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**EVALUATION OF LIBRARY MANAGEMENT SYSTEM IN NIGERIAN
FEDERAL UNIVERSITY LIBRARIES**

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ABSTRACT

This study assess the efficiency and user-satisfaction of cataloguing module of library management system in federal university libraries in Nigeria, using experimental and survey design. Seventy participants were purposely selected for the study. Observation and questionnaire were used to collect data. Results for efficiency showed that experienced participants was 100 %, while the efficiency of inexperienced participants are 71.08, 53.95, 53.87 and 30.55% for SLAM, Alexandria, NewGenLib and Koha respectively. The results also revealed that many participants were satisfied with SLAM, Alexandria and NewGenLib cataloguing module. However, majority of the participants were not satisfied with Koha cataloguing module. The study concludes that SLAM, Alexandria and NewGenLib cataloguing modules are efficient but Koha cataloguing module is not efficient. The study recommends that SLAM, Alexandria, NewGenLib and Koha cataloguing interfaces should be improved upon.

Keywords: Cataloguing module, Efficiency, Library management software, Satisfaction

INTRODUCTION

Academic libraries worldwide are now dependent on the use of library management system in operating different library functions. Library management software (LMS) is a system designed and developed to automate and manage all functions of the library. The system automates library house-keeping operations. It is used to maintain library records, keeps record of the number of books in the library, books issued out or returned, renewal of borrowed books, calculate fine and reserve items for users. Using LMS allow librarian to register users, catalogue library materials and users can search for any book. LMS also manages user data, allows user self-registration, self-check-in and check-out as well as keep track of book movement. Application of LMS in libraries have enable librarians to manage the whole data of the library in a single database with enhance effectiveness, efficiency and security. Library operations such as acquisition, circulation and cataloguing and



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classification have seamlessly transited from manually managed to automated libraries, making them more efficient and effective.

The use of LMS has made it possible for library to effectively and efficiently create and maintain bibliographic record of library materials. The process of creating and maintaining bibliographic records of books, serials and other library resources is known as cataloguing. It describes each document giving its bibliographic details (such as name of the author, title, edition and date of publication), subject and classification number in a way that a document can be easily retrieved from millions of different documents in a collection, as well as provide library users with access to resources in the library, showing users what the library have and where each item is displayed or can be located. The modern library use library management software to perform cataloguing function. It is expected that the use of LMS increase librarian's efficiency and effectiveness in processing library materials (Akawu *et al.*, 2020). However, effectiveness, efficiency and user satisfaction of LMS when used for cataloguing library materials may be impacted by the design. In this case, usability becomes an important factor that can impact directly on cataloguer's decision on using a specific LMS to catalogue library materials.

According to Nielsen (2012) usability of a system has multiple dimensions which include: easy to learn, efficient to use, easy to remember, low error rate and user satisfaction. Almasi *et al.* (2023) described usability in term of ease of learning, ease of use, efficiency, error prevention and user satisfaction. This description emphasized on user's experience with system. International organisation for standardisation (ISO) 9241-11 (2018, 1998) defined usability as the extent to which a software can be used by a group of users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. Suitable for work-related contexts, effort put to achieve objective and pleasantness of interaction with the system are important factors that affect user preference of the system. A good and well design system is based on the principles of easy to learn and use, increase user productivity, satisfaction and user acceptance. This implies that poor usability of an interface affects the use and may hinder the acceptance of such system. Kruger *et al.* (2020) stressed that poor usability is the reason for software rejection, and such system leads to lack of loyalty, desertion of tasks and user frustration.

An LMS is usable if users can use the system to perform library tasks with effectiveness, efficiency, ease of use and satisfaction. However, Prabhu and Prem (2017) and Hassan



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(2014) observed that some application software developed are difficult to comprehend and use, as such take much time to perform tasks. That is why Lee *et al.* (2015) opined that the problem of many software including library management software are deeply rooted in usability issues which frustrate users when performing tasks. Consequently, productivity is affected and users are not satisfied using such systems.

