The Impact of HTML5/CSS3 on Mobile Devices

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Abstract

The purpose of this study is to investigate the new features of HTML5 and CSS3. More specifically, how transitions, animations and embedding video are being incorporated into the design process for mobile devices. As well as how CSS3 and HTML5 are helping to reduce the amount of images needed to produce websites. The study asks the question "How HTML5 and CSS3 are impacting web development for mobile devices?"

With the recent release of the latest draft of HTML5 and CSS3 released in February of 2010 there are several new features of HTML5 and CSS3 that designers now have at their disposal. Features like transitions and animations, audio and video elements, and a group of properties that are reducing the amount of images, are helping to make HTML5 and CSS3 the coding language of choice when designing for mobile devices. Elite and Specialized Interviewing and Descriptive Research methods of research were used to discover the pros and cons of HTML5 and CSS3.

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Table Of Contents

I. Introduction.....5
II. Literature Review.....7
III. Research Methods and Procedures.....14
IV. Results.....16
V. Conclusions.....24

References.....25

Chapter 1 - Introduction

Since the creation of the World Wide Web, hypertext mark-up language (HTML) has been used to develop websites. The function of HTML is to place all of the text, images, and any other form of content one might have on their website. HTML also gives the designer the ability to define each element on the page. Unfortunately HTML does not offer a wide variety of styling options for the content, so in December of 1996, cascading style sheets (CSS) were introduced to style the HTML. If the HTML marks up the content, then the CSS controls all the styling of the content. Cascading style sheets give the designer the ability to make simple changes, such as color, font-selection, and sizing. CSS also allows for advance styling of HTML with placement. What makes CSS so powerful is that one can link several different pages of HTML documents to one style sheet. This gives the designer the ability to change the look of an entire website simply by changing one attribute in the CSS.

Today with the availability mobile devices such as the iPhone, iPad, Droid and Blackberry, the percentage of web pages being viewed is increasing dramatically. In an interview with Garth Jantzen, Co-founder of Vunction Interactive a design studio specializing in HTML5 and CSS3, Jantzen expects by the year 2015 over 50% of web interaction will be from a mobile device. This statistic should be significant to web designers and developers because there are several different considerations to take into account when designing for mobile devices. The first and main thing to consider when designing for smart phones is that mobile web browsers may interpret the HTML and CSS differently than desktop browsers. Another characteristic to consider is that there is no mouse to interact with elements on the page. The next thing to consider is the Internet connection. Unless the phone is operating on a wireless network, the Internet connection of most mobile devices is dramatically slower than desktop computers. What makes HTML5 and CSS3 significant when designing for mobile devices is that they are both cross-platform compatible. This means that HTML5 and CSS3 will perform the same way on all devices, from a desktop computer, to a tablet, to a mobile device.

Both CSS and HTML are constantly evolving, and an updated draft of the two were released

February of 2010 (Etemad, Ishii, and Murakami). HTML5 and CSS3 offer several new features that are revolutionizing the web development process. The features of CSS3 and HTML5 that are having the biggest impact fall into three categories: transitions and animations, embedding audio and video, and several properties that will reduce the amount of images being used throughout the webpage. The study will answer the question: How HTML5 and CSS3 are impacting web development for mobile devices, specifically through reducing the amount of images being used, transitions, and embedding video?

The purpose of this study is to investigate the new features of HTML5 and CSS3. More specifically, how transitions and animations, embedding video, and the reduction in the amount of images being incorporated into the design process for mobile devices. One can expect that as more designers start to implement these features that the amount of images being used on the web will dramatically reduce. While also reducing the amount of images being used, CSS3 and HTML5 will also reduce the amount of time that web developers spend developing their sites. In addition to increasing productivity, HTML5 and CSS3's new properties will allow designers to be more creative as they design sites that are optimized for mobile devices.

Chapter 2 - Literature Review

In order to truly customize a website prior to the release of HTML5 and CSS3, web designs would rely primarily on separate images. And if a designer wanted to incorporate movement or interactivity to a website, it would have to rely heavily on Javascript or would have to be created entirely in Flash. However there are three categories of properties and elements that are having the biggest effect on mobile browsers.

The three categories of CSS3 and HTML5 that are having the biggest impact on web development are the reduction of images being used, transitions and animations, as well as the audio and video tags. There are several different properties in CSS3 that reduce the total amount of images being used throughout the design process. Instead of needing to embed several images that used to specify any decoration to an image or font, features of CSS3 like border-radius, drop shadow, gradients, or the @font-face property can be used to eliminate extra image placement. By utilizing these properties when designing for mobile devices, the designer can not only reduce the amount of development time but also reduce the amount of time that it takes for the website to load. The next group of categories that are impacting website development are animations and transition properties. These properties are making movement and interactivity of a website much easier to code. The third feature that is impacting mobile web development is the ability to embed video directly into the HTML without relying on flash or any other video players. CSS3 also gives the designer the ability to mask, or skew the video.

