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Academic Library Features and Postgraduate Student Users' Satisfaction in Selected Public Universities in Southern Nigeria

Arochi, J.M.
Department of Management, Ignatius Ajuru University of Education, Port Harcourt, Nigeria
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Corresponding author email: michaelarochi@outlook.com

Abstract
This study examines the extent to which academic library features affect user satisfaction for postgraduate students in Southern Nigeria using a cross-sectional framework. The study involves a sample of three (3) public universities in Southern Nigeria. 141 survey data collected using a Likert structure questionnaire were analyzed. The empirical analysis is based on OLS regression cross-sectional model that incorporates location and space, materials/collections, facilities, staff, and programs and services as exogenous variables while incorporating intention to reuse and intention to recommend as endogenous variables. The study measurement model was validated using confirmatory factor analysis CFA. The study found that intention to reuse is strongly and positively triggered by improved library programs and services as well as adequate and accessible location and space. Materials/collections and staff were found to insignificantly affect intention to reuse. While intention to recommend was found to be enhanced by improved attitude and ability of library staff. Finally, our findings show, amongst other things, that except for library staff, all other variables of location and space, materials/collections, programs and services have positive but insignificant effects on postgraduate students' intention to recommend the library. The theoretical and practical implications of these findings are discussed. The study concludes that academic library features largely influence postgraduate student users' satisfaction. Accordingly, recommendations were provided in line with the research findings and conclusion.

Keywords: Academic Library Features, User Satisfaction, Intention to Recommend, Intention to Reuse

Introduction

Library user satisfaction is an area that has continued to attract a lot of scholars to the library literature. More specifically, factors that affect the satisfaction of students' use of academic libraries have been a topic of interest among researchers that has transcended time in library circles worldwide. Multiple studies have thus been conducted on this topic area. The university academic library is a dedicated advanced space for both postgraduate and undergraduate students, as well as researchers and faculty members. One of the primary objectives of the academic library is to increase the university's contribution to graduate and undergraduate students' information gathering and research output by providing services that directly assist students' research endeavours while also creating a conducive environment for researchers. An effective and efficient academic library system is expected to contribute significantly to students' development (Ababio et al., 2012). According to Nwalo (2003), a library is effective when it can satisfy the demands of its patrons relative to its goals and objectives. A library forms part of the main components of every institution, and hence, if under-resourced, it will defeat the fundamental objective of the institution (Khan & Zaidi, 2011). Particularly, the postgraduate programs are for mature people with a lot of expectations. The academic library plays an important role in helping postgraduate students learn the wide range of skills needed to be successful as both students and as future professionals or faculty members.

However, it appears that no research has determined the impact of academic library features/attributes on user satisfaction of postgraduate students in Nigeria using a structural equation model in a cross-sectional framework, particularly by selecting as subjects 3 public university libraries chosen as regional representative libraries in Nigeria. Understanding the link between academic library features and postgraduate student user satisfaction is significant for the growing literature on library users' satisfaction. While academic library feature is not, of course, the only factor that determines library users' satisfaction, however, it is an important determinant. The link between library user perception

and users' satisfaction has gained prominence, particularly in the major advanced countries following their greater attachment to the importance of education (Nguyen et al., 2022). However, the link between academic library features and student user satisfaction is an under-researched area for developing economies, including Nigeria. Understanding the link between academic library features and postgraduate student user satisfaction is significant for the growing literature on library users' satisfaction. While academic library feature is not, of course, the only factor that determines library users' satisfaction, however, it is an important determinant. The link between library user perception and users' satisfaction has gained prominence, particularly, in the major advanced countries following their greater attachment to the importance of education (Nguyen et al., 2022). However, the link between academic library features and student user satisfaction is an under-researched area for developing economies, including Nigeria. In China, Nzivo and Chuanfu (2013), using a descriptive technique, reveal that Chinese academic libraries are considerably well perceived by international students. It also indicates that they have differing purposes and differing needs for library services and information resources. In Korea, Bae and Cha (2015) in their study show that library users perceive collections, accessibility, and facilities factors as highly influential on their overall satisfaction, while the programs and online services factors had relatively low influence. Similarly, in a cross-sectional survey study, Noh and Chang (2020), employing structural equation model with AMOS tools, empirically reveal that material, facility, staff, program, and service, except location and space, have a significant effect on the intention to use and intention to recommend public libraries in South Korea. Tajedini et al. (2020) in a qualitative study, find that observing moral and humane principles when dealing with library users plays a significant role in both building user loyalty to the library and attracting new users. Kachwala et al. (2021) and Kojo Kakr Twum et al. (2022) in their similar studies also found that perception of overall service quality has an indirect influence on customer loyalty through customer satisfaction in library service. In USA, Cristobal (2018), using a survey study, empirically analyzed the University of Saint Louis (USL) College Library's patrons' minimum acceptable, desired, and actual observed service performance level, and the relationship between library service quality, patron satisfaction, and loyalty to the library. The result reveals that the USL library failed to meet the expectations of the patrons. However, the library service quality and customer satisfaction were found to be significantly correlated. Similarly, Gyau et al. (2021) evaluate the effects and relationships between user satisfaction and the overall academic library service quality for Jiangsu University international students in a survey study, employing descriptive tools of Pearson correlation analysis, and multivariate analysis of variance (one-way MANOVA). They discovered that the general quality of library services has a positive and substantial association with the happiness of library patrons.

Distinctively, using structural equation model, Oh (2022) creates a simplified Library Customer Satisfaction Index (LCSI Lite) for public libraries in an experimental study, using data gathered from surveys carried out at four South Korean public libraries. According to the measurement scores, the model fits the data well and the three aspects of service quality—library staff, library materials and user services, and buildings and equipment—had an impact on customer satisfaction and loyalty.

Methodology

In this study, we consider two dimensions of user satisfaction; repeat visit/use and intention to recommend, while academic library features are considered in terms of location and space, material, facilities, staff, programs and services. These definitions are consistent with previous studies in this area (Noh & Chang, 2020; Shill & Tonner, 2003). A survey questionnaire was adopted for data collection. The Academic Libraries and Postgraduate Student User Satisfaction Questionnaire LPSUSQ was given to 150 postgraduate students in person at each university's graduate school building over the course of seven working days. Fifty students were specifically chosen from each university's doctoral, master's, and postgraduate diploma programs. The respondents were asked to rate (from strongly disagree to strongly agree) their level of agreement on the items in the location and space, material/collections, facility, staff, and program and services on intention to reuse and intention to recommend scale in terms of their university academic library features and their satisfaction. The data on all the included variables were collected through a well-structured five-point Likert Scale questionnaire. The responses for the items were transformed using SPSS 20 from discrete ordinal data to ratio data and analyzed using Eviews 10 for regression estimations. The research was conducted using 141 copies of questionnaires that were returned, resulting in a response rate of 94%. The study focuses on postgraduate students of the 3 public universities in Rivers State, namely, the University of Port Harcourt, Rivers State University, and Ignatius Ajuru University of Education. The descriptive and demographic characteristics were analyzed using SPSS 20, and Microsoft Office Excel 2016 was used to generate graphs for the descriptive analysis.

