IXD & UX Intensive

MPICT FACULTY DEVELOPMENT WEEK

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This Week...

1. Monday: Discussion of UX Foundations
2. Tuesday: Personas, Scenarios, Flow Diagrams
3. Wednesday: Wireframes (Web, Mobile, and Responsive)
4. Thursday: Wireflows, Tasks & Scripts, Prototypes
5. Friday: Prototype Testing

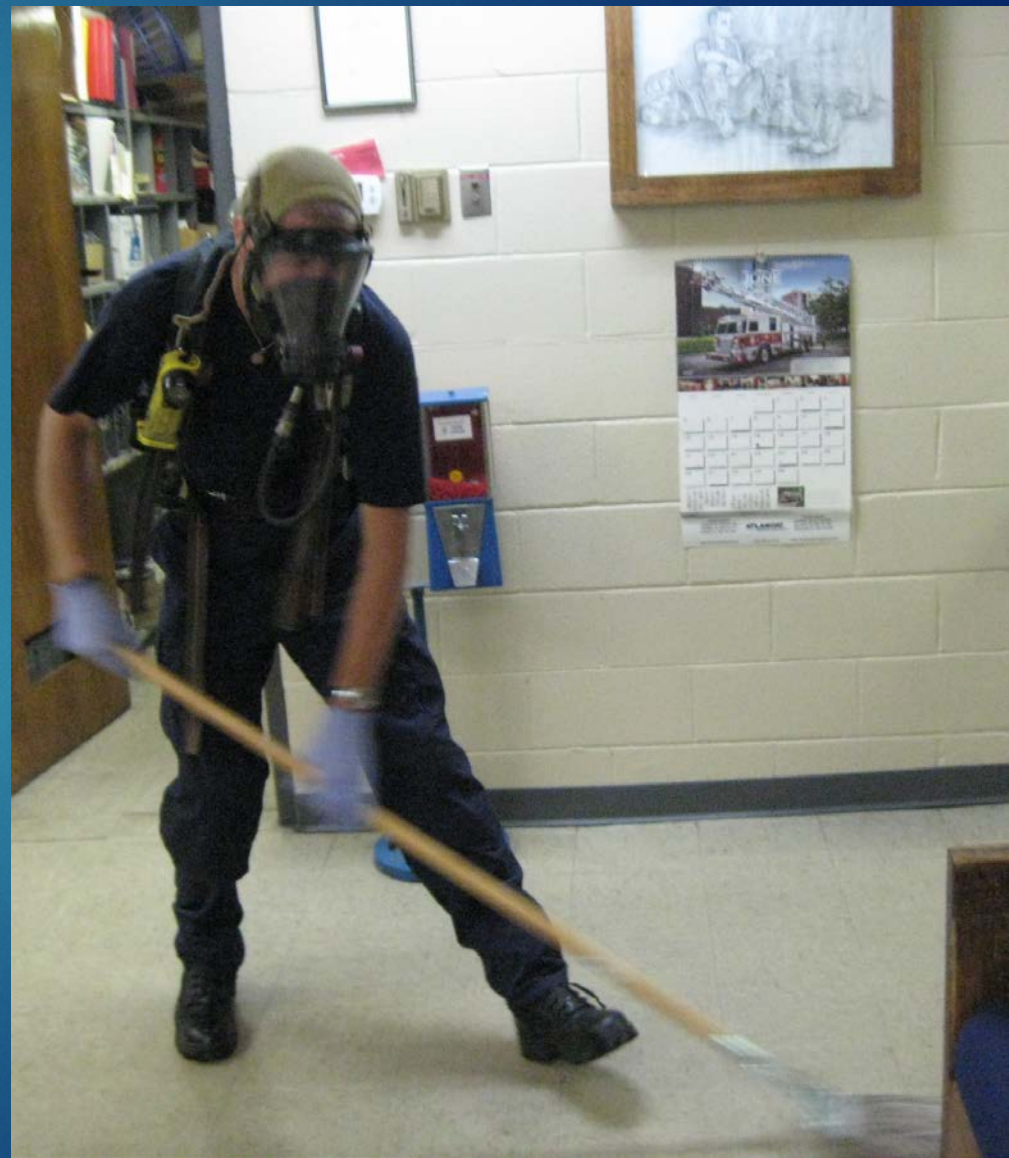
Before We Get Started…

A LITTLE STORY

Let's Talk About Mopping

How can we make mopping more effective?

- Adhere more dirt for a better clean!
- Faster drying means less time lost!
- Add spill and dirt resistance for fewer future messes!



Better Chemistry

Watch People Clean

- Sweep before mopping
- Use products from many manufacturers
- Spend as much time rinsing mops as mopping the floor
- Wear old clothes, because it's a dirty job
- Spot cleaning rather than the entire floor

