

VERSION

1.0

Segue Technologies, Inc.

RESPONSIVE DESIGN

Optimizing User Experience
for all Devices



www.seguetech.com

Version 1.0



Published 2014 by Segue Technologies, Inc.

Cover Design, Layout, and Illustrations created by
Segue Technologies.

All links featured in this book can be found at

www.seguetech.com/blog

About Segue Technologies

Segue has developed innovative, dependable, and user-friendly applications since our founding in 1997. We provide a wide range of Information Technology services, focusing on Software Engineering, Information Management, Quality Assurance, and Systems Integration. We are a growing small-business, supporting Federal, Commercial, and Non-Profit clients.

www.seguetech.com

TABLE OF CONTENTS

4 Foreword

INTRODUCTION TO RESPONSIVE DESIGN

6 Infographic 1: Responsive Design - What is it?

7 Infographic 2: Responsive Design - What are the benefits?

8 Why Your Next Website Should Be Responsive

12 Responsive Design: Getting Started

PLANNING AND PREPARATION

19 How Much Does a Responsive Web Design Cost?

24 The Importance of Wireframing for a Responsive Website

31 Using Site Analytics to Guide Your Responsive Website

35 Considerations When Planning a Responsive Design

IMPLEMENTATION

39 Using Task Analysis to Prioritize Content in Responsive Design

43 How CSS3 Supports Developing Responsive Design Websites

46 Challenges When Testing a Responsive Website

FOREWORD

Do you leave home without your smartphone? Have you replaced your laptop with a tablet? In addition to working at a desk or a home office, you've probably used your mobile handheld or tablet device to accomplish web-based tasks when you are up and about, and you are definitely not alone. This year the number of smart phones has topped one billion devices *world-wide*. These users are seeking the information, services, and/or products that you provide from their mobile and tablet devices. Your target audience is probably a much smaller number, but the reality of this growing mobile trend is that you need to make sure the digital door to your company welcomes all visitors from all devices with the same quality of user experience as desktop visitors, and this is achieved through Responsive Design.

These days, the desire for information, and the expectation to immediately find it, is unprecedented. The ability to find a website with precisely what you want through a search engine is simply amazing. This has shifted the importance of a business website from mostly informational, to a primary communication avenue to customers, and often a replacement for brick and mortar retail space. Websites are where customers interact and shop. Websites used to be built for "typical" users, designed for the most common web browsers and the most typical screen resolutions (usually 1024x768). Some sites even went so far as

to proclaim the specific browser and screen resolution that visitors should have. However, with the proliferation of smartphones, tablets, “ultrabooks,” and other devices, you must realize that there is no longer a “typical” user. To properly serve all customers, websites have to be built smarter so that they look great on just about any device, of any size, using any web browser.

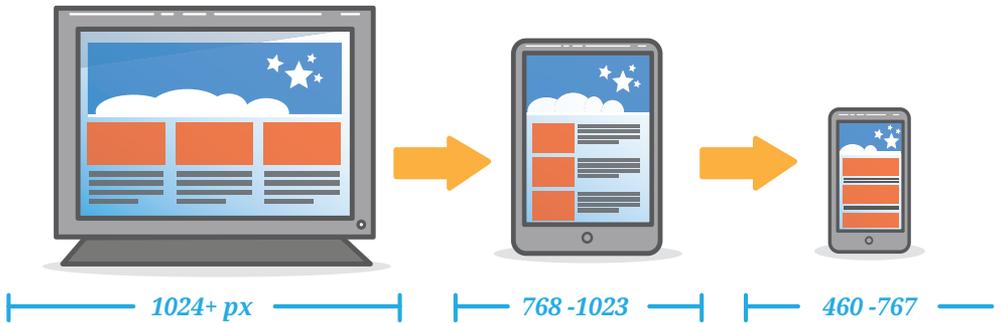
The mobile experience cannot be ignored. Visitors on websites that are not optimized for their mobile and tablet devices tend to quickly leave and 57% of consumers won’t recommend a business with a poorly designed mobile site and 40% will go directly to a competitor’s site after having a bad mobile experience (*Source: Mobile Marketer*). If you want to maintain the interest and loyalty of people viewing your site, you need to ensure that it is optimized for the devices they use. *Responsive Design* is a technique that allows web developers and designers to meet this goal, as it allows the layout of the site to “respond” to the screen size of the display (large or small).

This ebook is a collection of articles focused on responsive design written by Segue experts. We consider responsive design a best practice in website and web application development as it ensures an optimum user experience for all users, and every site should be designed for the user.

RESPONSIVE WEB DESIGN

WHAT IS IT?

Responsive Design is the approach that allows your website to respond to the device that it is being viewed on. Whether your audience visits your site on a computer, tablet, or phone, your site is tailored to provide the best user experience.



Responsive Design targets the size of each user's browsers to determine the size of the website it should display. Breakpoints, like the ones above, are created to determine the size of the browsing experience.

KEY COMPONENTS



WHAT ARE THE BENEFITS?



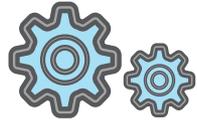
Your website looks great everywhere



No need to zoom on smaller devices to read content



Updates take less time because of a single source of content & code

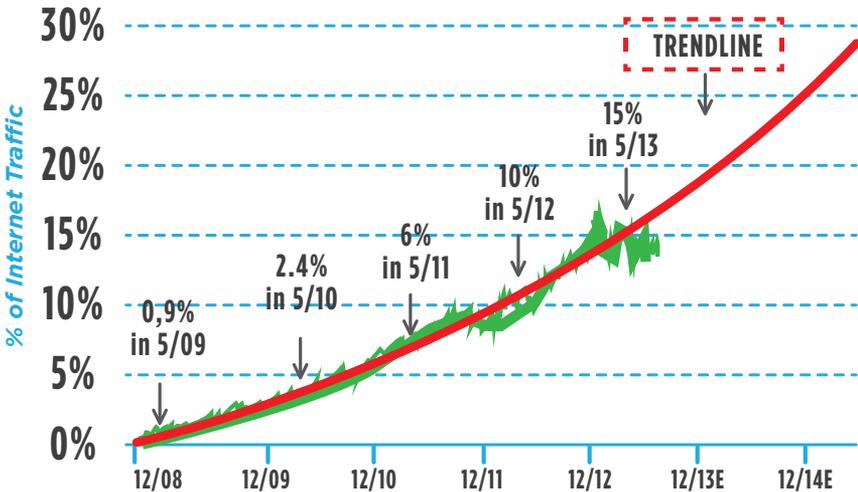


Better performance/consistent & tailored user experience

MOBILE TRAFFIC AS % OF GLOBAL INTERNET TRAFFIC

Growing 1.5x per year and likely to maintain trajectory or accelerate

GLOBAL MOBILE TRAFFIC AS % OF TOTAL INTERNET TRAFFIC, 12/08 - 5/13
(with Trendline Projection to 5/15E)



