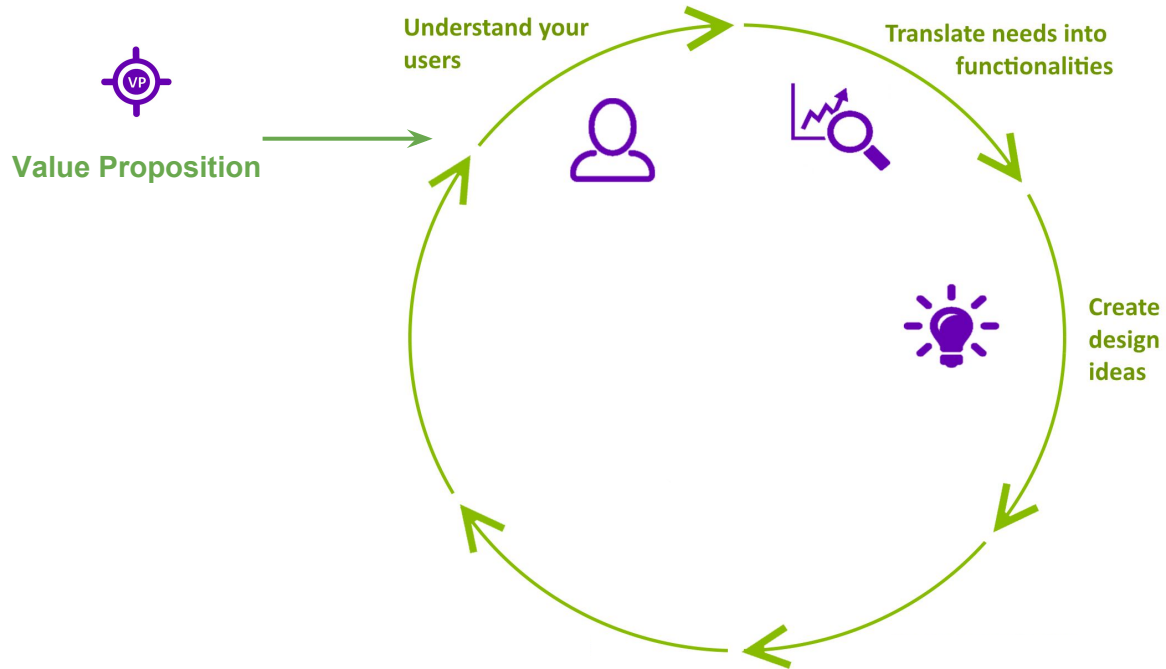


Course Review



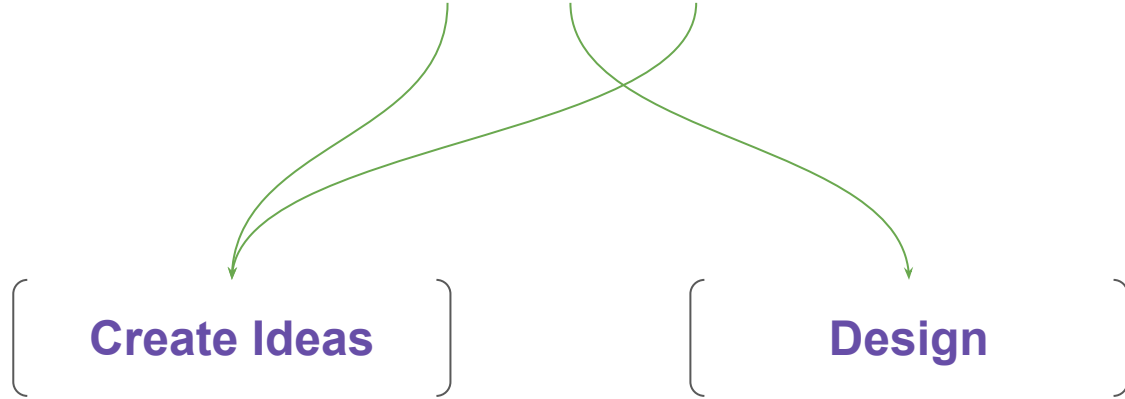


Course Review





Create Design Ideas





Create Design Ideas

Create Ideas

Creativity - process of producing a new idea which has value to someone

Nature

vs

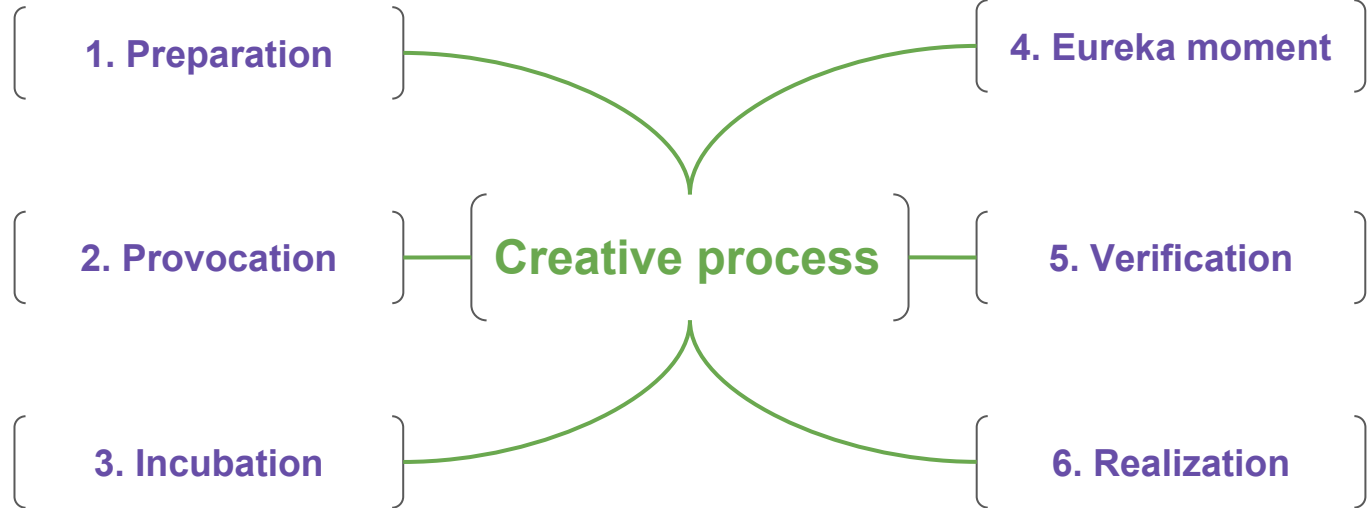
Nurture

Generating ideas: memories → ordinary → extraordinary



Create Design Ideas