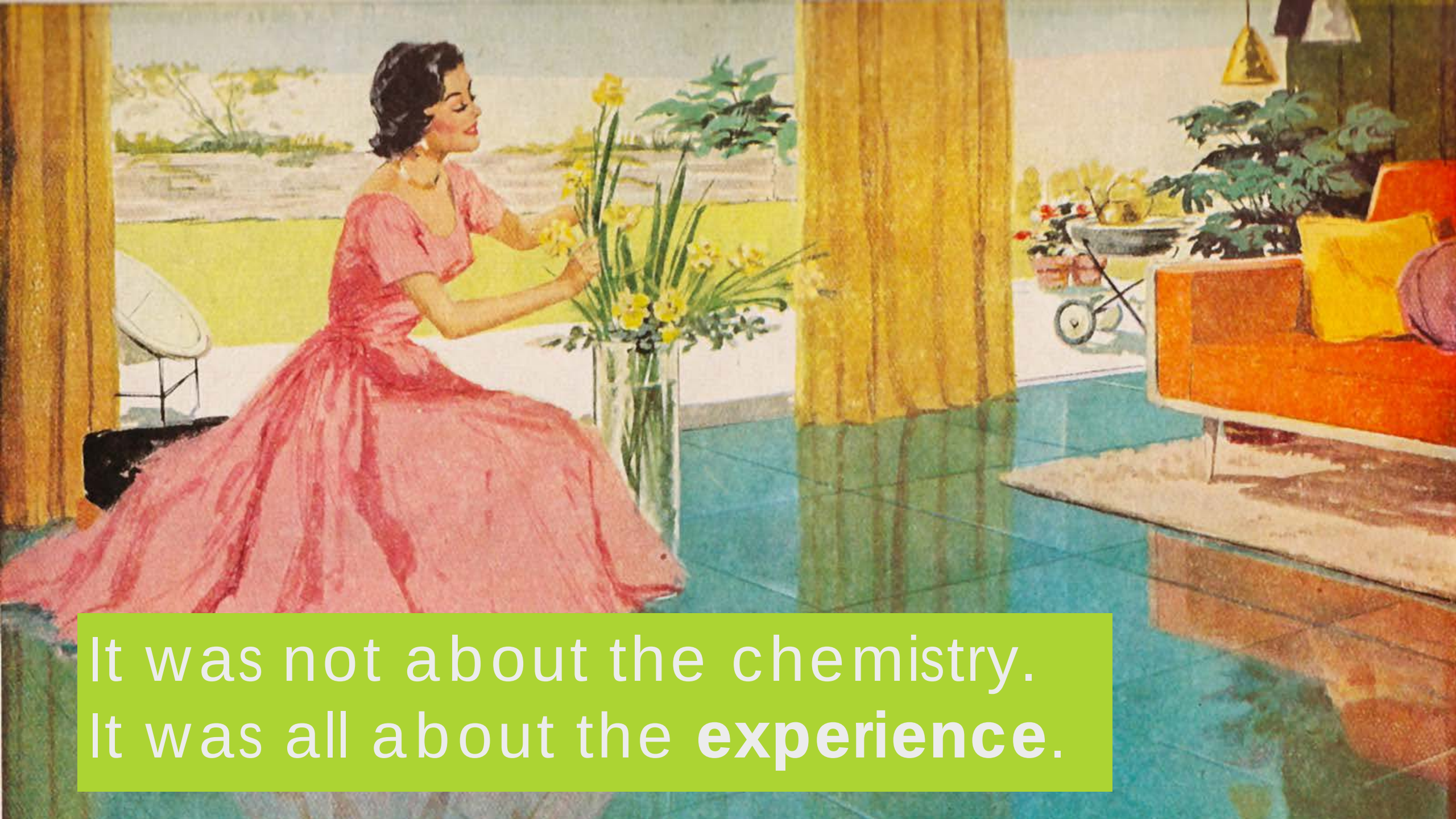
Eureka!

Easier Cleaning

Success!

Launched in 1999, there are now more than 9 products in the Swiffer line earning Proctor & Gamble more than

$500 million per year.


It was not about the chemistry.
It was all about the **experience**.

Let’s Jump Right In!

A QUICK EXERCISE

Mini-Project: Oahu Parking Kiosk

- What are the problems with this interface?
- Where is it difficult?
- Where might it produce confusion?
- Where are errors likely?

- Sketch some recommended fixes for these problems.

Mini-Project: Oahu Parking Kiosk

- Share your designs with the class.

- How did you approach the problem?
- Were you systematic or haphazard?
- What solution frameworks did you use?
- Were your methods efficient?
- Was your process repeatable?

Just What Is UX?

THE OBLIGATORY DEFINITIONS

"User experience highlights the experiential, affective, meaningful, and valuable aspects of human-computer interaction and product ownership. Additionally, it includes a person's perceptions of the practical aspects such as utility, ease of use, and efficiency of the system. User experience is subjective in nature because it is about individual perception and thought with respect to the system. User experience is dynamic as it is constantly modified over time due to changing circumstances and new innovations."

- Wikipedia

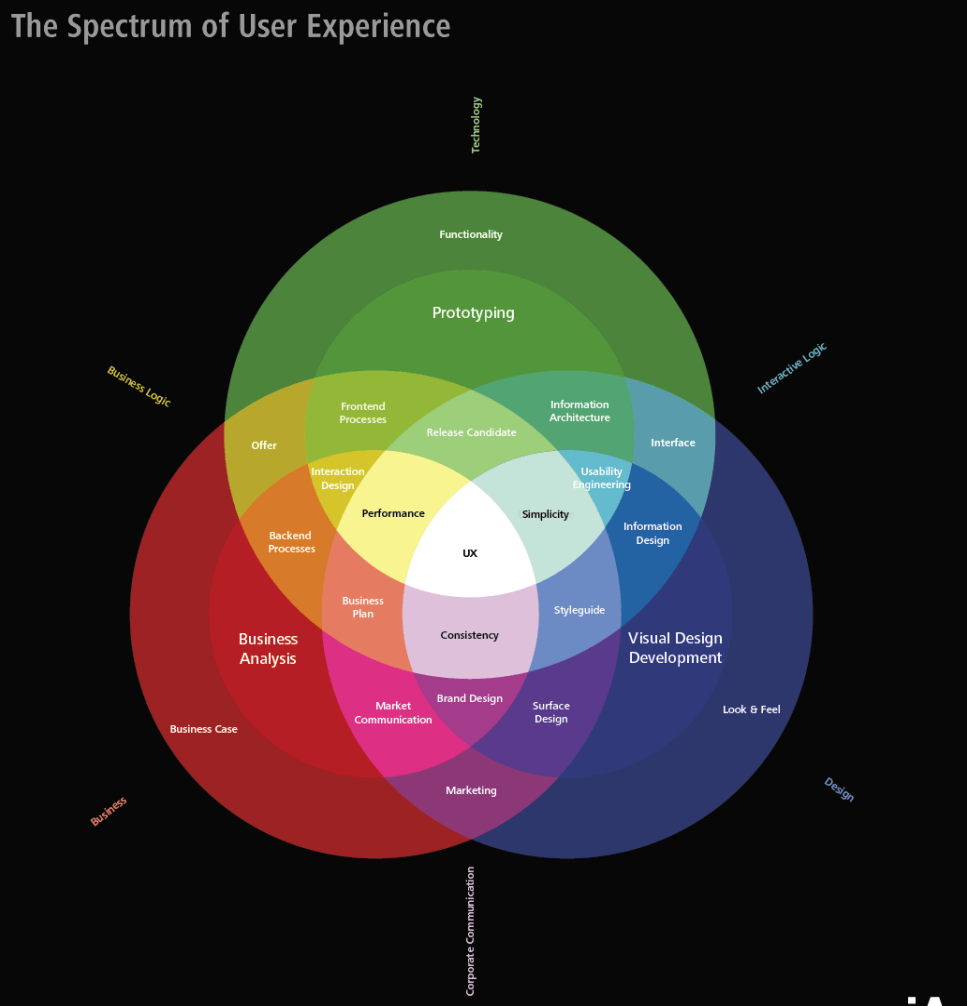
“User experience is a person's perceptions and responses that result from the use or anticipated use of a product, system or service. User experience includes all the users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviors and accomplishments that occur before, during and after use. Three factors that influence user experience are: system, user, and the context of use.”