Source: StatCounter Global Stats, 5/13. Note that PC-based Internet data observed by streaming

Chapter 1

Introduction to Responsive Design



Why Your Next Website Should Be Responsive

by Jason Silkey

According to Wikipedia, Responsive web design (**RWD**) is a web design approach aimed at crafting sites to provide an optimal viewing experience—easy reading and navigation with a minimum of resizing, panning, and scrolling—across a wide range of devices (from desktop computer monitors to mobile phones). Ethan Marcotte first coined the term “responsive web design” in his seminal article on A List Apart. He laid out the theory behind this “new” approach and provided code examples

that established the foundation for building websites that will work well on any device.

By making your web design flexible and using CSS media queries to determine the screen and window size, orientation (portrait like a smartphone held normally, or landscape like a typical computer monitor), display resolution, and other characteristics of the user's device, we can design websites that reformat themselves, help with readability and improve the overall user experience. A number of high profile websites have launched responsive redesigns since Ethan's article was published in 2010, including The Boston Globe, Microsoft, Starbucks, and Harvard University. To see how responsive designs work, open any of these sites in your web browser on your computer and slowly resize your browser window.

WHY IS RESPONSIVE WEB DESIGN BETTER?

Most websites today solve the mobile vs. PC dilemma by creating two different websites optimized for each type of device and directing users to each site based on the type of device they are using. Often, the mobile website is a stripped-down version of the main website with access to only some of the site's content with none of the bells and whistles. Users are given a link so they can switch between the two sites in case the information they want isn't available on the mobile site or if they run into an issue and are directed to the wrong site.

PROBLEMS WITH SEPARATE MOBILE SITES

Having a separate mobile site causes a litany of problems including:

- 1. Mobile users are often given a “crippled,” less functional experience with less content.*
- 2. Mobile devices are not all created equal: they have a wide range of screen sizes and capabilities.*
- 3. Tablets don’t fit neatly into the mobile vs. PC paradigm; often they have screen sizes similar to PCs, but they function like mobile devices.*
- 4. Users often get directed to the “wrong” website either because they opened a link to the mobile site from their PC (or vice versa), or because the website failed to correctly detect the type of device.*
- 5. Companies have to maintain two versions of their websites.*

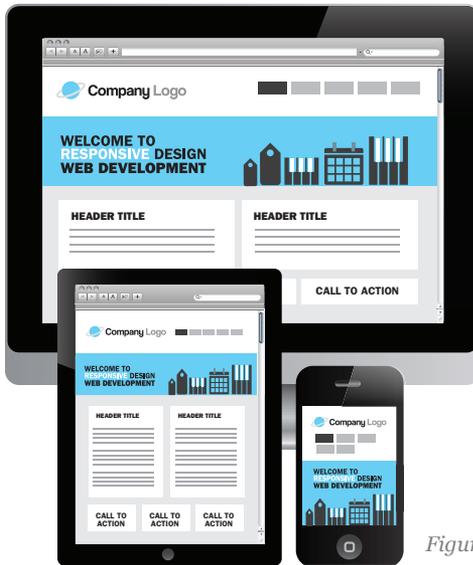
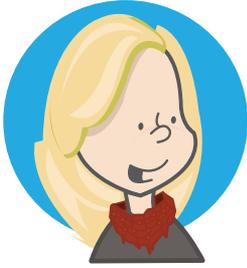


Figure 1

Responsive web design solves these problems by eliminating the second website and by optimizing the layout based on the capabilities of the device instead of trying to guess the type of the device. This means no more trying to guess if the user is on a smartphone, or tablet or PC, and no more links to content that doesn't exist on one version of the site or the other. There is only one website, and it looks great on any device.

Finally, responsive design isn't just about mobile. Many users have larger-than-average screens on their PCs. While many websites will stop resizing once the window reaches a certain size, a good responsive design will take advantage of all of the screen real estate available. [Smashing Magazine](#), a website for web designers and developers, does a good job of filling even the largest screens.

Building responsive websites requires designers and developers to think differently about what we create. Steven Allsop said it best in his classic [article](#), A Dao of Web Design: “The control which designers know in the print medium, and often desire in the web medium, is simply a function of the limitation of the printed page. We should embrace the fact that the web doesn't have the same constraints, and design for this flexibility. But first, we must accept the ebb and flow of things.”



Responsive Design: Getting Started

by Dana Frank

In 2013, Segue decided that it was time to make our website responsive. With thousands of users visiting our website each month from various devices, it had become evident that we needed to find a way to provide the same quality of user experience to all of our visitors.

Responsive design isn't just for mobile displays. "Truly" responsive sites have content that formats to both large AND small displays. That said, our site was already suited for the average desktop layout and was designed for a seamless display on those larger than usual devices (hello, 27" iMac monitors). So, we opted to focus our energy on the smaller screen viewing sizes that were quickly increasing across our user base. For the record, we plan to revisit the larger display for the .01% after we meet the needs of our one billion mobile and tablet users.

As we worked through our journey in responsive design, we were able to capture several lessons that are key points of focus for any future responsive efforts.

LESSON #1: MAKE SURE YOUR WEBSITE CONTENT IS READY TO BE TRANSFORMED INTO A RESPONSIVE DESIGN

It would be wasteful to design around content that was dated and in need of an update. So first things first - do everything you can to make sure your website is ready to be transitioned into a responsive site. Usability comes into play here by way of a [heuristic review](#). Take the time to go through your site and document outdated content and other areas that need a functional update.

The next move is to determine the priority of content on smaller devices. This is very different from figuring out how the content will look when it's viewed on different displays. I'm talking about what areas are more important to users and what should be moved to the top of the screen for more visibility.

Mobile users don't have much screen real estate, and it's frustrating to explore an entire website looking for information if it doesn't smack you in the face right away. We needed to identify high priority content areas and make that information easy to find - or risk losing a visitor, or worse – a potential client! One **Billion** potential clients.

