USABILITY OF LIBRARY MANAGEMENT SOFTWARE: AN EVALUATION OF THE LEARNABILITY OF CIRCULATION MODULE IN SERVICE DELIVERY IN FEDERAL UNIVERSITY LIBRARIES IN NIGERIA.

By

AKAWU L., ALHASSAN J. A., OYEDUN G.O. and BITAGI M.A.

Abstract

The study evaluated the learnability of circulation module of Library Management Software (LMS) used in service delivery in Federal University Libraries in Nigeria. Quasi experimental method was adopted for the study. The study evaluated the learnability of circulation module. Purposive sampling technique was adopted to select 40 participating users for the study from a population of 385 library staff consisting of librarians and para- professional staff. Observation was used as instruction to collect data for the study. Results indicated that SLAM (66.36%,), Alexandria (58.38%) and NewGenLib (65.69%) circulation modules were at acceptable region, but the level of acceptability was low due to usability issues with registration templates and features. The study recommended that registration templates and features should be improved when developing newer version in order to achieve maximal performance within a short time.

Keywords: Circulation, Evaluation, Learnability, Library management software, Usability.

Introduction

Libraries are solely responsible for acquiring and providing access to information resources in academic universities worldwide. The effectiveness and efficiency of libraries in academic institutions lies in their ability to provide adequate services to their users in support of teaching, learning and research. It therefore becomes paramount for library in universities to apply advanced technologies in order to serve the information need of its users. Application of technologies has enabled a wide range of library software to be developed that can be used by libraries. The deployment of Library software in libraries has revolutionized library functions and services globally. The use of library management software in libraries has transformed the traditional way library operations are performed. Their utilization in operating different library housekeeping functions have replace the manual system of library operations, thereby being able to manage library routines. The basic housekeeping operations include acquisition, cataloguing and classification, circulation reference and serial management.

Circulation is one of the vital functions in the library that provide library users with the means of utilizing resources in the library. Activities such as registration of users, charging and discharging of library materials, filling and keeping records of transactions, sending overdue notices, calculating and collecting fines and clearance of library users are operations that are perform in circulation by library staff. The quest to effectively and efficiently serve library users made libraries to apply library software to perform circulation activities. Nwachukwu and Musa (2016) affirmed this when they asserted that introduction of library management software in libraries was to give library users easy access to library resources, ease the operation of library staff, save the borrower time and speed up the routine of checking in and out. Thus, application of library management software in circulation is to improve service delivery and to keep accurate records of library materials thereby enhancing the performance of library staff.

Library Management Software (LMS) are library management and automation program designed to enable librarians manage library operations and give access to library resources. They integrate various functions of the library known as modules to perform different operations in the library. Muller (2011) asserted that LMS are multifunction programs that enable libraries to acquire, catalogue and circulate their resources to the users. The basic functions/modules in the library management software include acquisition, cataloguing, circulation and serial management. Due to the ability of library software to perform these functions, Nigerian university libraries have since embraced different types of library management software to manage their routine activities. Karo and Baro (2014) confirmed this when they asserted that Nigerian university libraries started using TINLIB library software for library automation in the mid-1990s and due to some technical issues with TINLIB some university libraries later adopted GLASS, X-LIB and ALICE for automation. Today, Nigerian university libraries are using different integrated library management software such as Koha, VIRTUA, SLAM, New GenLib and Alexandria to manage their basic housekeeping functions (Karo and Baro, 2014).Oyekale (2018) reported that most libraries in Nigeria universities have automated some of their operations in order to facilitate service delivery.

Statement of Problem

The circulation is a hub of activities directly involving contact between library staff and users. Registration of users, lending and checking in materials returned, sending overdue notices, calculating and collecting overdue fines and processing reservations are some activities that are being perform in circulation. The purpose of circulation is to control and regulate the use of library resources. Therefore, it is paramount to apply an easy to learn and use LMSto carry out circulation routine and clerical operations. The use of LMS in circulation has facilitated and enhanced services delivery in many academic libraries.

