

THE AWARENESS AND USE OF SMARTPHONE APPLICATIONS TO THE AVAILABLE SERVICES OF THE UNIVERSITY OF BAHRAIN LIBRARY: A PROPOSED APPLICATION

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Abstract

This analytical and quantitative approach study aims to investigate the potentialities in the utilization of Smartphone applications and services in an educational environment, namely University of Bahrain, the perception and awareness of the university students to the library services that are available through their smartphone, the actual benefits derived.

For the purpose of data collection, two survey questionnaires were conducted and distributed, the first designed to address the student users (undergraduates) from two academic faculties at the University of Bahrain (UOB). This standard questionnaire divided into two main parts: the first part covered the demographic elements of the respondents while the second part focused on their awareness of various available Smartphone services, their pattern of library use, the perceived types of library services that should be applicable through their Smartphone, their willingness of the services if offered. While the second was designed to address the library manager and staff members.

This paper therefore sets out to examine the availability of University of Bahrain Library services accessed through Smartphone and the awareness, use among currently, almost every student studying and using the university library.

The main findings indicated that, respondents' perception on the adoption of Smartphone apps for library and information services to be very positive. The majority of the respondents indicated their willingness to become the users of such services if offered. These main findings should assist information providers such as libraries and telecommunication service providers in designing the system that allows for effective access to various information and library services using mobile phones. This study also reveals the still need of more Smartphone apps designed for the support of library users who ever they are and that the wireless application services are still lacking, despite the increasing needs of the users.

Keywords: Smartphone, education, academic libraries, smartphone applications, information resources.

Introduction

Most users of the academic environment are now using a Smartphone to accomplish their academic experience, and the innovations in mobile services include mobile apps to administer library records, text message services reminding users of book return dates, instant chat services, etc. These challenges, academic libraries face to keep pace with the rapidly changing technologies and insures the services they provide compatible by using their advantage of being technological intelligence centre to enforce and create attractive new Smartphone library information and services that meet the needs of users effectively.

Access through Smartphone to university resources in general and to the university library resources in particular makes especially good benefit of all students, faculty, and other staff members. The University of Bahrain library (UOBL) deals with external providers who support the library catalogue and the information technology staff of 2.080 FTE professionals, maintain over 250 computer workstations in cooperation with the director of campus student computer labs, and oversee the computing needs of library staff and faculty members.

The degree of adopting Smartphone services of the library, what do library users want from Smartphone library information and services? To what extent UOBL adopts and responses to the available applications and services supported through Smartphone initiatives? These questions addressed, and investigated the users' use, awareness, requirements and desires in respect of Smartphone library information and services at UOB.

This study mainly focused on evaluating Smartphone apps services offered by University of Bahrain Library

(the only governmental university in the Kingdom of Bahrain). The study directly investigates the user need, and subsequently constructs mechanisms, which be implemented by librarians, allowing them to act as enablers to develop and enhance Smartphone service provision accordingly.

Data from two online questionnaires complemented by more qualitative data from focus groups of library users at University of Bahrain to establish trends, patterns and themes, which inform the direction suggested for developing a future Smartphone service at UOBL to develop the library services in a dynamic and future-proof manner.

A short literature review presented in section 2 of this study while the objectives expounded in section 3. A description of the survey was informed this analytical investigation and the model is given in section 4, taking into account the responses of the sample (the study population) who is actively involved in the University of Bahrain educational environment. The analyses covered in sections 5 while results including hypotheses and conclusions presented in section 6.

Literature Review

Several studies evidenced the value of using Smartphone apps in higher education [1] [2]. The recognized opportunity of mobile technology to the educational environment and their libraries has been demonstrated through several studies [3]. As Elmore and D. Stephens [4] mentioned that academic libraries cannot ignore the growing in using mobile devices which is considered for most students as a handheld information retrieval tool.

Many authors discussed and investigated Smartphone implications on the educational environments. In his exploratory study Elahi [5] identified the services that are possible to provide with the help of mobile phones and their applications, design a mobile based library information and service delivery system, and identify major challenges regarding mobile based library information and service delivery systems.