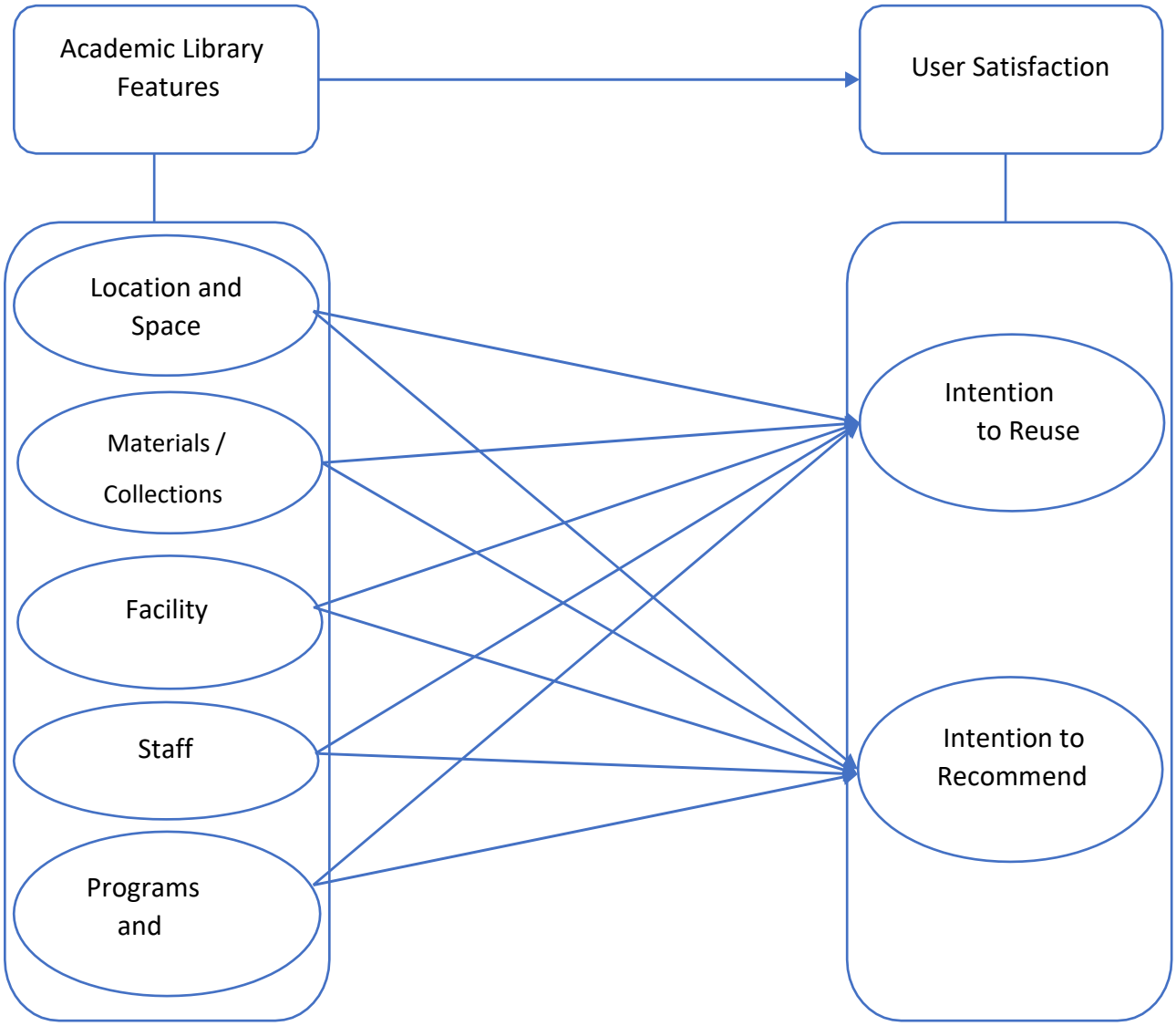

Figure 1: Study Variables and Operational Framework Source: The Researcher

To determine the extent to which academic library features affect user satisfaction of postgraduate students in public universities in Southern Nigeria. To perform statistical verification, confirmatory factor analysis on the antecedent factors was conducted using LISREL 12 to check for the single-dimensionality of each latent factor regarding its observed measurement items. The model for the study relationship, which is the impact of academic library features on user satisfaction specified in functional form as follows.

$$INTRU = f(LCS, MATC, FCLT, STF, PRGS) \quad (1)$$

$$INTRM = f(LCS, MATC, FCLT, STF, PRGS) \quad (2)$$

Where:

INTRU = Intention to Reuse INTRM = Intention to Recommend LCS = Location and Space

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MATC = Material/Collections FCLT = Facilities
STF = Staff

PRGS = Programs and Services

The cross-sectional empirical/econometric specifications of the above functional models are specified as follows:

$$y_i = \beta_0 + \beta_1 X_i + \epsilon_i \quad (3)$$

$$INTRU_i = \alpha_0 + \alpha_1 LCS_i + \alpha_2 MATC_i + \alpha_3 FCLT_i + \alpha_4 STF_i + \alpha_5 PRGS_i + \varepsilon_i \quad (4)$$

$$INTRM_i = \beta_0 + \beta_1 LCS_i + \beta_2 MATC_i + \beta_3 FCLT_i + \beta_4 STF_i + \beta_5 PRGS_i + \epsilon_i \quad (5)$$

Where $\alpha_0, and\ \beta_0$ are the model constants or intercepts (the respective values of the performance variables when the regressors are all zero), while ϵ_i, and ε_i, are the regression residuals or error terms that are assumed to be classical white noises. The subscript i indicates that our empirical data have only cross-sectional features; hence, our regression model is a cross-sectional model. $\alpha, and\ \beta$ are regression slopes or parameters that capture the effect of location and space, material/collections, facility, staff, and program and services on repeat use and intention to recommend, respectively.