In spite of the recognized benefits, automation of library services such as circulation in Nigeria has not yielded much result (Emasealu, 2019). This could be attributed to insufficient funds to maintain automation process, lack of constant power supply, poor ICT skills among Librarians, lack of passion and poor attitude of library staff towards the use of LMS and poor internet connection (Otunla, 2016; Iroaganachi, Iwu and Esse, 2015; Emasealu, 2019). In addition, usability factors pose a challenge to LMS adoption and use. Farrahi, *et al*. (2019) concord to this assertion when he noted that the problem of many software including LMS is rooted in usability issues that frustrate users when learning to use software interface to perform tasks. Therefore, it is important to evaluate the learnability of LMS circulation module in relation to usability from user's point of view.

Objective of the Study

The study evaluates the usability of LMS circulation module in relation to learnability in service delivery in selected Federal University Libraries in Nigeria from users' perspective. Specifically, the study seeks to determine the learnability of LMS in service delivery in Federal University Libraries.

Literature Review

Learnability is identified as a fundamental attribute of usability because most software have to be learned for efficient use (Nielson, 1993 and Joo, Lin and Lu, 2011). The International Organization for Standardization (ISO 9241-11, 1998) defined usability as the "extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use". Nielsen (1993) also described usability in terms of ease of learning, efficiency of use, memorability, error frequency and

subjective satisfaction. This means that usability depend on the interaction between user and task in a defined environment. Usability of LMS is therefore determined by user interactions and the degree to which it can be learned to successfully perform circulation tasks with effectiveness, efficiency and satisfaction in work environment.

Joo, Lin and Lu (2011) defined learnability as the ease with which users learn to use and become proficient with the use of software. Sauro (2013) described learnability as the ability of users to accomplish tasks on the first attempt with a software interface. Santos and Badre (1995) further explained that, the effort required for a user to learn and be able to perform a set of tasks with good level of proficiency describes learnable software. This view is supported by Nielson (1993) who affirmed that, learnable software allow new users (novice users) to figure out the step to take to accomplish a task. In order to achieve goals, the ease with which procedures are required to be learnt or mastered to allow usage is very important (Joo, Lin and Lu, 2011). Thus, this attribute measures how quickly a user can learn and use the features to perform tasks. Since librarians are not software developer and engineer, they need to learn how to use the features in LMS to be able to circulate library materials. Their ability to perform circulation tasks at the initial learning stage and to achieve optimal performance within a short period of time makes the software learnable and easy to use (Sauro, 2013). Simplicity of the software interface layout and its resources makes learning easy and fast (Kim, 2011). As such, users should be able to figure out what to do by exploring the interface quickly (Sauro, 2013).

With high learnability, users can understand and be able to perform task quickly with minimum instructions, but with low learnability of a software, users feels the terminologies used are unfamiliar and need more explanations and time to perform task with the system (Mentes and Turan, 2012). In view of the above context, this study aim to assess the learnability of LMS circulation module used in service delivery in Federal University Librarians in Nigeria.

Methodology

Quasi experimental method was adopted for this study. The study was carried out in four selected federal university libraries in Nigeria. The population for this study was 385 library staff consisting of librarians and para-professional staff. Purposive sampling technique was adopted to select 40 participating users for the study. The participants consisted of equal number of 5 experienced and 5 inexperienced users from each of the participating libraries. The criteria for the selection of participants included familiarity with LMS circulation module, computer skills and lack of working experience with LMS circulation module. Observation was adopted as the instrument for data collection for the study.

