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Case Study of the Deployment of Mobile Library Resources Application (MoLiRA) in Academic Institution

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ABSTRACT

Technology in educational institutions had influenced a lot and even changed the educational process there in. In the mobile age, every system is moving towards mobile-based service wherein everything had become available at the tip of the finger. In response to the call digitisation, Mobile Library Resources Application (MoLiRA) was developed to cater to the needs of the academe in knowledge management and to provide quality service to the students in terms of library services. The study was conducted in one of the schools in Bacolod City, Philippines, with the intention of evaluating its e-service quality level. The result of the study was that the MoLiRA enables the student to search through not only book-related resources but every library resource such as e-books, multimedia storage devices, unpublished researches, and other learning material using their primary gadget such as a smartphone. The study shows that the developed MoLiRA is high in terms of e-service quality level as perceived by the IT experts and students. The users have the ease of accessing the library resource information since the smartphone has become the primary gadget nowadays. The student can easily search resources available in the library which is in line with the course syllabus. Every library user using a smartphone received a notification informing them of the availability of the new library resources.

Keywords: Library resources; Library resources application; Mobile library resources; Library resources system quality assessment

1. INTRODUCTION

In today's generation, where people tend to find and acquire their needs and wants using available information at the tip of their finger had become the basis of improvement of application development in any type of organisation, according to Martin[1]. Stieglitz[2], *et al*. cited that the diffusion of mobile applications had risen significantly and strongly emerging in any type of business, enhancing productivity and satisfaction. Educational institutions are not exempted from this and have to improve their technological infrastructure for the sake of their clientele, the students.

One of the technological infrastructures that should be improved is the manual aspect related to the library system since it is regarded as the center of information. Most of the schools are not yet engaging in Online Public Access Catalogue (OPAC) but rather using the computerised catalogue system only available inside the library area and not online. Even OPAC only shares information materials commonly available in a library such as books, but not including magazines, multimedia materials, and institutional journals. Also, it is not sharing e-books that are now integrated in this educational age wherein students and teachers are not anymore buying physical books but rather digital books for their learning material. E-books are needed because the majority of the students are so lazy to checkbooks in the library to get the information needed for their classroom activities but prefer to use the information obtained from the Internet. Sometimes, the information acquired from the Internet is most likely not relevant, using a different approach and probably not timely information. This will lead to academic confusion and misinformation.

Hence, the accessibility of knowledge material must not be a focus on books alone but also multimedia material, local journals, e-books, magazines, and unpublished research of bachelors, masters, and doctorate. Having various sources of information and using the local library as the center will improve student academic growth and produce better academic outputs.

With the above-stated information, therefore, the researcher decides to develop a Mobile Library Resources Application (MoLiRA). Broussard[3] *et al.* in their research has encouraged libraries to start writing strong proposals for mobile options in this age of mobile ubiquity and information access and have shifted increasingly away from the desktop to mobile environments. The underlying problem was because technology influenced the lives of students and resorted to finger-tip searching. Today, the school needs to move with the current flow and show flexibility in a changing environment. Ally[4] *et al*. encourage students to use mobile applications that can aid their learning, and the applications must be designed to

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provide an enjoyable experience for the students. Applications should be user-friendly, understandable, learnable, and aesthetically pleasing to the user. The application should not just be a copy of the desktop alternative but designed to be effective on a smaller screen with touch screen capability.

1.1 The Present Study is aimed to Formulate Specific Research Objectives

1.1.1 To Develop a Mobile Library Resources Application (MoLiRA) with the Following Features

- Book searching
- E-books searching
- Unpublished research searching
- Local Journal E-copy searching
- Multimedia storages searching
- Magazine searching
- Library resource update notification
- Mobile-based application

1.1.2 To Determine the E-Service Quality Level of Molira Under the Following Quality Dimensions

- Efficiency
- Reliability
- Responsiveness
- Design
- Security

2. LITERATURE REVIEW

Various systems and studies have been developed and conducted to improve the accessibility and information dissemination to the member of the institutions or public. Many academic institutions have integrated Online Public Access Catalogue (OPAC) in their library system, but a lot of researchers tends to improve the OPAC since it only focuses on sharing book information in a library to the user. Studies below will show why traditional library norms have to be improved as technology is introduced, and information becomes at the tip of the finger. Also, the related systems below show how the library resources and services had progress gradually until the adoption of mobile technology.

