

# Adoption Factors and Problems of Mobile Library Services in the Academic Library for Graduate Students: Case Study of University of Wisconsin Milwaukee Library

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## Abstract

Due to the increase in mobile users, mobile services have penetrated the academic library recently. This study researches what kind of factors and problems affect graduate students using UWM mobile library services. To solve these research questions, a case study is used as a research design for a multi-dimensional and comprehensive approach. Observations, document reviews, and interviews were performed to acquire data. For data analysis, open coding scheme is used for identifying factors and problems in adoption of the mobile library services of UWM. Unlike previous research, this study focuses on graduate students and users' perception and recognition. During the data analysis, this study finds problems of adopting mobile library services and the influence phenomenon of interfering adoption of mobile library services. As a result, a user's perception and recognition about mobile service performance cause the user's emotional decisions, and eventually those emotions become the most significant obstacle to graduate students for adopting mobile library services.

**Keywords:** Mobile service; adoption factors; qualitative research method

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## 1 Introduction

Due to the increase in mobile users, many academic libraries have adopted mobile technology in enhancing the library's service for meeting customers' satisfaction and interacting with them. Mobile technologies give speedy interaction with users; however, it requires developers to pay attention to the limitation of mobile devices, such as small screens and slow speed of mobile network conditions. Those circumstances lead many researchers to study the usability of mobile technologies and services, especially technical aspects and web design. However, few studies explored why users accept using mobile library services or not. Users' adopting points and problems are an important field of study, but it seems to have received less attention by assuming that users would be using mobile devices. Therefore, this paper will find when and what factors will affect users. Besides this lack of studies, most of the research has investigated undergraduate students, but graduate students are valued less because of fewer numbers even though a number of their research works and library using time will be larger than undergraduate students. In this circumstance, the following questions are coming out: 1. What kind of factors affect mostly graduate students to adopt mobile web services in the academic library? 2. What problems do graduate students have in using mobile web services in the academic library?

## 2 Literature Review

### 2.1 Mobile Trend and Usage Headings

According to Internet Trends Report (Meeker, 2014), 30% of mobile phone users adopted smartphones and 25% of the total Internet traffic comes from mobile Internet use in May 2014, and this trend is going to accelerate. According to McKiernan, this also happened in the university where ownership of smartphones in university level students increased from 51.2% in 2009 to 62.7% in 2010 (McKiernan, 2010). Currently, 72% of people aged between 18-29, and 71% of the higher education level in the U.S. had a smartphone in 2014 (PewResearch, 2014).

There is a stereotype that mobile devices are alternative means when people could not use a desktop and need to access the Internet immediately (Bohyun, 2013). According to the survey from Compete.com (Bulger, 2010), however, over 80% of mobile users were using mobile devices at home or in downtime. On the contrary, fixed line usage was higher than mobile in week and office time (Nicholas, Rowlands, & Jamali, 2013). Therefore, it seems like mobile devices have become more like entertainment devices, as such they want to use it for a longer time than for the task at hand (Clark, 2012).

## 2.2 Mobile Library Services Development Headings

Mobile devices, especially smartphones, give useful functions for reading, watching, listening, and producing digital content (Lippincott, 2010). Because of these features, many researchers insisted that creating mobile APP and websites for a library would provide easier access to library services and information (Barile, 2011; Wong, 2012; Eunice & Tiko, 2013). To provide mobile services to users, many studies have explored the issue of developing mobile services. Most of the researchers encouraged usage of mobile services in libraries; however, most of them emphasized the advantages of mobile services (Barnhart & Pierce, 2011; Houghton, 2012; Malathy & Kantha, 2013). There are many studies about mobile library services' features and advantages, but a few researchers are focused on disadvantages and how they would be adopted for users, especially graduate students.

## 3 Theoretical Foundation

In order to determine how aspects and factors are affecting graduate students' adoption of mobile services in libraries, this paper will use Innovation Diffusion Theory (IDT) that was developed by Everett Roger in 1962 (Roger, 2003). IDT explains that innovation acceptance and spread are based on a user's mind and social perception, and there could be a gap between the speed of diffusion and acceptance time. To explain it, Rogers defines five elements affecting acceptance and diffusion; Relative Advantage, Compatibility, Complexity, Trialability, and Observability (Rogers, 1995). Relative advantage is the degree of improvement over previous versions; compatibility is the level of correspondence to user's experience; complexity is the level of difference of usage; trialability is the degree of innovation to an explorer; and observability is the concept that someone, who wants to adopt it in the future, can monitor an adopter. These five categories will be used to classify the resulting data from the data collection analysis.