The study assessed the efficiency and satisfaction of cataloguing module used in federal university libraries in Nigeria and make suggestion for improvement. Specifically, the objectives of the study are to

1. Determine the efficiency of cataloguing module of LMS in service delivery in federal university libraries in Nigeria
2. Determine the satisfaction derived from using cataloguing module of LMS in service delivery in federal university libraries in Nigeria

Literature Review

Usability is coined from the concept of user friendliness and is often used to refer to the ease of use of software. Oliveria *et al.* (2021) described usability as the ease of use, efficiency and the ability of users to effectively interact with software. According to Coursaris and Kim (2011) usability expresses the capability with which users can use system to achieve a particular goal with ease and satisfaction. Bouraghi *et al.* (2023) defined usability as the efficient, effective and and satisfactory use of a system by real users. As such persons with average or below average ability and experienced can effectively and efficiently use a system for intended purpose with ease and without getting frustrated (Almasi *et al.*, 2023; U.S. Department of Health and Human Services, 2016; Krug, 2006). This implies that usability deals with a set of attributes that have bearing on the effort needed for use. Such attributes include effectiveness, efficiency and satisfaction (ISO 9142 11, 1998). Nielson (2012) described usability in terms of five (5) characteristics to include ease of learning, efficiency of use, memorability, errors frequency and subjective satisfaction.

Georgsson and Staggers (2016) viewed efficiency as a performance metric that reflects the level of productivity of users. In this regard, the ability of users to be productive by using particular software is necessary. ISO/IEC 25010 (2011) defined efficiency as the resources expended in relation to the accuracy and completeness with which users can achieve goals. Relevant resources may include time, mental effort or physical effort. Therefore, efficiency



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is the ability of users to use software to complete a set of tasks with relative speed. Efficiency describes how quickly users can perform tasks after they have learned to use the application (simplicity of the steps) (Nielsen, 2012). Thus, a system that is efficient allows its users to perform and complete their tasks quickly. Efficiency can be measured by evaluating the time a user spent to complete a given task (Harrison *et al.*, 2013) and considering clarity, flexibility, obviousness, minimum number of steps to complete task and ease of use when assessing the efficiency of software (Coursaris and Kim, 2011).

For a product to be usable, real users should be able to use the system to achieve their goal in an acceptable amount of time and be satisfied with the process and result. ISO 9126-I (2001) defined satisfaction as the capability of the software to satisfy users in a specified context of use. It also refers to users' subjective assessment of the system concerning how pleasant it is to use. Satisfaction is the level of comfort and pleasantness users derive from the use of software. According to Roy and Pattnak (2014), satisfaction describes the comfort and acceptability of software used by users. This is reflected in the attitudes, feelings and opinions of the users towards the software and is measured subjectively. The user's opinion, perception and feeling of software used, give insight about the overall usability of the software system. According to Harrison *et al.* (2013), questionnaire and other qualitative techniques can be used to measure user's attitude and perception towards software application.

Khatun and Ahmed (2018) carried out a research on usability testing for an open-source integrated library system. The study examined the usability of Koha OPAC from end user point of view. The research comprised of twenty four (24) experienced and novice volunteer students. Computer screen recording software and questionnaire were used as data collection instruments. The test results indicated that there was significant difference between the experienced users and novices in terms of success score and errors made. The result of questionnaire also indicated significant difference in the subjective satisfaction for several items between the experienced users and the novices and concluded that online public access catalogue interface of Koha library system was not easy for new users.

Also, Kous *et al.* (2018) conducted an evaluation of library website with different end users. The objective was to investigate different types of end users interaction with library website in terms of effectiveness, efficiency and satisfaction. A mixed approach of formal usability testing and think-aloud methods were used for the study and data collection instruments



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were observation and questionnaire. The result of the study showed that different groups of end users achieved different levels of effectiveness, efficiency and satisfaction. The study also discovered that there was no significant difference between groups in satisfaction level, but inexperienced users did not achieve the threshold for usable website.

A research was carried out to evaluate the usability of information system used in Neuroscience Research Centres of Hospital affiliated to Shahid Beheshti University of Medical Sciences in Tehran, Iran by Abedini *et al.* (2021). The objectives of the study were to determine the system usefulness, learnability, ease of use and user satisfaction. Descriptive research method was used for the study and the instrument used for data collection was questionnaire based on seven-point scale. The result reported that the systems had acceptable level of 5.93 (usefulness), 5.73 (learnability), 4.76 (ease of use) and 4.89 (user satisfaction) but recommended an improvement of the system in order to achieve an excellent level of information system usability.

Despite the fact that studies have been carried out on the usability of different interactive software, extensive literature search by the researcher revealed that, there is no any study that has been carried out on the usability of cataloguing module of LMS in federal university libraries in Nigeria using quasi experimental method. Thus, it is against this backdrop that this study assessed the usability (efficiency and satisfaction) of cataloguing module of library management software used in service delivery in federal university libraries in Nigeria.