Indian researcher Regha[5] had developed a Virtual Library that tends to access the library resources related to social science and management using the web platform. He believes that through the nature of the web, it is easier to disseminate information among the public with the presence of the Internet. The Virtual Library had cataloguing of the library, from physical cataloguing to computerised cataloguing. It enables not only book searching but extended up to e-books and unpublished journals.

Similarly, Library Portal is a website that offers the same service aside from indexing electronic journals in their repository. The study had attempted to explain the library portal of the Technical Information Resource Centre of Naval Physical and Oceanographic Laboratory of Defense Research and Development Organisation. Letha[6] took a stand that libraries have to provide their data collection to fulfill the ever-increasing requirements of users by implementing the Library Portal.

As users demand information, accessibility increases. Hence, the Tata Institute of Social Sciences had decided to digitise their academic library services from searching of books, e-books, unpublished research of students, and making multimedia storage like CDs available to the search engine. This result in the birth of the school's local journal entitled Indian Journal of Social Work. Koganuramath[7] *et al.* indicate that digitisation of contents will lead to content preservation, and content preservation will lead to digital asset management, which becomes the driving force in research progress.

Time skips in the year 2015, mobile technology becomes at its peak, and the demand for software programs to run in a mobile environment becomes aggressive. Every organisation, including the academic institution, had adopted this pervasive mobile computing. The study of Pu[8] *et al.* is similar to the proposed system, however, it still lacks some functionality compared to the proposed system, as shown in Table 1. The Mobile Library APP system is a powerful library application tool that enables library resource searching and allows resource update availability. However, it falls short in digitizing the unpublished research of the institution and multimedia resources such as CDs or vintage tape drives containing valuable information, tutorials, software, lectures, etc. The unpublished research materials of the institution are also vital for the student since it will become easier for them to create their research as they read the existing researches of the institution.

Digital Library, similar to the Academic Library of Tata Institute of Social Science, aims to digitise the library resources to make knowledge management easy, according to Upadhayay[9]. Library resources and traditional knowledge mediums such as multimedia were digitised and archived in the digital library repository. It will now become much easier for the student and lecturers to find every resource needed. However, the said study is not yet in its final form since there is yet a lot of improvements to be made, as shown in Table 1.

The literature cited was used in the development of the proposed application and to find the research gap among them. The study aims to fill in the research gap and develop an application that possesses the highlights of the cited literature. The Mobile Library Resources Application (MoLiRA) is an application that does not only aim to provide the typical needed OPAC in a mobile environment but to digitised the physical library resources and provide a portal wherein students and lecturers of the institution will be able to access the library resources, for their knowledge development and completion of their academic requirements. Lastly, knowledge management is the very aim of the study, which may become the birth point of other research studies related to the library.

3. METHODOLOGY

To measure the quality of the proposed system, particularly the system's service quality, the researcher used a standardised questionnaire, namely e-SERVQUAL designed by Zeithamal[10] *et al*. It consists of 20 questions for five system service quality parameters.

The study comprises of students of Carlos Hilado Memorial State College - Alijis Campus and Information Technology

Professional in Bacolod City, Philippines. The student's samples (n=346) were taken from a population (N=2588) using the Yamane Formula, whereas the IT Professional samples were purposively chosen. IT professionals were composed of front-end developers, back-end developers, full-stack developers, database administrators, project managers, system analysts, web developers, and mobile developers. Respondents were asked to answer a question on a five-point Likert Scale: 5= strongly agree, 4= agree, 3= neutral, 2= disagree, and 1= strongly disagree. In the dissemination and gathering of the survey questionnaire, the researcher uses both paper-based and digital methods. Means and standard deviations were used as statistical tools.