Usability testing was employed to perform circulation tasks which include registration of users, charging and discharging of library materials to users. Participants were encourage to complete the tasks given to them, note the problems they encountered while performing task, skip the task that is difficult to accomplish but if the participants feel that difficult task could be accomplished with assistance, they could call for help and participants who were taken too much time on a task were asked to move to the next task, while the researcher watched how participants interacted with LMS in their working environment and noted their frustrations, confusion, failures, successes and the time it took them to completely each task on the 'participant's observation and recording form'. Since the inexperienced group has no pre requisite experience, they were given some time to explore Alexandria, SLAM, NewGenLib and Koha LMS circulation module to allow for familiarization. However, the exploration was

not needed for the experienced participants. Three circulation tasks were performed by experienced and inexperienced participants and performance metrics based on time taken on task and task success (Neilson, 1993 and Mifsud, 2015) were used to measure learnability of LMS circulation module. Each participant performed usability test at a time.

Results and Discussion

Results obtained for the study are presented in Table 1-3 and figure 1-2.

Table 1: Participants time on task (in seconds) for learnability of circulation module of LMS for experienced users

LMS	SLAM			Alexandria			NewGenLib			Koha		
	5			5			5			5		
Task: Registration of users and charging of books	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**
Time on task completed without help	485.00	335.00	288.00	543.00	360.00	293.00	627'00	485.00	335.00	1006.00	546.00	458.00
Ave time on task compl. without help	97.00	67.00	57.60	108.60	72.00	58.60	125.40	97.00	67.00	201.20	109.20	91.60

Table1present the results of time on tasks for learnability of circulation module with experienced participants. The results showed that all experienced participants completed circulation tasks. The highest time spent was on task 1 which is registration of library user. Koha participant spent more time to complete the registration process with a mean time of 201.20 seconds. NewGenLib participant spent a mean time of 125.40 seconds for registration of users and the minimal mean time spent on task 1 is 97.00 seconds obtained with SLAM. The difference in the time of task 1 indicates that some LMS circulation module contain more features and templates than other son registration interface. Results in Table 1also revealed that SLAM experienced participants have the lowest mean time of 67.00 and 57.60 seconds for tasks 2 and 3 and the highest mean time of 109.20 and 91.60 seconds with Koha LMS.

Table2:Distribution of participants' success on tasks for learnability of circulation module of LMS for inexperienced users

LMS	SLAM			Alexandria			NewGenLib			Koha		
Number of Participants	**5**			**5**			**5**			**5**		
Task: Registration of users and charging of books	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**
No. of participants who completed task without help	1	2	2	1	2	2	1	1	2	1	1	2
No. of participants who completed task with help	2	2	1	1	1	1	1	2	1	1	1	1
No. of participants who could not complete task	2	1	2	3	2	2	3	2	2	4	3	2

Table 3: Participants time on task (in seconds) for learnability of circulation module of LMS for inexperienced users

LMS	SLAM			Alexandria			NewGenLib			Koha		
Task: Registration of lib. Users and charging of books	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
Time on task compl. without help	182.00	244.00	223.00	209.00	265.00	226.00	231.00	192.00	277.00	407.00	213.00	396.00
Ave time on task compl. without help	182.00	122.00	111.50	209	132.50	113.00	231.00	192.00	138.50	407.00	213.00	198.00
Time on task compl. with help	363.00	129.00	259.00	198.00	129.00	119.00	227.00	179.00	128.00	398.00	217.00	204.00
Ave time on task compl. with help	181.50	129.00	129.50	198.00	129.00	119.00	227.00	179.00	128.00	398.00	217.00	204.00
Time on task not completed	394.00	279.00	110.00	653.00	257.00	222.00	742.00	542.00	257.00	1227.00	677.00	407.00
Ave time on task not completed	197.00	139.50	110.00	217.67	128.50	111.00	247.33	180.67	128.50	409.00	225.67	203.50
Total time on task	939.00	652.00	592.00	1060.00	651.00	567.00	1200.00	913.00	662.00	2032.00	1107,00	1007.00
Average total time on task	187.80	130.40	118.40	212.00	130.20	113.40	240.00	182.60	132.40	406.40	221.40	201.40

Table 2 revealed that, not all inexperienced participants completed the tasks given to them. While some inexperienced participants completed with help, others could not complete the tasks even with help. Table 2 also showed that not all inexperienced participants completed the process of registration, charging and discharging across the LMS used. The Table revealed that 28 tasks were not completed across the LMS assessed. This could be attributed to the inability of the participants to master the steps and the procedures required to register library users, charge and discharge library items. This could be attributed to the inability of the participants to master the steps and the procedures required to register library users, charge and discharge library items. Similar observation was reported by Joo, Lin and Lu (2011).

