

COMS W4170

UI Design and Evaluation 2

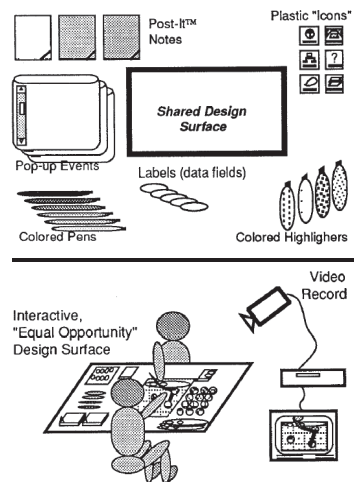
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1

Participatory Design

- Involve users in design process as “fully empowered participants” (→ “extreme UCD”)
- E.g., PICTIVE (M. Muller)
 - Plastic Interface for Collaborative Technology Initiatives through Video Exploration
 - Users given paper, plastic, markers, tape to create lo-fi/low-cost mockups that are videotaped to demonstrate interaction



Muller, CHI 91

2

Use Scenario

- Description of a representative way in which the system will be used
 - Each scenario tells a story
 - Often written to be rich in detail to capture reader's interest
 - A set of use scenarios represents different users, tasks, devices, situations,...
 - Act out to try to understand consequences
 - Technologic, sociologic, economic,...
 - Privacy, safety, IP,...
 - Help developers understand needs, clients understand benefits

3

Persona

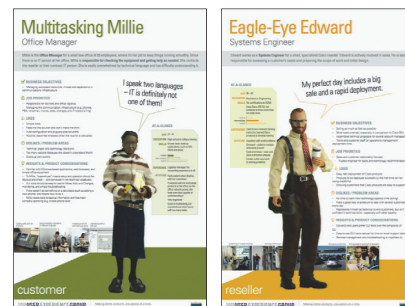
- Description of an archetypal user of the system
 - Each persona represents a stereotypical example of a class of prospective system users
 - Usually part of a set, covering a range of users
 - Developed from observation
 - Often written up as a detailed description, including personal details (name, age, background, physical appearance, job,...) to bring the persona to life
 - Serves as a stand-in for a real user
 - Allows developer to ask, "What would Helen do?"

See <https://www.microsoft.com/en-us/research/wp-content/uploads/2017/01/personas-practice-and-theory.pdf>
<https://www.microsoft.com/en-us/research/wp-content/uploads/2017/01/PersonaBook.pdf>

4

Personas at Cisco

- Informal research by the Cisco User Experience Group showed prospective users of personas liked posters with mockup action figures more than posters with real people
- Commissioned action figure doll for each persona
 - Used to create posters
- Each poster includes
 - Persona description
 - Scenario photos
- Made cardboard persona pop-ups for engineers' desks

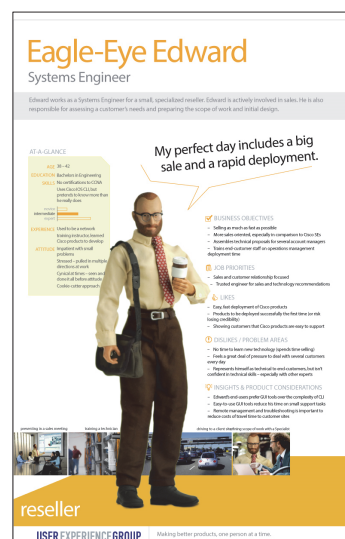


<http://doi.acm.org/10.1145/1240866.1240905>

5

Personas at Cisco

- Name, job, brief bio
- At-a-glance
 - Age
 - Education
 - Skills
 - Experience
 - Attitude
- Business objectives
- Job priorities
- Likes
- Dislikes/problem areas
- Insights & product considerations



<http://doi.acm.org/10.1145/1240866.1240905>

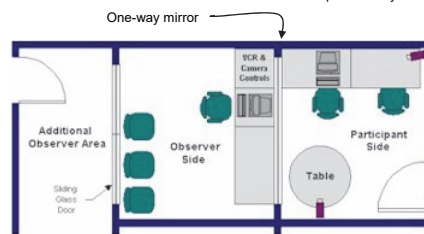
6

Usability Labs

- Separate areas allow participants to perform tasks independent of observers
- Log computer interactions
- Record video/audio of participants (face/hand/body), interaction devices, and displays



