

LIBRARY ONLINE DATABASE SYSTEM (LODS) FOR UNDERGRADUATE STUDENTS TO SUPPORT STUDIES AND RESEARCH: THE USERS EVALUATION

ZAHIDAH ZULKIFLI *, NOR ATHIRA AZLAN

*Department of Information Systems, Kulliyah of Information and Communication
Technology, International Islamic University Malaysia, Malaysia*

**Corresponding author: zahidahz@iium.edu.my*

*(Received: 26th January 2019; Accepted: 4th May 2019; Published on-line: 30th May
2019)*

ABSTRACT: Library online database system (LODS) has been developed to support the process of studies and research among undergraduate (UG) students. This paper reports on the user evaluation results that examine participants' acceptance. The objectives of the user evaluation are to ensure that the new system does what it sets out to do and meets the requirements of the business. A single case study has been employed in this evaluation which included UG students from International Islamic University Malaysia (IIUM) as participants. The user evaluation was carried out in two phases, which involved a task-based approach and a questionnaire. The user acceptance test of the LODS in serving the UG students has been reflected by the positive feedback from the 15 participants. From the findings, in general, the system has been perceived as useful to support studies and research works among undergraduate students electronically.

KEY WORDS: *User Evaluation; Library Online Database System (LODS);
Undergraduate students' studies; undergraduate students; online
database.*

1. INTRODUCTION

The demand for good quality research especially in academic field has given rise to the emergence of library online database services. The Internet is a network of physical objects that enable the availability of library online database services (Abdulkareem, 2017). Most of the universities in Malaysia have subscribed to the library online databases. The online database serves as a platform for user to search for scholarly information where it consists of several journal disciplines and can be accessed online (Britannica Concise Encyclopedia, 2012). The services are expected to give benefit to the postgraduate and UG students for academic purposes.

However, most of the UG students are not aware of the existence of library online databases services that universities provide. UG students are generally required to produce their coursework assessment work (i.e. assignment, project

proposal, project report, and research) with research writing quality by using valid academic sources that are available in the library online databases. Studies discover that most UG students rely too much on general Internet resources (i.e. Google search engines, websites, web portals and forum) (Adamou, Ntoka, 2017). They do not pay attention to digital library services if they can find information on the web freely. Most users consider libraries as places for finding books rather than finding digital items. Demand for digital items in academia is only high among postgraduate researchers (Badtesting.com, 2016). This scenario has led to the underutilization of university's information facilities among undergraduate students who form the majority in university.

It was also found that UG students use other resources for information needs because they do not know how to use the online database. In addition, UG students prefer search engine rather than online databases because they are not aware of the existence of online databases (Britannica Concise Encyclopedia, 2012). The dependency on these Internet resources also signifies the lack of skills in securing online information from other valid academic resources (Chapanis, 1991).

Therefore, this research mainly focuses on investigating how online databases could be of assistance and useful particularly for undergraduate students for their learning and research purposes. It shall promote the use of online databases as well as propose a conducive electronic environment; library online database system for the students.

2. RELATED WORKS

There are thousands of online databases available nowadays however this study mainly focuses on academic online databases. In the research, online databases subscribed by top universities were identified and certain online databases' features were captured. The features captured are in terms of its Accessibility, Ease of Use, Efficiency, Coverage, Languages, Recency, Number of databases subscribed, Library Search Engine (if available), and Content Management System (CMS) used to manage online databases. Three libraries listed in top universities and in Malaysia have been chosen, and the access is open to public.

2.1. University of Malaya, UM

University of Malaya (UM) is recognized as one of the research universities in Malaysia. The contribution of the university in producing high impact factor research that can contribute to economic development in local, state and national level is the main factor on why the University of Malaysia is being recognized as one of the research universities.

The University of Malaya Library has more than 100,000 subject based web links to resources like online databases, e-Journals, e-Books, selected web resources and more; all available in one place. Up till now, University of Malaya has subscribed to more than 100 online databases, more than 28,000 e-Journals, more than 90,000 e-Books and more than 3,000 selected Web resources. Figure 1 below displays the main page of online database system in UM with some examples of the online databases subscribed by the University of Malaya (Hambling, Goethem, 2013)

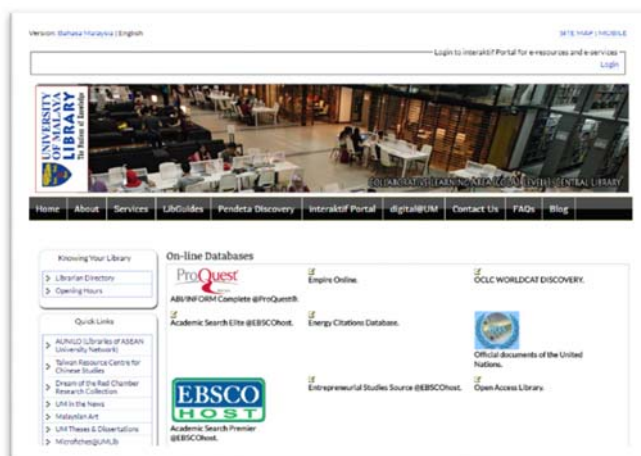


Figure 1. The Main Page of UM Online Database System

The examples of online databases subscribed by the university include ProQuest, EBSCOHost, Oxford University Press Journals, GLOBinMED and much more.

