Cost Savings of Early Accessibility

Maureen (Moe) Kraft
Accessibility Consultant Test Lead
Human Ability and Accessibility Center
IBM Research

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Introduction

• Growing Markets. Be Inclusive.

• Why Design for Accessibility?
  – Why it is important?
  – Why bring accessibility early into the development process?

• What are the cost savings of testing for accessibility?

• What are the costs to deferring accessibility?
An example of poor design

Photo courtesy of Jared Smith @ webaim.org.
Cost of bad design – Let’s suppose.

A) Two traffic pylons + a flexible lever + 2nd button + labor = not too expensive. Let's say ~$200 – 400.

B) Moving the entrance column. Moving the door. This seems to be much more expensive. Maybe several thousand $$ dollars.

Which solution is more expensive?
- Loss of customers. Lack of confidence in customer, employees, business partners.
- Esthetic of entrance.
- Potential failure. What if this falls over?

What if design considered the access of the entrance up front?
- Locate the door in a different place.
- Move access button to other side.
- Have a sensor on top of door.
Social Software: $770 million
Mobile Apps: $14 billion
Cloud: $60 billion
Mobile Devices: $277 billion
The Numbers

✓ There are **650 million persons with disabilities world wide**.

✓ Americans with disabilities have an estimated **$175 billion dollars** in disposable income.

✓ **420 Million** people world wide are **over** the age of **65**. By 2030, 19% of the US population will be over the age of 65.

✓ **47 million** Americans speak a **language** other than English at home.

✓ **Baby boomers**, age 45-64 have an estimated **$3 trillion** in spending power and make up ¼ of the North American market.

✓ Everyone experiences situational disabilities at some point.
Growth Markets?

- Cloud: $60 billion
- Persons with Disabilities: $175 billion
- Mobile Devices: $277 billion
- Aging baby boomers: $3 trillion
Situational Disabilities / Challenging Circumstances

- Outside light
- Public place
- One hand
- Aging eyes
- Ambient noise
- Bumpy road
Be Inclusive

• Be **Accessible** to the growing **aging population, persons with disabilities, foreign language speakers** and all who experience situational challenges.

• Our products and applications need to be **Inclusive to All.** It’s not just the **RIGHT** thing to do. It’s a **BUSINESS OPPORTUNITY** in growing markets.

• Including everyone allows for all ideas to be heard which leads to innovation and better products.

• To find out what IBM is doing to support **Inclusive Social Business to Drive Innovation,** join Frances West, Director HA&AC, IBM Research tomorrow, 3/1 at 1:50 p.m., **Elizabeth F.**
Why Design for Accessibility?

✓ Deferring Accessible design costs in retrofitting and delayed sales to customers and poor design.

✓ Designing for Accessibility leads to good design that’s usable by all.
“Make it easier for me to get to the doctor, to buy my food, to understand financial reform and healthcare. If marketers are looking for a key word – it’s going to be simplicity.”

Carol Orsborn, co-author,

_Vibrant Nation: What Boomer Women 50+ Know, Think, Do and Buy_
Case Study I – A Calendar Scheduling application

Design review example

1. Designer completed final draft of design specifications for a new scheduling application and sent to development for review.

2. Designer requested an accessibility review of the design with the Accessibility Center.

3. Accessibility Center identified issues: use of color, lack of keyboard accessibility, lack of accessible information

4. That’s nice but....Development has their sizings due and have no time to include accessibility. Will address next release!
Case Study I (continued)

Why Design for Accessibility?

- **Waiting** until next release means **loss of sales** and exposure to litigation.

- Request for Voluntary Product Accessibility Templates (**VPAT**) has risen **5%**.

- No longer just government agencies asking for product accessibility information.

- **Sale** of 5000 IBM Cognos® licenses to a large European telecom **contingent** upon **accessibility compliance** of product.

- Deferring Accessibility makes it difficult to retrofit design. May make product compliant but is it usable?
Case Study II

Compliant != Usable

“Where there are usability problems on a page, they multiply the accessibility challenges.”

“When accessibility is put off to the testing stage, we are faced with only one real option: to mitigate things with some added structure that does not affect the visual presentation.”

“...doing an accessibility analysis can improve wireframes. When I perform such an analysis, the accessibility 'viewpoint' often surfaces poor design choices”

-Mike Gower, IBM AARB UI Design Group & IT Specialist
Case Study II (continued)

**Issues:**
- Links of the same name.
- Unlabeled fields.
- Reaching time.
- Is this usable?

**Why not:**
- Pull down list
- A simple edit box
- Make it simple & usable.
Why not use a simple pull down list?
Is this accessible?
Is this usable?
What can a designer do?

Design for Accessibility – Consistent Structure

• Offer a consistent structure which allows for all users to find content on the page and the user can more easily predict how to navigate in similar applications or web pages.

• Design versus Implementation?
WAI-ARIA Landmarks

- Designer defines regions on the page.
- WAI-ARIA Landmarks allow developer to define the regions on the page using HTML markup.

```html
<div id="ibm-top" class="ibm-home-page">
    <div id="ibm-masthead" role="banner" style="left: 0px;">
    </div>
</div>
<div id="ibm-access-cntr" role="main">
```
WAI-ARIA Landmarks (continued)

- Landmarks convey the structure of the page to JAWS and other assistive technologies. ATs provide a list of the landmarks to the user to give more insight into the functional structure of the content.
- Landmarks also serve as a navigation mechanism to quickly move keyboard focus and the screen reader reading location to a specific landmark region.
- Landmarks encourage designers and developers to consider navigation for assistive technology users.
www.ibm.com uses WAI™ ARIA landmarks
Using ARIA to Describe Widget Behavior

A simple example – Action Links

• “Cancel” is an action link.
  – Action links are sometimes used in place of buttons.
  – Smaller footprint and real estate.
  – This is coded as a Link but behaves like a Button.

