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Influencing Academic Library Use in Tanzania: A Multiple Regression Analysis

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Abstract

Library use is influenced by many factors. This study uses a multiple regression analysis to ascertain the connection between the level of library use and a few of these factors based on the questionnaire responses from 158 undergraduate students who use academic libraries in two Tanzania's universities: Muhimbili University of Health and Allied Sciences (MUHAS), and Hubert Kairuki Memorial University (HKMU). It has been discovered that users of academic libraries in Tanzania are influenced by the need to: search and access online materials, check for new books or other resources, check out books and other materials, and enjoy a friendly environment for study. However, their library use is not influenced by either the free wireless network, or consultation from librarians. It is argued that, academic libraries need to devise and implement plans that can make these libraries better learning environment and platforms to drive socio-economic development particularly in developing nations such as Tanzania. It is further argued that, this can be enhanced through investment in modern academic library infrastructures.

Keywords: Library Users; Library Use; Multiple Regression Analysis; Tanzania; Academic Libraries

1. Introduction

Academic libraries (used interchangeably with university library/higher learning institutions' libraries) serve a vital role in the use of information in universities and the surrounding societies particularly, in this high-tech age. Various university library users, such as academic staff, researchers and students, need these libraries in order to increase their knowledge and produce quality academic outputs that will be used to propel socio-economic development in nations such as Tanzania. Various resources including adequate technological support are needed to support the success of academic libraries particularly in the vast changes of digital environment. It is this environment for example, that compels Morgan, Saunders, and Shrem (2013) to point out that university libraries need to link their users, especially the students, to the technology they encounter in their daily lives. There are however, numerous challenges that prohibit academic libraries from keeping up with this pace of technology, particularly in creating learning environment that attracts library users (Morgan et al., 2013). These challenges which include inadequate funds to install modern library infrastructure, develop and enrich electronic collections, and subscription barriers (The Research Information Network [RIN] & The Consortium of Research Libraries [CURL], 2007),

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may act as challenging obstacles to academic library development. However, as RIN and CURL (2007) point out that some of these infrastructures such as modern buildings are regarded vital but not necessarily essential, we argue that, an important aspect of library service improvement and development is for academic libraries to first understand the needs of their customers (particularly the students). Students' library needs are numerous. They have always included convenient location and quiet space for self-study (Dickenson, 2006; Du & Evans, 2011; RIN & CURL, 2007), seeking guidance from librarians (Du & Evans, 2011; RIN & CURL, 2007), seeking books and other printed resources (Dickenson, 2006; Du & Evans, 2011; RIN & CURL, 2007), accessing electronic materials (Dickenson, 2006), and accessing internet services (Dickenson, 2006; Du & Evans, 2011). The level of library use is affected by the demand of users. It is the duty of academic libraries to capitalize on these demands and create a suitable learning environment to maintain a favourable level of library use. Unless they understand their users' needs, academic libraries can neither improve library services nor foster any library innovation. This study is therefore interested to find whether the level of library use among university students in Tanzania is influenced by factors such as: checking for new books and other resources, checking out books and other materials, accessing online materials, free wireless network, seeking conducive environment for studying, and consultations from librarians. The level of library use is linked to these factors by a multiple regression analysis using bachelor degree students' responses from the two Tanzania's higher learning institutions: Hubert Kairuki Memorial University (HKMU), and Muhimbili University of Health and Allied Sciences (MUHAS). This study assists academic libraries in understanding various needs of their users and in developing strategies that will attract them to use libraries. Due to changes in technology and the information management environment, we argue that this study can act as a guideline to future research on the relationship between library users' needs and environmental changes.

2. Literature Review

2.1 Ranganathan's five laws of library science

The first of Ranganathan's five laws of library science is "Books Are for Use" (Ranganathan, 1931). This law encourages librarians to ensure that readers use the materials selected and purchased for them. Indeed, the first law emphasises the optimal use of library resources and services. Key factors here include longer opening hours, physical environment that can easily be accessed, effective signage, and readily available help for using resources and services (Bhatt, 2011; Ranganathan, 1931). This can be done by ensuring that every reader's needs are catered for. Librarians should be responsible for ensuring users acquire access to books and other materials in their area of specialization (Gamsby et al., 2011). It reminds the librarian why the books in the library are selected, processed and displayed. Again, this law puts the reader and the book, not the librarian, at the heart of the collection (Ranganathan, 1931). The second law is "Every Reader His or Her Book." This law dictates that since customers have diverse

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interests (Bhatt, 2011), the library must stock books that meet the diverse interests of its readers. The library can meet its users' needs by clearly understanding them, finding whether there are adequate resources to fulfil particular needs of readers, and by taking into consideration the present and future user requirements. In this regard, a good library collection should combine of old, rare books and the latest materials covering diverse disciplines (Ranganathan, 1931).