## 4 Research Design and Data Analysis

A case study is used for researching a comprehensive and current situation and for finding hidden factors (Flick, 2014). Observations, interviews, and document reviews were used. The Golda Meir Library and graduate students at the University of Wisconsin Milwaukee (UWM) were selected for the sampling. As a pilot, four voluntary participants (two masters and a Ph.D. student from Information Science, a master student from Communication, and a master student from Business) involved. They have a smartphone and know mobile library services so that they are expected to provide more detailed descriptions about current mobile library services at UWM. Every participant filled diaries, and I observed and interviewed them. For data analysis, open coding was used and the program was Nvivo. To analyze data collection, the coding scheme was built by constructing codes. There were three data sources: observation notes, interview results, and diary documents. Coding schemes were organized in two parts. The first part of the coding scheme was from the participants' usage patterns, and the second part of the coding scheme was from the diffusion of the innovation model. Inter-coder reliability was performed by another coder and Holsti's method was used. The inter-coder reliability result was 0.926 (92.6%).

## 5 Finding and Discussion

Three sources are imported to Nvivo and 607 nodes are referenced. The summary result of references in the Nvivo coding for pilot Study is in Table 1 and Figure 1. Participants explained when they were going to use mobile library services. Basically, they are using it when they needed to find information or search materials for study, and also they partly knew what kind of services are in the mobile library services. The combination of adoption and using category causes graduate students to use mobile UWM library services. Until willing or forced to use mobile access, participants don't want to use it. Among the categories, the emotion and design of services are key factors for adoption of mobile library services. Participants complained about how mobile library services were hard to use. According to Table 1 and Feature 1, the most frequently discussed type is "Emotion about Service". Dominantly, bad emotions have about 95% of the portion of Emotion about Service type (75 out of 79).

Factors for Adoption Type	Source	References
Emotion About Service	3	79
Design of Service	3	68
Performance of Service	3	55
Performance of Device	3	48
Recognition About Service	3	41

Using Mobile Library Services		
Type	Source	References
Finding Information	3	31
Study	3	26
General Information	3	25
Online Database of Library	2	18
School	2	16

Table 1. Top 5 of Frequently Discussed Type by Participant in Each Category

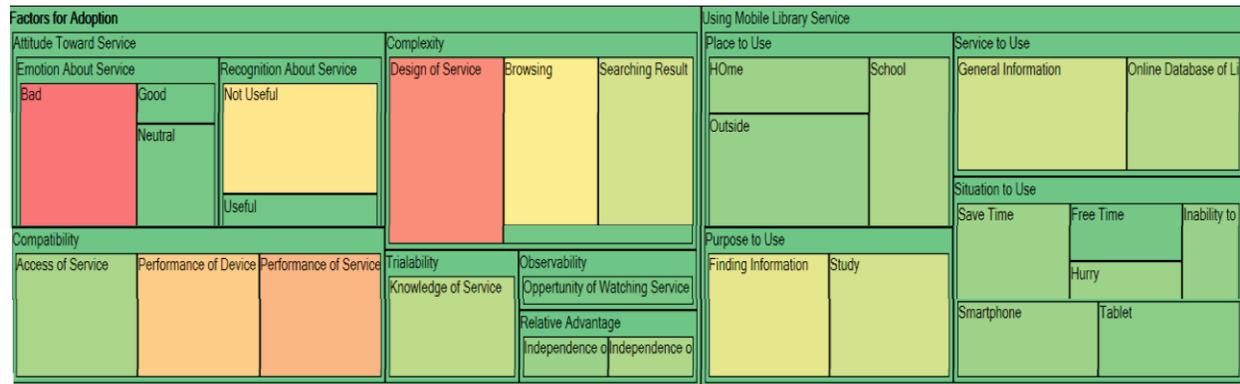


Figure 1. Nodes Compared by Number of Items Coded

According to Table 2 and Figure 2, participants compared the mobile services with the PC version of services and it increased the complexity greatly. In sum, adoption factors significantly affected using mobile library services. Moreover, location was not a matter for choosing mobile library services, but purpose and service were more important. Therefore, high comparability, less complexity, meeting purpose, and well-organized service are the key factors of using the mobile library services of UWM. Besides those factors, participants complained about the design of mobile web services and performance issues, especially browsing. A participant said, “Website is started from mobile web, but PC version webpages are mixed so that it is very hard to see and click.” Another participant explained, “I searched articles by mobile services but I just wrote the list and then find them in my PC because Desktop webpage is familiar and faster.” According to these results, it seems that performance and design issues cause browsing issues, and it leads to bad emotions about mobile services. Because of this bad feeling, they preferred to use simple services in the mobile devices rather than complex and heavy tasks, such as for searching articles. Based on this result and finding, the diagram of this problem phenomenon is shown in Figure 3.