LESSON #2: PRIORITIZE CONTENT BY DOING A TASK ANALYSIS EXERCISE

Prioritizing content will help you make informed design decisions when you're ready to wireframe the site. We got down to the nitty gritty by creating six personas based on existing clients. Then we created typical scenarios for each user. Each task was unique to the user's needs, and the steps to accomplish these tasks were tracked and later ranked by commonality across all the users. When you document the outcome, you can easily see the most critical and common tasks across the board. This determined the priority and placement of that information on the responsive site. In some cases we even made some adjustments to the existing site! It's a great time to make changes, and you already have the documentation to prove the need to make an update, so use it. In short, the more common the task, the easier we made the information to find on the mobile layouts. Yes, it's that easy!

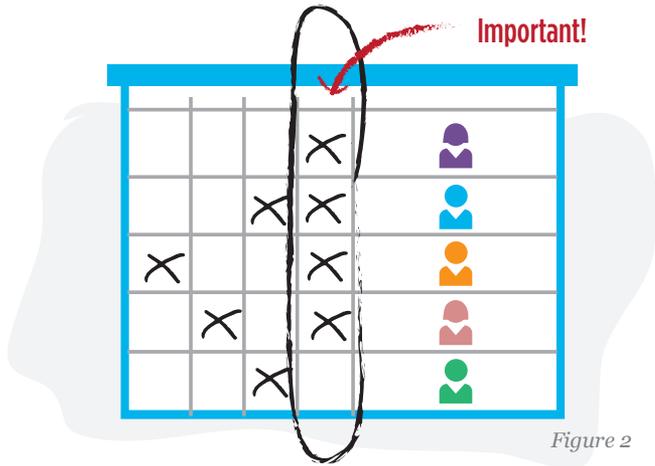


Figure 2

LESSON #3: WIREFRAME, WIREFRAME, WIREFRAME!

Now that you have your sections of content prioritized, you're ready to start laying out the responsive design for each page using wireframes. The process is easier than it sounds. When you size down information, the possible ways it can appear on the screen become limited. You may have fifteen page templates for your current site, but in tablet form that reduces to ten, and on a phone, you end up with five possible layouts.

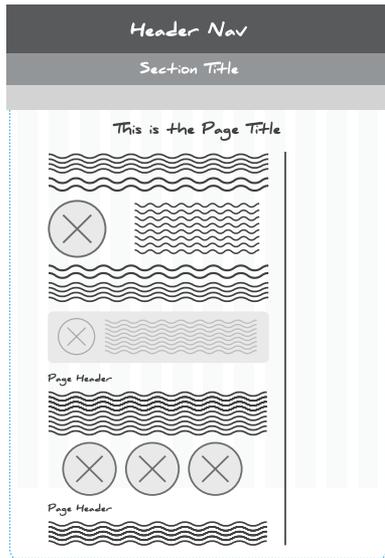


Figure 3

For our team, the best way to track the content and ensure it was being translated to the responsive design was to break up the sections using colors to block out each area, then tag unique content on the page with a number. As the responsive designs are mocked up, we cross-referenced the content to ensure every piece was included, especially the content that needed to be pushed to the top of the page (according to our task analysis information).

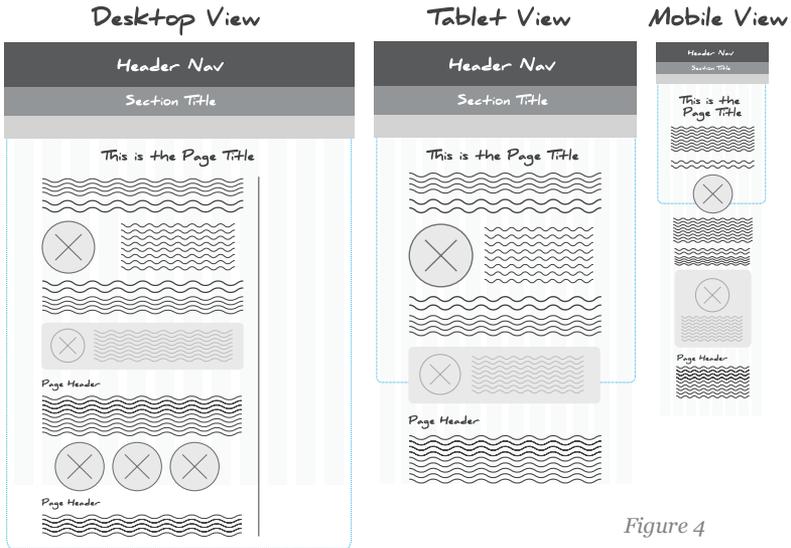


Figure 4

LESSON #4: PROTOTYPES ARE HELPFUL, BUT SO ARE STYLE LIBRARIES!

Ready for development? The next step is to provide direction to developers. This isn't what it used to be. After all, now you're designing for many different displays – not just one. Our solution was a hybrid Style Library paired with a hi-fidelity prototype of the homepage – just for kicks.

Why? For one, you really want to illustrate the general “feel” for the responsive layouts. Creating a polished prototype was helpful in establishing the artistic direction. But the more important document was the style library.

Our style library is basically a collection of treatments that contain specific information about all the web elements that get pushed around to make the different sized layouts. This includes every-

thing from colors to components, navigation, and formatting, and all the details in between. When the developers have this information, along with the lo-fidelity wireframes, they have everything they need to begin coding the site exactly how you planned it. If you save the style library, you can use it on future projects too. Just update the areas with the new design elements and you've saved yourself a lot of time.



Figure 5

This doesn't conclude the involvement of the Design and UX team, but outlines a series of steps we took to determine one (of many) design decisions that were taken into consideration during the responsive design phase of this project. Design and UX will remain a constant in the project lifecycle to support ongoing requirements. Style libraries are meant to be a living document. They should be reviewed and updated on a regular basis to keep the developers up to speed on those changes. In the scheme of things, updating the style libraries takes much less time than updating multiple prototypes.

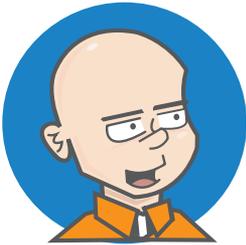
This approach to responsive design made adding additional functionality to our webpage a smooth process and will ultimately result in delivering better communication options to our customers.

ABOUT THE AUTHOR

Dana Frank is Segue's Creative Director and Certified Usability Analyst, specializing in responsive design and mobile application usability.

Chapter 2

Responsive Design: Planning & Preparation



How Much Does a Responsive Web Design Cost?

by Ron Novak

An increasing amount of our customers and potential customers started to ask us, “How much does a responsive design website cost?” Well, the truth is that there are many factors that can impact the cost of responsive design development. Like any custom web development effort, cost will ultimately come down to the requirements and complexity of the project. I think the analogy most often used here to explain the variance in web development costs is - *How much does it cost to build a house?* I won’t bore you with the explanation of the comparison because I am sure you get the point. Although there are numerous

factors that affect the cost of a responsive design website I will focus on breakpoints, content, style and performance, and extent of customization.

