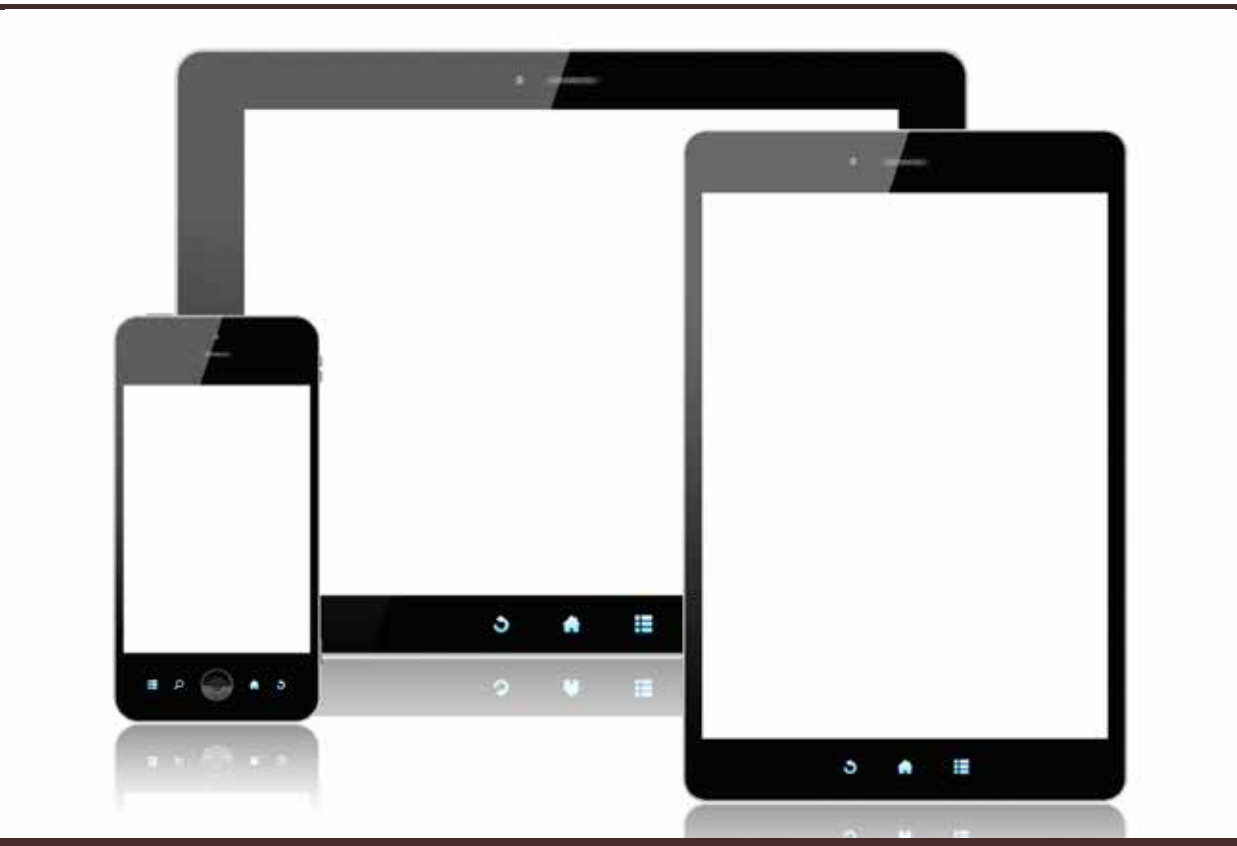
DNN

WHITE PAPER



Designing for Mobile Websites using Responsive Design

Amelia Marschall-Miller

The Social Imperative

Over the last few years, the web design community has seen a monumental shift in how we think about and create websites, due to the rapid rise of mobile browser use. From initially just making sure a site "worked" on mobile, we are now expected to make sure sites are "optimized" for mobile: providing a great user experience no matter the device viewing a site. There are several ways to accomplish this, and one of the most talked about techniques is Responsive Web Design (RWD).

Mashable dubbed 2013 "The Year of Responsive Web Design"[1] ; now is the time to fully understand what it takes to have a responsive website, and decide if 2013 will be the year you or your organization will take this leap.

KNOW THIS...