Results

Descriptive/Demographic Characteristics

The demographic characteristics of respondents were as follows. 81.1% of the respondents were male and 19.1% were female, with 2.1% in their 20s, 18.4% in their 30s, 44.0% in their 40s, 26.2% in their 50s, and 9.2% in their 60s or older. 34.0% of the respondents are postgraduate students at University of Port Harcourt, 32.6% are of Rivers State University, and 33.3 are of Ignatius Ajuru University of Education. 26.2% of the respondents are for Doctorate degrees, 49.6% have Masters degree, and 24.1% are for Post Graduate Diploma Programs. 41.1% of the respondents are at the coursework stage, while 58.9% are at the project work stage of their programs. 43.3% of the respondents used the library a few times per semester, 11.3% used the library a few times per week, 28.4% used the library once a month, and 17.0% used the library in other frequencies that are not mentioned.

Table 1: Descriptive/Demographic Characteristics of the Respondents

Survey Items	Options	Frequency	Percentage
Gender	Male	118	81.1
	Female	28	19.9
Age	19 – 29 years	3	2.1
	30 – 39 years	26	18.4
	40 – 49 years	62	44.
	50 – 59 years	37	26.2
	60 years or older	13	9.2
Participated University	University of Port Harcourt	48	34.0
	Rivers State University	46	32.6
	Ignatius Ajuru University of Education	47	33.3
Program	Doctorate	37	26.2
	Masters	70	49.6
	Postgraduate Diploma	34	24.1
Stage in Program	Course work	58	41.1
	Project work	83	58.9
Frequency of library use	A few times per semester	61	43.3
	A few times per week	16	11.3
	Once a month	40	28.4
	Others	24	17.0

Source: Survey data

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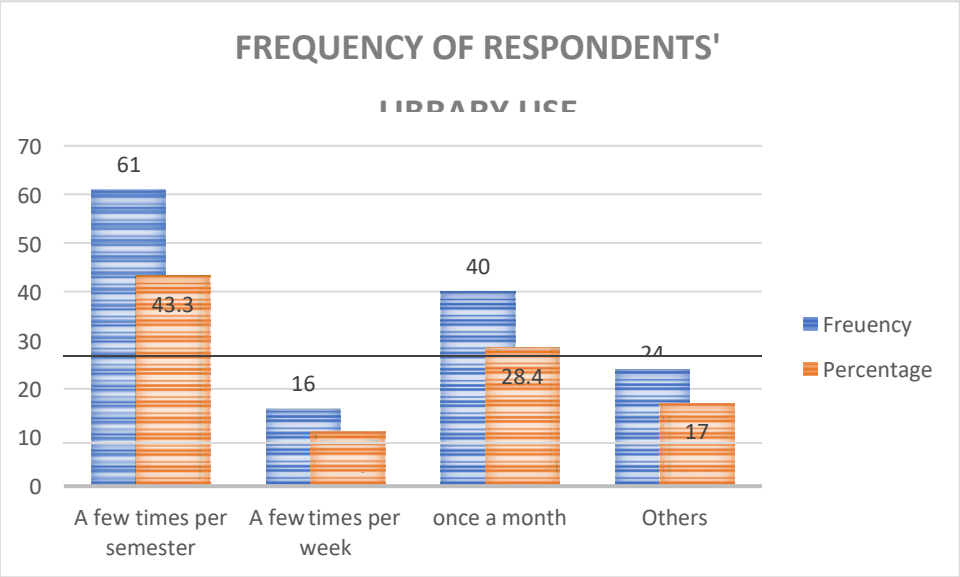

Figure 2: Frequency of Respondents' Library Use

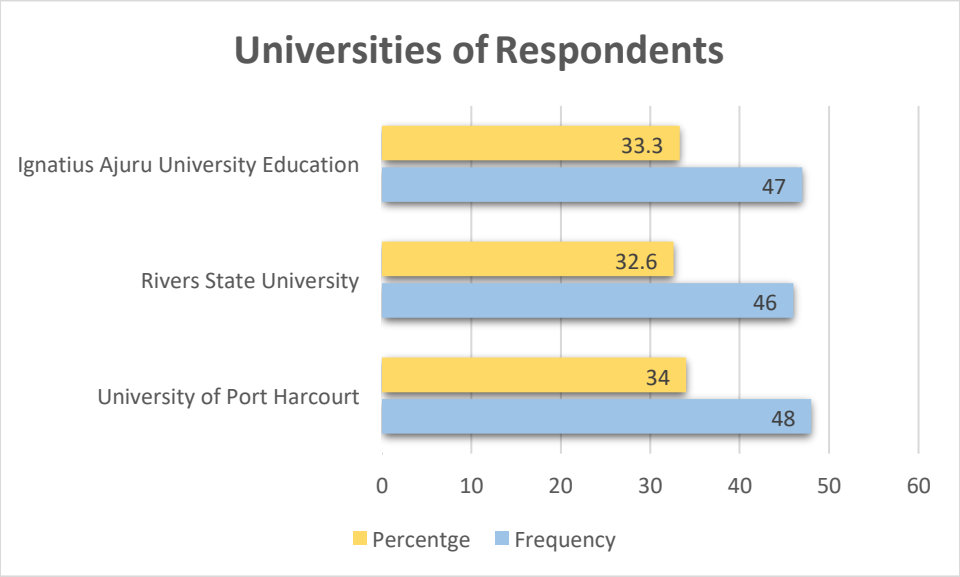

Figure 3: Universities of Respondents

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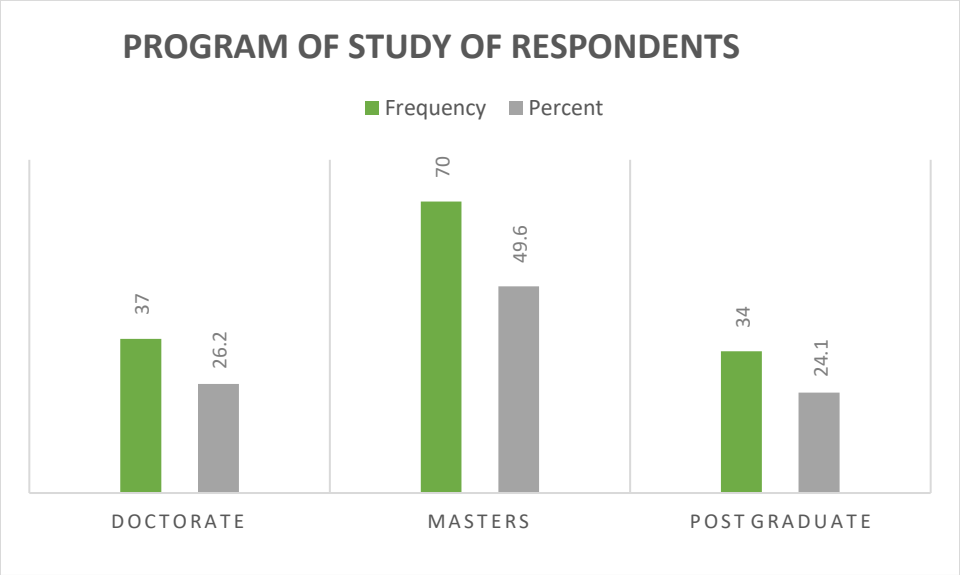

