



Uptime is the Bottom Line.

Improving Mobile Web Experience at Dyn Inc.

A Major Qualifying Project

Submitted to

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Abstract

Companies engaging in e-commerce stand to gain a significant competitive advantage through website optimizations resulting in increased mobile usability. There are, however, no established-and-proven industry guidelines on how to approach mobile optimization. Effectively delivering content on smaller displays calls for a reassessment of conventional web browsing paradigms. This MQP report examines Dyn Inc.'s efforts to enhance mobile usability of their checkout process through the implementation of adaptive web design. Two eye-tracking user experience studies were conducted to identify and evaluate mobile-specific drivers of usability. Websites requiring users to consistently zoom, pan and scroll were rated significantly lower than those with fixed vertical margins that fit the display. Recommendations were made to implement content and layout optimizations enabling pages to dynamically adapt to varying screen sizes. A mobile website design with logical content grouping, spacing and positioning appear to provide a more intuitive experience and may improve the overall usability of Dyn's checkout process.

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Executive Summary

With the rise of smartphones and expansion of the internet technology, electronic businesses (e-Business) are competing for the market share of the mobile e-commerce industry. According to Walsh, smartphones will supersede PCs as the most common web access devices worldwide by 2013 (Walsh, 2010); therefore, established e-commerce companies are making an effort to extend customers' mobile experiences from desktop to mobile through optimize websites and mobile applications. Mobile optimization has risen to the attention with huge market opportunities; however, there is lack of industry guideline for this innovative market. The challenge involved with mobile optimization is to effectively deliver content to customers on mobile devices with smaller screens.

Based in Manchester, New Hampshire, the Major Qualifying Project (MQP) sponsor Dyn is a worldwide Internet Infrastructure as a Service (IaaS) leader and DNS provider with over four million enterprise clients that utilize Dyn's Managed DNS and E-mail Delivery. To remain competitive in current market and keep innovative with mobile technology, Dyn has been improving mobile product purchasing experiences with effective and intuitive e-commerce process by optimizing the current desktop website design. To be able to achieve effective and intuitive mobile e-commerce process, the MQP was developed to evaluate the transactional workflow during Dyn's product purchase process (account.dyn.com) for mobile devices, especially iOS and Android phones. A list of website design factors was reviewed for usability such as workflow, website content, and layout to improve Dyn's website checkout experiences.

The project was conducted with a comprehensive background research of company, industry and competitors. Moreover, research was conducted to evaluate current performance of Dyn's website, workflow, and successful industry designs for insights of adaptive web design and other progressive enhancement technique. In addition, the MQP team tested Dyn's original site, an improved adapted site, as well as two proposed optimized design layouts created in addition to the initial project scope in two usability studies. Utilizing principles of System Usability Scale, the team was able to assess Dyn's improvement and the two mock-ups in comparison to industry best practices. With the advanced eye tracking technique in User Experience and Decision Laboratory, the team

was able to perform sophisticated tasks tracking users' gaze paths, creating areas of interests and generating heat maps to identify areas of users' attention.

Based on both quantitative and qualitative data analysis, Dyn's adapted website had a significant improvement over its original website. Users' satisfaction rose when consistent zoom, pan and scroll were reduced in the adapted website and mock-ups. There was not a significant difference in preference between the two mock-up designs, which can be attributed to the low sample rate. This poses the opportunity for future research.

The Major Qualifying Project Team proposed recommendations for content and layout reflected in the mock-up designs. It is suggested that Dyn consider 1) minimize and eliminate consistent zoom, horizontal scroll, and pan; 2) implement mask filtering for fields of State and expiration date on the check-out form; 3) provide logical content grouping, spacing and positioning to intuitive user interface design. Limitations were taken into consideration for mock-ups and the mobile eye tracking technology which will be discussed in later chapters.

The MQP team suggested continual effort in the rest of the implementation for website optimization. Further usability testing is necessary for evaluating the need to develop breadcrumb and collapsible testing for the final implementation of the optimized website.

Chapter 1: Introduction

Today's increasingly interconnected markets require that virtually all businesses provide an online outlet for information about and delivery of their products and services. The Internet quickly became a powerful business tool which allowed for low-cost business models to be structured around online commerce (Weill & Vitale, 2001). These businesses are now known as e-Businesses (electronic businesses). Both new and existing companies have been aggressively adopting this business model because of the ability to reach very wide markets at a lower cost than traditional methods. However, they enter a stiff and highly competitive market with very low barriers of entry (depending on product and service offered). As a result, the companies which do not effectively differentiate themselves will fail to attract and retain customers away from their competitors (Leonard, 2012).

Since websites are the backbone of an e-business, they must be designed to meet an ever growing standard of appeal, intuitiveness and functionality. E-Businesses have to adapt very quickly to differentiate themselves among competitors. Ideally, a company's website should be accessible to the broadest possible user base, this, however, requires an expensive and highly customized solution. The current standard demands websites to at least be compatible with the most popular web browsers (Internet Explorer, Safari, Google Chrome, Mozilla Firefox, etc.) and the major operating systems (Windows, Macintosh and Linux). The exponential popularity growth of web-enabled mobile devices has begun to raise the bar yet again, adding mobile compatibility to the list of must-have requirements for an effective website (Fidelman, 2012). Because this is a quickly changing technology, little guidelines are available for best practices on how to approach the effective and user-friendly delivery of content and services on very small screens. Dyn Inc. is an Infrastructure as a Service (IaaS) provider currently addressing the pressure to continuously adapt their website for an increasingly mobile audience.

Dyn already has a website with excellent load times, intuitive navigation, high browser and operating system compatibility. However, the company is still in the process of ensuring that their website meets the highest usability standards for mobile devices. Currently Dyn has been rolling out upgrades to specific parts of their website, which now

are known to dynamically determine the screen size being used to view the page. Moreover, Dyn's upgrades enable its website to dynamically adjust the vertical margins such that the content fits the screen, eliminating the user's need to scroll horizontally. Dyn's web development team leads the initiative for adapting the company's website for mobile devices. Their developments have prioritized the company's home page and product pages as the first ones to receive the layout optimizations. As Dyn prepared to move forward with their mobile optimizations for the rest of their webpages, this MQP project team was tasked with evaluating their current approach and assessing the direction for Dyn's next round of continuous improvement with regards to mobile usability.

As previously stated, mobile web usability is a new concept that an increasing number of companies have begun paying attention to. As a result, there is limited research indicating what the best approach may be used for tackling mobile usability. There are however, several trends growing in popularity as potential solutions to increasing mobile web usability. This project identified three broad categories of such approaches: 1) development of mobile applications, which can be installed locally on smartphones; 2) development of a standalone mobile website, accessed only via mobile browsers and thus holds content separate to that of the 'desktop' version of the website, and 3) an adaptive website, where the same page is displayed for PC's and mobile devices, except the layout dynamically adapts the content margins to fit the screen size used. The later, as mentioned before, is the approach Dyn has opted for to increase mobile usability of their website. However, there is little guidance suggesting the extent to which the dynamic changes should occur.

This project identified characteristics which, when properly implemented, had the potential to improve the usability of mobile websites using adaptive web design. Because the company reports a growing number of mobile transactions, two usability studies were executed to evaluate and compare improvements to Dyn's mobile checkout usability. The usability studies were geared towards gathering data that allowed the MQP team to identify effective, yet feasible, improvements to Dyn's web design. The objective was to deliver recommendations that enabled the company to increase the perceived usability of their mobile web checkout process, as measured by the System Usability Scale (SUS), a

widespread usability-measuring survey (Sauro, 2011). Additionally, the studies gathered qualitative and quantitative user experience feedback through a set of interviews and surveys and eye tracking data using a Tobii x120 eye tracker. The data collected was analyzed, recommendations centered on layout and content were issued to Dyn, which were partially implemented by the company's web design, and the resulting version was user tested again. The final goal of this project was to provide Dyn with data and recommendations that can help the company increase the business value generated by their website.

Chapter 2: Background

The first step in ensuring the success of the project was to gain a solid understanding of the sponsoring company. With this in mind, the team conducted extensive research on Dyn's company history, the industry it competes in, and the services it provides. The objective was to grasp key information and processes important to Dyn in order to fully understand their business needs, how Dyn will benefit from the project, and what considerations the team must assess when making recommendations to ensure they are realistic and aligned with Dyn's needs.

2.1 Company History

Dyn is a New Hampshire based, worldwide leader in Internet Infrastructure as a service (IaaS), providing E-mail Delivery and Managed DNS services (dyn.com/about, 2012) to over four million customers around the world. Dyn's client base includes home users, small businesses and large enterprises. Dyn is a company with strong focus on the reliability of the services it provides. Their company slogan "uptime is the bottom-line" conveys reliability as one of its core competencies, and a major selling point for customers. Currently, the company has ongoing efforts to improve the usability of its website, as it is the main form of interactions and delivery of its services to clients. The company was founded as Dynamic Network Services in 1998, when it began offering a free Dynamic DNS service. Dyn was incorporated in 2001 and quickly started by targeting their services towards small business customers. Eventually the company expanded its market to service enterprise level clients. Currently, Dyn provides services to many well-known and fast-growing e-businesses such as Netflix, Twitter, Spotify, Etsy, and Pandora. In 2010 Dyn expanded the IaaS products it offered by adding E-mail Delivery services. Today, the company serves over 15,000 e-mail users, and its customers have reported increased revenues due to the solid reliability of Dyn's E-mail Services (Dyn Inc., 2012)

2.2 Industry Analysis

In addition to understanding Dyn's history and innovative decision making, it was imperative to understand the markets that they compete in. In doing so, the team was able to better grasp the potential impacts of this project. With the aim of properly representing Dyn's interests, the team sought to understand the products offered by the company, as well as the nature of the different subsets of the Infrastructure as a Service (IaaS) market each product targeted. Since its inception, Dyn has been competing in DNS services market, where its success positioned the company to expand into the e-mail services market. For both of these submarkets, Dyn provides a wide variety of service packages that cater to individual customers, startups and large enterprises alike. The following sections outline a description of Dyn's services as well as the company's products by each submarket.

2.2.1 Managed Domain Name Services

DNS is the naming system by which devices connected to the Internet request content from other online devices. Every device online, be it computers, servers, smartphones, websites, etc., has a unique internet protocol (IP) address. IP addresses are a set of numbers which are used to identify different web devices and resources. For normal users, however, it is not very practical to remember 10 to 12 digits to simply access a website. Instead, DNS is used to translate a unique resource locator (URL) address into the resource's IP address. URL addresses are much more user friendly because they can be named using words and numbers that mean something about the resource it identifies. Websites, like dyn.com, rely on DNS to efficiently relay their web content to their user's computers, and having an easy to remember address is a big first step towards that goal (Mitchell, 2007). For example, remembering 'dyn.com' is easier than 204.13.248.106; however, typing either into a web browser gets to the same website. There are several background services that can be optimized to deliver reliable access to websites, and it's here where Dyn's managed DNS service plays an important role.

Roughly speaking, there are four processes that occur when users request a webpage: Information request, top-level domain (TLD) name-server query, authoritative DNS server request, and record retrieval. The information request begins with the user typing in an

address, at this point the computer will look up in its local cache of previously visited sites to see if it has the IP address for that URL. If not, then the computer asks the internet service provider's (ISP) recursive DNS servers for the IP address of that URL. Should these servers fail to find the IP address, they will query the root name-server, which is a computer that answers requests for information about domain names. While root name-servers don't actually hold this information, they serve as a switchboard for DNS, routing the request to the appropriate TLD name-servers. Root name servers determine which TLD name-server to route to by looking at the URL's top level domain: the right part of a URL (i.e. *.com*, *.org*, *.gov*, etc.). Once the query reaches the TLD name-servers, they look at the rest of the URL, the domain name, and determine the authoritative DNS servers for that domain. Lastly, the authoritative DNS servers retrieve the target IP address and relay it back to the user's computer, where the direct connection to the resource is made. Dyn's DNS suites provide stable and managed DNS authoritative servers which deliver robust connectivity and scalability, which in turn result in highly reliable and accessible sites (Gonyea, 2010). Highly accessible websites are important to companies, especially to those whose business relies on users getting to their site (i.e. e-businesses), and therefore there is an ever growing demand for DNS services such as Dyn's.

DNS management is the core service driving Dyn's business success. In order to appeal to an ample set of customers, the company offers different levels of DNS management services, all of which are outlined in Dyn's DNS marketing page with the purpose of directing customers to the DNS package that will fit their needs. *DynDns Pro* is the company's remote access service, and is mainly targeted towards home users. Dyn's main DNS service is *Dyn Standard DNS*, which offers complete DNS management services for a single domain, making it an ideal service for small businesses. Dyn's enterprise-level DNS package is called *DynECT Managed DNS*, which comes in a 'Lite' version and a full version. *DynECT Lite* is targeted towards fast growing companies in need of high reliability, speed and scalability. Dyn's full variant of DynECT provides advanced features such as global traffic management and load balancing, making it an attractive and robust service for global companies for whom uptime is a high priority.

According to a DNS industry analysis from VeriSign, the Second quarter of 2012 closed with more than 240 million domain name registrations across all of the top level domains (TLDs) (VeriSign, 2012). That totals 7.3 million more domain names registered than in Q1 2012, representing an increase of 3.1%. Compared to Q2 2011, Q2 2012 observed an increase of 8.4 million registrations, totaling a 4.2% increase. Data for the past two years can be observed in Figure 1, which corroborates the aforementioned trend of consistent growth in registrations of 2%-3% every quarter.

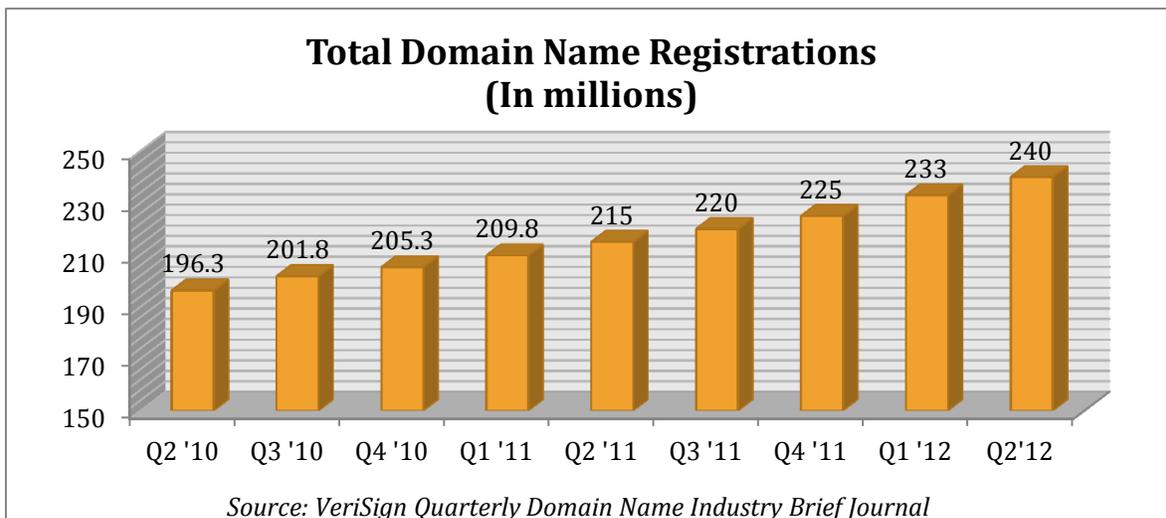


Figure 1: VeriSign Analysis - Total Domain Name Registrations Q2'10 - Q2'12

Considering the trends observed in VeriSign's analysis of the DNS industry, there are evident opportunities for companies providing DNS management services. Dyn is already positioned very well in this market, providing reliable services worldwide and is currently investing in its infrastructure to continue to provide competitive services. As with any industry, an increase in demand will result in increased competition for these new customers. This fact brings importance to the project at hand, as it relates directly to Dyn's ability to successfully convert potential customers into paying customers. Although the company provides very good services, it must continue to improve their customer's experience all throughout; this includes being at the forefront of web usability for all the different outlets customers use to access and purchase Dyn's DNS services.

2.2.2 Managed E-mail Delivery Services

Dyn is also a player in the E-mail Services and E-mail management market. There are a number of e-mail services in high demand today, which Dyn has divided in two broad categories: E-mail Sending Products and E-mail Receiving Products. Similarly to their DNS management suite of services, Dyn has E-mail delivery packages tailored for the needs of individual users, as well as small and large businesses.

The E-mail Sending Products include Dyn Standard SMTP, DynECT E-mail Delivery Lite, and DynECT E-mail Delivery. The difference in the products varies according to the business needs. Each of the offerings offers a secure and reliable e-mail delivery. The features include virus scanning, administrative console for monitoring e-mail flow, content management, and e-mail archiving and retention policy. The target audience of customers includes individual, small business owners, middle-sized enterprises, and large corporations (Dyn Inc, 2011).

Dyn's E-mail Receiving Products include Dyn E-mail Backup MX, Dyn E-mail Gateway, and Dyn E-mail Forward. The product features include e-mail storage, e-mail content review, archiving, protection against spoofing, and holding messages for review. The target market for these products varies from individuals, home users, and small business owners (Dyn Inc, 2011).

2.3 Competitive Analysis

Dyn has a number of competitors in the field. While the company has already established itself as the world's leader in Managed DNS Services, the company also has had to keep up with the latest trends and competitors on the market. As part of the initial benchmarking, the MQP team performed a competitive analysis of medium and large businesses in the IaaS industry, offering similar services to Dyn's. The comparison was completed using Hoover's database. The database administers information about public companies and industries. Hoover's provides a database of 85 million companies and 900 industry segments. (Company Information, 2012)

As part of the analysis, the MQP team established criteria for assessing the significance of the perspective competitors in Managed DNS Services and E-mail Delivery. A company

was included based on the similar products and services. The methodology consisted of researching each competitor’s website, establishing an understanding of the products and services offered, and making an accurate judgment as to how these relate to Dyn’s offerings. Since Dyn is a privately held company, the MQP team was not able to generate a list of the competitors directly from Hoover’s database. Instead, the list was comprised by doing a Google search with key words, such as “companies Managed DNS Services”, “E-mail Archiving”, and “E-mail Delivery”. The findings were collected in an Excel spreadsheet and further researched using their website. Applying the theory presented in Innovation Tournaments: Creating and Selecting Exceptional Opportunities, a book by Christian Terwiesch and Karl Ulrich, companies unrelated to Dyn’s services, were excluded from the list. The final list consists of public and private companies. While the first were researched using Hoover’s database, information about the latter was collected primarily from their websites. Table 1 below summarizes the MQP team’s findings.

Table 1: Dyn Competitors

	Email Delivery	Managed Domain Name System (DNS) Services
Competitors	Mimecast, LLC	Afilias
	NaviSite, Inc.	ZoneEdit, LLC
	Rackspace, US Inc	NeuStar, Inc
	Microsoft	Verisign

As shown in the table above, Dyn’s direct competitors include major companies, such as NaviSite, Mimecast, Verisign, and ZoneEdit. These companies offer similar services to Dyn’s in terms of Managed DNS Services and E-mail Delivery.

Dyn’s major indirect competitor includes Go Daddy Operating Company, LLC. While this company offers domain name registration and hosting services it does not offer DNS. For example, if a customer is to buy domain name ‘*dynmqp.com*’ from GoDaddy, he/she would also need to purchase DNS support for purposes addressed in the previous section. These include website reliability and uptime from across borders. Dyn’s competitive advantage is offering a bundle of domain name registration and DNS. Not only can a new customer purchase “*dynmqp.com*”, but can also buy Managed DNS Services to ensure website’s uptime. Additionally, as part of the process, Dyn annotates on the added value by

purchasing Managed DNS Services. Therefore, there is an also value for the consumer in the form of gaining new knowledge. Other indirect competitors include Log Me In, Go To My PC, and Remote PC. These all offer remote desktop access and file sharing. The relevance of these competitors was concluded by visiting their websites and assessing whether their products were a substitute for Dyn's products.

2.4 Dyn's Commitment to Innovation

Dyn is a progressive company that makes innovative decisions to further business growth. Dyn has a traveling road show called Culture-con that brings an intense and creative focus to the role that DNS and E-mail management services plays in the business world (Dyn Inc., 2012). Dyn's Culture con portrays the company's forward thinking attitude towards work environments, but it really aims at familiarizing audiences with the services it provides. Dyn's products are undeniably technical and regular consumers do not know what these services are, much less why they would need them. Dyn's approach with Culture con provides an engaging way to inform people about an otherwise daunting and rather dull technology. From a marketing standpoint, the company cleverly informs users about what managed DNS and e-mail delivery are, which subsequently enables Dyn to generate a need for such services.

Moreover, Dyn has been able to effectively expand its operations in order to meet fast growing global demand. Currently, Dyn provides services to clients and users located in 242 countries and territories; with over 13 million users served, over 65,000 domains registered with their DNS services and over 150,000 zones managed (Dyn Inc., 2012). In order to cope with their massive operations, Dyn employs 20 global data centers and an in house support team that operates 24 hours a day, every day of the year. Among these credentials Dyn has been named one of the "Most Democratic Workplaces in the World" by WorldBlu in 2012 (Dyn Inc, 2012), as well as being inducted into the "New Hampshire Hall of Fame" as an Employer of Choice, showing that not only do they provide a great service and are a great business, but they also do a great job of treating their employees with respect and fairness, and creating a great environment for individual growth.

Dyn's devotion to high quality service and business standards is powered by its dedication to innovation. After Dyn's CEO ,Jeremy Hitchcock, Tom Daly, and Dyn's CTO Cory von Wallenstein graduated from Worcester Polytechnic Institute (WPI), they keep in touch with WPI faculty and collaborate on projects as they see fit. The User Experience and Decision Making (UXDM) Research Laboratory became possible through Dyn's generous gift. In 2008, Dyn approached Professor Soussan Djamashi, Director of the UXDM lab, for an Major Qualifying Project about usability. Dyn believes in basic research as a primary driver of innovation and knowledge attained from user experience research can improve their product for ease of use for both customers and designers (Dyn, 2012). The support for the UXDM Laboratory and this project, are good examples of Dyn's commitment to innovation. The project required the MQP team to provide recommendation for innovation in user experience of Dyn's e-commerce site. The following sections explain how the MQP team tackled this challenging and important task.

Chapter 3: Current State Analysis

After understanding the products Dyn offered, their importance to Dyn's business model, and how this project fit in with the company's efforts of usability improvement, the team proceeded to evaluating the current state of the pages in the scope of this project. The MQP team was charged with providing recommendations for improving the user experience of Dyn's e-commerce site. Hence the research scope of this project was defined around Dyn's online Account Management Portal, which allows users to browse and purchase products using a secure authentication method.

Dyn's approach to delivering content across devices is to use the same website, regardless of the type of device requesting it. Because the same website is used, Dyn saves resources from not having to maintain a separate outlet of mobile information (i.e. mobile application) which results in content management problems. Currently, the company is invested on improving website optimization for mobile devices by ensuring that all the content of their website dynamically adapts to the screen size it is being viewed on. However, Dyn has not implemented these changes to the pages within this project's scope. The MQP team performed a thorough assessment of literature, benchmarks and content assessments to provide very concrete recommendations that would otherwise fall out of scope. Additionally, the team collaborated with Dyn's UX Web Development team to discuss ideas and determine how plausible and fitting they were to the company's objectives.

When evaluating the current state of Dyn's website, it was crucial for the MQP team to consider the process from the customer's standpoint, carrying out the process from start to finish. To accurately address these steps in the process, it was necessary to include additional pages into the initial scope workflow. Additional pages considered were Dyn's DNS products page (dyn.com/dns) and 'Dyn Standard DNS' marketing page (dyn.dom/dns/dyn-standard-dns/). Having a comprehensive understanding of the way the process worked enabled the team to identify areas with for improvement and provided a hypothesis for our study. In an effort to gain insight into Dyn's current state the team reviewed web performance metrics and the current workflow taken to checkout 'Dyn

Standard DNS'. This chapter will explain the results from these analyses and concludes by outlining the main opportunities identified by Dyn's web team and the MQP team.

3.1 Current Web Performance Metrics

Establishing a good understanding of web performance metrics was crucial for evaluating any changes proposed to Dyn. For the purpose of this project, web performance metrics from Dyn's website were collected using Google Analytics. The MQP team assessed the relevance of the collected data and presented reliable results in this report. Concepts and standards that are critical to assessing the success of an e-commerce website such as e-commerce abandonment rate and e-commerce conversion rate will be introduced and discussed in this section.

3.1.1. Ecommerce Abandonment Rate

Based on a Google Analytics Report ran on Dyn.com, out of all the page visits to Dyn's website, about 73.50% did not convert into a complete transaction. In comparison, the rate of users visiting on a mobile device who abandoned the transaction was 79.01% (see Figure 2). The difference between these two metrics poses an opportunity for lowering the mobile abandonment rate. Dyn would need to reassess their mobile website in efforts to increase the percentage of transactions completed. By increasing the mobile usability, thus enhancing the customer purchasing experience, Dyn would be in a position for potential increases in purchases. It is important to point out that even small improvements in customer experience have the potential of positively impacting sales.

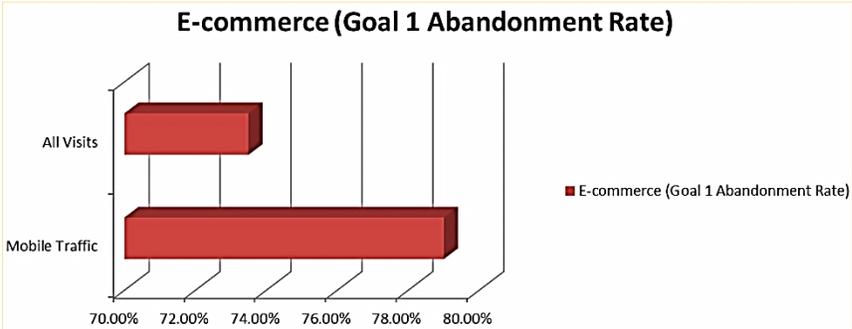


Figure 2: Dyn.com Abandonment Rate

3.1.2. E-commerce Conversion Rate

E-commerce conversion rate was outlined by Dyn’s web design team as one of their key performance indicators (KPIs). While the time constraints of this project did not allow enough time to effectively and reliably measure changes in conversion rate, the MQP team included an analysis of this metric, due to its importance to Dyn and its relation to user experience.

Conversion rate refers to the percentage of users who visit Dyn’s website with the intention to purchase a product. Conversion rate is strongly influenced by user experiences and higher score represents more positive feedback. As illustrated on the chart below, only 0.95 % of Dyn’s conversation rate is related to mobile, less than half of the percent for all visits, which is 2.12 % (see *Figure 3*).

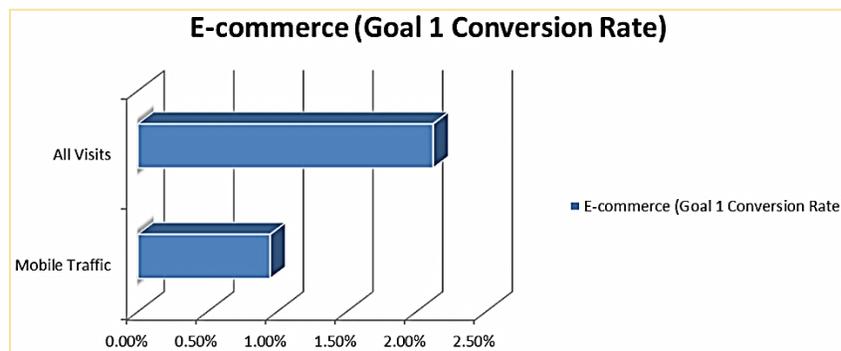


Figure 3: Dyn.com Conversion Rate

3.2 Current Workflow

To fully understand the purchase process through Dyn’s website, the team mapped out the process using a workflow diagram. The process benchmarking began at Dyn DNS’s marketing webpage (<http://dyn.com/dns/>) and ended at the purchase confirmation page.

The workflow map was initially developed by the MQP team based on screenshots from Dyn’s adaptive website, which at the time was still in a developmental stage. The MQP team visited Dyn on-site and reviewed the process from within their development environment. This gave the MQP team the chance to review the process live and to get updated screenshots. The workflow map was then revised and updated based on the completion of the MQP team’s process review. Having the process workflow mapped provided the team

with a visual representation of the task at hand, allowing for a different perspective to identify potential areas in the process where customers might struggle (see *Figure 4*). The objective of creating a map was to recognize where the MQP team could make recommendations for improving the process. The map also helped with designing a study for testing improvements in user experience.

