THE STATE OF MOBILE STRATEGY AND RESPONSIVE WEB DESIGN AT OHIO UNIVERSITIES

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ABSTRACT

Dr. Paul Cesarini, Advisor

Since responsive web design is such a new technique, there is a significant lack of information and research regarding this approach within a university setting. Therefore, the purpose of this study was to discover the status of responsive web design and other mobile strategies at Ohio state-funded universities, and to explore the viability of using responsive web design to serve web content to mobile users on university websites. The objectives of this study were to determine whether or not Ohio state-funded universities are currently implementing responsive web design and what additional strategies they are implementing to serve web content to mobile users.

This study utilized qualitative research methods, and focused on web industry professionals who work directly with the websites of Ohio state-funded universities. The researcher collected data through phone interviews with participants, and the interviews consisted of mostly open-ended questions.

This study concluded that the majority of Ohio state-funded universities are indeed making a move towards responsive web design, although many are still in the early stages of implementation. Most of these universities are also utilizing mobile applications and separate mobile websites to serve content to mobile users in some form. Based on participant response, it appears that mobile apps are continuing to see growth and improvement, while use of separate mobile websites is decreasing.
I would like to thank Dr. Paul Cesarini for all of his guidance and support as my committee chair, and my committee members for their valued feedback and expertise. I would like to acknowledge all of the participants in this study for their contributions and willingness to help. Finally, a huge thanks to all of my family, friends, and colleagues for their support and motivation. I couldn’t have done it without all of you!
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CHAPTER I: INTRODUCTION

Context of the Problem

Mobile usage is on the rise, with 46% of adults in the US owning a smartphone as of February 2012, and 90% of those smartphone owners claiming to use their device to go online. A majority of those users access the web on a mobile device daily, with 31% using a mobile device as their primary method of access (Smith, 2012). Smartphones are now “the most common starting place for online activities” such as web browsing and searching for information (Google, Aug. 2012). Smartphone sales reflect this trend, as they exceeded the amount of PCs sold in 2011 (Canalys, 2012). With such overwhelming statistics, the mobile web shouldn’t be overlooked; most web users now expect websites to be optimized for mobile viewing. As Google (Feb. 2012) explains it, “building a mobile-friendly site is essential for businesses to prepare for the mobile movement” (p. 1). In order for a website to successfully deliver content to mobile users, some type of mobile strategy must be in place.

Universities and the mobile web. For universities, the mobile web is an important marketing tool. With mobile use on the rise, it has become crucial for universities to develop a solid mobile web presence in order to stay current and to improve student recruitment and retention. The mobile web is especially important to recruitment since one of the main demographics targeted by universities is high school graduates, who are growing up using mobile devices on a regular basis. In fact, Smith (2012) found that 75% of cell phone owners aged 18-24 use their phones to go online. Additionally, universities also have to take the mobile web into consideration when
targeting international students. In some countries, browsing the web on a mobile device is more common than browsing the web on a desktop or laptop computer. For example, 38% of mobile web users in China are mobile-only users, and 28% of those users are students (OnDevice Research, 2012). Ultimately, the majority of today’s prospective university students expect to be able to access information from mobile devices, and universities cannot ignore this demand.

However, once a university chooses to implement a mobile presence, there isn’t just one method of content delivery. Mobile web content can be served using a variety of methods and techniques, and the appropriate mobile strategy must be chosen sensibly. Currently, three common approaches to the mobile web are:

- Mobile apps
- Mobile websites
- Responsive web design

Each of these options has both strengths and weaknesses, and should be selected only after the appropriate research has been conducted in order to ensure that it will meet the necessary goals and objectives of the university and its audiences. In Ethan Marcotte’s book *Responsive Web Design* (2011), he explains that overall, a mobile strategy should be selected according to user needs:

Perhaps there’s a compelling reason to keep your site’s desktop and mobile experiences separate, or perhaps your content would be better served by a responsive approach. Only you and your users know for certain. (p. 108)

**Mobile app.** A mobile application, or app, runs natively on a mobile device, meaning it is downloaded and installed to a device as opposed to being accessed through
a mobile web browser. A mobile application may be the best solution for a website if, as Luke Wroblewski (2011) explains, “your mobile product or business requires deeper hardware access, background processes, app or in-app sales, or more integrated placement on mobile devices” (p. 15). Generally, if a university’s goal is to offer a very specific mobile service (such as the ability to track shuttle buses on campus), then a mobile application is often the most appropriate method of delivery.

A major drawback to utilizing apps as a mobile strategy is that it can be costly, especially if it needs to be provided to a wide range of audiences, as that requires multiple versions of the app to be developed to account for the variety of operating systems for mobile devices. If there are multiple versions of a mobile app, this also increases the amount of time and personnel required for maintenance. Mobile apps may be too much work for a smaller team to handle since updates can be time consuming, whereas separate mobile websites and responsive web design generally involve “the same steps required to update your traditional website” (Klein, 2012, Updates and Maintenance section, para. 1).

Overall, mobile apps may not be a viable substitute for a mobile website or a responsive website. University mobile trends reflect this sentiment, with many universities “shifting their attention from stand-alone applications” to mobile websites (Keller, 2011, para. 2). More often than not, providing mobile applications “doesn’t mean you don’t need a mobile web solution, too” (Wroblewski, 2011, p. 15). Mobile applications are generally best utilized in combination with other mobile strategies in order to enhance the mobile experience instead of serving as the sole mobile experience (See Figure 1).
**Mobile website.** A mobile website is a separate entity of the desktop version of a website. In most cases, a mobile website will be created within a subdirectory of a website, such as m.university-name.edu. Once the separate mobile site is created, the main version of the website must implement some form of redirection to send users accessing the website on mobile devices to the mobile site (*See Figure 2*). This may be done as simply as adding a link to the mobile site on the main site, or by using more advanced techniques to automatically detect the type of device being used and redirect the user accordingly, also referred to as device or browser detection.