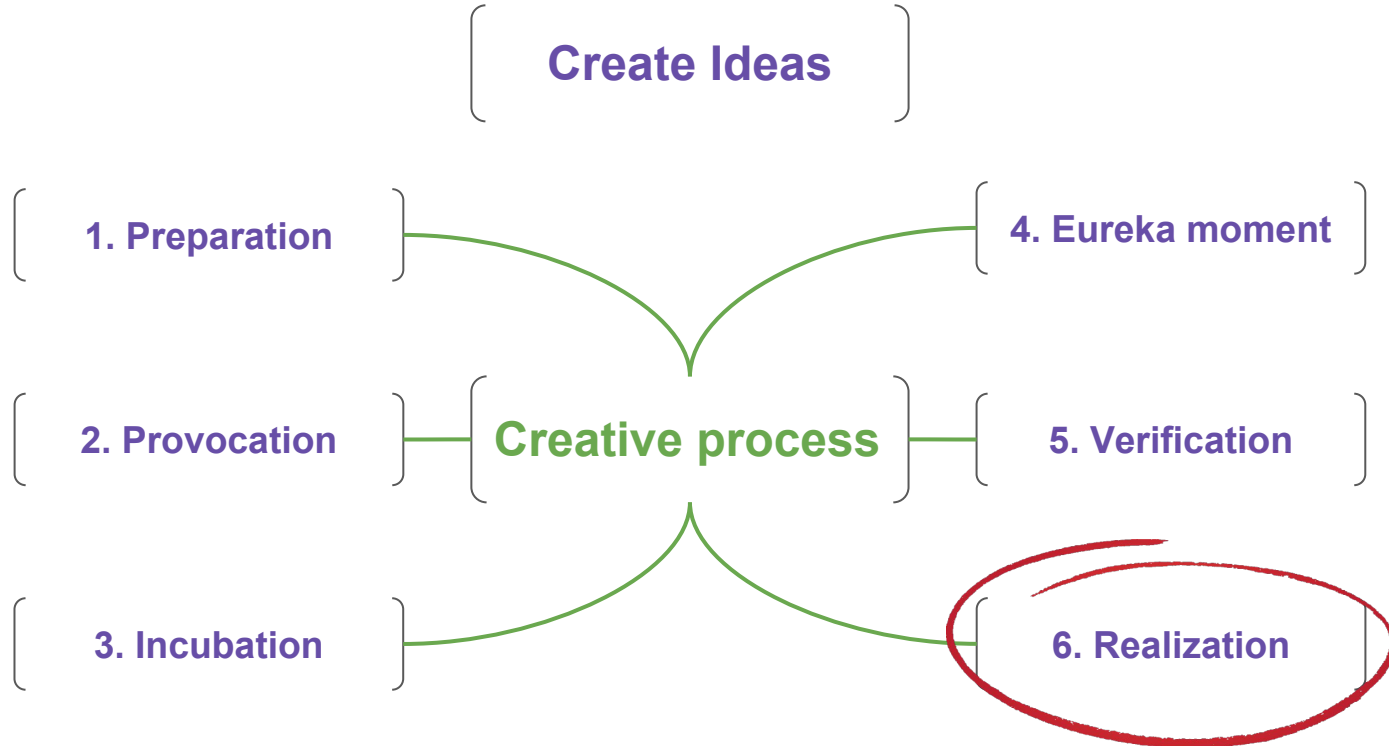
Create Ideas





Create Design Ideas

Create Ideas





Create Design Ideas

Sketches

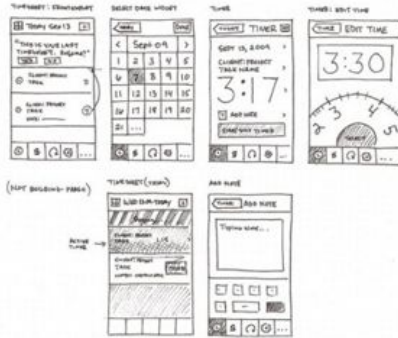
- illustration of how the basic concept works

User stories

- description of a feature from an end-user perspective

Wireframes

- static representation of the UI layout and user flow



The idea translated into user interface form.