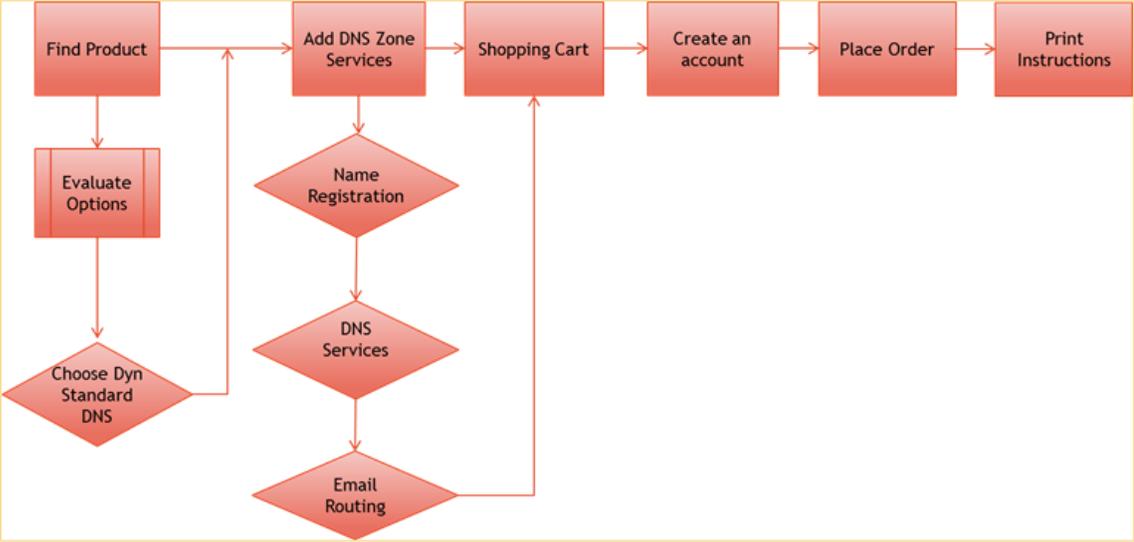


Figure 4: Dyn Standard DNS Check-out Flow Chart

3.2.1 Buying Process

An average customer will unintentionally initiate a number of decisions when making a purchase. Consumers are actively comparing product features, costs of maintenance, and benefits in a pursuit of meeting their sufficient needs and maximizing product satisfaction. In marketing, this process is referred to as the consumer buying process. The decision-making involves five stages: need recognition, information search, evaluation of alternatives, purchase decision, post-purchase decision. The current workflow for buying the Dyn Standard DNS product is evaluated from a customer perspective, assuming they have decided to make a specific purchase after comparing all alternative products (Hartline, 2010).

There are two important factors that are identified in the first stage: consumer needs and wants. While different in meanings, they are also interrelated. For the purpose of this

study, the customer had already identified the product and has considered making a purchase (Hartline, 2010).

Information Search is the second stage of the buying process where customers are interested in obtaining additional information for their on-going purchase. Typically, consumers rely on internal and external information during their research. For example, the former can be a contact with an employee and the latter can be available information found on the Internet. This process is more time consuming for new buyers than it is for buyers with previous experience. After narrowing down the number of options, the customer compares each of the products. The evaluation includes criteria such as costs, product features, and warranty. This process of comparison usually takes place on Dyn's marketing page (Hartline, 2010).

In the case, the consumer has identified the Dyn DNS Standard product and has the intention to make a purchase. The customer is asked to enter the DNS Zone (if any) and register for the domain name, then, the product is added to the shopping cart. At this moment, the user is asked to create a user profile to complete the purchase. Given that there are no external factors, such as loss of Internet access, the consumer completes the purchase and is given the option to print the instructions. This is the last step of the workflow.

3.3 Current Improvement Efforts

Dyn's Account Management Portal is well-developed for desktop. The website is accessible through most frequently used web browsers and provides a quick page load time. Dyn's Account Management Portal does not have a separate mobile website, however its desktop website was modified to adapt to a mobile view through a standard mobile browser. This adaptive website offers the same capabilities and functionalities as the desktop website. The limited screen area of mobile phones can have a negative impact on a user's experience of purchasing process, which in turn can affect the abandonment and completion rates of the site.

3.3.1 Page load time

As part of the Key Performance Indicators for the success of this project, the MQP team considered the page load time for Dyn’s Account Management Portal. The version of the website was initially tested and validated using Pingdom Tools and Google’s GoMoMeter, both referenced further in this chapter. The purpose of evaluating the page load time was to establish an understanding of the customer experience and specifically, their frustration, if any, from launching the website.

3.3.1.1 Pingdom Tools

Pingdom Tools is a website which provides insightful web statistics. These include an overall grade of the website architecture, number of request sent before reaching the URL, page load time, and page size. Pingdom Tools has become an industry standard website for gathering metrics about website structure (Pingdom Tools).

As part of our initial evaluation of the Dyn’s Account Management Portal, the MQP team rated Dyn’s Account Management Portal using the aforementioned metrics (*see Figure 5*). The final results for the website were load time of only 1.2 seconds, which is 84% faster than any other websites tested and archived in Pingdom Tools’ database. Overall, Dyn’s Account Management Portal scored 95 out of 100. This high score reflects Dyn’s immediate uptime response rate.



Figure 5: Dyn.com Pingdom Report

3.3.1.1 Google’s GoMoMeter

Dyn’s Account Management Portal (<https://account.dyn.com>) for mobile was also tested using Google’s GoMoMeter. The latter validates the website based on 10 best practices and provides recommendations for improvements in each one of the categories. Dyn’s Account Management Portal was evaluated based on criteria such as simplified navigation, ability to

be thumb-friendly, text size, loading images, and shopping cart feature (Google GoMoMeter).

Dyn's Account Management Portal loaded in 0.65 seconds and scored 5 out of 6 on the mobile-friendliness scale (see Figure 6). This acknowledges Dyn's highly mobilized website and represents a competitive advantage. While the company has not yet developed an optimized website, these results are highly assuring for the next level of improvements. Dyn's Account Management Portal has the potential to reach higher scores and enrich the customer experience. Efforts to improve the scores are likely to minimize the number of website abandonments, as referenced below, and thus generate an added business value for the company. Moreover, as the usability, layout, and visual appeal improve, Dyn has the potential to reach even a broader market penetration amongst new customers.

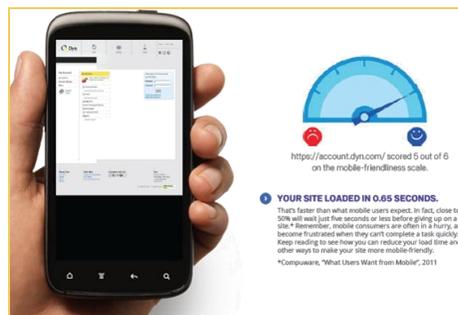


Figure 6: Google's GoMoMeter Report

3.3.2 Browser Compatibility

Dyn's Account Management Portal is accessible through the most frequently used browsers, such as Internet Explorer, Google Chrome, Firefox, Safari, and Opera. The majority of page visits are generated through Internet Explorer and Google Chrome for 31.91% and 26.65% respectively. Out of the top 5 browsers, Opera accounts for the least page visits with 2.03%. The metrics obtained from Google Analytics are displayed below in Figure 7.

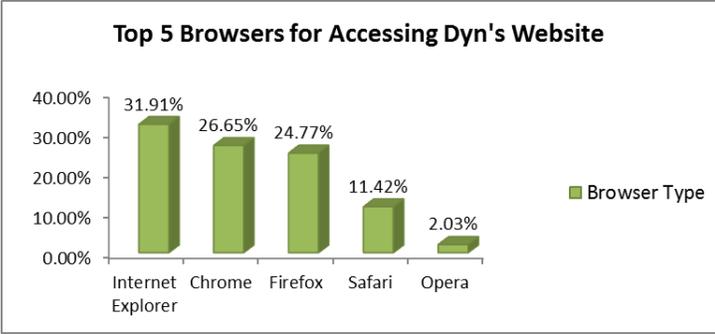


Figure 7: Google Analytics Page Access by Browser

3.3.4 Page Traffic by Devices

As mentioned earlier in the paper, Dyn’s Account Management Portal is accessible via mobile devices as well. In Figure 8, we have identified the top 5 devices with the most traffic. The top two devices are iPhone and iPad, with 39.08 % and 31.32 % of total visits respectively. Out of the top 5 devices, 4.09 % of total visits come from Sony Ericsson and 3.66 percent come from Samsung GT – I9100 Galaxy S II. Devices captioned with “not set” refer to all the other mobile devices which are not identified by Google Analytics.

In addition, the website is viewed from Apple iPod Touch, Samsung Galaxy Nexus, and Samsung GTI9000 Galaxy S. The remaining 6.68 percent of visits come from these devices.

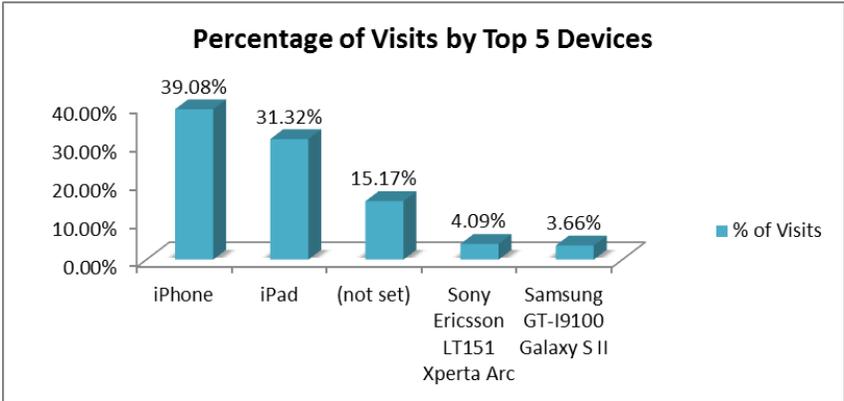


Figure 8: Google Analytics Report, Devices

Chapter 4: Need for Mobile Optimization

According to a report from the Pew Internet and American Life Project, titled *Americans and their cell phones*, 83% of US adults own a cell phone of any kind and 35% own a smart phone (Smith, 2011). Industry analysts predict that by 2013 smartphones will surpass personal computers as the most-used device used to access the internet worldwide (Walsh, 2010). The growing popularity of devices that enable consumers to be constantly connected to the internet led to a sharp increase in e-commerce. Statistics show that as much as 35% of smartphone owners have made an online purchase through their smartphones (Google, 2012) and 74% of smartphone shoppers used their smartphones to help with a purchase (Google, 2011). Mobile websites have become an increasingly important channel of commerce, although companies have been slow at developing mobile optimized websites to enhance user experience of this new medium. Mobile optimization enables a positive user experience and can ultimately benefit e-commerce sales if consistent with the paradigms of mobile usability. Google reports that 61% of users are unlikely to return to a website if they have had a negative mobile experience (Google, 2011). Thus, companies are urged to pay more attention to optimizing their mobile experience. Many of the drivers of user experience on mobile devices are completely different than those on computers, yet the initial approaches at mobile websites tried apply what worked on sites designed for computers. This chapter presents approaches companies currently consider when converting to mobile websites and reviews successful industry examples. These were all researched and evaluated with the goal of identifying opportunities for Dyn to improve their mobile user experience.

4.1 Available Approaches for Mobile Optimization

There are currently two broad implementation strategies for an e-commerce company seeking to deliver content or services through mobile devices: application development and mobile optimization of current websites. Furthermore, when opting for a website approach, there are three main alternatives within that category: 1) leaving the pages as they are; 2) adapting the web pages to fit mobile screens; and 3) optimizing the webpages to effectively display web pages on mobile screens. There are obvious downfalls to leaving

the pages ‘as- is’. This approach provides the company little control over how users view their website, leaving it up to the device’s browser to render a site designed for large displays on a small screen. As a result, users are likely to zoom in and out repeatedly, as well as pan the page vertically and horizontally to see the site’s content. An adapted website strategy seeks to implement styling on the site such that the content wraps around the screen and displays the desktop website content on mobile devices without any content changes.

Compared to ‘as -is’ and adapted websites, optimized websites show reduced and useful content with a friendly layout to enhance user experience on mobile devices. The graphic in Appendix A: Mobile e-Business Website Approaches illustrates the differences between the mobile application, the adaptive website, and the optimized website from ‘Amazon.com’. An adapted website looks the most similar to Amazon’s desktop site with the same content and layout fitting on a smaller screen. The application view is close to an optimized website: with less content, bigger text fonts, and more organized layout, such as menu, search bar, and products featured on the page. To better identify the feasibility and usability of the three models, the MQP team compared and contrasted the characteristics of a mobile application, an adapted website, and an optimized website. The comparison criteria consisted of the need to zoom in and out, ease of navigation, design and layout, development and maintenance cost, marketing outreach and the need for keeping a separate data repository. Table 2 summarizes the MQP team’s findings:

Table 2: Comparison of application, adapted and optimized websites

Characteristic	Mobile Application	Adapted Website	Optimized Website
Zoom-in/out	No	Yes	No
Easy to navigate	Yes	No	Yes
Design/layout	Positive	Negative	Positive
Cost	High	Low	Medium
Marketing Outreach	Limited	Broad	Broad
Extra data repository	Yes	No	No

Table 3 shows that optimized websites outperform adapted websites in all aspects except the cost of implementation. The MQP team’s analysis did not take into consideration the potential return on investment rates per dollar spent on each approach. However, research supports the conclusion that websites that provide a better user experience tend to have higher e-commerce conversion rates (Google, 2011). An optimized website provides similar advantages and customization features that a mobile application does, but also saves companies the efforts of maintaining an extra data repository. Therefore, the two optimal solutions for companies to consider are a mobile application and an optimized website as part of their mobile strategy. The benefits these provide have been listed in a comparison chart below, along with the factors to successfully develop a user-friendly website (Northington, 2011).

Table 3: Optimization benefits and Success Factors

Optimization benefits	Success Factors
Overall positive user experiences	Coding techniques that render graphics to minimize page load time
Customized and targeted content	Vector that scales and graphics to both large and small screen
Aesthetics and layout	Eliminate horizontal scrolling
Easy and straight-forward process	Use a fluid, single column design with a 320 pixel minimum width
Universal usability design	

Source: (Northington, 2011)

4.2 Successful examples

In this section, designs from Dyn’s competitors and industry best practices are reviewed, in addition to features that contribute to an effective mobile design. Since there are a limited number of samples of optimized websites, some mobile applications and desktop websites are included in the discussion. The features involved in the discussions include 1) checkout page; 2) orientation menu; 3) text; 4) pacing; 5) buttons; 6) icons. Table 4 shows a list of companies included in this section and the underlying reasoning for their listing.

Table 4: Industry Benchmarking Examples

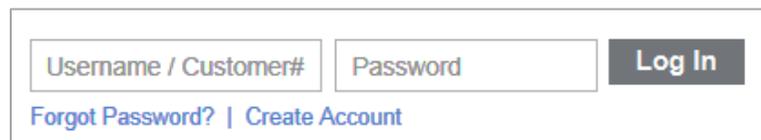
Company	Sample qualification
Log Me In	Direct Competitor
Go To My PC	
Remote PC	
Go Daddy	
Amazon Web Services	DNS Service Competitor
eBay, Amazon	e-commerce web example
Salesforce.com	Optimized web example

In the following paragraphs, reviews for targeted companies are provided for the sections of registration, content (especially amount of text), transition menu, buttons, and icons. Those factors all provide insights to a website’s content, layout, and aesthetics. Moreover, the eye tracking section in Chapter 5 will further discuss the performance and usability analysis of different sectors from Dyn’s Account Management Portal website. Since most companies require registration before checking out, the discussion for logging in and signing up was also considered as part of this section.

4.2.1 Logging in/Signing up

Snapshots from Go Daddy, Amazon, and Log Me In’s signing up pages are reviewed below. These have been included because they cover most layout options. Other registrations are also discussed to provide additional insights.

A typical login is comprised of four parts: 1) username; 2) passwords; 3) forgot username and password; and 4) create an account (transition to sign up). A checkbox will ask whether or not the user would like to remember user name.



The image shows a login form with two input fields: 'Username / Customer#' and 'Password'. To the right of the password field is a dark grey button labeled 'Log In'. Below the input fields are two links: 'Forgot Password?' and 'Create Account'.

Figure 9: Go Daddy Login

Amazon's web services registration page differs from all other websites reviewed. It utilizes Amazon's account to identify new users (sign up) and returning users (sign in) (see *Figure 10*). Additionally, Amazon does not require users to register with a unique ID; instead they can provide their e-mail address as their username.

The image shows two side-by-side login forms. The left form is titled "My e-mail address is:" and has a text input field. Below it are two radio buttons: "I am a new user." (unselected) and "I am a returning user and my password is:" (selected). Under the second option is another text input field. At the bottom is a button that says "Sign in using our secure server" with a right-pointing arrow. The right form is titled "Login" and has a text input field, a "Password" label, and another text input field. Below these is a blue "Log Me In" button. At the bottom of the right form are three links: "Create an account", "Forgot your password?", and "Log in to Rescue account".

Figure 10: Amazon Sign In (Left) and Log Me In Sign In (Right)

Similar to Amazon, Log Me In applies e-mail as their username instead of registering with a separate user ID. Besides, Log Me In also includes country on their account registration page.

Compared to Amazon and Log Me In, Remote PC still requires users to enter more pieces of information, such as first name, last name, and a username. Their registration page serves as the commercial page, too. The confirmation of any purchase made through the website is securely verified by users having to enter a randomly generated set of numbers. For example, in Figure 11 number 194 serves as the security image to differentiate valid users from virus programs. Correct input of 194 is prerequisite for a successful sign up. A checkbox is provided as a default for agreeing to receive updates.

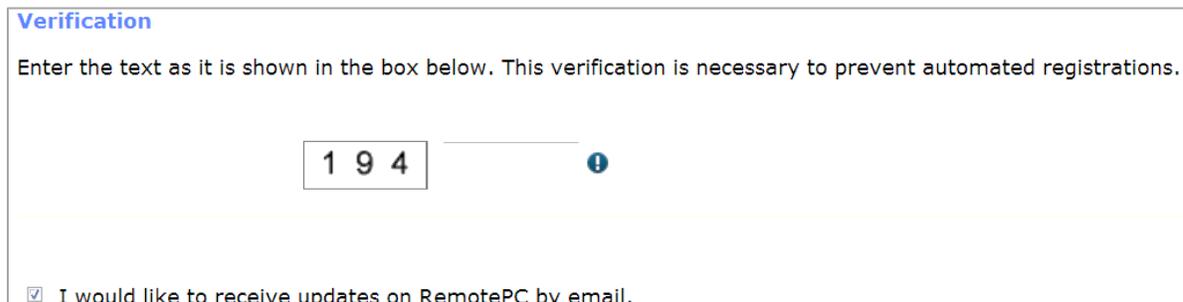
The image shows a "Verification" section. It starts with the heading "Verification" in blue. Below it is a paragraph: "Enter the text as it is shown in the box below. This verification is necessary to prevent automated registrations." In the center, there is a box containing the numbers "1 9 4" and a blue information icon to its right. Below this is a large empty text input field. At the bottom left, there is a checked checkbox followed by the text "I would like to receive updates on RemotePC by email."

Figure 11: Remote PC number verification

Go Daddy's registration page is relatively long, consuming of two and a half mouse scrolls on a desktop web browser to fill out their request to proceed. The required information includes user's name, company and organization information, phone, e-mail, PIN, and additional information, such as gender and birthday. After completing these steps of the registration, Go Daddy provides a comprehensive list of choices for customers to choose the level of updates they wish to receive from the company.

eBay requires first name, last name, and a user ID, in addition to user's e-mail address. One thing to consider is that eBay makes it default for a user to automatically receive updates when registering; however, update preferences can be changed from the user's account settings.

Salesforce offers a 30-day free trial option for new users. The registration consists of filling out first, last name, job title, and basic company information. There is no update preference checkbox on Salesforce's registration page. All users who sign up are default to opt in for receiving updates.

GoToMyPC indicates 3 steps to register and requires credit card information at the final step before starting the 30-day free trial. It also displays TRUSTe and Norton SECURED logo on the login page in a very obvious manner to ensure user security. This feature is likely to increase users' trust in the security of the website when making a purchase.

Similar to Remote PC and Go Daddy, Dyn requests username, password, and a valid e-mail address to open a new account. It also embeds the security image for verification. Company newsletter subscription checkbox is default to opt in. A friendly note reminds user that customer will not be receiving more than 2 newsletters monthly if they choose to subscribe. The TRUSTe logo is located at the bottom of Dyn's page but cannot be obviously noticed during the registration process (*see Figure 12*).

The image shows a registration form with a security image section. The security image is a 2x5 grid of numbers: 0, 1, 3, 0, 8. Below the grid is a text input field. There are two checkboxes: one checked for 'Subscribe to Dyn newsletter (One or two per month)' and one unchecked for 'I accept the terms of Dyn's [Acceptable Use Policy](#), the [Dyn Services Agreement](#), and Dyn's [Privacy Policy](#)'.

Figure 12: Dyn mobile registration page security image and update checkbox

To summarize the above findings, there are common features for website registration among samples reviewed. Users are expected to fill in their username, usually composed of their e-mail address or a self-identified paraphrase, password, and other basic information. Companies send updates when opted in. Registration process is usually fairly straightforward.

4.2.2 Textbox

Users do not read content word-by-word; they scan it. For mobile users, as most of them are on-the-go, scanning becomes even more common. According to Liu, more and more people are involved with the screen-based reading behavior, characterized by spending more time browsing and skimming, spotting keywords, one-time reading, and selective reading while spending less time on in-depth reading (Liu, 2005). Based on his research, companies need to replace the amount of text with more organized and obvious keywords to grab the user's attention. The article also mentioned that skimming is a means to get knowledge of the whole text but scrolling on a computer screen does not support this information processing (Liu, 2005). A visual memory is established for the location of items on pages during reading; however, scrolling typically weakens the relationship between location of items and memory (Olsen, 1994). Thus, it is imperative to develop a mobile

website which can be scanned with little scrolling a simple design, with few graphics that can convey information easily and obviously is preferable over large blocks of text on a mobile screen.

4.2.3 Breadcrumb/Collapsible Menus/Sections

Menus help transition a user from page by page or step by step. They serve as a guide or web map to help a user reach their desired destination on a website. In this project, two styles of menus were looked at that were relevant to our project: 1) breadcrumb as horizontal; and 2) collapsible as vertical (see Figure 13). While there are many other menu categories, breadcrumb and collapsible styles seem most appropriate for mobile phones. These two menus served as the basis for mockup designs in our study discussed further in Chapter 5.

Breadcrumb menu is used to display process flow, especially for step-oriented or sequence-oriented processes. The left picture of Figure 13 displays a standard example of a breadcrumb menu.

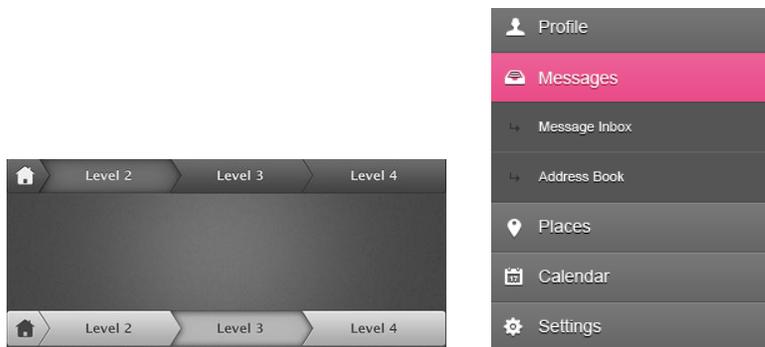


Figure 13: Sample of breadcrumb menu (left) and collapsible menu (right)

The right picture of Figure 13 and Figure 14 represent two examples for collapsible menu. Collapsible menu can hide sub-menus until the user expands them. It highlights the hierarchy of the menu, while hiding the details and saving the spacing consumed by unnecessary sub-menus.



Figure 14: Log Me In Collapsible Menu

4.2.4 Buttons/Icon

Since buttons and icons, e.g. logos, are commonly used features on company mobile websites, the section below provides some common industry practices to support the MQP team’s evaluation of Dyn’s current Account Management Portal website and provide recommendations for enhancing the mobile user experience.

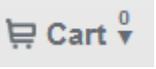
When coming to button designs, it is important that the button element is easy to click by a fingertip and is obvious to users. For example, Apple’s iPhone interface uses buttons with a height of 44 pixels (0.3 inches) (Northington, 2011). This allows customers to easily navigate through the phone menu, applications, and web browser (see *Figure 15*).



Figure 15: iPhone Button configuration

The icons selected should be universal and intuitive symbols. In this case, we choose shopping cart as an example. About half of the websites examined for this project, e.g. Go Daddy, eBay and Amazon, embed a shopping cart icon. It was noticed that most Information as a Service (IaaS) or software companies do not offer shopping cart option. It is assumed that because most users do not check out multiple service products from these companies, it is not necessary to embed a shopping cart. Table 5 provides examples of cart icons that were found on the websites reviewed for this project.

Table 5: Sample cart icons from Go Daddy, eBay, Amazon and Dyn

			
Go Daddy	eBay	Amazon	Dyn

From Table 5, the shopping cart icons for Go Daddy and Amazon specify the number of items checked out by customers. From the shopping carts, users can view details of items checked out by hovering the mouse over the icon. This feature serves as a reminder for users about their items. Dyn and eBay’s carts are both clickable icons that will transition users to their shopping cart pages.

4.3 Summary

Communication is most effective when the process is straightforward and simplified, content is concise and organized, buttons are distinguishable and clickable, icons are universal and intuitive. For Dyn to provide a user-friendly mobile website, the company needs to consider some common characteristics from e-commerce companies outlined in the chapter above.

Besides identifying industry best practices and successful examples, the MQP team conducted two usability studies using eye tracking to gather specific data and analyze the current state of Dyn’s Account Management Portal website. Throughout the completion of two studies, the MQP team presented their final recommendation to the company. The outcomes of both studies are discussed in the Chapter 5.

Chapter 5: User Studies: Design, Analysis, and Discussion

In order to successfully determine, assess, and accomplish the goals of this MQP project, the MQP team developed a structured approach to understand the business needs, analyze the current state of the process, identify opportunities for improvement, and study the alternative solutions to the research problem. This chapter will address the methods and protocols used to develop two usability studies to identify the opportunities for improvement and to test the project recommendations. Furthermore this section, explains the rationale used to justify the research methods chosen, provides an in-depth analysis of the data gathered throughout the usability study and discusses the various conclusions drawn from each of the studies.

5.1 Usability Study Requirements

Dyn's business needs for this project called for an innovative way to implement effective mobile e-commerce optimizations. The company's web development team had already identified possible mobile optimization theories through trade conferences, literature reviews and benchmarking other e-business websites, and had reached a consensus on which of the opportunities identified were to be further explored. The next project objective was to define a method to evaluate the potential usability improvements of each one of the theories identified. As stated in the previous chapter, the main optimizations the MQP team evaluated were based on the principles of adaptive web design. Prior to the start of this project, Dyn's web development team had begun efforts to improve the usability of their website using adaptive web design. Dyn's progress allowed some of the website to dynamically adapt its layout to fit the screen of the device viewing it. This signified a great improvement towards increased mobile usability. However, none of the pages in this project's scope had such improvements implemented. The MQP team determined that Dyn's current progress could be categorized as "mobile adapted" and that the main improvement opportunity was designing the site towards "mobile optimized". This project defines a mobile adapted site as one that changes only the layout of the page to ensure it fits a mobile device. A mobile optimized site achieves this same effect, and in addition ensures that the content presented, as well as the navigation provided were

tailored to mobile displays. For example, a regular website with a left navigation bar might seem intuitive on a computer screen, but on a small device the left pane would take valuable horizontal screen real estate. This project's user studies aimed at identifying and evaluating the best alternatives for mobile optimization of Dyn's webpages.

5.2 Usability Study I

In an effort to further understand what factors contribute to an optimal e-commerce experience on mobile devices, the team concluded that benchmark usability testing would be the best approach at collecting valuable information to aid in the formulating and supporting of alternative solutions to the opportunities identified. The main methods evaluated to develop an appropriate study protocol were surveys, interviews, focus groups, and use-case experimenting.

The first study was constrained by a short timeframe for development, execution, and analysis of results. This led to the decision of ruling out a widespread survey since this method requires targeting of a broad group of subjects, expecting low response rates, and because it would need to be conducted over a wide data collection time frame. The team also ruled out focus groups as an option, because these studies observe the development of a "group mentality" which proves counterproductive for the purposes of this project. The team identified that the best approach for the first study was to conduct an experiment that is carried out in one or two days with as much information gathered from an easily incentivized subject pool to increase turnout. Because the main objective of the project was to assess the usability of Dyn's mobile checkout process, student population served as a suitable pool of subject for this project. Younger people are avid mobile users. Additionally, this population forms a hard to please technology savvy group of users who tend to have high expectations when it comes to superior user experience (Djamasbi et al. 2011).