Ranganathan's third law: "Every Book Its Reader," is concerned with placing readers together with their needs. The emphasis of this law is placing books into the hands of readers who are not necessarily aware of their actual needs (Ranganathan, 1931). We argue that this can well be accomplished when librarians guide their users to resources that suit their needs. They can do so by supplying them with acquisitions lists, bibliography guides and new book exhibits (Leiter, 2003). The fourth law is "Save the Time of the Reader." Libraries can save readers' time by developing effective information systems that deliver quality service to users (Ranganathan, 1931). Efficient, accurate, and effective services can save the reader's time. This law places emphasis on the user benefits and preferences by guaranteeing the availability of information, quality service, and considering user preferences and benefits. The user who enters the library for a specific purpose should find what he or she wants and much more to avoid situations in which the users waste valuable time (Bhatt, 2011). Librarians, therefore, must organise information in such a way that users can find what they need in the shortest possible time. In this respect, users should be trained in information retrieval skills and procedures so that they do not only save time but also get what they want.

The fifth law is that the "Library is a Growing Organism," meaning that libraries are dynamic, not static (Bhatt, 2011; Ranganathan, 1931). Growth is not only related to physical space but also to the range of information resources, and products. This law advocates for the need to forecast user needs, type of users, resource mobilization, services, and library operations. This law requires libraries to adapt to the changes taking place around the globe, including adapting to new technologies (Bhatt, 2011). The fifth law emphasizes comprehensive and evolutionary growth of the library and that librarians should adapt to changes, acquire new skills and attitudes, integrate print and non-print materials in their collections, and purchase new materials after weeding. Such opportunities allow librarians to increase their scale of operation and set new goals and responsibilities. Generally, it is accepted that creativity and innovativeness can allow the library to survive and grow (Barner, 2011). That is why there has been a growing librarians' interest in library automation. Librarians' interest in automated circulation and other services is largely based on a long-standing awareness of problems inherent to labour-intensive and time-consuming manual circulation systems. With automation, users can easily determine library services available and fulfil their needs through connected networks (Patil, 2013; Saffady, 1989). However, automation depends on the availability of facilities and skilled labour which result in prompt provision of library services. Automation has changed work habits of library users, routine use of computers and remote access to library

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catalogues. Accessing information before automation was difficult since users depended on print library catalogues to search for reference materials in their field of interest (Buckland & Florian, 1991; Tabusum, Saleem, & Batcha, 2013)

2.2 Reference theory

This theory states that it is the librarians' responsibility to provide users with untrammelled access to resources either through instructional level, where the librarian teaches the user to help himself or herself; informational level, where the librarian gives the user information and not just instruction; or situational level, where the librarian exercises his or her professional judgement in providing both the information and instructions, depending on the library environment (Danner, 1983). The librarian ought to persistently advocate for information use rather than becoming a passive keeper, simply responding to stimulation whenever there are stimuli. The focus of this theory is on the quality of the growing librarian-user relationship. In this regard, the librarian's inclination towards internal housekeeping routines and knowledge of sources cannot provide an effective and efficient reference service (Ajileye-Laogun, 2004).Therefore this theory helps to explain how librarians can avoid obstacles which hamper access to library resources. The provision of library services through instructional, informational or situational environment must be emphasised through the services provided in the library. Also, the reference librarian should develop good relationships with users to promote effective use of library services. Librarian-user relations are geared towards establishing and maintaining mutual understanding between librarians and the users. This relationship that can be regarded as part of public relation helps to provide co-ordinated efforts to expose the library's positive image and promote library materials, programmes, and services (Israel, 2012). Public relations are one of the most important drivers in achieving the objectives of academic institutions. Public relations can also be constituted by all library activities that are directly and indirectly promoting the library use and its image (Dodsworth, 1998). However, good public relations also depend on the attitude of librarians. When librarians are friendly, humorous, intelligent, welcoming and helpful, users are encouraged to get services from the library and consult them. Users will not continue visiting a library that has unfriendly, unprofessional and lazy librarians, even if the products and services available are good (Ajileye-Laogun, 2004). It is therefore argued that, the level of the use of library services is heavily influenced by the professional, reliable and approachable librarians whose image and personality convey a positive image of the particular academic library.

Both the Ranganathan's Five Laws of Library Science and the Reference Theory give insights on why do users use the library. They also tell what users want. We have realized that library users are not only interested in books and other materials, but also in access to other important services like the internet and convenient environments for study. Users want library services that save their time and this has influenced users to search for materials online and be interested in electronic resources. We have determined that this is possible in libraries that have powerful internet connections. The availability of internet,

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particularly that which can be freely accessed by library users, has in most cases attracted users to the library. We have also determined that the relationship between the librarian and his or her user is of paramount importance in attracting library users to consume library services. Through this relationship, the users are likely to consult the librarians on various matters pertaining to library use. In this regard, we hypothesise that:

1. There is a relationship between the level of library use and the need to search and access online materials.
2. There is a relationship between the level of library use and the need to check for new books or other resources.
3. There is a relationship between the level of library use and the need to check out books and other materials.
4. There is a relationship between the level of library use and the need to enjoy the conducive environment for study.
5. There is a relationship between the level of library use and the need to access or enjoy free wireless network.
6. There is a relationship between the level of library use and the need to consult with librarians.