The major benefit of this approach is that it allows developers to create an adapted version of the desktop website that targets the specific needs of mobile users, thus giving them “a vastly better user experience” (Nielsen, 2012, Why Full Sites Don’t Work for Mobile Use section, para. 5). Certain features and content are usually eliminated from the mobile version of a website (*See Figure 2*) in order to help mobile users reach their goals more quickly and efficiently, and then a link is generally provided “to the full site wherever features or content are missing, so users have access to
everything when and if they need it” (Nielsen, 2012, Why Full Sites Don’t Work for Mobile Use section, para. 2). Therefore, a separate mobile website may make more sense than responsive web design if a university’s mobile site will need to significantly alter the content and features as compared to the main website.

The elimination of content and features on separate mobile websites can also be interpreted as the downfall of this approach. Serving content separate than that of the main desktop version of a website can cause inconsistencies in content strategy, and can often require more resources to maintain. As Ethan Marcotte (2011) states, “fragmenting our content across different ‘device-optimized’ experiences is a losing proposition, or at least an unsustainable one” (p. 6).

![Figure 2: Iams.com redirects users visiting on a mobile device to their mobile website at m.iams.com (shown right). The mobile site provides a stripped-down version of the desktop website.](image)

**Responsive web design (RWD).** Responsive web design (RWD) is a web design method that aims to create web sites that are essentially device independent, in that they can adapt to any screen size. Since responsive web design is a relatively new
concept, its viability as a mobile web solution has been debated. However, as it has become more widespread, its benefits have become more apparent and it is now an accepted mobile web strategy.

Before the rise in popularity of responsive web design, once the decision to develop a mobile presence was made, the most common choices were to either create a mobile app or develop a mobile website separate of the main website. RWD offers an alternative to other mobile options, provided that it meets the needs of both the website and its target audience. One of the major strengths of responsive web design is that it ensures that a website will display correctly no matter the type of screen on which it is being viewed. Though RWD is primarily a mobile web strategy, it also benefits a website’s desktop users, as it accounts for a variety of screen resolutions. Furthermore, RWD is cost effective, since it generally requires less development than creating an app or a separate mobile site.

Responsive web design has its downfalls as well. In some cases, RWD may be more difficult to plan for than separate mobiles websites since it requires determining how every page of a website will be scaled down to smaller screens. If a website utilizes a large amount of page templates, this may become a very time consuming task. Furthermore, if a university needs to implement a mobile strategy without changing the structure of the existing website, it may be easier to create a separate mobile website instead of making the existing website responsive, since not all websites are built in a way that allows for mobile adaptation. If a website relies on advanced functionality using technologies that are not supported by all mobile devices, such as Flash or JavaScript, users may be “unable to access important content” (Chapman, 2010, Don’t Rely on Flash or JavaScript section, para. 1). Loading time can also become a downfall of
RWD if a website is image-heavy or contains pages with large amounts of content. If not addressed properly, this can result in a website that is slower to load on mobile devices.

**Purpose Statement**

This study aimed to discover the status of responsive web design and other mobile strategies at Ohio state-funded universities and to explore the viability of using responsive web design to serve web content to mobile users on university websites.

**Significance of the Study**

Since responsive web design is such a new technique, there is a significant lack of information and research regarding this approach within a university setting. Furthermore, while some university websites have begun to utilize responsive web design to serve content to mobile users, very few universities in Ohio have thus far implemented this technique.

**Objectives of the Study**

This study aimed to identify the following:

- Whether or not Ohio universities are currently implementing responsive web design or planning to do so in the future.
- The pros and cons of implementing responsive web design at Ohio universities.
- What strategies Ohio universities are currently utilizing to serve web content to mobile users in addition to or in place of responsive web design.
Definition of Terms

Mobile web: Refers to the use of mobile devices, such as smartphones or tablets, to access the Internet remotely.

Responsive web design (RWD): A mobile strategy that utilizes a combination of techniques to create websites that can adjust to any screen size. It requires “a flexible, grid-based layout, flexible images and media, and media queries” (Marcotte, 2011, p. 9). Flexible grids create dynamic websites by defining the size of elements on a web page using percentages, as opposed to using fixed width measurements such as pixels. So, when a website is resized, the width of the elements will adjust accordingly. In addition, media queries are then used to set "breakpoints" that determine at which size(s) a website will alter its structure. For example, a website may utilize a three column layout when viewed in a browser on a desktop computer, but when viewed on a mobile phone, it instead adapts to a one-column layout in order to fit the content onto the smaller screen (See Figure 3).

Figure 3: CakePHP.org is a responsive web site. The image on the right shows how the site appears when the browser is resized or when viewed on a mobile device.
**CSS:** Cascading Style Sheet; controls the presentational aspects of elements on a web page, such as layout or typography.

**Media queries:** A CSS technique in which a set of styles is only applied when specific device conditions are met, such as media type, screen width, or resolution.

**Breakpoints:** Used in conjunction with responsive web design; the points at which a web page must be adjusted in order to fit to a certain screen width (See Figure 4).

**Figure 4:** SmashingMagazine.com is a responsive website with breakpoints that help to display it properly on desktop computers (top), tablets (bottom left), and smartphones (bottom right). The circled areas indicate areas where content has significantly adapted.
CHAPTER II: REVIEW OF LITERATURE

Overview

Examining the state of mobile strategy within universities first requires an understanding of the role of a university website. Also, an overview of both the “mobile first” viewpoint and content strategy helps to shed light on the significance of mobile strategy, including how it goes beyond mobile devices. Furthermore, the arguments both for and against responsive web design must be thoroughly understood in order to realize its benefits and limitations as a mobile web strategy.

University Websites

One of a university website’s primary goals is to recruit new students, and it is a key marketing tool in this process. However, recruitment is not the only role that a university website must fulfill; it must also address the needs of other groups, such as current students, faculty, staff, and alumni (Joly, 2012; SystemsAlliance, 2011). This puts university websites in a unique situation to provide content to various audiences simultaneously while still supporting the main goal of student recruitment.