The academic online databases have been managed by the university in an effective manner and are illustrated in Figure 2 below.

The screenshot displays the University of Malaya Library website interface. At the top, there is a navigation bar with tabs for HOME, myDATABASES (26), myJOURNALS (19), myBOOKS (11), myWEBS (0), mySUBJECTS (1), and a GUEST user profile. A search bar is located below the navigation, with a 'SEARCH' button and a 'Browse' dropdown menu currently set to 'DATABASES'. Other menu items include eSERVICES, ASK US!, FAQs, and LOGOUT. The main content area is divided into several sections:

- 2 Latest Databases:** Lists '1. Datastream Professional' and '2. IntelliConnect' with brief descriptions and 'Add to myLibrary' links.
- 41 Open Access Databases:** Lists '1. Aggregated Computational Toxicology Resource (ACToR)', '2. Bioline International', '3. Caltech Thesis', '4. Cambridge Digital Library - Islamic Manuscript', '5. ChemSpider', and '6. ClinicalTrials.gov'.
- Read eBooks from SpringerLink:** Features four eBook covers: 'Economic Justice: Philosophical and Legal Perspectives', 'Managing Knowledge Workers: Value Assessment, Methods, and Application Tools', 'Geographic Information Science at the Heart of Europe', and 'Insulin Therapy: A Pocket Guide'.
- 100 Subscribed Databases:** Lists '1. ABI/INFORM Complete @ProQuest', '2. Al Manhal', '3. American Chemical Society (ACS) Journals', '4. American Geophysical Union Journals', and '5. American Institute of Physics (AIP) Journals'.

Figure 2. Screenshot of subscribed database in University of Malaya Library web page

UM online databases can only be accessed within the campus network. The online databases are easy to use by students however students need to login first before they can use online databases services. Other than that, the online databases can be accessed using internet connection only. The online resources cover within online databases subscribed by the university. Based on the content analysis review, the system is efficient to use, and all information are well-organized. The system language is limited to English language only.

2.2. University of Cambridge, United Kingdom

The University of Cambridge is one of the top research universities in the world. According to QS World University, Ranking by Subjects (2014) (International Software Testing Qualification Boards, 2016)., the University of Cambridge that is in United Kingdom was listed to be the top six ranked in the world for statistics and operational research.

Cambridge University Library's collections have grown into one of the world's great libraries with an extraordinary accumulation of books, maps, manuscripts and journals. It covers every conceivable aspect of human endeavor, spanning most of the world's cultural traditions. The library collections including manuscript collections have already been published in print, microfilm, and digital formats. The library also provided substantial online resource so that their collections can be much more accessible to students, researchers and the wider public. Up till now, users can search over 70,000 million online licensed contents including the university's e-journal, newspapers, articles, and database subscriptions. Figure 3 and Figure 4 below display University of Cambridge Library web page and library search engine.

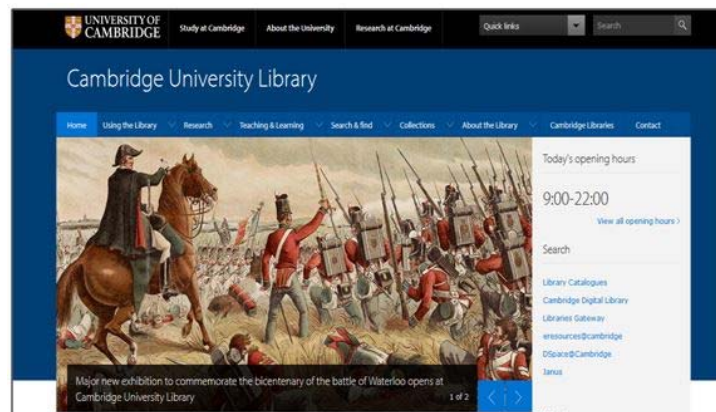


Figure 3. University of Cambridge Library Web Page.