As a user / <persona> ,
I want / need <action>
so that I can <user goal>.

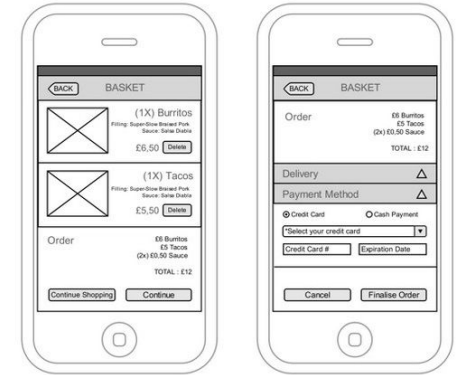


Image:
<http://uxmovement.com/wireframes/why-its-important-to-sketch-before-you-wireframe/>

Image:
<https://www.behance.net/gallery/13421913/Wireframes-Restaurant-App>



Create Design Ideas

Design

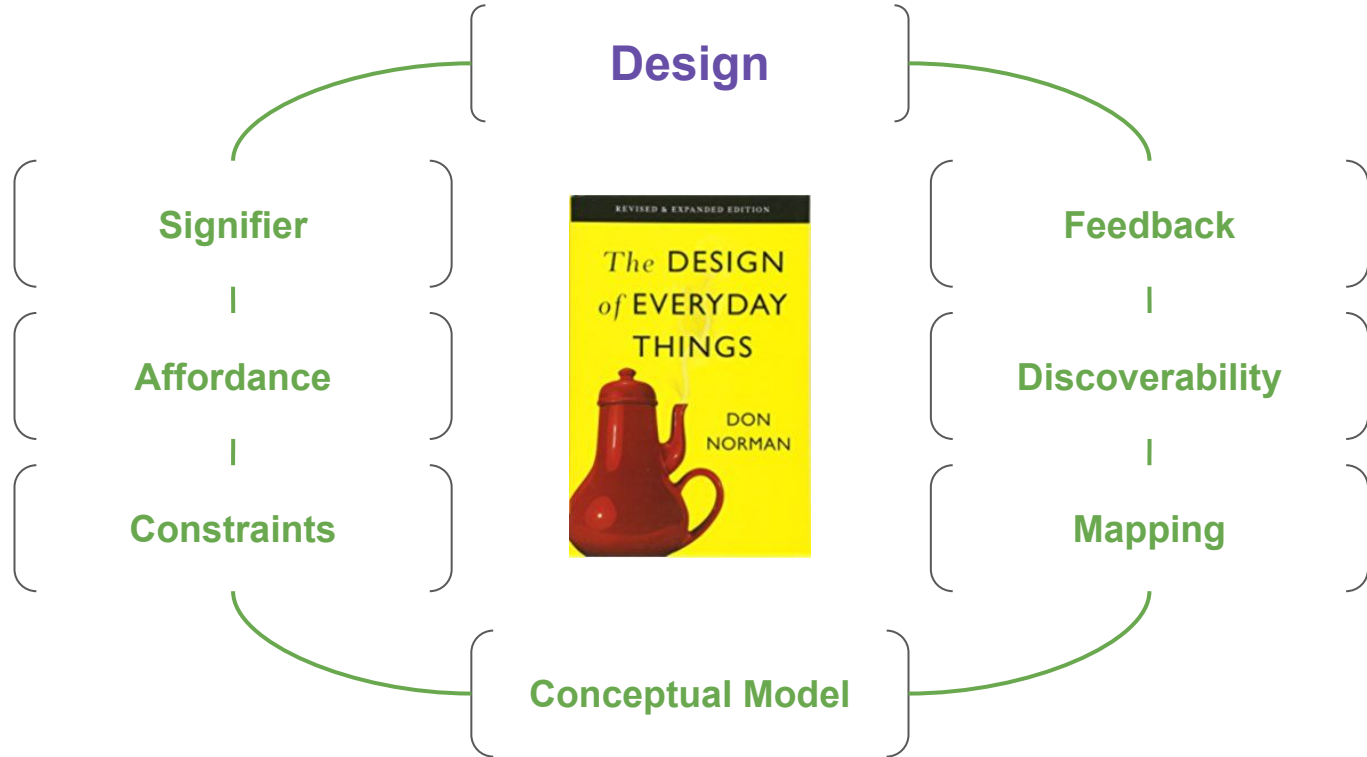
Interface - a surface/place where two independent systems, bodies or spaces meet / form a common boundary, and communicate with each other

Interface - a communication channel

Communication - exchanging of information



Create Design Ideas





Create Design Ideas

Design

Signifier - indicators of any type that communicate the action needed so the affordance can take place

Affordance - the possible use for an object when interacting with it

Constraints - restrictions that limit the possible actions available with an object