Reducing The Amount of Images Being Used

When developing for mobile devices it is important to reduce the amount of information that must be loaded from the server. Properties in CSS3 that are reducing the amount of images being used in web designs are the gradients, border-radius property, drop-shadow, as well as the typography solutions. On the development side, there are several universal issues that developers face when using images on the web.

The most common issue web designers face when using images on the web are file naming, file format, and file size for each image. When an image is placed into the HTML, the website designer must be aware of the image name, as well as the image location. Both name, and location are important when an image is placed into the HTML code because both must be specified in order for the image to be displayed. When an image is placed into HTML, the code reads: . The "img" tells the browser that there is an image that should be displayed. The "src" stands for the source of the file. The source specifies exactly where the browser should look to find the image; in this case it is referring to a file named "image.jpg". If the file name is not exactly the same as what is specified in the HTML document, than the image link is broken and will not be displayed. Often times a designer will organize their assets, including their images in a folder. If that folder is not specified in the HTML document, the image will not be visible. Developers must also decide which file format to use for each image. When using images on the World Wide Web, the designer must also take into account what the background of the image should look like. The three main image formats that are used on the web are Joint Photographic Experts Group (JPEG), Graphics Interchange Format (GIF), or Portable Network Graphics (PNG). Of these three file formats, PNG does the best of creating a transparent background. GIF has the capabilities of generating transparent backgrounds, however the quality of the image is lower than PNG. JPEG on the other hand cannot display on a transparent background. If a JPEG is used, the image will appear with a white background, unless another background color is chosen. Assume the designer is working with a JPEG that has the default white background. If that image is placed onto a webpage that has a dark background, the text is will appear inside of a white box, which is the default background for a JPEG (see Figure 1). If the designer had used a PNG to display the image, the text would appear directly on the background (see Figure 2).

Figure 1

Figure 2

Along with the type of file being used, developers must also take into account the size of the image being used. The typography solutions in CSS3 are giving designers the ability to better customize the look of a website as well as reducing the amount of images being used.

The @font-face property now gives designers the ability to reference a font in their style sheet. According to Håkon Wium Lie, the @font-face property will help show how powerful cascading style sheets can be; "Many CSS properties, both old and new, deal with text: they describe text color, position, style, and direction. This is all very good—after all, text fills most of our screens. But in order for properties to reach their full potential, we need a good selection of fonts (Lie). Not only does the @font-face property give the designer more freedom within the styling of the HTML, but it also reduces the amount of files being used, as well as eliminating the time spent creating images. There are several other features that go along with the @font-face property which allows the designer to modify and style the text. CSS3 allows for modification of the leading, tracking, transparency, rotation, and shadow to the text. Instead of having to create an image with text, the designer can now simply write all of the text into the HTML document, and modify the CSS to reference which font they would like to appear. According to one of the original developers of Cascading Style Sheets, Håkon Wium Lie, 'The Father of CSS,' "[The @font-face property] will be the next big thing if browsers start supporting them" (Gasston). Despite all the advantages of the @font-face property, there are still issues associated with it. One of which has to do with copyright infringement. All creative material such as movies, music and television are protected from sharing. Fonts are no different, therefore the creators of these fonts are doing all they can to make sure their fonts are not being shared over the Internet for free. Lie does not think that this will be a problem, in an interview with css3.info, Håkon states:

> Almost all the content on the web is copyrighted. It's still available because copyright holders want it to be available. Sure, there are cases when the copyright holder has not given permission. But I don't think anyone would argue that we should remove all images, video or music from the web for this reason. There are plenty of freely available fonts out there and no need to use fonts with resistant

> owners. Also, plenty of new fonts will be created open-source style if browsers start supporting web fonts (Gasston).

As more fonts become available, one can expect to see more designers making use of the @font-face property and the amount images being used to decline.

The other properties that help to optimize websites for mobile devices are the gradients, border radius, and drop shadows. Like fonts, prior to CSS3 if a designer wanted to implement one of these design techniques, they would have had to create and image for each, and then place the image in their HTML/CSS. As one might expect, many of the same issues come up when using images to create gradients, drop shadows or rounded-corners, as there are with creating images for text. The designer must make sure the images are labeled and referenced correctly to ensure the effect shows up in the design. One must also think about which file format to use, especially for the shadow element because the background must be transparent.