Figure 4: Programs of Study of the Respondents

1.1 Confirmatory Factor Analysis

The yielded results from the confirmatory factor analysis conducted using LISREL 12 presented in Figure 5, shows the path diagram of the standardized factor solution for the (exogenous) five- factor model for the academic library features constructs, namely: location and space LCS, Materials/collections MATC, facilities FCLT, staff STF, program and services PRGS. More specifically, for location and space LCS, the path diagram shows that LCS factor loadings were very high across 7 indicators ranging from 0.51 to 0.81. For material/collections MATC, it shows that the factor loading across the 3 indicators ranges from 0.57 to 0.91. For facilities FCLT, across the 5 indicators, the loading also loaded very high ranging from 0.61 to 0.87. The path diagram also shows very high factor loading for the 5 indicators of staff STF, ranging from 0.61 to 0.77, and loaded very high for the 4 indicators of programs and services PRGS factor, ranging from 60 to 72. In terms of the user satisfaction (endogenous) variables in Figure 6, the path diagram shows the CFA standardized solution and similarly shows very high factor loadings for the intention to reuse, ranging from 0.54 to 0.79. Also, for the intention to recommend factor, the path diagram shows a high factor loading across the observed indicators, ranging between 0.62 to 0.96. This indicates that all the observed variables have adequately measured the latent variables of academic library features and user satisfaction.

All in all, From Table 6, we can see that for all the five exogenous factors, namely: location and space LCS, Materials/collections MATC, facilities FCLT, staff STF, program and services PRGS, the factor loadings SFL range between 0.51 to 0.91, which indicates that our measurement indicators loaded well to their respective factors, exceeding the cutoff level of 0.50 for our measurements to achieve convergent validity (Fornell & Larcker, 1981). Similarly, the average variance extracted (AVE) ranges between 0.64 and 0.74, while the root average variance extracted (RAVE) ranges between 0.83 and 0.86, indicating that both AVE and RAVE exceed the 0.50 minimum acceptable level (Fornell & Larcker, 1981). Accordingly, the corresponding composite reliability CR coefficients range between 0.77 and 0.84, indicating that it also exceeds the 0.60 threshold value, showing that the measures in the study are all reliable (Bagozzi & Yi, 1988).The Cronbach's α coefficient, which ranges between 0.73 and 0.86, exceeds the threshold value of 0.7, indicating that our measurements met the internal consistency requirement. Similarly, from Table 7, we can see that for the two endogenous factors, namely intention to reuse INTRU and intention to recommend INTRM, the factor loadings SFL range between 0.54 to 0.96, which indicates that our measurement indicators loaded well to their respective factors, exceeding the cutoff level of 0.50 for our measurements to achieve convergent validity (Fornell & Larcker, 1981). Their AVE are respectively 66 and 79, while the RAVE are 0.81 and 0.89, which are beyond the acceptable level. While their corresponding composite reliability CR values are 0.80 and 0.78, which are above the 0.60 cutoff point. However, the value of Cronbach's α coefficient of reliability ranges between 0.76 and 0.80.

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The reliability analysis was conducted to ascertain the internal consistency of the multiple indicators for each construct (Lu et al. 2009). Specifically, the composite reliability coefficient was reported to measure the reliability of the factors, while composite reliability estimates the extent to which the latent factors share their measurement construct (Hair et al. 1998). Conventionally, Cronbach's alpha is widely used to measure the reliability of a construct. However, Cronbach and Shavelson (2004) contend that using only the Alpha coefficient to determine reliability may not be sufficient. Hence, composite reliability is also employed.