Experience Dynamics



Microsoft

7

Formal Experiments

- Experiment
 - Process carried out to resolve uncertainty
- Research question
 - *Hypothesis* stated in a measurable way
- Analysis
 - Set of statistical tests to be performed to analyze experiment
 - Attempt to show that the results of the experiment are not the result of chance

8

Experimental Design

- Independent variable
 - Something to be manipulated (e.g., size of a button, use of color, distance to screen). AKA *factor*
 - Value of an independent value is sometimes called the “treatment”
 - Different values are “levels of treatment”
- Dependent variable
 - Something presumed to depend on independent variable, to be measured (e.g., time to learn)
- Constant

9

Experimental Design

- Target group(s) of participants
 - E.g.,
 - Novice users of a program
 - Experienced users of a program
 - US children ages 8–12
 - ...
- Group may be independent variable

10

Experimental Design

- Want to determine if there is an *experimental effect*
 - Change in dependent variable *caused* by change in independent variable
- Must show that *extraneous factors* did not cause any observed change
- *Confounding variable (confound)*
 - Extraneous factor that affects a subset of the levels of treatment or affects them differently

11

Confounds

- Need to eliminate extraneous factors or assume they have an equal effect on all levels of treatment.
 - If not, experiment is *confounded*

12

Confounds

- Address a potential confound by measuring it and
 - Holding it constant across all groups
 - Reduces generality (e.g., results true only for novices)
 - Randomize assignment across all groups
 - Normalize assignment of participants with different values of variable to different groups
 - Introduces more variance: bad for statistics, may need more participants/trials
 - Manipulating it (i.e., by making it an independent variable) across different groups
 - Assign to different groups based on value
 - Introduces more variance: bad for statistics, may need more participants/trials

13

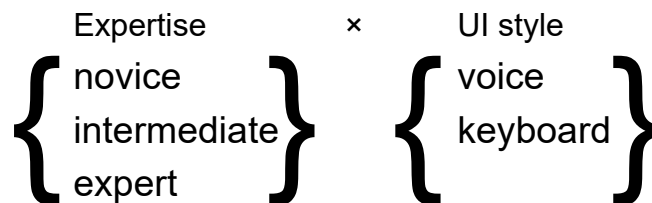
Types of Confounds

- History
 - Event occurred during study not associated with independent variable
- Maturation
 - Participant grows older, wiser, stronger
- Test–retest familiarity
 - Participant takes same test twice
- Instrumentation
 - Equipment changes during experiment
- Comparability of groups
 - Groups may be unintentionally different
- Amount of training
 - Too little or too much
- Experimenter
 - Different experimenters may interact differently with participants

14

Choosing Independent Variable(s)

- Need to control relevant factors
- Examples
 - 1 factor, 2 levels
 - UI style: Menu vs. command language
 - 1 factor with 3 levels, 1 factor with 2 levels



15

Choosing Dependent Variable(s)

- Time to complete task or learn system
- Accuracy
- Number and kind of mistakes
- Frequency of events
 - # of times user pushes “Help” or asks for assistance
 - # of times user looks upset
- Retention over time
- Preferences (subjective user satisfaction)
- ...

Must be measurable

16

Design Issues

- Within-subject: Each participant experiences all levels of treatment
 - Contamination of results through experience

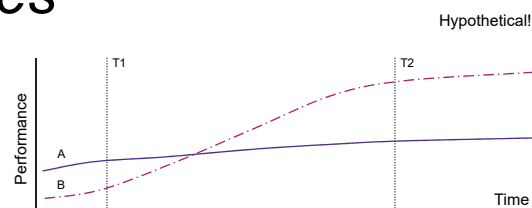
vs.

- Between-subject: Different participants receive different levels of treatment
 - Groups of participants may be unintentionally different

17

Design Issues

- When to evaluate performance
 - Base on real life task to be supported



18

Formal vs. Informal Experiments

- Formal experiments are hard to perform, control, analyze—expensive!
- Informal experiments are often easier, more useful—cheaper!

19

Informal Experiments: Rationale

- Results of a formal experiment might not be applicable to real world
 - Hard to control confounds (e.g., friends helping)
 - Environment is important
- Desire *ecological validity*
 - Degree to which a study matches the context of actual use
- Perform experiments *in vivo* in real environments
 - If you can't fight the real world, embrace it!
 - Comparisons between conditions often put more emphasis on analysis of behavioral observations, interviews, surveys

20