5.2.1 Objective

The objective of this study was to gather quantitative and qualitative data about the usability of Dyn's mobile checkout process. The team included an interview carried out at the beginning of the study with the purpose of gathering information about what users appreciated during mobile web experiences. The final protocol consisted of two interviews

that collected both quantitative and qualitative data, as well as an eye tracking usability experiment (*See Appendix C: Study I Protocol*). The interviews allowed for a flexible conversation with the subjects that covered a script to make sure the same questions were asked to each participant while allowing for follow-up questions to gather a broader set of information.

5.2.2 Participants

Participants were recruited from an undergraduate course in the WPI School of Business. In addition to class credit, students who volunteered in the study were entered in a raffle for a \$50 gift card. The study required participants to complete an e-commerce task on Dyn's website from a smartphone. A total 17 participants, 10 male and 7 female, participated in the study. The data for two of the participants (1 male and 1 female) was excluded from the analysis because they were not able to successfully complete the eye-tracker calibration process. Out of the remaining participants, 10 were administered the study on a Samsung Galaxy SIII smartphone running Android 4.0.4, while the other 5 participants were administered the experiment using an Apple iPhone 4S running iOS 5.1.1.

5.2.3 Task

Participants were asked to carry out the task of a small business manager, purchasing DNS hosting services for their company. Prior to the experiment users were instructed to look for a product called "Dyn Standard DNS" within the webpage displayed on the phone. After identifying the product, participants were asked to complete the checkout process as if they were buying "Dyn Standard DNS". Participants were informed that all the purchasing and shipping information would be provided verbally upon request.

5.2.4 Procedure

The study proceedings were divided into three phases: Introduction, Usability Test and Conclusion. Upon arrival, participants were briefed on the purpose of the study and asked to sign a study consent form. Participants were then asked a series of questions pertaining to their previous experiences and preferences for mobile web browsing, concluding the first phase of the study. For the Usability test, the participant was explained the task,

calibrated with the Tobii x120 eye tracker and then asked to perform the task on a smartphone. Finally, an exit interview was administered; the participant was then debriefed and thanked for volunteering.

5.2.5 Measurements

The measurement methods employed for this study were a set of two interviews and the qualitative analysis of eye-tracking data. This section will describe the purpose and details about each method as well as the information the team intended on gathering.

Interviews

The first interview was carried out at the beginning of the experiment when the goal was to gather qualitative information about the participant's preferences, dislikes, and overall experience level with mobile e-commerce. Participants were asked to describe what e-commerce websites they were familiar with, and what other mobile websites (not necessarily e-commerce) that they interacted with frequently. Additionally, participants were asked to describe characteristics, functionalities or features they appreciate in mobile e-commerce and non e-commerce websites they have interacted with, as well as negative experiences they may have had with these sites. (*See Appendix E: Study I Entry Interview*).

The exit interview was administered after the eye tracking experiment. The interview was designed to gather both quantitative and qualitative information about the participant's experience when navigating through Dyn's check-out workflow (*See Appendix F: Study I Exit Interview*). Participants were asked to describe what they found positive and negative about their experience. Additionally, they were asked to measure their agreement with usability statements such as "I thought the content was too technical". (*See Appendix F: Study I Exit Interview for the full set of questions*). Lastly, participants were asked information about the product they bought and the services offered in the process and were given the opportunity to make recommendations to Dyn about their site and purchasing process.

System Usability Scale (SUS)

The System Usability Scale questionnaire was used as a component of the exit interviews as it provides a reliable and well tested method of quantitative usability analysis. The MQP team opted for this scale due to its industry-proven result reliability across varying sample sizes, particularly small sample sizes (Tullis and Stetson. 2004). This was critical because the timeframe for the project did not allow for extensive participant recruitment or data-gathering; thus the MQP team needed a reliable scale to accurately evaluate usability based on a small number of observations. Results obtained from the SUS score have been perceived as some of the most reliable data collected in this project. The SUS Scale was developed in 1986. The SUS questionnaire consists of 10 questions, which the participant can rate from 1-5 on a scale of agreement, where 1 is "strongly disagree" and 5 is "strongly agree". The meaning of the points vary between odd and even questions, meaning that for some questions a score of 5 is optimal experience, but for others it implies negative experience. The intercalated question values add to the reliability of the scale, as it allows for easier analysis of outliers created by random answers. SUS scores are measured from 0-100, where '100' is the best usability score attainable. An important factor to be noted is that while the score ranges from 0-100, it does not mean that a score of 70 equals to a usability of 70% (Sauro, 2011). In fact, SUS researchers have pinpointed the SUS industry average at 68. Accordingly, a score of 70 would just be slightly over the 50th percentile of SUS scores, meaning that said score is better than 50% of all other scores tested. The SUS scale has been used for over 25 years, and some SUS expert researchers estimate it can be reliable for another 25 years.

Eye tracking usability experiment

The usability component of the study was designed as an eye tracking experiment where the participant was asked to follow a mock purchase scenario on a mobile phone. The use case was a walkthrough of Dyn's workflow to purchase "Dyn Standard DNS",



Figure 16: Tobii x120 Mobile Configuration

beginning at the 'DNS Marketing page' and concluding with the purchase order placement (See *Appendix C: Study I Protocol*). The team took the opportunity to utilize the eye tracking equipment in WPI's User Experience and Decision Making (UXDM) Laboratory. The UXDM Tobii x120 Eye tracker was used in the mobile test configuration (See *Figure 16*) to be able to observe where in the phone the participant looked at throughout test scenario. This allowed the team to obtain a deeper perspective into each participant's mobile e-commerce experience. At the broadest level, the resulting data is a video of the participant interacting with Dyn's website on a smartphone with an overlaid gaze-path of where the participant was looking at the time. This video feed was also available to the study coordinator during the study, which allowed for enhanced observations about each participant's experience.

5.2.6 Study I Results

After completing the data collection for the study, the team proceeded to compiling and evaluating the data gathered in the study. The objectives of the data analysis process were to gain insights into the mobile web experience determinants, identifying specific opportunities for improvement and gaining quantifiable benchmark data for assessing the impact of any implemented recommendations. With this in mind, efforts were honed on developing a comprehensive Excel spreadsheet containing four main analysis foci: SUS data analysis, interview data analysis, eye tracking video analysis, and form error analysis.

5.2.6.1 Interview Data Analysis

During each interview administered, there were two interviewers noting down the participant's responses. In order to identify and understand any trends in the overall interview data collected, the team developed a qualitative response assessment matrix. The premise of the matrix was to assign a value to each participant's response on a scale from 1 to 3, where '1' categorized the comment as negative, '2' as neutral and '3' as positive. All members of the MQP team filled out the matrix for each of the responses gathered. Subsequently, the matrix values were averaged to determine a consensus on the overall sentiment of the participant's comments. In doing so, the MQP team ensured that the conclusion drawn from each comment was backed by inter-rater reliability. In addition to the matrix, the most common responses were identified. This analysis of the 4 qualitative

questions asked (see Appendix F: Study I Exit Interview) found that on android devices, 32% of the comments were considered positive while only 11% of iPhone comments were positive.

Table 6: Study I Exit Interview Overview

Negative Comments	Positive Comments
Content not optimized for small screens	Easy to understand process
Too much scrolling (zoom-in and out)	
Hard to navigate	Good flow
Layout not always intuitive	

5.2.6.2 SUS Data Analysis

The System Usability Scale (SUS) survey consisted of 10 questions about the user’s general experience and thoughts about the site. By asking users to rate qualitative statements based on their level of agreement with the statement, SUS allows usability researchers to get a quantitative rating of the site’s usability. The first step in utilizing the SUS data gathered is to compute the overall score each participant provided for the site. To do so the following formula was utilized:

$$SUS = ((Q_1-1)+(5-Q_2)+(Q_3-1)+(5-Q_4)+(Q_5-1)+(5-Q_6)+(Q_7-1)+(5-Q_8)+(Q_9-1)+(5-Q_{10})) * 2.5$$

Where Q_n represents the number value (1-5) the participant assigned question n

In addition to each individual’s SUS score, the following averages were calculated for comparison: average question scores and average SUS score, average SUS score on iOS devices and average SUS scores on Android devices. Doing so allowed the team to gather more detail about how each form factor affected the user’s usability and overall experience with Dyn’s website. Lastly, the values of each question’s average score were color-coded according to their meaning using a 5-color heat-map scale; where green indicated an optimal response, yellow meant neutral response and red indicated a poor response. Intermediate scores received either light green or orange depending on their meaning. The number value of optimal, neutral and poor responses varied between even and odd numbered questions. For odd numbered questions, a score of 1 was poor and a score of 5

was optimal. Conversely, for even numbered questions a score of 1 was optimal and a score of 5 was poor. The average question scores and an overall SUS rating across both devices were calculated in Table 7.

Table 7: Dyn.com Study I SUS Averages

	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	SUS Score
Overall Avg.	2.57	2.86	3.21	1.64	3.07	2.43	3.21	3.14	3.36	2.64	57
Avg. Android	2.56	2.89	3.22	1.56	3.00	2.44	3.33	3.22	3.56	2.67	59.75
Avg. iPhone	2.00	3.00	3.00	2.00	3.00	2.75	2.75	2.75	2.50	3.00	51.5

5.2.6.3 Video Data Analysis

The Tobii x120 eye tracker mobile configuration recorded videos of the participants performing the research task. Additionally, by using Tobii studio, the MQP team was able to overlay a gaze plot over the video (See Figure 17). The end result was a recording that allowed the team to see where the participant was looking. Moreover, the recordings showed where participants were confused. Some of the main observations occurred in the pages outside the scope of this project. However the team considered it appropriate to document these for Dyn’s benefit.

On Dyn’s main DNS marketing page, there were a number of instances in which participants were confused about where they could click to access the product. On mobile devices, the page displayed the names of the different services in bold, with a short description below. Participants mistook the title of the product for a hyperlink to access it.

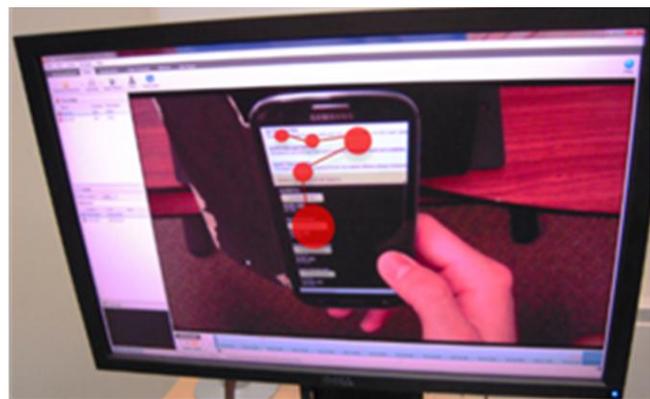


Figure 17: Tobii x120 Eye Tracker Gaze

The result was several attempts at clicking the text before scrolling down to find the actual button leading to the product’s individual marketing page. Once on the ‘Dyn Standard DNS’ marketing page, participants read about the product and tried to find out how to buy it. The page itself had a “buy now” banner front and center; however, eye tracking recordings

show several participants disregarded this banner before actually looking at it and selecting it. A few participants noted they had ignored it because they assumed it was a third-party advertisement.

Lastly, using the video recordings, the MQP was able to determine the length of user engagement on specific parts of the process, as well as on the overall task. On average, participants spent 4 minutes and 25 seconds completing the task from start to finish. The MQP team also looked into the length of completing only the checkout form. Accordingly, the team observed an average of 2 minutes and 38 seconds to complete the checkout form across all participants. This means participants spent about 60% of the task filling out the checkout form.

5.2.6.4 Form Error Analysis

Form errors were an important component of Dyn’s key performance indicators (KPI’s). The company’s web development team specifically requested that any errors in the checkout form be identified, recorded, categorized and reported separately. To do so, the MQP team compiled data from interview notes and the video analysis to identify all instances in which participants encountered form errors. An error was counted every time a participant submitted the form with invalid information, resulting in an error message. Below, Table 8 outlines the form errors reported to Dyn categorized by which section of the form the participants received the error messages at.

Table 8: Study I Check out from errors

Form section	Total errors	Android OS	iOS
Credit Card Number	3	1	2
Expiration Date	2	1	1
Zip Code	1	1	0
Total	6	3	3

The errors observed on the credit card number were only counted when the participant submitted the form and failed to acknowledge that the credit card number provided them by the study coordinator was fake and continued on to re-submitting the entire form. After

the task was completed, study coordinators asked those participants who received this error to comment on the specific experience. A common reason given was that the error message displayed was not very prominent and easy to miss.

Invalid credit card expiration dates are another form error worth evaluating. Despite the input suggestion provided by Dyn (MM/YYYY) designed crafted developed, several participants typed in the expiration date in various formats. Participants were verbally provided the expiration date *'January 2013'*. The most common mistake observed was when participants only typed in the digits *'012013'*.

The MQP team identified additional checkout form irregularities worth noting, regardless of them not fitting the aforementioned qualifiers of a form error. One of the most prominent issues observed was where participants had difficulties entering the billing address' state. Currently, the state input field allows for only three characters to be typed in, presumably for users to enter only abbreviated state names. However, this is not intuitively clear as demonstrated by several attempts from participants to type in the full state name. All participants were provided a street address from *'Manchester, New Hampshire'* (see *Appendix C: Study I Protocol*), and were observed making several attempts to type in *'New Hampshire'* only to have their input truncated at *'New'*.

5.2.7 Study I Discussion

Even though study I was designed and executed under tight time constraints, the MQP was able to obtain significant data about Dyn's mobile usability. The methods used to interpret all the information gathered varied from group discussions, statistical analysis, and graphical representations. After the completion of Usability Study I, the MQP team presented preliminary results of the raw data collected from the study. As mentioned in sections above, these included an error form, common survey responses, and SUS scores by operating system. This section outlines the interpretation and implications of the results, as well as how they can be used to contribute to improving Dyn's current mobile user experience.

Analysis of the *'study I'* data allowed the MQP team to identify four aspects which contributed to an unsatisfying e-commerce purchasing process: 1) having to zoom in and

zoom out; 2) scrolling sideways; 3) misleading links; and 4) selecting product details. These caused an overall increase in the time to completion rate of the task assigned.

The MQP team observed that completing Dyn's "Add Zone Services From" resulted in some confusion among several of the participants tested. Prior to this part, a participant would have successfully identified "Dyn Standard DNS" from Dyn's Marketing page, entered a domain name, selected expiration date, and proceeded towards purchasing the product. The order form comprised of 1) selecting or deselecting to automatically renew services before selected expiration date; 2) entering payment information; and 3) confirming the order. The main issue spotted with participants, was that they did not know where to start with this page, scrolling up and down the page until the study coordinator informed them about filling out the domain name. This behavior suggested that a more intuitive design was needed.

All error forms addressed in the previous sections were observed in the payment information page of the checkout process. This section included adding a new credit card for new users, option to pay with PayPal, and entering billing information. For the purpose of this study, users added a new credit card each time. This subform was composed of entering credit card number, credit card expiration in a "MM/YYYY" format and a security code. The billing information contained filling out the customer's full name, address, city of residence, state or providence, zip or postal code, country, and phone number. Company name was listed as optional.

During the study, a member of the MQP team would provide all necessary information to the participants to complete the check-out process. However, it was them who would fill out the form according to their judgment. Therefore, the study was not biased towards the final results. The participant was the person making the decision and had full control of the check-out process. In this train of thought, there was also no time limit for completing the assigned task.

Following a submission of the order, the HTML code in the background would verify the compliance of the content. Since the form is composed of a number of textboxes, each one of them would be checked. Should either one is identified as incomplete or improperly

completed; an error form would appear below each textbox. The common pattern of user errors consisted of entering information in the textboxes restricted to certain number of characters and masked with a data storage format requirement. These included, in order of entering, Credit Card Expiration Date and State. While the format for the first one was illustrated below the textbox, the users did not acknowledge the mandatory month/ year format. The form error was not because of entering insufficient amount of numbers, but because of participants not entering “/” between the month and year of credit card expiration. As discussed in the Error Form section, the number of errors in total was three, one for Android and two for iOS.

Another challenge for the participants was accurately filling out the State textbox. Dyn’s UX Development team had limited the number of characters to three because of data integrity purposes. For example, a state such as Massachusetts would be entered as ‘MA’, without causing an error form. Similarly, the state of New Hampshire would be entered as ‘NH’ only. However, there would be no hint for customers who are not familiar with this format. As such, some of the participants in the study would attempt to fill out the textbox with “New Hampshire” or submit with the textbox with the content “New”. Moreover, they would keep entering the full state name without recognizing the restriction on number of characters permitted.

To summarize the MQP team’s observations from both most common error forms, participants would not acknowledge the error form and would press “Place Order”, even after an error has been identified. All error would appear in a red font below the textbox. To illustrate, should a participant enter “012013” for the credit card expiration date, the web browser would return a result such as *“Please enter a date in the format MM/YYYY.”* For the state textbox, an error would be displayed as *“Please enter the official 2-letter state abbreviation for this mailing address in the US”*. However, the textbox would allow entering a 3-letter abbreviation for a state and not limit the participant in an acceptable 2-character abbreviation only.

In addition to the error form observations, the MQP team also perceived a common trend in the participants’ behavior. There was a tendency not to read the content, instead, participants would skip the long text describing the features of the “Dyn Standard DNS”

product and proceeded to the next page. After the task was completed, participants were asked why they scrolled past this banner. The majority of participants responded they thought it was an advertisement.

A contributing factor for this behavior was also the layout of the “Dyn Standard DNS” product. A snapshot of the website is included below. A common survey response would indicate that the “Order Now” button on the top of the webpage was conceived as a third-party advertisement.

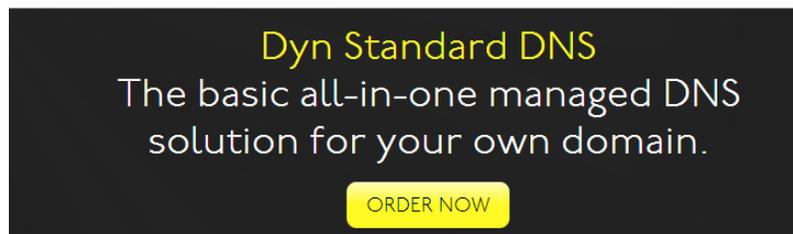


Figure 18: Dyn Standard DNS Banner

Based on the video recordings from Tobii Studio, the MQP team was able to extract each video separately and review its length. This helped the team analyze the average length each participant spent completing the assigned task. On average, each participant spent 4:24 minutes on the entire form. This includes from start to finish. Participants took 2:38 minutes to complete the form error only. The proportion of average time spent on the entire process over the time spent on the form is 59.94%. Based on the data, 2/3 of the participant’s time commitment was for completing the form from 1) finding the Dyn Standard DNS product; 2) adding a domain name; 3) confirming items added in the shopping cart; and 4) inputting payment information. A visual representation of the average time spent for completing the entire process and the average time spent on completing the checkout form is outlined in Figure 19.

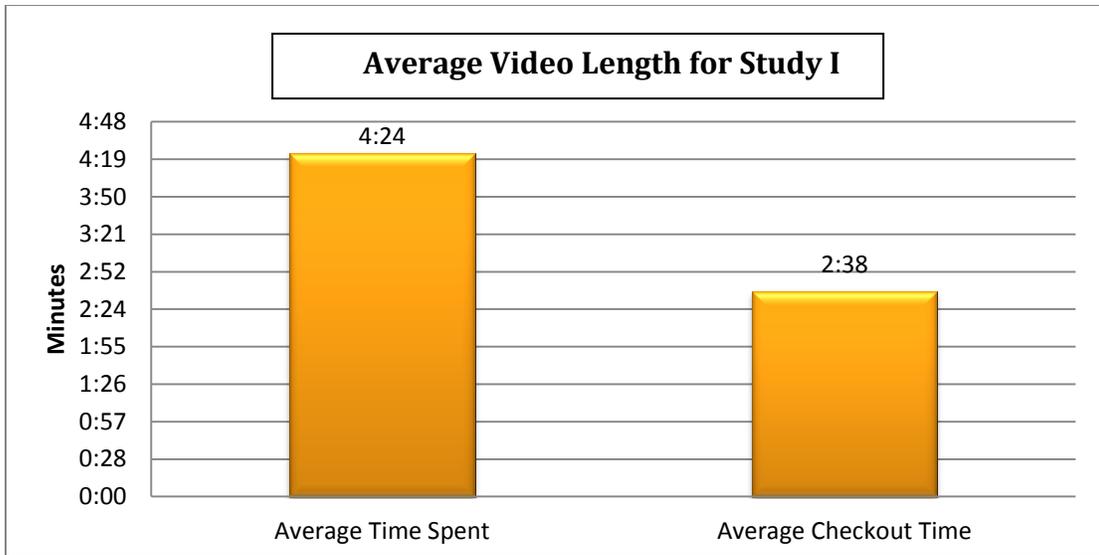


Figure 19: Average Video Length for Study I

Taking into consideration the observations and data metrics collected from Usability Study I, the MQP team collaborated on incorporating the most frequently-recognized error forms into mock-up recommendations in an attempt to minimize the user error and enhance the user experience. These recommendations reflected both the quantitative data from the surveys administered and the shared error forms. Further details concerning this data and its applicability in forming the recommendations will be discussed in the following section.

5.2.8 Recommendations

As part of the initial benchmarking, the MQP team familiarized themselves with the current state of Dyn’s mobile website and critically analyzed the opportunities for improvement. As part of the process, the team recognized the need for implementing changes in terms of both content and layout optimization. This section describes in details the recommendations, as they relate to the final recommendations to the company.

5.2.8.1 Content recommendations

The MQP team initially assessed the content on Dyn’s website. The review started on Dyn Standard DNS’s product webpage and concluded after submitting the order for “Dyn Standard DNS”. In this case, the last page included a confirmation for processing the order

and social media links for sharing the just-bought product with family and friends on Facebook, and Twitter. The full content review included 1) Dyn Standard DNS product specifications webpage; 2) Add Zone Services webpage; 3) shopping cart; 4) order placement and payment information; and 5) processed order confirmation page. The marketing pages were not included in the scope of the recommendations.

The review was completed from the customer perspective. The MQP team critically analyzed the content of the website, considered the length of the paragraphs, amount of scrolling to read a paragraph, and efforts to find relevant information. The final report included comments about each page and specific recommendation for enhancing the overall user experience. Specific recommendations included grouping similar information and using bullet points to visually outline necessary information, thus minimizing the amount of reading, scrolling, and time required to complete the process.

5.2.8.2 Layout recommendations

In addition to reviewing Dyn's website content included in the project scope and providing particular recommendations, the MQP team also carefully evaluated the layout. The scope consisted of the same pages assessed in the previous section. Again, the marketing pages were not in the scope of recommendations.

The MQP team considered the size of the Dyn logo as a percentage of a mobile device's real estate, header and shopping cart, discount box, and login. Based on the observations from going through the process, the MQP team made the following recommendations 1) considering an alternative navigation menu design (collapsible or breadcrumb) for each step of the Add Zone Services (e.g. Name Registration, DNS Services, E-mail Routing); 2) combining Dyn's header with the shopping cart; 3) moving the discount box before the order total; 4) decreasing the top and bottom margins; and 5) creating an alternative design with login and register button as the two buttons. These recommendations were backed up by the MQP team's initial research for best practices for an adapted mobile website.

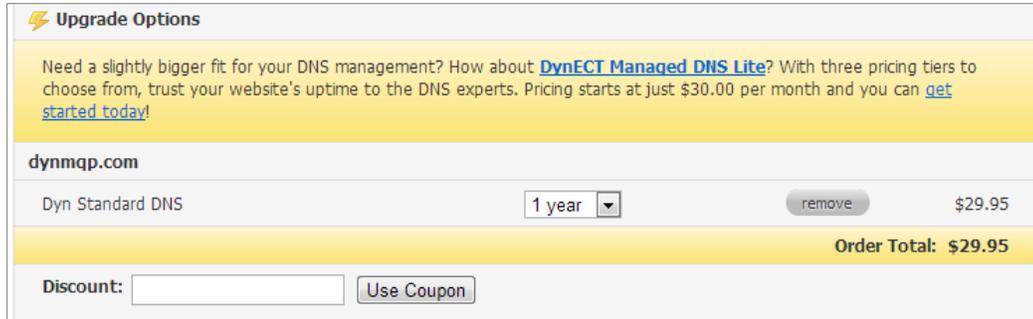


Figure 20: Dyn's Current Discount Box

Additionally, the data collected from Usability Study I confirmed the proposed changes to Dyn's website. Based on these observations, the MQP team created two mock-up designs as a guideline on incorporating the recommendations. The layout included a breadcrumb design (see Figure 21) and a collapsible menu design (see Figure 22). The MQP team considered best practices in the process of designing these recommendations and presented these to Dyn's UX Development Team during the Final Proposal's presentation on October 10th, 2012. The development of each of the recommendations aimed at enhancing the user experience. The mock-up recommendations included 1) logical content grouping; 2) compact and concise sectioning; 3) reduced scrolling; 4) reduced word count; 5) less screen real estate; 6) effective spacing; and 7) intuitive navigation. Additionally, both designs included input masking when entering a phone number and their credit card expiration date. The MQP team also addressed the error forms related to properly entering the correct abbreviation for U.S. states by proposing a dropdown menu.



Figure 21: Breadcrumb Navigation Mock-up



Figure 22: Collapsible Navigation Mock-up

5.3 Usability Study II

The second usability study was designed to test impact of the project's recommended changes implemented by Dyn. Because the MQP project had to be completed over the course of 14 weeks, the MQP team had to run the second usability study a month after the recommendations were presented to Dyn. Working within this timeframe, Dyn was not able to implement all of the recommendations made. However, the changes that implemented were of enough significance that the MQP team was able to expand the scope of the usability study. The new study design allowed for more quantitative data, while still collecting data points similar to those collected in study I. Additionally, the MQP team developed two different mockups to test their visual design and their effect on user experience. The following sections illustrate the study design rationale, execution and results and analysis.

5.3.1 Objective

The objective of the second study was to gather quantitative data about any usability improvements to Dyn's website as a result of the implemented recommendations. Because the project time limit did not allow the development of a mobile site with the MQP team's full recommendation, the MQP team decided to develop mockups that implemented the visual design based on the complete set of recommendations made to Dyn after the first study. For this reason, an additional survey and eye tracker portion were added to Study II with the goal of gathering qualitative and quantitative data about the design of the mockups. The team included a short interview carried out at the beginning of the study with the purpose of gathering information the participant's previous experience with mobile e-commerce. The final protocol developed consisted of one interview, two surveys and two eye tracking usability experiments (*See Appendix G: Study II Protocol*).

5.3.2 Participants

Participants were recruited from the same pool as in the first study but were not the same students who completed the first study. As in the first study, in addition to class credit, students who volunteered in the study were entered in a raffle for a \$50 gift card. The study required participants to complete an e-commerce task on Dyn's website from a smartphone. A total 27 participants, 19 male and 8 female participated in the study. Fifteen participants were administered the study on a Samsung Galaxy SIII smartphone running Android 4.0.4, while the other 12 participants were administered the experiment using an Apple iPhone 4S running iOS 5.1.1. In addition to viewing Dyn's website, participants were asked to view and rate screenshots (mock-ups) of possible alternative designs to the process they had just completed. Out of the participants who were administered, the study on Android OS, 8 reviewed the 'breadcrumb' mockups and 7 reviewed the 'collapsible' mockups. Participants who completed the study on iOS were evenly split, with 6 'breadcrumb' reviewers and 6 'collapsible' reviewers.

5.3.3 Task I

The main task remained the same as the one for Study I. Participants were instructed to assume the role of a small business manager, who is interested in purchasing managed DNS

services for their company. Participants were instructed to look for a product called “Dyn standard DNS”, and to proceed to purchasing it once it was located. Research coordinators informed the participants that all the purchasing and shipping information would be provided verbally upon request.

5.3.4 Task II

After completing task I and providing feedback based on their experience, participants were asked to look at an alternative layout for the website they had just used. The experiment coordinators made sure to inform the participant that their task was simply to look at the images on the mobile phone, which would be in the same order as Dyn’s checkout process, and to attempt to follow the process as they would on an actual mobile website. Half of the participants carried out this task looking at the ‘breadcrumb’ mockup, while the other half looked at the ‘collapsible’ mockup.