Before the implementation of the latest draft of CSS3 it was a long process to create these simple, yet attractive, design techniques. However now that designers have the ability to implement these techniques by using his or her style sheet, one can expect the development process to be streamlined. Gradients, drop-shadows and radius-borders are already being implemented on the web today, as browsers such as Apple's Safari, Mozilla's Firefox, and Google's Chrome are beginning to support CSS3. One company that is already implementing CSS3 into their designs is ZURB. ZURB is a team of designers that have worked on sites such as Facebook, Yahoo, eBay, and Photobucket. When asked about which features of CSS3 they are currently implementing into their designs, the ZURB team replied, "One example is using box-shadow…using CSS3 to generate shadows is significantly faster and more easily controlled than creating top, side, and bottom shadow PNGs. They would also go on to say that "The save in terms of development time, for us and our client, is significant" (An Interview with ZURB). The ZURB team also mentioned the border-radius property, "In terms of headaches avoided, border-radius has been a huge time saver when it comes to implementation" (An Interview with ZURB). As browsers start supporting more and more of the features

in CSS3, one can expect to see more people designing with CSS3 specifications, which in turn will result in fewer images being used in designs.

Transitions and Animations

CSS transitions and animations are another group of properties that are helping to create more dynamic websites while still minimizing the amount of loading time that it takes for mobile browsers to load the page. With the new transitions and animations properties, web designers can create simple transformations and animations to the HTML elements on the page.

Prior to the release of CSS3, if web designers wanted to incorporate movement of elements on the page, they would have to use either Javascript or Flash to move the elements. However with the transitions property of CSS3, designers can now create the same effects with just a few lines of code (Apple). Another benefit of CSS transformations and animations is that they can be hardware accelerated. Which means that the hardware used to view the animations can optimize the animations to ensure that movement smooth and fluid.

The various transitions and animations also help to optimize websites for mobile devices by having all of the transitions rely on a single CSS file rather than various different Javascript, or Flash files. Currently Flash is not supported by mobile browsers. Companies such as Apple have no intention of supporting Flash on their mobile devices. This means that the only way to create interactivity on mobile devices is to utilize either Javascript or CSS3. What is holding CSS transformations and animations back is browser support. Refer to Figure 3 and Figure 4 for browser compatibilty statistics.

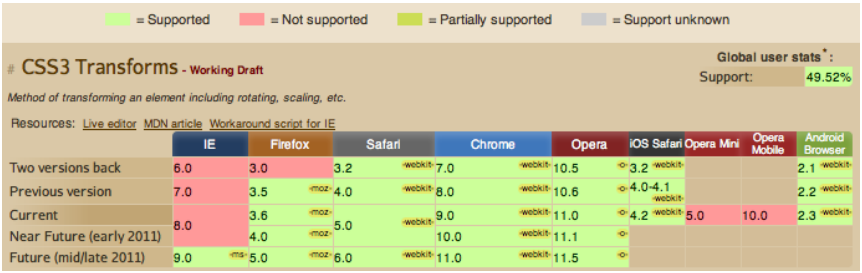


Figure 3

CSS3 Transformations Browser Support (http://caniuse.com/)

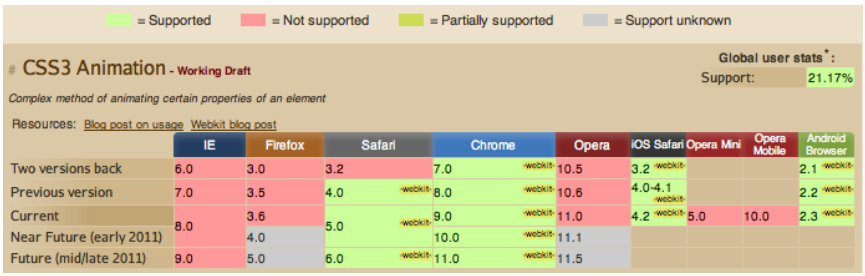


Figure 4
CSS3 Animations Property Browser Support (http://caniuse.com/)

Audio and Video

HTML5 now allows for embedding of audio and video directly into the HTML code. The biggest benefit to being able to embed audio and video is that it does not require users to have any sort of software. Prior to the release of HTML5 the only way to place video into a website was through Flash. Since Flash is not supported on mobile browsers there was no way to view video on a mobile browser. In an interview with Jeremy Limpic a web designer who has been designing with HTML5 and CSS3, Limpic expects the audio and video tags to play a large part in the future of web experiences. Limpic anticipates that as HTML and CSS develop, audio, video and web technologies will start to blend together, to help create more innovative user experiences.

Currently the only mobile browsers that support the video tag is Apple's Mobile Safari, and Google's Android Browser. Another road-block that web designers are facing when using the video tag is that there is no standard video format. According to The Stat Counter Global, a website that gives statistics on browser use, there are six browsers that currently support the video tag, however each one requires a different type of video format to be embedded. See Figure 5 for browser compatibility of HTML5 video tag.