Category	Sub-Category	References
Adoption Factors	Compatibility	175
	Complexity	146
	Relative Advantage	75
	Trialability	20
	Observatory	0
Using Factors	Purpose to use	57
	Service to use	43
	Place to use	38
	Situation to use	34
	Device to Use	19

Table 2. Frequency of Factors by Sub-categories

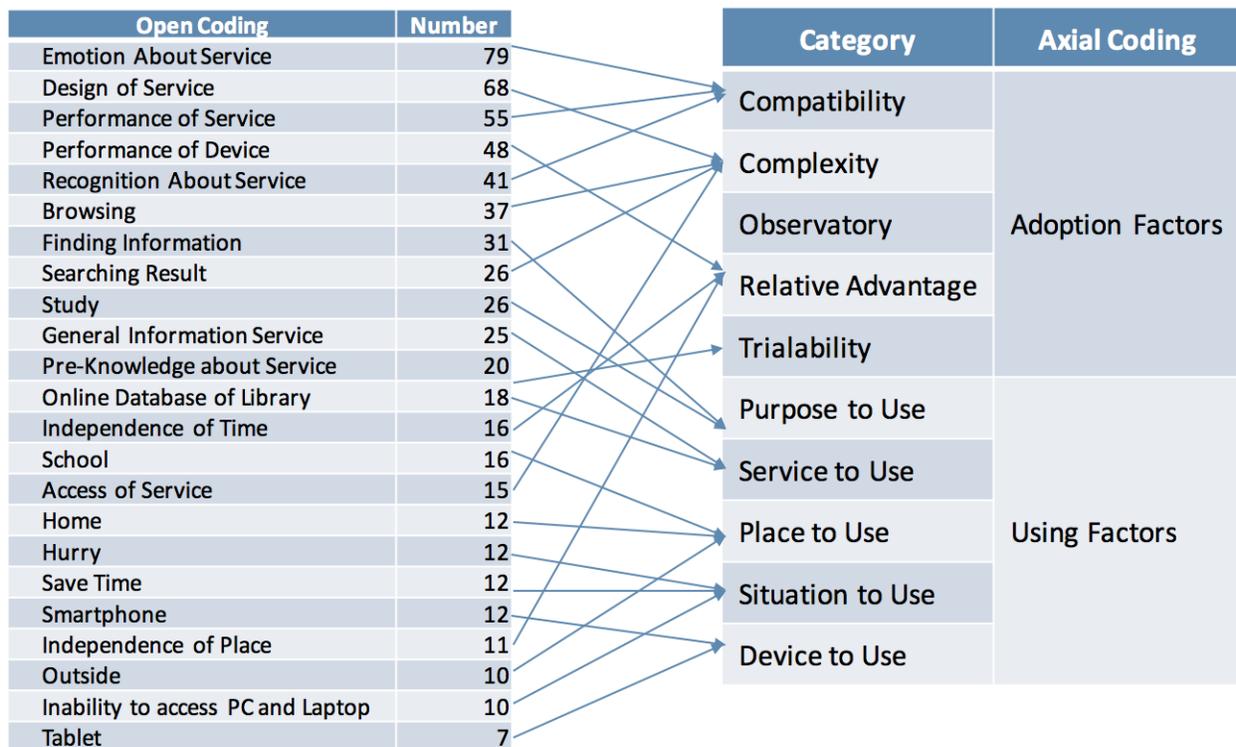


Figure 2. Data analysis results and Axial Coding

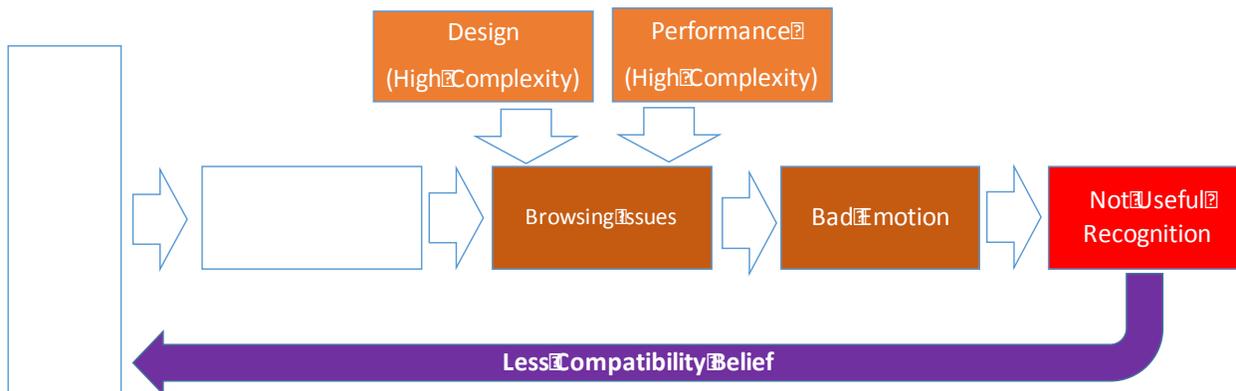


Figure 3. Influence Phenomenon of Interfering Adoption of Mobile Library Services

## 6 Conclusion

This study researches what kinds of factors and problems affect graduate students using UWM mobile library services. Unlike previous research, this study focuses on graduate students and users' perception and recognition. However, this study has several limitations. First, its result is only applicable to UWM and has a bias from a small number of participants. Perhaps other universities would have different situations and patterns. Second, it is only focused on current smartphones' small screens, but recently many smartphones will be coming out with higher resolution screens so this study's results would be changed in the future. Lastly, the coding scheme would be too selective to be generalized because its inter-coder reliability check was performed by only two researchers. For future research, it is recommended that using more researchers and participants who have different demographic and cultural backgrounds in the data collection and in inter-coder reliability would increase the objectiveness of data and data analysis. Also, the series of research would be required to generalize this finding theory, and comparative research and thematic analysis would be helpful to develop this study. Nevertheless, the finding of this research could prove the adoption and using factors that would be helpful to library managers who maintain mobile

library services because they could know what kinds of disadvantages they should avoid and consider in their mobile service for students.

## 7 References

- Barile, L. (2011). Mobile technologies for libraries: A list of mobile applications and resources for development. *College & Research Libraries News*, 72(4), 222-228.