Table 3 showed that task 1 had the highest completion time with a mean value of 407.00 seconds with Koha, followed by a mean time of 231.00 seconds with NewGenLib and the least mean time on registration of users was 182.00 seconds obtained with SLAM. The difference in the variation of time on task 1could be attributed to the number of steps, templates and data elements required to be filled on the registration interface of the circulation module, which makes it difficult for some users to complete the task within a shortest time and without help. Furthermore, charging and discharging tasks were also performed. The result in Table 3 also showed that the highest mean time used to complete tasks 2 and 3 without help were 213.00 and 198.00 seconds with Koha and the lowest mean time used to complete tasks 2 and 3 without help were122.00 and 111.50 seconds with SLAM. The variation in mean time of tasks 2 and 3 (charging and discharging) among inexperienced participants across the LMS assessed could be attributed to bad network service.

Figure 1 compared the mean time of the experienced and inexperienced participants for learnability of SLAM, Alexandria, NewGenLib and Koha LMS.
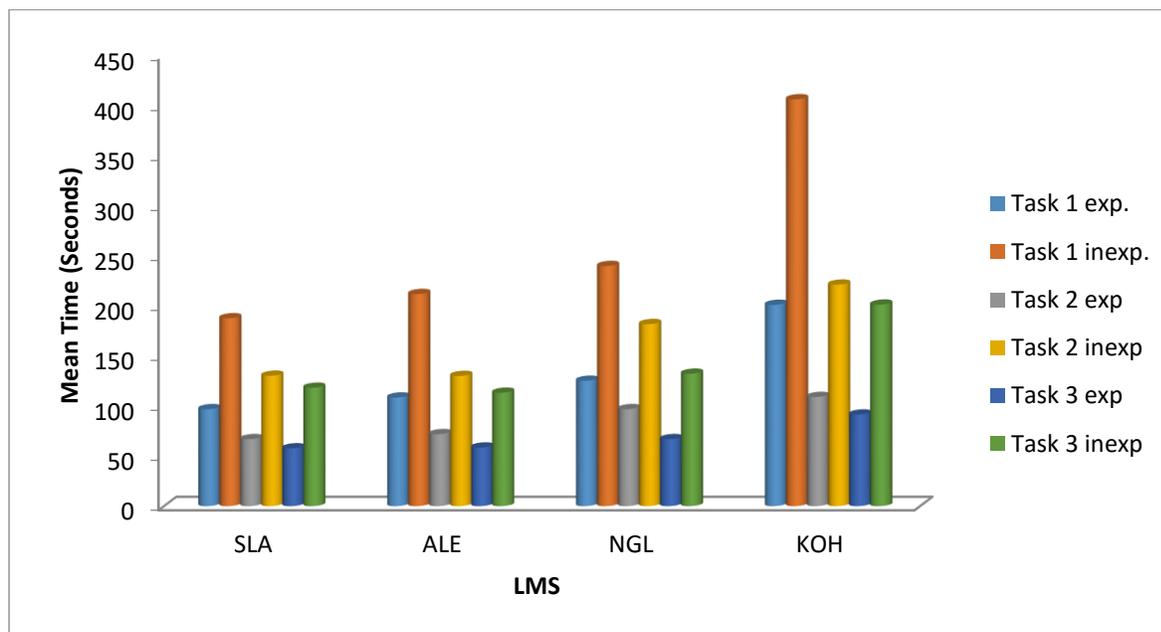
Figure 1: Comparison of mean time of experienced and inexperienced participants for learnability of circulation module of LMS