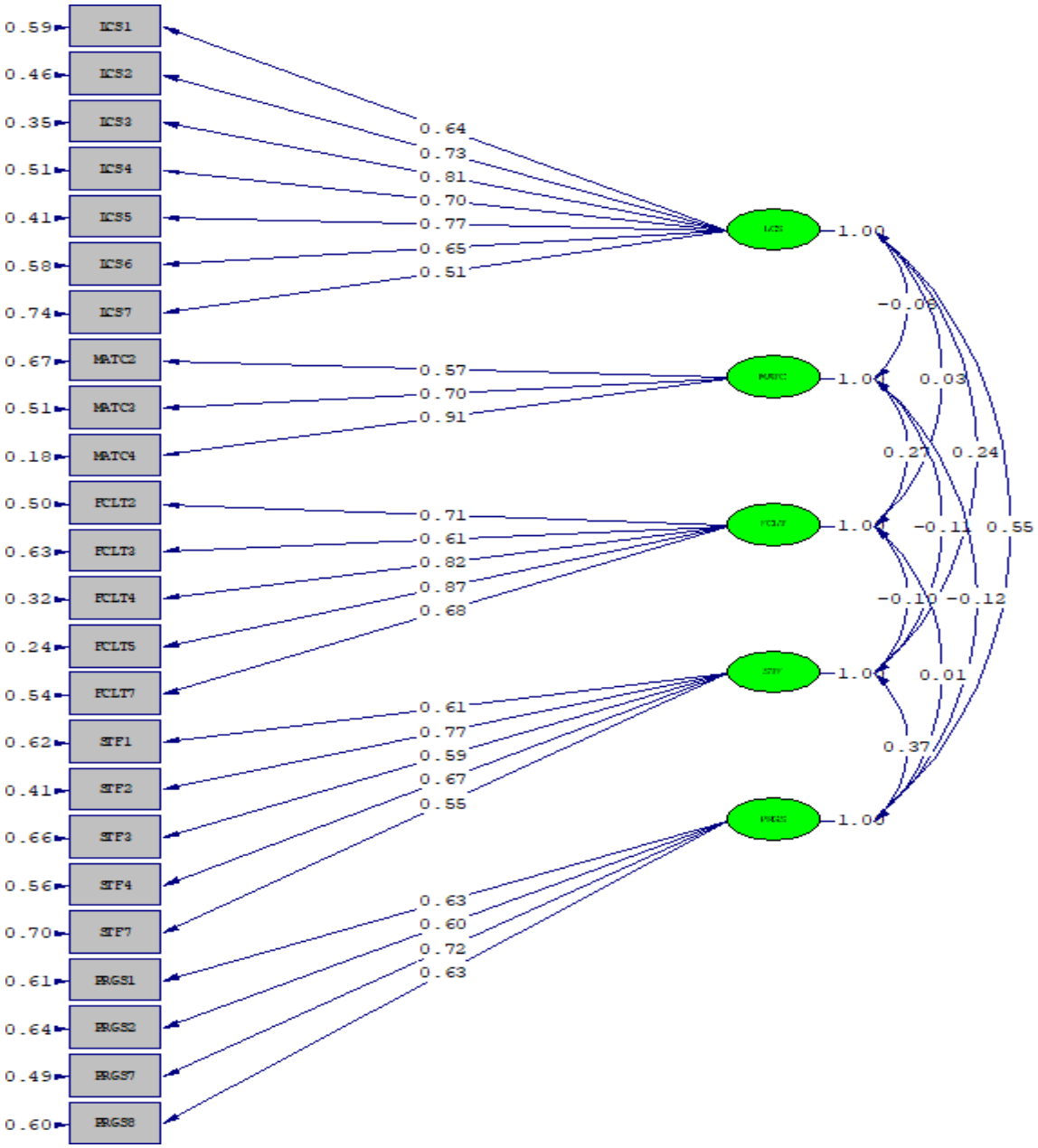

Figure 5: Path Diagram - CFA Standardized solution for the Explanatory Variables Source: LISREL

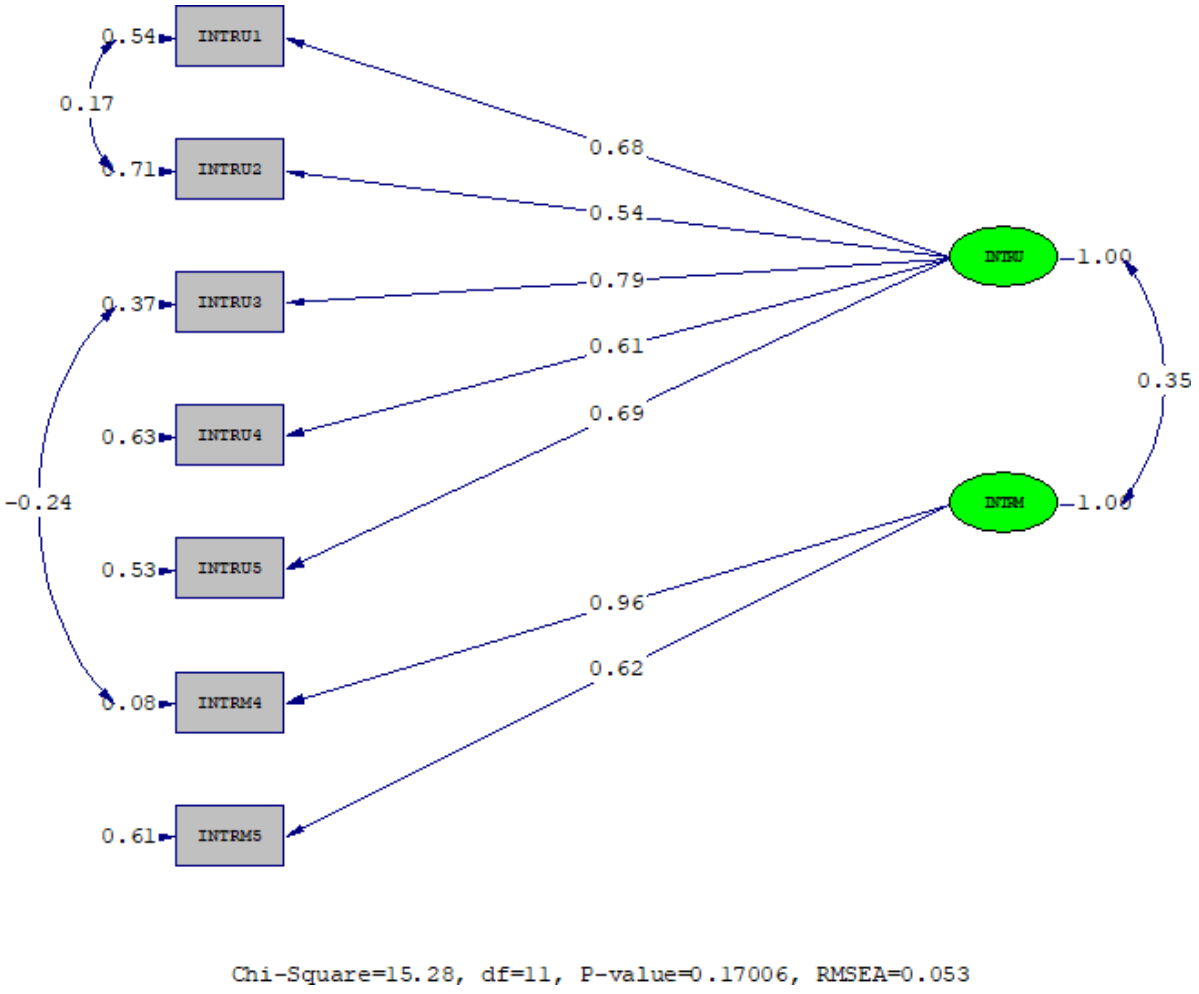

Figure 6: Path Diagram - CFA Standardized Modification Result for the Dependent Variables Source: LISREL

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Table 4: CFA Measurement Model and Reliability for the Explanatory Variables

Construct	Item	SFL	Error	Cronbach α	C.R	AVE	RAVE
LCS	LCS 1	0.64	0.59	0.86	0.86	0.69	0.83
LCS	LCS 2	0.73	0.47				
LCS	LCS 3	0.81	0.34				
LCS	LCS 4	0.70	0.51				
LCS	LCS 5	0.77	0.41				
LCS	LCS 6	0.65	0.58				
LCS	LCS 7	0.51	0.74				
MATC	MATC 2	0.57	0.68	0.75	0.78	0.73	0.85
MATC	MATC 3	0.70	0.51				
MATC	MATC 4	0.91	0.17				
FCLT	FCLT 2	0.71	0.50	0.85	0.86	0.74	0.86
FCLT	FCLT 3	0.61	0.63				
FCLT	FCLT 4	0.82	0.33				
FCLT	FCLT 5	0.87	0.24				
FCLT	FCLT 7	0.68	0.54				
STF	STF 1	0.61	0.63	0.76	0.78	0.64	0.80
STF	STF 2	0.77	0.41				
STF	STF 3	0.59	0.65				
STF	STF 4	0.67	0.55				
STF	STF 7	0.55	0.70				
PRGS	PRGS 1	0.63	0.60	0.73	0.74	0.65	0.80
PRGS	PRGS 2	0.60	0.64				
PRGS	PRGS 7	0.72	0.48				
PRGS	PRGS 8	0.63	0.60				