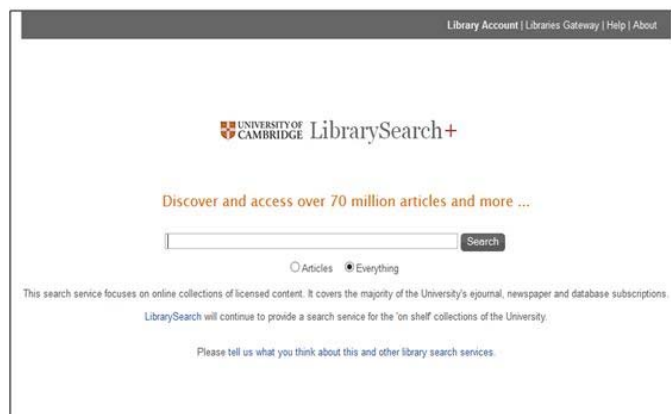


Figure 4. The University of Cambridge Library Search Engine.

Figure 3 displays the interface of University of Cambridge Library webpage. The University of Cambridge built web pages specially for their library collection including printed resources and online. Their collections are not limited physically in the library but also through online. Figure 4 shows that University of Cambridge stores all their collections in one place including e-journals, newspapers, and online databases subscriptions. Their library online database system interface is simple. It is also easy to use for information searching. The system contains search engine, LibrarySearch+ that offers similar functions and features like Google search engine.

The university resources can be accessed not only by the university students but also other researchers and public users. However, the researchers and public users must pay the fee before they can access the resources. The University of Cambridge also offers their students and public users the opportunity to access the resources even when the resources are not owned by the university. However, they must pay and request for the resources. Their library online database system is very efficient and stores millions of online resources that can be accessed in one place. Falcon and Drupal are used in the system. They are used to manage all the online resources.

Falcon is a Content Management Service that creates individually hosted websites in a managed environment, a ready-made template in the university house style and with a range of functionalities already available. It is run by the University Information Services (Computing) built on the Plone platform where Drupal is used by University Information Services (Management Information) to deploy the university's homepage, a few thousand pages of content that make up the research, news sections along with other core top-level contents. A Drupal theme is being developed to cater for additional content areas.

2.3. University of Oxford, United Kingdom

The University of Oxford is listed to be the top research university in the world. It is listed in the top 10 ranking in the world stated by QS World University Ranking by Subjects 2014 (Lee, et.al. 2012). Oxford meets the needs of its students, academics and the international research community with a wide range of library services provided by more than 100 libraries, making it the largest library system in the UK. There are four main libraries that the University of Oxford provides including Bodleian Libraries, The Bodleian Library, College libraries and Oxford University Libraries A-Z. The University of Oxford has been recognized as the top research university in the world. The facilities that the university provides include a special library for research purposes, researchers and students.

Other than that, the university provides SOLO (Search Oxford Libraries Online), the main search engine for library collections across Oxford, providing access to information in over 100 Oxford libraries including circa eight million bibliographic records and more than 13 million item records. These include ORA (Oxford University Research Archive), OxLIP+ (currently over 800 e-resource databases) and OU E-Journals (over 28,000 e-journals). The University of Oxford uses OLIS (Integrated Library System) to manage the libraries. OLIS is the Integrated Library System of the University of Oxford, part of the library catalogs and services provided by the Bodleian Libraries. It contains records of more than 13 million items held by libraries within or associated with the university. OLIS also provides complex library management services. Library staff members use it for maintaining catalog records, purchasing books and journals, recording and tracking loans and requests, and registering journal issues. The primary public search interface is SOLO: Search Oxford Libraries Online; OLIS can also be searched within Mobile Oxford and via Z39.50. The Oxford University uses Content Management System, Drupal to manage the website, library system, and online resources.

Table 1 below is the summarization of library online database system features, which are, accessibility, ease of use, efficiency, coverage, languages, recency,

number of databases subscribed, library search engine and Content Management System (CMS) (Pal, 2017), by these three research universities.

Table 1: Summarization of Library Online Database System Features

Features	Universities		
	University of Malaya, UM	University of Cambridge, United Kingdom	University of Oxford, United Kingdom
Accessibility	//	////	////
Ease of Use	///	////	////
Efficiency	///	////	////
Coverage	//	////	////
Languages	/	/	/
Recency	///	////	///
No. of Databases Subscribed	> 100	> 100	>100
Library Search Engine	-	Library Search+	SOLO Search Oxford Libraries Online
CMS	Content Collaboration Management System, CCM version 2.0	Falcon and Drupal	Drupal

Legend:

Excellent////

Good ///

Satisfactory //

Poor /

As a result, the best library online database system features were discovered and IIUM Library Online Database System that suits undergraduate student's information searching preferences was developed for students use (Pal, 2017).

