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—it 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 information, presentation
- Functionality (what does the system do?)
- Information architecture
- Interface

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

- 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

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

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 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