In a study conducted by the Social Issues Research Centre (2009), potential students were identified as one of the “most important audiences” for university websites. Cooper and Burns (2007) concluded that a website can be a valuable recruitment tool if it includes “design, navigation, and architecture that meets prospective students’ needs” (p. 203). Relatedly, Tucciarone (2009) revealed that prospective students use a university’s website as the primary source of information when conducting a college search. However, a university’s website is not only providing information to perspective students, but also influencing their perceptions of the
university overall. For example, in the Noel-Levitz study (2012), it is revealed that “more than 50 percent of students said the Web played a significant role in their decision to apply to a school” (p. 1).

Since prospective students use a university’s website as one of the primary tools for information, and “half of students report browsing college Web sites on mobile devices,” it is imperative for new student enrollment that a university’s website is displayed effectively and accurately on the mobile web. However, many universities still have not made this leap, with “fewer than 40 percent of four-year campuses and just 7 percent of two-year schools” having implemented mobile optimization (Noel-Levitz, 2012, p. 19).

**Mobile First & the Future-friendly Web**

Mobile first is the idea that websites should be designed by taking mobile devices into consideration from the beginning of the development process. Luke Wroblewski (2011), who coined the term, explains:

… things have changed so dramatically over the past few years that starting with the desktop may be an increasingly backward way of thinking about a web product. Designing for mobile first now can not only open up new opportunities for growth, it can lead to a better overall user experience for a website or application. (p. 1)

A mobile first approach to the web requires a re-assessment of areas like the content, navigation, or images of a website. If such features are created with mobile use in mind, the most important parts of a website are made priority. This provides the basis for a more efficient web experience, which is beneficial to both mobile and desktop users.
Mobile first is just a small part of the shift towards a “future-friendly” web, which is now a common philosophy among top web designers and developers in the web industry (Future Friendly, n.d.). The concept of a future-friendly web revolves around the notion that the web is changing very rapidly, with the constant introduction of new devices. Therefore, in order to be better prepared for the unpredictability of the future, websites must implement “meaningful content and adaptive experiences” (Frost, March 13, 2012, The future is ours to make... friendly section, para. 4).

**Mobile design.** The mobile-first mindset can help address many of the major design issues that arise when adapting a website for mobile use. Mobile design requires web developers to “look at site design in a new way, one that is decidedly more restrictive than design for standard browsers” (Chapman, 2010, para. 2). When a desktop site that is not optimized for mobile is viewed on a mobile device, the areas that need reformatted become more apparent. Navigation, content, and images are some of the most common elements that require special consideration for mobile devices.

**Navigation.** Navigation must typically be restructured when adapted for mobile use due the nature of navigation on mobile devices. Unlike desktop computers, mobile devices require “appropriately sized touch targets” for users to select, since on many devices users are navigating with their fingers (Wroblewski, 2012, p. 117). Due to this difference, functionality such as drop down menus that display when hovering over a menu must be reconfigured for mobile devices. To overcome this obstacle, a website may utilize a number of techniques to alter navigation. Some websites choose to include the navigation at the bottom of the page so that it doesn’t take up the initial screen space, while others move navigation into a single drop down menu. Another technique is to initially hide the navigation and then give users the option to access it through a
button or some other type of link. However, regardless of the approach, “mobile web navigation must strike a balance between quick access to a site’s information and unobtrusiveness” (Frost, Feb. 2012, para. 1).

**Content.** No matter what mobile strategy a university website implements, it needs to address the issue of content early on in the process. Mobile websites have significantly less space than desktop websites, thus making it necessary to simplify and “reengineer our copy to ensure that it’s useful” on mobile devices (Dawson, 2010, Text Content section, para. 2). By doing so, the amount of scrolling can be greatly reduced, resulting in a better user experience. Content can be simplified by utilizing a single column layout, hiding unnecessary information on the mobile version of a website, or “breaking up text over multiple pages” (Chapman, 2010, Simplify! section, para. 1).

In order to avoid such content issues when creating or adapting content for use on the mobile web, universities must also develop and implement an effective content strategy. Halvorson (2012) defined content strategy as the plan for the creation, delivery, and governance of content. With a content strategy in place, universities can better address issues such as the process for content creation, who will manage the content, and how it will be delivered. Content strategy can help universities to eliminate unnecessary content, communicate the university’s message more clearly, and meet user needs more efficiently (Kissane, 2011).

In addition to content strategy, many universities address content issues by implementing a content management system (CMS). A CMS can help universities to create content more efficiently, and can make it easier to manage content on a large scale. Some CMS platforms have implemented features that make it easier to adapt and re-use content on the mobile web as well, whether utilizing responsive web design or a
separate mobile website (Gapinski & Runyon, 2012). This can be beneficial to universities by allowing content to be created and updated in one place for both the main website and the mobile version.

**Images.** Images affect the loading time of a website, and since mobile devices generally take longer to load a website than a desktop computer, images should be used sparingly on the mobile web. Essentially, “eliminating graphic elements from your site is usually an effective way to optimize its display on a mobile device” (Chapman, 2010, Simplify! section, para. 1). One solution to this issue is to create smaller versions of the images on a website that can be served only to mobile devices using device-detection methods. Device detection allows a website “to deliver a . . . contained experience” based on the “requirements of the user and the device they are using” (Cremin & Passani, 2012, Catering to Devices and Business Requirements section, para. 5). Another solution is to replace static images using techniques that are infinitely scalable, such as CSS3 styles, Scalable Vector Graphics (SVG), and icon fonts (Frost, March 2, 2012).

