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Heuristic Usability Evaluation of University of Hong Kong Libraries' Mobile Website

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ABSTRACT

As mobile technology grows rapidly, more and more students use mobile devices for educational purposes. Under this circumstance libraries, especially academic libraries, should try to expand their services and design mobile websites to meet users' needs. The history of mobile library websites is relatively short, especially in Asia. Usability evaluation of mobile library websites is a new issue for study. As such, this paper evaluates the usability of the University of Hong Kong Library (HKUL) mobile website as a case study by benchmarking against two other universities (the Harvard University and the Chinese University of Hong Kong), according to the ten usability heuristics developed by Nielsen (1994). The evaluation result shows that the mobile website contains some usability issues in 5 heuristics, such as unable to inform users the waiting time, some information not provided in a logical way, some consistency problems in displaying contents, lack of advanced searching for expert users, and inadequate helpful error message. The weakness found in this way provides useful hints in making improvement to mobile website. The design of the HKUL mobile website is quite similar to other mobile library websites, and thus, the results are quite useful for many other academic libraries.

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Introduction

As mobile technology grows rapidly, more and more people use mobile devices for social, entertainment, and even educational purposes. They use their devices to take photos, listen to music, access the Internet, play mobile games, chat with friends through mobile apps, and so forth. According to the 2011 Pew Internet & American Life Project (Smith, 2011), 83% of the US adults owned cell phones and 42% of them had a smartphone. Meanwhile, in Hong Kong, the population of mobile phone owners continues to expand steadily. The number of mobile service subscriptions reached 17.22 million in February 2014 (GOVHK, 2014), although there were only around 7 million people in Hong Kong, i.e., on average every citizen subscribed to approximately 2.5 units of mobile service!

However, it is worth noting that the number of students owning mobile devices is also increasing quickly. Surveys conducted by the ECAR found that the number of undergraduates using Internet-capable mobile devices rose from 51.2% in 2009 to 62.7% in 2010 (Smith, Caruso, & Salaway, 2009; Smith & Caruso, 2010). The Hong

Kong Computer Society also announced that over 80% of Hong Kong students were using smartphones in 2012, and many of them browsed websites through smartphones (HKCS, 2012).

Under these circumstances, libraries, especially academic libraries, have attempted to expand their services and design mobile websites to meet users' needs. As mentioned by Kjeldskov and Graham (2003), mobile phones have only been available since 1990s; therefore, the history of mobile websites is relatively short. In fact, not many libraries provided mobile library websites in 2010 (Bohyun, 2013). After 2010, the number of mobile library websites has increased due to technological development. But still, mobile library websites are relatively new compared with most other technologies. For example, in the US and Canada, the number of academic libraries with mobile websites increased by 66% between 2010 and 2011 (Pendell & Bowman, 2012).

Regarded as one of the top universities in the world, Hong Kong University Library (HKUL) developed an official app in 2012 to support user access to the HKUL website through mobile devices (HKU, 2014). However, according to the statistics provided by the HKUL, only 2% of library services were provided through the mobile channel (Dukic, Lo, & Chiu, 2014). To probe into the cause of this, we develop this study to evaluate the usability of the HKUL mobile website by benchmarking against two other universities, according to the 10 usability heuristics developed by Nielsen (1994). Based on that, we further provide some recommendations for the HKUL to improve their mobile website.

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In brief, the objectives of this study are: (i) to evaluate the user interface design of the HKUL mobile website; (ii) to find out the usability of the HKUL mobile website; (iii) to identify the advantages and limitations of the HKUL mobile website when compared to other mobile library websites; and (iv) to give recommendations for the improvement of the HKUL mobile website.

This paper is developed as follows. After the introduction, we review the literature related to the library mobile websites and usability of mobile websites and identify the research gap in this field of research. Next, we discuss the methodologies used in this study. Then, we present our findings on the comparative studies between the design of HKUL with another two libraries. Finally, we discuss our findings and conclusion.

Literature review

Mobile websites and library mobile websites

A mobile website features most of the contents of a desktop full site and allows users to view it through handheld devices, such as mobile phones, tablets, netbooks, and so forth (Raman, 2011). Researchers point out that mobile websites have several advantages. For example, Kroski (2008a) indicated that mobile websites were able to provide constant connectivity, location-aware, limitless access, and interactive capability. Moreover, mobile websites comply with Web standards, such as the Hyper Text Markup Language (HTML) and JavaScript, so that users can access the mobile websites easily with standard browsers (Buettnner & Simmons, 2011).