BREAKPOINTS

Breakpoints, or adaptation points as I prefer to call them, are essentially the pre-defined ranges of browser width where a change in layout is programmed to take place (typically by calling a media query). In simple terms, these are the points that your website begins to display differently. It's an important concept to understand, because the more breakpoints that are required, the more your responsive design site will theoretically cost. There are many technical articles out there proclaiming best practices for defining breakpoints (often by resolution size of common devices). In my opinion, every site is different and these breakpoints should be defined by how your site information and functionality is best presented at each size.

CONTENT AND FUNCTIONALITY

Content is king! The amount, type, complexity, and language requirements of your content can drastically increase development time, and subsequently the cost, of your site. It is rare for a site to contain just text now a days, so it is important to take imagery, video, mapping data, and custom functionality into consideration when assessing scope and ultimately the cost of your site. The visual complexity of your content and the breakpoints that are required to support optimized display, will impact cost, as there is additional work required to create assets of different sizes.

CUSTOMIZATION

You have probably seen numerous sites that will sell you responsive design templates that are pre-built. If you have a very basic website, simple requirements, and don't mind the fact that others can also use the same templates on their sites, they might be a decent option. However, in our experience, our customers typically want a design that is customized to their brand. This customization doesn't always affect the cost of a responsive design, but often does.



Figure 6

STYLE AND PERFORMANCE REQUIREMENTS

I would like to address style and performance together because they have an inverse relationship with one another. Increased style complexity and quality of imagery/video content requirements can either reduce speed and performance of your site, or make it much more difficult to maintain those at acceptable levels. The effort to optimize performance will ultimately increase costs, particularly as more breakpoints are required. In controlling costs of performance optimization, many organizations choose to stick with three breakpoints to loosely respond to various desktops, tablets, and handhelds. However, there are great examples of sites (such as <http://tekroc.com/>) that have put a lot of thought into how their site looks on very large screen devices. Although each site is unique to customer requirements and its role in supporting visitors, it is critical to strike a balance between performance (load times) and image quality at various breakpoints, as a site should be as pleasing to use as it is to view.

“That’s great Ron, but can you now tell me how much a responsive design website costs?” My mantra for costs associated with custom software development is, “it depends.” At Segue, we have developed smaller websites that didn’t require Content Management System (CMS) integration and only required two breakpoints for under \$25K. However, we have also developed larger enterprise-level responsive sites for over \$100K, where we integrated a CMS (such as WordPress or Drupal) and developed 5-7 breakpoints to meet the customer’s expectations for the user experience on different devices.

ABOUT THE AUTHOR

As part of Segue's ownership team, Ron Novak leads the Commercial and Non-Profit customer verticals with the guiding principles of innovation, exceptional customer support, and customer value. His diverse experience in Information Technology has been formed through a consistent desire to understand the total picture with respect to information exchange, security, and the end-user experience. Ron is currently focused on leading development of Mobile Technologies to help businesses reach their customers in exciting new ways and supporting Non-Profits in better serving their members. Mobile application development is a natural extension of Segue's capabilities in Web development; Ron is applying this Segue experience to rapidly develop exceptional applications at low cost. Under his strategic direction, Segue's Mobile Application Development Team has grown from a small two-person operation to a cohesive development team that is releasing capability-specific mobile apps for Android and iOS platforms.



The Importance of Wireframing for a Responsive Website

by Michelle Lana

Designing and developing websites that work across multiple devices is an important part of the work we do on today's web. Responsive design is forcing us to re-think about how we plan out our site designs and how our pages gracefully fit the device they are being viewed on. These days, we rarely ever start a design without going through some sort of [wireframing](#) process. Even if clients do not need to see a wireframe, I think it's still important to create one internally so that designers and developers are all on the same page.

CHANGING THE WAY WE DO WIREFRAMES

A wireframe is the skeleton of the page, usually drawn with basic shapes and lines with limited colors and styling. The point is to focus on figuring out layout and content placement, and solving navigation and functionality problems in a format that is easy to adjust. When planning for a responsive website design, we cannot continue to think through the wireframing process from a desktop only perspective. However, I understand that changing the way we think about these layouts and choosing a new direction can be a little challenging. For years we have spent our time designing fixed width layouts or maximum 960px width in our designs. Now we need to mentally deconstruct our site as we create our wireframes,

breaking it down into columns and elements that cannot only exist side by side, but also above and below each other. Wireframing for mobile devices first (or from narrow widths outwards) helps us prioritize site elements while putting us in a good mindset for thinking about what content is most relevant to the site visitor and how your content becomes available to work with on wider screens.

YOUR WIREFRAMING TOOLS

The first step of any good design is to sketch out your ideas and determine the placement of all the different elements on a page. If you're trying to decide which type of wireframing tool to use, there are a wide variety of tools and apps out there that make wireframing quick and easy. Tools such as [Balsamiq Mockups](#), [Omnigraffle](#), and [Axure](#) are widely used for creating wireframes and have very extensive toolsets and features. For some, designing directly in the browser using CSS and HTML offers a lot of benefits as well. For me, personally, using [Adobe Illustrator](#) is great for wireframing (since I love it a whole lot) and good old paper and a marker can make an excellent wireframing tool as well. I find that sketching and drawing out your wireframes on paper is always a great way to get ideas flowing, to quickly illustrate those ideas to colleagues and to get things straight in your own head. When collaborating with our team here at Segue, I still start with paper and a pencil, roughly sketching things out and I probably always will.

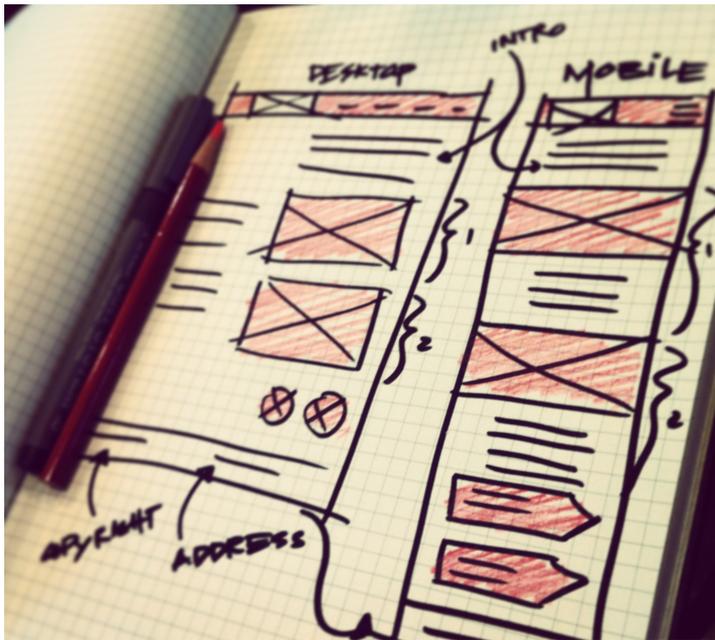


Figure 7

WHAT TO AVOID

Wireframing is both a process for thinking through problems and specifying interfaces. Like other aspects of your development process, wireframing can have its pitfalls if not done properly. Here are some things to avoid when you are creating your responsive wireframes.