Table 1. Profile of respondents

Type	Numbers	Percentage
Students	346	93.3
IT Professional	25	6.7
Gender	Numbers	Percentage
Male	346	62.5
Female	25	37.5
Use of Internet	Numbers	Percentage
Rarely	6	1.6
Sometimes	61	16.4
Often	38	10.2
Mostly	266	71.7

The study utilised the developmental and descriptive methods of research. The developmental method was used in the process of establishing the system, both the hardware and software parts, as Dellosa[11] stated in his study. While, the descriptive method was used to determine the service quality of MoLiRA as to its efficiency, reliability, responsiveness, design, and security. The development of the system was based on Software Development Life Cycle (SDLC), particularly in the Iterative Model.

In the development part of the study, the researcher uses android technology tools of development since 98% of the respondents use android mobile devices as their devices for communication. MoLiRA was built using native android programming to maximise the capability of android services as the researcher attempts to develop a lightweight application with caching capability and take advantage of some android services needed to operate the application with efficiency.

4. RESULTS AND DISCUSSIONS

4.1 MoLiRA Features

The following are the features of the Mobile Library Resources Application (MoLiRA) design.

The first feature is the book searching capability. The application will be able to search user's book desire dynamically using the search engine shown in Fig. 1 (left), and book results are listed in a tabular form as shown in Fig. 1(right).

The second feature is the e-book searching capability. The application will be able to search the e-book using its title,

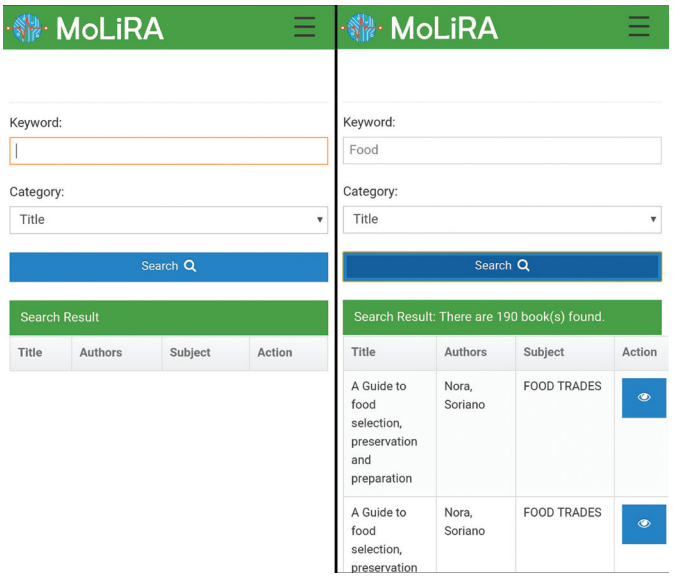

Figure 1. Search form and book result.

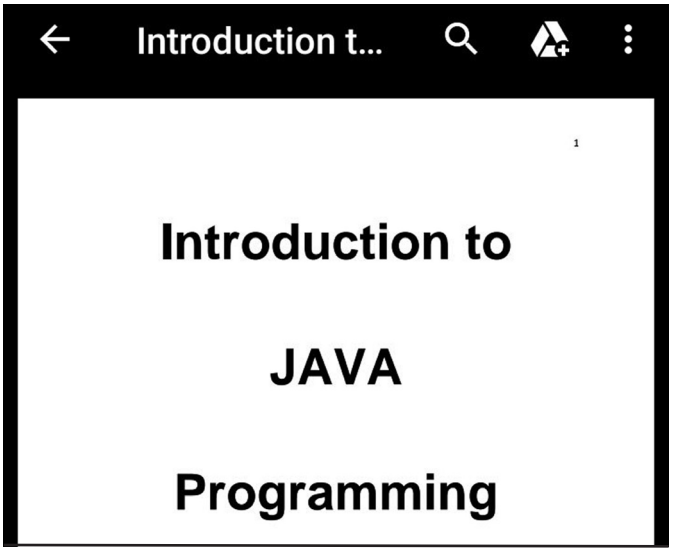

Figure 2. E-book search result.

and results can be downloaded to the user's mobile device. The e-books are in the typical format of PDF, as shown in Fig. 2.

The third feature is the unpublished research archiving and searching. The application will be able to view the archived unpublished research/thesis/capstone project of bachelor's, master's, and doctorate degrees. Since the researcher tested the program in CHMSC-Alijis, unpublish research of the said school was archived in the application, as shown in Fig. 3.