Feedback - conveys effects of user's actions

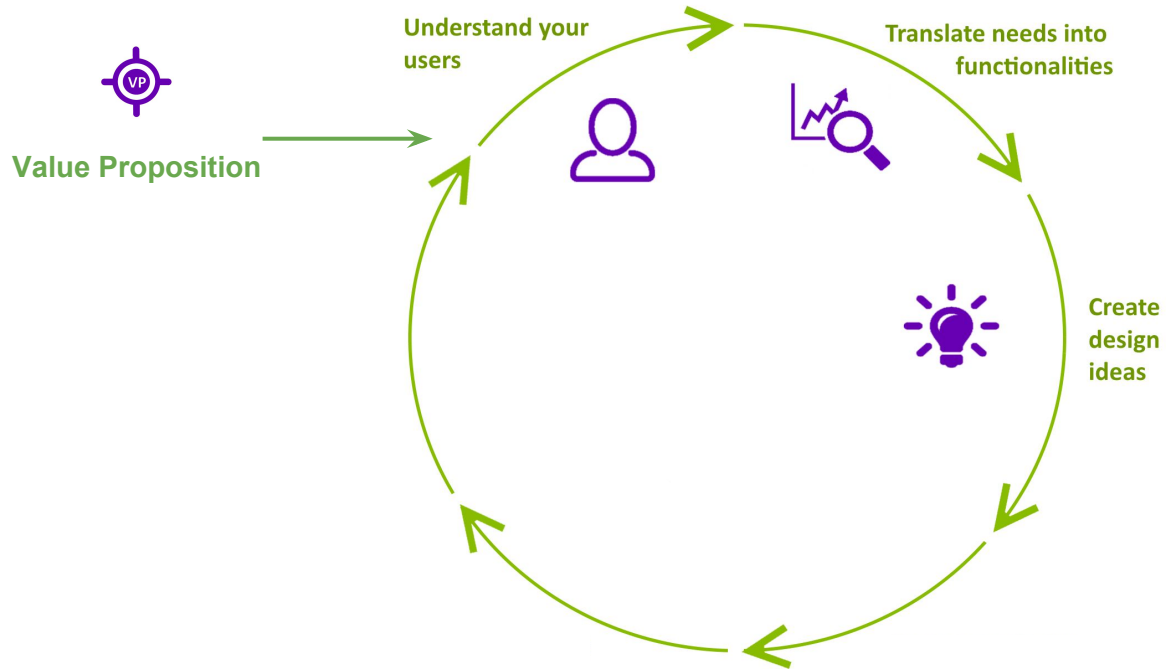
Discoverability - whether it's possible to figure out how to use an object by interacting with it

Mapping - indication of the relationship between objects

Conceptual Model - understanding of how the system works, communicated through the design

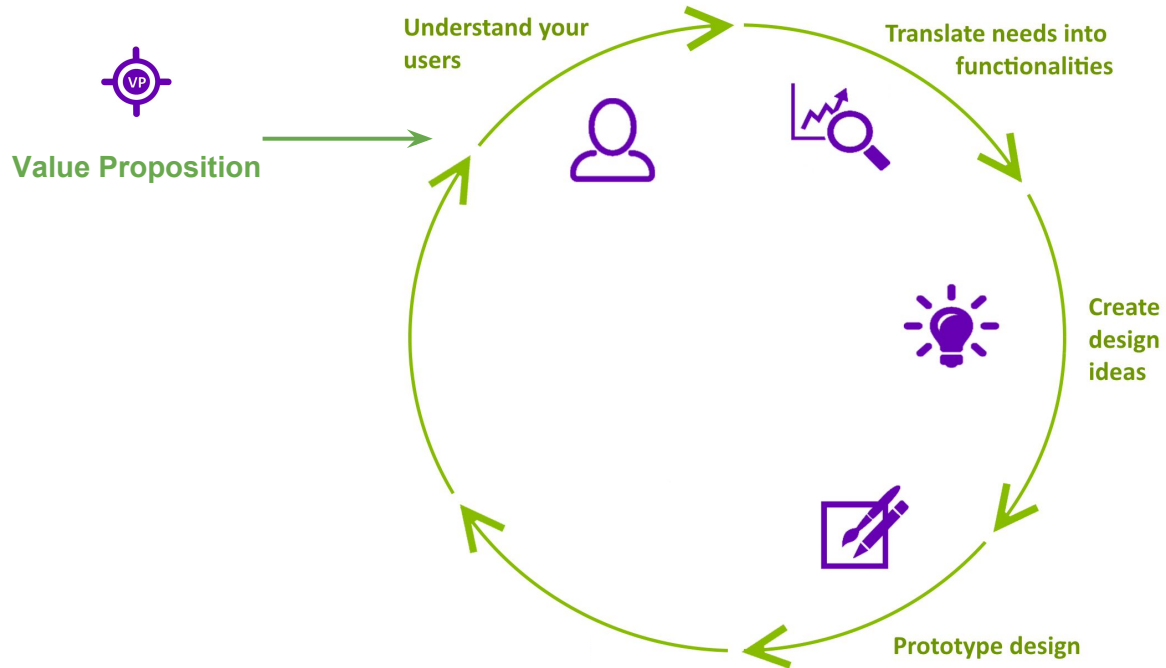


Course Review





Course Review





Create Design Ideas



Prototype Design

Information Architecture - structural design
of shared information environments

Richard Saul Wurman

**Users flow through
your product**

**Catalog user's
information**

**Presentation of the
information**

**Decision driving
function**



Create Design Ideas

Prototype Design

Knowledge Organisation

Taxonomy

Folksonomy

Domain Analytics Approach



Create Design Ideas

Prototype Design

Knowledge Organisation

Taxonomy

Practice of classification based on hierarchical relationship.