RESEARCH METHODOLOGY

Quasi experimental and survey research methods were adopted for the study. The population for the study was 384 library staff sampled from four federal universities libraries. Purposive sampling technique was used to sample 70 participants for the study. Twenty (20) library staff were sampled from each of the federal universities, however, in one of the federal university library, only 10 library staff were sampled because of the limited number of library staff in the cataloguing unit of the library. The 20 library staff sampled consisted of 10 library staff that have relevant work experience and the other 10 staff do not have relevant work experience in cataloguing module. Similarly, five (5) library staff that have relevant work experience and five library staff that did not have the required experience in



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cataloguing were sampled from the federal university library that had limited number of library staff.

The instruments used to collect data for this study were observation and questionnaire. Usability testing was performed on LMS user interface. Three tasks aimed at cataloguing library materials were performed by experienced and inexperienced participants to assess users' efficiency with the LMS. Since the inexperienced group had no required experience, they were given hands-on training and allowed to practice and explore Alexandria, SLAM, NewGenLib and Koha interface for familiarity for 30 minutes, but the exploration was not needed for experienced users. Each participant performed usability test at a time while the researcher observed and recorded task success and time taken to perform each task by the participants on the Performance Observation and Recording Form. At the end of each task performed, the researcher administered questionnaire to participants to fill.

Efficiency was calculated in terms of time taken to complete task by the participants. The amount of time taken to successfully complete task(s) was calculated to obtain the overall relative efficiency of LMS. The time taken by participants who completed their tasks in relation to the total time taken by all participants was used. Thus:

$$\text{Efficiency} = \frac{\sum nt}{\sum t} \times 100 \text{ (Mifsud, 2015; ISO, 1998)}$$

nt = Total time on tasks completed

t = Total time on task taken

The classification of System Usability Scale (SUS) modified by Farrahi *et al.* (2019 and Akawu *et al.*, 2020) was adapted for acceptable region of LMS usability. Therefore, the benchmark scores are, 0-25 (worst), 25.5 – 52 (poor), 53- 67 (Ok), 67.5- 74.5 (good), 75- 85 (excellent) and 85.5 - 100 (best). Therefore, from 53 – 100 score is considered an acceptable region. For the questionnaire, the benchmark mean of ≥ 2.50 and ≤ 2.40 on four point likert scale was used to either agreed or disagreed with the items.

RESULTS

Results are presented on Table 1-2 and figure 1



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Table 1: Participants' time (in seconds) on tasks for efficiency of cataloguing module of LMS for experienced and inexperienced users

LMS Participants Task: Description of library items	SLAM						Alexandria					
	Experienced			Inexperienced			Experienced			Inexperienced		
	T1 (secs)	T2 (secs)	T3 (secs)	T1 (secs)	T2 (secs)	T3 (secs)	T1 (secs)	T2 (secs)	T3 (secs)	T1 (secs)	T2 (secs)	T3 (secs)
Time on task completed with or without help	1046.00	927.00	700.00	1326.00	1008.00	1314.00	2674.00	2626.00	2527.00	2,836.00	2,729.00	3,191.00
Ave time on task completed with or without help	209.20	185.40	140.00	331.50	336.00	328.50	267.40	262.60	252.70	567.20	545.80	531.83
Time on task not completed	-	-	-	369.00	751.00	377.00	-	-	-	2864.00	2,935.00	2306.00
Ave time on task not completed	-	-	-	369.00	375.50	377.00	-	-	-	572.80	587.00	576.50
Total time on tasks taken	1046.00	927.00	700.00	1695.00	1759.00	1691.00	2674.00	2626.00	2527.00	5700.00	5664.00	5497.00
Average total time on tasks taken	209.20	185.40	140.00	339.00	351.80	338.20	267.40	262.60	252.70	570.00	566.40	549.70

Keys: LMS = Library Management Software, T= Task, Secs = seconds



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Table 1: Participants' time (in seconds) on tasks for efficiency of cataloguing module of LMS for experienced and inexperienced users (Cont.)