Source: Computed from LISREL output based on survey data

Table 5: CFA Measurement Model and Reliability for the Dependent Variables

Construct	Item	SFL	*Error*	Cronbach α	C.R	AVE	RAVE
INTRU	INTRU 1	0.68	0.54	0.80	0.80	0.66	0.81
INTRU	INTRU 2	0.54	0.71				
INTRU	INTRU 3	0.79	0.38				
INTRU	INTRU 4	0.61	0.63				
INTRU	INTRU 5	0.69	0.52				
INTRM	INTRM 4	0.96	0.08	0.76	0.78	0.79	0.89
INTRM	INTRM 5	0.62	0.62				

Source: Computed from LISREL output based on survey data

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As shown in Table 8, the Chi-square statistics (χ^2 = 15.279, p-value = 0.17006) for the endogenous variable construct is appropriate and met the fit index cut-off point. Thereby retaining the hypothesis that the fitted model is a good description of the data. However, the Chi-square statistic for the exogenous variable construct (χ^2 = 270.72, p-value = 0.00519) is quite high with a zero probability, which is contrary to our expectation, thereby rejecting the hypothesis that the fitted model is a good description of the data. However, the Chi-square test statistic is a test with asymptotic properties; hence, it is quite sensitive to sample size (Hayashi et al., 2011). Therefore, we argue that the high statistical significance of the Chi-square statistic did not affect the acceptability of the fitted model. According to Joreskog (1969), the Chi-square, which is usually sensitive to both sample size and model complexity, is more a descriptive criterion than a statistical fit evaluation test. Brown (2014) also asserted that when fit indices fall in the marginal ranges, it is important to consider the consistency of the model expressed by several alternative fit indices as well.

Consequently, Table 8 presents other goodness of fit statistics for the endogenous factors, such as the Goodness of Fit Index (GFI) = 0.97, Non-Normed Fit Index (NNFI) = 0.97, Comparative Fit Index (CFI) = 0.986, Incremental Fit Index (IFI) = 0.986, Adjusted goodness of fit index (AGFI) = 0.92, Normed fit Index (NFI) = 0.952, Root mean square residual (RMR) = 0.034 Standard root mean residual (SRMR) = 0.047, Root mean square error of approximation (RMSEA) = 0.057, Parsimony Normed Fit Index (PNFI) = 0.499, Relative Fit Index (RFI) = 0.909. While for the exogenous factors, the other goodness of fit conditions met include the Goodness of Fit Index (GFI) = 0.87, Non-Normed Fit Index (NNFI) = 0.95, Comparative Fit Index (CFI) = 0.96, Incremental Fit Index (IFI) = 0.96, Adjusted goodness of fit index (AGFI) = 0.82, Normed fit Index (NFI) = 0.84, Root mean square residual (RMSR) = 0.064, Standard root mean residual (SRMR) = 0.075, Root mean square error of approximation (RMSEA) = 0.044, Parsimony Normed Fit Index (PNFI) = 0.66, Relative Fit Index (RFI) = 0.80. With the above fit indices, which largely met the evaluation standard for a good fit model, we therefore accept the fitted model with the measurement items uni-dimensionalized to each factor as a good measurement model for our data.

Table 6: Goodness of Fit Index for the Research Measurement Model

Goodness of fit index	Evaluation standard (Hayashi et al., 2011; Bagozzi & Yi, 1988).	Model fit result for Endogenous Variable	Model fit result for Exogenous Variable
Degrees of freedom	-	11	482
Chi-square Statistics	-	15.279	270.72
Significance p-value	>0.05	(P = 0.17006)	(P = 0.00519)
Goodness of Fit Index (GFI)	Good when close to 1	0.97	0.87
Adjusted goodness of fit index (AGFI)	Good when close to 1	0.923	0.82
Root Mean Square Residual (RMSR)	Minimum value	0.034	0.064
Normed Fit Index (NFI)	Good when close to 1	0.94	0.84
Comparative fit index (CFI)	Good when close to 1	0.986	0.96
Incremental fit index (IFI)	Good when close to 1	0.986	0.96
Standard root mean residual (SRMR)	Good when close to 0	0.047	0.075
Root mean Square Error of Approximation (RMSEA)	Minimum value	0.057	0.044
Parsimony Normed Fit Index (PNFI)	>0.50	0.499	0.66

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Non-Normed Fit Index (NNFI)	Close to 1	0.973	0.95
Relative Fit Index (RFI)	Close to 1	0.909	0.80

Source: LISREL CFA output based on survey data

Correlation and Discriminant Validity

The correlation matrix in Tables 7 and 8 shows that there are largely positive and significant moderate correlations between the factors, and none of the different factors perfectly correlate with each other, which is good for the discriminant validity evaluation. Using the formula proposed by Fornell and Larcker (1981), we calculated the average variance extracted (AVE). We can see that the AVE among constructs used in the measurement model of this study exceeds the squared inter-constructs correlation coefficient among the variables when compared, which assures discriminant validity among our constructs. Hence, it is intuitively appealing to proceed with examining the unidirectional causal relationship between the academic library features (location and space LCS, Materials/collections MATC, facilities FCLT, staff STF, program and services PRGS) and user satisfaction (intention to reuse INTRU and intention to recommend INTRM) of postgraduate students in southern Nigeria.

Table 7: Correlation and Discriminant Validity for Exogenous Factors

Factors	LSC	MATC	FCLT	STF	PRGS
LSC	1				
MATC	-0.08**	1			
FCLT	0.03**	0.27**	1		
STF	0.24**	-0.11**	-0.10**	1	
PRGS	0.55**	-0.12**	0.01**	0.37**	1
AVE	0.69	0.73	0.74	0.64	0.65
RAVE	0.83	0.85	0.86	0.80	0.80

** Significant at 1%

Table 7: Correlation and Discriminant Validity for Exogenous Factors

	INTRU	INTRM
INTRU		
INTRM	0.35**	
AVE	0.66	0.79
RAVE	0.81	0.89

** Significant at 1%

Model 1 examines the effect of academic library features on intention to reuse. For model 1 (3.2), intention to reuse (INTRU) is specified to depend on the five dimensions of academic library features; namely, location and space (LCS), materials/collections (MATC), facilities (FCLT),staff (STF), and Program and services (PRGS). Intention to reuse is a dimension of postgraduate students' user satisfaction. Table 2 presents the model 1 estimation results: main regression results and goodness of fit statistics.

