Needs and Usability Assessment

- Needs > requirements based on knowledge of users
- Usability and usefulness
  - Usability: ease of learning, operation
  - Usefulness:
    - serves an intended purpose
    - serves an intended audience/community
    - meets people's needs

How It Relates to IS204

- Design and evaluation based on understanding users and their work
- Social science research methods applied to design and evaluation

Doing Needs and Usability Assessment

- Why
  - **Improved design**
    - **Better systems, more satisfied users**
    - **Improves the work supported**
  - **Cost savings-- less redesign**
- **Why not**
  - **"We know what users need"**
  - **Time and resources**
  - **Lack of incentives – doesn't affect ME**

Stages (not linear; iterative)

- Identifying users
- Identifying/understanding user needs
- Design & prototyping
  - Lo-fi, high-fi
- Testing/assessing prototype
- Implementation
- Testing/assessing implemented system

Early Approaches to Usability Assessment

- Performed near end of development process; limited changes possible
- Based on testing, experiments
- Lab studies:
  - Controlled environment
  - Pre-defined tasks
  - Observation (e.g. 1-way mirror)
  - Measurement (time; number of errors; number of operations; and the like)
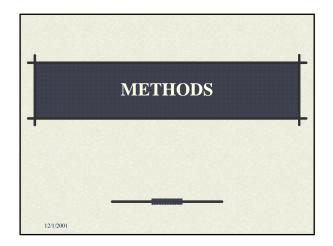
Trends in Usability Assessment

- Performed earlier in design process
- Facilitates a variety of cooperative relationships between users and designers
  - users not simply critiquing design but engaged in co-design
- Increased focus on users' work practices

Assessing Information-Intensive Systems

- **Content (Is it what people need and want? Can and will they use it?)**
  - Relevance
  - Trustability
  - Level (of info), presentation
- **Functionality (what does the system do?)**
- **Information architecture**
- **Interface**

METHODS

Methods of Data Collection & Analysis

- **Derived from social science research methods**
- **Designed to prevent errors common to inquiry**
  - Inaccurate observation
  - Overgeneralization
  - Selective perception
  - Biases introduced by interests
  - Premature closure of inquiry

Research Methods Principles

- **Validity – measure what they purport to measure**
  - relative to the goals and purpose of the evaluation
  - relative to the 'real' end-users, their tasks, uses, context
    - Ecological validity
    - ability to predict end-user problems
- **Reliability**
  - Repeated applications > similar results
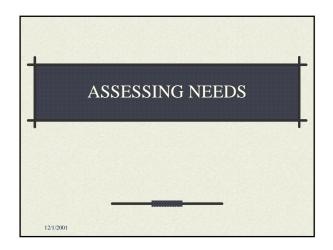

Classifying Data Collection Methods

- **According to how performed**
  - Automatic (e.g. logging activity)
  - Empirical (usability testing)
  - Formal (models and formulas)
  - Informal (heuristics; walk-thrus)
- **According to who does it**
  - Expert
  - Simulated user
  - Representative users
    - Few or many
- **Setting – laboratory or real world**

Choosing Methods

- **Goals of evaluation effort**
- **What is being evaluated**
- **For what purpose**
- **At what stage in development process**
- **Cost-benefit assessment of the method**

Combining Methods

- triangulation – same issues, different perspectives
- cost-benefit
- complementarity – new info
- practicality
- level of effort
- resources available
- what to do when different methods > different results?

ASSESSING NEEDS

Who are your intended users?

- **Purpose of system**
- **Identity of users**
  - **Captive audience, well-defined group, general…**
- **Relevant characteristics, behaviors, preferences**
  - **Experienced/inexperienced: with technology, with content area**
  - **W3C and disability, other relevant abilities**
  - **internationalization/globalization: language, icons that work x cultures**

Assessing Needs

- **Directly: asking them what they want/need**
  - **People don't always know how they would use innovations**
  - **Technology and work co-evolve**
- **Indirectly: understanding their intentions and activities**
  - **Task analysis**
  - **Scenarios**
- **Assessing existing resources**
  - **Competitive analysis**

Methods of getting information from users

- **Surveys (written questionnaires)**
- **Interviews**
- **Focus Groups**
- **Workshops**
- **Field studies**

Surveys (written questionnaires)

- Benefits: many responses, easy to analyze, low effort for respondents
- Problems:
  - limited to short answer/check off questions, inability to follow up
  - Finding respondents, getting responses, especially from non-captive audiences (e.g., non-users)

Survey Methods

- Sampling
  - Deciding on sample characteristics, size, sampling method
  - Avoiding bias, understanding limitations (esp'ly small and/or self-selected samples)
- Questionnaire design
  - Writing questions based on your goals
  - Wording questions such that users can answer, you can understand results
  - Length (short)