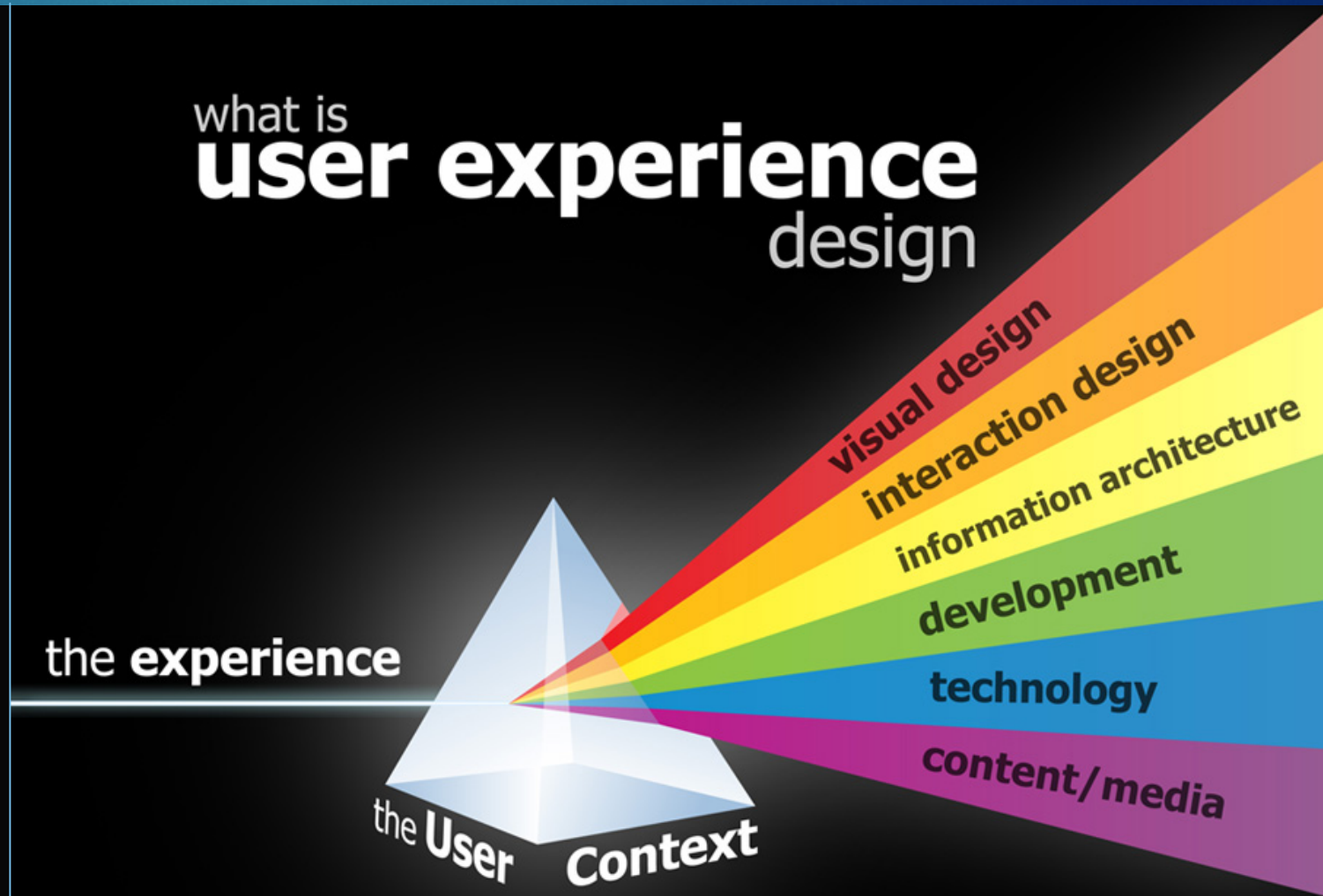
– ISO 9241-210 (Human-centered Design for Interactive Systems, 2008)

"I invented the term because I thought human interface and usability were too narrow. I wanted to cover all aspects of the person's experience with the system including industrial design, graphics, the interface, the physical interaction, and the manual. Since then the term has spread widely, so much so that it is starting to lose its meaning… user experience, human centered design, usability… They just sort of entered the vocabulary and no longer have any special meaning. People use them often without having any idea why, what the word means, its origin, history, or what it's about."

– Don Norman (1993, Apple's first User Experience Architect)