**Responsive Web Design (RWD) as a Mobile Strategy**

One of the most debated topics related to RWD as a mobile strategy is the issue of context. There are two main views surrounding the issue of mobile context; one supports utilizing a separate mobile website, and the other supports responsive web design techniques. The argument for separate mobile websites supports the idea that mobile web users should always be served separate mobile websites that focus on delivering the content deemed necessary in a mobile context. The mobile version of a website should “cut features” and “cut content” in order to optimize the mobile experience (Nielsen, 2012). However, those on the other side of the argument believe that mobile context can’t be determined accurately enough to limit features and content
for mobile users. As Josh Clark (2012) explained, just because someone is accessing the web from a mobile device doesn’t mean that he or she is “interested in less content or want[s] to do less” (Long Sessions section, para. 2). Google (Feb. 2012) recommended that mobile websites should “convert as much of the functionality of your desktop site to mobile as you can” since “people now use multiple screens throughout the day” (p. 5). Furthermore, Google (Aug. 2012) stated in another study that “context drives device choice,” and a user’s context is based on:

- Amount of time
- Goals
- Location
- Attitude/state of mind

With such a variety of characteristics determining whether or not a user will be accessing a website from a mobile device, it makes it difficult to define the exact needs of mobile users. Therefore, responsive web design is often the better option in that regard, since it allows a website to provide content in a way that is optimized for all devices and takes into account a variety of contexts.

The fact that responsive web design delivers the same content across all devices can be advantageous, because this encourages the re-evaluation of web content; it becomes necessary to simplify a website’s content in order to be more adaptable to smaller screens. This is a major benefit for universities, since students value the content on a university’s website more than other features. The 2012 E-Expectations Report from Noel-Levitz showed that the majority of students surveyed expressed that content and simplicity are the most important parts of a university website.
Another advantage of responsive web design is that it is more beneficial to search engine optimization (SEO) than the alternative mobile strategies. Google, one of the most popular search engines in the US, has recommended RWD as the preferred way to deliver content to mobile users from a search engine perspective. Although still supporting separate mobile sites, Google Developers (2012) claimed that RWD has the advantage because:

Using a single URL for a piece of content makes it easier for your users to interact with, share, and link to your content, and a single URL for the content helps Google's algorithms assign the indexing properties for the content. No redirection is needed for users to get to the device-optimized view, which reduces loading time . . . . For responsive web design pages, any Googlebot user agents need to crawl your pages once . . . to retrieve your content. This improvement in crawling efficiency can indirectly help Google index more of the site's contents and keep it appropriately fresh. (Why Responsive Design section, para. 1)

This is crucial for university recruitment, since better SEO means that prospective students can find information about a university more easily and efficiently when utilizing search engines like Google.

**Universities and responsive web design.** Presently, most universities have chosen to develop mobile strategies based around mobile apps or separate mobile websites, and only a handful of universities have made the push towards utilizing responsive web design to serve content to mobile users. Currently, there are only 24 documented university home pages that utilize RWD out of over 4,500 degree-granting universities worldwide (Gapinski & Runyon, 2012). According to Doug Gapinski (2012),
a web design professional specializing in higher education, the most common barriers for universities when it comes to responsive web design are:

- Lack of resources and budget
- Current site is too large
- Slow or dysfunctional decision-making
- Stuck in licensing agreements for other products or services

These are all issues that must be overcome if a university hopes to implement responsive web design as a mobile strategy. However, despite these issues, RWD has “been slowly—yet steadily—gaining supporters among university web designers” (Joly, 2012, Roots and Growth of RWD section, para. 4).
CHAPTER III: METHODOLOGY

Restatement of the Problem

This study aimed to discover the status of responsive web design and other mobile strategies at Ohio state-funded universities and explored the viability of using responsive web design to serve web content to mobile users on university websites.

Research Design

This was a descriptive study, and it employed qualitative research methods in order to meet its objectives. Qualitative research “is a means for exploring and understanding” a research problem, and supports “an inductive style . . . and the importance of rendering the complexity of a situation” (Creswell, 2009, p. 4). Interviews were used to gather data from the selected participants.

Participant Demographics

This study focused on Ohio state-funded universities (APPENDIX A), and a sample of web industry professionals who work directly with the websites of those universities were selected to participate. The participants selected were chosen due to the fact that these particular university employees should have in-depth knowledge of the mobile strategies currently being implemented at his or her university, as well as some knowledge of the web and mobile industry as a whole. The potential participants were chosen by conducting a search on each university’s website and selecting a university employee with the job title that best fit the participant criteria.

Data Collection

This study utilized interviews as the primary method of data collection. This method was chosen due to its exploratory nature, which is an appropriate approach for
uncovering the varying experiences of the participants. The interviews consisted of mostly open-ended questions and focused on gathering qualitative data.

The interview questions were separated into three sections (APPENDIX B). The first section of questions gathered background information about the role and responsibilities of the participant in relation to the university’s website, as well as background information about the website itself. The second set of questions focused specifically on responsive web design, with questions regarding whether or not responsive web design is currently being implemented or if it will be implemented in the future. The third set of questions explored the alternative mobile strategies employed by the university, specifically addressing separate mobile websites and mobile apps.

**Communication to Participants**

The researcher contacted participants by email and provided them with information regarding their participation in the study (APPENDIX C). After this initial email was sent, five of the contacts responded and agreed to participate in the study. A second email was sent to the intended participants who did not initially respond, again explaining what the study entailed and inviting the recipient to participate (APPENDIX D). After this secondary email was sent, two more contacts agreed to participate in the study. For those that still did not respond, an email was sent to a secondary contact in the event that the initial contact was not the appropriate recipient (APPENDIX E). After this last round of emails, one additional individual agreed to participate. The final participant was obtained through personal recommendation at the researcher’s university.

Once a contact agreed to participate in the study, the researcher scheduled a time for the participant to be interviewed. The researcher conducted the interviews over the
phone and the majority of the interviews lasted between 20-45 minutes. The interviews were recorded on two separate computers to ensure that there would be a back-up recording in the event of technical difficulties.

**Data Analysis**

Once the interviews were complete, the researcher reviewed and analyzed the recordings. The researcher then drew conclusions from the participant responses as a whole, including common themes and topics.

