

The Preferred Use of Responsive Web Design Versus Adaptive Web Design in Various Industries

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Keywords: oba, color management, measurement, uv

Abstract

Adaptive and responsive web design are the two leading development methods for optimizing websites for the desktop and mobile use. This paper determines which type of web design method is used most often, and it examines which factors contribute to the use of that specific method. For this study, 40 web designers/developers were surveyed. The results indicated that web designers, who developed larger sites, preferred the adaptive web design method. The responsive web design method was a preference for smaller sites, specifically those requiring frequent updates.

Introduction

There is no doubt that both Responsive and Adaptive web design are a crucial part of web development today. As the sale of smartphones and tablets dramatically increase, so does the importance of mobile-friendly websites. So, which approach to web design is best for you? At what point does Responsive become more favorable than Adaptive, and vice versa? To find the answers to these questions a survey was created to collect data on the details involved with each approach to web development. The research and data have been compiled into the following paper in order to further one's understanding of Adaptive and Responsive design and ultimately offer a guide to help determine under which circumstances each method is best used.

Problem Statement

How do you determine which approach to web design should be used in a given situation? To start, a background of each approach needs to be established. Adaptive web design was first coined by Aaron Gustafson in his book, *Adaptive Web Design: Crafting Rich Experiences with Progressive Enhancement* (Gustafson, A., & Keith, J. 2011). This method uses a predefined set of layout sizes along with CSS and JavaScript to adapt to the device accessing the site (Boudreaux, R. 2013). The site is catered to the device that is viewing it, meaning certain content can be withheld or added to certain devices by editing the corresponding layout. Responsive design was coined by Ethan Marcotte in his online article *Responsive Web Design*. Essentially a site designed with Responsive Web Design alters the layout to the environment it is being viewed in by using fluid grids (proportion-based), flexible images, and CSS3 media queries (Marcotte, E. 2010). The use of EMs, flexible images, flexible videos, and fluid type, allow the responsive website to adapt its layout to the viewing device, user agent, and environment (Boudreaux, R. 2013). This means that a website developed using Responsive Web Design not only adapts to the device it's on, but also responds to the window it is displayed within. However, this also means that all content on the website will be shown on all devices.

Literature Review

Although Adaptive and Responsive web design have many differences, they also have a couple of similarities. One is the fact that they both use one URL, which makes it easier for users to interact with the website (Boudreaux, R. 2013). The other is that they both change appearances based on the environment that they are viewed in (Boudreaux, R. 2013).

With Adaptive Web Design, the server determines the displayed layout rather than the browser (Charlton, G. 2014). This is referred to as server side programming. This can often be quicker than client side programming because the server detects the device and operating system, and then chooses the correct version of the site to be loaded (Charlton, G. 2014). This limits the amount of information that needs to be downloaded (Charlton, G. 2014). According to Craig Lowell, "the webpage response times (which measures how long it takes for all of the data on a site to be downloaded) are 40.2 percent faster on average for AWD sites when accessed on wireless networks due to the significantly smaller amounts of data which make up adaptive sites (an average of ~791 KB, compared to ~1.2 MB for responsive sites)." (Lowell, C. 2014). Another advantage of using Adaptive Web Design is the ability to tailor the user experience based on the device being used (Cao, J. 2015). In his online blog Graham Charlton says, "The experience on an adaptive site can be finely tuned to the device, so that it is intuitive, super quick and takes advantage of things like location, voice and HTML5." (Charlton, G. 2014). These are things

that are not necessary on a desktop site but could be useful for the mobile audience (Charlton, G. 2014).

One of the disadvantages of using Adaptive Web Design is the large team of developers and the budget that is required to maintain the site (Charlton, G. 2014). Although it is a good approach, it does require that separate layouts be designed, developed and maintained (Charlton, G. 2014). Nick Pettit states in his online article that “The major drawback is that device widths in-between the explicit breakpoints (or predetermined layouts) are often less than ideal, with either too much space or not enough space.” (Pettit, N. 2014).

In regards to Responsive Web Design, the browser determines how the site will be displayed (Charlton, G. 2014). This is referred to as client side programming. By having the browser determine how the content fills the page this allows the site to respond to the width of the window it is being viewed in (Ruluks, S. 2014). This also allows your site to respond to new device sizes without having to create any additional layouts (Ruluks, S. 2014). “Just as a liquid spreads out or draws in to allow its content to fill an allotted space and retain its appearance, responsive web design’s fluidity achieves the same result with website content on a device screen”. (Kundu, S. 2014). In his online article, Matthew Harris mentions that, “Responsive sites are flexible enough to keep working on their own, but Adaptive sites will likely need some occasional maintenance.” (Harris, M. 2014) . This means that less maintenance is required and when updates are needed there is only one set of content to update (Marcotte, E. 2010).