3. Methodology

3.1 The study area, target population and sample size

All academic libraries in Tanzania's higher learning institutions participated in this study. We had an assumption that each higher learning institution in Tanzania has one main library serving students, researchers and staff. Students were chosen as respondents because they are the ones who use these libraries more frequently than any other stakeholders in higher learning institutions. It is known that the undergraduate enrolment in Tanzania is higher than that of the postgraduate (Wilson-Strydom & Fongwa, 2012). This fact compelled us to only include undergraduate students pursuing bachelor degree as our respondents. This is because of all of the undergraduate programmes offered by majority of Tanzania's higher learning institutions, a bachelor degree was found to be common amongst them. Because of this commonality, we decided to have a population that includes all bachelor degree students in Tanzania's higher learning institutions. These institutions are the ones using the Central Admission System (CAS) for admitting students. By 2013, there were 66 institutions using CAS in their admission process (Tanzania Commission for Universities, 2013). However, we were unable to know the actual number of bachelor degree students using library services in these institutions. The assumption that about 50% of the bachelor degree students in these institutions use library services was preferred in order to get the optimum number of bachelor degree students (n) sampled (Cochran, 1977). We therefore set the committed error of 7.63% and α of 5% and came up with a sample size of 165 as follows:

$$n = \frac{Z^2_{\alpha/2} pq}{e^2} \quad (1)$$

Where $\alpha = 0.5$ $p = 0.5$ $q = 1-p = 0.5$
$e = 0.0763$ $Z_{\alpha/2} = 1.96$

3.2 Sampling procedure and data collection

All Tanzania's higher learning institutions were stratified on the base of disciplines/areas mostly offered. This resulted to six strata. Nine institutions whose programmes were heavily related to science, technology and engineering

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(science, technology and engineering institutions) became one stratum. The other subgroup consisted of 11 institutions whose programmes mainly fell into business, economics and statistics (business, economics and statistics institutions). The third stratum (not in order of preference) comprised of 6 institutions that specialize in health programmes (medical institutions). Others included 19 institutions whose programmes mostly fell into education, law, social science, community and rural development (education, law, social science, community and rural development institutions). The other stratum consisted of 5 institutions that heavily fell into land, agriculture and wildlife institutions (land, agriculture and wildlife institutions). The last stratum consisted of higher learning institutions offering a wide range of programmes. These were 16 institutions which are referred as general disciplines institutions.

Random sampling was used to pick one stratum out of the six strata. The chosen stratum was that of medical institutions. The members of this stratum were: Catholic University of Health and Allied Sciences (CUHAS), Hubert Kairuki Memorial University (HKMU), International Medical and Technological University (IMTU), Kilimanjaro Christian Medical College (KCMC), Muhimbili University of Health and Allied Sciences (MUHAS), and St Francis University College for Health and Allied Sciences (SFUCHAS). In order to get two medical institutions out of the six, a simple random sampling was run and HKMU and MUHAS were obtained. We decided to distribute our questionnaires evenly leading us to seek 82 respondents (library users for at least once in a week) from HKMU and 83 respondents (library users for at least once in a week) from MUHAS. These respondents were randomly selected under the guidance and assistance of both HKMU and MUHAS librarians. A questionnaire was given to each respondent during data collection process that ran for about four weeks. The positive response was 95.76% (158). Seventy seven and 81 questionnaires were received from HKMU and MUHAS respectively.

3.2.1 MUHAS Library

MUHAS is a full-fledged university. By 2013, it was the only public university for health sciences in Tanzania, offering 84 undergraduate and postgraduate programmes to over 2,500 students. The MUHAS library is in Dar es Salaam, Tanzania at the Muhimbili campus and has four main divisions which are Technical Service, Reader Services, Periodicals and Documentation, and ICT Services. By 2013, the library was able to accommodate 600 library users at a time.

3.2.2 HKMU Library

HKMU is a fully accredited university and was the first private university to be accredited in Tanzania. HKMU is one of the medical universities in Tanzania and is in Dar es Salaam city. By 2013, nine programmes ranging from certificate to postgraduate level were offered. The library is situated in the University block. HKMU library started operating immediately when the University started in 1997. The library contains three sections: The main library, book bank and computer laboratory. By 2013, the library was able to accommodate 70 users at a time and had six trained staff.

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3.3 Data analysis

The data from the questionnaires were analysed using Multiple Regression Analysis through PASW 16 (SPSS 16). PASW 22 (SPSS 22) was used to analyse inter-rater reliability using Kendall's Coefficient of Concordance.

3.3.1 Inter-rater reliability

We used Kendall's Coefficient of Concordance, W to test the agreement between the five evaluators. These evaluators are professionals in library and information studies, based in Tanzania. Each independent evaluator was provided with all 158 questionnaires. Their task was to rate each individual questionnaire by showing their agreement level (1.00 = Strongly disagree; 2.00 = Disagree; 3.00 = Neither agree nor disagree; 4.00 = Agree; 5.00 = Strongly agree); against the overall fairness exercised by respondents when filling in the questionnaires. We hypothesised that:

H_0: $W = 0$

H_1: $W \neq 0$

From both Table 1 and Figure 1, we find that the null hypothesis is rejected. This gives us confidence to ascertain that the five evaluators statistically significantly agreed in their evaluation ($W = .717$, $p = .000$).

3.3.2 Assumptions and order of testing

Our analysis comprises of one dependent variable and six independent variables. The dependent variable is the "level of library use (LLU)" with values $0 < LLU \leq 10$ provided by the respondents through questionnaires. The independent variables include: "the need to search and access online materials (AOM)"; "the need to check for new books or other resources (CNB)"; "the need to check out books and other materials (COB)"; "the need to consult with librarians (CFL)"; "the need to enjoy the conducive environment for study (CES)"; and "the need to access or enjoy free wireless network (FWN)." All values of independent variables (IVV) are in a range of $0 < IVV \leq 10$. They were also provided by respondents through questionnaires.