**Protection of Human Subjects**

Participant consent information and interview questions were initially submitted to Bowling Green State University’s Human Subject Research Board (HSRB) for review before conducting the study. The HSRB determined that this study did not fall under the guidelines of human subject research, thereby bypassing the review process. The HSRB letter can be found in APPENDIX F.

**Timeline**

A study timeline was created detailing the major deadlines for the completion of the study, as well as the schedule of interviews, as presented in Table 1.
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*Table 1: Timeline of study*
CHAPTER IV: FINDINGS AND ANALYSIS

Summary

This chapter focuses on the data collected from the interviews and the analysis of that data. The overall response rate of this study and the findings regarding responsive web design and mobile strategy at Ohio state-funded universities, including the specific experiences of the participants, are also provided.

Findings

Response rate. There are a total of 13 Ohio state-funded universities, and a contact from each university was invited to participate in this study. Of those 13 universities, nine interviews were conducted, resulting in a 69% response rate. The universities that participated are as follows:

- University of Akron
- Bowling Green State University
- University of Cincinnati
- Kent State University
- Ohio State University
- Ohio University
- University of Toledo
- Wright State University
- Youngstown State University
In order to protect any sensitive information discussed in the interviews for this study, the interview participants were identified as participants 1 – 9, assigned in random order.

**Participant background.** In order to better understand the unique situations of each participant and their university, the participants were asked background questions regarding their responsibilities in relation to the university’s website. Each participant is in some way directly responsible for the development and maintenance of their university’s main website, with the majority of participants located within the main marketing or communications department of the university. Only one of the nine participants stated that a third-party vendor was primarily responsible for the development of the main university website. Furthermore, each participant works within a department that shares at least minimal responsibility with other departments, with many relying on the university’s equivalent of an information technology department for tasks such as server hosting, privacy, and advanced development expertise.

**Website background.** Each participant was asked about the current design of their university’s website, including how long it has been active and if a re-design is being planned in the near future. The current designs of the university websites have been active between 1-5 years; three of the universities are currently in the process of a full re-design, while others have launched a new design within the last 2 years. Some participants expressed unique opinions regarding the concept of re-design. Four of the participants stated that instead of a full site re-design, they are instead making changes and adding new features as needed. One participant claimed that a full re-design is not desirable because people are often averse to learning something new, while other
participants stressed that improving usability is more of a concern than implementing a new website design. Participant 2 explained, “we’re moving away from [the concept of a re-design] . . . . It’s a lot more about tweaking and getting the usability correct. Re-design is no longer an event; it’s something that we ease into” (personal communication, 2012).

Each university has implemented a content management system (CMS) to aid in the creation and management of website content. The majority of the universities have been using their current CMS for 3-6 years, while one university has utilized its CMS for over 10 years, and another university has implemented its CMS within the last 2 years. Two of the universities are currently in the process of searching for a CMS that will better fit the needs of the university and its users, while the others expressed overall satisfaction with CMS performance.

The participants were asked whether or not they perceive their university’s website as meeting the goals and expectations of the university. The responses were split fairly evenly, with five participants stating that the university’s website is meeting goals, and four participants stating that the university’s website is not meeting goals. Participants that said the university’s website is not meeting its goals expressed that there are aspects of the website that need significant improvement, and that those areas are currently being addressed.

**Responsive web design.** Participants were asked if they are familiar with the concept of responsive web design, and whether or not they currently implement responsive design techniques on their university’s website. Participants 2, 3, 5, 6, and 9 have already implemented responsive design in some form, while participants 1, 4, and 8 are planning to implement responsive design in the future and are in the early stages
of either planning or development. Only one university has no current plans to implement responsive design on its website, although the participant expressed interest in considering responsive design techniques in the future.

Both the participants that have already started implementing responsive design techniques and those that are planning to do so in the future were asked about the reasoning behind the decision to move toward a responsive website. For participant 9’s university, the move towards RWD was based on the availability of resources; RWD eliminates the need for additional resources to maintain a separate mobile version of the website. Participant 2 stated that RWD is preferable because it will make web content available on mobile devices while allowing the university’s CMS users to update web content in the same way as before. Other participants expressed that the decision was made based on existing research of the importance of the mobile web and responsive web design. Participants 2 and 3 specifically became interested in RWD through conferences that presented discussions of the topic. Participant 6 concluded:

I think it’s kind of becoming a best practice. I just think it’s . . . taking the pulse of what other universities and what other commercial sites are doing . . . . If you look at analytics you can see the trend that mobile devices are becoming an important population . . . . We want to help make their experiences as nice as possible, and [responsive web design] is a way to do that. (personal communication, 2013)

Overall, the majority of participants determined that responsive web design seems like a logical step towards making web content available to mobile users.

The universities that have already started to implement responsive web design are each at a different point in the process. Participants 5 and 6 are using a similar
approach by implementing responsive web design on any new sections that are created on their university’s website. Both participants plan to eventually carry over responsive design to the rest of the website as well. As participant 6 explains, “that’s pretty typical that we’ll try some techniques on a smaller . . . site and see what works, and then we’ll take what works and apply that to our higher profiles sites” (personal communication, 2013). Similarly, participant 9 explained that there has been some responsive web design already implemented on new areas of the university’s website by third-parties, but the remainder of the site will be switched over to be responsive as part of the upcoming re-design of the website.