The fourth feature is the local journal e-copy searching archiving and searching. The application will be able to view the archived CHMSC e-journal copy by clicking it in the application drawer shown in Fig. 4.

The fifth feature is multimedia storage searching. The user will be able to search multimedia material from academic library resources encoded in the application as the user selects multimedia navigation in the navigation menu, as shown in Fig. 5 (left).

The sixth feature is magazine searching. The user will be able to search magazine encoded in the application as

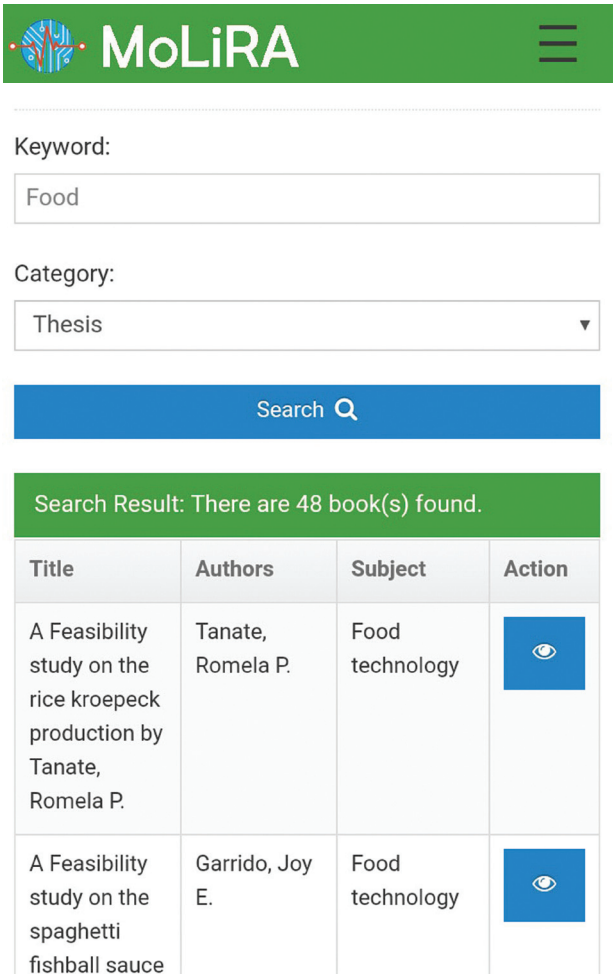

Figure 3. Unpublished research result.

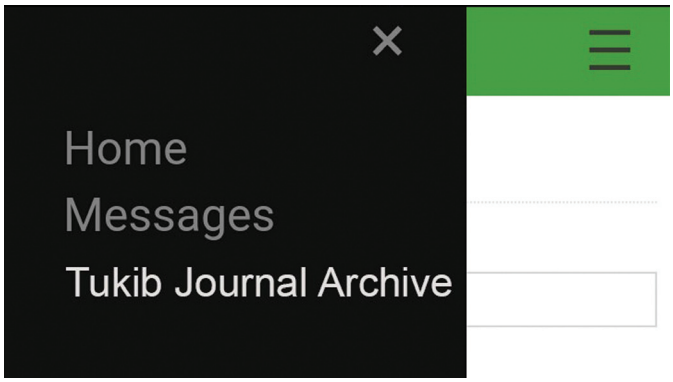

Figure 4. E-journal navigational link.

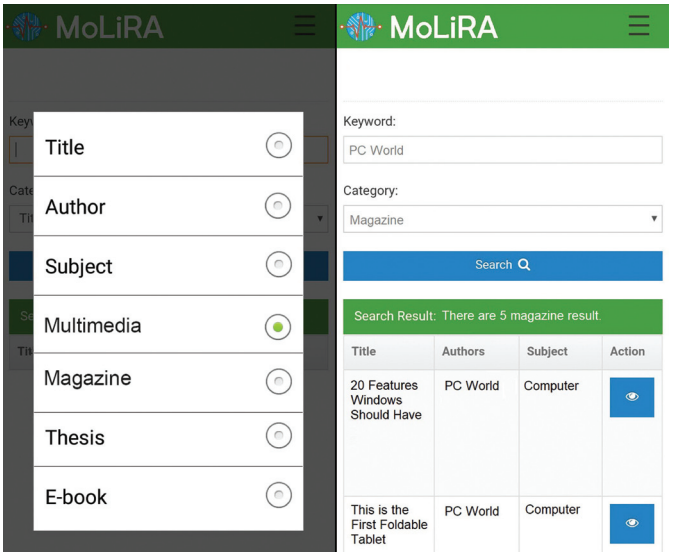

Figure 5. MoLiRA access point to bibliographic data of library resources and magazine search result.