One downside to Responsive web design is the slower download times (Lowell, C. 2014). Because the design is rendered on the client side, the browser needs to download the entire webpage before being able to resize it to the correct screen size (Lowell, C. 2014). This may not be noticeable on smaller websites, but it can cause problems for mobile users attempting to access larger, more complex sites (Lowell, C. 2014). Another disadvantage is that if there is an existing site and one wants to optimize it for mobile use, they will need to start from the ground up (Cao, J. 2015). When it comes to Adaptive and Responsive web design, neither one is better than the other for every website. It is circumstantial and choosing the right method of development relies heavily on understanding your target audience.

Method

A survey was put together to collect information from professionals involved in web design and development in order to determine which method should be used in any given situation. The results of the survey were analyzed to determine the industry, complexity, overall time, and cost involved in developing a website using each development method. The survey was created using SurveyMonkey and consisted of four pages and 19 questions. Not all questions were asked to all participants. All

participants started on page one of the survey.

- 1) Which method of web design does your your company use most often?
- a) Adaptive
 - b) Responsive
 - c) Both
 - d) Neither

Figure 1:1

If the user indicated that they used one method of development over the other, they were directed to page two and were asked a series of questions pertaining to the single development method.

- 1) Why do you use one over another?
- (Open response)
- 2) Which type of website does your company create most often?
- a. Medical
 - b. Retail
 - c. Oil & Gas
 - d. Non Profit
 - e. Education
 - f. Small Business
 - b. Other _____
- 3) On average, what do the websites that your company creates entail? Number of pages, layout, complexity, etc.
- (Open Response)
- 4) On average, how long does it take your company to complete development of a website? Development only / not including design.
- a. 1 – 2 weeks
 - b. 3 – 4 weeks
 - c. 1 – 2 months
 - d. 2 – 4 months
 - e. 4 – 6 months
 - f. More than 6 months
- 5) On average, how long does it take your company to design a website? Design only / not including development
- (Open response)
- 6) On average, how long does it take your company to design, develop, and launch a website?
- a. 1 – 2 weeks
 - b. 3 – 4 weeks
 - c. 1 – 2 months
 - d. 2 – 4 months
 - e. 4 – 6 months
 - f. More than 6 months
- 7) On average, how much does it cost your company to develop a website? Development only / not including design
- (Open response)
- 8) On average, how much does it cost your company to design a website? Design only / not including development.
- (Open response)
- 9) On average, how much should your company's clients expect to spend on the creation of a website?
- (Open response)

Figure 1:2

On the other hand, if the users indicated that they use both methods of development, they were directed to page three and asked questions comparing the two methods.

- 1) Which type of website does your company create most often?
 - a. Medical
 - b. Retail
 - c. Oil & Gas
 - d. Non Profit
 - e. Education
 - f. Small Business
 - b. Other _____
- 2) On average, which method entails more complexity? Number of pages, layout, development, etc.
 - a. Adaptive
 - b. Responsive
 - c. Same
 - d. Other _____
- 3) On average, which method of web design takes longer for your company to develop? Development only / not including design.
 - a. Adaptive
 - b. Responsive
 - c. Same
 - d. Other _____
- 4) On average, which method of web design takes longer for your company to design? Design only / not including development.
 - a. Adaptive
 - b. Responsive
 - c. Same
 - d. Other _____
- 5) On average, which method of web design takes longer for your company to design, develop and launch?
 - a. Adaptive
 - b. Responsive
 - c. Same
 - d. Other _____
- 6) On average, which method of web design costs more for your company to develop? Development only / not including design.
 - a. Adaptive
 - b. Responsive
 - c. Same
 - d. Other _____
- 7) On average, which method of web design costs more for your company to design? Design only / not including design.
 - a. Adaptive
 - b. Responsive
 - c. Same
 - d. Other _____
- 8) On average, which method of web design costs more for your clients
 - a. Adaptive
 - b. Responsive
 - c. Same
 - d. Other _____

Figure 1:3

All users were then guided to page four of the survey, which only contained one question, “Is there any other information that you think would aid in my research?”

- 1) Is there any other information you think would aid in my research?

(Open response)

Figure 1:4

This was an open-ended question that allowed users to add any thoughts or comments that they thought should be addressed.

This survey was posted on several different discussion boards, pertaining to web design and development, which were found on LinkedIn and Google+. Overall, 40 participants took the survey. The results were analyzed to determine which method takes more time and costs more money to design and develop. It also revealed which method contains the most complexity, and for which industries each is used most.

Results

Out of the 40 participants that took the survey, 11 used Adaptive design, 19 used Responsive design, eight used both, and two participants used an unknown method.