(1) Independence of observations

As shown in Table 2, the Durbin-Watson statistic of 1.870 is very close to 2. This can assure us that there is independence of errors (residuals).

(2) Linear relationship

We can reveal the most likely linear relationship between LLU and the independent variables: CFL, CES, AOM, CNB, FWN, and COB. This is proved by a scatter plot of studentized residuals against the (unstandardized) predicted values where our residuals form a horizontal band. We also have partial regression plots as shown in Figures 2 to 7.

The partial regression plot in Figure 2 shows a somewhat linear relationship between LLU and AOM.

The partial regression plot in Figure 3 shows a linear relationship between LLU and CNB.

Table 1. Hypothesis Test Summary

	Null hypothesis	Test	Sig.	Decision
1	The distributions of Evaluator1, Evaluator2, Evaluator3, Evaluator4 and Evaluator5 are the same.	Related-Samples Kendall's Coefficient of Concordance	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

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Total N	158
Kendall's W	.717
Test Statistic	453.262
Degrees of Freedom	4
Asymptotic Sig. (2-sided test)	.000

Figure 1. Related-Samples Kendall's Coefficient of Concordance

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Table 2. Model Summary[b]

Model	R	R^2	Adjusted R^2	Std. error of the estimate	Durbin-Watson
1	.654[a]	.427	.405	.56399	1.870

[a] Predictors: (Constant), CFL, CES, AOM, CNB, FWN, COB
[b] Dependent Variable: LLU

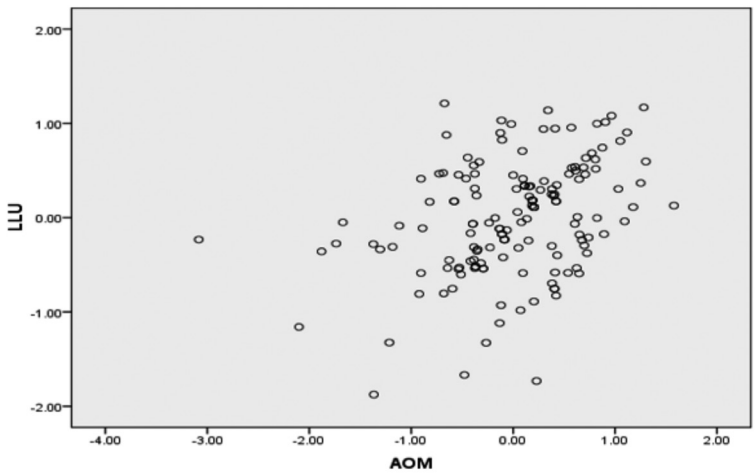


Figure 2. The Partial Regression Plot between LLU and AOM

The partial regression plot in Figure 4 shows a somewhat linear relationship between LLU and COB.

The partial regression plot in Figure 5 shows a somewhat linear relationship between LLU and CES.

The partial regression in Figure 6 shows a linear relationship between LLU and FWN.

The partial regression in Figure 7 shows an approximately linear relationship between LLU and CFL.

(3) Homoscedasticity and multicollinearity

The scatter plot for studentized residuals against the unstandardized predicted values shows that there is homoscedasticity because the spread of the residuals does not increase or decrease as we move across the predicted values. We also checked for multicollinearity in two ways. First, we examined the correlations in Table 3. Secondly, we examined the Tolerance values in Table 4. As shown in Table 3, it was found that none of the independent variables have correlations greater than 0.7 concluding that we do not have collinearity problem.

Again, as shown in Table 4, we examined the Tolerance values and found that all were greater than 0.1 (the lowest is 0.700). This gives us confidence to ascertain that there is no problem with collinearity in our data set.

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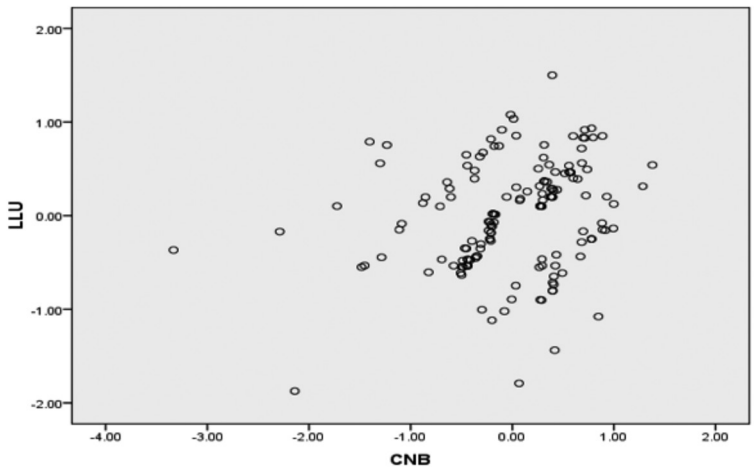


