

# Bells, Whistles, and Alarms: HCI Lessons Using AJAX for a Page-turning Web Application

Juliet L. Hardesty, Indiana University

# Outline

- CHI and the case study
- METS Navigator background
- Usability issues
- Accessibility issues
- What to do?
- CHI Madness

# CHI and the Case Study

- CHI (Computer Human Interaction) part of ACM (Association of Computing Machinery)
- “premier international conference of human-computer interaction” - <http://chi2011.org/>

VANCOUVER, BC  
MAY 7-12, 2011



### WELCOME TO CHI 2011

The ACM CHI Conference on Human Factors in Computing Systems is the premier international conference of human-computer interaction. CHI 2011 focuses on leveraging our diversity and connecting people, cultures, technologies, experiences, and ideas.

CHI 2011 will be held in gorgeous, energetic, sophisticated Vancouver BC, a city renowned for its innovation in sustainability, accessibility, and inclusivity. *The New York Times* calls it, "a liquid city, a tomorrow city, equal parts India, China, England, France and the Pacific Northwest." Join us at CHI 2011 in Vancouver and prepare yourself for a great time Connecting...

**General Conference Chair:**  
Desney Tan, *Microsoft Research*

**Technical Program Chairs:**  
Bo Begole, *PARC*  
Wendy Kellogg, *IBM Research*

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### ANNOUNCEMENTS

**Plenary Speakers Announced!**  
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[Shorter Talks so you see more of CHI](#)

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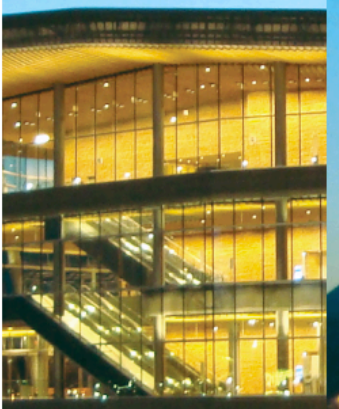
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### COMMUNITIES

- DESIGN
- ENGINEERING
- MANAGEMENT
- USER EXPERIENCE

### FEATURED COMMUNITIES

- HCI FOR KIDS
- ENTERTAINMENT
- HEALTH
- SUSTAINABILITY



# CHI and the Case Study

- Case study offered opportunity to share experience
- AJAX and usability/accessibility problems
- aka, let me tell you about my FAIL
- CHI said OK, I said holy cow!
- <20 minutes to talk at CHI

# A Bit About METS Navigator

- Page-turning web application
- Uses METS to navigate structure of multi-part digital objects
- Started in 2004
- Each click refreshed browser page
- Separate web app used by many collections but only available via DLP

Indiana University Digital Library

http://webapp1.dlib.indiana.edu/metsnav/general/navigate.do?oid=VAA2642-00003

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Indiana University Digital Library

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# Indiana University Digital Library

Help

President Herman B Wells speeches, General Suggestions of Subjects which might be included in Alumni Talks, undated

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< << 1 of 5 >> >| screen go

General Suggestions of Subjects Which  
Might Be Included in Alumni Talks

1. Introduction -- happy to be with you.
2. Feel that I am here to give you a report on your state university.
  - (a) The University's customers are, after all, the entire population of the state, with particular reference to its present students, and its alumni, and it is supported by the taxpayers. There are among you representatives of all three of these groups. Therefore you should expect a report.
3. However, I am really here to obtain ideas from you, to take back to the University.

Here is where the alumni come in with their great contribution. Notwithstanding Robert Maynard Hutchins and others who by their words try to put the alumni in the "doghouse" (Feb. Indiana Alumni Magazine, last page editorial), I definitely feel that they are a vital and important force and should be made even more so.

- (a) Inviting alumni to write in, etc.