LMS Participants Task: Description of library items	NewGenLib						Koha					
	Experienced			Inexperienced			Experienced			Inexperienced		
T1 (secs)	T2 (secs)	T3 (secs)	T1 (secs)	T2 (secs)	T3 (secs)	T1 (secs)	T2 (secs)	T3 (secs)	T1 (secs)	T2 (secs)	T3 (secs)	
Time on task completed	3,172.00	3,414.00	3140.00	3,037.00	3,735.00	3,695.00	8811.00	8798.00	8656.00	3,256.00	4,899.00	6,369.00
Ave time on task completed	317.20	341.40	314.00	607.40	622.50	615.83	881.10	879.80	865.60	1628.00	1633.00	1,592.25
Time on task not completed	-	-	-	3,391.00	2729.00	2,833.00	-	-	-	12,700.00	10,768.00	9,554.00
Ave time on task not completed	-	-	-	678.20	682.25	708.25	-	-	-	1587.50	1,550.00	1,592.33
Total time on tasks taken	3,172.00	3,414.00	3140.00	6428.00	6,464.00	6,528.00	8811.00	8798.00	8656.00	15,956.00	15,667.00	15,923.00
Average total time on tasks taken	317.20	341.40	314.00	642.80	646.40	652.80	881.10	879.80	865.60	1566.70	1592.30	1,592.30



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The results in Table 1 showed that all experienced participants completed the process of description of library resources. The highest average time spent to complete task 1 was used on Koha. Koha experienced participants completed cataloguing task 1 with the highest average time of 881.10 seconds and the lowest average time was 209.20 seconds obtained for task 1 by SLAM experienced participants. Similarly, Koha experienced participants had the highest average time of 879.80 and 865.60 seconds for tasks 2 and 3. The Table also indicated that SLAM experienced participants completed tasks 2 and 3 with the lowest average time of 185.40 and 140.00 seconds. Alexandria and NewGenLib experienced participants completed cataloguing task 1, 2 and 3 with average time of 267.40, 262.60 and 252.70 seconds (Alexandria) and 317.20, 341.40 and 314.00 seconds (NewGenLib) respectfully.

The results in Table 1 also showed the average time of inexperienced participants for cataloguing tasks performed. SLAM inexperienced participants completed task 1 with the least average time of 331.50 seconds, followed by Alexandria inexperienced participants with an average time of 567.20 seconds. Next to Alexandria was NewGenLib inexperienced participants who completed task 1 with an average time of 607.40 seconds and the highest average time spent to complete the same task was 1628.00 seconds with Koha inexperienced participants. The results in Table 1 further revealed that the highest average time taken to complete cataloguing task 2 was 1,633.00 seconds with Koha, followed by an average time of 622.50 seconds with NewGenLib. The lowest average time taken to complete task 2 was 366.00 seconds with SLAM. The Table also revealed that, the highest average time of inexperienced participants who completed task 3 was 1592.25 seconds (Koha) and the lowest average time was 325.50 seconds (SLAM).

The results on tasks presented in Tables 1 were further calculated to obtain the overall efficiency of each LMS. Therefore, the overall efficiency on the ratio of time was calculated based on this formula: $\frac{\sum nt}{\sum t} \times 100$