Ward, Hahn, and Mestre [6] in their case study identified potential student needs in mobile applications and location-specific access to library data, as well as assessing the viability of the competition format as a repeatable activity for the library's overall mobile development efforts.

Ebiye [7] investigated the impact of Smartphone/Tablets on the information seeking behaviour of medical students and staff in Bayelsa State, Nigeria. Results show that Smartphone/tablets have made a tremendous impact on their medical education most especially with easy and fast internet access, high speed browsing, saves time and money going to cyber cafe/college library, easy access to medical teaching and e-learning materials/e-textbooks. With the aid of these devices, students learn faster outside the classroom by having quick access to the internet and easy retrieval of required medical and health learning resources while lecturers also keep abreast of recent trend and development as it affects their medical teaching and research needs.

Liu and Briggs [8] stated that the most common mobile services offered were mobile sites, text messaging services, e-books, and mobile access to databases and the catalogue. In addition, chat/IM services, social media accounts and apps were very popular. The study attempts to answer two questions: What is the state of mobile services among academic libraries of the country's top ranked universities, and what can the experiences of these libraries teach us about best practice for mobile services at the university level.

Dresselhaus and Shrode [9] presented the situation at the Merrill-Cazier Library at Utah State University, where students who responded to a survey indicate they are very interested in mobile access, even if they have not yet purchased a Smartphone or find data plans to be too expensive at this point. Using the latest technology in libraries will help raise awareness that libraries are relevant and adapting to changing user preferences.

Zhou, Broussard and Lease [10] investigated a number of libraries have begun deploying customized mobile Web portals and applications to promote accessibility for patrons. Despite the rapid growth of these mobile solutions, their novelty has meant relatively little is known about the alternatives and trade-offs in designing for mobile access to libraries, describe a prototype mobile application we built to provide mobile access to our own university library catalogue. Overall, we find that libraries have several tiered options that make it simple to provide basic functionality with relatively little effort and deliver a significantly improved user experience in comparison to relying on traditional browser-based solutions.

Paterson and Low [11] provided evidence for libraries to determine the value of developing their own mobile services. It also demonstrates the proliferation of mobile device usage within the university and library context and indicates which services students would find most useful on a mobile device. The role of the academic library is to embrace change student behaviour by providing services optimized for mobile devices.

Objective of the Study

Along the years, traditional libraries have changed into digital and virtual ones where users can access the vast collections of information remotely, using various information technologies (ITs). One of the recent

technological innovations is the Smartphone library information and service delivery application, thus, the main objectives of the study are as follows:

- 1 To identify the availability of Smartphone based library Information and service delivery at the UOBL.
- 2 To identify the library services that is possible to provide to users with the help of Smartphone and their applications.
- 3 To find out the level of awareness and use of a Smartphone by students and staff in gathering information for their academic works.
- 4 To find out the impact of Smartphone on the information seeking behaviour of students and staff.
- 5 To suggest a design of mobile based library information and service delivery system.

The objectives of the study answered through these questions:

- 1 Do UOB Students use apps and tools to search for academic, or research information, and if so, what are the most used?
- 2 Were the available library information and services apps useful and easy to use?
- 3 What was the most required Smartphone application by UOBL users as well as library staff?
- 4 Do Smartphone apps to the library information and services motivate and drive to the use of library facilities and services?

To answer the above objectives and study questions, the following hypotheses are tested:

- 1 All user Respondents are aware and use the checking records of books and renewing library items services through Smartphone apps.
- 2 There are no significant differences in the needs for accessing library Database OPAC through Smartphone apps between the two discipline's users (Art and IT)
- 3 The respondents who are engaged in the summer program mainly female: There is no significant difference between the numbers of female registered in a summer program from College of Art from those of IT.

Design/ Methodology/ Approach

This exploratory case study and a quantitative content analysis to address the above objectives with a survey has been conducted to validate the availability, importance, and the necessity of designing a Smartphone library information and service delivery application.