UX Is A Team Effort

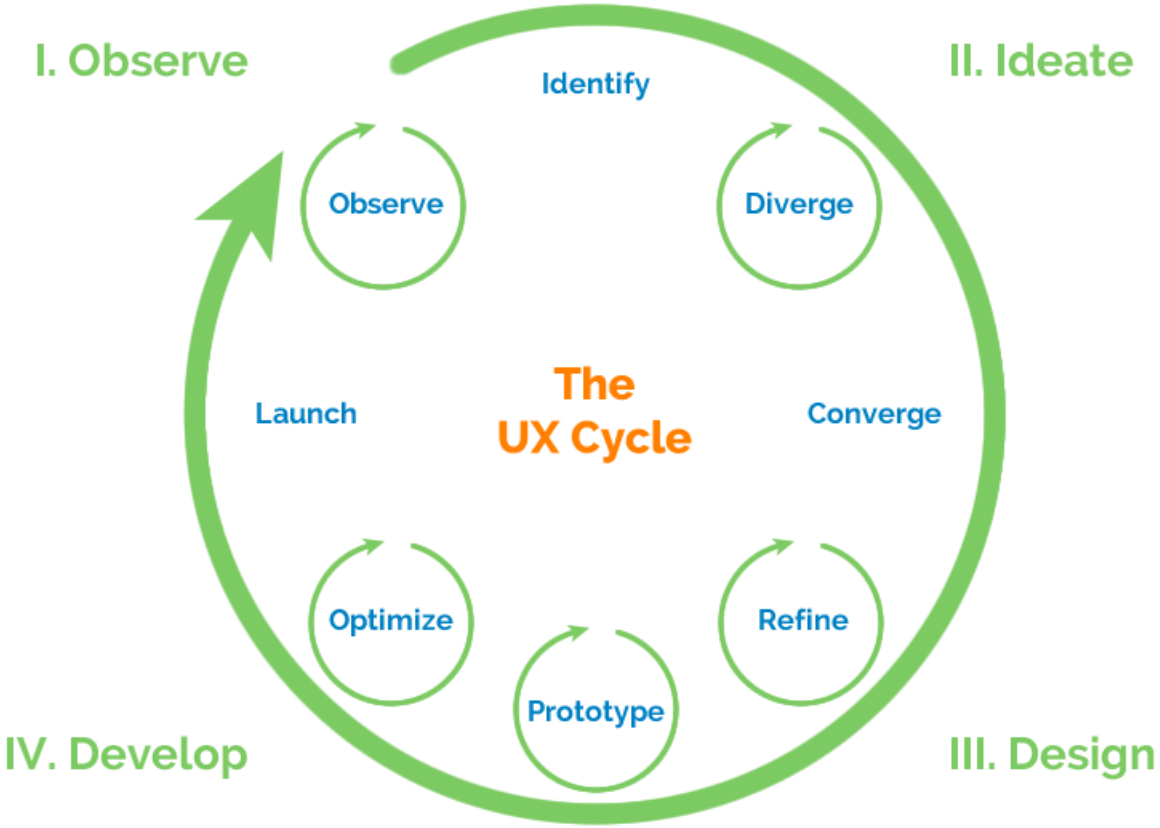




UX is neither unguent nor salve.

The UX Ladder

The UX Cycle


I. Observe
Identify
II. Ideate
Observe
Diverge
Launch
The
UX Cycle
Converge
Optimize
Refine
Prototype
IV. Develop
III. Design

UX Thinking

HOW WE UNDERSTAND PEOPLE (AND OURSELVES)

Five Interaction Design Principles

Perceive

Predict

Interact

Feedback

Understand

Learn

Transfer

Consistent

Observe & Practice

Understanding Context

People + Situation + Need + Importance + Urgency

Underlying Psychology

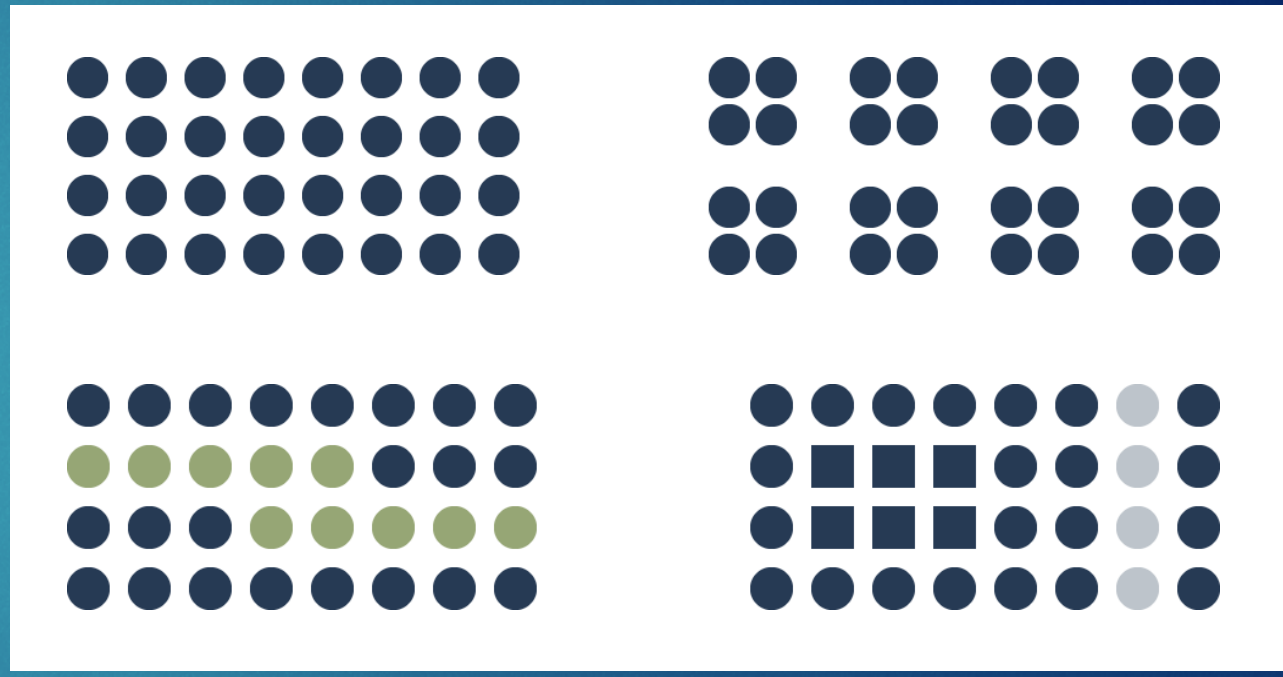
1. Perception
2. Motivation
3. Emotion
4. Cognition
5. Behavior
6. Creativity + Play

Remember: You are not designing for yourself.