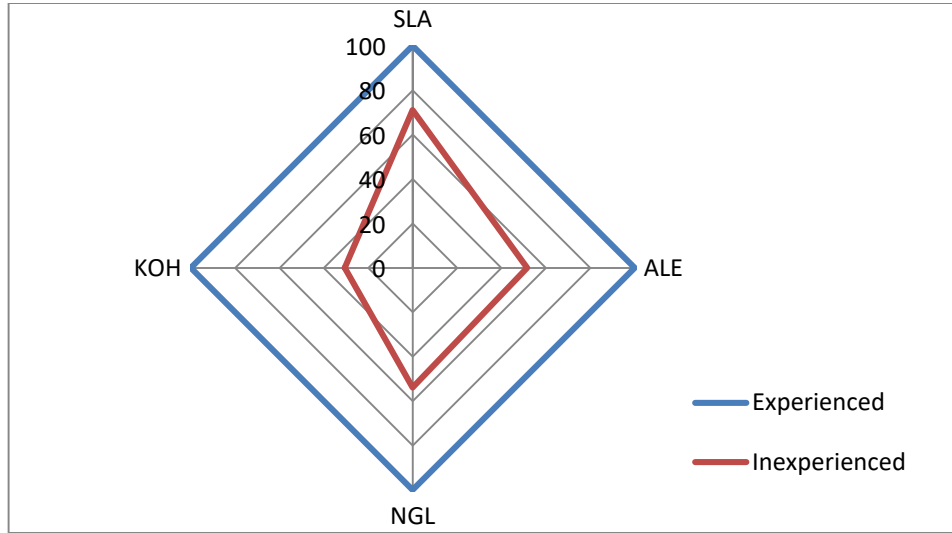


Figure 1: Overall relative efficiency of cataloguing modules

The overall efficiency in Figure 1 depicts that all experienced participants completed the predetermined cataloguing tasks at low time. Hence, they all attained 100 per cent efficiency. Figure 1 also showed that not all inexperienced participants completed cataloguing tasks at low time. Most of the inexperienced participants performed and achieved the predetermined cataloguing tasks at high time. The Figure showed that the overall efficiency of cataloguing module by inexperienced participants' for SLAM was 71.08, Alexandria was 53.95, NewGenLib was 53.87 and Koha was 30.55 indicating low efficiency for Koha cataloguing module.



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Table 2: Satisfaction derived from Using LMS Cataloguing Module in Service Delivery in Federal University Libraries

S/N	Statements	SLAM				Alexandria				NewGenLib				Koha			
		Mean value		Decision		Mean value		Decision		Mean value		Decision		Mean value		Decision	
		Exp	Inexp	Exp	Inexp	Exp	Inexp	Exp	Inexp	Exp	Inexp	Exp	Inexp	Exp	Inexp	Exp	Inexp
1	I am comfortable with steps required in cataloguing library materials	3.60	3.00	A	A	2.40	2.00	D	D	2.40	2.00	D	D	1.80	1.70	D	D
2	Cataloguing library materials are performed in a straightforward manner	3.80	3.40	A	A	2.80	2.40	A	D	3.00	2.40	A	D	2.30	1.60	D	D
3	I am satisfied with the amount of information displayed in the cataloguing module of LMS	2.80	3.00	A	A	3.20	2.50	A	A	3.20	3.00	A	A	3.50	2.30	A	D
4	I am satisfied with the help received through the help mode of the LMS	2.60	2.60	A	A	2.90	2.50	A	A	3.20	2.60	A	A	2.70	2.50	A	A
5	The user interface messages that appear on the cataloguing module are appropriate	3.00	2.80	A	A	3.10	2.60	A	A	3.30	2.90	A	A	2.90	3.00	A	A
6	The terms used in the cataloguing module are appropriate	3.00	3.20	A	A	3.10	2.70	A	A	3.20	2.70	A	A	2.90	2.70	A	A
7	I find the cataloguing module of the LMS enjoyable when using it	3.60	3.20	A	A	2.80	2.40	A	D	2.90	2.30	A	D	2.00	1.70	D	D
8	I find the cataloguing module of the LMS well designed to use	2.20	2.60	D	A	2.50	2.30	A	D	2.40	2.20	D	D	2.10	1.90	D	D
9	The cataloguing module of LMS is colourful and appealing	3.00	3.00	A	A	3.10	2.90	A	A	2.70	3.00	A	A	3.40	3.20	A	A
10	My overall impression about the interaction with the LMS user interface is satisfying	3.40	3.00	A	A	2.40	2.20	D	D	2.40	2.20	D	D	2.00	1.50	D	D

Key: A = Agreed, D = Disagreed, Exp = Experienced, Inexp = Inexperienced



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The results in Table 2 revealed that SLAM experienced and inexperienced participants agreed with items 1 - 7, 9 - 10 with mean scores of ≥ 2.50 . SLAM experienced participants agreed with mean scores from 2.60 to 3.80 and the inexperienced participants agreed with mean scores from 2.60 to 3.40. Table 2 also revealed that SLAM experienced participants disagreed with item 8 (I find the cataloguing module of the LMS well designed to use) with a mean value of 2.20, however, inexperienced participants agreed on the same item with a mean value of 2.60. Furthermore, both experienced and inexperienced participants expressed their satisfaction with the interaction process because of the single template of SLAM cataloguing module.