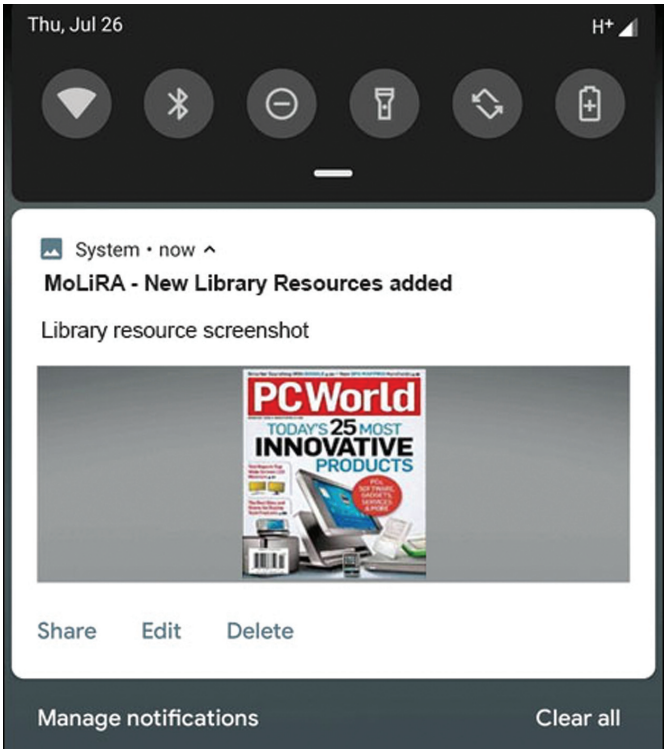

Figure 6. Library resource update push notification.

the user select magazine in the navigation menu, and results are generally tabulated in the application as shown in Fig. 5 (right).

The seventh feature is the library resource update notification. Figure 6 shows the sample library resource update, particularly the newly added magazine.

Lastly, the eighth feature is the designing of the application as a mobile app. Since the application was developed using the Android framework, then it is installed in android OS.

4.2 MoLiRA E-service Quality Level

The study was also conducted to determine the level of service quality of MoLiRA as to its efficiency, reliability, responsiveness, design, and security evaluated by IT professionals in Bacolod City and CHMSC-Alijis students. The respondents were asked to use the application and submit their responses in a week period. A total of 371 respondents have responded using both a paper-based survey questionnaire and a digital questionnaire powered by google forms as shown in Table 2. The questionnaire uses the 5-Point Likert Scale to gather the responses. The summary of mean scores and the standard deviation is presented in Tables 3.

In interpreting the result, the mean with the interpretation of its service quality was applied.

Table 2. Mean and standard deviation under service quality parameters

Parameters	Q #	Indicators	Mean	SD
Efficiency	1	Downloading speed of library resources	4.20	0.69
	2	Library information finding	4.56	0.51
	3	Navigation capability	4.10	0.76
	4	Search engine capability	4.51	0.53
	5	Search result speed and accuracy	4.15	0.72
Reliability	6	App performance reliability	4.25	0.70
	7	No error in downloading library resources	4.10	0.75
	8	Fast downloading	4.15	0.74
	9	Understandable information	4.56	0.50
	10	Accuracy of presented information	4.40	0.53
Responsiveness	11	Client support capability	4.20	0.68
	12	Complaint response speed	3.19	0.89
	13	Speed of fixing error	3.10	0.88
	14	Library resource suggestion capability	4.50	0.50
Design	15	Responsive design to the handheld device	4.40	0.52
	16	Easy to understand design structure	4.52	0.53
	17	Pleasing to the eye	4.10	0.74
	18	No design error in the current device	4.20	0.69
Security	19	The user is comfortable entering information	4.56	0.51
	20	User is confident to possible abuse of personal information	4.52	0.53
Overall			4.24	0.63