1. Perception

Gestalt Principles

- Proximity
- Similarity
- Closure
- Common Fate
- Continuity

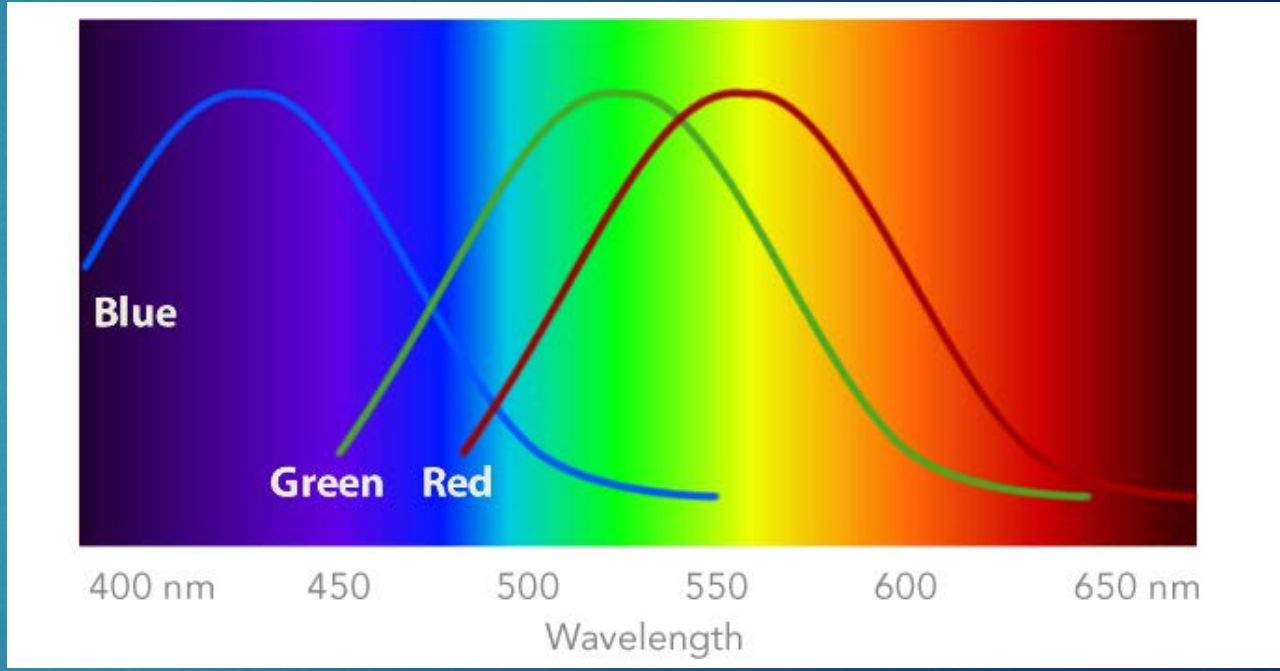


1. Perception

Color Vision

- RGB system
- Rods and Cones
- Color Deficient Vision

Pre-Attentive Processing



2. Motivation

The force that initiates, directs, and sustains behavior.

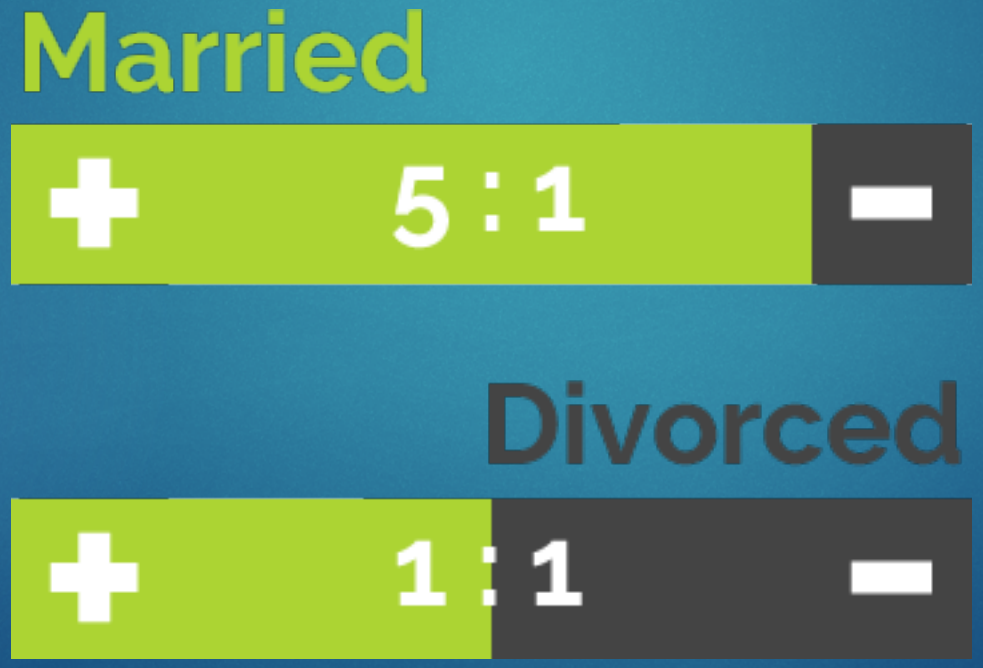
1. Intrinsic (drives) vs. Extrinsic (incentives)
2. Optimal Arousal
3. Need Theories
    1. Achievement, Affiliation, and Power
    2. Existence, Relatedness, and Growth
    3. Equity
    4. Drive Reduction
    5. Instinct

3. Emotion

- “Surprise and delight”
- Creating the positive, overcoming the negative
- 20,000 emotional experiences per day (Kahneman, 2002)

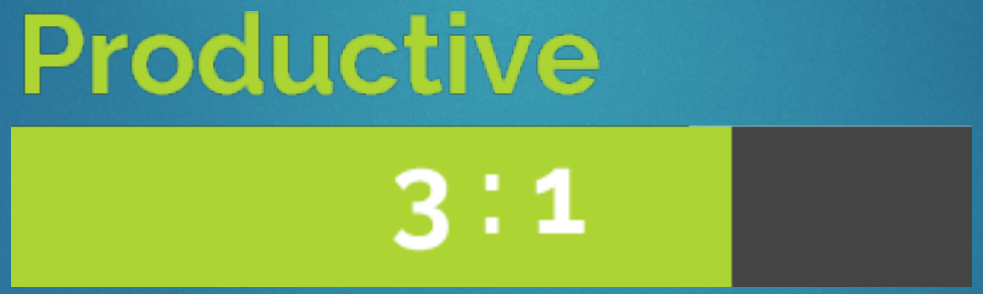
3. Emotion

- Gottman (2004) can predict marital status with 94% accuracy after only 15 minutes of observation