Table 2 also showed that Alexandria experienced and inexperienced participants disagreed with item 1 (I am comfortable with steps required in cataloguing library materials) with mean value of 2.40 (experienced) and 2.00 (inexperienced). The result further showed that experienced participants agreed with item 2 (cataloguing library materials are performed in a straightforward manner) with a mean value of 2.80. However, interview with experienced participant revealed that cataloguing module of Alexandria “is not straightforward”. The inexperienced participants disagreed with same statement (item 2) with a mean value of 2.00. Also, Table 2 revealed that experienced participants agreed with items 3- 9 with mean values of ≥ 2.50 . Similarly, the inexperienced participants agreed with items 3, 4, 5, 6 and 9 with mean values of ≥ 2.50 , however, the inexperienced participants disagreed with items 7 and 8 with mean scores of ≤ 2.40 . The Table also revealed that experienced and inexperienced participants disagreed with item 10 with mean values of 2.40 (experienced) and 2.20 (inexperienced) indicating that majority of the participants were not satisfied with the interaction while performing cataloguing tasks with Alexandria LMS.

Results in Table 2 further revealed that NewGenLib experienced and inexperienced participants disagreed with item 1 (I am comfortable with steps required in cataloguing library materials). The experienced participants disagreed with a mean score of 2.40 and the inexperienced disagreed with a mean value of 2.00. Also, Table 2 revealed that NewGenLib experienced participants agreed with item 2 with a mean value of 3.00. However, majority of inexperienced participants disagreed with item 2 with a mean time of 2.40. The results in Table 2 also revealed that experienced participants agreed with items 3 - 7 and 9 with mean scores of ≥ 2.50 . Similarly, the inexperienced participants agreed with items 3 - 6 and 9 with mean scores of ≥ 2.50 . Furthermore, the inexperienced participants disagreed with



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items 7 (I find the cataloguing module of the LMS enjoyable when using it), and 8 (I find the cataloguing module of the LMS well designed to use) with mean scores of ≤ 2.40 . The Table also showed that both experienced and inexperienced participants disagreed with item 10 with mean value of ≤ 2.40 indicating that users were not satisfied with the interaction when performing cataloguing tasks.

Furthermore, Table 2 showed that Koha experienced and inexperienced participants disagreed with items 1 (I am comfortable with steps required in cataloguing library materials) and 2 (cataloguing library materials are performed in a straightforward manner) with mean values of ≤ 2.40 . The result also showed that experienced participants agreed with item 3 with a mean value of 3.50, however, the inexperienced participants disagreed with item 3 with a mean value of 2.30. Interview with both experienced and inexperienced participants revealed that there is too much information in cataloguing templates of which some are repeated and some are not necessary, so they are use. Table 2 also revealed that experienced and inexperienced participants agreed with items 4- 6 and 9 with mean scores of ≥ 2.50 . The experienced participants agreed with mean scores from 2.70 to 3.40 and the experienced participants agreed with mean scores from 2.50 to 3.20. Furthermore, both experienced and inexperienced participants disagreed with items 7, 8 and 10 with mean values of ≤ 2.40 . The experienced participants disagreed with mean scores of 2.00 for item 7 (I find the cataloguing module of the LMS enjoyable when using it), 2.10 for item 8 (I find the cataloguing module of the LMS well designed to use) and 2.00 for item 10 (My overall impression about the interaction with the LMS user interface is satisfying). Similarly, the inexperienced participants disagreed with mean scores of 1.70 (item 7), 1.90 (item 8) and 1.50 (item 10). It can be deduced that many participants are not satisfied with the cataloguing module of Koha LMS.

DISCUSSION OF RESULTS

Efficiency of cataloguing module of library management software

Findings from the results indicated that all experienced participants completed the process of description. The highest average time (881.10 for task 1; 879.80 for task 2 and 865.60 for task 3) spent to complete the cataloguing tasks was used on Koha and the lowest average time (209.20 for task 1; 185.40 for task 2 and 140.00 for task 3) spent to complete cataloguing tasks was used on SLAM. The order of maximum time taken to perform and achieve cataloguing task was Koha, followed by Alexandria and NewGenLib and then



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SLAM in this order. The results also indicated that the efficiency of experienced participants differs from one LMS to the other. This could be attributed to the number of templates and steps required to be filled. Work environment, typing speed and network service could have also contributed to the difference in the average time. This study concord with the finding of Kous *et al.* (2018) that different groups of users achieve level levels of efficiency with library website.