Figure 3. The Partial Regression Plot between LLU and CNB

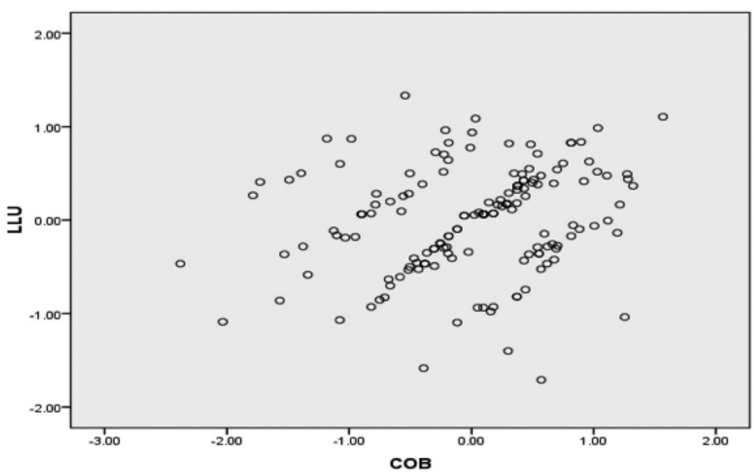


Figure 4. The Partial Regression Plot between LLU and COB

(4) Outliers

In detecting outliers, we first examined the Casewise diagnostics. From Table 5, we noticed that case number 15 had a standardized residual greater than ±3 standard deviations (3.198) and a predicted value of 3.8034. Apart from casewise diagnostics, we examined the Studentized deleted residuals to see whether these residuals were greater than ±3 standard deviations. We also found that case number 15 had a value of 3.40919 thus alerting us that we had an outlier. Before removing this case, we decided to check its leverage value. We found that case number 15 had a leverage value of 0.05210. This value is below the "safe" value of 0.2. We therefore conclude that there was no outlier.

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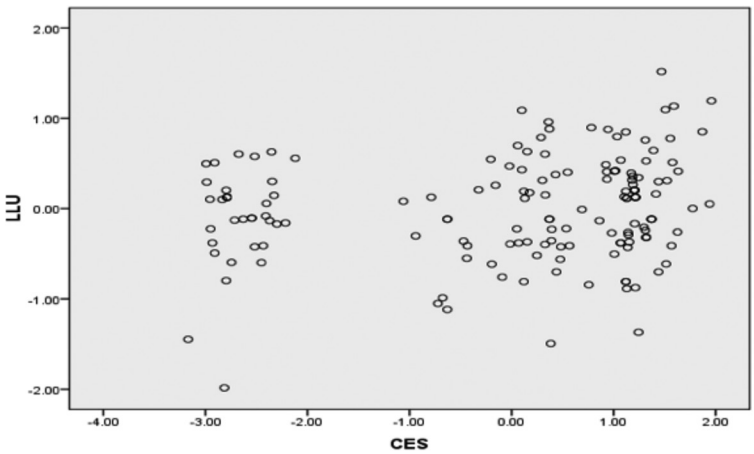


Figure 5. The Partial Regression Plot between LLU and CES

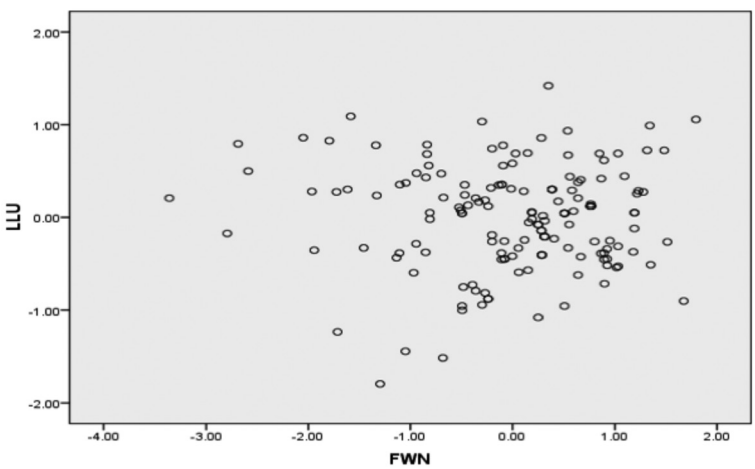


Figure 6. The Partial Regression Plot between LLU and FWN

(5) Influential points and normality

In checking for influential points, we examined all the Cook's Distance values and found that all were less than 1 meaning that we did not have any highly influential points. Also we checked for normality by considering both the histogram and the Normal P-P Plot of Regression Standardized Residual. From the histogram in Figure 8 we found the value of the mean to be very close to 1 and that of the standard deviation to be approximated to 0.

Also, the Normal P-P Plot of Regression Standardized Residual in Figure 9 shows that the residuals are approximately normally distributed whereby the points are aligned along the diagonal line.