Participants 2 and 3 have implemented responsive design with a slightly different approach, focusing on current pages of their university’s website as well, as opposed to only new pages. However, these participants have started at opposite ends; participant 2’s team has started RWD implementation on specific sub-sections of the website first, whereas participant 3’s team has started RWD implementation on the top-level pages first. Participant 2 explains that they are “specifically starting away from the home page” and starting with one of the college sections for testing purposes (personal communication, 2013). Participant 3 stated that although they started with top-level pages, as they have implemented RWD on sub-sections of the website, the original implementation has been improved:

As we’re working on the college sites . . . we already entirely rebuilt our theme . . . and then eventually we want to roll it back on the top-level sites . . . . At some point we need to revisit [the home page] and [carry over] what we’ve learned on theming some of the other sites. (personal communication, 2013)
These participants that have already started implementing RWD were asked if there have been any significant barriers to the implementation process thus far. Participant 2 stated that time, priorities, and staff have been the biggest barriers. Participant 9 also sees resources as a major barrier, as well as miscommunication with administration regarding the fact that RWD is a “different skillset” with a “different set of needs” (personal communication, 2013). Both participants 3 and 5 indicated that testing has been the biggest barrier. As participant 5 explained, “trouble-shooting” and “dealing with the usual browser incompatibility issues” have been the biggest roadblocks to implementing responsive design techniques: “You’re always testing on so many browsers [and] now it’s so many browsers with different sizes . . . there’s still not a great way to test it all” (personal communication, 2012). Participant 6 stated that the biggest barrier for them has been simply figuring out the best techniques for implementation, especially when determining the best way to present content in a mobile context.

The participants that specified they are only in the planning stages of the responsive design process were asked about their plans for implementation. Participant 1 hopes to start with the home page first, and then move on to the sub-sections of the website. Participant 8 is taking a slightly different approach by planning to implement RWD templates on the entire website at once as part of the upcoming re-design of the website. Similarly, participant 9 also hopes to incorporate RWD as a main feature in the university’s upcoming website re-design.

The participants with future plans to implement responsive web design were asked what barriers to the responsive design process they might anticipate. Participant 1 predicts that the biggest challenge will be getting web elements to be presented in the desired way when utilizing new RWD techniques. Participant 8 indicated that the
biggest barrier so far has simply been finding the right people to do the job; they are currently planning to utilize a third-party company to complete a large portion of the design and development work.

**Alternative mobile strategies.** Participants were asked about what mobile strategies their university has implemented in addition to or in place of responsive web design. Out of the nine participants, seven affirmed that their university has a separate mobile website, and eight indicated that their university is either currently offering at least one mobile application or working on an upcoming mobile application.

**Mobile websites.** The universities of participants 1, 2, 4, 5, 6, 7, and 8 all have implemented a mobile website. However, the participants have seen a varying level of success with mobile websites. Participant 1 stated that the mobile website was launched in 2006 and has been successfully meeting the majority of user needs, although people still tend to want more information than the mobile website provides. Participant 4 also has implemented a mobile website, but stated that it is only a “first effort” that has issues that need to be resolved, specifically a re-architecture of the navigation (personal communication, 2012). Participant 5 explained that while they do have a mobile website, it is “very scaled back” and has not been a main priority (personal communication, 2013). Participant 6 stated that the university does have a mobile website, but they aren’t actively pushing users towards the site since it hasn’t been kept up to date; instead, they are focusing on pushing users towards the university’s mobile application in order to provide a better mobile experience. Participant 7 just recently launched their university’s mobile website, and believes that it is currently meeting user needs.
For some participants, the implementation of responsive web design has made an impact on the use of a separate mobile website. Participant 2 has implemented a mobile website, but explained that it is not being frequently used:

We duplicated what was in the mobile app on that site, and that’s been the driving force behind it. It was definitely stopgap; we started working on it before we got fully invested in doing responsive. If I get my way we won’t maintain it much longer . . . it’s something else to worry about. (personal communication, 2012)

Participant 8 also indicated that once responsive web design is implemented, their university’s mobile website will be eliminated. Participant 3 voiced a similar sentiment in that the reason their university has not implemented a mobile website is because they are instead focusing on responsive web design as the primary method of delivering web content to mobile users.

**Mobile applications.** The universities of participants 2, 4, 6, 7, 8, and 9 currently offer one or more mobile applications. Participants 1 and 5 are currently working on upcoming mobile apps. The universities of participants 2, 4, and 6 offer a primary, “official” mobile app for the university, in addition to various supplementary mobile apps. The mobile apps currently being developed by participants 1 and 5 fall into this category as well. The universities of participants 7, 8, and 9 offer mobile apps based around specific services as opposed to offering one primary mobile application. The majority of the “official” university mobile apps include services such as campus maps, student grades, bus schedules, and so on.
Summary

The purpose of this chapter was to provide the data collected from the interviews, including the overall response rate. The participants provided information regarding website background, responsive web design, and alternative mobile strategies. Overall, the findings indicate that Ohio state-funded universities are moving towards responsive web design, but are also still utilizing mobile websites and mobile applications.
CHAPTER V: CONCLUSIONS AND RECOMMENDATIONS

Summary

This chapter will provide a summary of the findings in this study and will offer conclusions drawn from the interview data presented in the previous chapter. Also included in this chapter are considerations and recommendations for future research regarding mobile strategy and responsive web design in higher education.

Conclusions

The problem of this study was to discover the status of responsive web design and other mobile strategies at Ohio state-funded universities and to explore the viability of using responsive web design to serve web content to mobile users on university websites. The following conclusions have been drawn based on the main objectives of the study and the data collected from the interviews.

Objective 1: Determine whether or not Ohio universities are implementing or planning to implement responsive web design

Based on participant response, it can be concluded that the majority of Ohio state-funded universities are indeed making a move towards responsive web design. There was a total of nine study participants out of a possible 13, and eight of those participants are or will be implementing RWD on their university’s website.

While research shows that responsive web design has become a viable mobile strategy option, there has been a significant lack of research regarding responsive web design in higher education. Based on this study, it appears that universities recognize the benefits of RWD and have accepted it as a logical step towards more effectively delivering web content to mobile users. The majority of the participants indicated that
they are still in the early stages of implementing RWD, although many have already made significant progress in that regard. However, none of the participant universities have yet to fully implement RWD across their entire website.

**Objective 2: Determine the pros and cons of implementing responsive web design at Ohio universities**

The participants indicated various benefits and barriers to implementing responsive web design. Many participants expressed that the major benefit of RWD is its ability to make web content available to mobile users without having to create or update a separate mobile website or mobile application. The major drawback to implementing RWD appears to be a lack of resources, as many participants expressed that staff, time, or budget is an issue. Furthermore, several participants stated that testing and troubleshooting are also downfalls of implementing responsive web design.

