

# Usability of Interactive Systems

Shneiderman and Plaisant  
Designing the User Interface

# Human-Computer Interaction

- What is it?
- Is it important?
- Why or why not?

# User Interfaces

- Very important...after 9/11, members of Congress blamed the failure to detect the terrorists on inadequate user interfaces
- Effective user interfaces for professions mean that doctors can make more accurate diagnoses, pilots can fly airplanes more safely
- Children learn more effectively
- Users with disabilities can lead productive lives
- Frustrating: “Illegal Memory Exception: Severe Failure”  
how does that error make you feel?

# Goals

- ISO 9241 standard: Ergonomics of Human-System Interaction
  - Effectiveness
  - Efficiency
  - Satisfaction
- But how do we evaluate or measure these?

**ISO** (International Organization for Standardization) is an independent, non-governmental, international organization that develops **standards** to ensure the quality, safety, and efficiency of products, services, and systems.

# Practical Evaluation

- Time to learn: How long does it take for typical members of the user community to learn how to use the actions relevant to a set of tasks?
- Speed of performance: How long does it take to carry out the benchmark tasks?
- Rate of errors by users: How many and what kinds of errors do people make in carrying out the benchmark tasks?
- Retention over time: How well do users maintain their knowledge after an hour, a day, or a week? Related to time to learn and frequency of use.
- Subjective satisfaction: How much did users like using various aspects of the interface? Interviews, written surveys

# Tradeoffs

- Lengthy learning traded for task-performance shortcuts (abbreviations, macros, shortcuts)
- Low rate of errors traded for slower performance
- Perhaps, subjective satisfaction is the ultimate goal

# Process

- Requirements analysis
  1. Ascertain the users's needs
  2. Ensure proper reliability
  3. Promote appropriate standardization, integration, consistency, and portability
  4. Complete projects on schedule and within budget
- Prototype (low-fidelity, high-fidelity)
- User documentation, online help
- Implementation
- Acceptance testing

**Let's Evaluate**



# Life-Critical Systems

- air traffic control, nuclear reactors, power utilities, police/fire dispatch, military operations, medical instruments
- Time to learn:
- Speed of performance:
- Rate of errors by users:
- Retention:
- Subjective satisfaction:

# Industrial and Commercial Uses

- interfaces for banking, insurance, order entry, production management, airline and hotel reservations, billing, point-of-sales terminals
- Time to learn:
- Speed of performance:
- Rate of errors by users:
- Retention:
- Subjective satisfaction:

# Home and Entertainment Applications

- email clients, search engines, cellphones, digital cameras, music players, gaming systems, social media
- Time to learn:
- Speed of performance:
- Rate of errors by users:
- Retention:
- Subjective satisfaction:

# Universal Usability

- Physical Disabilities
- Cognitive Abilities
- Perceptual Abilities
- Personality Differences:
  - Extroversion vs. Introversion
  - Sensing vs. Intuition
  - Perceptive vs. Judging
  - Feeling vs. Thinking
- Cultural and International Diversity
- Age (older adults, children)