- 1. Emphasizing color and design:** Wireframing is for deciding the layout and location of elements. Working in grayscale helps maintain focus on the primary function of the process, which is to finalize the layout, not the design. Starting with simple, [low-fidelity](#) wireframes is probably better and easier to work with if you decide to change and move things around.

2. Too much detail: You can always add more detail to show to your team and clients later in the process. But including too much in the beginning may add confusion. Drawing on paper is always a great place to start and rough sketches allow you to come up with new, more interesting solutions. Keep the fidelity low and focus on making something that others will collaborate around.

3. Wireframing every single page: Creating wireframes doesn't usually require that you lay out every single page view. It's always good to know your website's content ahead of time and what your user is trying to achieve. All of that gathered information from stakeholder interviews, a content audit, and research are all important pieces of your site that will help prioritize elements on your page. Doing what's necessary to move the project forward and get consensus before building is what I think wireframes are most useful for.



Figure 8

BENEFITS OF WIREFRAMING

Wireframing is an important part in any web or app project. It gives the client, developer, and designer an opportunity to think through the structure of your website and the process of interactivity without getting sidetracked by design elements such as colors, fonts, and textures. For me, I believe that building a simple wireframe will save time in the long run and ease the development process for the designer, developer, and client.

The following is a list of some of the great benefits of wireframes:

- 1.** Wireframes bring clarity to your projects, allowing you to work through all the interactions and layout needs.
- 2.** Wireframes gets your client thinking about what their needs really are and helps them define their project goals and what their primary focus should be.
- 3.** Having your wireframes handy can make it easier for you to communicate your ideas to your team and how your design would work with [responsiveness](#) in mind.
- 4.** Wireframes helps gather feedback before spending too much time and effort working on the wrong thing and delivering the core message more effectively.
- 5.** Wireframes gives the developer a clear picture of the elements that they will need to code. How should the layout adjust for smaller-sized devices? What is the hierarchy of the content? How does the navigation respond to smaller screens?
- 6.** Wireframes helps designers layout many sections of the website, resulting in a more fluid creative process.

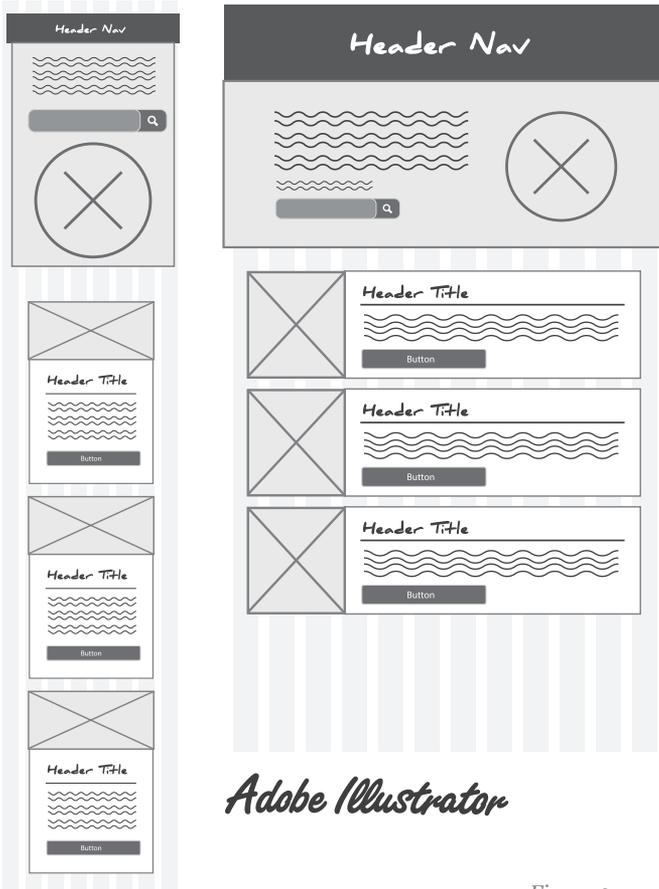


Figure 9

There is no getting away from the fact that responsive thinking challenges our design options and certain approaches will not be easy to implement as others. You might need to go through several wireframe revisions with your team and client to agree on a layout that both parties feel comfortable with. At the end of the day, frequent collaboration among team members and the client is a must in your design workflow, not the exception. It's always important

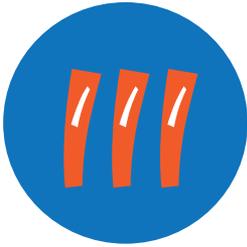
to keep in mind that content, design, and development team members should review and collaborate regularly at every stage in the creation process until the site is live.

Links and references:

- <http://blog.crazyegg.com/2013/05/07/responsive-web-design-tools/>
- <http://www.kalamuna.com/news/importance-mobile-first-wireframing>
- <http://alistapart.com/article/responsive-comping-obtaining-signoff-with-mockups>
- <http://trentwalton.com/2013/02/07/where-to-start/>

ABOUT THE AUTHOR

Michelle Lana is an illustrator and graphic designer at Segue focusing on web design, print, and UI/UX designs for web and mobile applications.



Using Analytics to Guide Your Responsive Website

by Segue Technologies

When you've decided to make your site [responsive](#), it's time to make some important decisions about how to implement your responsive design. While there may be some urge to just throw some mood boards at your designers and ask for an update when they are done, there is quite a bit of work in a responsive site design that doesn't involve graphics, colors, and fonts. Three big decision-making areas that need attention during a responsive rollout include prioritization, content, and impact.

This is not the time to pull out your crystal ball to make these decisions. Coin tosses, dart throwing, and trusting your gut are also less-than-stellar guides for making complex decisions. You have data, so use it! Make informed decisions throughout the responsive design process using the [web analytics](#) data right from your existing website.