**Objective 3: Determine what strategies Ohio universities are currently utilizing to serve web content to mobile users in addition to or in place of responsive web design**

Participants were asked what additional mobile strategies their university has in place in order to determine if mobile strategies aside from responsive web design are currently being utilized. Out of the nine participants interviewed, seven indicated that their university has a mobile website, although not all of those mobile websites are being actively updated or promoted. The majority of participants indicated that they do not believe their mobile website is adequately meeting user needs.

In addition to mobile websites, eight of the participant universities are also using mobile applications. However, for some of those universities, there isn’t a primary
university mobile app, but instead various mobile apps created by third parties or various university departments.

**Discussion**

In analyzing the background data of the study participants, a general participant profile became apparent. Based on this sample of Ohio state-funded universities, it appears that these universities are making significant improvements to the design and development of their websites. Each university included in this study is currently utilizing a CMS, which implies that content is an important focus for university websites. The majority of the university websites discussed have a design that is no older than 3 years, and at least half are either working on new designs or steadily making improvements. Many participants expressed the need to improve the usability and user experience of their university’s website. It appears that the idea of a traditional website re-design is changing, with some participants indicating a preference to make smaller changes to usability more frequently instead of changing the whole website every so many years. Overall, this shows a distinct desire to improve the current state of university websites and to provide a better experience to users.

In regards to responsive web design, the majority of the participant universities are only in the early stages of implementing responsive web design. This coincides with the research on RWD in higher education, which suggests that very few university websites have implemented RWD. Since these universities are so early in the RWD process, there is much that remains to be seen in regard to its success. However, the fact that these universities are taking the chance to move towards such a new technique indicates a larger push towards a mobile first mindset. In fact, some participants
specifically addressed the mobile first philosophy, using it to support the decision to more strongly focus on the mobile web.

Additionally, it seems the participants recognize that responsive web design is not a final solution for mobile strategy. Many participants indicated that the mobile applications they currently have or are developing are meant to be supplementary to any mobile web solution. Responses indicate that many of the mobile applications being developed are intended to provide services that would not be as easily provided on a mobile website. The majority of the participants indicated plans to continue focusing on mobile apps and developing even more interactive features to provide to mobile users. Overall, this shows promise for the future of mobile apps in higher education.

Unlike mobile apps, the future of separate mobile websites seems less promising. Surprisingly, the majority of participant universities that have mobile websites do not appear to be utilizing them to their full potential. Several participants specifically stated that implementing responsive web design will eliminate their mobile website altogether, while others expressed that their mobile websites have not been a major priority or are simply outdated. This reflects the research regarding the argument as to whether responsive web design or a separate mobile website is the better choice of mobile strategy. At least for the participant universities, it appears that responsive web design is currently the prominent choice.

**Recommendations for Future Studies**

This study focused on mobile strategy only at Ohio state-funded universities; therefore, the researcher recommends that future research focus on a larger sample of universities in order to provide a more accurate assessment of mobile strategy outside of Ohio state-funded universities. Furthermore, since this study focused on general
questions regarding the use of responsive web design and alternative mobile strategies, the researcher recommends a more in-depth look at some of the issues raised in this study, as follows.

1. **Technical complications that arise when implementing responsive web design.** The interviews conducted in this study focused only on the general aspects of RWD. However, since RWD is still a relatively new technique, there are various technical aspects and complications specific to RWD that need to be addressed during the implementation phase. It is recommended that more research be conducted as to what types of solutions universities are utilizing in response to these technical issues.

2. **The delivery and management of content when utilizing responsive web design.** Since RWD allows a website to utilize the same web content whether on a desktop computer or a mobile device, the issue of content delivery becomes more crucial. While a large amount of content may be effective on the desktop version of a website, when viewed on a smaller device, this can cause issues such as excessive scrolling or poor content arrangement. Since many university sites have a vast amount of content, this becomes a significant issue when implementing RWD. Also, since most universities are utilizing content management systems, this may also affect RWD implementation depending on the tools and processes that the CMS provides.

3. **The long-term success of responsive web design.** The majority of universities that participated in this study that are currently utilizing RWD are only in the early stages of implementation. Therefore, it remains to be seen how RWD will perform over a longer time period and whether or not it will adequately
meet the needs of mobile web users. According to participant responses, it appears that very little user testing has been conducted in order to assess the needs of mobile users. As the number of people accessing university websites on mobile devices continues to grow, these universities will need to explore this area of research further in order to help determine the success of RWD once it has been fully implemented.

4. **How a complete implementation of responsive web design affects the use of mobile websites and mobile applications.** Again, the universities discussed in this study are still in the early stages of RWD implementation, and how that implementation will affect alternative mobile strategies, such as mobile websites and mobile applications, in the long term is yet to be seen. The results of this study suggest that, at least for the participant universities, mobile websites are already being overtaken by RWD as the preferred mobile web strategy. Future research is necessary in order to determine whether or not RWD will continue to affect the use of alternative mobile strategies.

Overall, the majority of the universities evaluated in this study are only just beginning to utilize responsive web design, and many have only just recently implemented mobile websites or mobile apps. However, as mobile usage continues to grow, mobile strategy will become even more crucial to universities. Therefore, the issues raised in this study will become increasingly important, and further research will be beneficial to universities in effectively addressing the needs of mobile users.
REFERENCES


APPENDIX A: Intended Participants

State funded universities in Ohio

1. University of Akron
2. Bowling Green State University
3. Central State University
4. University of Cincinnati
5. Cleveland State University
6. Kent State University
7. Miami University
8. Ohio State University
9. Ohio University
10. Shawnee State University
11. University of Toledo
12. Wright State University
13. Youngstown State University
APPENDIX B: Interview Script

Background information

1. What task(s) do you perform in relation to your university’s website?

2. Is your department solely responsible for the development of your university’s website, or do you share those responsibilities with other departments?
   a. If yes, then which departments?

