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Mobile Web Adoption in Top Ranked University Libraries: A Preliminary Study

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ABSTRACT

This paper aims to study the level of adoption of mobile access to the academic libraries in the best universities in the world as well as the quality of services offered in order to ascertain if the quality of academic apps and mobile websites are at the level of the overall web impact of world-class universities. For the top 50 universities according to the Ranking Web of Universities (2014), we determined whether there is a mobile website or app for their libraries. Finally we evaluated the services offered against a list of 14 indicators. The results show that 88% of the libraries studied (44) offer mobile access via web or app, showing a high level of mobile adoption in elite universities. The form is clearly uneven: 80% (40) offers mobile web access while only 34% (17) has an app. As to the content, no library offered all 14 points evaluated, and the results are varied. Only 50% of apps meet at least half the indicators. In the case of mobile web this figure improves notably to 74.3%. We can note a high level of mobile web adoption in the world's best universities, although the quality does not reach their level of excellence.

INTRODUCTION

Using web indicators to study the impact of universities (principally through analysis of university websites) provides extremely useful information. These indicators can provide detailed measures, sensitive to geographic, linguistic and cultural factors (Thelwall, 2004). Moreover the web allows us to study the impact of a university's missions, not just those related to research (almost the sole measure in the main international rankings of universities (Aguillo, 2009). The web permits us to consider teaching (in the form of open educational resources online), knowledge transfer (in the form of patents, university-business links) and other areas complementary or subsidiary to research (Kousha & Thelwall, 2008; Thelwall & Kousha, 2008).

Further, the entities for governance, administration and services can be quantified, making the website a complex system able to reflect legal and functional activities (Orduña-Malea & Ontalba-Ruipérez, 2013). Among these entities are services responsible for the creation, diffusion and consumption of a significant amount of information, directed at students, professors and researchers. In particular we highlight academic libraries, a fundamental node to the transition to the electronic university (Lewis, 2015; Orduña-Malea & Regazzi, 2013).

Given the functions of university libraries, including development, maintenance and distribution of information-rich products (catalogues, digital collections or institutional repositories), they should be one of the principal nodes of access from universities to the network. A priori, this should particularly be the case for universities who lead the international rankings (supposedly those with the best researchers, professors, students, services and infrastructure). It would be logical to expect that libraries in world-class universities should be the most technologically advanced, offering access to high quality scientific information through the web to allow researchers access to the best information anywhere anytime, and receiving high web impact. This should reinforce the scientific production, and therefore the position in international rankings of these universities.

However, despite the high percentage of content that the academic library brings to the website of the university, its visibility is still low. The reasons are mainly two:

1) the technical problems with the information organization ; 2) because more and more information is generated outside the library website, relegating its principal function as indicated in the NMC Horizon Report 2012 (Johnson, Adams Becker, & Cummins, 2012; Orduña-Malea & Regazzi, 2014). This last circumstance suggests the need to consider new ways to generate interest in the library to make its resources more accessible and visible. Thus moving towards the mobile web and/or the use of apps is a fundamental step (Lippincott, 2010). Mobile devices are increasingly used to search for information and libraries cannot ignore

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the multiple benefits these devices bring their users (Arroyo, 2011; Hill, 2015; Murphy, 2010).

The university in general and the academic library in particular already offer information and services to their users through various web channels including virtual campus, discussion fora, news, email, etc. Nevertheless, creating a mobile website or developing an app can be a complementary means to offer users this information in a simpler faster way with greater flexibility.

Through its app or website, libraries can offer a personal account where one can consult loan information, reserve materials, and access other traditional library services. Equally, access to databases or documents can offer the great advantage of rapid access to information required at a given moment (Kroski, 2008). Thus the development of a mobile application should be an important part of access to the information held by the university library, permitting it to compete with external sources of information.

There is no doubt that the mobile websites of academic libraries can provide great value to both universities and their academic and research libraries. Measuring their content and services (and their visibility, use and quality) would also allow us to obtain indicators reflecting their impact on the web, complementing the value of indicators from the non-mobile web, and demonstrating the online visibility of the academic library and its contribution to the academic website of the institution.

Nonetheless, the web impact measurement for mobile websites is complex, especially in the case of apps. For this reason, evaluating both contents generated and services offered by those mobile websites may serve as a useful proxy. In this sense we can assume that better mobile websites can potentially generate higher web impact, not only for the library but for the university. Therefore, we could expect to find a positive correlation between these variables (quality and web impact), especially if the top world-wide universities are considered.