The two conducted online closed and open-ended questionnaires: First targeted students registered in summer courses (July-August 2017) from two Departments, an (Information System department within College of IT and English language and literature department within College of Arts), see Table 1 below. The majority of respondents were undergraduate and the responses was high with (380) but a few exempted from the rest due to incomplete, non-owners of the Smartphone or monotonous answers. A hard copy also distributed to assure the filling of the questionnaire by the respondents. The data collected were analysed dominantly using descriptive statistical analysis. SPSS tool version 22 used to analyse the data collected and test the study hypotheses. The second targeted Library manager and staff members of UOBL.

Table 1. *Number of Students in Two Colleges (summer program).*

Students in	Number of Students	College
IS department	707	IT
Core courses IS department	180	IT
English Language and Literature department	770	Arts
Core courses English Language and Literature department	200	Arts
Total number of students registered in two departments	1477	IT & Art

Total number of students registered in core courses in the two departments.	380	IT & Art
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Study Analysis

To shed light on the importance of the library services and their impact on users in general and the respondents in particular, the first part of the first survey questionnaire elicits information from a sample of a population of (1087) undergraduate students of two departments English And IS, representing two faculties (IT College and College of Arts). The respondents' demographics, their educational level at the University, their awareness and patterns of Library services and visits, the search engines mostly used for academic researches, their awareness with the available Smartphone library information and services applications. Their perceived types of library services that should be available through Smartphone app, the impact and satisfaction of the library services offered through Smartphone app. The second part of the questionnaire covers the extent respondent agree or disagree with the eight questions within three factors. Examining the first survey questionnaire response rate and from the sample of (1087) which is sufficiently represented of the whole population of the two above colleges of the UOB summer program.

The responses to the demographic questions 60% are between 18 and 20 and 40% are 21-24 this age as the students were from mostly first and second level of their undergraduate studies. Thirty percent (30%) of the respondents are male and 70% are female, as for the IT College 40 % are 18- 20 and 40% are 21-24 while 50% male and 46% female. Regarding hours completed by students, most of the respondents complete 30-59 and 60-90 hours in IT College and in College of Arts 50% of the respondents completed 0-29 and the rest between 30-59 and 60-90. The majority of respondents visited the library if needed only (meaning when they have special assignment required visiting the library and this is not even once a month). Forty percent (40%) of the college of Arts students visited the library to borrow or return books, and only 15% of IT College visited the library for the same purpose. The purpose of 98% of Art students, to read for a test or to conduct an assignment and from IT 50%. Only 1% of the respondents would like to ask the librarians for their needs. 99% of the students own Smartphone from both departments and use the tool for academic information and again 99% of them use Google as a search engine. Google was the first Respondents most preferable tool used for their last search conducted, UOB apps comes as their second choice, while their third was WhatsApp, followed by Instagram, then YouTube, then safari whether looking for a certain information about a book, find an article, or to complete the requirements of an assignment. The question concerned awareness of the availability of the Smartphone apps to library services, 60% were aware of the availability of the service by checking the records of the book borrowed, 39% of the renewal of the items borrowed, 20% getting noticed of the overdue charges, 35% contacting librarian, 16% SMS query services, 18% accessing the library Online Public Access Catalogue (OPAC). Fifty four percent (54%) were aware of the providers of the Smartphone apps offered by the library while 75% are not aware from the College of Arts but 39% of IT colleges (this is due to the specialties of the college). Fourteen percent (14%) aware of reservation of items services, 19% receiving text alerting of the new resources to the library, and finally 23% aware of the alerts on library events.

The second part of the first questionnaire measured in 5-point Likert scale from strongly agree to strongly disagree, aiming the extent respondents agree or disagree with the questions of three factors the first: covered the general library environment and provision with 8 related questions. 50% found the library open hours suitable against 8% strongly disagree. 45% found what they need against 7% disagree. 16% were aware of the library services offered against 44% strongly disagree. 35% liked it when they get what they want from their visit against 11% strongly disagree. 48% found the library location and the building suitable against 6% strongly disagree. 55% were aware of the arranged workshops of the library against 46% strongly disagree. 68% agreed that their suggestions accepted by librarians against 40% strongly disagree (52% were neutral because they did not ask). 69% strongly agree of being helped by library staff while 42% disagree, refer to table 2. The second: covers the availability and satisfaction with 10 related questions. 75% agree with the availability of Smartphone app Checking records of books borrowed against 22% disagree. 76% agree with the availability of being noticed or alerted on overdue books against 90%. 22% with the receiving reminders to return library items against 76%. 78% with the

