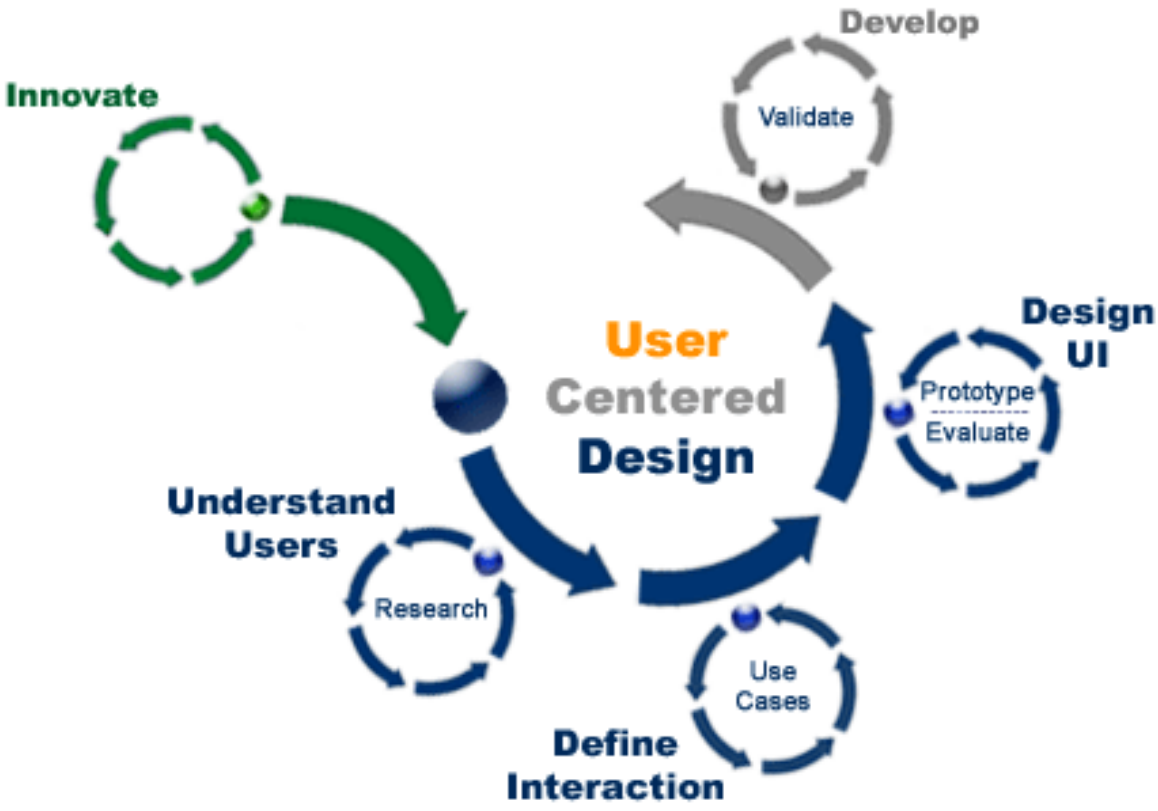
User Study – User Experience (UX)