5.3.5 Procedure

The second study’s proceedings were divided into four phases: study introduction, task I, task II, and conclusion (*See Appendix G: Study II Protocol*). Upon arrival, participants were briefed on the purpose of the study and asked to sign a study consent form. As part of the entry interview, participants were asked a series of questions with regards to their previous experiences and preferences for mobile web-browsing and e-commerce. Next, participants were instructed on their first task, calibrated on the eye tracker, asked to perform the task and then asked to the first part of the exit survey. Afterwards, participants were informed about the alternative design and the details of task II, for which they were also calibrated and tested on the eye tracker. Upon completing task II, participants were asked to fill out the second portion of the exit survey. Lastly, participants were thanked and debriefed after their final feedback was collected.

5.3.6 Measurements

The measurement methods employed for the second study were an interview, two feedback surveys and qualitative analysis of eye-tracking data. This section will describe

the purpose and details about each method as well as the information the MQP team intended in gathering.

Interview

The interview was carried out at the beginning of the experiment. The goal was to gather qualitative information about the participant's overall experience level with mobile e-commerce. Participants were asked information about which type of phone they owned, and, if applicable, what online activities they engaged in through their phone. Additionally, participants were asked describe what e-commerce websites they were familiar with and which other mobile websites (not necessarily e-commerce) they interacted with or made purchases on (*See Appendix I: Study II Entry Interview*).

Surveys

Because study II was more focused on quantitative data, the interview questions used in study I were modified into a two-part survey. Part one of the survey was administered at when participants completed task I, while the second part was administered after the conclusion of task II. The interview was designed to gather both quantitative and qualitative information about the participant's experience when navigating through Dyn's check-out workflow (*See Appendix F: Study I Exit Interview*). Participants were asked to describe what they found positive and negative about their experience. Additionally, they were asked to measure their agreement with usability statements such as "I thought the content was too technical". Lastly, participants were asked information about the product they bought and the services offered in the process and were given the opportunity to make recommendations to Dyn about their site and purchasing process.

Eye tracking usability experiment

Similarly to the usability component of study I, eye tracking was used for study II to capture gaze data while participants completed each of the two tasks on a mobile phone. The eye Tobii x120 eye tracker of WPI's UXDM lab was used once again in its mobile configuration (*See Figure 16*). Eye tracking data was processed using Tobii studio, which allowed for the generation of area-specific metrics, gaze plots, and gaze heat maps for each

of the mockups. The MQP team also used the video of users completing the task recorded with the UXDM equipment to perform high-level user experience analysis. This video feed was also available to the study coordinator during the study, allowing for high detail observations about each participant's experience.

5.3.7 Study II Results

The data collection for study II spanned for a week, during which 27 participants volunteered in completing the two tasks and providing feedback. Once the data collection was completed, the MQP team once again moved on to compiling and analyzing a more extensive data set. The objectives of the data analysis process were to identify, evaluate and quantify any improvements in the usability of Dyn's website after some of the MQP team's recommendations were implemented. Moreover, the MQP team sought to consolidate usability data about the recommendations not implemented, with the objective of providing Dyn with valuable information and foundations for deciding on future improvements. Therefore, efforts were targeted on extracting eye tracking data, generating new error reports for Dyn, and comparing all usability metrics with the ones gathered during study I.

5.3.7.1 Interview Data Analysis

The study II interview was shortened in comparison to the one used for study I (*see Appendix I: Study II Entry Interview*). The main objective of this interview was to collect information about the type of phone each participant owned, as well as some of their previous experiences in mobile web and e-commerce (*See Appendix I: Study II Entry Interview*). From this interview, the MQP calculated that out of the 27 participants who volunteered, 14 reported owning an iPhone, 11 said they owned an Android smartphone, and 2 reported not owning a web enabled smartphone at all. The data also showed that while 92% of participants tested stated they browse on their phone at least daily (Figure 23); only 41% of them reported making online purchases with it (Figure 24). The most common responses observed for what participants did while online were social networking, e-mail and news. For mobile purchases, the most common responses were buying food, applications and movie tickets.

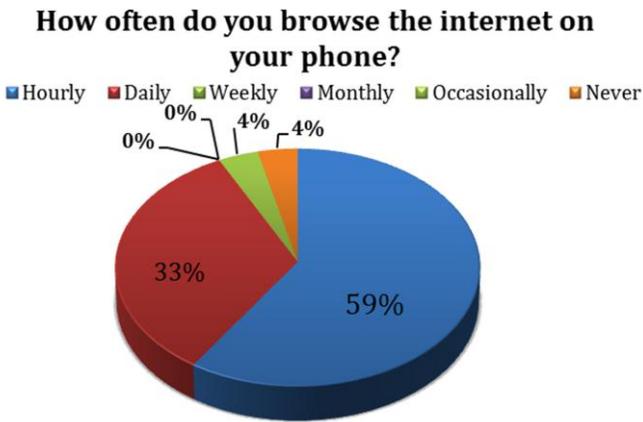


Figure 23: Participant Mobile Web Browsing Frequency

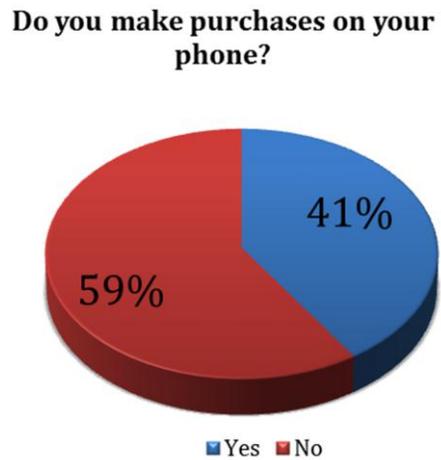


Figure 24: Participants Who Have Engaged in Mobile Purchasing

5.3.7.2 Survey Data Analysis

The exit surveys provided a good deal of data for evaluating in detail Dyn’s new website’s user experience. The first three quantitative questions from the part I of the exit interview sought to evaluate Dyn’s website on three parameters: visual appeal, layout and usability; for each, participants were asked to give a percentage grade to Dyn’s website. This portion of the survey is summarized in Figure 25.

Scoring Comparison - Appeal, Layout and Usability

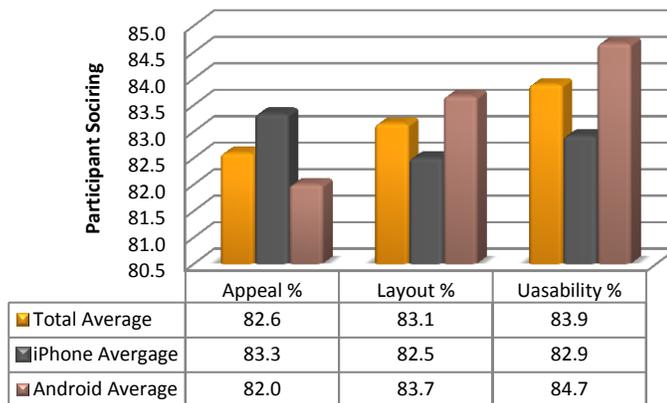


Figure 25: Exit Survey II - Appeal, Layout and Usability Rating

Moreover, the survey captured an additional set of eight questions geared at gathering quantitative information about Dyn’s overall user experience. (See questions E –M in Appendix J: Study II Exit Interview). The results from these questions were compiled and visualized in the color scale as the SUS data for study I. Table 9 includes a visualization of all the average scores for the quantitative questions asked for the exit survey.

Table 9: Study II Exit Interview Quantitative Questions

	Appeal %	Layout %	Usability %	q4	q5	q6	q7	q8	q9	q10	q11	q12
Total Avg.	82.6	83.1	83.9	5.6	3.0	5.0	1.9	6.1	3.0	5.2	4.5	3.0
iPhone Avg.	83.3	82.5	82.9	5.3	3.2	5.2	2.3	5.8	3.4	5.1	4.3	2.8
Android Avg.	82.0	83.7	84.7	5.7	2.8	4.8	1.5	6.4	2.7	5.3	4.7	3.2

There were also questions asked as part of the task II feedback survey. These questions were meant to gather information to compare the two recommended layouts. The table below shows the comparison of the results for ‘bread crumb’ and ‘collapsible’.

5.3.7.3 SUS Data Analysis

As previously mentioned, the MQP team chose SUS as the main usability survey measure for this project due to its high reliability with small sample sizes and industry-proven result consistency. SUS scores and statistics were readily compiled for the second study using the excel template made for the same purpose after study I. For study II, the overall SUS score increased to 72.4, up 27.08% from 57. Looking at the device-specific averages, the MQP team observed that Android averages were once again higher than the iPhone averages. For study II, Android SUS score of Dyn’s site was 77.2, up 29.04%. On iPhones, Dyn’s website scored 67.7, up 31.47% from study I. The averages for study II are displayed below.

Table 10: Dyn.com Study II SUS Averages

	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	SUS Score
Overall Avg.	3.19	1.85	3.78	1.41	3.63	1.93	3.85	2.07	3.89	1.89	72.4
Avg. Android	3.40	1.87	4.07	1.13	3.80	1.73	3.93	1.93	4.00	1.67	77.2
Avg. iPhone	2.92	1.83	3.42	1.75	3.42	2.17	3.75	2.25	3.75	2.17	67.7

The second part of the exit surveys asked participants to answer the SUS survey for either 'breadcrumb' or 'collapsible' layouts, depending of which test was administered. The total average of the 'collapsible' SUS scores was 85.0, while 'breadcrumb' scored an average of 77.7. The device breakdown for 'breadcrumb' is as follows: iPhone averaged 66.3, while Android averaged 86.3. For 'collapsible', Android averaged 87.9 while iPhone averaged 81.7. This data once again shows higher scores on Android than iPhone. It is to be noted that there were two extreme outliers for the 'breadcrumb' scores, several standard deviations from the mean (See Ch. 5.4.3 *Significance of measured data* for discussion of the descriptive statistics).

Table 11: Breadcrumb Menu Study II SUS Averages

	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	SUS Score
Overall Avg.	3.64	1.86	4.07	1.50	4.00	1.71	4.14	1.79	4.14	2.07	77.7
Avg. Android	3.88	1.25	4.63	1.00	4.13	1.38	4.38	1.63	4.50	1.75	86.3
Avg. iPhone	3.33	2.67	3.33	2.17	3.83	2.17	3.83	2.00	3.67	2.50	66.3

Table 12: Collapsible Menu Study II SUS Averages

	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	SUS Score
Total Avg.	3.62	1.46	4.38	1.15	4.23	1.62	4.54	1.92	4.69	1.31	85.0
Avg. Android	3.86	1.14	4.57	1.14	4.43	1.29	4.29	2.00	4.71	1.14	87.9
Avg. iPhone	3.33	1.83	4.17	1.17	4.00	2.00	4.83	1.83	4.67	1.50	81.7

The percentage change in SUS scores for Android was 29.04% and for iPhone 31.47%. The total percentage change in the SUS scores from study I to study II was 27.08%. Beyond the percentage change overall there was a significant percentage change in SUS scores for individual questions. The graph below shows these changes in a range of roughly 10% to 50% change in scores from study I to study II.

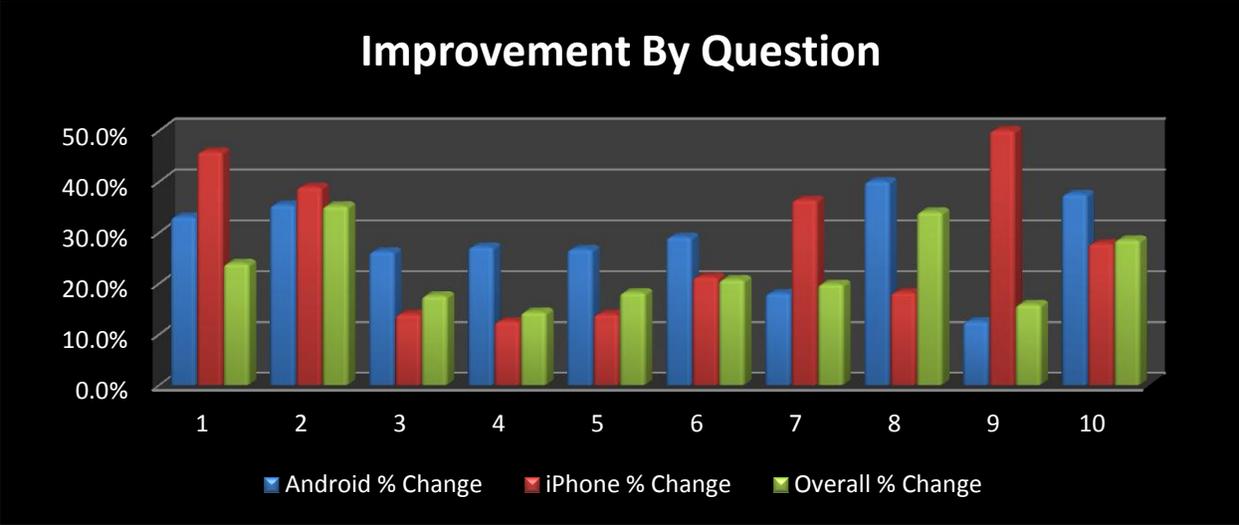


Figure 26: Dyn SUS Score Improvement by Question

There was the highest percentage change in question 9, with a change of 50% from the previous study for iPhones.

Table 13 shows the average SUS scores for both studies, from both Android and iPhone testing with positive percentage changes in each question from the first to second study.

Table 13: SUS Score Comparison for Study I and II

	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10
Study II Avg.	3.19	1.85	3.78	1.41	3.63	1.93	3.85	2.07	3.89	1.89
Study I Avg.	2.57	2.86	3.21	1.64	3.07	2.43	3.21	3.14	3.36	2.64
Android Study II	3.40	1.87	4.07	1.13	3.80	1.73	3.93	1.93	4.00	1.67
Android Study I	2.56	2.89	3.22	1.56	3.00	2.44	3.33	3.22	3.56	2.67
iPhone Study II	2.92	1.83	3.42	1.75	3.42	2.17	3.75	2.25	3.75	2.17
iPhone Study I	2.00	3.00	3.00	2.00	3.00	2.75	2.75	2.75	2.50	3.00
Android % Change	33.0%	35.4%	26.2%	27.1%	26.7%	29.1%	18.0%	40.0%	12.5%	37.5%
iPhone % Change	45.8%	38.9%	13.9%	12.5%	13.9%	21.2%	36.4%	18.2%	50.0%	27.8%
Overall % Change	23.9%	35.2%	17.5%	14.3%	18.2%	20.7%	19.8%	34.0%	15.8%	28.5%

There were also very high percentage changes for both Android and iPhone testing for questions 1, 2, and 10, with percentage changes in scores of 45.8 % for iPhone, 38.9% for iPhone, and 40% for Android. These percentages match the data analysis done by supporting the adapted design over the original site used for benchmark testing.

5.3.7.4 Video Data Analysis

Similarly to Usability Study I, the MQP team completed a video analysis of the average time a participant took to complete the assigned task. The data analysis consisted of going through each recorded video for both Android and iPhone, which participants completed using Dyn's adapted website. As outlined in Figure 27, a participant would spend 4:53 minutes to complete the entire assignment. Compared to Usability Study I, the percentage change is 10.87% higher for the second study.

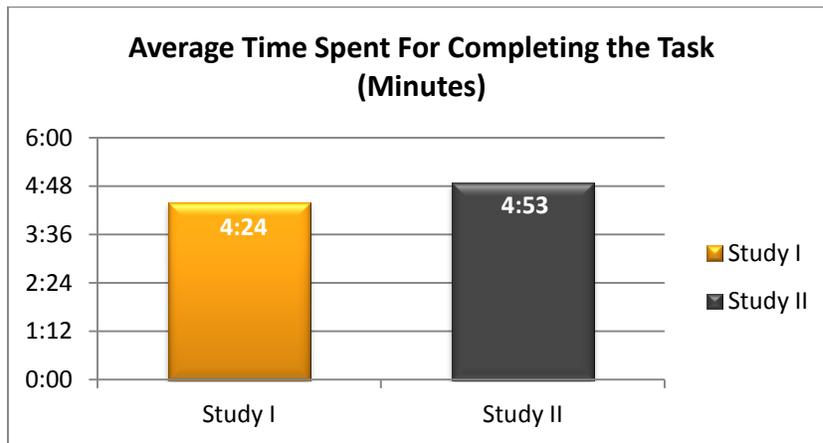


Figure 27: Average Video Length Comparison between Study I and Study II

Correspondingly to the metrics gather for Usability Study I, the MQP team complied the average time participants spent on the checkout form. The results were compared to the results from Usability Study II. As outlined in the chart below, it took approximately 2:58 minutes for a participant to complete the checkout form only. In comparison, it took 2:38 minutes for Usability Study I. This is a percentage change of 9.57%. The proportion of time spent to complete the checkout form related entire assignment was 59.34%, which was 1% less than the proportion it took during Usability Study I, which was 59.94%.

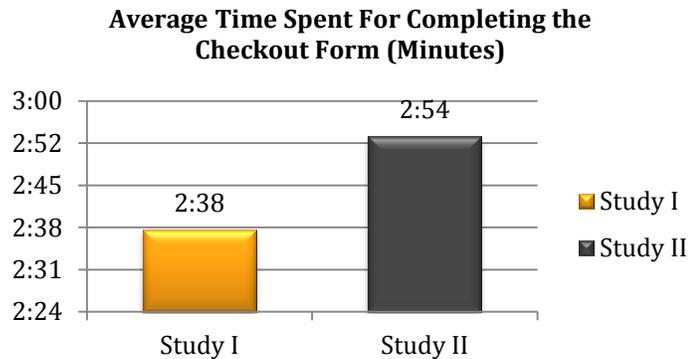


Figure 28: Average Video Length for Completing the Checkout Form

5.3.7.5 Eye Tracking and Heat Maps

The MQP team utilized eye tracking technology in Study II to further evaluate their two proposed alternative layout designs. The team was interested in observing the participants' attention plots for the two mock-up designs to compare them against each other. To be able to generate high quality eye tracking data, the team divided the mock-up designs into different sections called Area of Interests (AOI). Defining AOI is a powerful way to quantify gaze data. It allowed the team the capabilities of getting information on which object (AOI) the participants were looking at instead of observing the coordination on the screen (Tobii Technology, 2009). On each scene or image, the sections were given a unique name based on the scene that they belonged to. When there was more than one section that was named with the same category (menu, content etc.), a sub-name would be added (such as menu 1a and menu 1b). To illustrate the naming convention, a full specification of naming has been included in the Appendix K: Area of Interests (AOI) Section for Breadcrumb and Collapsible Menus .

Table 14 displayed the categories between breadcrumb and collapsible. For example, breadcrumb has button 1, 2, 3, 6, 7 and 8. Collapsible only has button 3, 7 and 8. But to keep in mind, the even when the category and number matches each other, for example, button 3 exists both in breadcrumb and collapsible. Button 3 in breadcrumb is different from the one in collapsible.

Table 14: AOI list of Sections in Breadcrumb and Collapsible Menus

	Breadcrumb	Collapsible
Button 1	Yes	
Button 2	Yes	
Button 3	Yes	Yes
Button 6	Yes	
Button 7	Yes	Yes
Button 8	Yes	Yes
Content 1	Yes	Yes
Content 2	Yes	Yes
Content 3	Yes	Yes
Content 4a	Yes	Yes
Content 4b	Yes	Yes
Content 5a	Yes	Yes
Content 5b	Yes	Yes
Content 6	Yes	
Content 6a		Yes
Content 6b		Yes
Content 7a	Yes	Yes
Content 7b	Yes	Yes
Content 8a	Yes	Yes
Content 8b	Yes	Yes
Content 8c	Yes	Yes

	Breadcrumb	Collapsible
Top 1	Yes	Yes
Top 2	Yes	Yes
Top 3	Yes	Yes
Top 4	Yes	Yes
Top 5	Yes	
Top 7	Yes	Yes
Top 8	Yes	Yes
Menu 1	Yes	
Menu 1a		Yes
Menu 1b		Yes
Menu 2	Yes	
Menu 2a		Yes
Menu 2b		Yes
Menu 3	Yes	Yes
Menu 4	Yes	
Menu 4a		Yes
Menu 4b		Yes
Menu 5		Yes
Menu 6		Yes
Menu 7	Yes	Yes

Among the 27 participants tested in Study II, only 17 of which were able to be calibrated and recorded. 7 participants were taken into final consideration as their video sample rate was higher than 70%.

Table 15 displays the alternative design administered to the participants and their eye tracking sample rate. The sample rate in the Replay View in Tobii Studio estimates the quality of the eye tracking quality, adapted from the validity code by the eye tracker for each eye and each gaze sample (Tobii Technology , 2011).

Table 15: Eye tracking participant and eye tracking sample rate

Tested menu	Eye Tracking Sample rate
Collapsible Menu	99%
	93%
	87%
	72%
Breadcrumb Menu	97%
	95%
	95%

The eye tracking raw data generated include time to first fixation, first fixation duration, total fixation duration, fixation count, visit duration, total visit duration, visit count and percentage fixated. Count and mean value was recorded for all the categories (such as button 1, 2, 3 etc.) of the seven participants for breadcrumb and collapsible. Average value was calculated based on the data.

Time to first fixation refers to time in seconds from when the stimulus was shown until the start of the first fixation within an AOI. Fixation count refers to the number of fixations within an AOI. Percentage fixated means the percentage of participants that have fixated at least once within an AOI (Tobii Technology, 2009). Fixation duration means the time in milliseconds that a fixation lasts (Tobii Technology, 2010).

From data gathering and data analysis, findings were presented in Table 16 and Table 17. These two tables display the number of participants who did not pay attention to specific AOIs. The table was color coded as yellow which meant 0 participants saw that section, light red showed one participant was missing the section, medium red meant two participants were missing the information and dark red meant all participants were not aware of the section during their product purchase. In the collapsible table, top 7 was missed by all four participants during study 2. Top 4, menu 5 and button 3 were missed by three participants, accounting for 75%.

Table 16: Eye tracker data findings for Collapsible Menu

Collapsible Menu							
Category	No. of Participant	Category	No. of Participant	Category	No. of Participant	Category	No. of Participant
Button3	3	content1	0	menu1a	2	top1	0
Button7	0	content2	0	menu1b	0	top2	2
Button8	2	content3	0	menu2a	0	top3	1
		content4a	1	menu2b	0	top4	3
		content4b	0	menu3	0	top7	4
		content5a	0	menu4a	1	top8	1
		content5b	0	menu4b	2		
		content6a	0	menu5	3		
		content6b	1	menu6	4		
		content7a	0	menu7	0		
		content7b	2				
		content8a	0				
		content8b	0				
		content8c	0				

The breadcrumb menu generally performed better than collapsible menu as most of the contents were seen by all three participants. There was not a single section of content that had been missed by all the participants. Top 2 to 5 were missed by two participants, accounted for 67% of all participants.

Table 17: Eye tracking data findings for Breadcrumb Menu

Breadcrumb Menu							
<i>Not enough data for following fields among participant</i>							
Button1	1	content1	0	menu1	1	top1	0
Button2	1	content2	0	menu2	1	top2	2
Button3	1	content3	0	menu3	1	top3	2
Button6	1	content4a	0	menu4	0	top4	2
Button7	0	content4b	0	menu7	1	top5	2
Button8	0	content5a	0			top7	1
		content5b	0			top8	1
		content6a	0				
		content6b	0				
		content7a	0				
		content7b	0				
		content8a	1				
		content8b	0				
		content8c	0				

In order to gain a better understanding of the eye tracking data, the heat maps were generated for further examination. The heat map is a gaze visualization tool created based on the summary of gaze data and fixation counts from different scene recordings in this

study (Tobii Technology, 2009). It can be concluded that participants usually paid attention to the content and most of the menu while disregarding most of the tops.

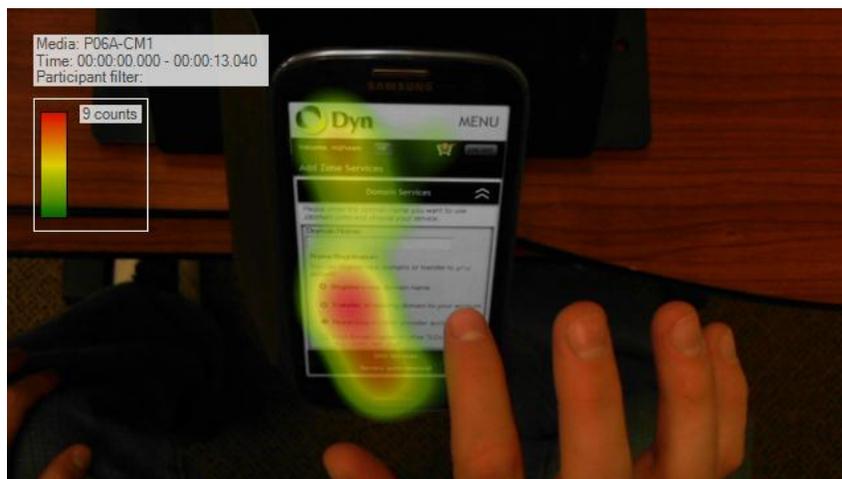


Figure 29: Sample of heat map for collapsible menu

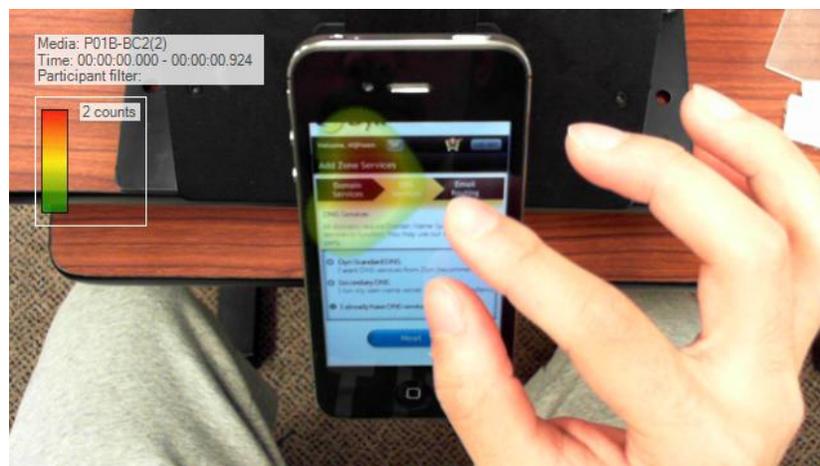


Figure 30: Sample of heat map for breadcrumb menu

Figure 29 and Figure 30 display two heat map samples generated from the fixation count data. The heat maps are a great tool for revealing the areas that participants focused on and the areas they dismissed. To further explain the findings, a comparison was conducted between heat map and eye tracking data in Figure 31. The eye tracking data identified in the previous section that all of the participants missed top 7, which included Dyn's logo and the blue banner of order review.

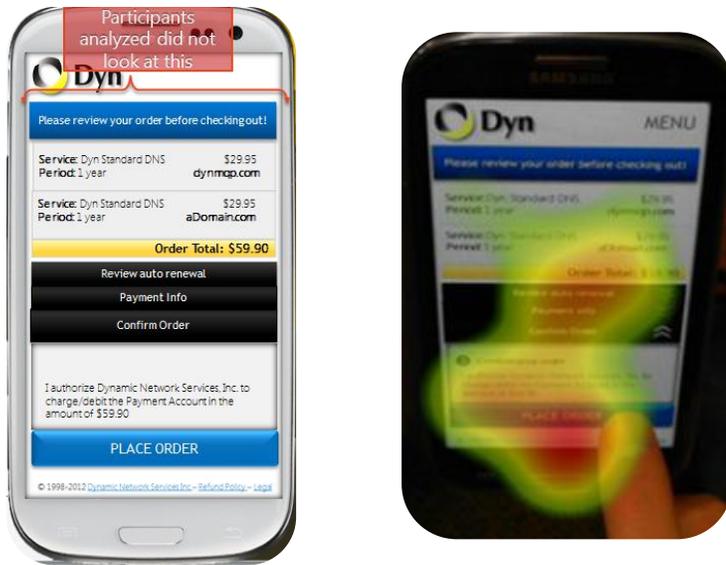


Figure 31: Heat map sample showing area that participants missed

Figure 31, displaying a sample heat map shows that the participant was focused on the order total and place order button while disregarding the top section.



Figure 32: Sample Heat Map Areas for Thank You Page

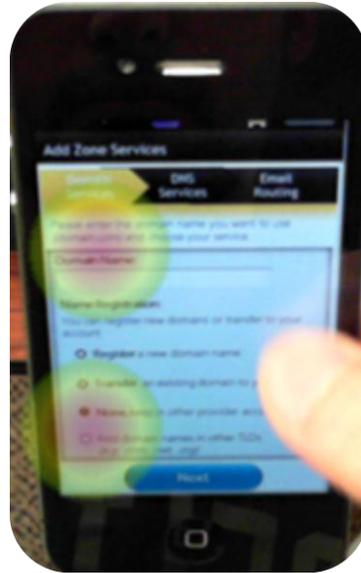


Figure 33: Sample Heat Map Areas for Domain Name

Figure 32 displays a sample heat map for the order processing page. The qualitative analysis of the heat maps for mockups showed that participants' attention fell onto important items, such as the buttons and social media text messages. The banner that displayed "*Order 26 has been processed*" was missed by one participant indicating that an enlarged button may be useful in later designs.