Results (on Table 1) also showed that not all inexperienced participants completed the cataloguing tasks. SLAM inexperienced participants had the least average time of 331.50 seconds, followed by Alexandria inexperienced participants with an average time of 545.80 seconds. The next was NewGenLib inexperienced participants with an average time of 607.40 seconds and the highest average time used to complete task 1 was 1628.00 obtained with Koha participants. This implies more effort would be needed to catalogue library materials with Koha when compared to Alexandria and NewGenLib. Findings from the result also revealed that the highest time taken to perform and achieve cataloguing tasks 2 and 3 were obtained using Koha, followed by NewGenLib and Alexandria. The lowest time taken to perform and achieve cataloguing tasks 2 and 3 was with SLAM. The length of time used to complete cataloguing tasks could be attributed to the number of templates and steps participants followed to fill-in the bibliographic data of each item and network service.

The help rendered to the inexperienced participants could have also contributed to long length of average time used to complete cataloguing tasks and large number of data elements (bibliographic data) required to be filled in the templates. Also, the different degree of steps and templates coupled with the simplicity and clarity of the information on cataloguing module interface could also be the reason behind the long length of time taken to complete cataloguing tasks. SLAM has 1 template, Alexandria has 3 templates, NewGenLib has 4 templates with more data elements and Koha has 9 templates with much data elements that are not used while cataloguing and a number of steps involve in describing library materials. This means that productivity of cataloguers would depend on the type of LMS a particular library is using. Similar findings were reported by Kous *et al.* (2018) and Nyame *et al.* (2019). Nyame *et al.* (2019) reported that users spent long time on tasks because the content of the website was clustered with much data.



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Findings (Table 1) further indicated that inexperienced participants spent more than twice the time it took the experienced participants to catalogue library item across all the LMS. This implies that new users require more effort and time to catalogue library materials. This is contrary to the views of Harrison *et al.* (2013) and Nyame (2019). Harrison *et al.* (2013) stated that a system should be easy to allow new users to learn and efficiently start working with the system. Nyame (2019) also noted that a user centred system must be usable to first time users. Therefore, the productivity of new cataloguers who spent much time on cataloguing will be low, compare to those who spent less time to catalogue an item. This is due to the long time taken to accomplish cataloguing task. Further observation indicated that Koha participants had the highest time spent on tasks performed, followed by NewGenLib, next was Alexandria and the least time was spent using SLAM LMS. This implies that cataloguers who use SLAM and Alexandria would catalogue more resources within short period of time compared to those who use NewGenLib and Koha.

The overall efficiency of cataloguing module revealed that experienced participants completed all cataloguing tasks (Figure 1). Hence, they all attained 100 per cent efficiency. However, not all inexperienced participants completed cataloguing tasks. The per cent efficiency of inexperienced participants for SLAM is 71.08, Alexandria is 51.53, NewGenLib is 53.89 and Koha is 30.55. From the classification of system usability scale (SUS) modified by Farrahi *et al* (2019) and adapted for acceptability region of LMS efficiency, 25- 37.5 is considered poor, 37.6-52.9 is considered fair, 53-67 % is adequate, 67.5-74.5 % is good, 75-85 is excellent and 85.5-100 % is considered best. This means that SLAM and NewGenLib cataloguing modules are within acceptable region, therefore, SLAM and NewGenLib cataloguing modules are adequate and hence, efficient for use. Alexandria is considered to be fair and Koha cataloguing modules is not within the acceptable region. Therefore, Alexandria is said to be fair and Koha cataloguing module is considered to be poor and hence may not be efficient to allow users to quickly describe library materials. These findings are contrary to those reported for efficiency of E-Rapor by Wirasmiata and Uska (2019). The report stated that there was no time difference in the tasks performed between novice and expert users, therefore concluded that E-Rapor system was efficient.



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Satisfaction derived from using cataloguing module of library management software

The findings from the results (Table 2) showed that experienced participants agreed with majority of the statements on satisfaction derived from using SLAM cataloguing module but disagreed that the module was well designed for use due to lack of z39.50 feature. Furthermore, the results indicated that inexperienced participants agreed with all the statement on satisfaction derived from using SLAM cataloguing module to catalogue library materials. The participants agreed with high mean scores indicating that both experienced and inexperienced participants were comfortable and satisfied with the process of entering bibliographic data of library materials using SLAM cataloguing module. The finding of this study agrees with that of Munaiseche and Liando (2016) who discovered that participants were satisfied with the use of expert information system.

