Modelling web-based library service quality and user loyalty in the context of a developing country

Structured Abstract:

**Purpose** – This study aims to empirically validate the LibWebSQ measurement scale. In addition, it investigates the relationship between perceived web-based service quality and three other latent constructs, namely user satisfaction, service value, and user loyalty.

**Design/methodology/approach** – A quantitative survey design was used to collect the data. Structural Equation Modeling (SEM) was employed to determine the influence of web-based service quality on the three latent constructs. The respondents were students, academic staff, and non-academic staff from two federal universities in the North-western zone of Nigeria.

**Findings** – The findings of the path analysis indicate that perceived web-based service quality and service value exhibit no statistically significant direct influence on user loyalty. However, user satisfaction has a direct positive influence on user loyalty, and it also mediates the relationship between web-based service quality and user loyalty to the library.

**Research limitations/implications** – The LibWebSQ is a reliable and valid scale to be used in Nigerian university libraries for web-based service quality measurement. User loyalty in academic libraries can be modelled as a result of service quality and user satisfaction.

**Originality/value** – This is the first attempt to assess web-based library service quality using the LibWebSQ measurement scale. A satisfactory model fit is obtained, which allows the measurement model to be integrated with service value, user satisfaction and user loyalty. The study contributes to the conceptualization of web-based library service quality.
Keywords: Service quality; User satisfaction; Service value; User loyalty; University library; Nigeria.

Article Classification: Research paper

Introduction

The library as an institution operates in a dynamic environment based on the ever-changing demands and needs of the clientele it serves (Ross and Sennyey, 2008; Soong and Chan, 2010). Advances in information technology result in hybrid libraries (Beyene, 2012) that provide variations of products and services, and which are required to gauge their success based on the continuous use of these services by their users. As users are the focus of all library core activities (Ranganathan, 1931), the assessment of service quality (Seay et al., 1996) or web-based library service quality, as perceived by the users, is a necessity in university libraries (Hernon and Nitecki, 2001). The ultimate goal is to maintain library user loyalty (Kiran and Diljit, 2011) since loyal library users provide word-of-mouth and referrals to the library; thus, increasing patronage and use. A substantial justification for the interest in service quality outcome by practitioners is that it has a beneficial influence on the bottom-line performance for the organization and creates a better understanding of the influence of service quality, user satisfaction, and service value. This helps library management to develop a model which maintains user loyalty (Kiran and Diljit, 2011; Siddiqi, 2011).

The global digital environment, increasing competition, and decreasing patronage (Adeniran, 2011) are major problems for university libraries in Nigeria. These problems undermine the role of libraries to maintain user loyalty. In the past, service quality in libraries
was described in terms of size and collections of the library holdings (Ahmed and Shoeb, 2009; Hernon and Altman, 2010; Sahu, 2007). These traditional measurements are no longer appropriate, nor applicable, as a means of web-based library service quality assessment (Cook et al., 2000). Researchers in the field of library and information science rely heavily on SERVQUAL (Parasuraman et al., 1985), and SERVPERF (Dauda et al., 2013) to measure library service quality, despite the fact that the application of these in library settings have proven unreliable (Cook et al., 2000; Nitecki, 1996). This initiated the development of the LibQUAL+ by the Association of Research Libraries (ARL) to measure library service quality on three dimensions: affect of service, information control, and library as a place. This instrument has since been trademarked as LibQUAL+™ and is available in many languages, but requires a subscription fee and its lengthy questionnaire may be a deterrent to respondents. Considering these limitations, Kiran and Diljit (2012) developed the LibWebSQ scale specifically to measure web-based library service quality based on a re-conceptualization of service quality in this context.

This current study is an attempt to determine the perceived web-based service quality in federal university libraries in the north-western zone of Nigeria. It investigates the relationship between service quality and three latent constructs; namely, user satisfaction, service value, and user loyalty. This study empirically tests the application of LibWebSQ to commensurate with the current technological development in Nigerian university libraries under study.

Literature review

Service quality measures
Service quality is a prevalent area of research in the library and information science discipline. Numerous studies have been conducted to measure the quality of library services using scales ranging from SERVQUAL, SERVPERF, and LibQUAL+™. Though SERVQUAL is widely used, it was developed to assess service quality in traditional markets (Parasuraman et al., 1988). Awan and Mahmood (2013) provided a detailed argument on the need to develop a context specific scale that does not rely on SERVQUAL. They developed a scale specific to the Pakistani context consisting of six dimensions: access, reliability, responsiveness, assurance, communication, and empathy. However, their scale measures overall library service quality and is not specific to web-based services.

