

Usability Engineering as a Critical Process in Designing for Accessibility

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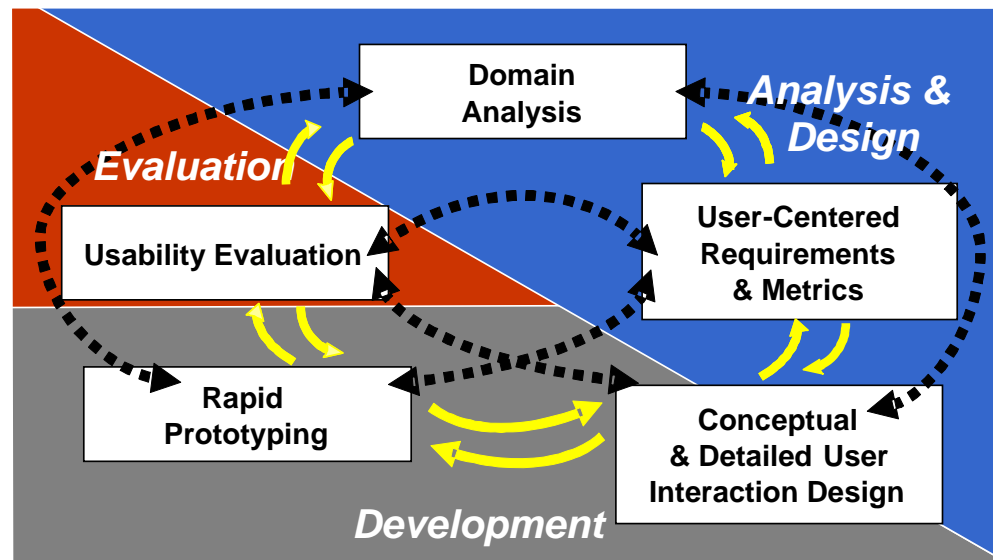
Empowering
Humans
To Use
Computers

Humans and Computers, Inc.

Accessibility Panel March 16, 2006

What Is Usability Engineering?

A successful, iterative, cost-effective, user-centered development process that ensures a high level of **effectiveness, efficiency, user satisfaction and safety**



Usability Engineering of Accessibility

- *Why:* At least 750 million people have disabilities; more than 77 million in US
- *Roadblock:* Usability engineering often relegated to lowest priority in software development
- *Newsflash:* Usability engineering and software engineering processes completely compatible
- *Even better:* Engineering for usability easily incorporated into traditional usability engineering process

Education:

Key to Integrating Usability Engineering & Software Engineering

- Usability engineers: Agents of change
- Raise awareness
- Demonstrate that usability engineering of accessibility is integral part of software development processes already in place
- Empower customers and developers with no disabilities to understand users with special needs

Usability Engineering Activities

- Usability engineering incorporates perspectives of users with special needs to achieve accessibility
- For each activity:
 - Explain it
 - Show how to address accessibility
 - Give example

Engineering for accessibility is not optional

Domain Analysis

- Working with subject matter experts, capture usage setting, user characteristics, user tasks, and associated needs
 - Who are the users?
 - What tasks will they perform?
- *Accessibility*: Users with special needs are just another user class type
- *Example*: Users with hand tremors; need buttons large enough to easily click on

User-Centered Requirements & Usability Metrics

- Set **quantifiable goals and benchmarks / baselines** for user task performance
- ***Accessibility***: Target levels for users with special needs determined by what is acceptable to representative users with specific disability

User-Centered Requirements & Usability Metrics Example

User class	Usability attribute	Measuring instrument	Value to measure	Baseline level	Target level
Users with quadriplegic disabilities – hand dexterity disability	Longitudinal performance (steady-state, not initial performance)	User task (e.g., send an email) using a mouth stick	Time to perform user task	30 secs.	20 secs.

Conceptual & Detailed User Interaction Design

- **Instantiate user-based requirements**
 - Start as conceptual screen sketches
 - Evolve into detailed layout, content, icons, controls, etc...
- ***Accessibility***: What's good for user with special needs is usually good (or better) for every user
- ***Example***: Redundant presentation, one auditory and one visual

Rapid Prototyping

- **Instantiate emerging design** for evaluation
- **Accessibility**: Accessibility goals complement software engineering's functional goals
- **Example**: For e-commerce site with graphics, prototype must
 - Have alt tags for users with visual disabilities
 - Interface with assistive devices

Usability Evaluation



From Kessler Rehabilitation Center, NJ

- With representative users, **determine usability problems** (including user performance difficulties)
 - Users perform tasks
 - Evaluators collect / analyze qualitative & quantitative data

- **Accessibility: Accommodate users in plan:** Chair accessibility; special devices; extra time
- **Example:** Latency periods, indicating number and length of substantive breaks in user activity

Conclusions

- Usability engineering: process that ensures bringing the benefits of computing to users with special needs
- Usability engineering activities **complement** software engineering activities, adding benefits of a **user-centered approach** that **ensures accessibility**
- Achieving accessibility is about being concerned, compassionate computer scientists