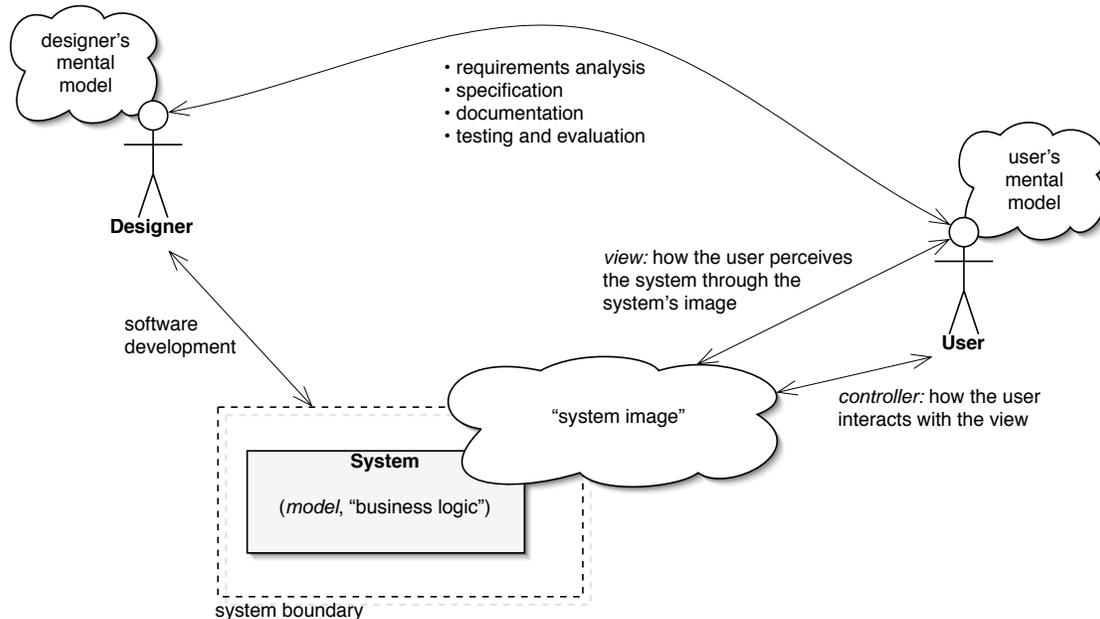


Interaction Design (IxD) Overview

- At the end of the day, it's all about the picture below

A system's designer/developer must effectively communicate his or her perception (mental model) of the system to the system's users through the "image" presented by that system

- Once you know how to bridge that gap, then you know interaction design



based on Don Norman's model, with some UML, software engineering, use case modeling, and MVC tweaks

How the Course is Structured

- **Theory:** Concepts, principles, history, methods, techniques, models
- (*undergrad*) **Practice:** Focus on specific technologies for testing and applying the theory
 - ◆ Java Swing — knowing the library, implementing specific functions
 - ◆ Others, depending on time: OpenGL/GLUT, XHTML/CSS/JavaScript, Cocoa — different technologies, similar application to HCI/IxD
- (*grad*) **Research:** Review, analysis, and discussion of the latest HCI/IxD literature — as with most research, may be years ahead, or eventual dead ends

How to Use the Materials

- *Designing the User Interface* by Shneiderman & Plaisant — This is the core textbook; the theory part of the course will follow the chapters in this book
- *The Design [Psychology] of Everyday Things* by Norman — Basis for many core design principles; not the only one, but widely acknowledged as seminal
- *Usability Engineering* by Nielsen — Basis for design methodologies; again, not the only one, but viewed as pioneering work in the area