(Page 77, Silver Anniversary number of the American Alumni Council publication)

Done

# METS Navigator and AJAX

- Serve content anyone can use
- Within document and across collection browsing
- Search text of digitized items
- New version uses AJAX library
  - User Interface (UI) components



# A Bit About AJAX

- Asynchronous JavaScript and XML (AJAX)
- Allows calls to web server to reload portions of web page without requiring entire page refresh
- Lots of AJAX libraries/toolkits out there
  - User Interface (UI) components found here

# METS Navigator – AJAX version

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    - February 1934**
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    - April 1934
    - May 1934
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    - July 1934
    - September 1934
    - November 1934
    - December 1934
  - 1935
  - 1936
  - 1937
  - 1938
  - 1939
  - 1940
  - 1941
  - 1942
  - 1943
  - 1944
  - 1945
  - 1946
  - 1948
  - 1949
  - 1950
  - 1951
  - 1952
  - 1953
  - 1957
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Search Collection

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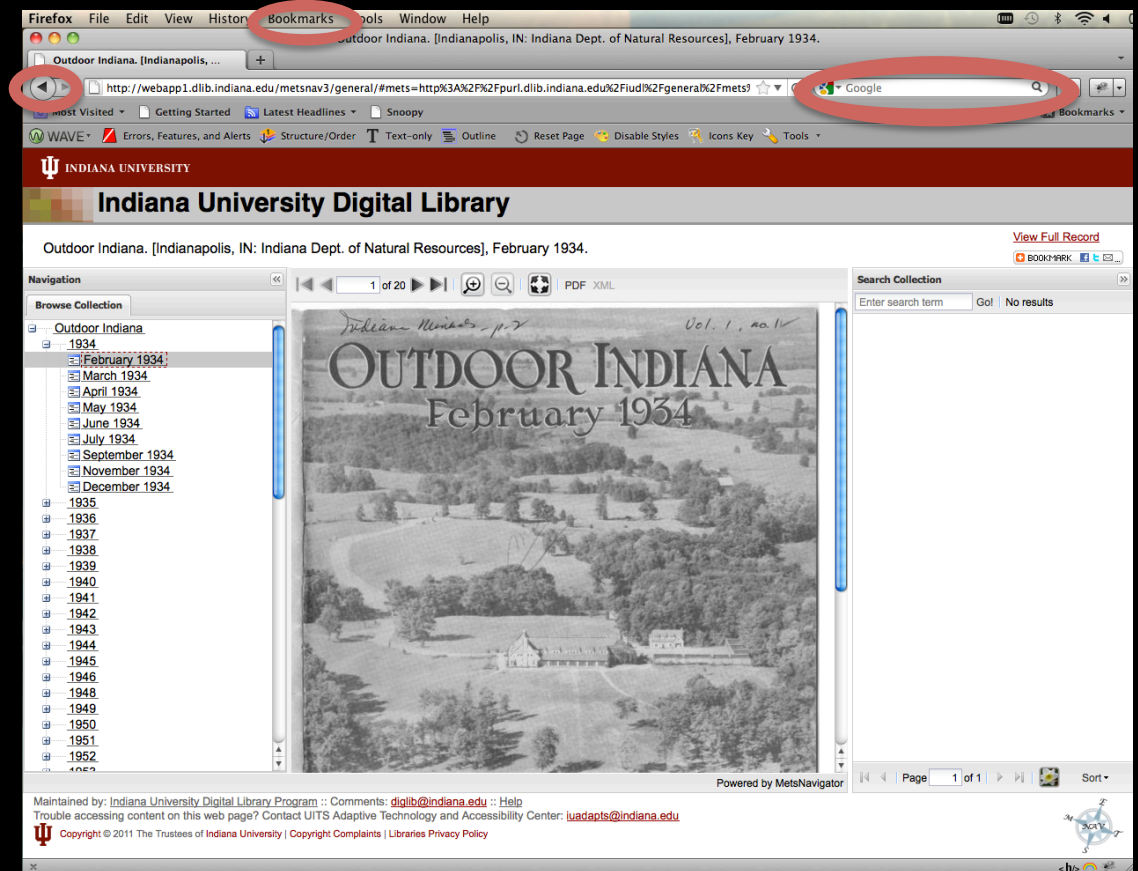
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# AJAX: Known Issues