Due to the benefits of mobile websites, more and more libraries have developed them. For example, the Ball State University Libraries implemented a mobile site, which provided cataloging, mobile resources, course reserves, and information about libraries. As a result, they were able to provide information effectively to users (West, Hafner, & Faust, 2006). There were many other reports indicating the usefulness of library mobile websites and suggesting various mobile Web services for libraries, such as mobile databases, mobile collections, SMS reference, library news, and so on (Bridges, Rempel, & Griggs, 2010; Herman, 2007; Kroski, 2008b; Lippincott, 2008; Vromans et al., 2009). Some studies further explored the development of mobile library websites and their future (Holt & Walker, 2011; Jackson, 2013; Kim, 2013).

Usability evaluation and mobile usability evaluation

There are many definitions of usability, and the most widely accepted definitions of usability are introduced by Nielsen (1993) and ISO (1997). According to Nielsen (1993), usability can be identified as five attributes: efficiency, satisfaction, learnability, memorability, and errors. ISO (1997) further defined usability as “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use” (p. 10). Usability is considered one of the major elements for Web applications. Hence, different usability evaluation methods have been proposed and can be divided into three categories: usability inspection, usability testing, and usability inquiry (Ivory & Hearst, 2001; Karat, 1997; Kjeldskov & Graham, 2003; Scholtz, 2004).

However, some researchers found that not all usability evaluation methods were suitable for the mobile domain, and only a few methods are useful. Ketola and Røykkee (2001) stated that traditional usability methods did not work well in evaluating the mobile context. Zhang and Adipat (2005) further explained that these methods might not be applicable to mobile due to changing of environment and individual needs. Some researchers suggest to adapt heuristic evaluation, which is one of the usability inspection methods, to mobile context (Bertini, Gabrielli, & Kimani, 2006; Inostroza, Rusu, Roncagliolo, Jimenez, & Rusu, 2012; de Lima Salgado & Freire, 2014; Po, Howard, Vetere, & Skov, 2004). Other researchers applied heuristic evaluation to test the usability of mobile websites. For example, Diaz, Harari, and Paola

(2008) used heuristic evaluation to test the mobile interface of an educational website. Monkman and Kushniruk (2013) and Neto and Campos (2014) applied heuristic evaluation method to evaluate a mobile health application, and tablet applications, respectively.

Usability evaluation of mobile library websites

Although numerous research can be found in studying mobile usability evaluation, there have been very few studies on evaluating the usability of mobile library websites. Most of them used usability testing methods to evaluate the library mobile websites. For example, Pendell and Bowman (2012) used usability testing to evaluate the Portland State University Library's mobile site. Yeh and Fontenelle (2012) conducted an evaluation of a science university library's mobile website. Plus, Rosario, Ascher, and Cunningham (2012) applied usability testing method to evaluate the mobile website of a university health sciences library in order to help redesign the mobile website.

Research gap

To sum up, there are only a few research studies conducted for evaluating the usability of mobile library websites—particularly, there are almost none in Asia. This is because the history of mobile websites is relatively short, and mobile websites are not commonly implemented in libraries until 2010. Therefore, the usability evaluation of mobile library websites is a new issue for study. Further, the recent advancement in mobile devices with larger screens and equipped with computing power close to desktop ones, coupled with the rapid diffusion of low-cost high-speed mobile Internet in the Asia-Pacific makes it worth to examine the usability issues of mobile websites. Therefore, this research attempts to bridge the gap between the usability evaluation and mobile library websites under contemporary mobile technologies, as well as to make contribution for present and future research.

Methodology

This paper evaluates the mobile website of the HKUL as a case study, and it provides recommendation for improvement based on our evaluation. As motivated by the literature above, we employ heuristics evaluation and benchmarking for the evaluation.

Heuristics evaluation

Heuristics evaluation (Nielsen & Molich, 1990; Nielsen, 1992) is a usability inspection method for identifying the usability problems of a user interface design. Nielsen (1994) modified the heuristics evaluation method and proposed the 10 *usability heuristics*, i.e., (i) visibility of system status; (ii) match between system and the real world; (iii) user control and freedom; (iv) consistency and standards; (v) error prevention; (vi) recognition rather than recall; (vii) flexibility and efficiency of use; (viii) aesthetic and minimalist design; (ix) help users recognize, diagnose, and recover from errors; and (x) help and documentation.

Heuristics evaluation has many advantages, such as cost-effectiveness (Ji, Park, Lee, & Yun, 2006), speed (Jeffries & Desurvire, 1992; Law & Hvannberg, 2002), and conciseness (Paddison & Englefield, 2003). Salazar, Lacerda, Nunes, and von Wangenheim (2013) pointed out that usability heuristics provided pragmatic guidelines for evaluating systems, which helped designers improve systems. Because of these benefits, we apply the heuristic evaluation method as guidelines to evaluate the usability of HKUL mobile website.

Benchmarking

In order to have a comprehensive analysis of HKUL mobile website, benchmarking is also used for evaluation. Bogan and English (1994) stressed on the importance of “learning by borrowing from the best

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