The State of the Field

- IxD is a “young” field, when compared to other computer science topics  (so young, in fact, that even its acronym varies...we'll use “IxD” in this course)
- Naming: “user interface design,” “human-computer interaction (HCI),” “interaction architecture”
- Today, IxD is distinct from HCI, and is viewed as a synthesis of:
 - ◆ Traditional disciplines (e.g., computer science, psychology, sociology)
 - ◆ Interdisciplinary fields (e.g., HCI, cognitive psychology, human factors engineering, computer-supported cooperative work [CSCW])
 - ◆ Design practices (e.g., graphic and industrial design, Web authoring, studio arts)
- Characteristics of a “young” field
 - ◆ Few fully established universal concepts
 - ◆ “Guru-oriented” — field depends on key individuals that establish their own schools of thought; results in unstable vocabulary, jargon
 - ◆ Commercial products sometimes ahead of research
- Characteristics of a “mature” or “established” field
 - ◆ Established, universally accepted conceptual framework
 - ◆ Standardized vocabulary; individualized schools of thought shift to the cutting edge of the field
 - ◆ Research leads commerce

Usability Requirements

- What do we ask of a usable system?
- An early take: the *US Military Standard for Human Engineering Design Criteria* (paraphrased, my italics)
 1. Achieve required *performance*
 2. *Minimize* skill and personnel requirements, *training time*
 3. Achieve required *reliability* for personnel, equipment, software
 4. Foster design *standardization*

Requirements are Requirements are Requirements

- One view is that usability requirements are pretty much the same as software requirements in general:
 1. Ascertain users' needs
 2. Ensure proper reliability
 3. Promote appropriate *standardization, integration, consistency, and portability*
 4. Complete projects on schedule and within budget
- Nielsen's term is "system acceptability"

Usability Measures

- To imperatively determine that a requirement has been fulfilled, *metrics* are required — how do we quantify requirement goals (1) and (3)?
 - ◆ Requirement (2): unit tests, fault tolerance, program correctness
 - ◆ Requirement (4): deadlines met, products shipped, money remaining in the bank!
- International Standards Organization (ISO) standard 9241: *effectiveness, efficiency, satisfaction*

- Current consensus (terms in parentheses indicate Nielsen's vocabulary):
 1. Time to learn (*learnability*)
 2. Speed of performance (*efficiency*)
 3. Rate of errors by users (*errors*)
 4. Retention over time (*memorability*)
 5. Subjective satisfaction (*satisfaction*)
- Nielsen lists memorability as the metric #3, errors as metric #4

Usability Motivations: Not Just a Pretty Face

- *Life-critical systems*: need we say more?
- *Industry and commerce*: usability is frequently the “oil” in a well-oiled business
- *Office, home, entertainment*: Web browsers, e-mail, cell phones, and digital music players as usability successes — or are they?
- *Exploration, creation, collaboration*: traditionally very “human” activities; so far, technology gets in the way more often than not
- *Technology and society*: hanging chads, anyone?

Universal Usability: IxD as Democratizer

- *Workplace/environment diversity*: Anthropometry, sometimes referred to as “human factors”
- *Human diversity*: Cognitive and perceptual abilities; personality; cultural and international differences; disabilities and handicaps; age groups (older adults, children)
- *Technological diversity*: Today, this deals with bandwidth (network, display) and internationalization, or “i18n” for short (languages, formatting conventions)

IxD as a Profession, Science, and Field of Study

- “Addressing the needs of ***all*** users”
- Not a “religion” — early perception of HCI as nitpickers and aesthetes, even elitist; in fact it is a full-fledged subdiscipline of computer science, with IxD now serving as an interdisciplinary umbrella that includes HCI
 1. *Growth/maturity as a field of study*: Seek and establish universal concepts, theory, techniques
 2. *Apply the theory*: Develop tools to make “good IxD” easier to do — analogous to increasingly more sophisticated programming languages/compilers
 3. *Raise public consciousness*: Unique to IxD, because it involves exactly the system/user border

Good IxD Leads to Tangible, Significant Financial Impact

- *Improved software development process*: Time to deployment/market, cost savings, overall system performance
- *Lower overhead*: Fewer systems/designs (ideally just one!) for a broader user base
- *Enhanced competitiveness*: Sony Walkman, Nokia cell phones, Apple iPod
- *Expansion of markets*: Call centers, markets with different native languages