From Figure 1, the mean time on task 1 with experienced participants is 201.00 seconds while the inexperienced participants is 406.00 seconds (Koha); also, the mean time Alexandria experienced participants is 108.60 seconds while the mean time of the Alexandria inexperienced participants is 212.00 seconds. The difference in the mean time between experienced and inexperienced participants could be attributed to continual use of the LMS to perform circulation tasks. Thus, more time will be required to learn and be familiar to use the software to register library users. Similarly, the mean time on task 2 of the experienced participants is 97.00 seconds while the experienced participant is182.60 seconds (NewGenLib). Furthermore, the result also showed that the mean time on task 3 of the experienced participants is174.60 seconds while the inexperienced participants is 338.60 seconds (SLAM). It can be clearly seen from the Figure that the time of the inexperienced is more than the time the experienced spent on task performance. The difference in the timing can be attributed to the inability of the inexperienced participants to quickly understand and be familiar with the features especially with task 1. Similar observation was reported by Dalkirana, Akera, Oztemiza, Taskina and Tunca (2013).

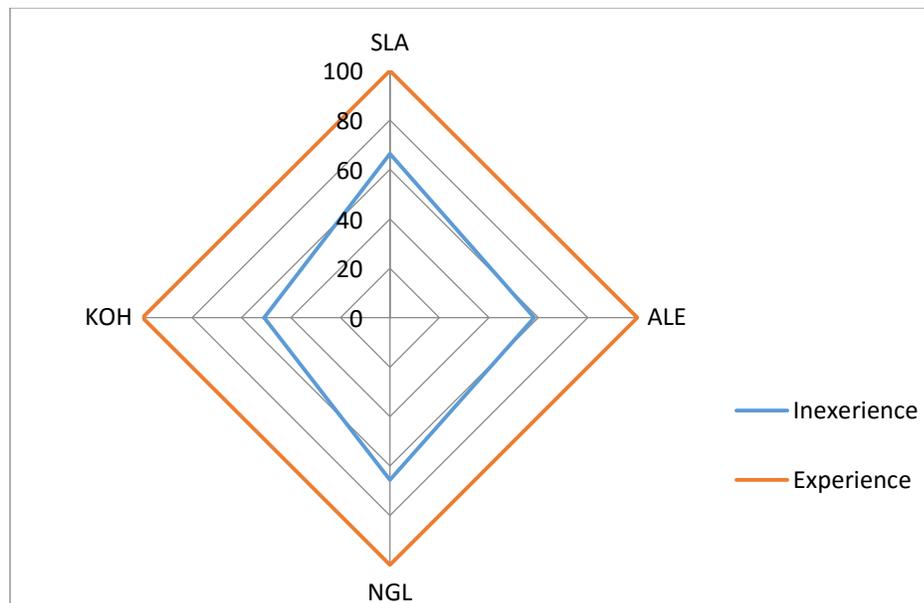Figure 2 present the percentlearnability for circulation module

Figure 2:Percent learnability for circulation module

The percent learnability graph shows that all experienced participants completed all circulation tasks without help. Hence, they all attained 100 percent learnability. The graph also shows that not all inexperienced participants completed circulation tasks without help. Most of the inexperienced participants could not complete the circulation tasks, few of them completed the tasks without help and fewer participants completed with help as indicated in the percent learnability in Figure 2. The Figure also showed that the percent learnability for SLAM is 66.36%, Alexandria is 58.38%, NewGenLib is 65.69% and Koha is 50.84%. From the classification of System Usability Scale (SUS)modified by Farrahi*et al*(2019) and adapted for acceptable region

for software learnability, 39- 52 percent is considered poor, 53-67 percent is considered ok, 67.5-74.5 percent is good, 75-85 percent is excellent and 85.5- 100 percent is best. This implies that SLAM, Alexandria and NewGenLibare within the acceptable region and Koha is not. Thus, SLAM, Alexandria and NewGenLib circulation modules are considered to be ok and hence learnable. While Koha circulation module is said to be poor and hence not easily learnable.