Figure 33 shows a sample heat map for domain name on the breadcrumb design. The analysis of heat maps showed that in general participants looked at the Domain name input textbox and the available choices. This page had effectively captured the participant's attention.

5.3.8 Study II Discussion

The MQP team closely collaborated with Dyn's UX Development Team to develop a study based on best practices. This study, similar to any study, had limitations such as its setting and population used. The study was expected to be completed within 14 weeks thus it was also limited by this time constraint.

It is important to consider that the comparison between the MQP teams' mock-ups in itself a surrogate test, since these were not live websites. As such, participants were asked to simulate a live website process. It is axiomatic that any usability data gathered from these designs cannot be objectively compared to Dyn's current website. Nonetheless, the comparison between the two designs provided a concrete benchmark for future decision making. The MQP team used the study protocol to establish as much of a parallel to between the mockup tests and Dyn's adapted site tests. This proved helpful in increasing consistency of results and the participants' understanding of the purpose of the study. Taking this into consideration, the MQP team recognized the value from the data collected regardless of its direct comparison capabilities with the adapted site.

5.4.3 Significance of measured data

In both Study I and Study II, there were a number of unexpected observations. The MQP team was able to record the actions of participants in the study, as well as confusion make observations based on their facial expressions and user behavior. One of the unexpected observations was the number of times participants left the e-commerce process. It is important to emphasize in that it was expected to have minor moments of confusion in the ecommerce process, but to get confused enough to completely leave the process was worth further discussion. Users would often click on the wrong link or button, which would lead to information that was not directly relevant to the task outlined in the study protocol. During one of the usability tests, a participant went through the wrong ecommerce process because he purchased a product through the DynDNS Pro ecommerce process instead of the intended Dyn Standard DNS.

Statistical calculations were used as a method to further validate work done in the study. The MQP team ran a paired t-test assuming equal variances. Analyzing observations

from both studies, there was a change in the mean of the SUS scores from 57 to 72.96, and a change in standard deviation from 23.34 to 21.28. This data strengthens SUS-driven recommendations, which were developed from the first usability study and background research. The t-test gave a p-value of 0.03, which implies that there is only a 3% chance that the differences observed in Dyn’s SUS scores from Usability Study I to Usability Study II are the effect of random chance. Therefore, the MQP team was able to assert with a 97% confidence that changes implemented by Dyn’s UX Development Team, congruent with the MQP team’s recommendations, can be attributed to the 27% improvement in the SUS scores of Dyn’s Account Management Portal. It is important to note that the data sets collected displayed low standard deviation, attesting to the reliability and consistency of the methods and measures used in this project. The higher mean emphasizes an improved average of data, thus further strengthening the MQP team’s mock-up deliverables.

Statistic	Dyn Study I	Dyn Study II
Mean	57.00	72.96
Standard Deviation	23.34	21.28
Observations	15	27
<i>t= 2.25, df=40, p=0.03</i>		

Figure 34: SUS - Descriptive Statistics

These results, coupled with the results from the SUS responses, allowed the MQP team the opportunity to further endorse the recommendations with statistical evidence.

Chapter 6: Recommendations for Future Work

In the course of four months, the MQP team reviewed, analyzed, and provided recommendations for the improvement of Dyn's Account Management Portal website. These were supported by 1) two usability studies, both conducted in the User Experience and Decision Making Laboratory; 2) entry and exit interviews; and 3) observations during the completion of the task assigned for the study. Throughout the length of this project, the MQP team collected quantitative and qualitative data, in addition to closely collaborating with Dyn's UX Web Development team. All of these steps were instrumental to the process of recognizing potential improvements to Dyn's check-out process. These were also based on research from best practices and literature review. Dyn's UX team implemented some changes congruent with the MQP team's recommendations. However, during the collaboration process, both teams agreed on the need of continuous improvement and measurements.

As addressed in the "Best Mobile Practices from Google's GoMoMeter" report, a website needs to effectively keep up with the technological trends and user behavior. "Listen, Learn, and Iterate" is a significant part of maintaining an up-to-date website (Google GoMoMeter). As mentioned in the report, satisfying the customer is an on-going process. The quote below by Peter Fingar supports this argument:

"The customer is no longer king; the customer is now a never-satisfied dictator"
(Fingar, 2006)

Therefore, Dyn should consider increasing usability as a crucial part of their growth strategy. To do this, they must continuously develop a customer-centric website, which will facilitate maintaining a loyal customer base. This in turn, will increase the business value generated from their website, enabling them to sustain a competitive advantage in a fast-paced technological industry. The MQP team continuously addressed these three building blocks throughout the planning, design, and implementation of the usability studies, data interpretation, and recommendations. With these in mind, the MQP team recommends that the company considers conducting more user studies to test in detail their next course of action. These subsequent user studies should be administered to users that closely match

Dyn's actual customers; this will increase the reliability and validity of data collected. Establishing a relationship with these customers would not only support the efforts of validating improvements from the consumer viewpoint, but it would also serve as another building block for fostering a relationship with the participants. Hence, from a business perspective, the company would increase its reputation and capture a broader market through this customer-centric strategy.

The MQP team developed mock-up recommendations deliberating on the observations recognized from the usability studies. These were divided into two designs: breadcrumb menu and collapsible menu. While the content was the same for both, the layout specifically addressed error forms, navigation issues, and content flow issues observed during the user studies. These particular recommendations included implementing a dropdown menu for choosing a state, masking the credit card textbox to accurately input the credit card number in a pre-loaded format "MM/DDDD" and providing an example of a domain name in the textbox for entering a domain name. The MQP team recommends that these should be implemented in the next build of Dyn's website, as the issues they caused were significant enough to appear in both user studies.

Finally, the MQP team would recommend that the layout of the marketing pages is revised. While these pages were defined as outside of the project scope, several issues were observed stemming from the product description tables. It is worth noting that on desktop view, these tables are well designed and intuitive. However, when viewed on a mobile device, the content is laid out in a way that is not logical to users. Currently, the table displays three sets of information about three different products; however, the information is not grouped by product. Rather it is grouped by three categories: 'What is it for', 'Who uses it' and 'technical specs'. This makes users have to scroll up and down to see each section for a specific product. The MQP team recommends grouping all the information by product, leaving the product choice up to Dyn's customers.

Works Cited

- Company Information*. (2012). Retrieved December 8, 2012, from Hoover's: <http://www.hoovers.com/company-information.html>
- Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., et al. (2009). Above the Clouds: A Berkeley View of Cloud Computing. 1-23.
- Djamasbi, S. S. (15:4) Summer 2011). Online Viewing and Aesthetic Preferences of Generation Y and Baby Boomers:. *International Journal of Electronic Commerce (IJEC)* , pp.121-158.
- Dyn. (2012, Mar 19). WPI Alumni Focused on the Future of the Internet. (S. Goel, Interviewer)
- Dyn Inc. (2011, 09 09). *Bulk & Transactional Email Delivery, SMTP Relay & More*. Retrieved 12 06, 2012, from Dyn: <http://dyn.com/email/>
- Dyn Inc. (2012, 04 10). *WorldBlu Names Dyn A Top Democratic Workplace*. Retrieved 12 2, 2012, from Dyn: <http://dyn.com/worldblu-names-dyn-a-top-democratic-workplace/>
- Dyn Inc. (2012, 08 22). *About Dyn: Our New Hampshire Startup Story*. Retrieved 09 20, 2012, from Dyn: www.dyn.com/about
- Fidelman, M. (2012, 05 02). *Mobile Business Statistics for 2012*. Retrieved 12 10, 2012, from Forbes.com: <http://www.forbes.com/sites/markfidelman/2012/05/02/the-latest-infographics-mobile-business-statistics-for-2012/>
- Fingar, P. (2006, 12 6). *Extreme Competition*. Retrieved 12 12, 2012, from ebizO: The Insider's Guide to Next-Generation BPM: http://www.ebizq.net/topics/web_services/features/7049.html?page=6
- Gonyea, C. (2010, 08 25). *DNS: Why it's Important, How it Works*. Retrieved 11 29, 2012, from Dyn DNS: <http://dyn.com/dns-why-its-important-how-it-works/>

- Google. (2011, Sep 21). *Mobile website optimization now factors into mobile search ads quality*. Retrieved from <http://googlemobileads.blogspot.com/2011/09/mobile-website-optimization-now-factors.html>
- Google. (2011, April 26). *Smartphone user study shows mobile movement under way*. Retrieved from Google Mobile Ads Blog: <http://googlemobileads.blogspot.com/2011/04/smartphone-user-study-shows-mobile.html>
- Google. (2012). *Our Mobile Planet:United States*. Google.
- Google GoMoMeter*. (n.d.). Retrieved from <http://www.howtogomo.com/en/d/test-your-site/#gomo-meter>
- Hartline, F. &. (2010). *Marketing Strategy (5th ed)*. Cengage Learning.
- Leonard, S. (2012, 04). *Ebusiness and its Advantages*. Retrieved 12 10, 2012, from The Ecommerce Authority: <http://onlinebusiness.volusion.com/articles/e-business-advantages/>
- Liu, Z. (2005). Reading behavior in the digital environment: Changes in reading behavior over the past ten years. *Journal of Documentation*.
- Market Research Media. (2012). *Global Cloud Computing Market Forecast 2015-2020*. San Francisco: Market Research Media.
- Mitchell, C. (2007, 02 10). *What Is a DNS Server?* Retrieved 10 30, 2012, from About.com: Computing Wireles/Networking: http://compnetworking.about.com/od/dns_domainnamesystem/f/dns_servers.htm
- Monaco, A. (2012, June 7). *A View Inside the Cloud*. (I. org, Producer, & IEEE organization) Retrieved from The IEEE news source: <http://theinstitute.ieee.org/technology-focus/technology-topic/a-view-inside-the-cloud>
- Nielson. (2011, Nov 3). *Generation App: 62% of Mobile Users 25-34 own Smartphones*. Retrieved from http://blog.nielson.com/nielsenwire/online_mobile/generation-app-62-of-mobile-users-25-34-own-smartphones/

- Northington, D. (2011, Nov 28). *Why Mobile Site Optimization Matters- 6 Best Practices for Mobile Design*. Retrieved from <http://www.theseearchagents.com/2011/11/why-mobile-site-optimization-matters-6-best-practices-for-mobile-design/>
- Olsen, J. (1994). Implications for Scholars.
- Pingdom Tools. (n.d.). Retrieved from <http://tools.pingdom.com/fpt/#!/NEVhEXDQP/account.dyn.com>
- Sauro, J. (2011, 02 02). *Measuring Usability With The System Usability Scale (SUS)*. Retrieved 09 27, 2012, from *Measuring Usability*: <http://www.measuringusability.com/sus.php>
- Savitz, E. (2012, Oct 22). *Gartner: 10 Critical Tech Trends For The Next Five Years*. (Forbes) Retrieved from <http://www.forbes.com/sites/ericsavitz/2012/10/22/gartner-10-critical-tech-trends-for-the-next-five-years/>
- Smith, A. (2011). *Americans and their cell phones*. Washington DC: Pew Research Center.
- Tobii Technology . (2011, April 19). *What does the sample rate percentage in the replay tab represent?* Retrieved 2012, from Tobii Eye Tracking Research: <http://www.tobii.com/de/eye-tracking-research/global/support-and-downloads/faqs/5013000000a2ka/>
- Tobii Technology. (2009). Tobii Studio TM 2.X. Retrieved from http://www.tobii.com/Global/Analysis/Downloads/Product_Descriptions/Tobii_Studio_2.2_Product_Description.pdf
- Tobii Technology. (2009, May). Tobii Studio Training. United States. Retrieved from <http://www.slideshare.net/Tobii/tobii-eyetracking-and-eprime-training-course-eyetrackids-1199134>
- Tobii Technology. (2010, June). Product Description for Tobii T & X Series Eye Trackers. United States. Retrieved from http://www.tobii.com/Global/Analysis/Downloads/Product_Descriptions/Tobii_T_X_Product_description.pdf

- TRUSTe Certified Privacy. (n.d.). *PROTECT YOUR PRIVACY*. Retrieved from TRUSTe:
http://www.truste.com/products-and-services/consumer_privacy/privacy_tips
- Tullis, T. a. (2004). A Comparison of Questionnaires for Assessing Website Usability. *UPA Conference*.
- VeriSign. (2012, 10). The Verisign Domain Report. *The Domain Name Industry Brief*, 9(3), 6.
- Walsh, M. (2010). *Mobile To Outpace Desktop*. Gartner.
- Weill, P., & Vitale, M. R. (2001). The eBusiness Revolution. In *Place To Space: Migrating to eBusiness Models* (pp. 2-30). Boston, MA: Harvard Business School Press.

Appendix A: Mobile e-Business Website Approaches

Amazon.com Android App	Amazon.com Adapted Site	Amazon.com Optimized Site

Amazon.com Desktop Site

Appendix B: Mobile Content Review and Recommendations

During the initial stages of the project, the MQP began the review of Dyn's process by reviewing the written content and its layout in order to make the following preliminary recommendations. These were primarily aimed at reducing the number of 'screens' and amount of reading required for each page.

Dyn Standard DNS Marketing Page



What is it?

An all-in-one [Managed DNS](#) product for your own domain name (such as yourdomain.com). Dyn Standard DNS is the perfect solution for your domain name's basic DNS needs, whether it is for personal or small business use.

What Is It?

- All-in-one Managed DNS product for your domain name
- Perfect solution for personal or small business use

What Does It Do?

It gives you complete control over your DNS zone and its associated DNS records, complete with a simple DNS management web interface.

What Does It Do?

- Control over your DNS zone in an asy-to-use web interface

What Are The Benefits?

- Use Dyn Standard DNS for just about all ICANN approved top-level domains and all domains registered with Dyn.

What Are the Benefits?

- Affordable DNS service for home or small business needs
- Suitable for all ICANN approved top-level domains and domains registered with Dyn
- Support available over e-mail and phone

- The perfect DNS service for your home or small business needs.
- Choice of wizard-based easy-to-use web interface for standard DNS users or powerful expert tools for those who prefer a more zonefile-like interface.
- Complete control over your zone and its DNS records.
- Award winning email and phone support available Monday-Friday 9am-5pm U.S. Eastern

Try Before You Buy: Check out our [Dyn Standard Trial](#)

Next Level Up: [DynECT Managed DNS Lite](#)

Five geographically diverse servers

Five unicast DNS servers in geographically diverse locations to ensure DNS resolution for your domain.

Numbers that matter

Up to 75 records and 600,000 queries per month.

DNS record types

Support for 9 DNS record types including A, AAAA, CNAME, MX, TXT, etc.

Servers:

- Dependent DNS service resolution
- Geographically spread server locations

Numbers That Matter:

Up to 75 records and 600,000 queries per month

Additional & Add-on Features

Built-in Dynamic DNS support

Get the ability to update any hostname with a dynamically changed IP address using our standard update client.

Webhop redirection

Some Internet Service Providers block common ports, such as 80 (HTTP) and 25 (SMTP). Using our WebHop redirection service, you can circumvent this port blocking by redirecting to your server on an alternate port.

Hide this information for mobile.

Managed DNS

[DynECT Managed DNS](#)

[DynECT Managed DNS Lite](#)

[Dyn Standard DNS](#)

[DynDNS Pro](#)

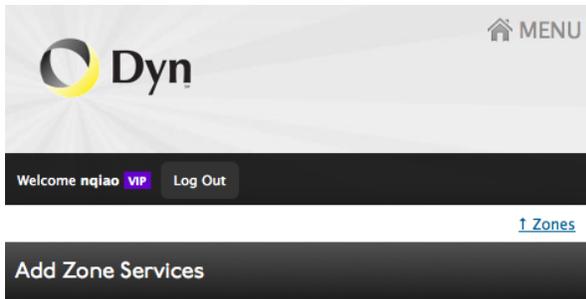
[Compare Features](#)

[Secondary DNS](#)

Domain Registration

[DNS Configuration](#)

Add Zone Services Page



Dyn logo takes a considerable amount of screen space. There should be a smaller image referenced when the screen size

To setup a domain name, please enter the name you want to use (domain.com) and choose your services.

Domain Name:
testdomain.com
[+ add more names](#)
[? Zone Services Help](#)

Name Registration:
You can register new domains or transfer existing domains to your account.

- Register a new domain name
- Transfer an existing domain to your account
- None, keep in other provider account
- Find domains names for registration in other TLDs
(e.g. .com, .net, .org)

DNS Services:
All domains require Domain Name System (DNS) services to function. You may use our services or a third party.

- Dyn Standard DNS
I want DNS service from Dyn (recommended)
- Secondary DNS
I run my own nameserver and need redundancy
- I already have DNS service for this domain

Email Routing:
Dyn offers a suite of services to improve your email.

- Dyn Email Backup MX
Accept mail for my mail server if it is down
- Dyn Email Gateway
Filter spam and viruses and redeliver mail to my mail server
- Dyn Email Forward Lite (5 aliases)
Accept my mail, clean it, and send it to other mailboxes
- Dyn Email Forward
I want unlimited addresses and up to ten recipients per address
- I already have mail hosting

[Continue](#)

Name registration: List whether they would like to keep the provider account first and then have a drop down for if they would like to do something else. This will save them time if they already have a provider account of some kind

Have the information for each service should be something that is collapsed and can be expanded if they have any questions on what it is. Try to have fewer words. Maybe just have the option and have a choice of bringing them to a page with descriptions of they truly need it.

Dyn Email Forward
 I want unlimited addresses and up to ten recipients per address

I already have mail hosting

[Continue](#)

The Menu ↑ TO TOP

My Account

My Services

- DynDNS Pro/Hosts
- DynECT Managed DNS Lite
- Domain names, DNS hosting, Dyn Email services
- Internet Guide
- Dyn Standard SMTP
- DynECT Email Delivery Lite
- Renew Services
- Auto Renew Settings
- Sync Expirations
- Tips on Getting Started

Account Settings

Billing

 Your cart contains **1 item**

About Dyn

[Our Story](#) [Careers](#) [Clients](#) [Events](#)

Get Help

[Support Knowledgebase](#) [Dyn Status](#) [Dyn Community Forum](#)

Connect with Us!






[Sign up to receive our monthly eNewsletter »](#)

Dyn

150 Dow Street Manchester, NH 03101 +1 603.668.4998 [Contact Us »](#)

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nqiao-dev.mht.dyndns.com load time: 0 wallclock secs (0.02 usr + 0.01 sys = 0.03 CPU)

Have the information under 'My Services' be collapsed under it and users can click to expand it if need be.

This information isn't always needed on this (or every) page. A suggestion might be to have a link called 'About Dyn' and 'contact us', to redirect users to a page that has all the contact information they would need to get in touch with Dyn.

Shopping Cart Overview Page

The screenshot shows the Dyn Shopping Cart Overview Page. At the top is the Dyn logo and a 'MENU' link. Below is a dark header with 'Shopping Cart'. The main content area includes an 'Upgrade Options' section with a yellow background, a service selection for 'asd1234.com' (Dyn Standard DNS, 1 year, \$29.95), a yellow 'Service: Order Total: \$29.95' bar, a discount box with a 'Use Coupon' button, and a link to 'print an estimate/quote?'.

Annotations on the right side of the page:

- Blue bracket: Combine the Dyn's header with shopping cart into Dyn's shopping cart.
- Green bracket: The two links here both lead to the Dyn Lite website which is not totally adapted on mobile if scrolled all the way down.
- Orange bracket: Discount box usually come before order total charge.
- Blue bracket: Print estimate not applicable. Use "e-mail estimate".

Combine the Dyn's header with shopping cart into Dyn's shopping cart.

The two links here both lead to the Dyn Lite website which is not totally adapted on mobile if scrolled all the way down

Discount box usually come before order total charge

Print estimate not applicable. Use "e-mail estimate"

Would you like to [print an estimate/quote?](#)

Create account or log in to continue checkout:

Already Registered?

Username

Password

[Forgot your password?](#)

Alternative design: having login and register as two buttons. It collapses if clicked to show more options.

Login button should be bigger and color should be stronger (maybe in blue)

Username

Password

Confirm password

Email

Confirm Email

Security Image
Enter these characters in the field below



Enter the numbers from the above image:

All this could be collapsed under a menu, and expanded if users decide to register

Subscribe to Dyn newsletter (One or two per month)

I accept the terms of Dyn's [Acceptable Use Policy](#), the [Dyn Services Agreement](#), and Dyn's [Privacy Policy](#).

[Create Account](#)

If you're having difficulty creating your account, for any reason, feel free to [contact us](#).

The Menu [↑ TO TOP](#)

My Account

My Services

Account Settings

Billing

Active Services

Renew Services

Auto Renew Settings

Order History

Billing Profile

Sync Expirations

About Dyn

[Our Story](#) [Careers](#) [Clients](#) [Events](#)

Get Help

[Support Knowledgebase](#) [Dyn Status](#)
[Dyn Community Forum](#)

Different line spacings are confusing, and could be more effectively sized for mobile screens. Right now they take a lot of screen

Menu can be collapsed by default

Consider having all the information below this point hidden, or more condensed when on mobile view

Draft Design for this page based on recommendations (same content but not including the register)

Shopping Cart

 **Upgrade Options**

Service:
Need a slightly bigger fit for your DNS management? How about [DynECT Managed DNS Lite](#)? With three pricing tiers to choose from, trust your website's uptime to the DNS experts. Pricing starts at just \$30.00 per month and you can [get started today!](#)

asd1234.com

Service: Dyn Standard DNS

Period: \$29.95

Discount:

Service: Order Total: \$29.95

LOGIN HERE 

* You must be a free registered user to submit content.

The Menu  TO TOP

My Account

Checkout Form and Payment Confirmation Pages

The screenshot shows a checkout page for Dyn. At the top is the Dyn logo. Below it is a blue banner with the text "Almost there! Please review your order and follow the instructions below:". The main content area is a table with the following information:

asd1234.com
Service: Dyn Standard DNS
Period: 1 year
\$29.95
Service: Order Total: \$29.95

Below the table is a section titled "1 Review your auto renewal setting". It contains a paragraph of text about auto-renewal and a checkbox labeled "I do not want my services to be renewed when they are expiring." Below this is a section titled "2 Provide payment information". It has a radio button selected for "Your Visa ending 0027 (expiring 05/2016)" and another radio button for "Add a new credit card". Below these are logos for VISA, MasterCard, AMERICAN EXPRESS, and DISCOVER. At the bottom are input fields for "Card Number:", "Card Expiration:" (with "MM/YYYY" text), and "Security Code:".

Dyn logo takes a considerable amount of screen real estate. There should be a smaller image referenced when the screen size gets to the "mobile" category.

The less words the better: "Please review your order before checking out"
Reduce top and bottom margins of blue box

Check spacing. On desktop size, this table is $\frac{3}{4}$ of the size than on mobile.

The less words the better:
"1. Auto renewal settings" - OR - "Set up auto renewal"
"The services purchased on this order will be automatically renewed 15 days before they expire"
 "I do not want auto-renewal"

Remove "provide" - just leave it as "2. *Payment Information.*"

There is a big space left on the credit card box when the TrustE image gets removed when the screen is small.

Billing Address:

Full Name:

Company:

 (optional)

Address:

City:

State/Province:

ZIP/Postal Code:

Country:

Phone:

 (why required)

3 Confirm your order

I authorize Dynamic Network Services, Inc. to charge/debit the Payment Account in the amount of \$29.95.

PLACE ORDER

Bigger textboxes compensate for the low accuracy of mobile selection. Reduce the spacing between each item.

No comment.



MENU

Welcome **nqiao** **VRP** My Cart Log Out

Order 9 has been processed

Just signed up for Dyn Standard DNS so I can get the most out of my domain name.

Show us some love! [Share](#) [Tweet](#)

Thank you for your order!

Order 9 has been processed. You will be receiving an e-mail confirmation shortly, and can [print your receipt here](#).

[Give your friends a 15% discount and get 30% off for yourself!](#)

Get Started with Dyn Standard DNS and your domain

1. Set up your zone records.
2. Pre-activate your zone and wait 2 hours, so our servers will be ready to answer queries the moment the delegation is set to our nameservers.
3. Delegate the zone to our nameservers in your Dyn account domain details page or if your domain is registered with another company, please see their documentation for instructions on changing your domain's delegation to:

ns1.mydyndns.org	204.13.248.76
ns2.mydyndns.org	208.76.60.2
ns3.mydyndns.org	208.78.69.76
ns4.mydyndns.org	91.198.22.76
ns5.mydyndns.org	203.62.195.76
4. If your destination IP address is dynamic, install an update client at the location you wish to connect to. This will keep your hostname pointed to your dynamic IP address whenever it changes.

For more detailed information please see [this article](#).

PRINT THESE INSTRUCTIONS

Condense Dyn logo and Menu into black "welcome" bar

Just show the social network buttons. They will be able to see/edit the Tweet/Share message after

Are these instructions provided somewhere else? Users on mobile might not want follow these steps right away. Perhaps on mobile you just want the link to the instructions, or an expandable option.

What are zone records? Do all customers know what these are? Clarifying or adding a hyperlink to read about them.

Add hyperlink to account details page.

Which update client do they need to install? Dyn's? Where can they find it? Add a hyperlink to it.

Maybe for mobile, button says "E-mail me these instructions"

Additional Resources

Join thousands of DNS experts and ask or answer questions about our services. Visit [Dyn Community!](#)

The Menu  TO TOP

My Account

My Services

Account Settings

Billing

Active Services

Renew Services

Auto Renew Settings

Order History

Billing Profile

Sync Expirations

About Dyn

[Our Story](#) [Careers](#) [Clients](#) [Events](#)

Get Help

[Support Knowledgebase](#) [Dyn Status](#)
[Dyn Community Forum](#)

Connect with Us!

[Sign up to receive our monthly eNewsletter »](#)

Dyn

150 Dow Street Manchester, NH 03101
+1 603.668.4998 [Contact Us »](#)

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Good content, consider spacing and having the menus being collapsed by default.

Dyn Customer Experience Study Protocol

The study will be conducted at WPI with a sample of currently enrolled undergraduate students. The data for the research will be mainly gathered through an eye tracking experiment. Half of the testing demographic will be tested via iPhone while others will be tested via android phones (to be specified).

Each eye tracking experiment will take around 30 minutes to complete. Participation in the study is voluntary and respondents may choose not to respond to any questions that they do not wish to answer or stop the experiment at any moment they wish to do so.

Demographic and Recruitment:

Participants will be recruited from the undergraduate class. Students will be incentivized with a \$50 gift card and 3 course bonus points when sign up for a 30 minute study over the course of two weeks in the fall of 2012.

Procedure for the experiment:

The experiment will be conducted at the User Experience and Decision Making (UXDM) Laboratory and consists of three phases.

PHASE I: Introduction

The goal of phase I gathers the background information and ecommerce experience from participants to help conduct comparison and further qualitative analysis. This phase takes around 5 - 10 minutes.

- 1) Lab assistants will briefly introduce the goal of MQP and usability tests as can be seen from the table.

Brief description of our MQP and the goal of usability testing	To optimize Dyn's mobile web check-out experience
	To gather consumer insights on the current Dyn's checkout process
	Set up benchmarking for future improvements

- 2) The participants read and sign the consent form. Only if they agree to participate they will go to the next step. Participants will be informed that they can exit the survey at any time during the experiment.

- 3) Participants will be asked to complete the entry interview protocol and the lab assistants will take notes while discussing specific items from the protocol.

PHASE II: Eye tracking usability testing

During the eye tracking usability testing, participants will be asked to operate on the mobile device provided by the lab according to lab assistants' instructions as follows. This session takes around 10 – 15 minutes.

Calibration and preparation:

- 4) The participants will be asked to sit in front of the mobile eye tracker and the mobile device. Lab assistant need to make sure the entire five red dots can be captured from the camera and make accordingly adaptations.
- 5) The participants will follow 5 dots on the panel to calibrate the eye tracker based on the lab instructions for further calibration.
- 6) The participants will be asked to follow a scenario of purchasing the “Dyn Standard DNS” service on a mobile device.

Realistic Connection, Examples:

After successful calibration, the candidate will be showed a fictional scenario of purchasing the “Dyn Standard DNS” service from Dyn’s website. This scenario served to ground the brainstorming idea of general ecommerce experience and pull realistic consumer web checkout experience from the participants. The scenario can be seen below.

Many small businesses purchase DNS hosting services for their company. Suppose you are a small business owner looking into purchasing the “Dyn standard DNS” services. Please look for this product on Dyn’s website and complete the check-out process. The participant will be asked to look for the product on their own first on <http://dyn.com/dns>. Relevant information will be provided to complete the purchase. You can inform the lab assistant after you completed the check-out page.