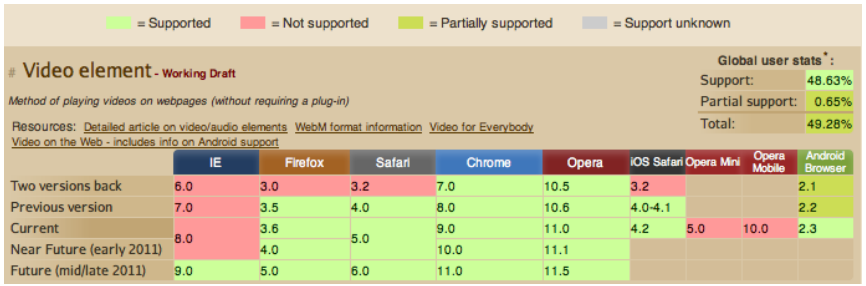


Figure 5
HTML Video Element Browser Support (http://caniuse.com/)

Despite all of the new features being offered by CSS3 there are still issues with browsers supporting them. The first drafts of CSS3 and HTML5 was released in March of 2007 and January of 2008 respectively, however they are just now starting to become supported by browsers (Etemad, Ishii, and Murakami). According to Garret Jantzen, Internet Explorer could be the one to blame for how long it has taken for HTML5 and CSS3 to become adopted. According to W3Cschools.com in 2009 37% of internet users were using Internet Explorer. Until the release of Internet Explorer 9 in February of 2010 Internet Explorer had no support of HTML5 and CSS3. With more than a third of people using Internet Explorer, it did no good for designers to waste their time designing with HTML5 and CSS3 specifications when a large majority of viewers wouldn't be able to see, or interact with the website the same way. Another reason why there is a shift towards HTML5 and CSS3 today is because the percentage of viewers using Internet Explorer is reducing, and the amount of people using HTML5 and CSS3 compliant browsers are increasing. According to W3Cschools.com, the percent of people browsing on Internet Explorer has declined to 26% with Firefox now becoming the browser of choice with 42.8% of the Internet audience. Jantzen also mentioned that the viewers of websites can also be to blame for the delayed adoption of CSS3 and HTML5 saying that "It is also the responsibility of website viewers to upgrade their browsers to ensure that their browsers are performing at their best." Also adding to the increase adoption of CSS3 and HTML5 is that mobile devices such as the iPhone, iPad, Blackberry, and Droid are working to support these features. Apple has been leading the way as they are the first to support HTML5 and CSS3 with their browser Mobile Safari. With the recent adoption of CSS3 and HTML5 by mobile devices and Internet Explorer 9 one can expect that as more designers start to utilize the power of CSS3, and begin implementing CSS3 into their websites, the number of browsers supporting CSS3 will dramatically increase.

Chapter 3 - Research Methods

Before the release of CSS3 and HTML5, there were many design limitations that had a considerable effect on the design process of website development for mobile devices. However with the release of HTML5 and CSS3 designers are now able to create more interactive websites that able to be viewed on mobile devices and desktop computers. Because the focus of HTML5 and CSS3 is on mobile devices, HTML5 and CSS3 will also help to reduce the amount of information that must be loaded by decreasing the amount of images used throughout the development process. This study will focus on how HTML5 and CSS3 will dramatically reduce the amount of images being used in the website development process, and examine how the reduction of images being used in website designs will also decrease the amount of time that it takes designers to create a website.

To determine if HTML5 and CSS3 will in fact reduce the amount of images used on websites and increase designer productivity, the Elite and Specialized Interview and Descriptive Research methods will be used. According to Dr. Harvey Levenson's book titled, *Some Ideas about Doing Research in Graphic Communication*, the Elite and Specialized Interview is a style of interviewing where subjects are "asked precise, open-ended questions, but questions that are open to refinement as the research and interview continues," unlike "a standard interview which pursues a predetermined line of questioning" (Levenson).

For the Elite and Specialized Interviews, I chose to interview two professional web designers, who have been working with CSS3 and HTML5. The two subjects that were interviewed were:

-**Garth Jantzen:** Co-founder/Lead UI Engineer at Vunction Interactive. Vunction is a small design company that specializes in HTML5 and mobile website development. Garth combines creativity with technology. As a lead user interface engineer, his passion lies in building engaging web applications that communicate brands in new ways across devices.

-**Jeremy Limpic:** Co-founder of 805 Design Collective. Limpic has experience in designing with Flash, as well as HTML5, CSS3 when designing for mobile devices.