3. IIUM LODS

In the present day, libraries need to develop single window search for all its resources, so that users can have a single term search into the entire collection rather than searching various databases (Nor Athira Azlan, et.al., 2016) Currently, IIUM does not have any online database system. The library online databases subscribed by the university are arranged and displayed one by one in the library website. It is difficult for students to search the online resources that they want as they must click one by one the link provided in the library website. It obviously violates the ease of use feature offered by top research universities online database systems. It became one of the reasons for the decreasing use of library online database each year.

It was found that all top research universities have their own library search engine. It is efficient for students to find information and online resources. The search engine offers students simple interface and ease of use and it is effective to use for information searching. Other than that, IIUM should choose more suitable content management system to manage the online resources and website. The issue is that all the information provided in the IIUM library website is not organized. The interface of the library website also looks dull and not attractive. It is unlikely with top research universities websites and library online database systems. It is because they use Falcon, Drupal and Content Collaboration Management System, CCM version 2.0 to manage their websites and online resources. It is found to be the most suitable content management systems for their websites and systems.

Moreover, IIUM needs a wider coverage in terms of its online resources. IIUM needs to subscribe more library online databases like top research universities. It is important to increase the possibility of students getting resources that they want and need from library online databases without getting help from internet search engine like Google.

For example, up till now, University of Malaya has subscribed to more than half library online databases compared to IIUM. IIUM also needs to adopt the accessibility feature in the future system. The online resources should not only be accessed by the IIUM community but also the public users. The language feature will be an added advantage if it is adopting the future library online database system. Most of the top research universities are not emphasizing and using multiple languages in their system. However, it will be a great feature to be adapted as the popular search engine provides this feature and it is proven to be one of the reasons people are attracted to use search engine to find information.

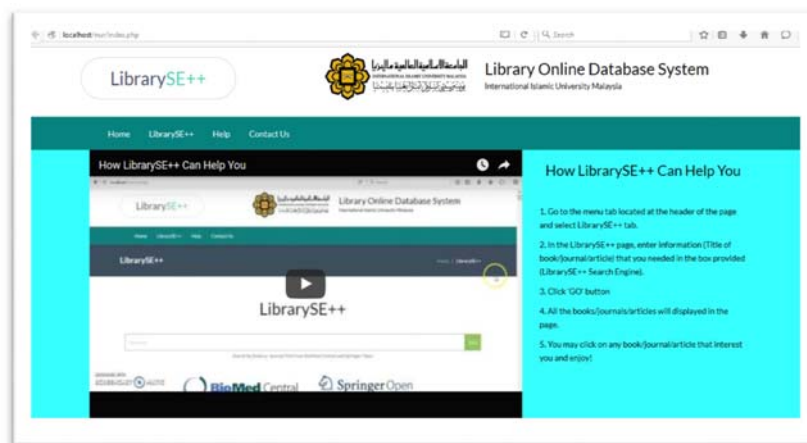


Figure 5. IIUM LODS main page

The system design for the current and new system, frameworks, tools and platform were used to develop the system and screenshots of the new system. The system design mainly physical design (user interface design and process design) for the current system has been analyzed. The input, output and process requirements gathered and collected from the survey have been added in the user interface design and process design for the new system. As a result, new business processes have been created. The physical design then guided the system development. Tools example (PHP, HTML5, CSS and jQuery), frameworks example (Bootstrap and CodeIgniter), and platform example (Context Editor) were with content management system for IIUM LODS (Pal, 2017).

4. OBJECTIVES AND METHODOLOGY

The main objective of this system evaluation is to examine undergraduate students' acceptance of LODS that was developed to support the process of studies and research among undergraduate students. In order to meet the objective, a single case study approach was employed and involved librarians and students in IIUM. A total of 15 participants took part in this evaluation and they comprised

thirteen undergraduate students and two librarians who are involved in managing the online database subscriptions and management in IIUM Library. The user evaluation was carried out in two phases. The first phase (A) involved a task-based approach where participants were given several tasks to perform when using the LODS. This method was proposed by Chapanis (Purdy, 2012). where participants were given several tasks to perform in a defined set of environment. The second phase (B) was a survey where the participants were given questionnaires to elicit their feedback on the system after they had completed the given tasks based on the variables that have been categorized into four - people, system usability, system features and user satisfaction.

A. USER TASKS: USER MANUAL GUIDE

This section explains user tasks or activities done by the user to test and use the system. Users mainly students and admin (librarian) need to complete the tasks given. Steps and procedures in using the system are explained in the User Manual Guide which was provided to the users during the user evaluation process. Overall, users need to complete eight modules. The eight modules are:

- a) Module 1: Understand the definition of Library Online Database System
- b) Module 2: Understand the definition of LODS.