Table 2: Model 1 Estimation Results; INTRU = f (LCS, MATC, FCLT, STF, PRGS)

Variable	Coefficient	P-value
Panel A: Main Regression Results		
Intercept (α_0)	2.9962	0.0000
LCS (α_1)	-0.2619	0.0240
MATC (α_2)	0.0212	0.7201
FCLT (α_3)	-0.0111	0.8579
STF (α_4)	0.0913	0.2857
PRGS (α_5)	0.3184	0.0016
Panel B: Goodness of Fit Statistics		
R^2	0.1068	
$\bar{R}^2$	0.0737	
F-statistic (P-value)	3.229 (0.0087)	
Wald F-statistic (P-value)	3.6649 (0.0038)	
Durbin Watson	1.7366	

Source: SPSS output based on research data

From Panel A of Table 2, we can see that the intercept term ($\alpha_0 > 0, p\text{-}value < 0.05, 0.1$) is positive and statistically significant for the model, suggesting that intention to reuse would, on average, be significantly different from zero in the absence of all explanatory variables. Also, α_1, which captures the effect of location and space on the postgraduate students' intention to reuse the library, is negative and has statistical significance (p-value = 0.0240). This indicates that, on average, an improvement in the academic library location and space tends to significantly lead to a reduction in the postgraduate students' intention to reuse the academic library. In terms of the library materials/collections, we can see that α_2 has a positive sign, indicating that on average, an increase in materials and collections tends to be associated with higher postgraduate students' intention to reuse the library. However, its coefficient is statistically insignificant (p-value = 0.7201). In terms of facilities as an attribute of academic library, we can see that the parameter α_3 is negatively signed, and statistically insignificant (p-value = 0.8579), indicating that on average, improved library facilities tend to reduce the postgraduate students' intention to reuse the academic library, although insignificantly. Also, we see that α_4, the coefficient capturing the effect of staff as an academic library feature on intention to reuse, is positive but statistically insignificant (p-value = 0.2857), indicating that on average, an improvement from the library staff tends to increase the postgraduate student's intention to reuse the academic library. However, the staff effect is insignificant. Similarly, we can see that α_5 which captures the effect of programs and services on the postgraduate students' intention to reuse the academic library, is positive and has statistical significance (p-value = 0.0016), indicating that improved library programs and services tend to on average, significantly increase the postgraduate students' intention to reuse the academic library, keeping other variables constant.

In terms of model diagnostics, the F-statistic (p-value = 0.0087) in Panel B has a zero p-value and shows that the fitted intention to reuse *INTRU* model is highly significant. It indicates that our model provides a better fit to our data. However, as shown by the $\bar{R}^2$, the proportion of the model variation explained by the joint influence of all included variables is about 7%, indicating that about 7% of the total observed variation in intention to reuse the

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library is explained by the joint influence of our explanatory variables. This implies that there are other factors that explain the remaining about 93% of the variation in the postgraduate students' intention to reuse the academic library, which our model could not capture. We can also see from Panel B that the Durbin-Watson statistic (DW = 1.7366) is much higher than R^2 (R^2 = 0. 1068), indicating that our model is not spurious, while the Wald F-statistic (p-value = 0.0038) is significant, indicating that all the included parameters in our model are of value to the model. However, it is difficult to establish causal relationships using a cross-sectional design. As a remedy to this limitation, the regression estimates of this study are based on heteroskedasticity and autocorrelation consistent HAC standard errors, which, according to Newey and West (1987), makes the estimates remain robust even in the presence of heteroskedasticity and autocorrelation. Hence, this study sufficiently attempts to establish the causal relationship between the variables of interest.

Table 3: Model 2 Estimation Results; INTRM = f (LCS, MATC, FCLT, STF, PRGS)

Variable	Coefficient	P-value
Panel A: Main Regression Results		
Intercept (β_0)	2.3820	0.0008
LCS (β_1)	0.1845	0.1732
MATC (β_2)	-0.4553	0.4966
FCLT (β_3)	0.0604	0.3400
STF (β_4)	0.1846	0.0675
PRGS (β_5)	0.0494	0.7160
Panel B: Goodness of Fit Statistics		
R^2	0.0779	
$\bar{R}^2$	0.0438	
F-statistic (P-value)	2.2840 (0.0497)	
Wald F-statistic (P-value)	2.1922 (0.0586)	
Durbin Watson	2.2995	

Source: SPSS output based on research data

From Panel A of Table 2, we can see that the intercept term $\beta_0 > 0, p\text{-}value < 0.05, 0.1)$ is positive and statistically significant for the model, suggesting that intention to recommend would, on average, be significantly different from zero in the absence of the explanatory variables. Also, β_1, which captures the effect of location and space on the postgraduate students' intention to recommend the library, is positive and statistically insignificant (p-value = 0.1732). This indicates that an improvement in the location and space tends to cause a reduction in the postgraduate students' intention to recommend the academic library. For the library materials/collections, we can see that β_2 also has a negative sign, indicating that an increase in the materials and collections tends to cause the postgraduate students' intention to recommend the library to reduce, although insignificantly (p-value = 0.4966). In terms of library facilities, we can see that the parameter β_3 has a positive sign, and is statistically insignificant, indicating that improved library facilities tend to insignificantly (p-value = 0.3400) increase the postgraduate students' intention to recommend university academic library. Also, we see that β_4, the coefficient capturing the effect of staff as an academic library feature on intention to recommend, is positive and statistically significant (p-value = 0.0675) at 10% level, indicating that an increase in the postgraduate student's intention to recommend the academic library tends to be significantly caused by improvement from the staff of the academic library. Similarly, we can see that the parameter β_5 capturing the effect of academic library programs and services on the postgraduate students' intention to recommend the academic library is positive and statistically insignificant (p-value = 0.7160). This indicates to recommend the academic library is positively affected by improved library programs and services. However, the effect of academic library programs and services on the postgraduate students' intention to recommend the library is insignificant. Turning to the model diagnostics in Panel B of Table 3, the F-statistic has

a p-value of (p-value = 0.049) and therefore shows that the fitted intention to recommend *INTRM* model is significant. It indicates that our model provides a good fit to our data. However, as revealed by the $\bar{R}^2$, the proportion of the model variation explained by the joint influence of all included explanatory variables is about 4%. This indicates that about 4% of the total observed variation in intention to recommend is explained by the joint effect of our explanatory variables. This implies that there are other factors that explain the remaining about 96% of the variation in the postgraduate students' intention to reuse the academic library, which our model could not include. We can also see from Panel B that the Durbin-Watson statistic (DW = 2.2442) is much higher than R^2 (R^2 = 0. 0779), indicating that our model is not spurious, while the Wald F-statistic (p-value = 0.0586) is significant at 10% level, indicating that all the parameters in our model are of significant value to the model. However, it is difficult to establish causal relationships using a cross-sectional design. As a remedy to this limitation, the regression estimates of this study are based on heteroskedasticity and autocorrelation consistent HAC standard errors, which, according to Newey and West (1987) makes the estimates remain robust even in the presence of heteroskedasticity and autocorrelation. Hence, this study sufficiently attempts to establish the causal relationship between the variables of interest.