- Bookmarks
- Back button
- Search engines



# AJAX: Surprise Issues

- Customizing HTML/CSS
- Accessibility
- Mobile Devices

# Customizing HTML/CSS

- Can't "view source"
- Tools like Firebug will show dynamic HTML, but can't validate
- Dynamic HTML produced via "minified" JavaScript files (not meant for editing)
- Dynamic HTML complicated by UI combos from AJAX library (not semantic)
- Inline styles - Incomplete separation of content from style

Outdoor Indiana. [Indianapolis, ...] +

http://webapp1.dlib.indiana.edu/metsnav3/general/#mets=http%3A%2F%2Fpurl.dlib.indiana.edu%2Fui%2Fgeneral%2Fmets? ☆ Google

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  - 1934
    - February 1934
    - March 1934
    - April 1934
    - May 1934
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Console HTML CSS Script DOM Net

```
body#ext...xt-gecko < html.ext-strict
  <div id="ext-gen1" class="x-panel-bwrap">
    <div id="ext-gen18" class="x-panel-body x-panel-body-noheader" style="width: 937px; height: 263px;">
      <div id="defaultMetsNav" class="x-panel" style="width: 937px;">
        <div id="ext-gen77" class="x-panel-bwrap">
          <div id="ext-gen78" class="x-panel-body x-panel-body-noheader x-border-layout-ct" style="width: 937px; height: 240px;">
            <div id="defaultMetsNav:pageTurner" class="x-panel x-panel-noborder x-border-panel" style="left: 305px; top: 0px; width: 632px;">
              <div id="ext-gen83" class="x-panel-bwrap">
                <div id="ext-gen84" class="x-panel-tbar x-panel-tbar-noheader x-panel-tbar-noborder" style="width: 632px;">
                  <div id="ext-comp-1002" class="x-toolbar x-small-editor x-toolbar-layout-ct" style="width: 628px;">
                    <table class="x-toolbar-ct" cellspacing="0">
                      <tbody>
                        <tr>
                          <td class="x-toolbar-left" align="left">
                            <table cellspacing="0">
                              <tbody>
                                <tr class="x-toolbar-left-row">
                                  <td id="ext-gen89" class="x-toolbar-cell">
```