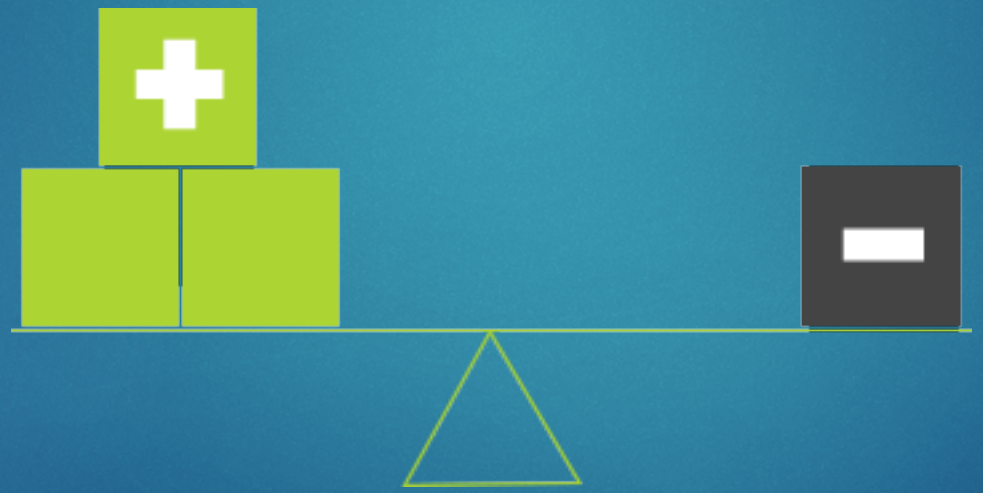
3. Emotion

- Losada (1999) found that workgroups with positive relationships are more productive



3. Emotion

- Fredrickson (2009) found that we need three positive emotional experiences to overcome just one negative emotional experience



4. Cognition

1. Attention
2. Learning and Memory
3. Language
4. Reasoning and Problem Solving
5. Decision Making

4. Cognition

Cognitive Biases

1. Framing
2. Anchoring
3. Functional Fixedness
4. Mechanization of Thought
5. And many more…

What we ask influences how we answer.

Where we start influences where we go.

4. Cognition

Cognitive Load and Cognitive Friction

1. Direct vs. Indirect Manipulation
2. Translation (e.g., keys on charts, settings and preferences, icons)
3. Reduce memory load
4. Never make the user do work that could be done by the machine
5. Never make the user wait
6. Never make the user repeat themselves
7. Anticipate the user's needs ("Just in time" design, not "just in case")
8. Use smart defaults (that are likely to be correct and which can be undone)

5. Behavior

How people interact with the device or interface. We may directly observe behavior or indirectly observe traces of behavior.

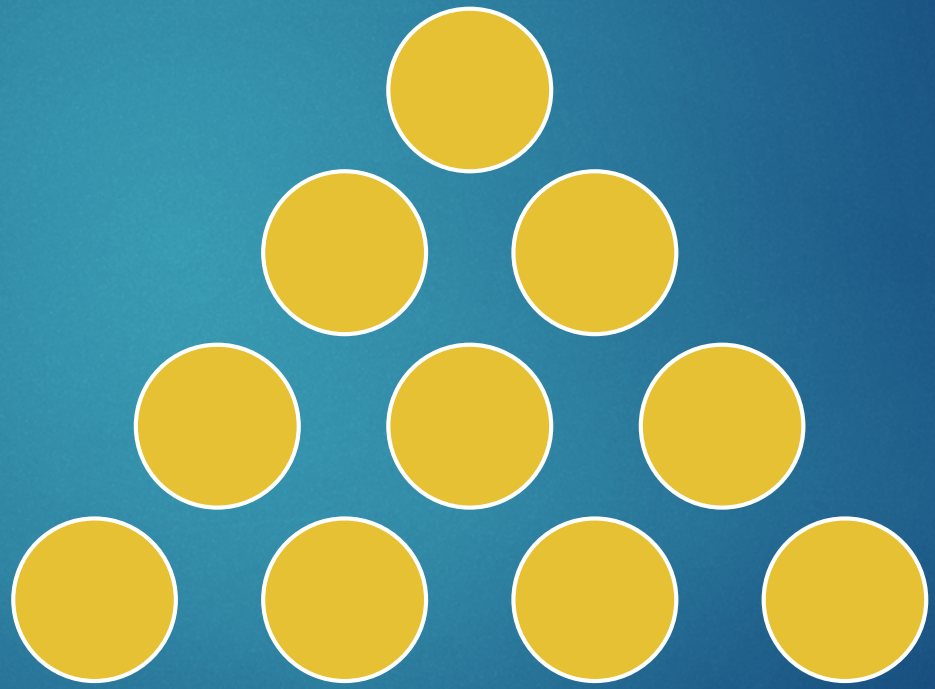
- Mouse movements
- Clicks and taps
- Gestures (2D and 3D)
- Eye-tracking
- Typing
- Voice

6. Creativity + Play

Perhaps one of the most difficult abilities to define and measure, creativity is often associated with and assigned to designers, but everyone has it.