Table 3. Mean score interpretation

Verbal interpretation	Range of mean score
Very High	4.50 - 5.00
High	3.50 - 4.49
Moderate	2.50 -3.49
Low	1.50 -2.49
Very Low	1.00 - 1.49

The overall service quality rating of MoLiRA is M = 4.24, SD = 0.63 was interpreted as high. These findings indicate that the application is highly efficient, reliable, responsive, designed, and secure under service quality metrics. The IT experts and students of CHMSC-Alijis of Bacolod City, Philippines where MoLiRA is tested, have a high impression when using the application, as it helps them to query their needs in the library and is able to deliver the expected functions. However, it also shows that there is room for improvement since it does not get the highest possible rating and interpretation. In Table 3, the lowest among indicators were "Complaint response speed" and "Speed of fixing error". IT experts and students recommend increasing the speed of the complaint response and error fixing since a lot of them had suggested adding the desired book, while some have encountered a minor bug when using the application. The response becomes slow since there is a swarm of requests required to be accomplished. Nevertheless, it is interpreted as moderate.

MoLiRA improves the library information finding feature drastically as it indicates in the result with a very high rating. Students and IT professionals had eased in finding the library information using the application because of the search engine capability feature with a similar interpretation. The download speed does not get the possible highest rating, as shown by "downloading speed of library resources" and "fast downloading" indicators. This implies that in the implementation of the application, it is necessary to find the best hosting possible. Nevertheless, it is still rated as high. Whereas, information structure in the application is very high in rating because of good user interfacing in reference to "understandable information" and "easy to understand design structure" indicators. Information is well organised since the application is responsive to any device monitor, and data is readable and presented. Students and professionals are comfortable in sharing their information as they perceived that the application security is very high.

In general, the high rating indicates that the application is easy to operate and caters to the need of the users in finding library resources at their convenience.

5. CONCLUSIONS

The study involves the systematic evaluation of the electronic services granted by Mobile Library Resources Application (MoLiRA) in Carlos Hilado Memorial State College – Alijis Campus, Bacolod City, Philippines, with the intention of assessing the electronic service quality provided by the app. After the IT professionals and CHMSC-Alijis campus student evaluation, it was found that the users have a high evaluation in all e-service quality dimensions in terms of efficiency, reliability, responsiveness, design, and security. The evaluation responses, particularly the 'library information finding', 'understandable information, and 'user is comfortable of entering information are the most rated indicators. This indicates that MoLiRA can search their desired library materials and present result. Aside from that, users are comfortable in sharing their personal information, including email as needed in the dual notification of library updates, apart from the push notification that can also be triggered inside the school ground using Local Area Network (LAN) access similar to Rivera[12] has developed. Whereas 'speed of fixing error' and 'complaint

response speed' indicators were the lowest rated. It implies that the aspect of system responsiveness should be focus on and have to be improved. During the respondent's evaluation, a swarm of complaints has been submitted to test the responsiveness dimension. The researcher perceives that manpower becomes the critical factor of supplying the digital data in the application since the majority of the users complain about the information resources, which are not yet digitised but available in the library resources. It is recommended that the digitisation will be completed to minimise the client's complaint of the absence of resources. Nevertheless, the responsive dimension is still rated as high in general and able to respond to the complaints of the user on time.

The study was intended to help the library become more functional and also play a major role in the student's academic programmes. Internet is a good source of information, but not everything there is true or can be considered as valuable information. It might also yield information that might not be the same as the teacher's course lessons. Having the appropriate reference in line with the course syllabus is vital for student progress, as stated by Smith[13] *et al.* in his study. The study will promote more of the use of the school library and become a primary resource of knowledge to the teacher or the student. In general, it helps the school in their knowledge management and preservation of valuable library resources in the form of digitisation. Thus, it was rated as high in which both IT professionals and students perceive that the application can be beneficial to the school and able to deliver the expected functions.

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