The questions asked included:

1. Which features of CSS3 and/or HTML5 are you using the most?

2. Which properties, elements of HTML5 or CSS3 are having the biggest influence, or do you anticipating having a major influence on web development?

3. How much time are you saving in using HTML5 and CSS3 as compared to not using these features? Which properties are saving you the most time?

4. What issues are you running into with HTML5 and CSS3?

5. How are you dealing with browser compatibility?

Due to the fact that HTML5 and CSS3 are continuously evolving, the interview process will provide the most up to date views of CSS3 and HTML5 from professionals who are currently utilizing these technologies. So research on HTML5 and CSS3 was based upon the data gathered from interviews.

According to Dr. Harvey Levenson's book titled, *Some Ideas about Doing Research in Graphic Communication*, the purpose of Descriptive Research is to "determine the nature of a situation as it exists at the time of the study" (Levenson). Descriptive Research consists of several different methods including case studies, surveys, developmental studies, follow-up studies, documentary analysis, trend analysis and correlation studies. The case study method of descriptive research will be used for this study. A case study "is an intensive investigation of one individual or of a single unit, [or] a small group"(Levenson). However to investigate the features of CSS3 and HTML5 there will be a case study examining several different websites which are demonstrating the use of the features of HTML5 and CSS3 that are impacting web development.

This study will examine how the new features of HTML5 and CSS3 will dramatically reduce the amount of images being used. As well as investigate the new features of HTML5 and CSS3 specifically transformations and animations, the video tag, as well as a group of properties that will reduce the amount of images being used.

Chapter 4 - The Results

Garth Jantzen

When asked about which features of CSS3 and HTML 5 he uses the most, Jantzen answered that there wasn't just one feature that he was using the most, but rather a group of features. The group of features that Jantzen has been using the most deals with removing the amount of images being used throughout the website. More specifically the gradients, drop-shadow, border-radius, and @font-face properties of CSS3. Jantzen has found these properties to be so helpful for a couple of reasons. The first and main reason why Jantzen uses these properties so much is that they are reducing the amount of images being used in his designs. This is particularly important for Jantzen as he designs for mobile devices, so he must constantly be thinking about optimizing his designs to keep loading times down. Another benefit that of this group of properties is that they also remove the process of creating the images, which can be very time consuming to the web designer.

Two properties that Jantzen anticipates to have a major effect on web development are CSS animations and transitions. The main reason why Jantzen expects transitions and animations to have such a large effect on web design is because they are so powerful. "CSS transitions and animations allow for the designer to seamlessly transition or animate CSS styles to other CSS styles." Prior to CSS3 if a designer wanted to integrate movement into their designs it would be a fairly difficult process. In order to create movement of elements on the page, the website would require a large amount of Javascript coding, or would have to be created entirely in Flash. However because the majority of mobile devices do not support Flash, this is not an option for Janzten; as he designs for mobile devices. However now with CSS transitions and animations, the designer can now specify these movements in a few simple lines of code. (Jantzen)

When asked about which features saves him the most time, Jantzen answered that there are several features of CSS3 and HTML5 that are reducing the amount of time that it takes for him to design websites. Jantzen answered the properties that are reducing the amount of images being used

in designs are the CSS gradients, @font-face, border-radius, and drop-shadow properties. Jantzen stated, “depending on the size of the project, [these properties] can save me several hours of production time.” Jantzen noted that the audio and video tags in HTML5 are also saving time. What he likes so much about the audio and video tags are that they do not require the viewer of the website to have any sort of special software in order to view the sound or video.

Despite the advantages of CSS3 and HTML5, there are still some issues that designers must consider when designing with CSS3 specifications. The main issue that Jantzen has with HTML5 and CSS3 is that all of the browsers are doing different things, and there is no set standard. The lack of standardization can be seen in the audio and video tags. When embedding audio or video into HTML5, the designer must now think about which audio or video format to use. Browsers such as Internet Explorer 9, Safari 3.0+, Mobile Safari, and the Android Browser all require a MP4 video format. While Firefox, Chrome, and Opera require a M4V video format. The lack of standardization does not just apply to the audio and video tag, but also to properties like the @font-face property which also has no standard format being used for fonts.