Mashable dubbed 2013
"The Year of Responsive Web Design"

Is RWD Right for Me?

Before we go in depth about how to develop an RWD website, it's important to understand the different options available to achieve a mobile-friendly website, and ensure that Responsive Web Design is the right choice for your needs. In a nutshell, a responsive website uses a fluid layout and flexible images adapted with media queries – the ultimate goal being a single website, optimized for any screen size. Adaptive Web Design (AWD) also uses media queries to set breakpoints and create separate fixed-width layouts, optimized for multiple screen sizes. So while responsive website layouts change fluidly to account for any browser width, adaptive websites may have slightly less than ideal layouts between breakpoints.

A third option to achieve a mobile-friendly website is to develop a dedicated, standalone mobile website. Unlike RWD and AWD, a dedicated mobile website is developed independent from a corresponding desktop site, and browser detection is used to redirect mobile users to the correct site.

RWD, AWD, and dedicated mobile websites all have their advantages and disadvantages. The following charts compare these techniques and native mobile applications.

KNOW THIS...

Websites running on a Content Management System with **easily customizable CSS layouts**, such as DNN, are **ideal candidates for RWD**.

These pros and cons apply differently to every organization. Sometimes larger organizations prefer a dedicated mobile site, with mobile-specific content

	RWD	AWD	Dedicated Mobile Website	Native Mobile App
Content Maintenance 	**EASY** Single version of content is maintained.	**EASY** Single version of content is maintained.	**MODERATE** Multiple content versions need to be maintained (however, this could be seen as a benefit if mobile-specific content is desired, such as for marketing purposes).	**DIFFICULT** Programmers usually need to make content changes; sometimes content updates require resubmission for app store approval.
Device Optimization 	**HIGH** Optimized for any device.	**MODERATE** Could have less than ideal layouts and some horizontal scrolling between breakpoints.	**MODERATE** Can be tricky to implement and test mobile detection and redirection; unless you have a CMS solution that has a preview option and offers tablet redirection.	**DIFFICULT** Custom development is required for each platform (iOS, Android, and so on); tough to customize between device screen sizes.
Development Time & Cost $$$	**MODERATE** Slightly more time consuming than a new desktop-only website development.	**LOW** Slightly less time consuming than RWD; can most easily be applied to an existing desktop website.	**MODERATE** Requires a separate website development. However, features like module sharing can reduce the effort required.	**HIGH** Requires extensive development specific to each platform.
Performance 	**MODERATE** Can be less than ideal since entire site content is usually loaded in most viewing cases.	**MODERATE** Can be less than ideal since entire site content is usually loaded in most viewing cases.	**HIGH** A mobile-specific site can be developed to include less content and resources than its desktop counterpart.	**HIGH** Native applications are usually developed to perform quickly.
Per Device Flow Optimization 	**DIFFICULT** Having a single website makes it difficult to modify the flow for different devices.	**DIFFICULT** Having a single website makes it difficult to modify the flow for different devices.	**EASY** Flows can be optimized for different devices using multiple site variations.	**MODERATE** Flows can be optimized for different devices but requires more extensive development.
Adding Mobile to an existing website 	**DIFFICULT** Usually requires redesign of existing website, and a complete redevelopment works best.	**MODERATE** Can be more easily applied to an existing site that RWD, using a set Media Query breakpoint.	**EASY** Can simply focus on adding the new mobile-specific site content.	**DIFFICULT** Can simply focus on adding the new mobile specific site content but requires more extensive development.

for marketing purposes, to avoid modifying any current desktop website. Dedicated mobile sites are also sometimes developed using some responsive techniques, so the "mobile" website version also looks good on tablets and not just certain phones. But the combination of centralized content maintenance and optimization across all devices often makes RWD the best choice for many organizations, small and large. No matter the website technique, a website solution is always going to be less costly than a native app.

Designing a Responsive Website

There are more elements to consider when designing a responsive website, but the process can easily be adapted into your current design style. Before developing a responsive site, it is most helpful to start with mockups for at least three screen sizes: desktop, tablet, and mobile. These mockups do not need to be created at any particular device size, since the website will be optimized in between these snapshots as well.

KNOW THIS...

Regardless of the preferred design process, it is important to understand **how a responsive website layout is modified** during development to provide workable mockups.