Researchers and practitioners in the area of Internet or online service quality are increasingly calling for newer measures to assess their e-service initiatives (Gajendra and Wang, 2015). Parasuraman et al., (2005) developed E-SERVQUAL to demonstrate the significance of electronic service quality in the context of the Internet using two scales. E-S-QUAL uses 22 items to measure four dimensions: efficiency (ease of web site use), privacy (assurance of confidentiality of users/customer data and information on credit card), fulfillment (accuracy of service promises), and reliability (technical functions). The second scale, E-RecS-QUAL, incorporates 11 items to measure three dimensions: compensation, contact, and responsiveness. However, these instruments are not widely cited in the library and information science (LIS) literature.

In the LIS context, LibQUAL+™ was adapted from SERVQUAL as a standardized dimension of library service quality across an institutional library system (Cook et al., 2002; Dash and Padhi, 2010). Though the widespread use of LibQUAL+™ is evident, several criticisms have been raised by practitioners, mainly on the administration of the survey. There is
a fee imposed on its use and all the questions need to be answered before the survey can be accepted; thus, patrons complained that it is too long (Saunders, 2007). Literature pertaining to developing countries’ use of LibQUAL+™ is scarce.

Acknowledging the absence of a scale to measure online library services, Kiran and Diljit (2012) developed a scale specifically to measure service quality of web-based services in Malaysian research university libraries. This scale was developed from grounded data and 25 items were finalised for the second-order service quality dimensions. The hierarchical conceptualization of web-based service quality was done based on the Nordic perspective by taking into account the environment, delivery, and outcome dimensions as the first level and subsequent eight sub-dimensions of web-based service quality. The scale has since been used in studies within the digital library context (Cheng, 2014; Zha et al., 2015).

The relationship between service quality and user loyalty has been considered in numerous research contexts. Service quality has a significant influence on user satisfaction (Ghalandari, 2013) and user loyalty (Fares et al., 2013; Pearson et al., 2012). Likewise, user satisfaction also positively influences user loyalty (Bakti and Sumaedi, 2013). Others have indicated an indirect influence of service quality on user loyalty to the library, via user satisfaction as the mediating variable (Kiran and Diljit, 2011; Sumaedi and Bakti, 2011).

Nigerian university libraries

Nigerian university libraries have established their presence online (Gbajie, 2007); however, research on service quality of Nigerian library services is scarce. Umar (2012) studied service quality delivery in the north-western zone of Nigeria using SERVQUAL, and found that creating user commitment can be effective in achieving the business goals of university libraries. The use
of SERVPERF by Dauda et al., (2013) to study the internal service quality of a university library revealed no significant impact on the job satisfaction of library staff.

Literature revealed that Nigerian universities are on the path of increasingly adopting web technologies for the delivery of library services. Kehinde and Tella’s (2012) investigation of 30 Nigerian federal university libraries reported a low level of web technologies use. However, Emmanuel et al. (2014) and Tella and Oyegunle (2016) revealed an increase in the uptake of technology in Nigerian university library service delivery, though not as advanced as South African university libraries.

To maintain the habitual user loyalty to the libraries and retain new ones, university libraries in Nigeria have been putting considerable efforts in designing information products and services for effective and efficient delivery of services to its users (Adeniran, 2011; Tella and Oyegunle, 2016). However, there are no current studies to assess the level of web-based service quality provided by university libraries in Nigeria, and the subsequent effect of service quality on user satisfaction and loyalty. This study will seek to validate the LibWebSQ measurement scale developed by Kiran and Diljit (2011) to determine the impact of web-based service quality in federal university libraries in the north-western zone of Nigeria.

Research objectives and hypotheses

This study aims to:

1. measure web-based service quality of federal university libraries in the north-western zone of Nigeria; and

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2. investigate the relationship between user loyalty and the latent constructs – service quality, user satisfaction, and service value – in federal university libraries in the north-western zone of Nigeria.

Several hypotheses were developed to guide this study. Studies have shown that perceived service quality influences user satisfaction, and satisfaction then influences user loyalty (Cristobal et al., 2007; Gajendra and Wang, 2015; Sumaedi and Bakti, 2011).