Parent-child hierarchies

Folksonomy

Practice of classification based on non-hierarchical relationship.

Public tags and their frequencies

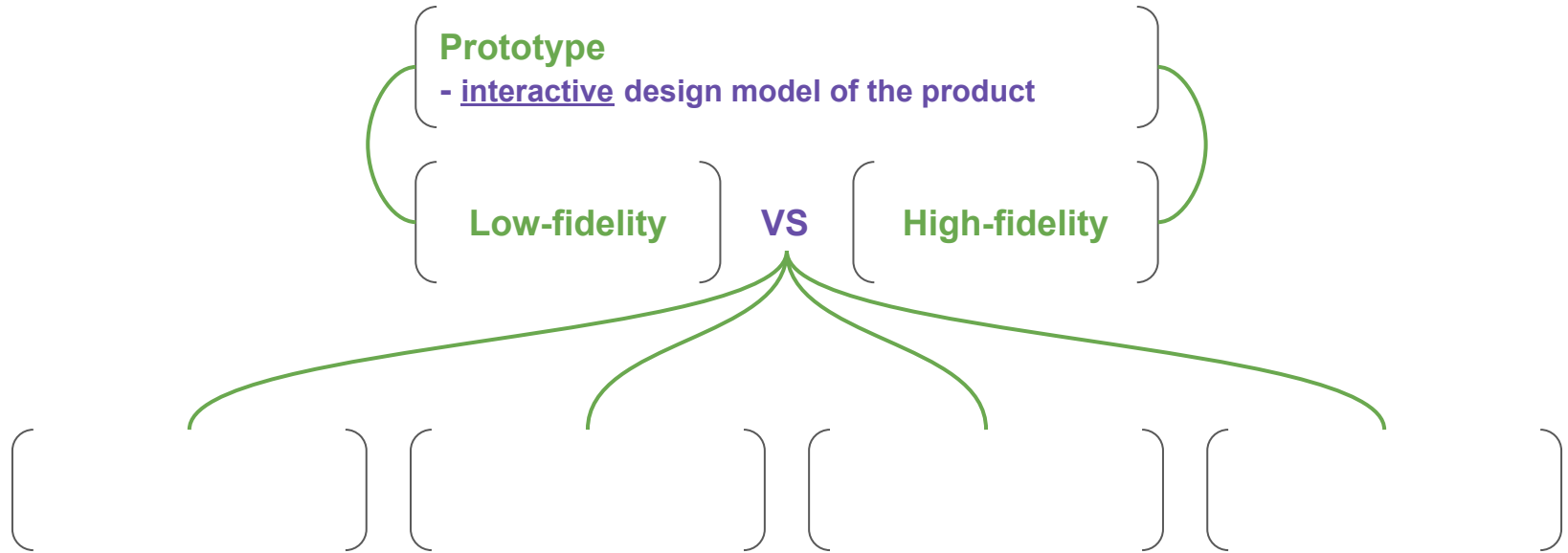
Domain Analytics Approach

Practice of classification based on sociological - epistemological view.