The following information will be given to the participants for ease of process and standardization of data.

Test account information:	Username: dynmqp
	Password: usability
Domain Name:	Job.com
Card number:	1304231367342938
Card Expiration:	01/2013

Security code:	784
Full name:	Dyn DNS
Company:	Dyn
Address:	14 dow st
City:	Manchester
State:	NH
Zip code:	03102
Country:	US
Phone:	508-365-8923

The correct steps ordering Dyn Standard DNS will be as follows. Screenshots are attached in the appendix A.

- <http://dyn.com/dns/> => click on Standard
- <http://dyn.com/dns/dyn-standard-dns/> => click on Order now
- https://account.dyn.com/services/zones/svc/add.html?add_dns=c => domain name service
- <https://account.dyn.com/cart/?via=zoneadd> => create account or sign in
- Fill in credit card information and billing address => complete payment

Due to the authenticity of the credit card information we provide for testing, the participants will reach to their final step when they see the error message “Please enter a valid credit card number” after they placed the order.

PHASE III: Closing

The closing phase will be mainly conducting user experiences after completing the web check-out scenario in both qualitative and quantitative ways. This process takes around 5 – 10 minutes.

- 7) After completing the web check-out process, the participants will be asked to complete the exit survey designed for collecting their web check-out experience.
- 8) The lab assistants will discuss with the participants for their purchase experience and take notes while the participants finished the interview sheet.
- 9) The participants will be debriefed and reviewed for Dyn’s DNS services and products.

VOLUNTEERS NEEDED!

The Dyn MQP Team is conducting a usability study of the effectiveness of mobile ecommerce websites. We need students to volunteer 30 minutes of their time to answer a few questions, look at a website and provide brief feedback for our study.

When:

September 19th/September 20th

Where?

WB 216B - UXDM Lab

Professor Hall Phillips has agreed to give 3 participation points to students in her BUS 4030 class who complete the study.

All volunteers will be entered in a raffle of a \$50 gift card!



For questions or rescheduling,
Please email us at: dyn-mqp12@wpi.edu



Appendix E: Study I Entry Interview

Time: _____

Interviewer: _____

Date: _____

Participant Identifier: _____

Dyn MQP - Mobile Checkout Interview

*(Please note, your information will **not** be sold or given to outside entities. It is for internal use only.)*

Major: _____ **Class Year:** _____

A. Can you browse on your phone?

Yes No

B. If yes, how often do you use it for accessing the Web?

Hourly Daily Weekly Monthly Occasionally Never

What do you usually do when browsing?

Purchasing Social Media (Facebook etc.) Email News/articles Video Others: _____

C. If no, why not?

D. Do you ever buy things using a mobile phone? What was the last thing that you purchased?

Yes No

E. What are the top 3 websites you visit to buy things using your phone? Can you show me your most favorite one and why you like it?

1. _____

2. _____

3. _____

F. What are 3 things that you like from any mobile check-out experience?

a. _____

b. _____

c. _____

G. What are 3 things you don't like from any mobile checkout experience?

a. _____

b. _____

c. _____

H. Have you heard of DNS services? If yes, can you give me some examples of the type of services that it provides? Do you know any companies providing that service?

Yes No

Time: _____

Interviewer: _____

Date: _____

Participant Identifier: _____

I. Are there any other comments that come to mind? Anything that you enjoyed or disliked about your mobile purchasing experience?

J. If you wish to enter the lottery for \$50 Gift card, please provide your E-mail address:

Appendix F: Study I Exit Interview

Time: _____
Date: _____

Interviewer: _____
Participant Identifier: _____

Please Let Us Know What You Think...

(Please note, any information you provide is for internal use only.)

Website Feedback

1. For the check-out process for the Dyn Standard DNS, which part do you find easy to navigate?

2. Is there any other part you find favorable in a ecommerce web check-out process?

3. Which part do you find vague or confusing?

4. Of the following options, please select the ones you find confusing about Dyn's website?

(Check all that apply)

- The content was too technical
- Had to zoom in and out a lot
- Too much irrelevant information interfering with the content
- Attractiveness or style of the website is less appealing
- Others (please specify)

5. How would you rate the following statements?

a. ***"Dyn.com had an easy check out process"***

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

b. ***"The check-out form was easy to understand"***

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

c. ***"I was able to understand what I was buying"***

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

6. Now after the purchase process, can you explain in your own words what service does Dyn Standard DNS provide?

Time: _____
Date: _____

Interviewer: _____
Participant Identifier: _____

7. Compared to your experiences with other ecommerce websites, what would you recommend for Dyn?
(Remember your favorite site)

8. Please complete the following ratings based on your Dyn's purchase experience:

	Strongly Disagree				Strongly Agree
1. I think I would like to use this website frequently.	<input type="radio"/>				
2. I found the website unnecessarily complex.	<input type="radio"/>				
3. I thought the website was easy to use.	<input type="radio"/>				
4. I think I would need Tech Support to be able to use this website.	<input type="radio"/>				
5. I found the various functions in this website were well integrated.	<input type="radio"/>				
6. I thought there was too much inconsistency in this website.	<input type="radio"/>				
7. I would imagine that most people would learn to use this website very quickly.	<input type="radio"/>				
8. I found the website very cumbersome to use.	<input type="radio"/>				
9. I felt very confident using the website.	<input type="radio"/>				
10. I need to learn a lot about this website before I could effectively use it.	<input type="radio"/>				

9. Would you like to make any other comments about Dyn's website?

Dyn Customer Experience Study Protocol

The study will be conducted at WPI with a sample of currently enrolled undergraduate students. The data for the research will be mainly gathered through an eye tracking experiment. The study is composed of three different set ups, each of which will be tested with one third of the participants based on random selection. Besides, half of the testing demographic will be tested via iPhone while others will be tested via android phones based on random selection.

Each eye tracking experiment will take around 30 to 45 minutes to complete. Participation in the study is voluntary and respondents may choose not to respond to any questions that they do not wish to answer or stop the experiment at any moment they wish to do so.

Demographic and Recruitment:

Participants will be recruited from the WPI undergraduates. Students will be incentivized with a \$50 gift card and course bonus points when sign up for a study over the course of two weeks in the fall of 2012.

Procedure for the experiment:

The experiment will be conducted at the User Experience and Decision Making (UXDM) Laboratory and consists of three phases. A standard script will be followed by all lab members to keep the consistence of the process.

PHASE I: Introduction

The goal of phase I gathers the background information and ecommerce experience from participants to help conduct comparison and further qualitative analysis. This phase takes around 5 - 10 minutes.

10) Lab assistants will briefly introduce the goal of MQP and usability tests as can be seen from the table.

Brief description of our MQP and the goal of usability testing	To optimize Dyn's mobile web check-out experience
	To gather consumer insights on the current Dyn's checkout process and the alternatives recommendations
	Collect feedback and data for comparisons

11) The participants read and sign the consent form. Only if they agree to participate they will go to the next step. Participants will be informed that they can exit the survey at any time during the experiment.

- 12) Participants will be asked to complete the entry interview protocol and the lab assistants will take notes while discussing specific items from the protocol.

PHASE II: Eye tracking usability testing

During the eye tracking usability testing, participants will be asked to operate on the mobile device provided by the lab according to lab assistants’ instructions as follows. The three set ups include the adaptive Dyn website, the breadcrumb menu recommendation and the collapsible menu recommendation. It is randomly selected beforehand to allocate the set up to each participant but we will make sure all the three set ups get equal testing demographic. This session takes around 15 – 20 minutes.

Calibration and preparation:

- 13) The participants will be asked to sit in front of the mobile eye tracker and the mobile device. Lab assistant need to make sure the entire five red dots can be captured from the camera and make accordingly adaptations.
- 14) The participants will follow 5 dots on the panel to calibrate the eye tracker based on the lab instructions for further calibration.
- 15) The participants will be asked to follow a scenario of purchasing the “Dyn Standard DNS” service on a mobile device.

Realistic Connection, Examples:

After successful calibration, the candidate will be showed a fictional scenario of purchasing the “Dyn Standard DNS” service from Dyn’s website. This scenario served to ground the brainstorming idea of general ecommerce experience and pull realistic consumer web checkout experience from the participants. The scenario can be seen below.

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Test account information:	Username: dynmqp
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Domain Name:	Job.com
Card number:	1304231367342938
Card Expiration:	01/2013

Security code:	784
Full name:	Dyn DNS
Company:	Dyn
Address:	14 dow st
City:	Manchester
State:	NH
Zip code:	03102
Country:	US
Phone:	508-365-8923

Process for three different set ups:

Dyn's adaptive website:

The correct steps ordering Dyn Standard DNS on Dyn's adaptive website will be as follows. Screenshots are attached in the appendix A.

- <http://dyn.com/dns/> => click on Standard
- <http://dyn.com/dns/dyn-standard-dns/> => click on Order now
- <https://account.dyn.com/services/zones/svc/add.html? add dns=c> => domain name service
- <https://account.dyn.com/cart/?via=zoneadd> => create account or sign in
- Fill in credit card information and billing address => complete payment

Due to the authenticity of the credit card information we provide for testing, the participants will reach to their final step when they see the error message "Please enter a valid credit card number" after they placed the order.

Mock-up option I (Breadcrumb Navigayion):

The correct steps ordering Dyn Standard DNS on Dyn's adaptive website will be as follows. Screenshots are attached in the appendix A. There are no URLs involved with the mock-up.

- Page I=> click on Standard
- Page II => click on Order now or Next Button
- Page III => domain name service or Next Button
- Page IV => create account or sign in or Next Button
- Fill in credit card information and billing address => complete payment

Due to the authenticity of the credit card information we provide for testing, the participants will reach to their final step when they see the error message “Please enter a valid credit card number” after they placed the order.

Mock-up option II (Collapsible Navigation):

The correct steps ordering Dyn Standard DNS on Dyn’s adaptive website will be as follows. Screenshots are attached in the appendix A.

- Page I=> click on Standard
- Page II => click on Order now
- Page III => domain name service
- Page IV => create account or sign in
- Fill in credit card information and billing address => complete payment

Due to the authenticity of the credit card information we provide for testing, the participants will reach to their final step when they see the error message “Please enter a valid credit card number” after they placed the order.

PHASE III: Closing

The closing phase will be mainly conducting user experiences after completing the web check-out scenario in both qualitative and quantitative ways. This process takes around 5 – 10 minutes.

- 16)** After completing the web check-out process, the participants will be asked to complete the exit survey designed for collecting their web check-out experience.
- 17)** The lab assistants will discuss with the participants for their purchase experience and take notes while the participants finished the interview sheet.
- 18)** The participants will be debriefed and reviewed for Dyn’s DNS services and products.
- 19)** The participants will be reviewed the eye tracking video with the team members for their purchase behavior if their gaze showed an interesting pattern or trend.

VOLUNTEERS NEEDED!

 **UXDM**
RESEARCH LABORATORY

The Dyn MQP Team is conducting a usability study of the effectiveness of mobile ecommerce websites. We need students to volunteer 45 minutes of their time to answer a few questions, look at a website and provide brief feedback for our study.

When:
November 13th – November 16th

Where?
WB 216B - UXDM Lab

To sign up use the sheet below, scan the QR code on this flyer, or just go to:
<http://tinyurl.com/Usability-SignUp>

All volunteers will be entered in a raffle for a \$50 gift card!

 **WPI**



For questions or rescheduling,
Please email us at: dyn-mqp12@wpi.edu

 **Dyn**
DNS | EMAIL | LABS
Uptime is the Bottom Line.

Appendix I: Study II Entry Interview

Time: _____

Interviewer: _____

Date: _____

Participant Identifier: _____

Dyn MQP - Mobile Checkout Interview

*(Please note, your information will **not** be sold or given to outside entities. It is for internal use only.)*

Major: _____ **Class Year:** _____

A. Can you browse on your phone?

[Yes] [No]

B. If yes, how often do you use it for accessing the Web?

[Hourly] [Daily] [Weekly] [Monthly] [Occasionally] [Never]

C. What are your phone's model and operating system?

D. What do you usually do when browsing?

Purchases - Social Media (Facebook etc.) - Email - News/articles - Video -

Others: _____

E. Do you ever buy things using a mobile phone?

[Yes] [No]

F. What was the last thing that you purchased through your phone?

G. If you wish to enter the lottery for \$50 Gift card, please provide your E-mail address:

Appendix J: Study II Exit Interview

Time: _____
Date: _____

Interviewer: _____
Participant Identifier: _____

Please Let Us Know What You Think...

(Please note, any information you provide is for internal use only.)

Website Feedback

- A.** If you were to give a percentage grade (0% - 100%) to this website's **visual appeal**, what would it be? _____%
- B.** If you were to give a percentage grade (0% - 100%) to this website's **layout**, what would it be? _____%
- C.** If you were to give a percentage grade (0% - 100%) to this website's **usability**, what would it be? _____%
- D.** Please complete the following ratings for the website that you just used to complete the task:

	Strongly Disagree				Strongly Agree
1. I think I would like to use this website frequently.	<input type="radio"/>				
2. I found the website unnecessarily complex.	<input type="radio"/>				
3. I thought the website was easy to use.	<input type="radio"/>				
4. I think I would need Tech Support to be able to use this website.	<input type="radio"/>				
5. I found the various functions in this website were well integrated.	<input type="radio"/>				
6. I thought there was too much inconsistency in this website.	<input type="radio"/>				
7. I would imagine that most people would learn to use this website very quickly.	<input type="radio"/>				
8. I found the website very cumbersome to use.	<input type="radio"/>				
9. I felt very confident using the website.	<input type="radio"/>				
10. I need to learn a lot about this website before I could effectively use it.	<input type="radio"/>				

Please rate your level of agreement with the following statements.

E. Dyn's product pages were easy to understand and navigate

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

F. The website's content was too technical

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

Time: _____
Date: _____

Interviewer: _____
Participant Identifier: _____

Please Let Us Know What You Think...

(Please note, any information you provide is for internal use only.)

Alternative Interface Feedback

Please rate your level of agreement with the following statement.

A. This interface was visually appealing

Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

- B.** If you were to give a percentage grade (0% - 100%) to this alternative interface's **visual appeal**, what would it be? _____%
- C.** If you were to give a percentage grade (0% - 100%) to this alternative interface's **layout**, what would it be? _____%
- D.** Please complete the following ratings for the website prototype that you just viewed:

	Strongly Disagree				Strongly Agree
1. I think I would like to use this website frequently.	<input type="radio"/>				
2. I found the website unnecessarily complex.	<input type="radio"/>				
3. I thought the website was easy to use.	<input type="radio"/>				
4. I think I would need Tech Support to be able to use this website.	<input type="radio"/>				
5. I found the various functions in this website were well integrated.	<input type="radio"/>				
6. I thought there was too much inconsistency in this website.	<input type="radio"/>				
7. I would imagine that most people would learn to use this website very quickly.	<input type="radio"/>				
8. I found the website very cumbersome to use.	<input type="radio"/>				
9. I felt very confident using the website.	<input type="radio"/>				
10. I need to learn a lot about this website before I could effectively use it.	<input type="radio"/>				

Thank you for your participation!

Appendix K: Area of Interests (AOI) Section for Breadcrumb and Collapsible Menus

Breadcrumb Menu Area of Interests Section from Image I-VIII:

This screenshot shows the 'Add Zone Services' page on the Dyn website. The annotations are as follows:

- Top 1:** Points to the top navigation bar containing the Dyn logo, 'MENU', 'Welcome, MQPteam', 'VIP', a shopping cart icon, and 'LOG OUT'.
- Menu 1:** Points to the breadcrumb menu with three items: 'Domain Services', 'DNS Services', and 'Email Routing'.
- Content 1:** Points to the main content area, which includes a text prompt 'Please enter the domain name you want to use (domain.com) and choose your service.', a 'Domain Name:' input field, and a 'Name Registration:' section with three radio button options: 'Register a new domain name', 'Transfer an existing domain to your account', and 'None, keep in other provider account.' There is also a checkbox for 'Find domain names in other TLDs (e.g. .com, .net, .org)'.
- Button:** Points to the blue 'Next' button at the bottom of the form.

This screenshot shows the 'DNS Services' selection page. The annotations are as follows:

- Top 2:** Points to the top navigation bar, identical to the previous screenshot.
- Menu 2:** Points to the breadcrumb menu with three items: 'Domain Services', 'DNS Services', and 'Email Routing'.
- Content 2:** Points to the main content area, which includes the heading 'DNS Services', a paragraph explaining that all domains require DNS services, and three radio button options: 'Dyn Standard DNS' (recommended), 'Secondary DNS' (for redundancy), and 'I already have DNS services for this domain' (selected).
- Button:** Points to the blue 'Next' button at the bottom.

This screenshot shows the 'Email Routing' page. The annotations are as follows:

- Top 3:** Points to the top navigation bar.
- Menu 3:** Points to the breadcrumb menu with three items: 'Domain Services', 'DNS Services', and 'Email Routing'.
- Content 3:** Points to the main content area, which includes the heading 'Dyn offers a suite of services to improve your email' and five radio button options: 'Dyn Email Backup MX', 'Dyn Email Gateway', 'Dyn Email Forward Lite (5 aliases)', 'Dyn Email Forward', and 'I already have email hosting'.
- Button:** Points to the blue 'Proceed to checkout' button at the bottom.

This screenshot shows the checkout page. The annotations are as follows:

- Top 4:** Points to the top navigation bar.
- Content:** Points to the main content area, which includes a blue banner 'Please review your order before checking out!', a table of services, and an 'Order Total: \$59.90'.
- Menu 4:** Points to the breadcrumb menu with three items: 'Review auto renewal', 'Payment Info', and 'Confirm Order'.
- Content:** Points to the main content area, which includes the heading '2 Provide your payment information' and three radio button options: 'Pay with PayPal', 'Add a new credit card', and 'Use saved card'.

Review auto renewal | **Payment Info** | Confirm Order

2 Provide payment information

Pay with PayPal
 Add a new credit card

Credit card number

Expiration Date (MM/YYYY) Security Code

MM / YYYY

Billing Information:

Full Name

Company (Optional)

Address

Menu 5

Content

Content

Billing Information

Full Name

Company (Optional)

Address

City

State

Choose a State

Zip/Postal Code

Country

Choose a Country

Phone Number (why is this needed?)

Area Code

Next

Content 6

Button 6

MENU

Please review your order before checking out!

Service: Dyn Standard DNS	\$29.95
Period: 1 year	dynmqp.com
Service: Dyn Standard DNS	\$29.95
Period: 1 year	aDomain.com

Order Total: \$59.90

Review auto renewal | **Payment Info** | Confirm Order

3 Confirm your order

I authorize Dynamic Network Services, Inc. to charge/debit the Payment Account in the amount of \$59.90

PLACE ORDER

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CERTIFIED PRIVACY

Top 7

Content 7a

Menu 7

Content

Button 7

MENU

Welcome, MQPteam [LOG OUT](#)

Order 26 Has been processed!

Show us some love! Tell your friends about Dyn!

Thank you for your order!

You will be receiving an email confirmation shortly. Click here to [print your receipt now](#).

[Give your friends a 15% discount and get 30% off for yourself!](#)

Learn how to get the most out of your Dyn Standard DNS

Sure, show me now! **Not now, but email me about it**

Additional Resources

Join thousands of DNS experts and ask or answer questions about our services. Visit the [Dyn Community!](#)

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CERTIFIED PRIVACY

Top 8

Content 8a

Content 8b

Button

Content 8c

Collapsible Menu Area of Interests Section from Image I- VIII:

The image displays four sequential screenshots of the Dyn website's 'Add Zone Services' page, illustrating a user's journey through the service selection process. Each screenshot is annotated with callouts for specific UI elements:

- Screenshot 1 (Top Left):** Shows the initial state with 'Domain Services' selected. Callouts include 'Top 1' (header), 'Menu 1a' (selected menu), 'Content 1' (main content area), and 'Menu 1b' (bottom menu).
- Screenshot 2 (Top Right):** Shows 'DNS Services' selected. Callouts include 'Top 2' (header), 'Menu 2a' (selected menu), 'Content 2' (main content area), and 'Menu 2b' (bottom menu).
- Screenshot 3 (Bottom Left):** Shows 'Review auto renewal' selected. Callouts include 'Top 3' (header), 'Menu 3' (selected menu), 'Content 3' (main content area), and 'Button 3' (bottom button).
- Screenshot 4 (Bottom Right):** Shows the checkout process. Callouts include 'Top 4' (header), 'Content 4a' (order summary), 'Menu 4a' (selected menu), 'Content 4b' (payment options), and 'Menu 4b' (bottom menu).

Review auto renewal

Payment Info

2 Provide payment information

Pay with PayPal

Add a new credit card

VISA MasterCard AMERICAN EXPRESS DISCOVER

Credit card number

Expiration Date (MM/YYYY) Security Code

Billing Information:

Full Name

Company (Optional)

Address

Menu 5

Content 5a

Content 5b

Address

City

State

Choose a State

Zip/Postal Code

Country

Choose a Country

Phone Number (why is this needed?)

Area Code

Confirm Order

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TRUSTe CERTIFIED PRIVACY

Content 6a

Menu 6

Content 6

Dyn MENU

Please review your order before checking out!

Service: Dyn Standard DNS \$29.95
Period: 1 year dynmqp.com

Service: Dyn Standard DNS \$29.95
Period: 1 year aDomain.com

Order Total: \$59.90

Review auto renewal

Payment Info

Confirm Order

3 Confirm your order

I authorize Dynamic Network Services, Inc. to charge/debit the Payment Account in the amount of \$59.90

PLACE ORDER

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Top 7

Content 7a

Menu 7

Content 7b

Button 7

Dyn MENU

Welcome, MQPteam VIP

LOG OUT

Order 26 Has been processed!

Show us some love! Tell your friends about Dyn!

Share Tweet

Thank you for your order!

You will be receiving an email confirmation shortly. Click here to [print your receipt now.](#)

[Give your friends a 15% discount and get 30% off for yourself!](#)

Learn how to get the most out of your Dyn Standard DNS

Sure, show me now! Not now, but email me about it

Additional Resources

Join thousands of DNS experts and ask or answer questions about our services. Visit the [Dyn Community!](#)

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TRUSTe CERTIFIED PRIVACY

Top 8

Content 8a

Content 8b

Button 8

Content 8c



Dyn

UJOM
UNIVERSITAS JAWA OPEN MANAGEMENT

Improving Mobile Check-out Experience at Dyn

Wilmaran Gomez, Georgi Kardzhaliyski, Tammy Liu, Frank Ogletoby
 Advisor: Professor Souzan Djarmadi (School of Business)
 Dyn Liaisons: Dan Molauiffe & Lara Swanson



WPI

Abstract

Mobile check-out systems are becoming increasingly popular as they offer a convenient and fast way to pay for goods and services. However, the current mobile check-out systems often have a poor user experience, which can lead to a decrease in sales and customer loyalty. This poster presents a research project that aims to improve the mobile check-out experience at Dyn by identifying the current user experience and proposing a new design that addresses the identified issues.

Background

The current mobile check-out systems at Dyn are based on a legacy system that was designed for a desktop environment. This system is not optimized for mobile devices, which leads to a poor user experience. The current system is slow, difficult to navigate, and does not provide any feedback to the user. This poster presents a research project that aims to improve the mobile check-out experience at Dyn by identifying the current user experience and proposing a new design that addresses the identified issues.

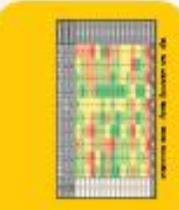
Methodology

The methodology of this study involves a combination of qualitative and quantitative methods. The qualitative methods include user interviews, focus groups, and usability testing. The quantitative methods include surveys and analytics. The data collected from these methods is used to identify the current user experience and to propose a new design that addresses the identified issues.

Mobile Optimization Approaches



Mobile Usability Data - Item Selection



Mobile Usability Data - Item Review



Data Analysis

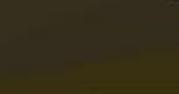
The data analysis involves a combination of qualitative and quantitative methods. The qualitative methods include user interviews, focus groups, and usability testing. The quantitative methods include surveys and analytics. The data collected from these methods is used to identify the current user experience and to propose a new design that addresses the identified issues.

Data Problems

The data problems identified in this study include a slow and unresponsive system, a difficult-to-navigate interface, and a lack of feedback to the user. These problems are addressed by the proposed design, which is faster, easier to navigate, and provides clear feedback to the user.







Appendix M: MQP Final Presentation Slide Deck

1

Improving Mobile Check-out Experience at Dyn

MQP Project Final Presentation

Dyn Liaisons:
Dan McAuliffe - Lara Swanson

MQP Advisor:
Professor Soussan Djamasbi



Our MQP Team

<p>Georgi Kardzhaliyski WPI'13 MIS, Entrepreneurship Minor</p> 	<p>Frank Oglesby WPI'13 MIS</p> 
<p>Tammy Liu WPI'13 MIS, CS Minor</p> 	<p>Wil Gómez WPI'13 MIS, CS Minor</p> 

2

Topic Overview

Project Background

- ▶ Project Scope
- ▶ Current State
- ▶ Opportunity Identification
- ▶ Phase I Overview, Results & Recommendations

Phase II: Testing and Analysis

- ▶ Usability Study I vs. Usability Study II
- ▶ Data analysis
- ▶ Video Analysis
- ▶ UXDM Lab Data

Recommendation For Future Work

- ▶ Research & Testing
- ▶ Improvements

3

Project Scope

Phase I: “Review, test, and analyze the usability for the check-out workflow followed when purchasing Dyn Standard DNS.”

- ▶ Main Scope
 - ▶ Add Zone Services Form
 - ▶ Shopping Cart Overview
 - ▶ Check out page
 - ▶ Purchase confirmation page
- ▶ Additional pages examined
 - ▶ DNS Marketing Page
 - ▶ Dyn Standard DNS Marketing Page

4

Proposed Phase I Deliverables

- ▶ Recommendations on how to improve mobile usability of the pages in the main project scope.
 - ▶ Content
 - ▶ Layout
- ▶ Additional: Mock-ups of the recommendations for Dyn's UX web design team

5

Success Measurements

- ▶ Dyn key performance indicators (KPI's)
 - ▶ E-commerce conversion rate
 - ▶ Number of form errors
 - ▶ Page load times
 - ▶ Number of support tickets
- ▶ MQP Success measures
 - ▶ Improved usability test results
 - ▶ Timely deliverables
 - ▶ Dyn's satisfaction with recommendations and results

6

Phase I Methodology

- ▶ Evaluation
 - ▶ Understand process
 - ▶ Mobile content and layout review
- ▶ Test
 - ▶ Usability study at UXDM Lab
- ▶ Analyze
 - ▶ UX interviews and SUS scores
- ▶ Develop recommendations based on conclusions
 - ▶ Additional: Mock-ups

Collaborate with Dyn!

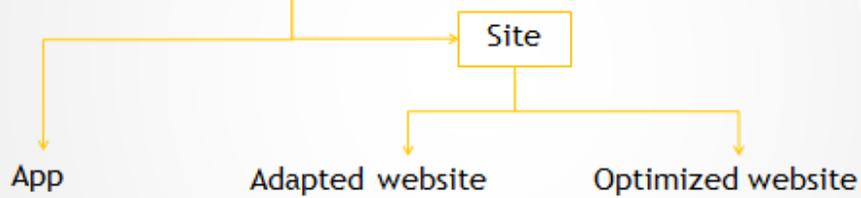
- ▶ On-site meetings
- ▶ Status reports
- ▶ No surprises!