Few studies have analyzed to date the characteristics or offerings of mobile web or apps for the world's top universities and their libraries. Highlights include some country-focused studies such as Aldrich (2010), based on libraries and universities belonging to the Association of Research Libraries (ARL); Canuel and Crichton (2011), who focus in the Association of Universities and Colleges of Canada (AUCC); or Liu and Briggs (2015), who analyze the top 100 US universities based in the U.S. News & World Report's national university rankings. Even so, the comparative evaluation of mobile web and app quality among the libraries of top worldwide universities is lacking, as is analysis of the relationship between their quality and web impact on the universities that host them. Thus the main goal of the present work is to ascertain if the quality of academic apps and mobile websites are at the level of the overall web impact of world-class universities.

The following specific objectives are proposed:

- Determine the level of adoption of apps and mobile websites in the libraries of world-class universities
- Evaluate the quality of services offered through mobile websites and apps by those libraries
- Rank university libraries by the quality of their apps and mobile websites
- Compare the quality of university libraries' mobile websites and apps with the web impact of those universities, measured through web indicators.

STATE OF THE ART

"Mobile devices" are small computers with processors, limited memory and internet connection. They include smartphones, PDAs and tablets. The variety of devices available and the ability of users to adopt them and adapt them to their daily needs have led to rapid growth in their use.

Among mobile devices, smartphones lead in number of units sold. In 2013 estimates of sales exceed 1 billion, an increase of more than 300 million over 2012, with China the greatest buyer globally (26.5% of smartphones sold), more than 8% ahead of the USA since 2012. According to the whitepaper "2013 mobile future in focus", 54% of the mobile audience in the USA use smartphones, principally for sending text messages, compared to the tablets whose major use is search. In Europe, adoption of mobile devices is led by Spain (66%), followed by the UK (64%) (Donovan, 2013; Fundación Telefónica, 2014; Idc, 2013).

The growth in sales and use of smartphones to access the internet brings with it an increasing use of apps. These applications have grown in popularity since 2008, when the main online application stores began operations: Google Play https://play.google.com and Appstore https://www.apple.com/itunes/charts/free-apps, each hosting around 1.3 million active apps in August 2014. Globally more than 1.2 billion people were estimated to use mobile apps globally at the end of 2012 (Portio Research Mobile Factbook, 2013).

MOBILE WEB VERSUS APPS

A mobile website can be described as a version or adaptation of a website specifically created to work well on mobile devices, offering rapid download and respecting the screen sizes of devices to meet users' interaction expectations.

An app is a program developed to be installed in mobile devices, designed for use in a particular task or to offer a particular functionality. Apps aim to provide additional value over the mobile web, offering information and services with a single touch. Their immediacy, 24/7 availability and the privacy that a mobile telephone offers are their principal advantages.

When choosing to develop an app or adapt a website for mobile web, different factors need to be considered:

- The mobile web generally has the advantage that developing a single application correctly will make it available on all mobile devices, whereas apps need to be developed specifically for each operating system, limiting the number of devices that can use them (Hu & Meier, 2010).
- The advantage of building an app is that devices often have capabilities which are not available (or available later) to a web application (e.g., payment facilities).

USABILITY AND ACCESSIBILITY OF APPS

In the early days of the mobile web users preferred where possible a "normal" website rather than a parallel version developed for mobile, but as the usability and functionality (and cost) of mobile devices has improved, this tendency has changed (McCathieNevile, 2009). In January 2014, mobile apps have overtaken PC internet usage in the US (CNN Money, 2014).

The main limitations of mobile devices are related to the screen size, the usability of the interface, battery consumption and the necessity to adapt content to the mobile web or an app (Hernández-García, Iglesias-Pradas, Chaparro-Peláez, & Pascual-Miguel, 2009). Further the use of any mobile website or app in a smartphone varies according to the characteristics of the device itself. It is therefore important to take into account the operating system(s) with which to work (iOS, Android, Blackberry, Windows, etc.) as well as different screen sizes which can alter the visualization and optimal user interaction.

MOBILE SERVICES IN ACADEMIA: UNIVERSITIES AND LIBRARIES

Websites and apps help provide services related to teaching and research, key to the learning processes of students and professors (Kroski, 2008). The NMC Horizon Report 2012 identifies apps as part of the near-term horizon in superior education, a theme repeated in the 2014 report (Johnson et al., 2012; Johnson, Adams Becker, Estrada, & Freeman, 2014). Yet adoption in universities and their libraries is