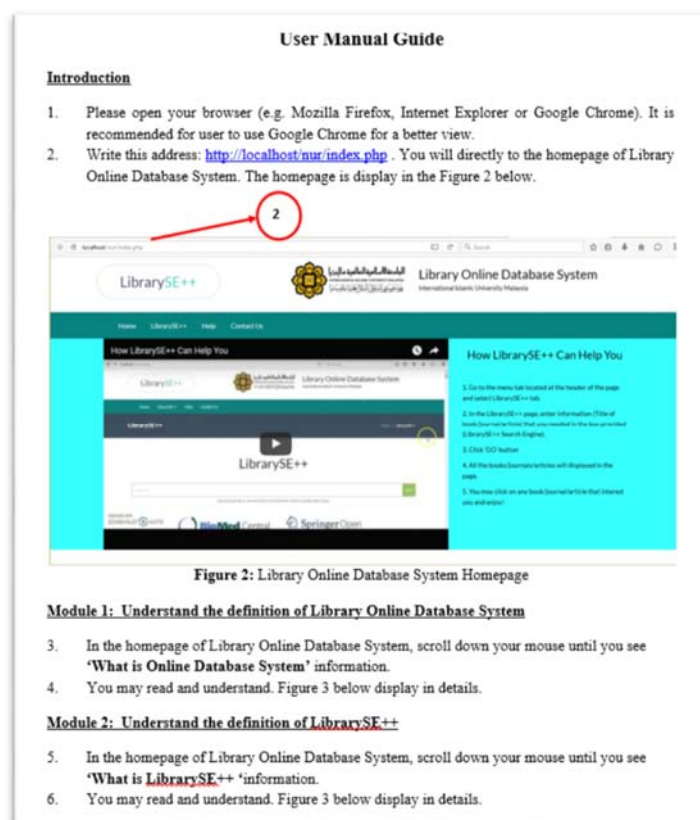


Figure 6. User Manual Guide: Modules 1 and 2

c) Module 3: Recognize list of Online Databases Subscribed by University

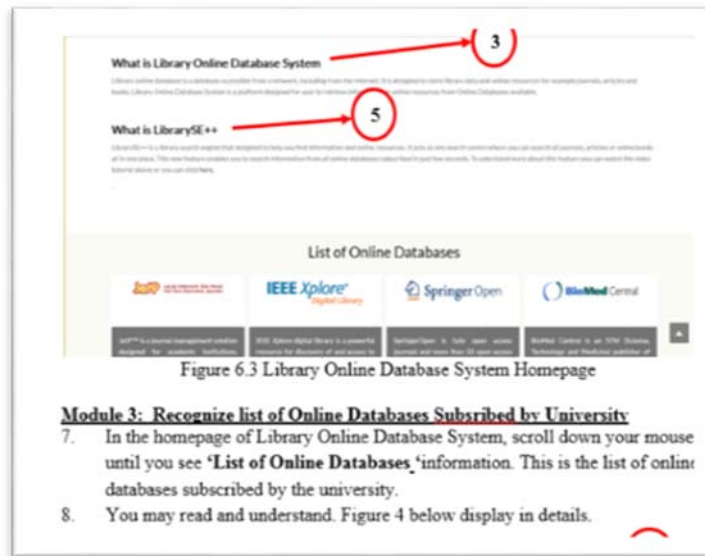


Figure 7. User Manual Guide: Module 3

d) Module 4: Watch video tutorial on how to use LODS.

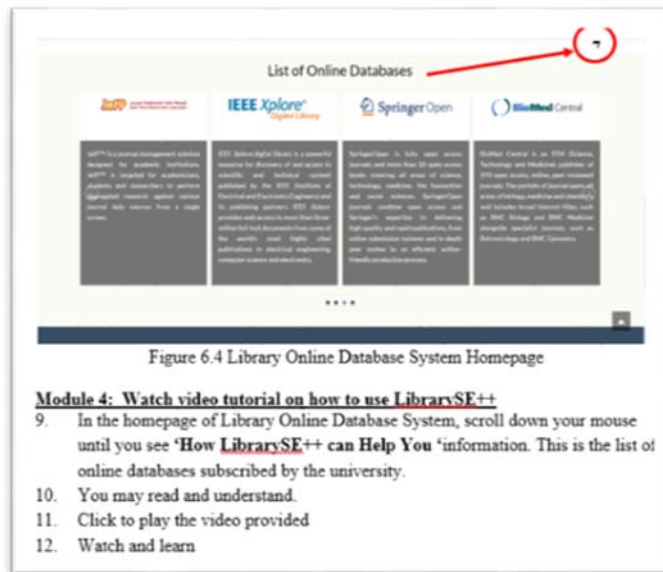


Figure 8. User Manual Guide: Module 4

e) Module 5: List all medicine journals, articles and books from library search engine