Websites running on a Content Management System with easily customizable CSS layouts, such as DNN, are ideal candidates for RWD. In DNN, a responsive design is applied in the skin files, just like any non-responsive design. Your columns and content panes are laid out as usual in the skin.ascx file, while the responsive styles are added using media quires in skin.css.

If you want to "mobilize" an existing site, creating a separate dedicated mobile site or using AWD will likely be easier to implement than full RWD. Responsive Web Design works best when you can start with a new code layout and well thought out design, which we discuss in the next section.

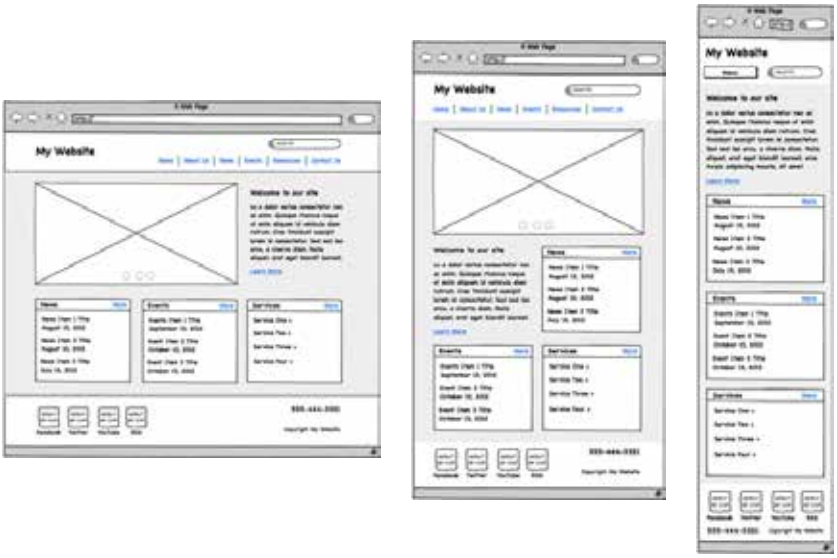
It may be most comfortable to design the desktop layout first, which can work fine. After that, you can determine how the layout should change when shrinking the width for tablet and mobile device sizes. Or, many RWD proponents advocate a "mobile first" process. From a design standpoint, this means thinking about your content and what is absolutely necessary for a mobile user, designing the mobile layout first and adding more content as is appropriate when designing the tablet and desktop layouts.

Regardless of the preferred design process, it is important to understand how a responsive website layout is modified during development to provide workable mockups. Responsive websites use columns

of content "floated" next to each other. As a screen width shrinks, the columns get skinnier. Once those columns are too small for their content to fit, they stack vertically, with the later, right columns pushed below. This means it is important to keep elements in the same general order between each mockup, as it is difficult to move content from a column that appears later in the HTML markup above earlier columns.

some content used on larger screens may still be loaded and taking up resources, even if hidden from mobile users. However, for the sake of simplicity and wider familiarity with traditional desktop website development, our demonstration will use a desktop-first approach. The process of applying responsive techniques to a desktop site can be easier to learn and understand at first.

These wireframes show the layout transformations of a basic responsive website.



Developing a Responsive Website

Once your responsive site mockups are ready, you will also need to decide if you plan to develop your site mobile first. One of the main benefits of developing the mobile version as the default website layout is improved performance. Since larger images and resource-intensive content is often only included for larger screens, developing mobile first allows you to only load that content once it's needed. If you start by developing the desktop version first,

Set a Fluid Grid

First up in the CSS, we frame our entire site with a fluid, wrapping container:

```
#page {
   width: 90%;
   max-width: 960px;
   margin: 0 auto; }
```

By centering the site (`margin:0 auto`) and setting `width:90%`, this ensures that the site will always

have a 5% margin on either side, no matter the browser width. This is important to prevent content from pushing right up to the edge of browser screens and becoming more difficult to read. By setting `max-width:960px`, we are giving our website a maximum size, so widescreen monitors will still see a standard desktop website size, and maintain readable line-lengths.