Indexing is suited to fulfill a task by specific group

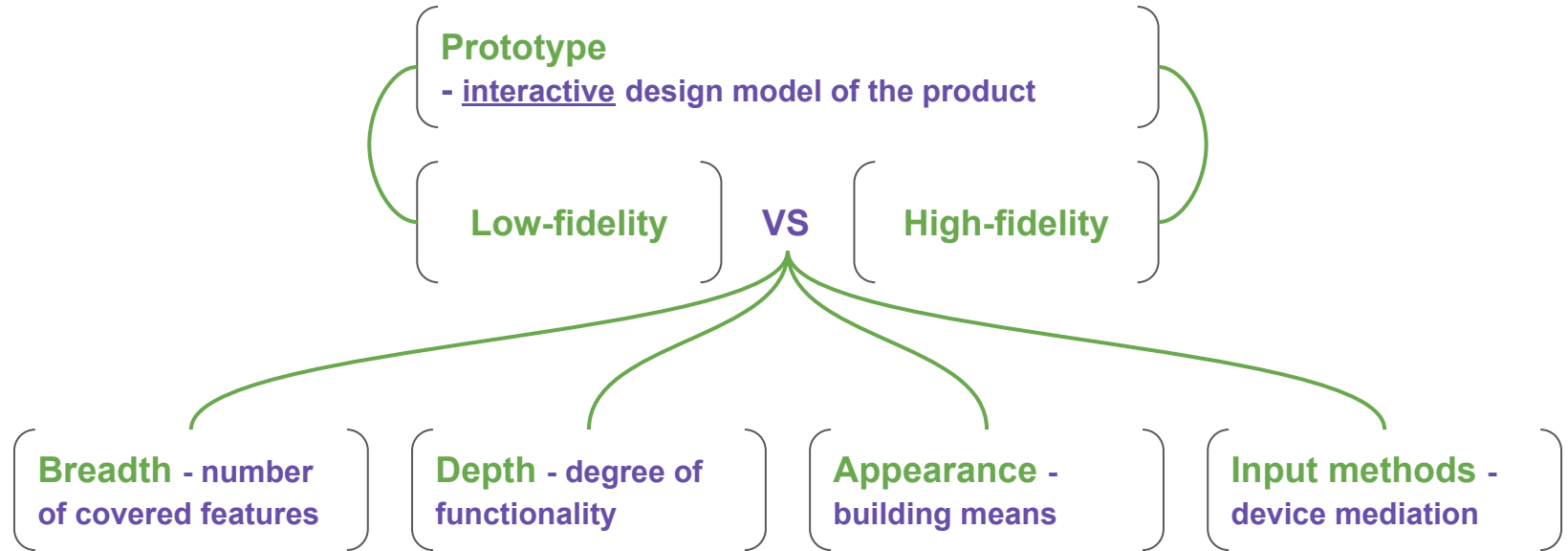


Prototype Design





Prototype Design





Create Design Ideas

Static representations of the product

Sketches

Wireframes

Mockups

Visualization



Prototype Design

Prototype
- interactive design model of the product

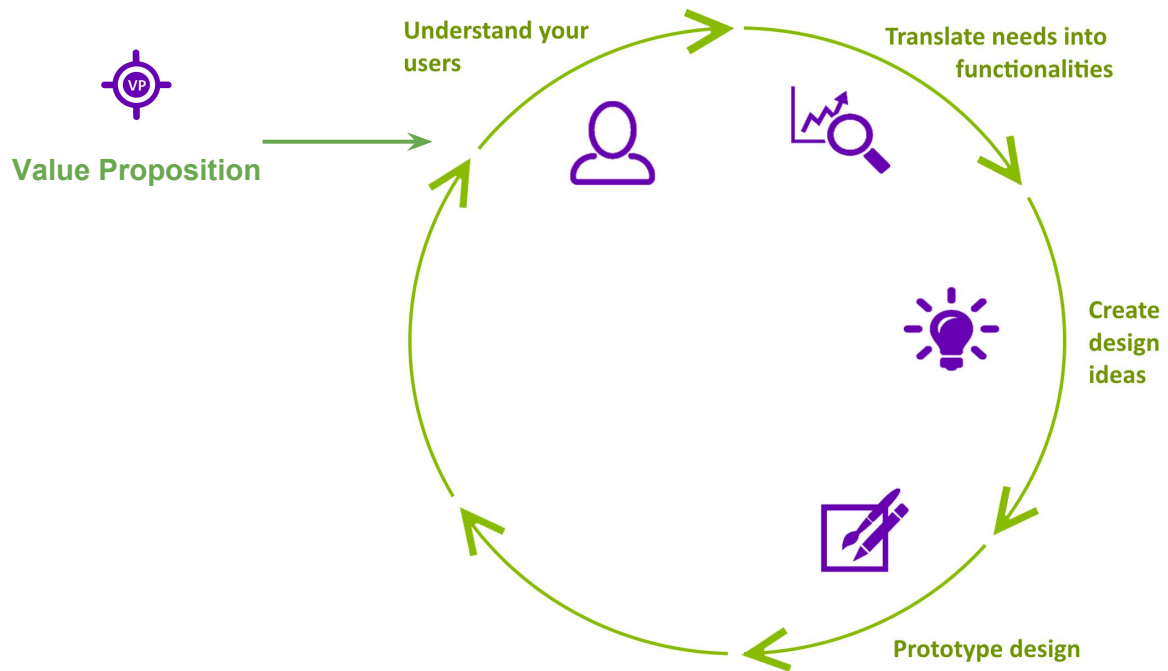
Low-fidelity

High-fidelity

Testing and Evaluation

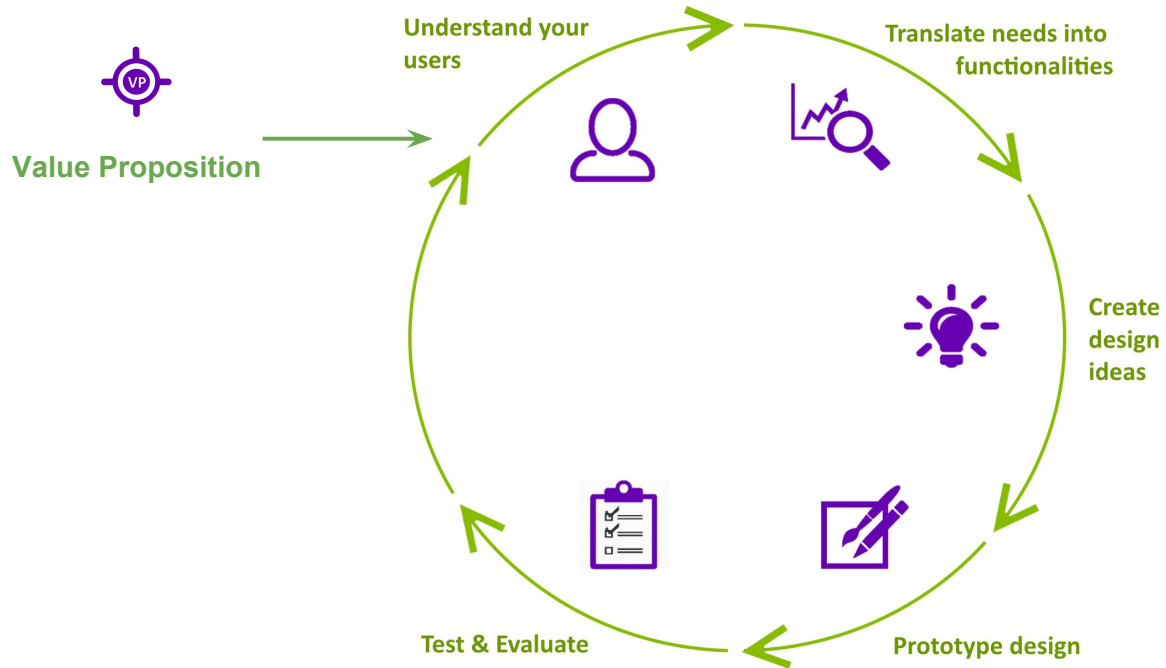


Course Review





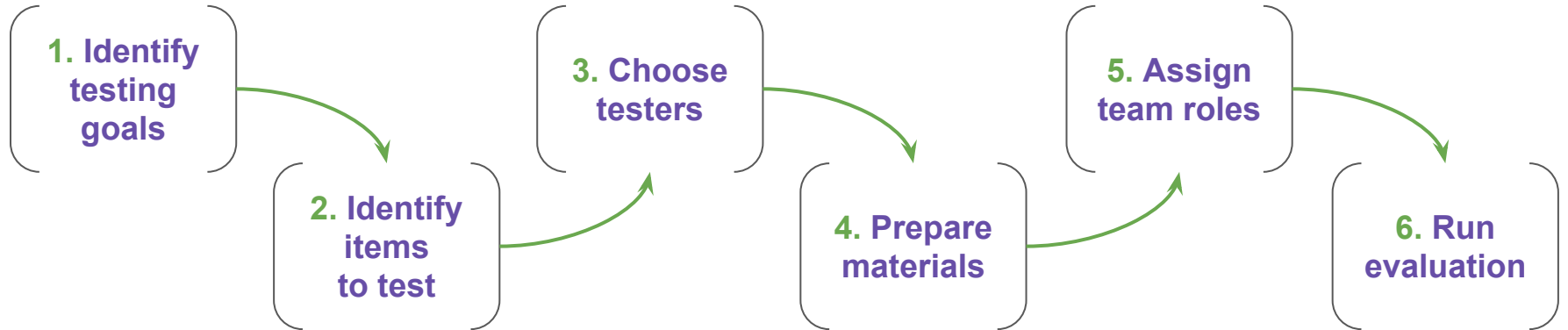
Course Review





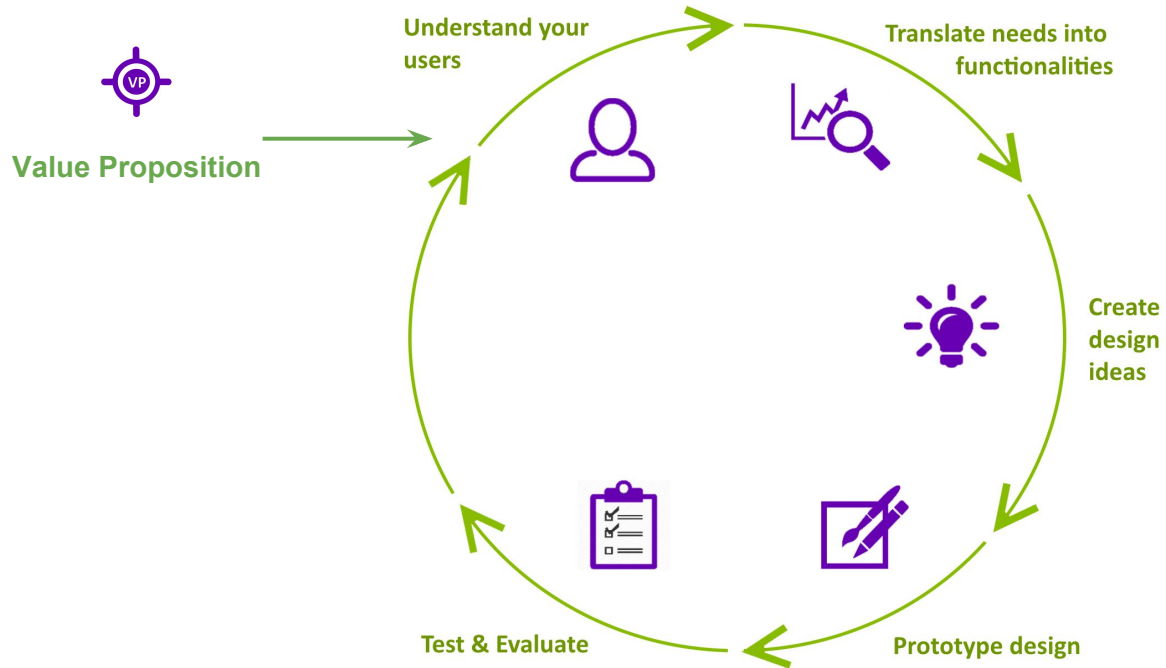
Prototype Design

Paper Prototyping Evaluation



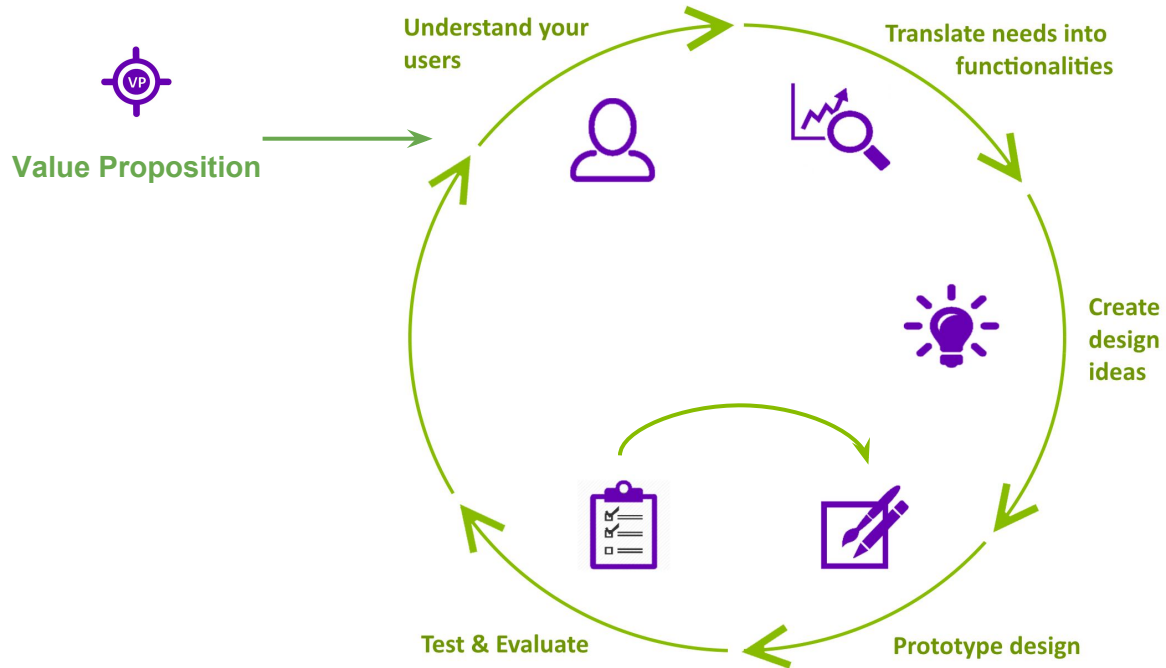


Course Review