SAUL DELABRIDA

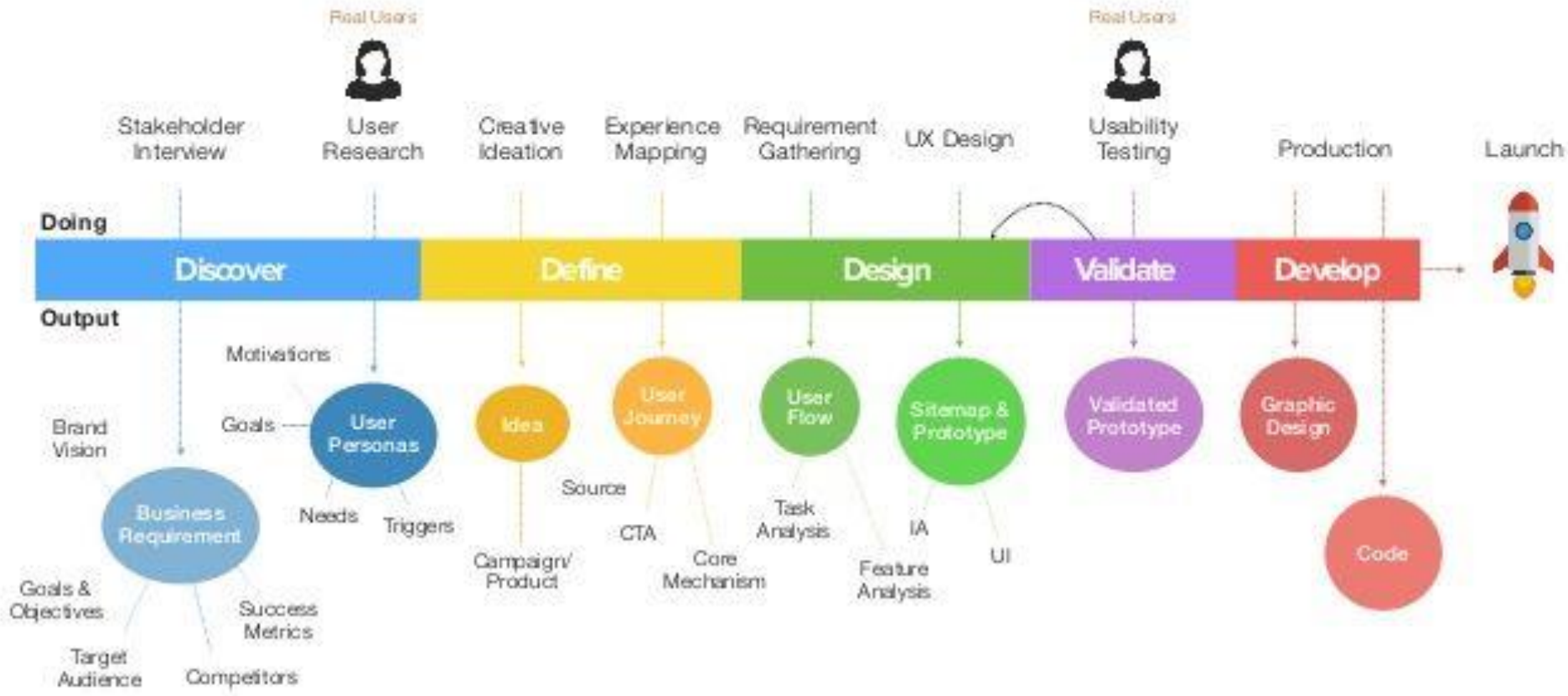
SLIDES BASED ON DR. ARINDAM DEY SLIDES (HTTPS://PT.SLIDESHARE.NET/ARIDEY1983/USER-EXPERIMENTS-IN-HUMANCOMPUTER-INTERACTION)

Why do we need User Study?

User Centered Design



User-Centered Design Process



User Study Goals

- Test your idea/Prototype with real users of application
- A particular case study should be done for assessment
- Usually the response is: The new method/prototype is better than older
- Understand how it can improve the **user experience**

User Experience - UX

- There is no a consensus about the UX concept
- Hassenzahl and Tractinsky (2006) define UX as "a consequence of a user's internal state, the characteristics of the designed system and the context within which the interaction occurs"
- Other authors define UX as a market term
- In most latin authors make reference of User Experience as Usability
- This should be due to the traditional systems which have an UI for interaction

UX x Usability (Arindam Dey)

- The methods can be the same
- But, the goas often are different
- Usability goals
  - To identify Usability problems
  - To identify system interface problems
  - To solve issues of a product
- User Experience Goal
  - To answer a research question
  - To discover new knowledge
  - To improve user perception and add value of the new way to perform a task

UX x Usability (Arindam Dey)

Usability	UX
Improve Products	Discover knowledge
Few Participants	Many participants
Results inform design	Results are validated statistically
Usually not Completely replicated - Specific case study	Must be replicable - Generalizable results
Conditions controlled as possible	Strongly controlled conditions
Procedure planned	Experimental design
Results reported to the product designer/developer	Scientific report to scientific community

UX vs. Usability

Usability

Effectiveness
Efficiency
Learnability
Error prevention
Memorability

User Experience

Satisfaction
Enjoyment
Pleasure
Fun
Value

Where usability is narrow and focused,
UX is broad and holistic.

User Experience Evaluation

Challenge

How to measure the users' feeling and their experiences?