renewal of library items against 30%. 30% with the availability of reference enquiry services against 62% .33% with the SMS query services against 55%. 13% with receiving notices of library events and tutorials against 66%. 33% with the reservation services against 80% (the justification students buy books from the university bookstore). 30% with searching the library OPAC against 68%. 30% with PC lab booking on hourly bases against 65, refer to table 3. The third: covered the requirements and drivers with 8 related questions. 55% by using the maps on the library catalogue to search and find items against 17%. 49% with the looking up the shelves app against 17%. 80% require the reservation of items against 38%. 58% require to be alerted of the timing of the training sessions and workshops against 50%. 65% require viewing articles and books on-line against 48%. 44% strongly agree about being alerted of the new coming which help being aware of the new coming to the field against 49%. 50% agree about paying fines avoiding the charges of late delivery of the items against 17%. 33% with that the FAQ help avoiding SMS messages to the librarians against 47%, refer to table 4.

Table 2. *Library environment and provision*

Statement	Students users						
	N	Disagree and Strongly Disagree	Agree & strongly agree	Neutral	Percentages for disagree & Strongly disagree	Percentages for Agree & strongly agree	Percentages for Neutral
Library open hours suitable	380	8	50	29	30.4	190	110.2
Find what they need		7	45	35	26.6	171	133
Aware of the library services offered		16	44	46	60.8	167.2	174.8
Like it when they get what they want from their visit		11	35	43	41.8	133	163.4
Find the location and the building suitable		6	48	46	22.8	182.4	174.8
Aware of the workshops arranged by the library		46	55	40	174.8	209	152
Library Acceptance of the user's suggestions		40	68	52	152	258.4	197.6
Library staff always available to help		42	69	54	159.6	262.2	205.2

Table 3. The availability and satisfaction

Statement	Students users						
	N	Disagree and Strongly Disagree	Agree & strongly agree	Neutral	Percentages for disagree & Strongly disagree	Percentages for Agree & strongly agree	Percentages for Neutral
Checking records of books borrowed	380	22	75	10	5.8	285	38
Getting noticed on overdue books		90	33	14	23.7	125.4	53.2
Receiving reminders to return library items		76	22	19	20	83.6	72.2
Renewing library items		30	78	2	7.9	296.4	7.6
Reference enquiry services(FAQ)		62	30	24	16.3	114	91.2
SMS query services		55	33	23	14.5	125.4	87.4
Receiving notices on library events and tutorials		66	13	44	17.4	49.4	167.2
Reserve and hold books		80	33	14	21.1	125.4	53.2
Searching the library OPAC database		68	30	13	17.9	114	49.4
PC lab booking on hourly bases		65	30	5	17.1	114	19

To make sure of the accuracy and validity of the information gathered from the user respondents. In addition to elicit information about the library services currently offered to the UOB users through Smartphone. Their way of collecting awareness of the actual and most needed services by the University users, their perceptions and plans for future apps to serve the users, a second open-ended survey questionnaire targeted the library manager and staff members of UOB library. The answer of three librarians including library manager about what Smartphone library information services were available. They assured us that, only Checking records of books, and renewing library items are through Smartphone as library information and service delivery system to the users and these are programs available through library catalogue Symphony and the portal from a provider of research databases, e-journals, magazine subscriptions, e books and discovery service for the academic (EBSCO), while the network infrastructure provided by the University. The answer is “Yes” for the two questions concerning whether a study survey used by the library asking users of the most needed Smartphone apps to the library information and services, and to collect statistical information about the users’ satisfaction and use of the available services offered.

The answer to the question regarding future Smartphone apps plans, the library manager assured the introduction of full features of Bookmyne software, which covers: off the shelf apps, library virtual map with the locations of the service points and bookshelves, identifying the location of the user and walk him/her through the library, when budget is secured. Access to the library’s catalogue and databases through the Smartphone app is another plan, as well as the library two PC Labs booking on hourly bases allowing users to check the available through interfacing with the server then do the booking.