As far as browser compatibly, Jantzen is running into problems is with the people who are viewing the site. According to Jantzen, one of the main reasons why people are not able to experience the HTML5 and CSS3 in his websites is because their browsers are not up to date. And Jantzen feels that it is the responsibility of the general public to make sure that their software is up to date so that they can experience what HTML5 and CSS3 have to offer. Another very common issue that most web designers face when designing web pages for mobile devices is that they often do not look the same, or perform the same on a mobile device as they do on a desktop computer. However Jantzen takes a slightly different approach when designing for mobile devices. Jantzen argues that websites should not perform the same on mobile devices as they do on the desktop. The first reasons why Jantzen argues mobile websites do not provide the same interactivity is that there is no mouse. The second reason is the size of the screen is significantly smaller, which does not allow users to see elements of the page the same size as they would on a desktop. The third reason why Jantzen feels mo-

bile websites do not perform the same is because of the internet connection. When viewing websites from a mobile device, unless the viewer is connected to a wireless network, they will typically have a much slower internet connection. So Jantzen feels that it is important to Figure out what information is important to the viewer. Then optimizing the information to decrease the amount of loading time.

Jeremy Limpic

When asked about which features are being used the most, Jeremy Limpic answered the audio and video tags, as well as the @font-face property. Limpic mentioned that one of the best things about the audio and video tags is that they are allowing designers to place audio and video into a website without having to rely on Flash. Being able to design without having to rely on Flash is particularly important when designing for mobile devices. Limpic has also been incorporating the @ font-face property into his designs. Limpic is so excited about the @font-face property because of the lack of variety in fonts that were deemed acceptable for web design prior to CSS3. Limpic feels that the @font-face property allows for more creativity, and a more customized design.

One feature of HTML5 and CSS3 that Limpic expects to have a large impact on the web is the video tag. One of the reasons why Limpic expects video to have such a profound effect on web development is because video is being used by so many people. And as HTML5 and CSS3 progress, Limpic expects that "media will start to blend together and become a much more regular throughout the web design process."

As far as time-savings, Limpic has found the @font-face property has saved him a large amount of time in his development process. Limpic has noticed the bigger the web site project, the more time that the @font-face property saves him. Prior to CSS3 if he wanted to use a font that was not web safe, Limpic would have to create a separate image for each area of text that he wanted to use a custom typface. And if a client decided that they wanted to change the color of the text, Limpic would have to recreate all of the images again in the specified color. The @font-face property allows

him to make all of the changes directly to CSS file, which is much easier to modify. However Limpic goes on to mention that the @font-face property also helps him create sites that are better optimized for search engines. Because the @font-face property modifies HTML text, it means that search engines can read through all of the text on the page.

When asked about issues with HTML5 and CSS3, like Jantzen, Limpic also sees a problem in the amount of people that do not update their browsers. This causes a problem for the people view the website because they are not able to experience the same effects the designer intended when he created the website.

Case Study

In order to demonstrate how HTML5 and CSS3 are streamlining the website development process, I will examine several different websites that are utilizing HTML5 and CSS3 in their designs. I will show examples of a specific property, and discuss how the effect would be created in CSS2. And then I will show the snippet of code that makes the effect possible in CSS3.

@font-face property

The @font-face property is now making it possible for web designers to embed specific fonts into their cascading style sheet. Prior to CSS3 if a designer wanted to incorporate the font TrumpGothicEastMedium into their website, he would have to create a separate image for each header tag on the page. Refer to Figure 8 notice that there are five header tags using the @font-face property. This may not seem like a very large number but as the website grows in size, the amount of header tags being used will also increase. The solution to this problem can be found in the @font-face property. When using the @font-face property, the designer first must specify the font that is to be used (Figure 6). Once the font is specified, the designer then applies the style to the elements on the page. Refer to Figure 7, notice that all of the header elements of the page will appear in TrumpGothicEastMedium. The avantage of the @font-face property over the use of images is that if the designer wants

to edit the styling of all the header tags, he or she can make changes to the entire document simply by editing the stylesheet.

```
@font-face {
        font-family: 'TrumpGothicEastMedium';
        src: url('../typefaces/trumpgothiceast_medium/TrumpGotEasMed-webfont.eot');
        src: local('☺'),
            url('../typefaces/trumpgothiceast_medium/TrumpGotEasMed-webfont.woff') format('woff'),
            url('../typefaces/trumpgothiceast_medium/TrumpGotEasMed-webfont.ttf') format('truetype'),
            url('../typefaces/trumpgothiceast_medium/TrumpGotEasMed-webfont.svg#webfont9JD8bKhs') format('svg');
        font-weight: normal;
        font-style: normal;
}
```

Figure 6
The @font-face declaration.

```
    font-family: 'TrumpGothicEastMedium','LeagueGothicRegular',"Impact",sans-serif;
    font-weight: normal;
    text-transform: uppercase;
}
```

Figure 7
Styling of header elements.