Planning a UX Evaluation

- Define a Hypothesis
- Design a experimental task
- Independent Variables
- Dependent Variables
  - Subjective
  - Objective
- Other Variables
  - Random, controlled
- Experimental Design
  - Within-Subjects, between-subjects, mixed-factorial

Hypothesis

- Based on your research question, but narrower
- The research question can be tested in multiple hypothesis
- Should be specific and clear

Ex1: The system B (new system) is better than system A (old system)

  - What does mean better?

Hypothesis

- Based on your research question, but narrower
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Ex1: The system B (new system) is better than system A (old system)

- What does mean better?

Ex2: Users learn system B (new system) faster than system A (old system)

- Time is a metric. This can means easier!

Ex3: System B provides a more accurate way to perform a task than System A

- User mistakes are the metric.

Ex2 and Ex3 should complement the Ex1, when better means easier and more accurate.

Independent Variables (IV)

- Variables independent of participants behavior
- Manipulated by the experimenter
- Variables that the experimenter is interested
- You can have one or more IV on your study

Typical IVs

- Technology
  - Type of technology
  - Devices
  - Interface
- User
  - Physiology and physiological status
  - Social Status
    - Age, gender, previous experience, education, culture
- Context
  - Environment status
  - External influences (noise, light…)

Conditions

- Combination of IVs

IVs	Mouse	Touch Screen	Gesture
Close			
Far			

Conditions

Dependent Variables (DV)

- Subjective
  - Dependent of users' opinion
  - Point of view, emotion, previous experience, judgment
  - It can be collected by questionnaires
  - NASA-TLX
    - Workload assessment tool to allow users to perform subjective workload assessments on operator(s) working with various human-machine interface systems
    - Mental Demand, Physical Demand, Temporal Demand, Performance, Effort, Frustation

Dependent Variables (DV)

- Objectives
  - More consistent
  - It can be logged by the system
  - E.g.: Time, error
  - Not influenced by user feeling or opinion
  - But, the emotional state can influence

Experimental Design

- Within-subjects
  - Each one performs under all conditions
  - Repeated-measure
- Between-subjects
  - Each one perform one condition
  - Independent samples
  - Matched groups
- Mixed-Factorial
  - Combination of both
  - More than one IV is necessary

Within vs Between

Within - Subjects	Between-subjects
Learning effect	Avoids interference effects
Long time for each participant	Short time for each participant
Individual difference can be isolated	Impact of individuals difference
Easy to detect difference among conditions	Hard to detect difference among conditions
Small sample	Large sample
Randomize the order of conditions	Randomized assignment to conditions or matched groups

Randomization

- Critical condition to validate an experiment
- Avoids addictions of a repetition of a condition
- No one can control the conditions sequence presented to users, including the experimenter

Counterbalancing

- Define the permutations
  - 2 Conditions = 2 permutations (1,2) (2,1)
  - 3 Conditions = 6 permutations (1,2,3) (1,3,2) (2,1,3) (2,3,1) (3,1,2) (3,2,1)
  - 4 Conditions = 24 permutations (1,2,3,4) (1,2,4,3) (1,3,2,4) .....
- The number of participants should be multiple of number of permutations
- This way, you ensure that each condition was tested the same number of times

Sample

- You should define participants who have requirements to your case study
- Is not easy to find participants
- Sample size
  - Within Subjects – 15-20 participants
  - Between Subjects – 15-20 participants per condition
- More variance, more users
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Ethical Issues

- Some human and animal studies should be approved by the board ethical of your University (Brazilian rules)
- You should report in case of users exposition to risks
- The Conselho Nacional de Saúde define the regiment for human studies on CNS 510.
- If your study represents a public opinion without user identification you don’t need submit
- If you have questions, send a message to the local board members at UFOP

For Next Class

- You are 32
- Create 4 groups
- Define a Case Study
  - Wearable is not a restriction
- Plan your User study
- Before the class
  - Define the questionnaire (Google Forms? Printed? Excel?)
  - Execute the pilot study
- In the class
  - Each group should execute the experiments (~40 minutes, ~5 users)
  - Each group should compile the results (~20 minutes)
  - Each group should present the results (PPT) (about 10 minutes)
    - What is your goal?
    - How do you designed your study?
    - Results?

Thanks for your attention!

saul@sdelabrida.com