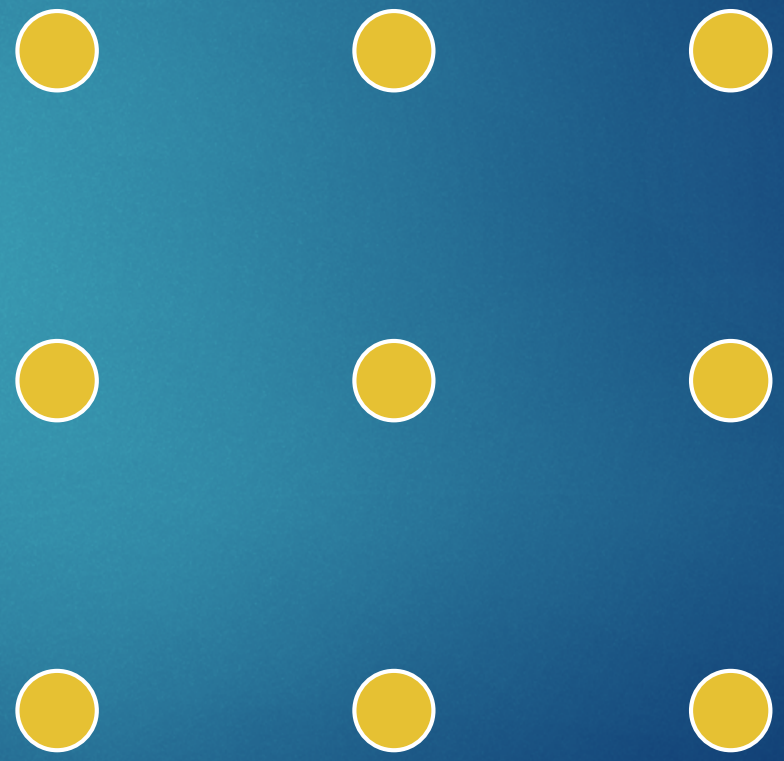
6. Creativity + Play

Move three pennies to make the triangle point the opposite direction.



6. Creativity + Play

Connect nine dots
with four straight lines
without lifting your pencil.



How many uses are there for a brick?

6. Creativity + Play

- Divergent Thinking
- Abductive Reasoning
- Generativity
- Discoverability
- Challenge
- Cooperation and Competition

6. Creativity + Play

Actions, Images, and Symbols

- Jacques Hadamard (1865 - 1963)
- Asked 99 of the world's most prominent mathematicians how they work and accomplish their achievements.

$$\frac{D}{Dt}\overline{w'^i w'^j} + \overline{w'^i w'^\alpha}\nabla_\alpha \bar{u}^j + \overline{w'^j w'^\alpha}\nabla_\alpha \bar{u}^i - \alpha\left(g^{i\alpha}\overline{w'^j\frac{T'}{\bar{T}}} + g^{j\alpha}\overline{w'^i\frac{T'}{\bar{T}}}\right)\left(\nabla_\alpha\bar{\Phi} + \frac{D\bar{u}_\alpha}{Dt}\right)$$

Very few work in the language of math.

$$+\frac{1}{\bar{\rho}}\overline{w'^i w'^j \nabla_\alpha(\bar{\rho}u'^\alpha)} - \overline{P'(g^{i\alpha}\nabla_\alpha w'^j + g^{j\alpha}\nabla_\alpha w'^i)} = -\frac{1}{\bar{\rho}}\left[\overline{\sigma^{i\alpha}(u')\nabla_\alpha w'^j} + \overline{\sigma^{j\alpha}(u')\nabla_\alpha w'^i}\right] = -\epsilon_2^{ij}\,, \quad (30)$$

$$(1+e_4)\frac{D}{Dt}\overline{\left(\frac{T'}{\bar{T}}\right)^2} - 2f(t)\overline{\left(\frac{T'}{\bar{T}}\right)^2} - 2\overline{w'^\alpha\frac{T'}{\bar{T}}}D_\alpha + \frac{1}{(1+e_4)\bar{\rho}C_p^2}\nabla_\alpha\left[(1+e_4)^2C_p^2\bar{\rho}\overline{w'^\alpha\left(\frac{T'}{\bar{T}}\right)^2}\right] + \frac{1+e_4}{\bar{\rho}}\overline{\left(\frac{T'}{\bar{T}}\right)^2\nabla_\alpha(\rho u'^\alpha)}$$

$$+\frac{2}{\bar{\rho}\bar{T}C_p}\overline{\frac{T'}{\bar{T}}\left[P'\nabla_\alpha w'^\alpha - \nabla_\alpha(P'_g w'^\alpha) - \frac{DP'_g}{Dt}\right]} = \frac{2}{\bar{\rho}\bar{T}C_p}\overline{\frac{T'}{\bar{T}}\left[\sigma^{\alpha\beta}(u')\nabla_\alpha u'_\beta - \nabla_\alpha F'^\alpha_r\right]} = -\epsilon_2\,, \quad (31)$$

$$(1+e_4)\left[\frac{D}{Dt}\overline{\left(w'^i\frac{T'}{\bar{T}}\right)} + \overline{w'^\alpha\frac{T'}{\bar{T}}}\nabla_\alpha\bar{u}^i - \alpha\overline{\left(\frac{T'}{\bar{T}}\right)^2}g^{i\alpha}\left(\nabla_\alpha\bar{\Phi} + \frac{D\bar{u}_\alpha}{Dt}\right)\right] - f(t)\overline{w'^i\frac{T'}{\bar{T}}} - \overline{w'^i w'^\alpha}D_\alpha$$

$$+\frac{1}{\bar{\rho}C_p}\nabla_\alpha\left[(1+e_4)C_p\bar{\rho}\overline{w'^i w'^\alpha\frac{T'}{\bar{T}}}\right] + \frac{1+e_4}{\bar{\rho}}\overline{w'^i\frac{T'}{\bar{T}}\nabla_\alpha(\rho u'^\alpha)} + \frac{1}{\bar{\rho}\bar{T}C_p}\overline{w'^i\left[P'\nabla_\alpha w'^\alpha - \nabla_\alpha(P'_g w'^\alpha) - \frac{DP'_g}{Dt}\right]}$$

$$= \frac{1+e_4}{\bar{\rho}}\overline{\frac{T'}{\bar{T}}\nabla_\alpha\sigma^{i\alpha}(u')} + \frac{1}{\bar{\rho}\bar{T}C_p}\overline{w'^i\left[\sigma^{\alpha\beta}(u')\nabla_\alpha u'_\beta - \nabla_\alpha F'^\alpha_r\right]} = -\epsilon_2^i\,, \quad (32)$$

UX Thinking

HOW WE APPROACH PROBLEMS

Identify, Define, and Represent

Effective solutions require accurate definitions and representations of problems.

"If you cannot explain it simply, you do not understand it well enough." – Albert Einstein

Observe what users do, and be careful about asking them what they need or want.