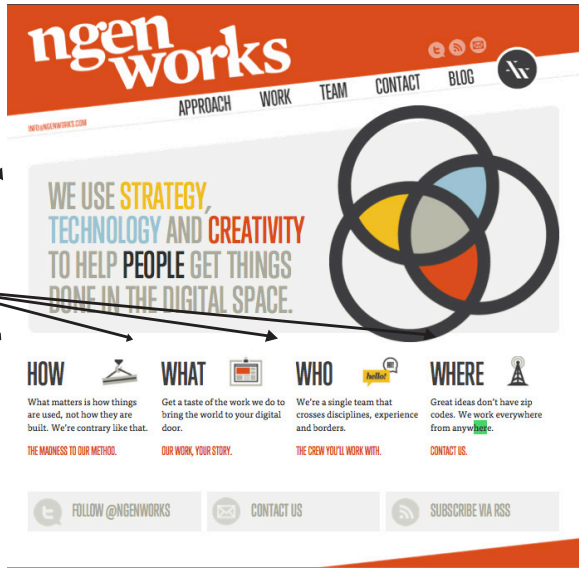
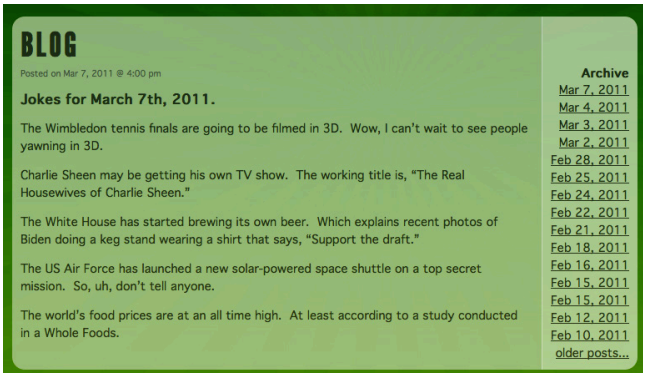


Figure 8
Website with @font-face examples.

Border Radius

The border-radius property is also reducing the amount of images being used throughout the development process. Before the release of CSS3 there were a few different ways to create the effect of a rounded corner. The simplest way to create the rounded corner was to simply create the desired image, and then place it as a background image. This would allow the designer to place text or graphics on top of the background image. However, this method creates a problem if the elements on the page change size. Many web browsers give the viewer the ability to zoom, or magnify the content of the page. When this happens the text on the page becomes larger and the content may exceed the




```
-moz-border-radius-bottomleft: 15px;
-moz-border-radius-bottomright: 15px;
-moz-border-radius-topleft: 15px;
-moz-border-radius-topright: 15px;
```

Figure 9
Border-Radius Example

area of the background image. The second method for creating rounded corners was to create two images; one for the top two corners and one for the bottom two corners. Once the graphics are created, they are placed into a background image, and then placed at the top and bottom of the content box. The advantage of using this method is that the content area of the box is able to expand. Which means that if the viewer of the website magnifies the text on the page, that the content box will be able to expand with the text. With CSS3 however, designers now have the ability to create rounded corners with four lines of code (Figure 9). CSS3 also gives designers the ability to specify exactly how much they want each corner to be roudned. What makes the border-radius property particularly useful is that designers can specify a different border-radius for each corner.

Refer Figure 10, notice that the top right corner of the box is not rounded, because that property has been turned off.

```
-moz-border-radius-bottomleft: 15px;
-moz-border-radius-bottomright: 15px;
-moz-border-radius-topleft: 15px;
-moz-border-radius-topright: 15px;
```

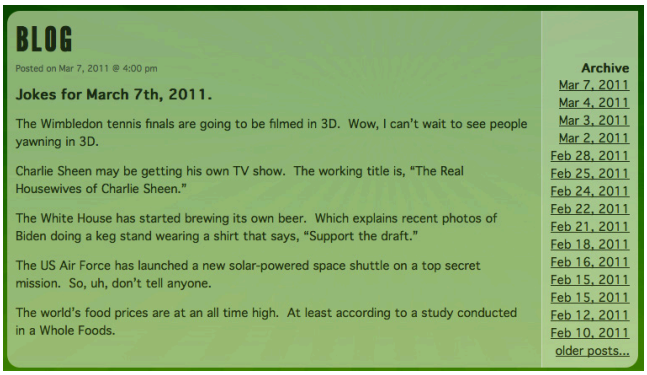


Figure 10
Border-Radius example without top-right border radius

CSS Gradients

Another feature that reduces the amount of images being used in the web development process is the CSS gradients property (Figure 10). Prior to the release of CSS3 designers would have to create all gradients as a separate image, and then place them into their desired location. Much like the other properties that are reducing the amount of images being used on the web, if designers wanted to modify their gradient, they would have to create a whole new image to replace the previous one. With CSS gradients however, designers can now simply specify the two colors that they want to use, the type of gradient, either linear or radial, and how fast the colors change. One of the biggest advan-

tages of CSS gradients is how easy it is for the designer to modify the gradient. Refer to Figure 11, notice the property specifies the two colors being used. If the designer wanted to change the color of the gradient, all that needs to be done is to change one of the two end colors of the gradient.