Research hypotheses

Service quality is a crucial factor that has a significant influence on customer satisfaction (Kiran and Diljit, 2011; Kaura et al., 2015) and user loyalty (Fares et al., 2013; Lee et al., 2011; Pearson et al., 2012). Service quality also enhances perceived value, which consequently contributes to user loyalty to the library (Parasuraman and Grewal, 2000; Pearson et al., 2012). Other scholars found a positive influence of perceived value on user satisfaction (Keshvari et al., 2015; Kiran and Diljit 2011; Kaura et al., 2015). User satisfaction is a major determinant to build customer loyalty towards a product or service (Aydin and Özer, 2005; Coker, 2013), leading to higher future profitability (Dehghan and Shahin, 2011) and has a significant positive prediction on user loyalty (Ganiyu et al., 2012). Studies indicate an indirect influence of service quality on user loyalty to the library by the mediating variable of user satisfaction (Bakti and Sumaedi, 2013; Keshvari et al., 2015; Kiran and Diljit, 2011).

Thus the following hypotheses are posited:

H1: There is a positive relationship between web-based service quality and user satisfaction.

H2: There is a positive relationship between web-based service quality and service value.

H3: There is a positive relationship between service value and user satisfaction.
H4: There is a positive relationship between service value and user loyalty.

H5: There is a positive relationship between user satisfaction and user loyalty to the libraries.

Figure 1 depicts the structural model that guides the investigation in this study.

![Proposed structural framework](image)

**Figure 1. Proposed structural framework**

**Methodology and data collection**

The authors used the survey method to investigate the relationship between web-based service quality, user satisfaction, service value, and user loyalty. The LibWebSQ instrument (Kiran and Diljit, 2012) comprising the original 31 items to measure service quality was used. The reasons for selecting this instrument are its accurate and recursive cycle that is based on the assessment of the instrument in terms of reliability and validity. Service value, user satisfaction, and user loyalty are measured using three items each on a seven-point Likert-type scale (1 = strongly disagree, to 7 = strongly agree).

The study was conducted in two Federal university libraries in the north-western zone of Nigeria: Ahmadu Bello University, Zaria (ABU) and Bayero University, Kano (BUK). The domain area of this study in terms of web-based library services is access to online databases, web OPAC, online reference services, online request forms, online help, online customer
feedback, and access to digitized materials, to assess service quality. Participants were undergraduate and postgraduate students, as well as academic and non-academic staff of the university. Probability sampling was chosen for this study that signified the use of random selection to eliminate subjectivity. The total population of staff and students in ABU and BUK is 73,209. Using Krejcie and Morgan’s (1970) sample calculations, a total of 382 was suggested. Estimating a 50 percent return rate, a total of 764 questionnaires were distributed. However, after data cleaning, only 242 usable samples were available for further analysis.

Analysis and results

Respondents from both universities had almost equal participation with 123 (50.8%) from BUK and 119 (49.2%) from ABU. The respondents were 121 (50%) undergraduate, 34 (14%) postgraduate, and 39 (16.1%) academic staff, whereas the remaining 48 (19.8%) were non-academic staff.

Exploratory factor analysis revealed that most of the items correlated on at least 0.3 with the Kaiser-Meyer-Olkin measure of sampling adequacy, which were 0.854, 0.855, and 0.862 above the recommended value of 0.5 (Tabachnick and Fidell, 2007). The Bartlett’s test of sphericity was significant ($\chi^2 (55) = 855.870, p < .05$; $\chi^2 (55) = 1155.585, p < .05$; and $\chi^2 (36) = 998.711, p < .05$). The communalities of most items were above 0.5, but a few with 0.4 were retained above the bench mark of 0.3 (Pallant, 2007). Similarly, diagonals of the anti-image component matrix were all above 0.5, further confirming that most of the items shared some common variance with other items. Considering the overall indicators, factor analysis was conducted with no items deleted.
Principle component analysis was used to identify and compute composite involvement scores for the underlying factors. The initial Eigen values showed that the first, second, and third factors account for 4.34 percent, 5.09 percent, and 4.48 percent of the variance in the data. Since the purpose was to identify the basic structure of the variables and their respective sub dimensions, varimax rotation (orthogonal) was deemed suitable to examine the factor loadings.

**Measurement model assessment**

All constructs exhibited strong psychometric properties and satisfied the criteria of reliability and convergent and discriminant validity. The factor loadings of all three dimensions of web-based service quality and each of the items was above 0.5 and Cronbach’s alpha ranged from 0.637 to 0.880, indicating good construct reliability (Table I).