- Barnhart, F. D., & Pierce, J. E. (2011). Becoming Mobile: Reference in the Ubiquitous Library. *Journal Of Library Administration*, 51(3), 279-290. doi:10.1080/01930826.2011.55694
- Bohyun, K. (2013). The Present and Future of the Library Mobile Experience. *Library Technology Reports*, 49(6), 15-28.
- Bulger, D. (2010). Smartphone Owners: A Ready and Willing Audience. *Compete Pulse Blog*. Retrieved from <https://blog.compete.com/2010/03/12/smartphoneowners-a-ready-and-willing-audience/>
- Clark, J. (2012). Why jakob nielsen is wrong on mobile. *Net Magazine*. Retrieved from <http://www.creativebloq.com/josh-clark-why-jakobnielsen-wrong-mobile-4124168>
- Eunice, M., & Tiko, I. (2013). Adoption of mobile technology to enhance services at academic library. *Proceedings of the International Conference on Information Management & Evaluation*, 17.
- Flick, U. (2014). *An introduction to qualitative research (5th ed.)*. Los Angeles; London: SAGE
- Houghton, S. (2012). Mobile services for broke libraries: 10 steps to mobile success. *Reference Librarian*, 53(3), 313-321. doi:10.1080/02763877.2012.679195
- Lippincott, J. K. (2010). A mobile future for academic libraries. *Reference Services Review*, 38(2), 205-213.
- Malathy, S. S., & Kantha, P. P. (2013). Application of mobile technologies to libraries. *DESIDOC Journal of Library & Information Technology*, 33(5), 361-366.
- McKiernan, G. (2010). Worldwide mobile phone adoption and libraries. *Searcher*, 18(3), 48-51.
- Meeker, M. (2014). Internet trends 2014. *Code Conference*, Retrieved from [kpcb.com/InternetTrends](http://kpcb.com/InternetTrends)
- Nicholas, D., Clark, D., Rowlands, I., & Jamali, H. (2013). Information on the go: A case study of Europeana mobile users. *Journal of the American Society for Information Science & Technology*, 64(7), 1311-1322.
- PewResearch, (2014). Cell phone and smartphone ownership demographics. Retrieved from <http://www.pewinternet.org/data-trend/mobile/cellphone-and-smartphone-ownership-demographics/>
- Roger, E. M. (1995). *Diffusion of innovation*. New York: The Free Press.
- Roger, E. M. (2003). *Diffusion of innovation (5th ed.)*. New York: The Free Press.
- Wong, S. (2012). Which platform do our users prefer: website or mobile app?. *Reference Services Review*, 40(1), 103-115.