Critical Thinking

- Understand the problem
- Identify potential solutions
- Foresee the consequences (in the near- and long-term)
- Evaluate the options
- Optimize the solution

Task Analysis

- Subgoal Decomposition
- Theory of Constraints
- Five Whys

Mental Models

Mental Model

Conceptual Model

System Model

Comparisons

- **People vs. Machines**
  - Design for the efficiency of the user, not the computer.
- **Value vs. Pain**
  - People will tolerate difficult experiences as long as the value is greater.
- **Mistakes vs. Errors**
  - Mistakes are often unnoticed until it is too late.
  - The best error handling is error prevention.

Simplification

- Subtraction (removal)
- Distribution (expand or contract steps)
- Reduction (reduce priority, scope, or scale)
- Consolidation (combine similar and related)
- Representation (adjust presentation of information)

Facilitating Insights

- Incubation
- Exposure to other people, ideas, fields, etc.
- Analogy and metaphor
- Backwards Thinking
- Re-framing
- Change perspectives

Future Thinking

Try to foresee the consequences of designs and subsequent user actions.

- What happens if _____?
- What happens when _____?
- What happens next?
- How will it break or fail?
- What doesn't it do?

UX Research

HOW WE GATHER DATA

Triangulation

Gather data from multiple sources. Try not to make decisions on a single source or type of data.

- Minimize bias and error
- Multifaceted data provide better insights into complex problems
- Develop better perspectives about users, needs, goals, expectations, problems, etc.

Sources of Data

Watch people.

- Contextual Inquiry / Ethnography
- Prototyping
- Usability Testing
- Remote Testing
- Concept Validation
- Collaborative Design
- Card Sorting / Affinity Diagrams
- And more…

Sources of Data

Ask people.

- Surveys
- Interviews
- Focus Groups (not a favorite…)
- And more…

Sources of Data

Analysis and review.

- Heuristics Evaluation
- Competitive Analysis
- Analytics Review
- Content Audit
- And more…

Heuristics Evaluation

Professional review of an existing site or application to identify weaknesses. Common criteria include:

- Organization
- Simplicity
- Perceivability
- Efficiency
- Feedback
- Tolerance
- Credibility
- Accessibility

Qualitative Data

Much of what we want to measure in user experience is subjective, but we can still quantify it.

- **Operational Definitions**
- **Measuring behavior:**
  - Frequency
  - Intensity
  - Duration
- **Scaling:**
  - Nominal, Ordinal, Interval, and Ratio scales
  - Single and multi-dimensional scales

You want me to measure what?

How might we measure the “intuitiveness” of an interface?

- What observable behaviors might reflect “intuitiveness”?
- What other factors might be related to “intuitiveness”?
- What are the dimensions of “intuitiveness”?
- What scales could be created to quantify “intuitiveness”?
- What might we ask people about their experiences?

Validity and Reliability: Are we actually measuring what we claim to measure, and are we doing it consistently?

UX Ideation

HOW WE GENERATE IDEAS

Brainstorming

We've all been in brainstorming sessions, and we know from experience that they are not all successful.

- Social Influence
- Diffusion of Responsibility
- Lack of preparation
- Lack of clear or common goals
- Poorly defined scope
- Poorly represented or framed problems
- Poor communication (before, during, and after)
- Poor follow-through

Brainstorming

Some methods to improve brainstorming:

- Clearly define the scope and the problem
- Identify and acknowledge constraints
- Allow participants to ignore constraints
- Give homework before the session
- Allow people to work individually and independently first
- Use time pressure / constraints
- Collaborate, consolidate, and iterate
- Have a capable moderator

Brainstorming

My favorite brainstorm techniques (there are many more):

- **6 in 6 Minutes** (time constraints for divergent thinking)
- **10 – 3 – 1** (collaboration for convergent thinking)
- **Worst Idea Ever** (re-framing the problem)
- **Role-Play** (changing perspectives)
- **Six Hats** (changing perspectives)

6 in 6 Minutes: Oahu Parking Kiosk

You have six minutes to sketch 6 NEW interface layouts that will improve this parking kiosk.

6 in 6 Minutes: Oahu Parking Kiosk

STOP!

1. Review your individual ideas (notice the “familiar to wild” continuum)
2. Form small groups and compare your ideas
3. Consolidate and iterate the best features
4. Share your groups best idea with the full group
5. Compare, consolidate and iterate the best ideas

UX Research Deliverables

HOW WE COMMUNICATE OUR FINDINGS

Research Deliverables

We analyze the data, summarize the results, and present the conclusions and ideas:

- Reports (on all of the above analyses and reviews)
- Personas
- Scenarios
- Feature and Business Requirements
- Success metrics and KPIs

Personas and Scenarios

We need to understand the target user(s), their goals, their context, and their expectations.

- **Personas**
  - Demographics and psychographics
  - Background and history (biographies)
  - Motivations and expectations
- **Scenarios**
  - Personas + Context + Behavior
  - We often have more in common with our behaviors than our personal characteristics.

Course Project

OLD OAKLAND FARMERS' MARKET

UX Design Project

Over the next few days we will design and prototype a simple web site for a local farmers' market. We will apply nearly everything we have discussed on this project, and we will have the opportunity to discuss our successes and challenges along the way.

Old Oakland Farmers' Market

The Old Oakland Farmers' Market (OOFM) wants to attract more customers, and recent customer surveys and interviews reveal their customers' primary needs are:

- Which vendors will be present?
- What products will be available?
- What is new and in-season this week?

Old Oakland Farmers' Market

Additionally, there were requests for:

- A market map of vendor locations
- Featured vendor spotlight and interview
- Recipes
- Food, wine, and beer pairings
- Social features:
  - Vendor reviews
  - Submit product requests
  - Recommend vendors who should sell at the market
  - Share information (recipes, photos, stories) with vendors and customers

Old Oakland Farmers' Market

Project tasks and goals:

1. Personas, Scenarios, Site Map, and Flow Diagrams
2. Wireframes (for a responsive web site that is mobile-friendly)
3. Wireflows, Write Tasks & Scripts, and Build a Prototype
4. Prototype Testing and Evaluate the Design

Let's Get Started!

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