Course Review





Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Visual Design

“Cognitive” Design



Prototype Design

Designing User Interface

Elements & characteristics

Elements composition

Spatial organisation

Information processing

Interaction

Color Perception

The Von Restorff effect

Rule of Thirds

Dual-coding theory

Manipulation

Shape Perception

Gestalt Principles

Types of vision

Patterns matching

Locomotion

Visceral Reaction Triggers

Fitts' Law

Free space

Social & Emotional info

Conversation



Prototype Design

High Fidelity Prototype Evaluation

Heuristic Evaluation

Eye Tracking

Focus Groups

Tree Testing

A/B Testing

Walk Through

Click Testing

Keystroke Level Modeling

Five Second Test



History

Waterfall Model

GUI and WIMP

Agile Development

User Centered Design in Computer Systems

HFE and Ergonomics

Socio-Technical Systems Design

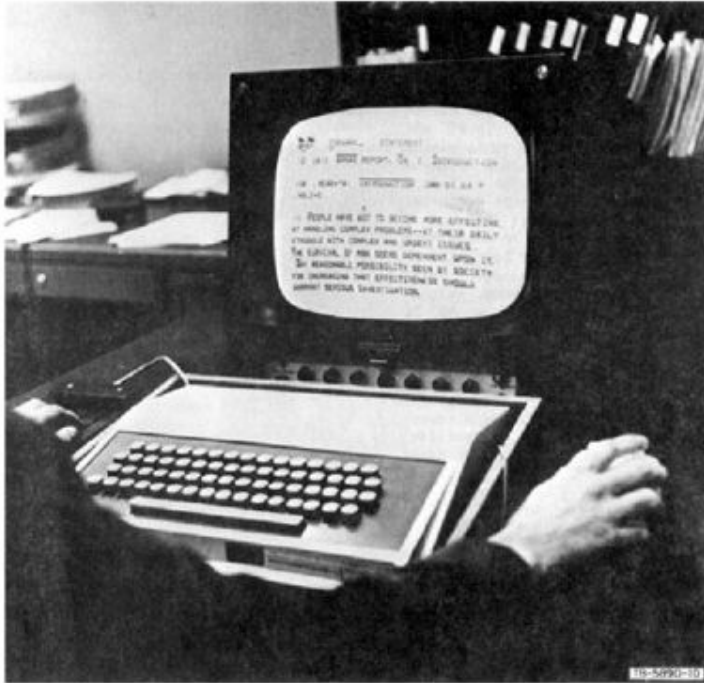
Cognitive Psychology

Cooperative Design

Interaction Design



History



NLS - oN-Line System - developed by Douglas Engelbart and his colleagues at the Augmentation Research Center, SRI

**First demonstrated December 19, 1968 at the Fall Joint Computer Conference, San Francisco.
Was called “The mother of all demos”**

“We were not just building a tool, we were designing an entire system for working with knowledge.” Douglas Engelbart