Style Computed Layout DOM

```
element.style {
  background-color: #FFFFFF;
}
.x-viewport,
.x-viewport body ext-all.css (line 4848)
{
  -moz-border-bottom-colors: none;
  -moz-border-image: none;
  -moz-border-left-colors: none;
  -moz-border-right-colors: none;
  -moz-border-top-colors: none;
  border-bottom-color: -moz-use-
text-color;
  border-bottom-style: none;
  border-bottom-width: 0;
  border-left-color-
ltr-source: physical;
  border-left-color-
```

```
ext-all.js
Last Saved: 3/30/10 11:06:10 AM
File Path: /Library/WebServer/Documents/metsnavSourceforge/web/js/ext-3.2.0/ext-all.js

1  /*
2  * Ext JS Library 3.2.0
3  * Copyright(c) 2006-2010 Ext JS, Inc.
4  * licensing@extjs.com
5  * http://www.extjs.com/license
6  */
7  Ext.DomHelper=function(){var
s=null,j=/^(?:br|frame|hr|img|input|link|meta|range|spacer|wbr|area|param|col)$/i,l=/^table|tbody|tr
|td$/i,p,m="afterbegin",n="afterend",c="beforebegin",o="beforeend",a="<table>",h="</table>",b=a+"<
tbody>",i="</tbody>" +h,k=b+"<tr>",r="</tr>" +i;function g(x,z,y,A,v,t){var
u=p.insertHtml(A,Ext.getDom(x),q(z));return y?Ext.get(u,true):u}function q(A){var
v="" u,z,y,t,B;if(Ext.isString(A)){v=A}else if(Ext.isArray(A)){for(var
x=0;x<A.length;x++){if(A[x]){v+=q(A[x])}else{v+="  
<div>";Ext.iterate(A,function(C,
D){if(!/tag|children|innerHTML/i.test(C)){if(Ext.isObject(D)){v+="  
"+C+"";Ext.iterate(D,function(F,E){v+=F+" "+E+"";v+=" "}}else{v+="  
"+(cls:"class",htmlFor:"for")[C||C]+'+'+D+' '}});if(j.test(A.tag)){v+="/>"}else{v+="/>";if((B=A.
children|A.cn)){v+=q(B)}else if(A.html){v+="  
<div>";return v}function
e(B,y,x,z){s.innerHTML=[y,x,z].join("");var
t=-1,v=s,u;while(++t<B){v=v.firstChild;if(u=v.nextSibling){var
A=document.createDocumentFragment();while(v){u=v.nextSibling;A.appendChild(v);v=u}return
v}function d(t,u,x,v){var
y,z;s=document.createElement("div");if(t=="td"&&(u==m||u==o)||!/td|tr|tbody/i.test(t)&&(u==c||u==
n)){return}z=u==c?x:u==n?x.nextSibling:u==m?x.firstChild:null;if(u==c||u==n){x=x.parentNode;if(t=="
td")|(t=="tr"&&(u==o||u==m))){y=e(4,k,v,r)}else if((t=="tbody"&&(u==o||u==m))|(t=="tr"&&(u==c||u==n
))){y=e(3,b,v,i)}else{y=e(2,a,v,h)}x.insertBefore(y,z);return y}p={markup:function(t){return
q(t)},applyStyles:function(x,y){if(y){var
u=0,t,v;x=Ext.fly(x);if(Ext.isFunction(y)){y=y.call(x)}if(Ext.isString(y)){y=y.trim().split(/\s*(?::|
;)\s*/);for(t=y.length;u<t;){x.setStyle(y[u++],y[u++])}else if(Ext.isObject(y)){x.setStyle(y)}}},
insertHtml:function(z,t,A){var
y={v:C,B,D,x,u; z=z.toLowerCase();y[c]="BeforeBegin",previousSibling";y[n]="AfterEnd",
nextSibling";if(t.insertAdjacentHTML){if(!.test(t.tagName)&&(u=d(t.tagName.toLowerCase(),z,t,A))){
return
u}y[m]="AfterBegin",firstChild";y[o]="BeforeEnd",lastChild";if((v=y[z])){t.insertAdjacentHTML(
v[0],A);return
t[v[1]]}else{B=t.ownerDocument.createRange();C="setStart"+(end/i.test(z)?"After":"Before");if(y[z]
){B[C](t);D=B.createContextualFragment(A);t.parentNode.insertBefore(D,z==c?t.nextSibling);return
t[z==c?"previous":"next"]+"Sibling"}}else{x=z==m?"first":"last"}Child";if(t.firstChild){B[C](t[x
]);D=B.createContextualFragment(A);if(z==m){t.insertBefore(D,t.firstChild)}else{t.appendChild(D)}
else{t.innerHTML=A}return t[x]}throw"Illegal insertion point ->
"+z+"",insertBefore:function(t,v,u){return g(t,v,u,c)},insertAfter:function(t,v,u){return
g(t,v,u,n,"nextSibling")},insertFirst:function(t,v,u){return
g(t,v,u,m,"firstChild")},append:function(t,v,u){return
g(t,v,u,o,"true")},overwrite:function(t,v,u){t=Ext.getDom(t);t.innerHTML=q(v);return
u?Ext.get(t.firstChild):t.firstChild,createHtml;q}return
p}();Ext.apply(Ext.DomHelper,function(){var
d,a="afterbegin",g="afterend",h="beforebegin",c="beforeend";function
e(l,n,m,p,k,l){l=Ext.getDom(l);var
j;if(d.useDom){j=b(n,null);if(i){l.appendChild(j)}else{(k=="firstChild"?l.parentNode).insertBefore
(j,l[k]||l)}else{j=Ext.DomHelper.insertHtml(p,l,Ext.DomHelper.createHtml(n))}return
m?Ext.get(j,true):j}function b(p,j){var
l,m=document,k,i,n,q;if(Ext.isArray(p)){l=m.createDocumentFragment();Ext.each(p,function(o){b(o,l)}
)}else if(Ext.isString(p)){l=m.createTextNode(p)}else{l=m.createElement(p.tag||"div");k=!l.
setAttribute;Ext.iterate(p,function(o,r){if(!/tag|children|innerHTML/i.test(o)){if(o=="cls"){l.
className=r}else if(k){l.setAttribute(o,r)}else{l[o]=r}}});Ext.DomHelper.applyStyles(l,p.style);if(
(q=p.children|p.cn)){b(q,l)}else if(p.html){l.innerHTML=p.html}}if(j){j.appendChild(l)}return
l}d={createTemplate:function(j){var i=Ext.DomHelper.createHtml(j);return new
Ext.Template(i)},useDom:false,insertBefore:function(i,k,j){return
```

# Customizing HTML/CSS: What to do?

- Use the AJAX library to customize
- Contribute to library if you can (we haven't been able to, but boy would I like to!)