Table 3. *Requirements and drivers.*

Statement	Students users						
	N	Disagree and Strongly Disagree	Agree & strongly agree	Neutral	Percentages for disagree & Strongly disagree	Percentages for Agree & strongly agree	Percentages for Neutral
Use maps on the library catalogue to search and find item and location	380	17	55	52	64.6	209	197.6
Looking up off the shelf apps including: library virtual map with the locations of the service points and book shelves		17	49	51	64.6	186.2	193.8
Pay fines		17	50	45	64.6	190	171
Reserve items planned		38	80	45	144.4	304	171
Getting alert about timing of the training sessions and workshops		50	58	16	190	220.4	60.8
View online articles or books in Smartphone app/ OPAC availability		48	65	33	182.4	247	125.4
Contacting library staff/ FAQ		47	33	14	178.6	125.4	53.2
Receiving alerts and notes to new resources		49	44	14	186.2	167.2	53.2

Development of Prototype Library Mobile App

A prototype mobile application is developed to allow users accessing library services through their Smartphones. Appy Pie Market Place implemented to develop UOB Library mobile application. New library member signs up first using his/her identification card. The entered membership information is stored in the library database and a user profile is created. Figure 1 shows the login page. The main page is displayed when the user logged in successfully, see Figure 2. The main page includes four main services: Ask Librarian, Add Book, Search, and Book Study Room. The hub of the library mobile app is searching and adding a book. Adding a book to user's basket can be done by scanning book barcode, entering the ISBN book number or the title or/and the author. In addition to the main menu, a side menu includes more services like notifications where the users receive an alert on overdue of library items continually four days before the due date until they are returned otherwise fines will be calculated.

Results and Conclusions

Result shows that UOBL offered more than one Smartphone services, precisely two of the circulation services (Checking records of books and renewing library items) from other circulation services such as borrowing library items, reservation of documents, registration for carol service, reminders about loaned library items. A suggested Smartphone library circulation system is to be available in that Users need to register with the system, sending SMS register to Smartphone library circulation system. The library server responds that the user successfully registered. To borrow item, users need to send a SMS, which include the term borrow their id and item Id. If they need the delivery of the document, then a charge for that would be from their Smartphone balance or the reserved

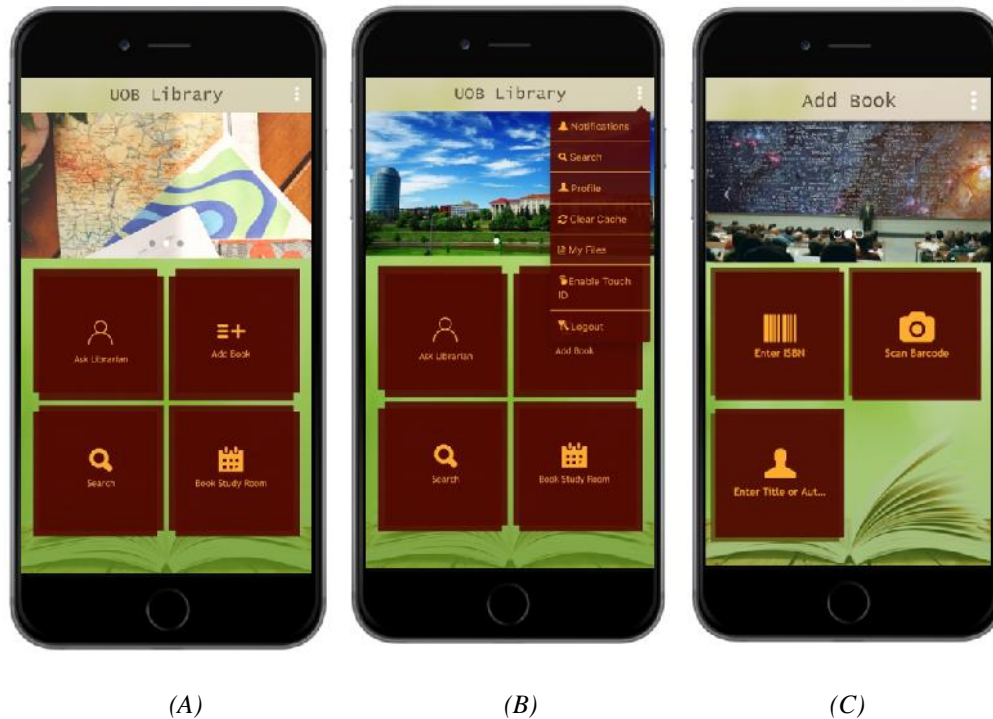
item collected personally within two days from the library. Instead of Borrow the term Reserve used in the SMS. For carol service, again the SMS should be sent to the authorized library number using Re-F-Carol. The library server automatically generates a message to remind the users of the finished date of the borrowed item.