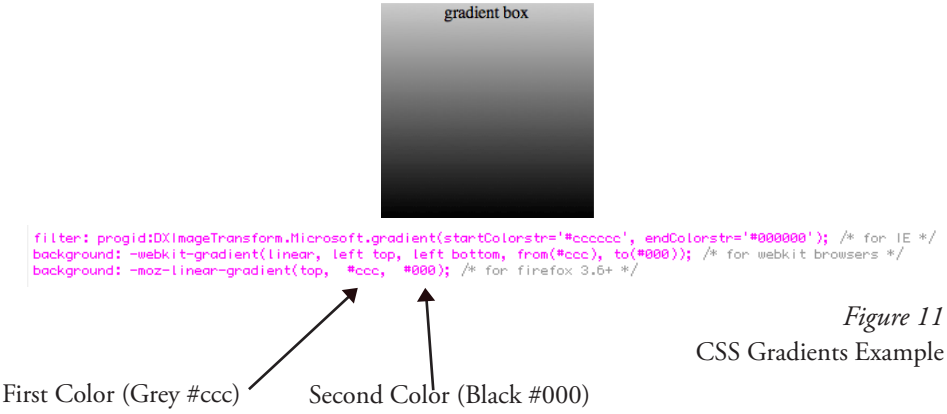


Figure 11
CSS Gradients Example

HTML5 Video Tag

The video tag of HTML5 is also reducing the amount of time it takes for website designers to create sites using video. Prior to the release of HTML5, designers did not have the ability to place video directly into their HTML. To get around this, many web designers turned to Flash to create their videos, however with mobile devices not able to view Flash this created a problem. However

```
<video id="html5player" width="592" height="256" poster="../video/poster-
demo.jpg" preload="metadata" controls="controls" tabindex="0">
    <source type="video/webm" src="http://iberindia.com/demosite/video/demo.webm"></source>
    <source type="video/ogv" src="http://iberindia.com/demosite/video/demo.ogv"></source>
    <source type="video/mp4" src="http://iberindia.com/demosite/video/demo.mp4"></source>
</video>
```

Figure 12
HTML5 Video Embed Example

with HTML5, designers now have the ability to embed video directly into their HTML. Figure 12 demonstrates how the video tag is used. Currently the only issue associated with the video tag is that all of the browsers require a different video format. So if a designer only embeds one video format, the video will only be visible in browsers that support that particular video format. One way designers are getting around this problem is by embedding several different video formats, to account for the different browsers. Refer to Figure 12, notice that the designer utilizes three video formats: MP4, OGV, and WebM. To ensure that the video will be visible in all browsers, the designer must be sure to embed each video format.

Prior to the release of HTML5 and CSS3 web designers relied heavily on images and other coding languages to create interactive websites. However with the recent release of HTML5 and CSS3 designers now have the ability to create many of the same effects with HTML and cascading style sheets. The Elite and Specialized Interview and Descriptive Research methods of research, have demonstrated how CSS3 and HTML5 are reducing the amount of images being used. As well as decreasing designers' dependence on Flash, Javascript, and other languages being used throughout the design process.

Chapter 5 - Conclusions

This study was designed to examine several of the new features of CSS3 and HTML5. More specifically, how transitions, and animations, and audio and video tags are helping to create interactive websites for mobile devices. As the new features of HTML5 and CSS3 are being implemented fewer images will be needed to produce websites. With industry professionals expecting nearly 50% of all internet interaction to be on a mobile device by the year 2015, it is important that designers consider how their website will look on a mobile device.

The Elite and Specialized Interview method of research and literature reviews provided tremendous insight as to how industry professionals are handling the new features of HTML5 and CSS3. The interviews also produced valuable information regarding how these industry professionals are dealing with many of the issues present in both HTML5 and CSS3. The case study portion of Descriptive Research helped to demonstrate exactly how HTML5 and CSS3 are helping to reduce the amount of images, and designers' dependence on other languages of code.

Now that browsers such as Internet Explorer, and mobile browsers such as Mobile Safari and the Android Browser are supporting HTML5 and CSS3, one can expect that the amount of designers utilizing the power of HTML5 and CSS3 will increase. As the percentage of websites being produced in HTML5 and CSS3 increase, one can expect that the amount of images being used in the design process will decrease. In addition to reducing the amount of images, CSS3 and HTML5 will also reduce the amount of websites that are dependent on other languages of code, such as Flash.

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