Discussion

Consistent with the previous study by Oh (2022), we validated the measurement model of this study using confirmatory factor analysis. Hence, this study proceeds to investigate the extent to which academic library features affect user satisfaction of postgraduate students in public universities in southern Nigeria using cross-sectional method. More specifically, 1 unit increase in location and space would, on average, lead to a reduction in intention to reuse the academic library by 0.26. While a 1 unit increase in facilities would, on average, lead to an insignificant reduction in the intention to reuse the academic library by 0.01. These findings, which are partly consistent with the previous work of Noh and Chang (2020), Cha and Kim (2020) and Tajedini et al. (2020), imply that the location and space of academic libraries significantly affect the postgraduate students' change in the intention to reuse libraries downwardly. This can be explained by a theoretical perspective that postgraduate students might not be interested in reusing the library after having an unpleasant experience in terms of the library environment, distance, and space for social interaction and learning.

Also, a 1 unit increase in staff and materials/collections tends to lead to an insignificant increase in the intention to reuse the library by 0.09 and 0.02, respectively; a unit increase in library programs and services tends to lead to a significantly increased intention to reuse the library by 0.32. The previous research by Noh and Chang (2020) is consistent with our findings on programs and services and however, inconsistent with our findings on materials/collections and staff. This implies that these factors positively affect the postgraduate students' intention to reuse the academic library. This could be explained by a theoretical opinion that postgraduate students tend to have the intention to reuse the academic library when they are given access to recent materials/collections, and are allowed to print and photocopy academic documents and materials at a subsidized cost, and when the librarians are knowledgeable and helpful to students. Similarly, postgraduate students tend to reuse the academic library when it offers them optional courses on information retrieval or database searching and training to students who do not have a strong understanding of the legal and ethical issues involving information use and research.

On the other hand, the study finds evidence that, except for materials/collections, all other variables, namely location and space, facility, staff, programs and services have a positive effect on intention to recommend. More specifically, a 1 unit increase in location and space, facilities, staff, programs, and services would on average lead to a higher intention to recommend the academic library by 0.18, 0.06, 0.184 and 0.049, respectively, while a unit increase in material/collections tends to on average reduce the intention to recommend the academic library. However, all the variables have no significant impact on the intention to recommend, except staff, which affects the intention to recommend significantly at 10% level. These findings are consistent with the previous work of Bae and Cha (2015) and Noh and Chang (2020) and could be explained by a theoretical opinion that the postgraduate students' intention to recommend their academic libraries increases when the librarians are knowledgeable and helpful to students. Also, there could be an increased intention to recommend the library when their academic library offers optional courses on information retrieval or database searching and training to students who do not have a strong understanding of the legal and ethical issues involving information use and research. On the other hand, they could reduce the intention to recommend when their academic library does not give them access to recent

materials/collections, does not allow them to borrow printed books or journal articles, have access to ebooks, databases, audio and video materials.

Additionally, however, the descriptive analysis of this study reveals that the majority of our respondents use the university academic library a few times per semester. This can be adjudged to be poor. Hence, the need for persuasive recommendations based on our overall findings to improve the use of the academic library by university students, especially postgraduate students, through our proposed user satisfaction model.

Conclusion

There is evidence that location and space negatively but significantly affect intention to reuse. This implies that the academic library location and space negatively but strongly affect the intention to reuse the academic library. There is evidence that facility has a negative but insignificant effect on intention to reuse. This can be explained by the theoretical perspective that the postgraduate students' intention to reuse the academic library might reduce as a result of lack of access to free internet Wifi, lack of digital book locating system, interruption in power supply, insufficient chairs, tables, lack of well-furnished instruction labs, seminar rooms, conference rooms, collaborative learning enhancement facilities, clean conveniences for the comfort of the library users and staff etc. We also find evidence that library programs and services, staff, and materials/collections have positive impacts on the intention to reuse the academic library, and their impacts are insignificant except for programs and services. There is evidence that the impact of programs and services on intention to reuse is significant. The study also finds evidence that, except for materials/collections, all other variables, namely location and space, facility, staff, programs and services, have a positive effect on intention to recommend. While all the variables have no significant impact on the intention to recommend, except for staff, which affects the intention to recommend significantly at 10% level.

Recommendations

Based on the findings and conclusions of this study, we recommend the following:

1. Universities can significantly increase their library users' satisfaction, particularly their postgraduate students, by considering their library location and space. This can be achieved by ensuring that their libraries are located in a favourable, clean, green and quiet environment. Also, by ensuring that there is adequate space within the library.
2. Universities can significantly improve the satisfaction of their academic library users, especially postgraduate students, by paying more attention to the library materials/collections. They can achieve this by ensuring the provision of good and recent collections/materials for their library users. Also, by ensuring that their library users have access to ebooks, databases, audio and video materials, and are given the opportunity to print and photocopy academic documents and materials at a subsidized cost.
3. Universities can significantly increase their library users' satisfaction, particularly their postgraduate students, by giving more attention to their library facilities. This can be made possible by making sure that their libraries have adequate lighting fittings, computers and uninterrupted power supply. Also, by providing access to free internet Wi-Fi, well- furnished instruction labs, seminar rooms, conference rooms and collaborative learning enhancement facilities.
4. Universities can significantly increase their library users' satisfaction, particularly their postgraduate students, by paying more attention to their library staff and librarians. This can be achieved by ensuring that their librarians and staff are knowledgeable and continuously trained to always demonstrate good communication skills and competence to help research students, especially research students while focusing on their satisfaction.
5. Universities can significantly increase their library users' satisfaction, especially their postgraduate students, by paying greater attention to their library programs and services. This can be achieved by ensuring that their academic library offers training and specialized research assistance to students who do not have a strong understanding of the legal and ethical issues involving information use and research. Also have the capacity to offer e-reference and plagiarism checking services, academic data, and optional courses on information retrieval or database searching for their research students and faculty members.

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