# Accessibility

- Screen reader users cannot access page-turner content or controls
- Tree menu and search are minimally accessible
- Keyboard users can't find their way through columns and tabs or the search results

# METS Navigator – AJAX version

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    - February 1934**
    - March 1934
    - April 1934
    - May 1934
    - June 1934
    - July 1934
    - September 1934
    - November 1934
    - December 1934
  - 1935
  - 1936
  - 1937
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  - 1939
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  - 1942
  - 1943
  - 1944
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  - 1949
  - 1950
  - 1951
  - 1952
  - 1953
  - 1957
  - 1958



Search Collection

Enter search term  Go! No results

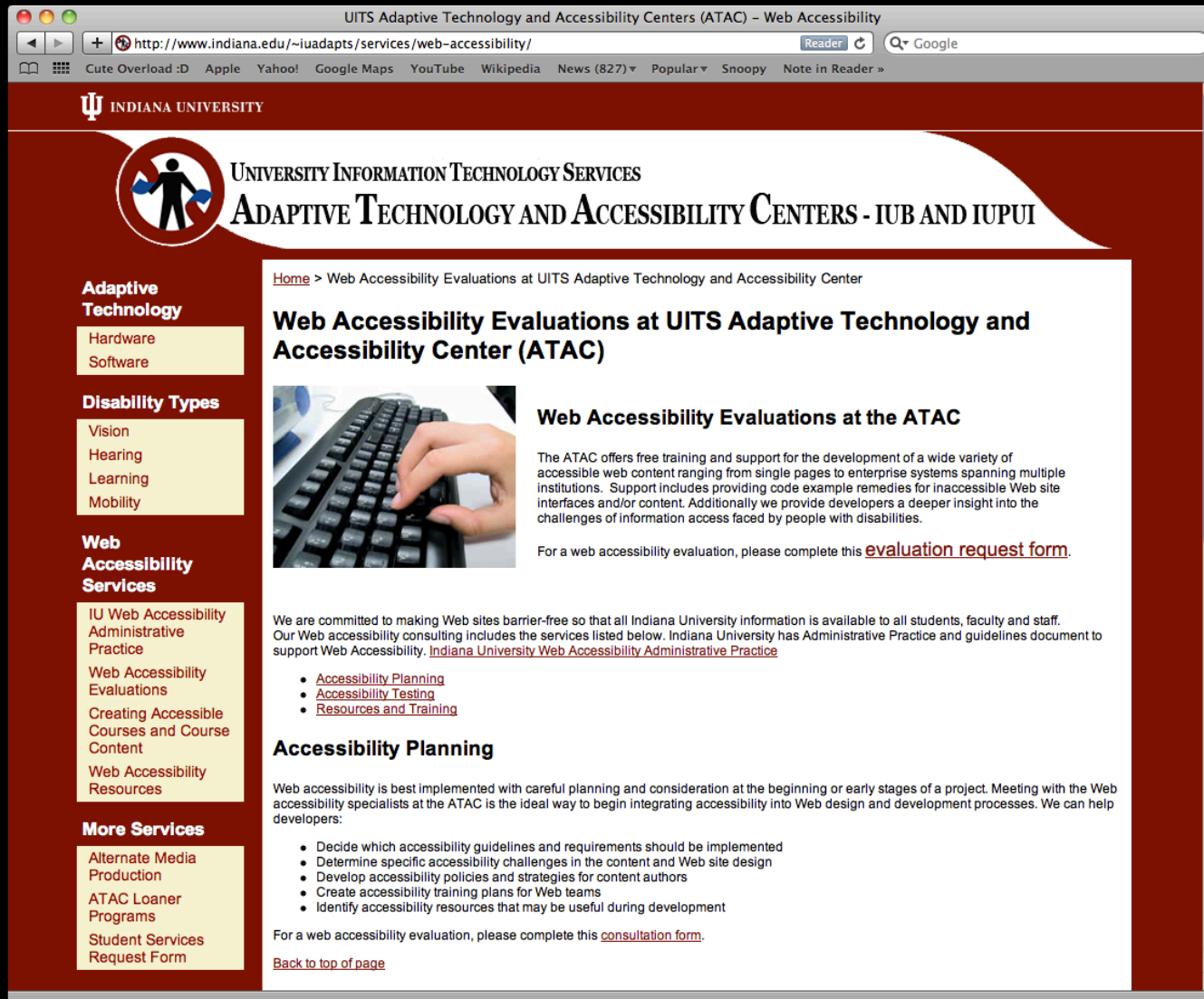
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# Props to ATAC