3. How long has the current design of your university’s website been active?

4. Are you planning a re-design any time soon?

5. Does your website utilize a CMS?
   a. If so, which CMS?
   b. How long have you had that CMS?
   c. Are you planning on keeping it, or getting a new CMS any time soon?

6. Would you say that your website is meeting any goals or expectations set?
   a. If no, why not?

Responsive Web Design

1. Are you familiar with the concept of responsive web design? (Interviewer’s note: if yes, ask question 2 before moving on. If not, skip ahead to mobile strategies section.)

2. Are you currently implementing any responsive web design on your university’s website?
   
   If yes:
   a. Are you implementing it on your main website, or elsewhere?
   b. Where are you currently at in this process?
   c. What influenced your decision to implement RWD?
   d. How much and what type of research was involved in this decision?
   e. Have there been any drawbacks to this approach so far?

   If no:
a. Have you at any point considered this as an option?
   a. If yes, for what reasons did you decide not to use this strategy? What barriers did you foresee?
   b. Do you think you might decide to implement responsive web design in the future instead?

**Alternative mobile strategies**

1. Does your university currently have a mobile website?

   If yes:
   a. Why did you choose this mobile strategy?
   b. Is it serving the needs of your users and meeting expectations?
   c. What do you perceive as the major pros and cons to this approach?

   If no:
   a. Do you plan to implement a mobile website in the future?

2. Does your university currently offer any mobile apps?

   If yes:
   a. What type of mobile apps do you offer?
   b. Why did you choose this mobile strategy?
   c. Are they serving the needs of your users and meeting expectations?
   d. What do you perceive as the major pros and cons to this approach?

   If no:
   Do you plan to implement any mobile apps in the future?
Hello -

My name is Kayleigh Williams and I am a graduate student at Bowling Green State University working towards my Masters of Education in the College of Technology. I am conducting a research study for my thesis in order to explore the status of responsive web design and other mobile strategies at Ohio universities.

In order to gather this information, I am contacting Ohio university staff members that work with web and mobile strategy. Since your position falls into this category, you have been selected as a potential participant in this study. If you think you have been incorrectly identified as a possible participant, please forward this message to the appropriate person.

As a participant in this study, you will be asked to submit to a phone interview, estimated to last approximately 20-30 minutes. You will be asked questions regarding your responsibilities in relation to your university’s website, background information about the website itself, what mobile strategies your university is currently implementing, and your experience with responsive web design.

This study is entirely voluntary, and you may decline to answer any of the interview questions, as well as discontinue participation at any time. You may be quoted in the final document, but your identity and the identity of your institution will be omitted and replaced with identifiers (such as Participant A) in order to protect your confidentiality, as well as the confidentiality of your institution. You may request a summary of the interview for review before the final document is published.

Please let me know as soon as possible if you are willing to be interviewed for this study. If you have any questions or concerns regarding this study, you may contact me at kjwilli@bgsu.edu or 419-569-5606, or my faculty advisor Dr. Paul Cesarini at pcesari@bgsu.edu or 419-372-7740.

Thank you for your time and consideration!

Kayleigh Williams
kjwilli@bgsu.edu
419-569-5606
Hello -

I had previously emailed regarding the opportunity to participate in an interview for my thesis research study regarding mobile strategy, and I just wanted to follow-up on that since I hadn't received a response. I'm currently still in the process of conducting interviews for the study, so I was wondering if you might yet be interested.

If you would be willing to participate in a phone interview for this study, please let me know at your earliest convenience. If you believe that someone else at your university would be the better contact person regarding this, please let me know that as well, or feel free to forward along this information.

The study details from my previous email are included below. Thank you for your time!

Kayleigh Williams
419-569-5606
kjwilli@bgsu.edu
APPENDIX E: Third Email

Hello -

My name is Kayleigh Williams and I am a graduate student at Bowling Green State University. I'm currently conducting a thesis research study on mobile strategy and responsive web design at Ohio universities. I had previously emailed someone else from your university, [NAME HERE], but I didn't receive a response so I wasn't sure I was contacting the right person. I was hoping to interview someone (by phone) that can answer questions relating to your university's website and mobile strategy.

If you would be willing to participate, or could forward this information along to the appropriate party, I would greatly appreciate it. I've included the details of the study below.

Let me know if you have any questions. Thanks for your time!

Kayleigh Williams
kjwilli@bgsu.edu
419-569-5606
APPENDIX F: HSRB Letter

DATE: October 25, 2012

TO: Kayleigh Williams

FROM: Bowling Green State University Human Subjects Review Board

PROJECT TITLE: 366555-1 The state of mobile strategy and responsive web design at Ohio universities

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF NOT RESEARCH WITH HUMAN SUBJECTS

DECISION DATE: October 23, 2012

Thank you for your submission of New Project materials for this project. The Bowling Green State University Human Subjects Review Board has determined this project does not meet the definition of human subject research as defined by the federal regulations and review of this project is not under the purview of the HSRB.

Comment: This determination was made based upon the information in the HSRB application which indicates that the purpose of this research is to obtain information about web design currently being used at universities. The researchers are proposing to ask questions related to job duties, the software being used, and future website strategies. The researchers will not collect personally identifying information, so the research does not meet the federal definition of "human subject". You do not need HSRB approval and can conduct your study at this time. If, in the future, you want to modify your interview questions so that personally identifying information will be collected, please resubmit a modified HSRB application for review and approval before initiating that portion of the research.

We encourage you to continue to confirm with the HSRB whether future projects of this nature require review. We will retain a copy of this correspondence within our records.

If you have any questions, please contact the Office of Research Compliance at 419-372-7716 or hsrb@bgsu.edu. Please include your project title and reference number in all correspondence regarding this project.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Bowling Green State University Human Subjects Review Board's records.