If for some reason you don't have analytics set up on your existing site, do it now! We tend to use [Google Analytics](#) for most projects, but feel free to [pick the option](#) that best suits your needs. You only need a few weeks of data to get a clear picture of how visitors are using your site.

PRIORITIZATION

Your redevelopment budget is probably not unlimited. You're going to have to make some tough decisions about what is and is not included in your responsive site. By combining the goal of your responsive design project with analytics data, you can identify high leverage points to generate the greatest value for your project stakeholders.

Normally, a significant goal of a responsive redevelopment project is to make the site more usable for those on mobile devices. By filtering your analytics data to show only mobile devices, you can get a clearer picture of how [mobile](#) users are trying to use your existing site. In addition, you can see numbers of device types and browsers, which can determine priority levels for addressing cross browser/device compatibility issues and discrepancies. Whether you are rolling out the responsive site in phases or doing it all at once, working on these frequently-accessed portions of your site first will generate the most value early on in the project.

CONTENT

While one major goal of a responsive design is to make content look good on any device, [it will not magically organize all of your content](#) in a meaningful manner for everyone who visits your site. The content on your site will be broken down into smaller, more atomic units as a part of the responsive design process. Breaking these content elements down means you will also have to adjust the site's navigation so that users can find the content they are looking for.

Use analytics to determine what pieces of content your mobile, desktop, and other user types are seeking. Pay special attention to the analytics data for how much time site visitors spent on the page combined with the last page the user visits in a session to determine what the user was most interested in. Also, keep in mind external, generalized analytics about users on different platforms when making decisions. For example, because [users on mobile devices are twice as likely to share content over social media](#) than those on desktop devices, you may want to make your social media links easier to access on smaller screens, than on larger screens.



Figure 10

IMPACT

How are you defining success for your responsive design? As awesome as your site is going to look when you're done, something more measurable than "coolness factor" will be useful in proving the value of the project to those with less aesthetic interests. Comparing site analytics before and after the responsive implementation will prove that you have made gains in user engagement and social media presence.

So remember, use data to inform your decisions about your responsive redesign. Save your magic 8-ball for making decisions about lunch.



Considerations When Planning a Responsive Design

by Matthew Gorbsky

While there are many reasons and methods for implementing responsive web designs, there are also some challenges of which developers and clients need to be aware. While these may not be a concern with every project, you can safely assume that implementation and/or design could suffer from these pitfalls and it's a good idea to at least consider them up front. Before committing to a responsive design or redesign, consider the complexity, costs, and performance impacts compared to the needs and goals for your website.

COMPLEXITY OF RESPONSIVE DESIGN

There's a delicate balance that needs to be found in responsive design. The end goal is not to have a site (or web application) that is designed for every device. The goal is to have a site that looks good and functions well on whatever device people are using, whether that's today or next year. This balance reflects the complexity of your site and design. The best way to manage this complexity isn't some secret formula. There's no "responsive site generator" (and if you find one, be wary). The best way to manage the complexity is to first understand it, and then address it. Yes, that's a vague copout of an answer, but it's also the truth. You need to analyze your site and how your visitors use it, to understand how your responsive design needs to either preserve or enhance the user

experience at varying screen sizes. You also need to understand where your visitors are coming from, what they are using to view your site, and the actions they are most commonly taking. I suggest checking our posts on using site analytics to guide your responsive website to get an idea of how to understand the complexity and break it down. Then read the post on the importance of wireframing and mockups for a responsive website to understand how to address it.

COST FACTORS OF RESPONSIVE DESIGN

The increased complexity can have a direct impact on total project cost. More complex code takes longer to write, is more difficult to test, and has higher maintenance costs associated with it. Relatively simple responsive sites can be tested with desktop browsers and a subset of mobile devices. Sites that perform advanced device detection, utilize mobile device-specific functions (e.g. camera, GPS, etc.), or redirection services require more hands on testing time with actual devices. Third party services exist to help here, but there are costs associated with them as well. Because costs are one of the main constraints for our clients, it is extremely important to understand the complexity up front, make important decisions up front, and focus on delivering the most value to your users without going overboard and creating a separate version of your site for every conceivable device.

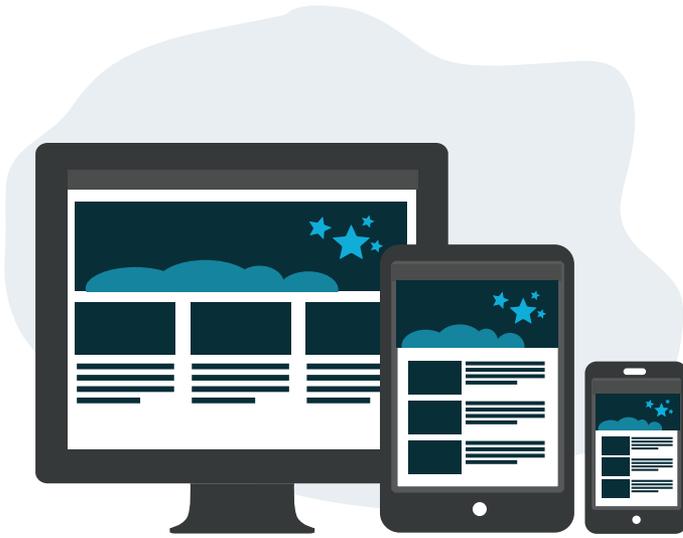


Figure 11

PERFORMANCE IMPACTS WITH RESPONSIVE DESIGN

One issue many responsive websites currently face is that they can become very bloated very quickly. HTML, CSS, and JavaScript for the site must be delivered to the devices and then rendered for that display. While this varies from implementation to implementation, the fastest (read: cheapest) way to make a site responsive is to deliver all of the content, regardless of whether or not the device displays it. Previously, desktop sites would only send the desktop version of the site to the desktop browsers. Dedicated mobile sites (or “m dot” sites) would only send streamlined content to the mobile browsers. Responsive sites have to package all of these versions (and those in between) and send it all to the browser and let it figure out how to display it. This leads to increased load times for all users. If the performance achieved from sending all content to all visitors is not good enough, there are technical approaches that can help reduce HTML packet sizes, select JavaScript libraries, and

optimize image sizes. Those add complexity to the implementation (see above). Ironically, if not used correctly, they can also potentially reduce performance by requiring pre-processing and device detection to be performed. This also increases complexity (read: cost).