<http://www.indiana.edu/~iuadapts/services/web-accessibility/>



UIITS Adaptive Technology and Accessibility Centers (ATAC) - Web Accessibility

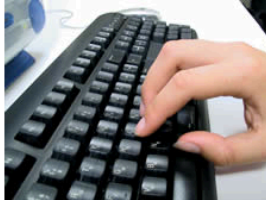
<http://www.indiana.edu/~iuadapts/services/web-accessibility/>

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[Home](#) > [Web Accessibility Evaluations at UITS Adaptive Technology and Accessibility Center](#)

## Web Accessibility Evaluations at UITS Adaptive Technology and Accessibility Center (ATAC)



### Web Accessibility Evaluations at the ATAC

The ATAC offers free training and support for the development of a wide variety of accessible web content ranging from single pages to enterprise systems spanning multiple institutions. Support includes providing code example remedies for inaccessible Web site interfaces and/or content. Additionally we provide developers a deeper insight into the challenges of information access faced by people with disabilities.

For a web accessibility evaluation, please complete this [evaluation request form](#).

We are committed to making Web sites barrier-free so that all Indiana University information is available to all students, faculty and staff. Our Web accessibility consulting includes the services listed below. Indiana University has Administrative Practice and guidelines document to support Web Accessibility. [Indiana University Web Accessibility Administrative Practice](#)

- [Accessibility Planning](#)
- [Accessibility Testing](#)
- [Resources and Training](#)

### Accessibility Planning

Web accessibility is best implemented with careful planning and consideration at the beginning or early stages of a project. Meeting with the Web accessibility specialists at the ATAC is the ideal way to begin integrating accessibility into Web design and development processes. We can help developers:

- Decide which accessibility guidelines and requirements should be implemented
- Determine specific accessibility challenges in the content and Web site design
- Develop accessibility policies and strategies for content authors
- Create accessibility training plans for Web teams
- Identify accessibility resources that may be useful during development

For a web accessibility evaluation, please complete this [consultation form](#).

[Back to top of page](#)

**Adaptive Technology**

- Hardware
- Software

**Disability Types**

- Vision
- Hearing
- Learning
- Mobility

**Web Accessibility Services**

- IU Web Accessibility Administrative Practice
- Web Accessibility Evaluations
- Creating Accessible Courses and Course Content
- Web Accessibility Resources

