Universal-Design Requirements for Cross-Platform Electronic Services

Universal Design 2012, Lillestrøm, Norway
2012-06-11
Outline

- Constraints
  - Service provider, user, context, market, channel, device, technical
- Recommendations
- Dos vs. don'ts
Service provider constraints

- Same “corporate” identity on all platforms
- Positive customer experience across channels
- Honoring legal frameworks
- Good legibility
- Consistent look & feel
- …
User constraints

- Ability diversity
  - Cognition, motor, sensor
  - Age, illness, severity
  - Lingual, memory, learning, problem solving, orientation, focus, attention span

- Background diversity
  - Language
  - Culture
  - Skills/literacy
User constraints, cont'd

- Preference diversity
  - Design (e.g., font, font size, color scheme, user style)
  - Content (e.g., image, audio, ads)
  - Technology (e.g., JavaScript, plugins)
  - Interaction (e.g., scrolling)

- Expectation diversity
  - Useful, efficient, ubiquitous, mature, usable, accessible, ...
Context constraints

- Context diversity
  - Short-time impairments (e.g., sun on screen, car driving)
  - Distance from screen
  - Overhearing surrounding
  - ...
- Task diversity (e.g., ATM; withdrawing cash vs. printout of available amount)
Market constraints

- Device diversity
  - Desktop & tablet PC, smartphone, phone, media reader/player, TV, middleware, ...
Channel constraints

- Channel diversity
  - Offline vs. online
  - 2G (GSM/GPRS), 3G, 4G, WLAN, WiMax, Bluetooth, ...
Device constraints

- Input hardware diversity
  - Mouse, keyboard, T9 keypad, game controller, touch, ...

- Output hardware diversity
  - Screen dimensions, screen colors, audio, tactile, ...
Device constraints, cont'd

- Software, assistive technology, operating system, user agent, and service diversity
  - Varying equipment, installation, configuration, versions
  - Different fonts, screen colors, screen resolutions, screen dimensions, ..
Technical constraints

• Lack/confusion of standards
  • e.g., definition of “pixel”
• Standards limitations
  • E.g., WCAG does not cover all accessibility issues
• OS limitations
  • iOS reportedly more accessible than Android
• Software flaws
• SW and HW incompatibilities/conflicts
To submit an abstract please follow these instructions:

Using Internet Explorer, Firefox or Safari browsers is recommended. (do not use Google Chrome)

1. Enter personal information
Technical constraints, cont'd

• Different technology strategies
  • Native mobile apps
    - Better control of system resources, Apple/Google/Microsoft/... accessibility guidelines
  • Web apps
    - HW limitations, W3C recommendations
  • Hybrid apps
    - HW limitations, W3C recommendations
Technical constraints, cont'd

- Screen space and colors not costly
- User interaction cumbersome and error-prone
Recommendations from related research

- Open and universally designed solutions with accessible, flexible/adaptive, and personalized multimodal user interfaces
- Minimally exposed profiling with reasonable defaults and opt-ins, combined with privacy-enhancing technology
- (Repeated) education on demand
The don'ts

- No design for all
- No unified user experience
- No device specificity
- No pixel identical rendering
- No fixed grids
- No dedicated stylesheets (e.g., mobile)
The dos, overview

- User first!
- Individual UX
- Content over navigation
- Natural user interfaces
- Intuitive interactivity
- Bottom-up approach (mobile first)
- Web technology for efficient cross-platform accessibility
- Fluid/liquid grid (responsive design)
- Progressive enhancement through feature detection
- Similarity of mobile and accessibility requirements
- WCAG, ARIA, additional requirements (e.g., font family, screen dimensions)
- W3C validators, additional checkers (e.g., Webaim)
- Test with zooming
- Testing stress points
- Testing on as many devices and user agents as possible
- Testing only latest versions
- Simple smartphones rather than phones
- Testing with Rent a Device or emulators
- Relative units WRT container
- Content dimensions relative to text size
- Floating content
  - Content relationships
- Min-width, max-width, min-height, max-height
- Maximum line length
- HTML5, CSS3
- Scripting (JavaScript) for additional logic
- Cross-platform JavaScript libraries
  - hyphentator, css3-mediaqueries, ...
- Style sheets for specification of style
- Media queries
  - (Max-)device-width, device-pixel-ratio, orientation, ...
The dos

• User first!
• Individual UX
• Content over navigation
• Natural user interfaces
• Intuitive interactivity
The dos, cont'd

- Bottom-up approach (mobile first)
- Web technology for efficient cross-platform accessibility
- Fluid/liquid grid (responsive design)
- Progressive enhancement through feature detection
The dos, cont'd

- Similarity of mobile and accessibility requirements (MWBP)
- WCAG, ARIA, additional requirements (e.g., font family, screen dimensions)
- W3C validators, additional checkers (e.g., Webaim)
The dos, cont'd

- Test with zooming
- Testing stress points
- Testing on as many devices and user agents as possible
- Testing only latest versions
- Simple smartphones rather than phones
- Testing with Rent a Device or emulators
• Relative units WRT container
• Content dimensions relative to text size
• Floating content
  • Content relationships
• Min-width, max-width, min-height, max-height
• Maximum line length
The dos, cont'd

- HTML5, CSS3
- Scripting (JavaScript) for additional logic
- Cross-platform JavaScript libraries
  - hyphenator, css3-mediaqueries, ...
- Style sheets for specification of style
- Media queries
  - (Max-)device-width, device-pixel-ratio, orientation, ...
Key take-aways

1. User first!

2. Fluid grids

3. Progressive enhancement & feature detection = true
Contact

Till Halbach Røssvoll
Norwegian Computing Center
Mail: till.halbach.rossvoll@nr.no
Twitter: tillhalbachchr
Web: nr.no