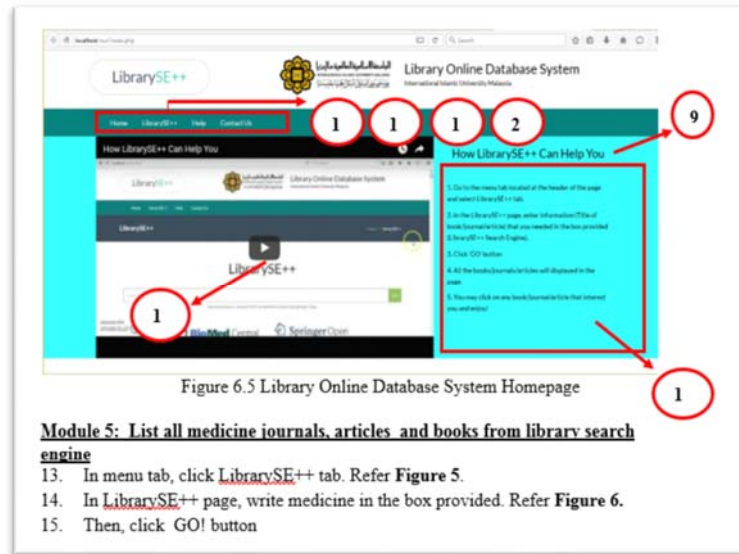


Figure 9. User Manual Guide: Module 5

f) Module 6: Identify journal title Ethics and Traditional Medicine from search engine