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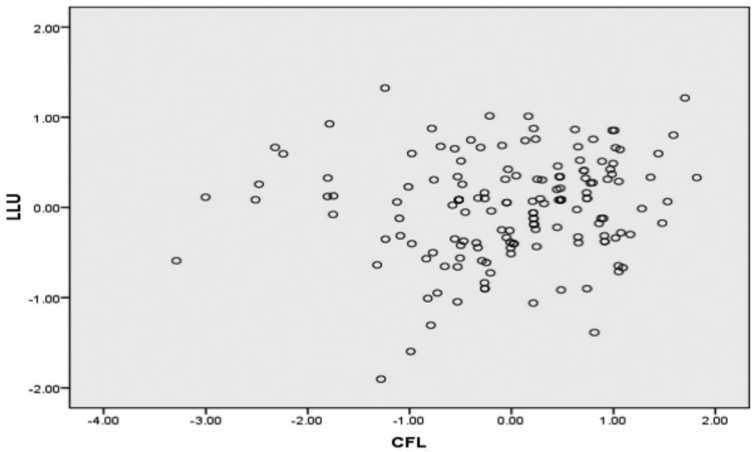


Figure 7. The Partial Regression Plot between LLU and CFL

Table 3. Correlations

	N = 158	LLU	AOM	CNB	COB	CES	FWN	CFL
Pearson Correlation	LLU	1.000	.534	.439	.450	.171	.285	.326
	AOM	.534	1.000	.389	.383	-.010	.409	.237
	CNB	.439	.389	1.000	.300	.038	.234	.273
	COB	.450	.383	.300	1.000	.134	.313	.367
	CES	.171	-.010	.038	.134	1.000	-.026	.028
	FWN	.285	.409	.234	.313	-.026	1.000	.365
	CFL	.326	.237	.273	.367	.028	.365	1.000
Sig. (1-tailed)	LLU	.	.000	.000	.000	.016	.000	.000
	AOM	.000	.	.000	.000	.450	.000	.001
	CNB	.000	.000	.	.000	.317	.002	.000
	COB	.000	.000	.000	.	.047	.000	.000
	CES	.016	.450	.317	.047	.	.375	.364
	FWN	.000	.000	.002	.000	.375	.	.000
	CFL	.000	.001	.000	.000	.364	.000	.

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Table 4. Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients	*t*	Sig.	95% confidence interval for B		Correlations			Collinearity statistics	
		B	Std. error	Beta			Lower bound	Upper bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.895	.328		2.726	.007	.246	1.544					
	AOM	.312	.064	.358	4.863	.000	.185	.439	.534	.368	.299	.700	1.429
	CNB	.198	.066	.208	3.017	.003	.068	.327	.439	.238	.186	.801	1.248
	COB	.165	.061	.193	2.690	.008	.044	.286	.450	.214	.166	.737	1.357
	CES	.064	.029	.138	2.212	.028	.007	.122	.171	.177	.136	.974	1.026
	FWN	-.006	.048	-.009	-.121	.904	-.101	.089	.285	-.010	-.007	.747	1.339
	CFL	.078	.048	.113	1.623	.107	-.017	.174	.326	.131	.100	.779	1.284

[a] Dependent Variable: LLU

Table 5. Casewise Diagnostics[a]

Case number	Std. residual	LLU	Predicted value	Residual
15	-3.198	2.00	3.8034	-1.80337

[a] Dependent Variable: LLU

4. Results

From Table 2, a value of 0.654 shows a good level of prediction. We can also find that CFL, CES, AOM, CNB, FWN, and COB explain 42.7% of the variability of LLU. Adj. R^2 is an estimate of the effect size, which at 0.405 (40.5%), is indicative of a medium effect size, according to Cohen's (1988) classification. Table 6 shows that CFL, CES, AOM, CNB, FWN, and COB statistically significantly predict LLU, $F(6, 151) = 18.781$, $p < .0005$. Therefore, CFL, CES, AOM, CNB, FWN, and COB statistically significantly predict LLU

4.1 Estimated model coefficients and hypothesis testing

The dependent variable LLU is predicted from AOM, CNB, COB, CES, FWN, and CFL as follows:

$$\text{LLU}=0.895+0.312\text{AOM}+0.198\text{CNB}+0.165\text{COB}+0.064\text{CES}-0.006\text{FWN}+0.078\text{CFL} \quad (2)$$

As discussed earlier, our aim was to find whether LLU is influenced by AOM, CNB, COB, CES, FWN, and CFL. In determining the relationship between LLU and the independent variables: AOM, CNB, COB, CES, FWN, and CFL, we formulated the following hypotheses:

H_0: $\beta_1 = 0$ (LLU and AOM)
H_1: $\beta_1 \neq 0$

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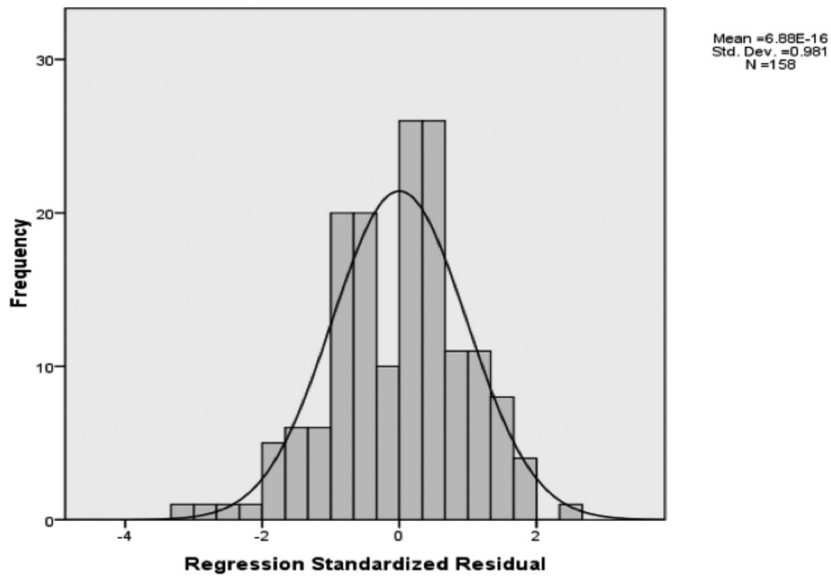