Survey Data Analysis

- Knowing what conclusions you can (and cannot) draw from data
- Correlating variables, e.g. user characteristics and behavior

Interviews (face-to-face, phone)

- Benefits
  - Complex questions and answers
  - Ability to follow up
- Difficulties
  - Labor intensive for both interviewer and interviewee
  - Possible interviewer effects

Interviewing Issues

- Medium: Face-to-face, phone, email…
- Interview schedule: what to ask and how
- Gaining cooperation
- Avoiding bias

Focus Groups

- Directed group discussion
- Benefits
  - Synergy within the group
  - Multiple participants simultaneously
  - Complex questions and discussion
- Difficulties
  - Group interaction conditions responses
  - Labor intensive
  - Analyzing results can be difficult

Focus group methods

- Choice of participants: which types, which individuals; how heterogeneous?
- Guiding the discussion
- Reporting the results
  - video
  - written summaries

Field studies/Ethnography

- Focus is on understanding work, practices, resources Studying people's activities in their natural setting
- Learning participants' understanding of their own activity
- Approaching activity in context of other activities, resources

Types of Ethnographic Studies

- Studies of work - where new tech might be intro'd but w/o explicit design agenda
- Studies of technology in use - situated use of specific technologies/classes of technology
- Participatory/work-oriented design - people who use/are affected involved

Ethnography / Field Observation Methods

- Visit work site
- Video work in action
- Photograph resources, layout
- Interviews, group discussions
- "Hiring in" – becoming a part of the work group

Ethnography – Limits

- Labor intensive for all parties
- Not easy to do well – requires training and practice
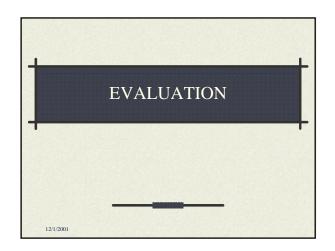- Time required – often does not match project schedule

Contextual Inquiry/Design

- Applied, structured ethnography
- Aimed at helping turn inquiry into design
- Complex, hard to learn, time-consuming

EVALUATION

EVALUATION

- Who does it
  - Experts
  - Users
- On what basis
  - Inspection
  - Empirical testing
    - Simulated/artificial use
    - Real use

Expert-based evaluation - Inspection

- Competitive analysis
- Heuristic evaluation
- Cognitive Walkthrough
- Formal Usability Inspection
- Feature Inspection
- Standards Inspection
- Guideline checklists – including accessibility for the disabled

Expert-based evaluation grounded in fieldwork

- Scenarios
- Task analysis
- [contextual inquiry]
- Benefits:
  - Investigators trained in methods and criteria
  - Grounded in user work
- Difficulties:
  - Investigators not the same as users
  - Time, effort to collect ethno data

Formal Testing

- Rooted in experiments
- Controlled tasks and conditions > comparable data x designs, users, conditions
- Where:
  - In lab
  - In user's workplace (remote testing)
- Measures:
  - System performance
  - User performance

Testing Issues

- Benefits: controls for sources of observed differences
- Difficulty: ecological validity of artificial tasks and conditions
  - Validity of the tasks used
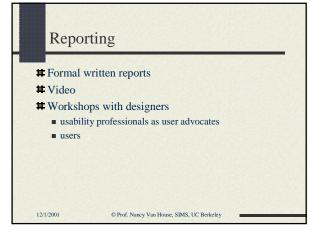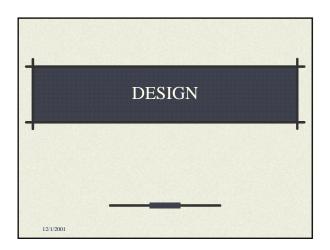 - People generally use variety of resources in their work

Testing – Thinking Aloud Protocol

- Real-time
  - direct response; but may interfere
- Retrospective with video
- Co-discovery method - 2 users

"Automatic" Evaluation

- Methods
  - Logs – e.g. server logs
  - Monitoring – e.g. cookies
- Advantages
  - 100% cooperation (unless user actively resists)
  - Unobtrusive
- Disadvantages
  - Need to understand what data you can and cannot collect, inferences can/cannot make

Reporting

- Formal written reports
- Video
- Workshops with designers
  - usability professionals as user advocates
  - users

DESIGN

Design Methods Rooted in Understand Users

- user-centered design
- contextual design
- participatory design
- prototyping, co-operative prototyping
- case-based prototyping – Xerox law firm ex

PRINCIPLES

- To be useful and used, a system has to be rooted in *users' actual work goals/intentions and practices,* coordinated with the resources they use
- Users are experts in what they do; designers may be experts in technology but not the users' work
- Technology design is work re-design
- Design continues in use – work adapts to tools, users adapt tools to the work – cannot fully anticipate