7

Mobile Optimization Approaches

Going Mobile



8

Usability Study I Overview

- ▶ UXDM Lab study
 - ▶ Different perspective for user behavior
- ▶ Study Protocol
 - ▶ Entry interview
 - ▶ User scenario experiment
 - ▶ Purchase Dyn Standard DNS on smartphone (Android and iOS)
 - ▶ Exit Interviews
 - ▶ System Usability Scale (SUS)
 - ▶ Quantitative Questions



9

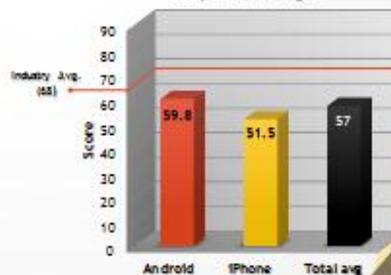
Usability Study I Overview

- ▶ Study I (30 Mins)
 - ▶ 10 Android Users - Galaxy S III
 - ▶ 5 iOS Users - iPhone 4S
- ▶ Test scenario: "Buy Dyn Standard DNS"
- ▶ Results:
 - ▶ Form/Process Errors
 - ▶ Inputs: Exp. Date, State & Phone Num.
 - ▶ Horizontal Scrolling
 - ▶ Interview Comments
 - ▶ +85% Negative (Due to zoom issues)
 - ▶ System Usability Scores

Dyn Study I SUS Data Map

Participant ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	SUS Score
u01	1	4	1	3	1	4	2	3	2	4	72.5
u02	4	2	4	1	4	2	4	3	4	3	72.5
u03	3	1	4	1	3	1	3	2	4	2	75
u04	2	3	2	3	2	4	1	4	3	4	75
u05	3	3	4	2	4	2	4	2	4	2	76
u06	3	3	3	1	3	2	3	2	4	3	67.5
u07	2	2	4	1	3	1	5	2	4	3	77.5
u08	4	2	5	1	4	2	5	5	5	1	80
u09	1	4	2	1	3	4	3	4	2	4	75
u10	5	2	4	1	4	1	4	4	5	1	67.5
u11	3	2	4	1	3	2	4	2	3	2	76
u12	1	4	2	4	3	4	1	4	1	5	77.5
u13	2	4	2	2	3	3	2	3	2	3	60
u14	2	2	4	1	3	2	4	2	4	2	76
u15	2	2	4	2	4	2	3	4	4	2	76
Overall Avg	2.57	2.86	3.21	1.64	3.07	2.43	3.21	3.14	3.36	2.64	69.8
Avg Android	2.56	2.89	3.22	1.56	3	2.44	3.33	3.22	3.56	2.67	68.5
Avg iPhone	2.0	3.0	3.0	2.0	3.0	2.75	2.75	2.75	2.5	3	57

Study I SUS Averages



10

Phase I Recommendations

Content

- ▶ Revise wording
 - ▶ Reduce word count, while keeping same message
- ▶ Enhance Mobile Intuitiveness
 - ▶ Rethink banners that look like ads
 - ▶ Call-to-actions that make more sense for mobile users (i.e. 'email' vs. 'print')
- ▶ Reduce content 'portions'
 - ▶ Avoid long chunks of text, lists, or tables
 - ▶ Group content logically

Layout

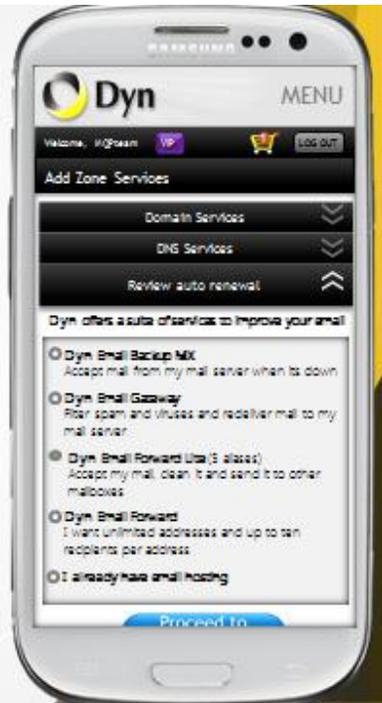
- ▶ Implement adaptive web-design
 - ▶ Eliminate side-scrolling
- ▶ Implement mobile-friendly navigation
 - ▶ No more side menus
 - ▶ Compact and intuitive
- ▶ Minimize the need for scrolling
 - ▶ Spacing and logical content flow
- ▶ Implement input masks
 - ▶ i.e. dates and phone numbers
- ▶ Reduce typing needed
 - ▶ Use dropdowns if appropriate
i.e. Country & State

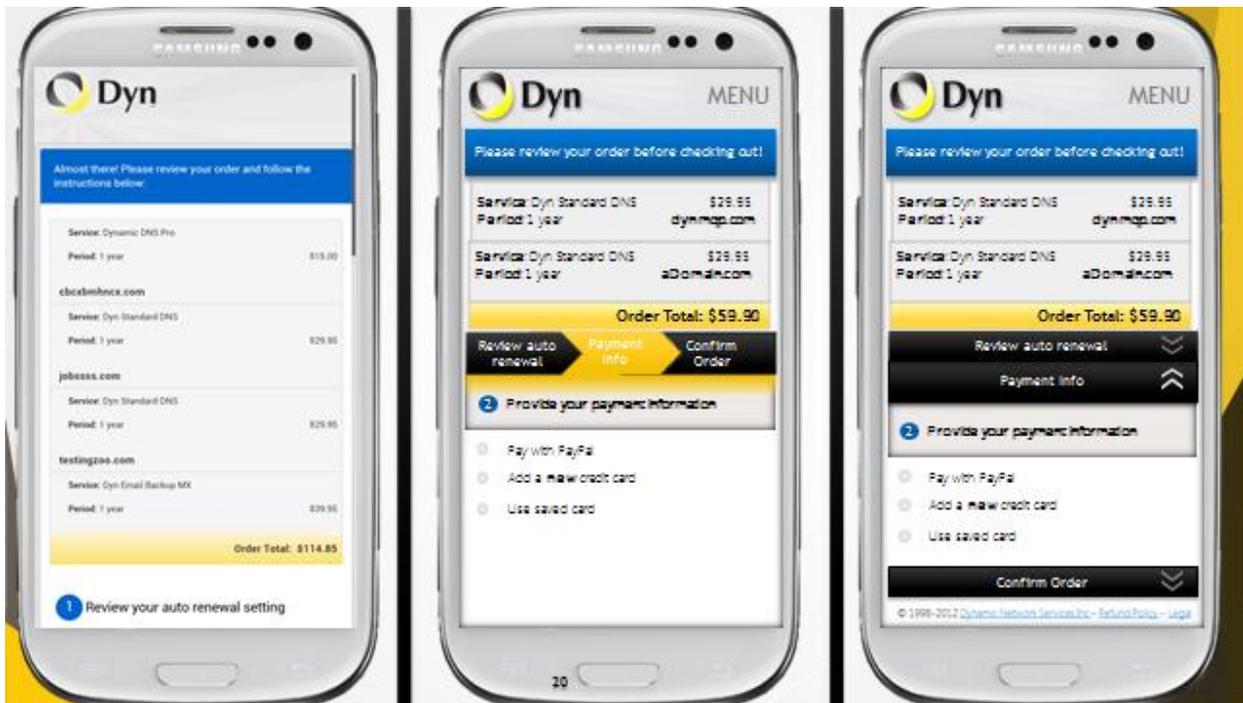
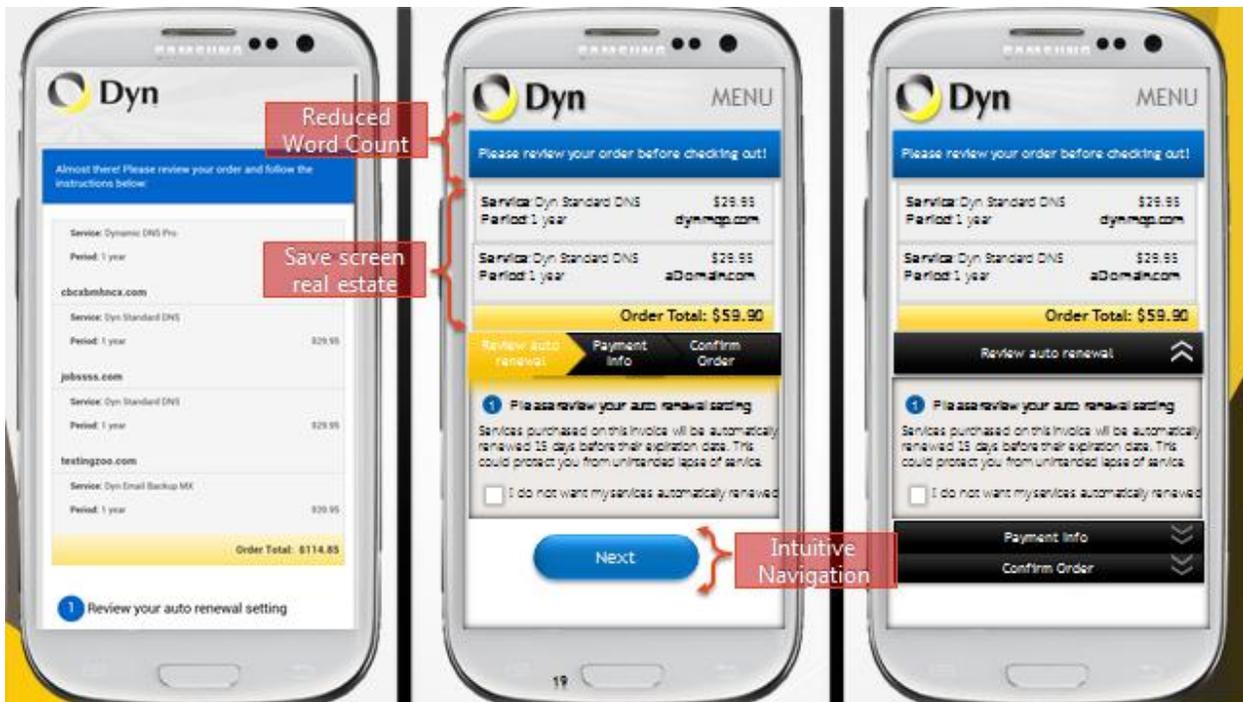
11

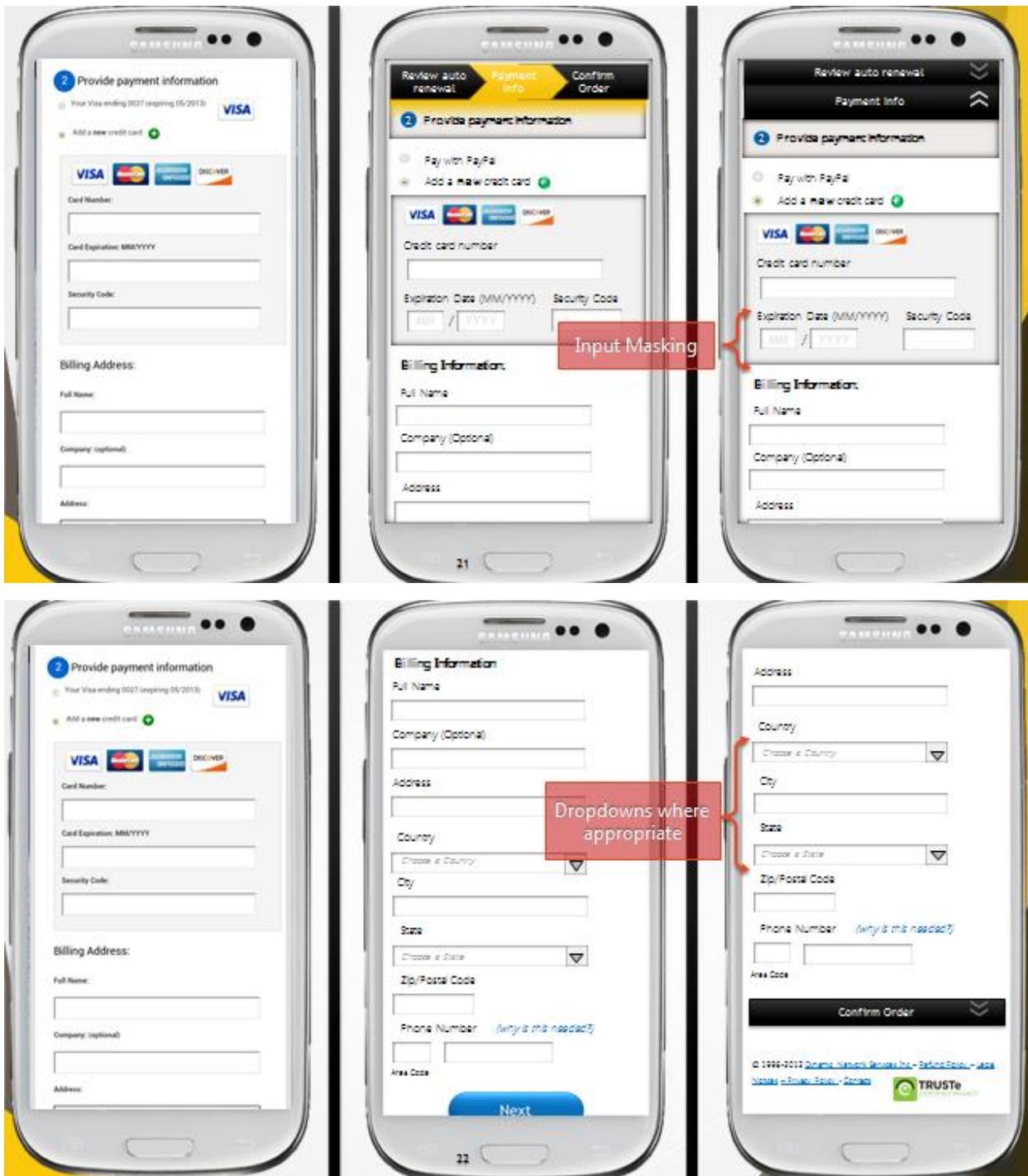
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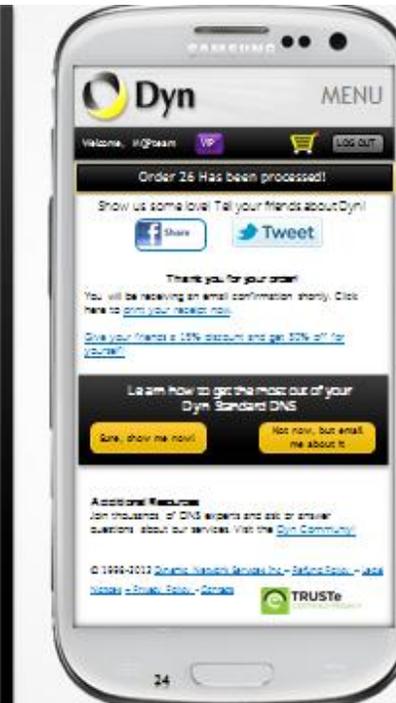
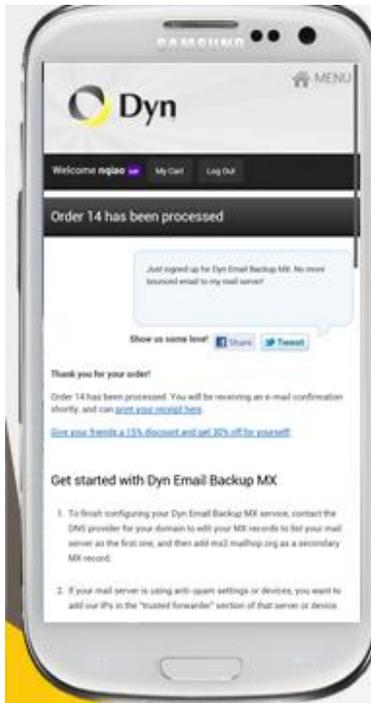
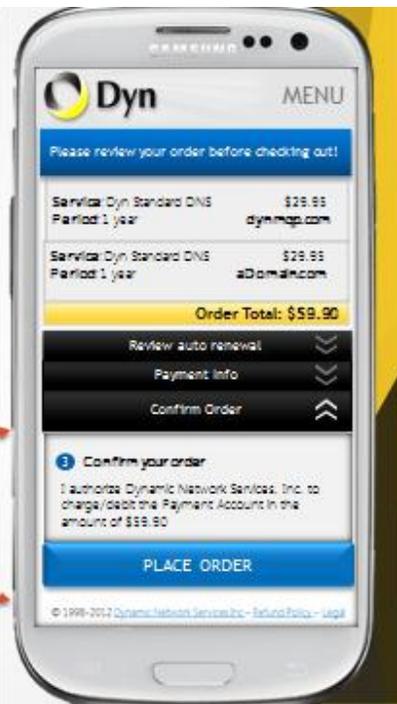
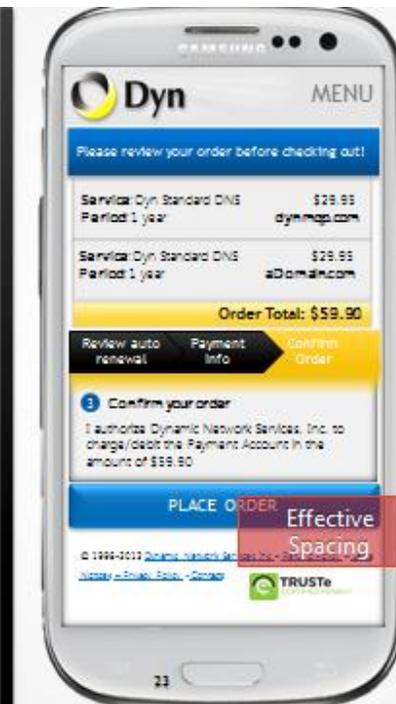
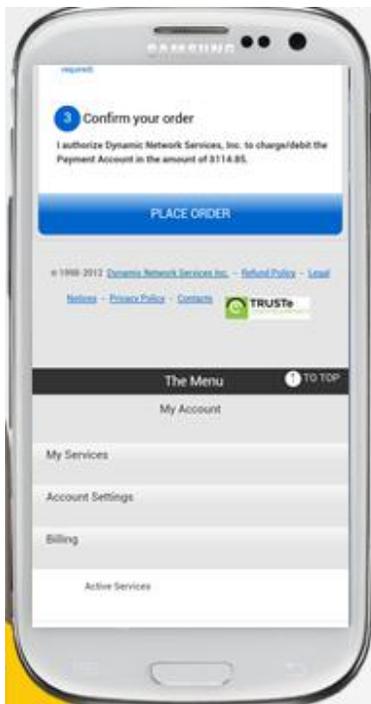
Recommended Design Mock-ups











Phase II Methodology

- ▶ Study II Design
 - ▶ Two surveys: New Questions = more data!
 - ▶ Two eye-tracking portions
 - ▶ Additional: Mock-up comparison
- ▶ Recruit & Test
 - ▶ Usability study at UXDM Lab
- ▶ Analyze
 - ▶ UX Surveys
 - ▶ New SUS Data
 - ▶ Video analysis
 - ▶ Form errors
 - ▶ Eye tracking data
- ▶ Analyze it some more...



Communicate Results With Dyn

- ▶ Status reports
- ▶ Some surprises :)
- ▶ Prepare 'Exit' strategy
 - ▶ Share data and analysis



Write MQP Report!!!

- ▶ 150+ Pages
- ▶ No sleep

25

Usability Study II Overview

- ▶ UXDM Lab study
- ▶ Study Protocol
 - ▶ Entry interview
 - ▶ User scenario experiment
 - ▶ Purchase Dyn Standard DNS on smartphone (Android and iOS)
 - ▶ Exit Survey I
 - ▶ System Usability Scale (SUS)
 - ▶ Quantitative Questions
 - ▶ Mock-up Review
 - ▶ Breadcrumb vs. Collapsible!
 - ▶ Exit Survey II

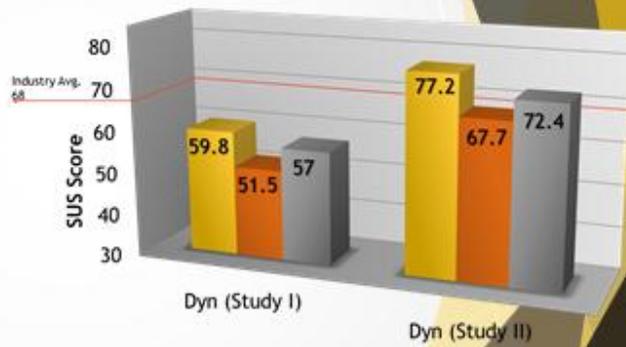
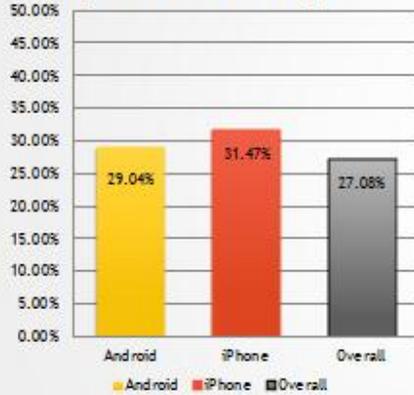


UXDM
RESEARCH LABORATORY

26

Study I vs. Study II (Cont.)

Dyn.com SUS Score % Change



30

Breadcrumb SUS Data Collected

Participant ID	SUS Question										SUS Score	
	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10		
Android	P01A	5	1	4	1	4	2	4	2	4	1	50.0
	P03A	5	1	5	1	5	1	5	1	5	1	100.0
	P05A	5	1	5	1	4	1	5	1	5	1	97.5
	P07A	5	1	5	1	4	1	4	2	4	5	80.0
	P09A	5	2	4	1	4	1	4	2	4	2	77.5
	P11A	4	2	4	1	4	2	4	2	4	5	75.0
	P13A	5	1	5	1	4	1	4	1	5	2	92.5
	P15A	5	1	5	1	4	2	5	2	5	1	87.5
	iPhone	P01B	4	2	4	1	4	5	5	2	4	4
P02B		2	4	2	4	5	4	2	4	2	4	27.5
P04B		4	1	5	1	5	1	5	1	5	1	97.5
P06B		5	4	2	4	5	2	5	2	5	4	45.0
P08B		4	5	4	1	4	1	4	2	4	1	80.0
P10B		5	2	5	2	4	2	4	1	4	1	75.0
Overall Avg		3.64	1.56	4.07	1.50	4.00	1.71	4.14	1.79	4.14	2.07	
Avg. Android		3.88	1.25	4.65	1.00	4.15	1.38	4.58	1.65	4.30	1.75	
Avg. iPhone		3.55	2.67	3.55	2.17	3.85	2.17	3.85	2.00	3.87	2.50	



31

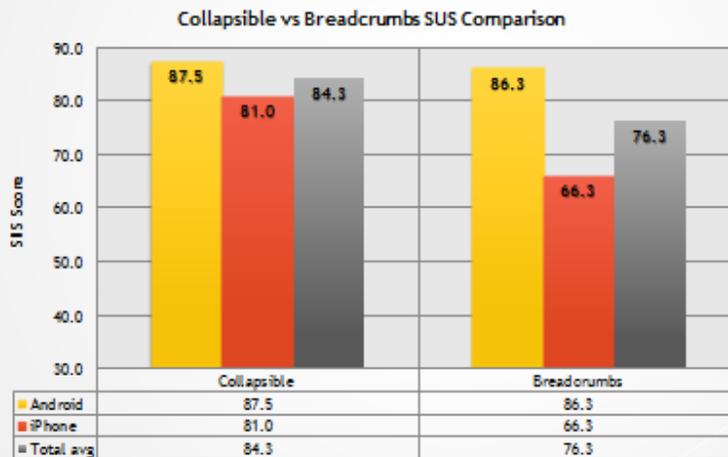
Collapsible Menu SUS Data Collected

	Participant ID	SUS Question										SUS Score
		q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	
Android	P02A	5	1	5	1	4	1	5	5	5	1	87.5
	P04A	5	1	5	1	2	1	4	2	5	1	85.0
	P06A	4	1	5	1	4	1	5	5	4	1	87.5
	P08A	4	1	5	1	5	1	5	1	5	1	87.5
	P10A	4	1	4	1	5	1	4	1	5	1	82.5
	P12A	5	1	4	1	4	2	4	2	5	1	82.5
iPhone	P14A	4	2	4	2	4	2	5	2	4	2	72.5
	P16B	3	1	5	1	4	2	5	5	1	85.0	
	P18B	4	2	5	1	4	2	5	1	5	1	82.5
	P20B	4	2	4	2	4	2	5	2	5	4	75.0
	P22B	2	2	4	1	4	1	5	2	4	1	80.0
	P24B	4	2	4	1	4	2	4	2	4	1	80.0
P26B	5	1	5	1	4	5	5	1	5	1	87.5	
Overall Avg		3.82	1.46	4.52	1.15	4.25	1.82	4.54	1.92	4.09	1.21	
Avg. Android		3.86	1.14	4.57	1.14	4.45	1.29	4.29	2.00	4.71	1.14	
Avg. iPhone		3.35	1.85	4.17	1.17	4.00	2.00	4.85	1.85	4.07	1.50	



33

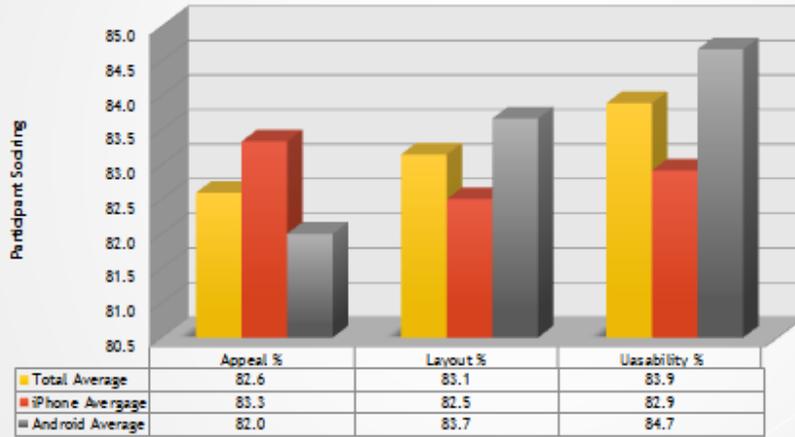
Collapsible vs. Breadcrumbs SUS Comparison



33

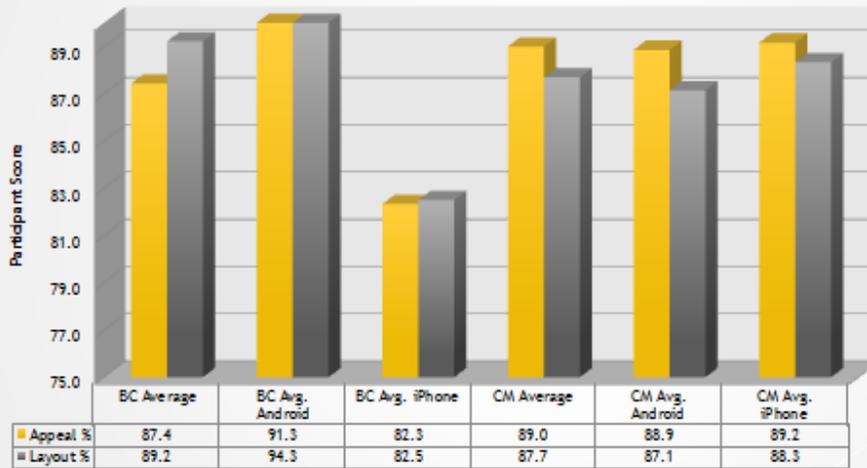
Scoring Comparison - Exit Interview

Scoring Comparison - Appeal, Layout and Usability



34

Visual and Layout Appeal Percentage Scoring



35

SUS - Descriptive Statistics

Statistic	Dyn Study I	Dyn Study II
Mean	57.00	72.96
Standard Deviation	23.34	21.28
Observations	15	27

$t= 2.25, df=40, p=0.03$

- ▶ The MQP team can assert with 97% confidence that there is a statistically significant difference in the SUS scores observed in study I to those observed in study II.