Figure 8. The Histogram between Frequency and Regression Standardized Residual

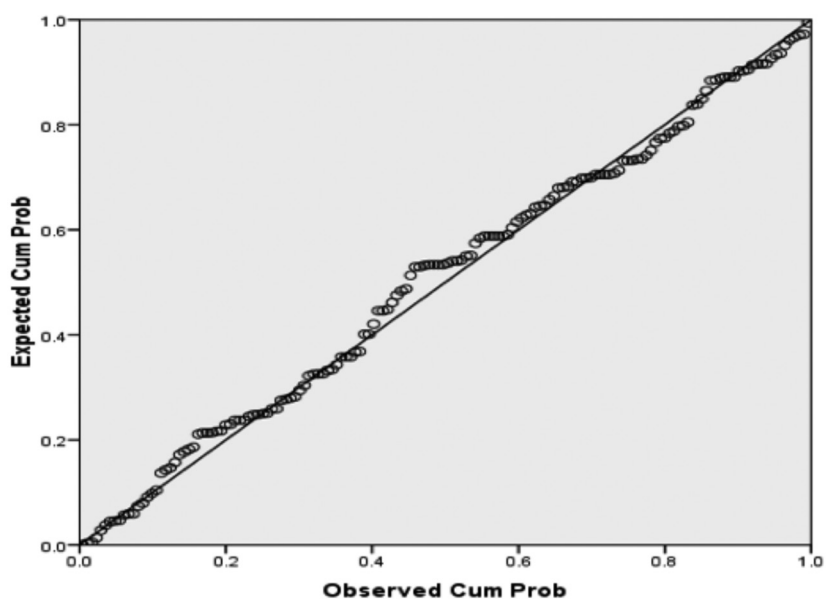


Figure 9. The P-P Plot between Expected Cumulative Probabilities and Observed Cumulative Probabilities

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Table 6. ANOVA[b]

Model		*SS*	*df*	*MS*	*F*	Sig.
1	Regression	35.843	6	5.974	18.781	.000[a]
	Residual	48.030	151	.318		
	Total	83.873	157			

[a] Predictors: (Constant), CFL, CES, AOM, CNB, FWN, COB

[b] Dependent Variable: LLU

$H_0: \beta_2 = 0$ (LLU and CNB)
$H_1: \beta_2 \neq 0$

$H_0: \beta_3 = 0$ (LLU and COB)
$H_1: \beta_3 \neq 0$

$H_0: \beta_4 = 0$ (LLU and CES)
$H_1: \beta_4 \neq 0$

$H_0: \beta_5 = 0$ (LLU and FWN)
$H_1: \beta_5 \neq 0$

$H_0: \beta_6 = 0$ (LLU and CFL)
$H_1: \beta_6 \neq 0$

From the first hypothesis, (H_0: $\beta_1 = 0$, H_1: $\beta_1 \neq 0$), we reject H_0; since an unstandardized regression coefficient (0.312) is statistically significantly different from 0 ($p < 0.05$). Here, there is a positive relationship between AOM and LLU. Regarding the second hypothesis, (H_0: $\beta_2 = 0$, H_1: $\beta_2 \neq 0$), we reject H_0; since an unstandardized regression coefficient (0.198) is statistically significantly different from 0 ($p < 0.05$). Again, there is a positive relationship between CNB and LLU. Likewise, from the third hypothesis, (H_0: $\beta_3 = 0$, H_1: $\beta_3 \neq 0$), we reject H_0; since unstandardized regression coefficient (0.165) is statistically significantly different from 0 ($p < 0.05$). We find a positive relationship between COB and LLU. From the fourth hypothesis, (H_0: $\beta_4 = 0$, H_1: $\beta_4 \neq 0$), we reject H_0; since an unstandardized regression coefficient (0.064) is statistically significantly different from 0 ($p < 0.05$). Again, a positive relationship between CES and LLU is found. However, from the fifth hypothesis, (H_0: $\beta_5 = 0$, H_1: $\beta_5 \neq 0$), we do not reject H_0; since an unstandardized regression coefficient (0.006) is not statistically significantly different from 0 ($p > 0.05$). This is the same with the sixth hypothesis (H_0: $\beta_6 = 0$, H_1: $\beta_6 \neq 0$), where we do not reject H_0; since an unstandardized regression coefficient (0.078) is not statistically significantly different from 0 ($p > 0.05$).

4.2 Results summary

A multiple regression was run to predict LLU from AOM, CNB, COB, CES, FWN, and CFL. The assumptions of linearity, independence of errors, homoscedasticity, unusual points and normality of residuals were met. The variables: AOM, CNB, COB, CES, FWN, and CFL statistically significantly predicted LLU, $F(6, 151) = 18.781$, $p < .0005$, adj. $R^2 = .405$. Four variables

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added statistically significantly to the prediction, $p < .05$ while the rest two variables did not. Regression coefficients and standard errors can be found in Table 7.

