CS5714 Usability Engineering

An Iterative, Evaluation-Centered Life Cycle For Interaction Development

Copyright © 2004 H. Rex Hartson and Deborah Hix

Topics

- Connections of user interaction development to software engineering
- Development activities in the usability engineering life cycle
- Usability management
- User interface development team

Typical Software Engineering LC

- The Waterfall Model
The Process of User Interaction Development

- Connections of user interaction development to software engineering
- All these figures depict communication paths, not temporal ordering of activities
- Distinction between design and implementation
- Start with basic software engineering concept:

![Diagram showing software design, implementation, constraints, and problems]

The Process of User Interaction Development

- Adding systems analysis, testing, and problem (application) domain

![Diagram showing software design, implementation, constraints, and problems]

The Process of User Interaction Development

- Analogous activities for user interface development

![Diagram showing interface design, usability, software design, implementation, constraints, and problems]
The Process of User Interaction Development

- Connecting the processes together and adding rapid prototyping

The Process of User Interaction Development

- The rest of this course is about just this part:
The Wheel – Usability Engineering Life Cycle Process Model

- Iterative, evaluation-centered process model for interaction development
  - Why iterative? Because it's not possible to get it right the first time (in any complex design domain)
  - Need:
    
    **Ready, Fire, Aim!**

The Wheel – Usability Engineering Life Cycle Process Model

- New life cycle concept comes from:
  - The waterfall model – movement toward completion
  - Star (Hartson & Hix, 1989) – evaluation centered
  - LUCID (Cognetics, Inc.) – development activities
  - Boehm’s Spiral Model – iteration
  - New work by Helms & Hartson (2001) – put it together

- Star (Hartson & Hix, 1989)
  - Evaluation centered
The Wheel – Usability Engineering
Life Cycle Process Model

- Boehm’s spiral model-evolution through iteration

The Wheel – Usability Engineering
Life Cycle Process Model

- Boehm’s spiral model abstracted

The Wheel – Usability Engineering
Life Cycle Process Model

- Spiral model adapted

Devt methodology
The Wheel – Usability Engineering Life Cycle Process Model

- Spiral unwound

The Wheel – Usability Engineering Life Cycle Process Model

- Spiral unwound and stretched out

The Wheel – Usability Engineering Life Cycle Process Model

- Waterfall with whirlpools
**The Wheel – Usability Engineering Life Cycle Process Model**

- Life cycle=iterative configuration of cycles (each associated with a stage/form of the product)
  - Example: System analysis model, scenarios and screen designs, lo-fi prototype, hi-fi prototype, software production & integration
- Cycle is a sequence of four development activity types:
  - Analyze
  - Design
  - Build
  - Evaluate
The Wheel – Usability Engineering
Life Cycle Process Model

- Zoom in on
details of a
generic cycle
activity

Choose a technique for each activity type in each cycle

Show how each activity type is assigned a
technique, the role of the person doing the activity,
support tools, and documentation

- Example: In scenario and screen design cycles, design walk-
through is used as evaluation technique

Basic Principles
- Process is product oriented
- Products evolve through cycles (cycles named for
product forms)
The Wheel – Usability Engineering Life Cycle Process Model

- Each cycle is iterative
- Each cycle contains same activity types
- Each cycle is evaluation-centered
- Work products (documentation) evolve over cycles
- Process can be viewed at different levels
  - Process, cycle, activity, documentation

Any part of the process is an instance of what is possible
- Pick and choose cycles, activities, iterations to meet schedule, budget, management style
- Integrate with software engineering development process
- Validated by Helms & Hartson (2001) in e-commerce start-up company

Any part of process is instance of what is possible
- Developers include their favorite UE methods and techniques
- Omit activities, cycles, iterations indicated by management, budget, schedule, project scope, team composition
- Can be different every time
Usability Management

- The control mechanism for the iteration
- Control involves:
  - Establishing usability specifications
  - Evaluating against usability specifications
  - Performing impact and cost/benefit analyses

- Deciding on changes to make to interaction design
- Deciding when to stop iterating
- Same process can be applied to develop user documentation or training course

Meet the User Interface Development Team

- Roles on user interface development team

  Note: Different roles, but not necessarily different people
  - User interaction designer (or usability engineer or usability specialist)
  - Evaluator (or facilitator)
  - User (and/or user representative)
  - Software engineer and/or programmer
  - Technical writer
  - Graphic designer
  - Application domain expert (also called subject matter expert)