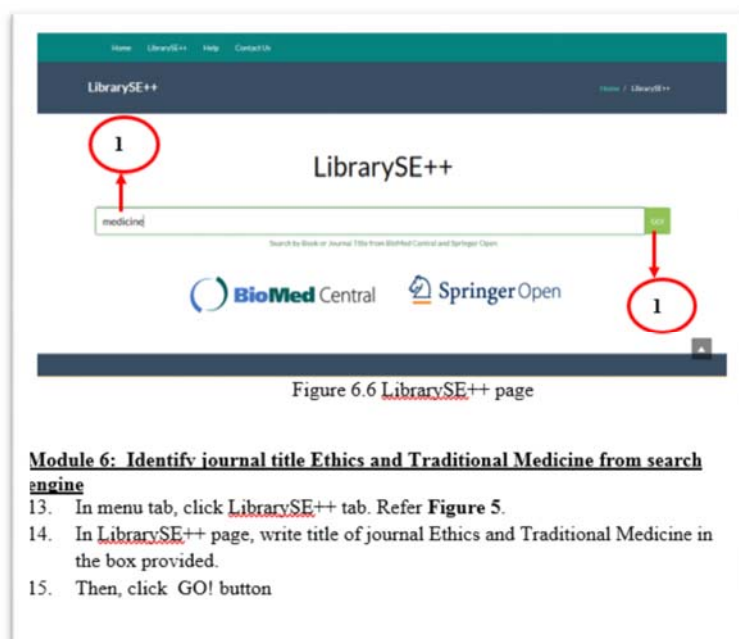


Figure 10. User Manual Guide: Module 6

g) Module 7: Choose the most frequently asked questions to solve problems

h) Module 8: Ask any inquiries through the system

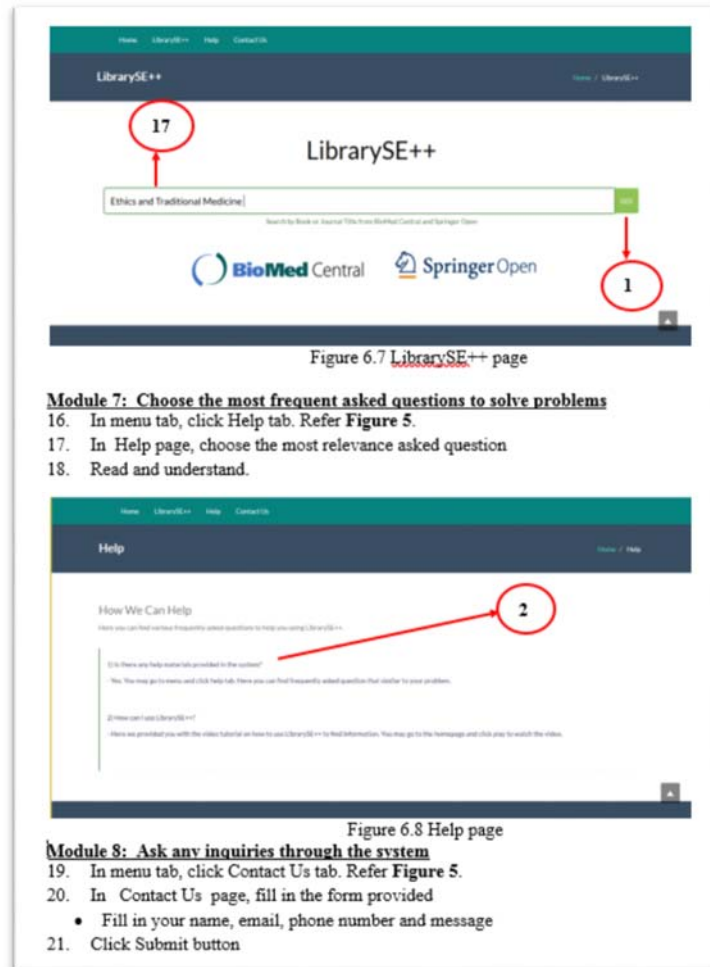


Figure 11. User Manual Guide: Module 7 and 8

In order to test the system efficiency and ability to cooperate with user demands and expectations, certain variables have been taken into consideration. The variables were taken from the requirements collected from the survey (Pal, 2017). The input, output and process requirements have become the variables used to test the system. These requirements were then categorized into four categories mainly People, System Usability, System Features and User Satisfaction (QS World University Rankings by Subject, 2014) The variables were displayed in Table 2.

Table 2: System Evaluation Variables

Categories	UAT Variables
System Features	Simple Interface Help Assistance Attractive Pleasant Inquiries Support
System Usability	Simple Procedures Incomplex Consistent Not Cumbersome Display Relevance Information No Self Learn Accurate Result
User Satisfaction	Easiness Clear Effective
People	Awareness Understanding

These variables guided the development of the questions and tasks for user acceptance testing. The questionnaires were displayed in the next section below.

B. SYSTEM EVALUATION QUESTIONNAIRES

Questionnaires were created and categorized based on the variables presented in Table 3 below. These questionnaires enable users to evaluate the system performance (Rice, 1985), (The University of Malaya Library, n.d). This ensures that the system can meet user requirements and expectations. In this research, the users recognized include students and librarians.

Users (Students and Librarians) need to test the system by doing the tasks provided in the User Manual Guide (Refer to Figure 5, 6, 7, 8, 9, 10 and 11). Upon completing the tasks, users need to fill in the questionnaires by evaluating each variable contained in the questionnaires and filling in yes/no or leaving some comments for improvements (see Table 4 below). The results collected from UAT were then analyzed and presented in the Result from UAT Questionnaires section.

5. RESULT FROM QUESTIONNAIRES

Upon the completion of the UAT, the results from the questionnaires were gathered. The results then were analyzed to measure the user expectation towards the new system. The UAT was conducted at Kulliyah of Information Systems and Communication Technology lab. The results collected are presented in detailed below.

Table 3: User Acceptance Testing (UAT) Questionnaires

Questions	Yes/No	Comments
1. People		
1.1. You are clear on what is online database system and how it is function		
1.2. You are aware about the online databases that IIUM subscribed		
2. System Usability		
2.1. Procedures are simple and required minimum number of steps		
2.2. The system is <u>incomplex</u> and easy to use		
2.3. The system is consistent and not cumbersome to use		
2.4. The system is able to display relevance information		
2.5. User do not have to do <u>self learn</u> before use the system		
2.6. The system is able to display all information suit with the keyword entered by user		
3. System Features		
3.1. There were help page provided for user to find the most frequent asked questions		
3.2. The interface of the system was simple		
3.3. The system is pleasant and attractive to use		
3.4. There was form provided for user to send any enquiries through the system		
3.5. There was reference material provided in the system		
4. User Satisfaction		
4.1. I am satisfied on how easy to use the system		
4.2. The information provided in help page is clear		
4.3. The information provided is effective in helping you find your desired resources		

Most of the users stated that they are clear on the definition of the online database system and how it works. Almost 90% students agreed and only 10% of students did not agree with the statement.

It shows that all the users agreed that they are aware of the existence and list of all online databases subscribed by IIUM after using the system. After users were done testing the new system, all the users agreed that the procedures in the new system are simple and require minimum number of steps compared to the IIUM current system. All users agreed that the new system is incomplex and easy to use.

Other than that, they also agreed that the new system is consistent and not cumbersome to use.

In addition, all of the users agreed that the system is able to display the relevant information. Moreover, users also do not need to learn by themselves on how to use the system and they felt that the system is able to display all information that suits the keyword entered by the users.

Furthermore, all the users stated that there was a help page provided for users to find the most frequently asked questions. They felt the interface of the system is simple. 90% of students felt the system is attractive and pleasant to use while 10% of the users did not agree with the statement. Besides that, all of the users stated that there was a form provided for the user to send any inquiries and reference material available in the system for users' reference.