Within the wrapping container, each content div will be floated and have a width set with percentages, such as:

```
#LeftColumn {
   float: left;
   width: 70%; }
#RightColumn {
   float: right;
   width: 30%; }
```

These two columns will fill the entire width of the surrounding container at all times, since 70% + 30% = 100%. Don't get confused because we set the wrapping container to have a width of 90%. Percentage widths are always relative to their surrounding element – every div has a total available width of 100% within it, no matter the pixel size. Now we have two content columns that will sit next to each other, expanding and contracting in width while always keeping the same proportions and filling the surrounding container.

We want to set up all sections of our site layout in the same fashion. Any content area of pixel-based mockup can easily be translated to percentages using a little math:

```
Target (px) / Context (px) = Result (%)
```

This will ensure ratios and proportions remain as intended, instead of just guessing at what percentage width to use. For example, a 300px wide column inside of a 700px wide surrounding container in a mockup:

```
300px / 700px = 0.42857 or 42.857%
```

Set Margins

Of course, we need some space between these content columns! But we also need to ensure our total widths of elements next to each other stay under 100%. We could do:

```
#LeftColumn {
   width: 65%;
   margin-right:5% }
#RightColumn {
   width: 30%; }
```

So 65% + 5% + 30% = 100%. The margin size will also shrink and expand proportionately as the surrounding container size changes.

Set Media Sizes

Although responsive content areas are set using percentages, most included media, such as images, will have pixel sizes associated with them. In order to ensure media stays within the current size of its surrounding container, the following CSS should be included:

```
img, object, embed, iframe, video {
max-width:100%; }
```

This small bit of code can do a lot to make sure media stays properly aligned within your site.

Make Changes with Media Queries

With our layout setup fluidly with percentages, and all content set to fill it dynamically, we should have a basic responsive site that will adjust as we shrink our browser. Of course, if our browser gets too small, columns will start to get too skinny, menus will get out of line, and things will look broken. That's where CSS media queries come in.

Media queries serve different CSS based on your browser size or type. Media queries can target all sorts of aspects of your browser, such as resolution and orientation, but for this demo we will simply be targeting browser size using `max-width`. Media queries can be included directly in the main CSS file (put them at the end, since CSS is applied in the order its written), so our CSS file will look something like this:

```
/* Desktop site CSS first */

@media (max-width:800px) {
   /*tablet-specific styles go here*/
}

@media (max-width:600px) {
   /*smaller tablet styles go here*/
}

@media (max-width:400px) {
   /*mobile styles go here*/
}
```

If we were developing mobile-first, the CSS order would be opposite:

```
/* Mobile site CSS first */

@media (min-width:500px) {
   /*tablet-specific styles go here*/
}

@media (max-width:700px) {
   /*larger screen styles go here*/
}

/* etc */
```

At this stage in development, we begin to test and review our website at increasingly smaller widths, and make necessary adjustments to ensure things work well and fit with our smaller mockups. One common adjustment is to stack content columns that were previously next to each other, by setting 100% widths, once they become too skinny:

```
@media (max-width:600px) {
   #LeftColumn {
      width: 100%;
      margin-right:0% }
   #RightColumn {
      width: 100%; }
}
```

Remember that media query breakpoints do not need to be set at any particular "standard" device size, which is common within AWD. For example, 320px and 480px have been popular breakpoints since those are the portrait and landscape widths of the Apple iPhone. However, if something looks like it needs adjusting at 496px, then that's where a change should be made. Set media queries where they are most needed!

We can also show and hide content using media queries. Using `display:none` in our CSS will remove content from view when it's not needed, such as hiding a large banner rotator in your mobile media query. As previously mentioned, it's important to remember that using `display:none` does not

KNOW THIS...

It's important to note that in Internet Explorer, media queries are only supported by version 9 and above. **To support older versions of Internet Explorer, conditional comments can be used** to link to Internet Explorer specific CSS, or a Javascript polyfill can be utilized (see Respond.js from Scott Jehl: https://github.com/scottjehl/Respond)

generally help performance of the site, since the content is usually still loaded and just hidden from display.

At this point, it's simply a matter of reviewing your website at different sizes and making CSS adjustments to improve usability along the way. Below is a real-world responsive site example (http://www.springfieldclinic.com):

The Springfield Clinic site adapts to from desktop/laptop viewports to mobile/tablet layout without compromising on content, navigation, legibility or brand aesthetic.