**More Services**

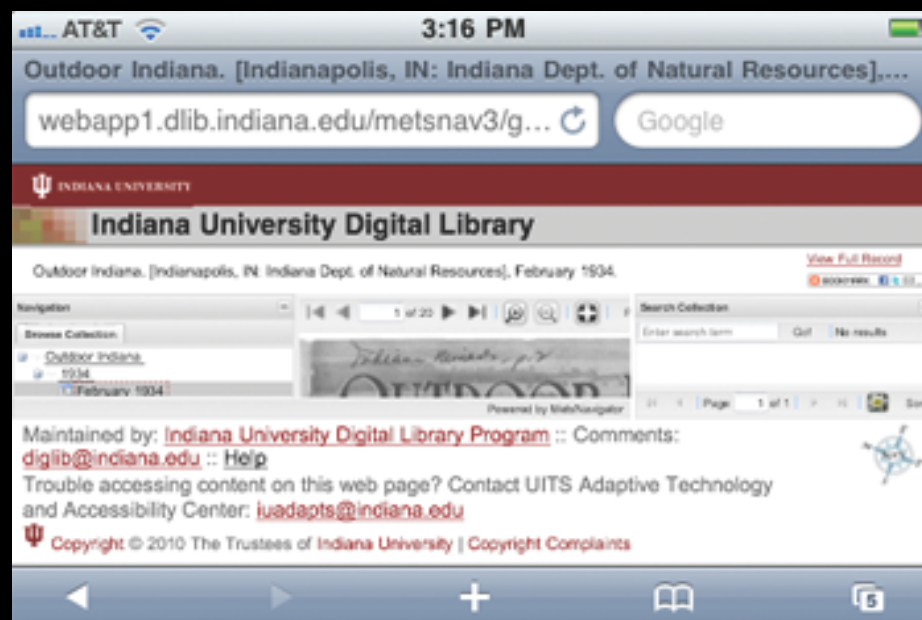
- Alternate Media Production
- ATAC Loaner Programs
- Student Services Request Form

# Accessibility: What to do?

- Enhance keyboard access with :focus style on links and buttons
- AJAX library offers key mapping
- Watch for/Ask for improvements in future releases of AJAX library
  - Becky Gibson, Web Accessibility Architect at IBM (2007) – Web 2.0 following pattern of early web (non-standard, requiring specific tools)

# Mobile Devices

- METS Navigator on iPhone  
(this is my sad face ☹)




# METS Navigator on iPad (tablet)

iPad 9:38 PM 100%





Outdoor Indiana. [Indianapolis, IN: Indiana Dept. of Natural Resources], February 1934.


webapp1.dlib.indiana.edu/metsnav3/general/#mets=http%3A%2F... Google

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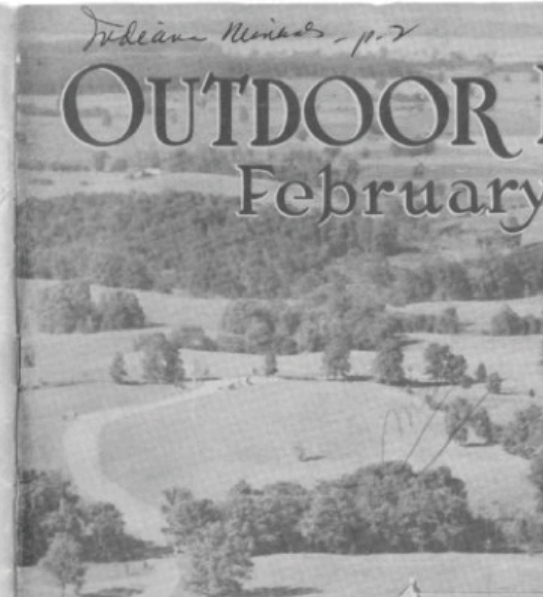
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  - 1936
  - 1937
  - 1938
  - 1939
  - 1940
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  - 1942
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# Mobile Devices: What to do?

- Not sure yet
  - Use media queries to change banner and footer areas via stylesheet (css)
  - Change size of controls/layout of page-turner components using stylesheet
    - Remind me to tell why this is !important
  - Develop separate interface for mobile devices

# Current METS Navigator Work

- Embedded page-turner (Finding Aids)
  - Continuing with current AJAX library
  - Content currently shown in METS Navigator is only page images (.tiff, .jpg, .gif)
    - Limited accessibility



# Future METS Navigator Work

- Want to expand capabilities to show other kinds of content (full text, audio, video)
- Full text will require major overhaul to create a fully accessible page-turning web app
  - Either contribute to current AJAX library or consider rewriting using different AJAX library

# Questions? Comments!

Kittens >^..^<

- [jlhardes@indiana.edu](mailto:jlhardes@indiana.edu)

# CHI Madness

- 20 seconds to hock my talk
- Can I practice on you? OK, thanks!