Overall all the students were satisfied with how easy it is to use the system. They also felt that the information provided on the help page is clear and the information provided in the system is effective in helping users find their desired resources.

6. CONCLUSION

This paper reports on user assessment of the LODS prototype developed earlier. The UAT was conducted to gather users' feedback on System Features, System Usability, User Satisfaction and People. The findings generally indicate positive reactions of the participants. Significantly, the LODS prototype has demonstrated its capabilities to better serve undergraduate students in studies and research activities as reflected by the positive feedback on the functional requirements. A number of useful comments and suggestions were put forward in the questionnaire sessions. From the findings, the LODS has been developed mainly to support undergraduate students in searching reliable online resources in order to support their study activities such as doing assignments and other tasks. It became the factor that attracts students to use the system for information searching.

Other than that, IIUM needs to subscribe more library online databases to encourage students to use the future library online database system and eliminate the urge for them to use internet search engine to find information and resources. Similar with a study reported before during online databases search in the library, students encountered that they have inadequate skills to recognize and identify their information needs, ascertain where to find the information that will meet the identified needs, and know how to find the information, how to evaluate the quality of the information when obtained and also how to use it effectively and efficiently (University of Cambridge LibrarySearch+. n,d).

These findings are believed to be the potential solution that can eliminate the issues and problems related to the decreasing use of library online database services. It is important to increase research quality and to avoid the decreasing number of libraries online databases subscriptions each year. The students will have no limitation to have references to do research. As a consequence, IIUM will fall behind from other universities in university ranking, research values and contribution for country development. Further study could be conducted to embed semantic search tools to the current system prototype to enrich the search results.

ACKNOWLEDGEMENT

This research is funded by the Research Acculturation Grant Scheme 2014 (RAGS14-053-0116), under the title Modeling Searching Behavior among Undergraduate Students.

REFERENCES

- Abdulkareem,(2017) A. Challenges of Online Database Searching among Medical students of Kaduna State University, Nigeria.
- Adamou, S., & Ntoka, L. (2017). The impact of Digital Technologies on Academic Libraries : a study in Greece (Dissertation). Retrieved from <http://urn.kb.se/resolve?urn=urn:nbn:se:lnu:diva-67157>
- Badtesting.com,. (2016). Test Case Specification - Bad Testing®. Retrieved 5 January 2016, from <http://www.badtesting.com/test-documentation/test-case-specification/>
- Britannica Concise Encyclopedia (2012). Search engine definition. Retrieved from: <http://www.answers.com/topic/serch-engine>.
- Chapanis, A. (1991), Evaluating Usability, Cambridge University, Cambridge, UK.
- Hambling, B., & Goethem, P. (2013). User Acceptance Testing A Step-By-Step Guide. United Kingdom: The Chartered Institute for IT. Retrieved from <http://shop.bcs.org/resources/pdf/9781780171678.pdf>
- International SoftwareTesting Qualification Boards, (2016). ISTQB Glossary of Testing Terms. Retrieved 5 January 2016, from <http://www.istqb.org/downloads/glossary-1.3.pdf>
- Lee, J. Y., Paik, W., & Joo, S. (March 2012). Information resource selection of undergraduate students.metrics, pp.1-8..
- Nor Athira Azlan, et.al.,(2016) Indian Journal of Science and Technology, Vol 9(34), DOI: 10.17485/ijst/2016/v9i34/100844, September 2016
- Pal, S. K. (2017) Library Resources Discovery Service: Future of the Libraries. 62nd ILA Conference 2017. International Conference on "Gearing Up for the Future: Library Initiative for Digital India.
- Purdy, J. (2012). Why first-year college students select online research resources as their favorite. First Monday, 0. doi:10.5210/fm.v0i0.4088
- QS World University Rankings by Subject 2014 - Statistics & Operational Research. Top Universities. N.p., 20 Feb. 2014. Web. 8 Mar. 2015. <http://www.topuniversities.com/university-rankings/university-subject-rankings/2014/statistics-operational-research#sorting=rank+region=+country=+faculty=+stars=false+search>
- Rice, B. (1985). Evaluation of Online Databases and Their Uses in Collection Evaluation. Retrieved July 30, 2015, from https://www.ideals.illinois.edu/bitstream/handle/2142/7387/librarytrendsv33i3e_opt.pdf?sequence=1
- University of Malaya Library. N.p., n.d. Web. 8 Mar. 2015. <<http://www.umlib.um.edu.my>>.
- University of Cambridge LibrarySearch+. N.p., n.d. Web. 8 Mar. 2015. <http://searchplus.lib.cam.ac.uk/>