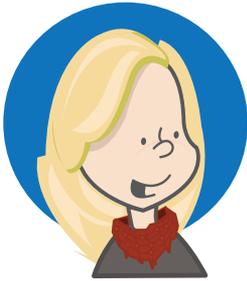
In the end, responsive design can make your site's content available to everyone, regardless of the device used – you just need to watch out for a few roadblocks (or money pits) along the way. I think we're going to start seeing changes to HTML/CSS/JavaScript very soon to help accommodate these variations in content delivery natively. In the meantime, however, we need to take what we have now and make it work for our users in the best way possible.

ABOUT THE AUTHOR

Matt Gorbsky is an analyst, mobile services manager, and a Certified Scrum Product Owner at Segue focusing on mobile applications, health-care IT, and web development. He's a graduate of Penn State and a fan of technology. Matt enjoys working on electronic projects and brewing beer in his spare time.

Chapter 3

Responsive Design: Implementation



Using Task Analysis to Prioritize Content in Responsive Design

by Dana Frank

A desktop view has more freedom for layout because designers have a lot more space to work with. But as the viewport shrinks, so do the options for content placement.

Before we could plan the design for Segue’s responsive website, we had to determine exactly what information our users needed first, particularly when they accessed the site on mobile devices. Of course, you should always follow best practices for placement of logos, menus, and so forth. However, the real “meat” of the website, and the relative information our users were looking for

still had to be defined and prioritized so they could find it just as easily. By prioritizing this information and making that content easy to find, we could keep our website visitors happy and increase the likelihood of them remaining on the site for longer periods of time, hopefully moving them one step closer towards becoming a customer. This is when task analysis comes in handy!

WHAT IS TASK ANALYSIS?

A task analysis is a usability exercise that helps identify users' tasks and goals on a website. Doing a task analysis will help designers make informed layout decisions as they wireframe the site. In our case, we already had a website but needed to work on the responsive solution, so, a task analysis was justified because technically we were designing a new site... a responsive one!

When conducting a task analysis, you'll learn more about:

- What are users are doing on your site?
- Looking for an order form?
- Sending an email?
- Looking for information on a contract vehicle?
- What effect does environment have on users?
- Are they on the road?
- Do they work from home?
- Do they sit in a cubicle with other people close by?

CREATING PERSONAS

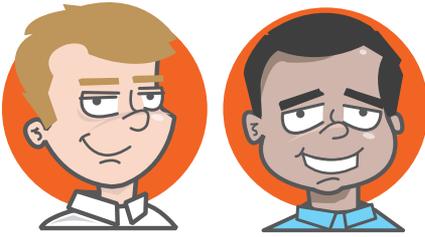
Before we could perform a task analysis, we had to identify the types of users that would actually be completing the tasks. This is when personas are reintroduced to the project. Personas are written representations of your users. Since our website was built years ago, we opted to use actual clients. We pulled client information by reviewing contact forms and marketing wins accomplished through the website. It's good to have anywhere from six to eight personas, depending on the project. We had six different personas for our exercise and each persona had a story about who they were, and what they were trying to accomplish on our website. Each story was very specific to that persona because, just like in real life, no two people are exactly alike. So now that we had our personas, we were ready to compare the frequency of specific tasks on our website.

To get started, every team member was assigned a persona. We had a spreadsheet with all the possible tasks listed down the side, as well as room for new tasks we didn't consider. The names of each of the personas were along the top of the spreadsheet. Each team member read aloud what their particular persona was doing on the website. Every time they completed a specific task, we checked it off on the spreadsheet. We did this for every single persona.

By the end of the exercise we had a document that outlined critical tasks for our users. This information was exactly what the designers needed before they could make suggestions for content layout on smaller viewports. The more frequent the tasks, the more visible the content. It's really that easy!

You can also use this opportunity to update a few things on the desktop version of your website as you “walk” in your users’ shoes. We made some changes to our existing website as well. These changes were particularly made to the careers section and how specific job openings are accessed. We also updated the location of some information on our homepage to accommodate our Government clients.

Remember, this is your opportunity to improve the site so go for it! As a matter of fact, you should do a persona run through on your website every so often to make sure you’re still providing good content in a useful format. This is exactly what you are doing with the task analysis and persona exercise, and you will now have the documentation to justify your suggestions to any decision makers in your company.



How CSS3 Supports Developing Responsive Design Websites

by Todd Godbout and Srinath Davu

With the increased use of tablets, smartphones, and even wearable computers; developers must account for multiple devices and screen sizes when designing websites or web applications. This situation will result in lengthier and more complex designs, but can be implemented rather gracefully using standard stylesheets and CSS3.

There are two approaches a developer can implement to become more responsive to the user's environment. The first is to create a miniaturized version of the larger desktop view. The benefit of this option is that users are accustomed to the layout and user flow. On the other hand, the miniaturized layout may not provide a beneficial experience if the links, text, graphics, and other elements are too small to adequately interact with.

A more adaptive approach is to create multiple layouts - a fixed width for large and medium screens and fluid widths for smaller screens. In practice this means not only scaling columns to smaller widths, but also reducing columns – eventually displaying all con-

tent in one column. This is the approach we normally implement here at Segue Technologies. Both approaches are implemented using varying stylesheets. CSS 2.1 introduced the concept of media types where the site can recognize the environment and load a stylesheet based on that environment.

```
<link rel="stylesheet" type="text/css" href="core.css" media="screen" /> <link rel="stylesheet" type="text/css" href="print.css" media="print" />
```

Improving on this concept, CSS3 added the media query – a method which allows developers to target not only certain device classes, but to actually inspect the physical characteristics of the environment before rendering the page. Developers can load various style sheets based on the media query or even more granular changes to html elements or css classes. The query contains two components, the legacy 2.1 media type and the media component, which contains a media feature.

For instance within this code (`<link rel="stylesheet" type="text/css" media="screen and (max-device-width: 480px)" href="segue.css" />`) the section within the parentheses is the media query. It translates to “if the device is in a horizontal position and the width is equal to or less than 480px, then load the segue.css file”.

Media queries are not limited to loading css files; media queries can also determine the character of specific html elements or css classes. For instance if you have a layout with three columns in a large display; a media query can reformat the layout to one column, with the content displayed vertically. To create our three

column display we add a class in our stylesheet called `grid-3` and set the `float: left` and the `width: 33%`. For smaller layouts, we utilize a media query to set the `width: 100%` so now the columns stack on top of each other.

```
.grid-3 { float: left;
width: 33%; } @media screen and (max-width: 480px)
{ .grid-3 { width: 100%; } }
```

That's it. The browser sets all `.grid-3` classes to 100% width for devices that are equal to or less than 480px width; otherwise the width of `.grid-3` classes is set to 33%. Pretty easy! Two common CMS platforms for developing responsive design websites are Drupal and Wordpress. The following sections show how to incorporate Responsive Design concepts into these platforms.