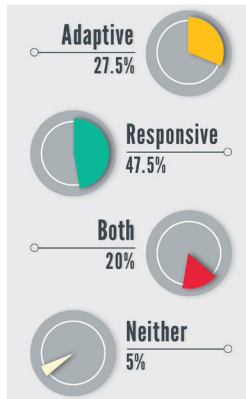


Figure 1:5

Participants that used both design methods expressed that the complexity involved with each site is the same in most cases. They also revealed that the overall time to create each site is relative. However, for the overall cost of each website, half of the participants implied that Responsive costs more and the other half suggested that they both cost the same.

For Adaptive web design the average site specifications were that of a 30-page site with 8 layouts. The average time spans were 1-2 months for development, 4-8 weeks for design, and 2-4 months from start to finish. On average the costs involved with Adaptive web design were \$5,645 for development, \$3,063 for design, and a total of \$9,745 for the price of the entire website.

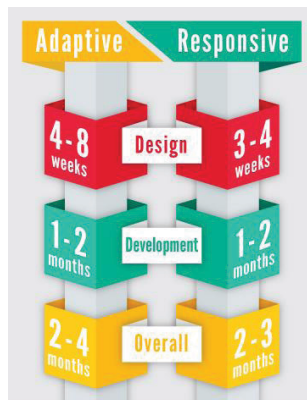


Figure 1:6

For Responsive web design the average site specifications were a 20-page site with 1 layout. The average timeline was 1-2 months for development, 3-4 weeks for design, and 2-3 months from start to finish. On average the costs related to Responsive web design were \$4,352 for development, \$1,163 for design, and \$7,842 as the price of the entire site.

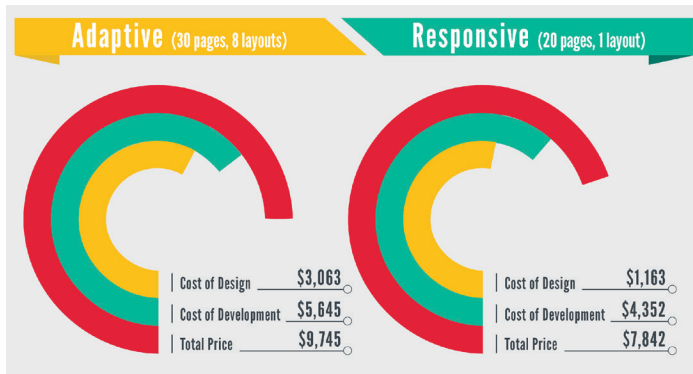


Figure 1:7

Overall, Adaptive was used most often in the medical, oil and gas, and non-profit industries, while Responsive was used most in retail, education, and small business.

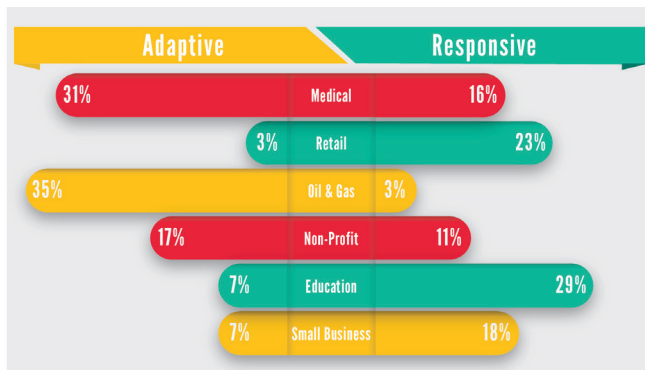


Figure 1:8

Participants that chose Adaptive over Responsive design did so due to the ability to have device driven content. Participants that chose Responsive over Adaptive design were most influenced by the fact that the site responds to the width of the window it is displayed in.

Conclusion

According to the data collected, Adaptive web design is best used for sites of 30 pages or more, containing content that is mainly informative and does not change frequently. It is also a good idea to use Adaptive web design if there is a desire for the content shown on mobile devices to be different than what is shown on

the desktop site. Responsive design is best used for sites containing less than 30 pages and for sites that have content that needs to be updated on a regular basis. Many participants mentioned that they often synchronize the Responsive sites they create with Wordpress, allowing their clients to update images and text when need be. In order to do this with an Adaptive site, all layouts would need to be uploaded and the client would need to update the information in all layouts to ensure the site's consistency across all platforms. As far as cost is concerned, there doesn't appear to be a significant difference. There is only a \$68 difference in the cost of each site when you determine the cost per page. In an ideal world, the best method to use would be both. This would ensure that all content responded to the width of the window and would also allow the possibility of catering content to each device. Although this would make for the best website, it would require constant communication between the design and development teams, which isn't always an option. Further research could be done on this topic to determine the differences in design choice based on new development and rebuilds. It would also be interesting to see how the recent popularity of "do-it-yourself" web design sites like wix.com will affect the evolution and growth of web design and development.

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