Conclusion and recommendation

The result obtained in this study showed that 3 of the 4LMS circulation module were learnable and 1 was not easily learnable. Registration templates were found to have learnability issues (usability issues). The level of usage proficiency of registration templates was not effectively and efficiently achieved. This affected the level of learnability of circulation module across the LMS especially Koha LMS. The level of interaction in term of learnability of user interface of SLAM, Alexandria and NewGenLib circulation modules were at acceptable level and Koha circulation module was considered to be poor. The study concluded that the LMS under study showed low level of acceptability in term of their learnability, therefore, recommends that the registration templates and the features in the circulation module should be reviewed and improved upon, when designing and developing newer version of the LMS in order to achieve maximal performance within a short time

References

Dalkırana, O., Akera, I., Öztemiza, S., Taşkına, Z. &Tunça, S.K. (2013). Usability Testing of Digital Libraries: The Experience of E-Prints. In *Proceeding of Social and Behavioral Sciences* held at the 3rd International Conference on Integrated Information (IC-ININFO).Retrieved from www.sciencedirect.com

Emasealu, H.U. (2019). Automation of academic libraries and web development: a reverie or reality. *International Journal of Knowledge Content Development and Technology,* 9(1); 43-56

Farrahi, R., Rangraz, F. J., Nabovati, E., Jabali, M. S. &Khajouel, R. (2019). The relationship between user interface problems of an admission, discharge and transfer module and usability features: a usability testing method. *BMC Medical Information and Decision Making,* 19(1); 172-185

Iroaganachi, M. A., Iwu, J. J. &Esse, U. C. (2015).Software selection and deployment for library cooperative and resource sharing among academic libraries in South West, Nigeria. *Journal of Library and Information Technology, 35(1), 3-8*

ISO 9241-11 (1998).Ergonomicrequirements for office work with Visual Display Terminals(VDTs),Part 11:GuidanceofUsability. Retrieved from Retrieved from https://www.//.iso.org>standard Accessed on 11th June, 2018.

Joo, S., Lin, S. & Lu, K. (2011). Usability evaluation model for academic library websites: efficiency, effectiveness and learnability. *Journal of library and information studies*, 9(2): 11-26

Kari, K. H. &Baro, E. E. (2014).The use of library in Nigerian University Libraries and challenges. *Library Hi Tech News*, 3:15-20

Kim, Y. (2011) Users' perceptions of university library websites: a unifying view. *Library and Information Science Research,* 33(1); 63-72

Mentes, A.P. &Turan, A. P. D. (2012). Assessing the usability of university websites: An empirical study on Namik Kemal University, *TOJET,* 11(3): 54-69

Mifsud, J. (2015). Usability metrics: A guide to quantify the usability of any system. Retrieved from https://usabilitygeek.com/usability-metric-a-guide...

Muller, T. (2011). How to choose a free and open source integrated Library System. *OCLC Systems and Services,* 1(27):57-78.

Nielson, J. (1993). *Usability Enginnering.* Retrieved from https:www.nngroup.com>books

Nwachukwu, V. N. & Musa, B. A. (2016). Development and validation of circulation software package for libraries in Federal Universities of North Central, Nigeria. *International Journal of Library and Information Science Studies,* 2(1); 43-58

Otunla, A. O. (2016). Current Status of automation in Academic Libraries in Osun State Nigeria. *Journal of applied information Science and Technology,* 9(2), 30-39

Oyekale, J.O. (2018). An investigation on Integrated Library Systems (LMS) in use in university libraries in Osun State, Nigeria. *Open Access Library Journal*, 5-11. Retrieved from doi;104236/oalib.1104915

Santos, P.J. &Badre, A. (1995).Discount learnability evaluation. Retrieved from smartech.gatech.edu

Sauro, J. (2013). How to measure learnability. Retrieved from measuring.com >measure-learnability

Sauro, J. (2015). Measuring: Picking the right data collection method. Retrieved from https//measuring.com>data-collection