

Are University Websites Prepared for Mobile Users?

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Abstract

According to the U.S. Census Bureau, the number of millennials also known as Generation Y (ages 18-34 in 2015, 75.4 million) exceeds the number of Baby boomers (ages 51-69, 74.9 million) in 2016, and Generation X (ages 35-50 in 2015) is projected to pass the Baby Boomers in population by 2028. Moreover, the millennial generation continues to grow as young immigrants expand its ranks [1]. One of characteristics of the millennials is that they are tech-savvy [2]. They were born and grew up with various technologies and were armed with smartphones, tablets, and other gadgets. They surf the web using their mobile devices rather than desktop computers and laptops.

Universities that utilize their websites to attract future students and to provide important information to their current students should rethink their website designs for drastically increased millennial generation who uses mobile device for 24 hours a day and 7 days a week and who also has a notion that universities providing a good looking and easy to use websites offer better and quality education.

This paper exams mobile readiness of university's websites in the United States. The performance of a page for mobile devices is measured using 1) an Alexa 1000 benchmark, which benchmarks university's website mobile ready score against the distribution of the top 1,000 Alexa sites [3], 2) an actual loading speed measured by PageSpeed Insights provided by Google Inc. [4], and finally 3) a page weight measured by the number of bytes. In addition, as show in the table 1, 38 technical components are tested to find what major components are causing a slowness of website and not optimized. This paper also suggests how to improve performance that can significantly impact a user experience.

Items	Description
Image crunch	All images should be optimized to reduce file size and the appropriate image type should be used for each image asset
DOM too large	The total number of DOM elements should be less than 700 to avoid complexity that will affect rendering and user experience
ETag support	All page assets should use appropriate Etag headers to enable client-side caching and speed up future page loads
JavaScript placement	JavaScript includes should always be included at the end of the document to avoid blocking the page loading

GZip encoding	HTTP response should be compressed using server-side configuration of GZIP or similar compression technology
CSS measurement	Absolute dimensions and positions in CSS directives should be avoided as they will not render correctly on all device types
Caching control	Dynamic and static page components should use appropriate caching controls to speed page loading
Favicon	The favicon will be downloaded automatically so should be less than 2kb in size and should have a far-future Expires header
CSS sprites	CSS image assets should be combined into sprite files to avoid expensive HTTP overhead
Internal CSS directives	External stylesheets should be used to allow the client to cache CSS separate to content
Popups	Link targets of _self, _parent or _top should be avoided as only desktop fully supports the tabbed browsing experience
Inline JavaScript	Inline JavaScript code should not be used, instead JavaScript should be collected into a single minified include file
HTML minimize	HTML markup should be minimized to reduce file size and to speed up transit time between server and browser
JavaScript minimize	JavaScript files should always be minimized to reduce transit time and help up speed page load
CSS minimize	CSS should be minimized to reduce transit time and speed up page loading as much as possible
Image specify size	Image dimensions should always be included and images should not be resampled at run-time as this will slow rendering of the page
External resources	External resource count should not exceed 20 as each additional asset loaded will directly affect page load time
Viewport meta	Viewport meta tag should exist to define device scaling
CSS import	The CSS import directive should not be used as it better to inline stylesheet data into one minified file
Cookie size	Total cookie size should not exceed 1kb, session cookies can help eliminate excessive cookie data
Redirect error	Page redirects will slow page load and directly affect user perception of the webpage speed
Duplicate resources	Duplicate CSS or JavaScript includes should be avoided as they are redundant but may affect page load time
DNL lookups	More than 6 distinct domains should not be referenced by one page as each imparts a direct speed penalty

CSS expression	CSS should not use the expression keyword as it will impact rendering speed and causing problems on certain device types
Stylesheet placement	Stylesheets should be included at top of document to avoid jittery rendering of page content
Empty image	Image tags should always be populated with file sources, or should be created at runtime using JavaScript
Table Nested	Nested HTML tables should never be used as they will not render well across all device types
Tables	HTML tables should not be used as they are unlikely to render well across all device types
Styled markup	HTML should not contain basefont, bdo, center, del, dir, font, ins, menu, s, strike or u elements
Page title	All webpages should have appropriate title tags to help guide the user to the page content and purpose
Applets	Applet tags should not be used as native web technologies can provide fuller rich experiences across device types
Image alt tag	Image tags in markup should have descriptive alt tags or they should be left empty for unimportant design elements
Frames	Documents should not contain frame, frameset or iframe as they will not render well across device types
Image resizing	Images should not be resized dynamically at run-time and should always have correct dimensions specified
Image map	Use of Image Maps is strongly discouraged as they will not render well across device types and often provide a poor touch experience
Input type	Input field types should be correctly specified, not left blank - alternatively they should be created at runtime by JavaScript
Valid markup	Document should specify a valid markup doctype and adhere to it with valid HTML
Charset	Page character encoding should be set to UTF-8 or other suitable page encoding scheme

Table 1. 38 items to be checked (source: <https://ready.mobi>)

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