ABOUT THE AUTHOR

Todd M Godbout is a Senior Software Engineer at Segue Technologies dabbling in .Net, Mobile Development, HTML5, and Responsive Design.

Srinath Davu is a Senior Developer for Segue Technologies, Inc. with over 13 years of software development/engineering experience. As a commercial software developer, Srinath has been responsible for full life cycle support of a variety of applications, from initial design, through development, testing, deployment, and post-deployment maintenance. Additionally, he was the team lead and played a major role in building a web-based contract management system for J&J and Back office management systems for different gaming industries. He has also assisted on a number of other applications for CSC, J&J, Assured Guaranty and Tyco Electronics. Srinath is an experienced C# / ASP.Net, MVC, SQL Server and Oracle developer and is familiar with other database management systems and Reporting tools including ReportNet, Crystal Reports as well as other languages and technologies. He has experience building websites using Drupal CMS. Srinath has a Master's degree in Computer Science from Western Michigan University.



Challenges When Testing a Responsive Website

by the Segue Quality Control Team

Although a responsive website has several benefits to the organization and the end users, it presents numerous challenges to the software tester. These challenges include a unique testing environment, lack of automation framework, and misleading design.

CHALLENGE 1: TESTING ENVIRONMENT

First, the testing environment presents some challenges because of the plethora of operating systems, browsers, platforms, and mobile devices that are required to replicate the end users experience. For example, a website on a desktop monitor with 1600x900 pixels will render differently when scaled down to an iPhone 5's 4-inch Retina 1136-by-640 pixel screen, which will also be different on a Galaxy S4's five inch screen with 1080x1920 pixel resolution. Ensuring that mobile websites will work on all types of devices (smartphones, tablets, and laptops) produced by the major brands (Apple, HTC, Nokia, Samsung, Sony, etc.) and on all the platforms (Android, BlackBerry, iOS, Windows, etc.) is a daunting task. Additionally, new devices are constantly being introduced into the market, so there's an almost constant game of catch up in the quest to cover all the major devices. This means that the tester should test the functionality of the website on the most popular devices and platforms.

It is not feasible to test on each and every available device/OS/browser combination, which means testers have to strategically choose multiple configurations of physical devices. Tracers like [Google Analytics](#) can track which browsers, operating systems, and devices that the majority of people are using to reach your site. This information helps narrow your testing scope. It is important to create something on the lines of graded browser support used by Yahoo to ensure that major platforms are covered. Using emulators is another method to overcome some of the issues of testing on numerous devices.

CHALLENGE 2: LACK OF AUTOMATION FRAMEWORK

Secondly, not having an [automation](#) framework will hamper the efficiency and thoroughness of the testing efforts. An automation framework is an integrated system that establishes the rules of automation testing of the product. The framework offers the basis for and simplifies test automation. Frequent application changes can make automation a huge aid in completing responsive testing across multiple platforms. However, without an automation framework that has specific verification points, the test process becomes difficult and time consuming, making smoke and [regression testing](#) timely, and cost ineffective to automate. As a result, you cannot perform automation testing on responsive sites and manual testing time must be increased to handle all the smoke and regression testing.

Here at Segue Technologies we use [Selenium WebDriver](#), an automation tool, to tackle many of these changes. Selenium WebDriver can be used in conjunction with other tools to increase test coverage and the variety of mobile devices we can test on. Webdriver

scripts can run on real devices and in an Android emulator or in the iOS Simulator. [Sauce LABS](#) gives us the ability to run their tests across hundreds of real browsers and platforms. Segue has used Selenium WebDriver with Sauce LABS for the testing of its own [website](#). Sauce LABS takes screen shots after each page-altering command (issued by the selenium script) and a person can flip through the shots to diagnose errors and verify layout. Or, they can also watch a screencast of the whole test from start to finish.

CHALLENGE 3: MISLEADING DESIGN

Third, design strategies and approaches can easily mislead the tester, especially if they are not familiar with what to test and how they expect to test it on several devices and across different size break points. The nature of a responsive design is for the screen to display differently and appropriately to each screen size, which creates multiple versions for the tester to verify at each. Interactions that are standard on a desktop device may be irrelevant on a mobile device, and vice versa, because we interact with desktop and mobile devices differently. We use a mouse and keyboard shortcuts to navigate on a desktop, but touch and gestures are used on mobile devices, and not all interactions transfer over from one device to another. For instance, the designer may build in links that are displayed with a hover-over-effect in the desktop version. How is that feature transferred into a touch-screen mobile version where there is no mouse? Most touchscreen devices have gestures that are not possible with a desktop setup, unless the user has a touchscreen monitor. The different behaviors and the challenge to simultaneously accommodate for both regular and touch screens, requires some excessive testing. Knowing the interaction methods of the different platforms shapes the testing

approach and strategy. A multi-platform tester will learn to recognize which test cases do not apply or must be edited when applied to various platforms. Without this knowledge, test cases can be selected and applied incorrectly, resulting in inadequate coverage on some platforms and false test run failures.

A responsive website offers a suitable solution to the key challenges arising from the increase in the use of mobile devices to access the internet. This is because the fluidity of the responsive website allows the content to fit on screens of any size. Most importantly, responsive websites save time and money that would be required to design different websites for various devices. However, responsive sites can make testing efforts much more difficult than for a non-responsive site. These challenges may be reflected in development costs and timelines, but they are worth it to ensure a positive user experience and proper site functionality for all of your visitors, regardless of the device they are using.

About the Author

Segue's Quality Control (QC) focus integrates Requirements and Testing services to ensure our solutions are squarely aligned with our customer's needs. Our Systems Engineering processes meet or exceed SEI/CMMI Level-2 standards for all phases of the software development lifecycle. We've instituted a model for reviewing and improving our quality approach with every project we undertake. As a software developer, Segue is keenly aware of the critical nature of well-engineered and properly executed and managed processes.

ABOUT RESPONSIVE WEB DESIGN: Optimizing User Experience for all Devices

Thank you for reading our eBook. We hope you found it informative and interesting. If you are interested in working with Segue, please contact us so we can learn about your needs and plan a development path that works for you.

Segue Technologies provides:

Web

- Custom Application Development
- User Interface Design
- Content Management Systems

Data

- Business Intelligence
- Data Quality and Profiling
- Enterprise Data Management

Mobile

- iOS Development
- Android Development
- Mobile Web