5. Discussion

The multiple regression analysis has provided positive relationships between the level of library use and several factors such as the need to search and access online materials, check for new books or other resources, check out books and other materials, and enjoy the conducive environment for study. The vast development of technology has compelled academic libraries to start digitizing their materials that can be accessed online. Based on this, academic libraries receive users whose aim is to access online materials, particularly those with limited access to library members such as students. However, searching and accessing electronic materials depends on users' searching knowledge. We argue that, proper education on how to use various library services should be provided to users in order to familiarize them with effective techniques that will not only supply them with accurate, but timely, information. Outdated materials for example, have never been preferred by library users. That is why users may visit the library to see new acquisitions. Once appropriate materials are found in the library, users are likely to borrow and use them at their own time and place. This is because academic libraries do have reserved materials, reference materials and lending materials. Reserved and reference materials can only be read within the library but lending materials can be borrowed for specified days. Checking out materials depends on different user habits including cherished interest to use library materials outside the library particularly in the user's convenient time and environment. This is because, library users borrow books and other materials because they need more time to go through these materials for in-depth reading and referencing. Students do not have enough time to stay in the library due to their tight schedules, accumulated lectures and limited reading space. However, there are users who enjoy reading within the library. These are the ones who are attracted by

Table 7. Regression Coefficients and Standard Errors

Variable	*B*	SE_B	β
Intercept	0.895	0.328	
AOM	0.312	0.064	0.358**
CNB	0.198	0.066	0.208**
COB	0.165	0.061	0.193**
CES	0.064	0.029	0.138**
FWN	-0.006	0.048	-0.009
CFL	0.078	0.048	0.113

Note. *B* = unstandardized regression coefficient; SE_B = standard error of the coefficient; β = standardized coefficient.

** $p < .05$.

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the library's general conducive environment such as the availability of air conditioners, excellent and well-arranged fittings; basic needs such as toilets, and conveniences like television. Gupta (2006) points out that, socio-economic information that can be found on television or newspapers attracts more library users. These are likely to influence users to study within the library.

However, no relationships with the need to access or enjoy free wireless network, or consult with librarians are realized. Most academic libraries in Tanzania do provide free wireless internet in their libraries and the surrounding areas. This is mainly geared towards attracting users but at the same time allowing users who come in to use their personal computers. This benefits these libraries especially when there are not enough computers to accommodate a great number of users at once. However, in most cases, the free wireless internet signal is weak or unavailable, and this has frustrated users. That is why enjoying free wireless internet in the library or surrounding areas is not one of the reasons to use academic libraries in Tanzania. We hypothesised that consultation from librarians would be a service that attracts library users; however, it is not. Several reasons can support as to why this is not being done. The reasons behind this include less than ideal knowledge of most of the academic library users such as undergraduate students to basic library use. We also argue that well-arranged materials within the library and clear processes and procedures in using library services can reduce the level of consultations from librarians.

6. Conclusion

Library services, processes and procedures vary. Several factors contribute to this variation. One of the reasons is technological changes and the development in information science discipline. All these contribute significantly to the level of library use among users such as university students. Although the multiple regression analysis has been able to establish the relationship between the level of library use and the reasons that make users use the library, we encourage academic libraries to frequently study various needs of their users and understand their respective libraries' strengths and weaknesses and consequently devise and implement ways to improve library service. For example, we argue that in order for effective searching and accessing of online materials to take place, librarians need to improve their user education particularly knowing and understanding the modern searching processes and evaluation. Effective infrastructures should be in place to meet needs pertaining to accessing electronic collections. We also argue that academic libraries should not consider new books and other resources optional, instead they need to update their collections with new and relevant materials all the time. This is because most library users are not only attracted by new and appropriate books and other materials but also their abundance. To get rid of outdated materials, we argue that, academic libraries particularly in developing nations such as Tanzania should establish and run projects that will give them ability to purchase new materials instead of depending on institutions' tiny budgets and donors. The money raised will also make

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libraries a conducive environment for self-study and hence an increased level of library use.

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以多元迴歸分析探討影響坦尚尼亞學術圖書館使用之因素

Influencing Academic Library Use in Tanzania: A Multiple Regression Analysis

Leocardia L Juventus[1], Kafigi Jeje[2]

摘　要

本研究採問卷調查法調查坦尚尼亞兩所大學：Muhimbili University of Health and Allied Sciences（MUHAS）與Hubert Kairuki Memorial University（HKMU），共158名大學生之學術圖書館使用經驗；透過多元迴歸分析，了解影響大學生使用圖書館之因素與其圖書館使用程度之關聯。研究結果發現，坦尚尼亞學術圖書館使用者因以下需求使用圖書館：搜尋與近用線上資源、檢視新書或其他資源、借閱圖書或其他資源、享受便利的研究環境。但免費的無線網路或圖書館諮詢服務，則非影響其使用圖書館之因素。研究者認為，學術圖書館應策劃並執行相關計畫，以便讓學術圖書館成為更優質的學習環境；同時，在像坦尚尼亞此類發展中國家，學術圖書館更應成為促進社經發展的平台。研究者並建議，為提升學術圖書館達成上述目標，相關之現代化基礎建設投資有其必要性。

關鍵字：圖書館使用者、圖書館使用、多元迴歸分析、坦尚尼亞、學術圖書館

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