Results (from Table 2) further showed that experienced participants agreed with majority of the statements regarding satisfaction derived from using Alexandria cataloguing module (Table 2). The findings revealed that both participants were satisfied with the quantity of information displayed on the cataloguing interface, the help received through the help mode of the cataloguing interface, messages that appear on the cataloguing module and the terms used in the cataloguing module. The findings also indicated that experienced participants enjoy using cataloguing module and noted that the module was well designed for use and cataloguing activities were performed in a straightforward manner. However, close observation of performance revealed that both experienced and inexperienced participants were not comfortable with the steps required to catalogue library materials.

The findings further indicated equal number of agreed and disagreed with the statements on satisfaction derived from using cataloguing module by inexperienced participants. The findings from the results further indicated that cataloguing module was not well designed, as such, inexperienced users were not comfortable and did not enjoy interacting or cataloguing with the module. This would have contributed to the unpleasant and dissatisfy state experienced by the participants when using Alexandria cataloguing module but continue usage would improve user experience of interacting with Alexandria cataloguing module. Therefore, majority of the participants noted that they were fairly satisfied with Alexandria cataloguing module. The finding in this study corroborates with the finding of



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Stuidiyanti *et al.* (2019) who discovered that participants were not satisfied with the use of Information System prototype because of the errors committed.

Findings from the results (Table 2) also revealed that experienced participants agreed with majority of the statements regarding satisfaction derived from using NewGenLib cataloguing module. Experienced users of NewGenLib cataloguing module were satisfied with the straightforward manner with which library materials were described, amount of information displayed, terms used and also enjoying of cataloguing task using NewGenLib with high mean values. The values obtained from experienced users could be attributed to continual use of the module to catalogue library materials indicating the level of satisfaction with the module. However, few responses of the participants revealed that, experienced users were not comfortable with the steps required to catalogue library materials; hence, the module was not well designed to allow ease of use and the interaction with the cataloguing user interface was not satisfying. This finding is contrary to the finding of Shanbehzadeh *et al* (2021) who discovered that users were satisfied with the use of information system based on its friendliness and flexibility.

Results further showed equal number of agreed and disagreed with the statements on satisfaction derived from using NewGenLib cataloguing module by inexperienced participants. The results indicated that inexperienced participants were satisfied with the amount of information displayed, help received through the help mode, messages that appear on the user interface and terms used were appropriate in the cataloguing module of NewGenLib LMS. However, further responses of the participants showed that, inexperienced users were not comfortable with steps and did not enjoy cataloguing library materials with NewGenLib cataloguing module, hence, disagreed that cataloguing of library materials are performed in a straightforward manner, cataloguing module is well designed for use and the interaction with the user interface is satisfying. The low values obtained for the inexperienced participants implied that it was not pleasant to use NewGenLib cataloguing module. The finding of this study negates that of Munaiseche and Liando (2016) who discovered that participants were satisfied with the use of expert information system.

The findings (Table 2) also showed equal number of agreed and disagreed with the statements on satisfaction derived from using Koha cataloguing module by experienced participants, while the inexperienced participants disagreed with majority of the statements regarding satisfaction derived from using Koha cataloguing module (Table 2). The low



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values obtained revealed that both experienced and inexperienced participants were not comfortable with the steps required to catalogue library materials, as such both participants indicated that library materials are not catalogued in a straightforward manner.

The findings also showed that both experienced and inexperienced disagreed that cataloguing module of the Koha LMS was enjoyable when using it to input bibliographic data of library materials. Participants noted that Koha cataloguing module was not well designed to use, as interaction with the user interface was not satisfying. This was indicated by the low values of satisfaction obtained. This implies that majority of the participants were not satisfied with the cataloguing module of Koha LMS. This finding is contrary to the findings of Orfanou *et al* (2015) who reported that users were satisfied with the use of learning management system and rated it at 76.27 per cent.

CONCLUSION

From the finding, the study concludes that there was difference between experienced and inexperienced participants in the time taken to complete cataloguing tasks. Furthermore, SLAM, NewGenLib and Alexandria cataloguing modules were within the acceptable region, hence, considered to be efficient for use at good (SLAM) and adequate (Alexandria and NewGenLib) levels. However, Koha cataloguing module was not within the acceptable region, hence, not efficient for performing cataloguing tasks. Participants find interaction with NewGenLib and Alexandria cataloguing module as fairly satisfying but participants were not satisfied with the interaction with Koha cataloguing module. The study recommends that software developers should improve on cataloguing interface of the LMS studied to enable users to interact with cataloguing interface with efficiency and satisfaction.

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