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Form errors & Video Analysis

▶ Study I:

Category	Total errors (out of 27)	Android (15)	iPhone (12)
Expiration Date	4	4	0
State	8	4	4

▶ Study II:

Category	Total errors (out of 27)	Android (15)	iPhone (12)
Expiration Date	5	5	0
State	7	5	12
Search for Product	2	2	4

▶ Observation:

- ▶ Order processed bigger not obvious
- ▶ Checkout button for direct buy
- ▶ Product comparison grid

▶ Other errors:

- ▶ Check availability
- ▶ Domain name
- ▶ Click on text

▶ Some common issues participants had during Study II included:

- ▶ Confusion about "Check Availability"
- ▶ Credit Card Expiration
- ▶ NH Input

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Checkout form completion time

Metric	Study I	Study II	% change
Average Time (Mins)	4:24	4:53	10.87%
Average Checkout Form (Mins)	2:38	2:54	9.77%
Proportion	59.94%	59.34%	-1.00%

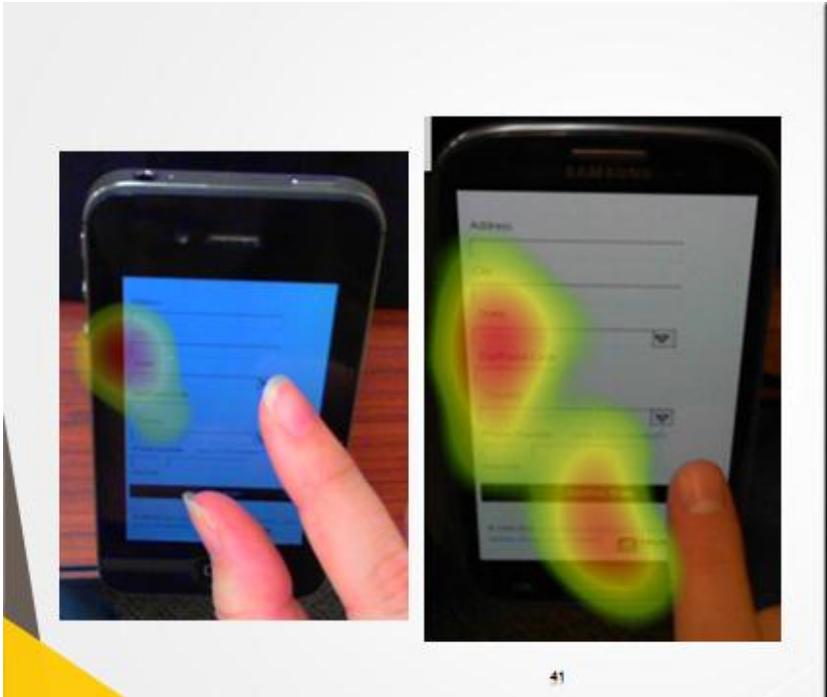
39

Eye tracking Data Analysis

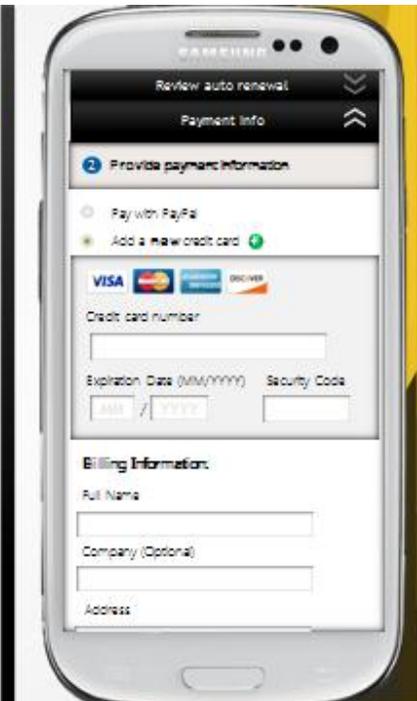
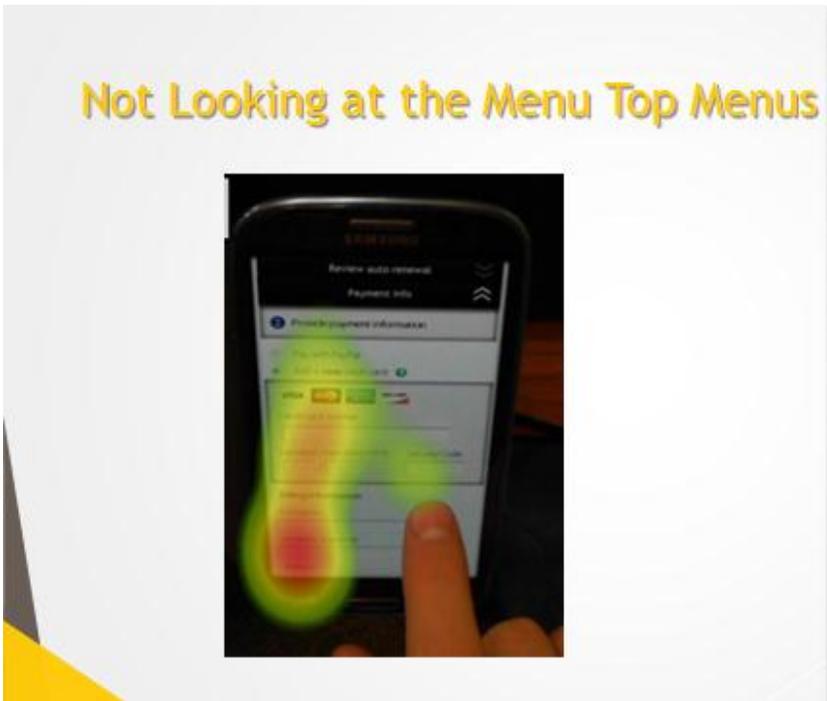
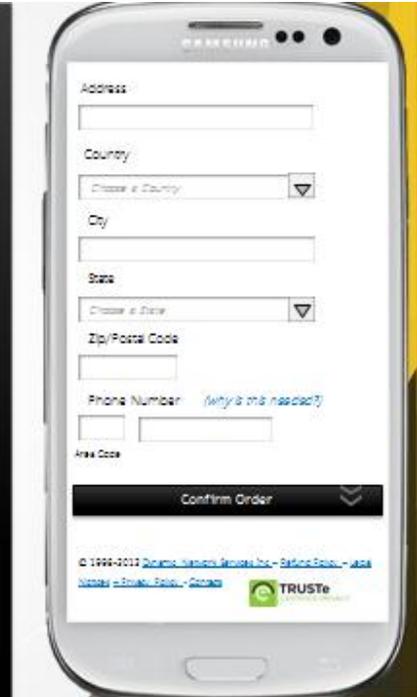
- ▶ Heat maps corroborate an extensive Area of Interest analysis.
- ▶ Participants observed the navigation menus but still focused on the content of the task at hand.



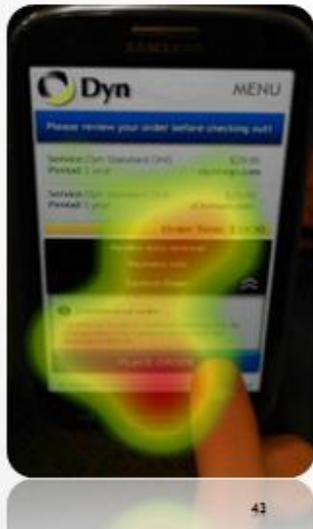
40



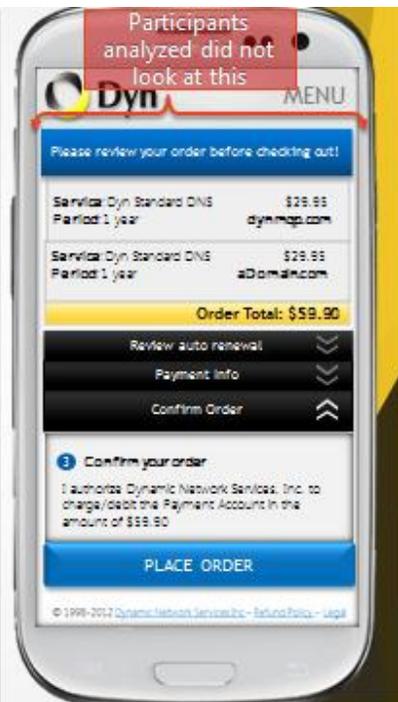
41



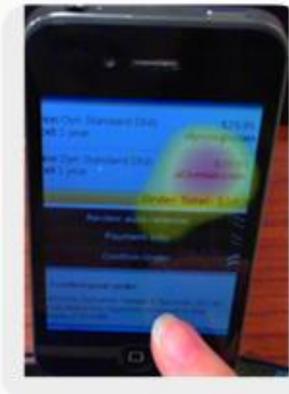
Area Of Interest Findings



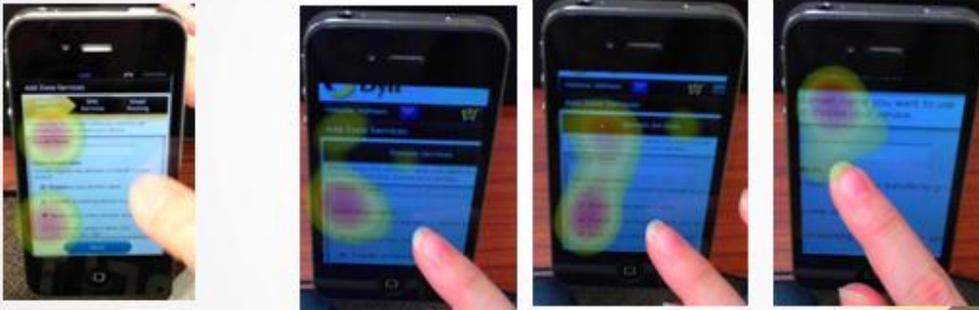
43



Order Review Page



Domain Name Page



Order Processed Page



Recommendations For Future Work

- ▶ Decide to whether to implement remaining changes
- ▶ Evaluate if its worth to develop A & B tests
 - ▶ UXDM Lab
- ▶ Keep us in the loop!
 - ▶ Google Analytics
 - ▶ conversion rate changes
 - ▶ page load changes

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THANK YOU



Appendix N: On-site Meetings with Dyn UX Team

On-site Meeting Agenda, Sep 5th, 2012

Date: Wednesday, 9 - 5 - 2012

Meeting Start Time: 11 a.m.

Location: Dyn's Office, 150 Dow Street
Manchester, NH 03101

Meeting End Time: 1 p.m.

Attendees:

Dyn	WPI MQP Team
Dan McAuliffe	Wilmann Gomez
Lara Swanson	Georgi Kardzhaliyski
	Tammy Liu
	Frank Oglesby

Purpose and Intended Results:

1. Discuss the purposes of the MQP
2. Discuss goals of the project overall and specifics for A-term
3. Discuss Success Metrics for the project

Decisions and Actions:

Actions Items: from WPI MQP Team:

1. Research experience on mobile/read assigned books
2. Steps in check-out process for mobile
 - a. What needs to be selected first (enter credit card, not the same steps)
3. Improve menu navigation (anchored)
4. Consolidate "needed" from "not needed" information on mobile platforms
5. Review:
 - a. Size of Input textbox
 - b. Drop down menu
 - c. Text size
6. Add a customized keyboard based on input type (credit card, e-mail address)

7. Find alternatives for Print Instructions (alternative - save as a pdf, Word on SD card)
8. Evernote feature

Project Success Metrics

- ecommerce conversion rate (started -> completed)
- number of errors (entering e-mail address, credit card, etc)
- web page performance (100 ms)
- lower Client Support Services tickets

Questions

- a. Purpose, what are you hoping to measure
- b. What can be done this term regarding goals

Notes from Dan:

Interesting things to further discuss:

Dyn Standard DNS = domain name + DNS

- 1) GoDaddy = domain name only
- 2) GoDaddy domain name + DNS from Dyn

Goal:

Domain Name + DNS => all from Dyn

Intuitive easy, less scrolling

Actions Item on Dyn's side:

- Breakdown of form error

.....

Suggested Web Sources:

[@RWD](#)

Graphite

Deliverables:

Recommendations by A term

Qualitative Measures by A term

Focus groups before recommended solutions

Risks:

Impact on Client Services (more tickets)

Increased page loading time

Lower Conversion Rate

Assumptions:

No coding

On-site Meeting Agenda, Sep 12th, 2012

Date: Wednesday, 9 - 12 - 2012
Location: Dyn's Office, 150 Dow Street
Manchester, NH 03101

Meeting Start Time: 11 a.m.
Meeting End Time: 1 p.m.

Attendees:

Dyn	WPI MQP Team
Dan McAuliffe	Wilmann Gomez
	Georgi Kardzhaliyski
	Tammy Liu
	Frank Oglesby

Purpose and Intended Results:

1. Get information needed to work at Dyn
2. Passwords and work spaces
3. Go over checkout questionnaire
4. Go over pre and post surveys

Decisions and Actions:

Discuss next steps

1. the possible changes to interview and forms
2. Anything needed from us further progress?

Questions

- a) What do you think of the information/forms/interview?
- b) What are the necessary passwords for the workplace we will be using

Notes from Dan:

Interesting things to further discuss and To-Do:

Password for wireless internet: DynIncR0cks

Commentary for possible changes for the checkout interview, pre and post surveys:

- How often do you use the web, include hourly, (along with the current daily, monthly etc.)
- Changes to question 7: Shopping or ecommerce websites
- Changes to question 8: Give examples/what's the most important to make it easy to use, what frustrates you the most?
- Changes to question 9: Domain Name Service

Possible changes for exit document:

- Test them on the knowledge of the DNS process
- How long does it take to fill out the form (optimize the form)
- Evaluate how informative the form is (give them more fleshed out services)

Notes about the study protocol:

- Beginning of study- give them a scenario, for example you are a small business and you just bought a domain and want a more appropriate business service. They don't need a domain name (since they just bought one), or e-mail, but adding a DNS service to that name is what they want.
- Make it less about the account and more about the payment page, Account stuff can be added later for scope purposes.

Updates concerning testing:

- Samsung issue is fixed
- Do we want to do a tablet? (No just do it mobile phone, it can be something small on the side if we want to) Thinking of doing half android and half apple
- What does DNS do? (Do you understand what it is and what it does?) don't spell out DNS, because they don't
- Make Question 2, into two separate questions, what was easy, what was confusing
- Break down question 3, what part of the experience/break it down to usability more than just appearance
- Question 4, a) Change the wording to, "was it too hard to understand, or too technical?"
 - b) Is Website navigation too hard to control on mobile phones
 - c) Is it too much information on the page? Is it too distracting?
 - Include something about the forms/entering data
 - Error messages weren't clear
 - Took too long? / Is the time to complete the form too long?
 - Focus on the forms more than the content

Notes for the post test interview:

- Also change the sequence of questions Ask them question 4 first
- Recommendations questions
- More usability than experience

On-site Meeting Agenda, Sep 26th, 2012

Date: Wednesday, 9 - 26 - 2012
Location: Dyn's Office, 150 Dow Street
Manchester, NH 03101

Meeting Start Time: 11 a.m.
Meeting End Time: 1 p.m.

Attendees:

Dyn	WPI MQP Team
Dan McAuliffe	Wilmann Gomez
	Georgi Kardzhaliyski
	Tammy Liu
	Frank Oglesby

Purpose and Intended Results:

1. Share Study Background Information
2. Deliberate and interpret SUS Scores / Survey Results
3. Share observational feedback
 - a. Common trends and challenging areas
4. Convey Recommendations
 - a. Web forms (expiration date, state, phone number)
 - b. Content (banner, text)

Decisions and Actions:

1. Discuss Next Steps
 - a. High-level data analysis
 - b. Mock-ups

Questions

- c. Implementation of Recommendations

d. Timeline: two weeks to go live

Interesting things to further discuss:

- A comparison of Android user data on the 1st and 2nd usability testing day in regards to the Galaxy SIII update
- Need to provide more result analysis on entry and exit (e.g., % of people who have no previous mobile purchase experience)
- ‘Standard product is more expensive than ‘pro’
- Confirmed: HTML can be used to implement the mask for keyboard which will be one of the recommendations we provide
- One of our recommendations is to reduce spacing on mobile which Dan is already implementing the change. The take-in here is for a user to easily input his/her information while can also expect next two or three things coming on the same page.

To-Do:

- a. Provide proposal on depth analyzing entry/exit results
- b. Analyze the eye tracking data trend

Web-Ex Meeting Agenda, Oct 24th, 2012

Date: Wednesday, 10 - 24 - 2012
Location: Online using WebEx technology

Meeting Start Time: 11 a.m.
Meeting End Time: 12 p.m.

Attendees:

Dyn	WPI MQP Team
Dan McAuliffe	Wilmann Gomez
Lara Swanson	Georgi Kardzhaliyski
	Tammy Liu
	Frank Oglesby

Purpose and Intended Results:

1. Discuss Progress on Mock implementation
2. Deliberate on any changes that need to be made with the timeline
3. Provide any other requested information

Decisions and Actions:

2. Discuss Next Steps
 - a. Dates for second study
 - b. Any changes that need to be measured in this study
 - c. Any additional changes beyond what was presented in the mockups

Questions

- e. Anything new regarding implementation (speed bumps, missing information?)
 - f. Timeline: two weeks to go live
- :

Web-Ex Meeting Agenda, Oct 31st, 2012

Date: Wednesday, 10 - 31 - 2012
Location: Online using WebEx technology

Meeting Start Time: 11 a.m.
Meeting End Time: 12 p.m.

Attendees:

Dyn	WPI MQP Team
Dan McAuliffe	Wilmann Gomez
Lara Swanson	Georgi Kardzhaliyski
	Tammy Liu
	Frank Oglesby

Purpose and Intended Results:

1. Discuss Progress on Mock implementation
2. Deliberate on any changes that need to be made to information provided this week
3. Provide any other requested information

Decisions and Actions:

3. Discuss Next Steps
 - a. Dates for second study
 - b. Any changes that need to be measured in this study
 - c. Any additional changes beyond what was presented in the mockups

Questions

- g. Anything new regarding implementation (speed bumps, missing information?)
- h. Timeline: two weeks to go live

Appendix O: Dyn MQP Team Meeting Notes

MQP Meeting Agenda: Aug 29th, 2012

Meeting Time: Wed 7-8:15pm Library Tech Suite 121

Attendees: Wilmann Gomez, Georgi Kardzhaliyski, Tammy Liu, Frank Oglesby

1. Discussed project's progress report
2. Discussed and modified PowerPoint presentation
3. Went over previous Dyn MQP from 2011 (similar project streamlining account check-out process)
4. Prepared potential questions for Skype meeting with Dyn and Professor Djamasbi tomorrow

Deliverables:

Summary and presentation for the next meeting with Dyn tomorrow, Thursday 8/30, 12 pm

MQP Meeting Agenda: Sep 9th, 2012

Meeting Time: Sunday 12-2pm Tech Suite121

Attendees: Wilmann Gomez, Georgi Kardzhaliyski, Tammy Liu, Frank Oglesby

Things discussed:

1. MQP report outline
2. Questionnaire (pre and post)
3. Study proposal for usability tests
4. Competitor list

Things to be done:

1. research competitor (take screen shots)
2. revise study proposal
3. MQP proposal write up

MQP Meeting Agenda: Sep 23th, 2012

Meeting Time: Sun 11am-1pm Library Anderson Lab A

Attendees: Wilmann Gomez, Georgi Kardzhaliyski, Tammy Liu, Frank Oglesby

1. Discussed SUS and entry summary

2. Presentation Outline

- Data, web forms, content, finding
- Recommendation
- Next steps

3. Data + finding

- SUS with theory
- Top 3 like/ dislike

4. Web forms + context

- form errors
 - Expiration date
 - State
 - Phone number
- Context
 - Banners
 - Texts (in general)
- Screenshot feedback

Next Steps

- High level data analysis
- Mockup
- Number
- Scrolling
- Zoom in/out

Questions for Dyn

What is the process for implementing the change

How long (MQP report)

Appendix P: Bi-weekly MQP Advisor Meeting Minutes

Advisor MQP Meeting Agenda: Aug 27th, 2012

Meeting Time: Monday 8:30 p.m. - 9:30 p.m.

Location: Skype

Attendees: Wilmann Gomez, Tammy Liu, Frank Oglesby, Professor Soussan Djamasi

1. Discuss project details and scope
 - Dyn's role
 - Products and Services
 - Site visits
 - UX components
2. Discuss team feedback
3. Research discussion
 - account checkout walkthrough on different devices
 - general layout suggestions (lack of direction and confuse)

Service Type:

- Host with IP address
- WebHop Redirect (URL forwarding service)
- Offline Hostname

Dyn Account Set Up feedback:

- **PC:**
 - Vista, Firefox: no major issues.
 - Win7, chrome: No major issues,
- **iPad**
 - Safari: No major issues,
- **Android**

Account.dyn.com snaps to the within appropriately on landscape and portrait mode (dyn.com does not do this.) There is a need to zoom in when in portrait mode.

- **Mac**
 - Safari: Issues with activation code.

4. Timelines and deliverables (tracking sheet)

- Project Expectations
 - Advisor
 - Team
 - Sponsor
- Timeframe

Deliverables:

- Agenda and minutes for the next meeting with Dyn (both electronic and hard copy)
- Meeting times for MQP team meeting on wed

Advisor MQP Meeting Agenda: Sep 6th, 2012

Meeting Time: Thursday 1-2pm Washburn

Attendees: Wilmann Gomez, Georgi Kardzhaliyski, Tammy Liu, Frank Oglesby, Prof Soussan Djamasbi

Things to be done:

- Share Dyn's progress and discuss project charter
- Discuss the next step and deliverable for next week Dyn meeting
- Discuss procedure for focus group

Advisor MQP Meeting Agenda: Sep 13th, 2012

Meeting Time: Thursday 1-2 p.m.

Location: Washburn, Conference Room

Attendees: Wilmann Gomez, Georgi Kardzhaliyski, Tammy Liu, Frank Oglesby, Prof Soussan Djamasbi

Purpose and Intended Results:

- Share minutes from on-site meeting with Dyn
- Discuss logistics for running the Usability Study
 - Entering Credit Card information
 - Recruiting Objects

Decisions and Actions:

- Recommendations for content optimization by EOW
- Revise:
 - Study Protocol
 - Entrance Data Collection
 - Exit Data Collection

Advisor MQP Meeting Agenda: Sep 25th, 2012

Meeting Time: Tuesdays 1:00 p.m. - 2:00 p.m.

Location: Washburn, Conference Room

Attendees: Wilmann Gomez, Tammy Liu, Frank Oglesby, Professor Soussan Djamasbi

Purpose and Intended Results:

- Discuss SUS Scores / Survey Results
- Share observational feedback
 - Common trends and challenging areas
- Review Presentation for Dyn

Decisions and Actions:

- Recommendations for Dyn
 - SUS Analysis / Survey Results
 - Web forms (expiration date, state, phone number)
 - Content (banner, text)
- Next Steps
 - High-level data analysis
 - Mock-ups
- Questions for Dyn
 - Implementation of Recommendations
 - Timeline

Advisor Meeting Agenda: October 2th, 2012

Meeting Time: Tuesday, 1:00 p.m. - 2:00 p.m.

Location: Washburn, Conference Room

Attendees: Wilmann Gomez, Georgi Kardzhaliyski, Frank Oglesby, Professor Soussan Djamasbi

Meeting minutes

- Professor Djamasbi said that she will inform us of all dates that she would like us to deliver parts of the project with the deadline of 12/12/2012 in mind.
- She suggested that she would like us to submit the student agreement and release forms; she suggested that we send it to directly to Lori glover or just sent it to Professor Djamasbi to be safe.
- She made the suggestion of organizing the data that we compiled for the SUS Entry and Exit data for Dyn in a way where we mention how we utilized a number of different resources, and how it was a compilation of multiple sources
 - SUS(industry standard)
 - Breakdown of questions(interviews qualitative data) continuum of experience
 - Objective measure of reaction/ user gaze data(is there a pattern or trend)

Mock up information:

- Have comparisons between mock up and original
- Emphasize the differences or changes
- Meet with the whole group before showing me work or changes
- Color scheme changes and considerations
- Shopping cart location changes
- Design should be based on information from study, website references, not person preference, why did you make the changes that you made, make sure to validate what you did, Explain your logic
- Top portion is prime real estate
- Avoid on additional clicks, or pages

Additional information for next meetings:

- Print out presentation for meetings for professor Djamasbi

Advisor Meeting Agenda: October 4th, 2012

Meeting Time: Thursday 12:00 p.m. - 1:00 p.m.

Location: Washburn, Conference Room

Attendees: Wilmann Gomez, Georgi Kardzhaliyski, Frank Oglesby, Professor Soussan Djamasbi

Purpose and Intended Results:

1. Share the minutes from the on-site meeting with Dyn
2. Deliberate on mock-up designs
3. Review outline for proposal
4. Review timeline

Decisions and Actions:

1. Proposal for Dyn
 - a. Send by Friday, October 5th for review
2. Present proposal to Dyn on Wednesday, October 10th in WPI
 - a. Prepare presentation
 - b. Send for review by Monday, October 8th
 - c. Book a conference room
3. Update timeline
4. Other

Advisor MQP Meeting Agenda: Oct 11th, 2012

Meeting Time: Thursday 12:00 p.m. - 1:00 p.m.

Location: Washburn, Conference Room

Attendees: Wilmann Gomez, Tammy Liu, Frank Oglesby, Professor Soussan Djamasbi

Purpose and Intended Results:

1. Evaluate presentation
2. Discuss next steps of the project
 - b. Timeline for proposal write-up
3. Additional Comments and Feedback

Decisions and Actions:

4. Dyn MQP Assignments:
 - a. Sample video with selected common trends
 - b. Metrics for error forms
5. Next Steps
 - a. Proposal write-up

Advisor Meeting Agenda, November 1st, 2012

Meeting Time: Wednesday 11:00 p.m. - 12:00 p.m.

Location: Washburn, Conference Room

Attendees: Wilmann Gomez, Georgi Kardzhaliyski, Frank Oglesby, Professor Soussan Djamasbi

Purpose and Intended Results:

1. Discuss Dyn's Progress on Mock implementation
2. Discuss the Timeline and specific deadlines with the paper
3. Discuss our plan of action when it comes to our second data collection session, adapted vs. mock up testing

Decisions and Actions:

6. Discuss Next Steps
 - a. Dates for second study
 - b. Any changes that need to be measured in this study
 - c. Any additional changes beyond what was presented in the mockups

Questions

- i. Any other information you need from us
- j. Do the dates work for her concerning the delivery date for aspects of the paper

Notes from Professor Djamasbi:

Interesting things to further discuss:

To-Do:

Advisor Meeting Agenda, Nov 6st, 2012

Meeting Time: Tuesday 7:00 p.m. - 8:00 p.m.

Location: Web Ex

Attendees: Wilmann Gomez, Georgi Kardzhaliyski, Frank Oglesby, Professor Soussan Djamasbi

Purpose and Intended Results:

1. Discuss Dyn's Progress on Mock implementation
2. Discuss the Timeline and specific deadlines with the paper
3. Discuss our plan of action when it comes to our second data collection session, adapted vs. mock up testing
4. Recruitment efforts for study
5. Overall progress with paper

Decisions and Actions:

7. Discuss Next Steps
 - a. Dates for second study
 - b. Any changes to scheduling

Questions

- k. Any other information you need from us

Notes from Professor Djamasbi:

Interesting things to further discuss:

To-Do :

What we need for Thursday

Take another look at the questions that we will ask for the Entry and Exit interviews

Making sure that when we have them go through the study we make sure to ask which interface they like better if we show them both

Look at the Study Protocol

Deliverables: Study Protocol/Design, Entry and Exit Interviews, Information follow up with Dyn about the progress on the mobile adapted site, comes with ideas for brainstorming the best scenarios

Makes sure everyone is trained with the Eye tracker as well as data extraction if its deemed appropriate, and making sure that we have at least two people in a room with each other at the same time.

Make sure to remind Professor Djamasbi about “the image of the phone always being the same” you said it was hard to talk about over the phone but you would like us to remind you at the meeting.

Have the study process, essentially step by step of what you’re saying and doing specifically in the study and in what order you’re saying it in.

Bring your script try to have it edited for her review on Thursday

Make sure to follow up with Dyn about the progress with the mobile adapted site.

Advisor Meeting Agenda, Nov 8th, 2012

Meeting Time: Thursday 11:00 a.m. - 12:00 p.m.

Location: Washburn 221

Attendees: Wilmann Gomez, Georgi Kardzhaliyski, Frank Oglesby, Professor Soussan Djamasbi

Purpose and Intended Results:

1. Discuss Dyn's Progress on Mock implementation
2. Discuss the Entry and Exit interviews
3. Discuss our plan of action when it comes to our second data collection session, adapted vs. mock up testing, more specifically the script, our process and ideas

Decisions and Actions:

8. Discuss Next Steps
 - a. Recruiting from Professor Djamasbi's class today at 2pm
 - b. Any changes that need to be measured in this study according to what is written down
 - c. Best way to go experiment with what we have to work with according to what Dyn has provided

Questions

- l. Any other information you need from us?
- m. What did you mean by the image of the phone always being the same? You said to remind you at this meeting so you could explain what you meant.

Notes from Professor Djamasbi:

Interesting things to further discuss:

Advisor Meeting Agenda: November 26th, 2012

Meeting Time: Monday 8:00 p.m. - 9:00 p.m.

Location: Skype

Attendees: Wilmann Gomez, Georgi Kardzhaliyski, Frank Oglesby, Professor Soussan Djamasbi

Business

- Analysis and progress: we are doing the last push to get everything online, we are doing the video analysis this week. We are going to do video error analysis and the results in the paper

Meeting on Thursday

- Anything specific? Interview stuff?
- We put it in the presentation and tammy did the error analysis, and what they were doing while they were browsing, from the comments,
- Enter things in the excel sheet for the analysis of the videos for trending, and survey
- Excel sheet, organize it in a nice way, labeled and bring it to the meeting or send her a copy before the meeting
- Are we planning to go to dyn before Wednesday?
- Send an e-mail to them to let them know that we plan to do more analysis at wpi, therefore not going to dyn. Maybe a conference call if it makes any sense, but check to see what is the most effective.
- Not going to be in the office on Wednesday,

Data for Thursday for Djamasbi

- Gift card for the raffle and make sure that someone gets it
- Sending an e-mail with details concerning access for Washburn
- Paper, data/excel and the PowerPoint that we have presented to Dyn
- Use some the slides for the final presentation at the end of this term