The first most used tool by the UOB Students to search academic, or research information is Google, followed by UOB apps, WhatsApp, Instagram, YouTube, and safari.

FIGURE 1. LOGIN PAGE



FIGURE 2. (A) MAIN SERVICES (B) ADDITIONAL SERVICES (C) ADD BOOK MENU



To access the database and the Library Catalogue (OPAC), are the most Smartphone apps required by the student respondents and library staff. Survey to the library manager and staff member responses indicated a trend towards responsive design so that any user can access the library's full site on any Smartphone.

Result concerning the above first hypotheses: awareness of the two available services through Smartphone apps, H_0 was rejected which means that variances are not equal, see Table 5.

Table 4. Descriptive statistics of the first hypotheses.

Variable 1: Checking Records of Books		
Variable 2: Renewing through Smartphone Apps		
H0: Variances are equal for Variable 1 and Variable 2		
H1: Variances are not equal for Variable 1 and Variable 2		
	Variable 1	Variable 2
Male	68.4	45.6
Female	159.6	106.4
F-Test Two-Sample for Variances		
	Variable 1	Variable 2
Mean	57	133
Variance	259.92	1415.12
Observations	2	2

df	1	1
F	0.183673	
P(F<=f) one-tail	0.257762	
F Critical one-tail	0.006194	
Conclusion > F Critical One-Tail, we Reject H0 and Accept H1		

Testing the second above hypotheses shows there are significant differences in the needs between the two disciplines. Results are shown in table 6.

Table 5. *Descriptive statistics of the second hypotheses.*

Variable 1: Differences in need of OPAC through Smartphone Apps		
Variable2: No difference in need of OPAC through Smartphone Apps		
H0: No significant differences in the needs to the accessing of the library Data base OPAC through Smartphone apps between the IT major and Art		
H1: There is significant differences in the needs to the accessing of the library Data base OPAC through Smartphone apps between the IT major and Art		
	Variable 1	Variable 2
IT	292.6	87.4
Arts	45.6	311.6
F-Test Two-Sample for Variances		
	Variable 1	Variable 2
Mean	190	178.6
Variance	21053.52	35378
Observations	2	2
df	1	1
F	0.595102	
P(F<=f) one-tail	0.418307	
F Critical one-tail	0.006194	
conclusion > F Critical One-Tail, we Reject H0 and Accept H1		

The third above hypotheses concerning gender, which shows a significant difference between IT major and Art, and this is justifiable as female tend to exploit summer vacation by taking courses instead of being at home, see table 7.

Table 6. *Descriptive statistics of the third hypotheses.*

Variable 1: English major	
Variable 2: IS major	

H0: There is no significant difference between the number of female registered in summer from Art college and the number of female registered in summer in IT college.

H1: There is a significant difference between the number of female registered in summer from Art college and the number of female registered in summer in IT college.

	Variable 1	Variable 2
Male	114	152
Female	266	228
F-Test Two-Sample for Variances		
	Variable 1	Variable 2
Mean	133	247
Variance	722	722
Observations	2	2
df	1	1
F	1	
P(F<=f) one-tail	0.5	
F Critical one-tail	0.006194	
conclusion > F Critical One-Tail, we Reject H0 and Accept H1		

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