• THE RULE:
  – If it behaves like “X”, it should be coded as “X”.
  – Links take you to elsewhere.
  – Buttons perform an action within the application itself.

• Using ARIA to give the link a role="button"
  • This allows ATs to identify the link as a button to the user.
  • ARIA describes the widget's behavior not its visual appearance.
Describing Custom Widget Behavior

IBM Connections

• To properly describe the widget behavior in this example, the following ARIA substitutions have been made:
  – The tabs have been assigned a role="button" while they perform an action that updates the page when pressed.
  – The tab list has been assigned a role="toolbar" and a landmark role="navigation". A tab list contains tabs while a toolbar contains buttons and supports left/right arrow navigation of the buttons it contains. This widget behaves like a navigation toolbar.
  – The “tab panel” is actually a set of landmark regions some of which get updated when a button is pressed others remain static.
Design Tools that incorporate Accessibility

Maqetta

- Allows Designer to layout page and widgets incorporating HTML, Dojo and ARIA.
- Designer can hand off accessible wireframe to developer with generated HTML.
In summary - Why include accessibility in the design phase?

➤ **Cost**
- Avoid having to retrofit design/implementation for Accessibility.
- Review wire frame for Accessibility. Get the bugs out early.

➤ **Usability**
- Not only make an application accessible but make it usable by persons with disabilities and by the largest possible audience. Provide integrity and consistency in the design.
- Define structure, navigation and relationship of elements to allow for easier markup for Accessibility by developers.
- “Usable accessibility, which typically requires designed accessibility, is necessary to create a world with equal employment opportunity for people with disabilities.”
  - Matt King, IBM Chief IT Accessibility Strategist

➤ **Wins in the marketplace**
- When Accessibility is left to implementation phase of the process it usually falls off the plate until next release.
- To sell to US and other governments as well as many other customers, Accessibility is becoming a contingency upon a sale.
Why test early for Accessibility?

Cost of bugs per release across development life cycle:

- Average cost to find a bug on developer's desktop: $25
- Average cost to find a bug during testing: $500
- Average cost to find a bug by the customer: $15,000
- Top quartile of developers still inject 62 bugs per 1K LOC or 62,000 per 1M LOC
- Average defect rate post release 6-7 bugs per 1000 LOC
- 6000 defects post release, cost of $28 Million per MLOC/release
- **Static Analysis** during unit test finds an average of 20% of bugs injected by developer, saving **$6.2 Million** during Test.
- Even a reduction of 1 defect per KLOC at $15,000 could save $15 Million per 1 MLOC over 1 release!

*ROI Models for Static Analysis*, Greg Spehar Full Knowledge LLC – 2005

Software Assessments, Benchmarks, and Best Practices, 1996, Casper Jones

1996, Capers Jones
Case Study III – Tivoli TPAE

• **Typical** Accessibility Verification Test Cycle for product release of same size.
  – 4 – 6 Months
  – 200 defects

• **Tivoli** TPAE AVT
  – 4 Weeks
  – 18 Defects
  – Ran Static Analysis of Web application during unit test.

  ➢ End Result, **16 products** that run on top of Tivoli Process Automation Engine are now **100% Accessible**!

• “It’s great to know that this will help other teams realize the importance of testing for Accessibility as early as unit test.” – Eduardo Macias Rodriguez
Rational® Policy Tester® / Dynamic Assessment Plugin

• Scan of Web applications using a set of accessibility compliance rules.

• Immediate feedback of issues.

• Web interface automated file scan for static HTML.

• Dynamic Assessment plugin for dynamic content like AJAX & Dojo plugs in to Firebug.

• Robust rules that incorporate ARIA checks, role=presentation for Table layouts, filters hidden content.
Rational Policy Tester / Dynamic Assessment Plugin

- Interact and navigate through each page section to scan the page.
- In the right panel of the Dynamic Assessment plug-in, under the **Policy** tab, you will see all the accessibility errors found.
- Select any error to see the corresponding source code displayed in the left panel.
Rational Policy Tester / Dynamic Assessment Plugin

To find out more about Rational Policy Tester and its Dynamic Assessment Plugin come join us:

- **Web-024: Tools for Visualizing Web Accessibility**
  - **Date & Time:** Wednesday, February 29, 2012 - 9:20 AM PST
  - *Hironobu Takagi, IBM Research - Tokyo*

- **Web-032: Tools for Complete, Efficient WCAG Governance**
  - **Date & Time:** Thursday, March 1, 2012 - 9:20 AM PST
  - *Matthew King, Office of the CIO, I/T Chief Accessibility Strategist, IBM*

- **Location**
  - Elizabeth F, 2nd Floor
Innovation

- Designing for Accessibility leads to solutions that are usable by largest audience.
- Developing for Accessibility leads to Innovation.
- Modern hearing aids brought about the invention of the transistor.

- Today's innovation:
  - Speech recognition.
  - Captions.
  - Audio description of videos.

- Supporting
  - Temporary disabilities.
  - Foreign language speakers.
  - Make it simple for all.
In summary - Why include accessibility early in the process phase?

➔ Cost
   – Avoid having to retrofit design/implementation for Accessibility.
   – Unit test for Accessibility and Get the “bugs” out early.
   – Reduce exposure to litigation and law suits.

➔ Usable, Inclusive & Innovative
   – Not only make an application accessible but make it usable by persons with disabilities and by the largest possible audience.
   – Allow all ideas to be heard. Provide for Innovation.

➔ Wins in the marketplace
   – When Accessibility is left to implementation phase of the process it usually falls off the plate until next release.
   – To sell to US and other governments as well as many other customers, Accessibility is becoming a contingency upon a sale.
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