Responsive Menu Options

Menus can be one of the trickiest aspects of a responsive website, but many different techniques and options have recently emerged. Basically any menu that is structured using unordered lists can be manipulated appropriately for smaller screen sizes.

The easiest option to modify a horizontal menu for smaller screen sizes is to switch it to a vertical menu. Horizontal list items that have a width set automatically for desktop browser sizes simply get a width of 100% set for mobile sizes, stacking vertically:

Regular CSS:

```
nav ul li {
      float:left;
      width:auto; }
```

Mobile-size CSS:

```
@media (max-width: 480px) {
   nav ul li {
      float:none;
      width:100%; }
}
```

This tutorial also shows how to expand upon this purely CSS technique to support menus with more

than one level: http://ejhansel.com/a-responsive-drop-down-navigation-menu.

Building upon that basic option, a vertical menu may be hidden and only shown when a "Menu" button is clicked, freeing up more space for content. An extra button used to toggle the menu is hidden from desktop view using `display:none`, and then shown while the `ul` is instead hidden at a mobile size. A little bit of jQuery is also used to toggle the menu to appear when the button is hit.

KNOW THIS...

Menus can be one of the trickiest aspects of a responsive website, but many **different techniques** and options have **recently emerged.**

The markup:

```
<nav>
   <a href="#" class="show-
mobile">Main Menu</a>
   <ul><li>…</li></ul>
</nav>
```

Regular CSS:

```
.show-mobile { display: none; }

CSS to show the button and hide the
menu for mobile:
@media (max-width: 768px) {
   nav .show-mobile { display: block;
}
   nav ul { display: none; }
}
```

jQuery for the menu toggle:

```
<script>
   jQuery(".show-mobile").
click(function () {
      jQuery("nav ul").
toggle("fast");
   });
<script>
```

A third option, that also requires some jQuery, is to switch a `ul` menu into a `select` list. Select lists utilize native device controls on many devices, providing a smooth, familiar user experience. This technique is thoroughly explained by Chris Coyer in the following tutorial: http://css-tricks.com/convert-menu-to-dropdown.

Remember the Viewport

A small, but important, detail to remember is to include the viewport meta tag in the `<head>` of the site:

```
<meta name="viewport"
content="width=device-width">
```

This tag ensures mobile browsers show websites at the actual size of the browser window, triggering the smaller versions of the responsive site. Some mobile browsers will zoom out by default to show the desktop version of websites if this is not in place.

Responsive Web Design: Making the Leap

You should now have a good understanding of what Responsive Web Design is, how it compares to other mobile web options, and the basics of how to design and develop for RWD. While a new web project can present a major decision for any organization, the web is constantly changing and it's important to consider all modern development options before beginning down a new path. While there are many more extensive tutorials on how to create a website using RWD, this should provide some valuable insight on whether responsive is right for you.

ABOUT THE AUTHOR...

Amelia Marschall-Miller is Partner and Creative Director at Gravity Works in Lansing, Michigan. With five years of hands-on website design and front-end development experience, she now balances between design, HTML/CSS coding, and leading her team through an ever-changing stream of web and mobile projects. Amelia was a contributing author to "Professional Mobile Application Development" from Wrox, a collaborative effort by Gravity Works as an introduction to various mobile development techniques. Amelia is continually exploring the latest responsive website design techniques and mobile user interfaces. She is one of the rare designers who likes to code. She also has a love of typography, and enjoys swimming, skiing, snowboarding, pottery, and competing in triathlons.

About DNN

DNN provides a suite of solutions for creating rich, rewarding online experiences for customers, partners and employees. Our technology is the foundation for 750,000+ websites worldwide and our customers include True Value Hardware, Bose, Cornell University, Glacier Water, Dannon, Delphi, USAA, NASCAR, Northern Health and the City of Denver. In addition to our commercial solutions, DNN is the steward of the DotNetNuke Open Source Project.

CONTACT

For more information about Evoq Content, visit

www.dnnsoftware.com

Call us:

(650) 288-3150

Email us:

sales@dnnsoftware.com

[1] http://mashable.com/2012/12/11/responsive-web-design

155 BOVET ROAD, SUITE 201 SAN MATEO, CA 94402 WWW.DNNSOFTWARE.COM