**Table I.** Exploratory factor analysis of web-based service quality

<table>
<thead>
<tr>
<th>Web-based service quality</th>
<th>Factor</th>
<th>Items</th>
<th>Loading</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental factors</td>
<td>1</td>
<td>A1 The web site is convenient to access</td>
<td>0.857</td>
<td>0.813</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2 The web site is easy to use</td>
<td>0.844</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A3 The web site has links that are all working</td>
<td>0.640</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>A4 The web site is always available from outside the campus</td>
<td>0.739</td>
<td>0.637</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A5 There are enough working computers to access web-based services</td>
<td>0.716</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A6 There are enough ports for laptop use to access web-based services</td>
<td>0.747</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>A7 The site menu helps me understand how content is arranged</td>
<td>0.743</td>
<td>0.748</td>
</tr>
<tr>
<td>A8</td>
<td>Online information resources are clearly arranged by subject</td>
<td>0.736</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>-------------------------------------------------------------</td>
<td>-------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A9</td>
<td>The service provides access to a wide range of electronic resources in my subject area</td>
<td>0.796</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A10</td>
<td>The service provides trusted information compared to the Internet</td>
<td>0.670</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A11</td>
<td>The online public access catalogue (OPAC) records accurately match the actual collection of the library</td>
<td>0.662</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B1</th>
<th>Online librarians interact with me in a courteous manner</th>
<th>0.756</th>
<th>0.844</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2</td>
<td>Online librarians are always willing to help me</td>
<td>0.800</td>
<td></td>
</tr>
<tr>
<td>B3</td>
<td>Online librarians understand my specific information needs</td>
<td>0.713</td>
<td></td>
</tr>
<tr>
<td>B4</td>
<td>I am able to save my searches and display my search history</td>
<td>0.501</td>
<td></td>
</tr>
<tr>
<td>B5</td>
<td>I am able to set up an alert for new materials in my discipline</td>
<td>0.636</td>
<td></td>
</tr>
<tr>
<td>B6</td>
<td>The library system stores all my preferences to offer me extra information</td>
<td>0.647</td>
<td></td>
</tr>
<tr>
<td>B7</td>
<td>The service enables me to determine which electronic resources are most relevant to my course needs/research interests</td>
<td>0.501</td>
<td></td>
</tr>
<tr>
<td>B8</td>
<td>There are clear, precise instructions at the point of use</td>
<td>0.726</td>
<td>0.795</td>
</tr>
<tr>
<td>B9</td>
<td>The instructions on remote access are easy to follow</td>
<td>0.803</td>
<td></td>
</tr>
</tbody>
</table>
The measurement model has loaded satisfactorily with CMINDF = 1.828, GFI = .868, TLI = .918, CFI = .920, RMSEA = .059, and P = .000. The measurement model seems to be complex due to high correlation among the variables; hence, the low value of GFI is acceptable. Fornell and Larcker (1981) suggested using AVE as a criterion for convergent validity. AVE values

<table>
<thead>
<tr>
<th>Outcome factors</th>
<th>Item</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B10 The site allows me the convenience of sending a query/comment online</td>
<td>0.743</td>
</tr>
<tr>
<td></td>
<td>B11 The service promptly responds to my online complaints/suggestions</td>
<td>0.699</td>
</tr>
<tr>
<td></td>
<td>C1 Online document delivery requests are provided within the promised time</td>
<td>0.830 0.739</td>
</tr>
<tr>
<td></td>
<td>C2 Online interlibrary loan requests are provided within the promised time</td>
<td>0.888</td>
</tr>
<tr>
<td></td>
<td>C3 Materials listed in OPAC can be surely found at the library</td>
<td>0.502 0.880</td>
</tr>
<tr>
<td></td>
<td>C4 Using web-based services, I can easily get what I am looking for most</td>
<td>0.777</td>
</tr>
<tr>
<td></td>
<td>C5 Using web-based services, I can get the exact information I’m seeking</td>
<td>0.749</td>
</tr>
<tr>
<td></td>
<td>C6 Using web-based services, I can get the information I’m seeking with minimal time and effort</td>
<td>0.776</td>
</tr>
<tr>
<td></td>
<td>C7 I feel very happy when I get what I want from the web-based services</td>
<td>0.792</td>
</tr>
<tr>
<td></td>
<td>C8 The web-based services have innovative features that are interesting to use</td>
<td>0.769</td>
</tr>
<tr>
<td></td>
<td>C9 Using web-based services makes me feel the library is truly dedicated to fulfilling my needs</td>
<td>0.756</td>
</tr>
</tbody>
</table>
exceed the recommended 0.5, indicating that the variables explain more than half of the variance of its indicators. Discriminant validity is evident as the correlations between items in any two constructs show lower values than the square root of the AVE shared items within the construct, as shown in Table II.

Table II. Discriminant validity

<table>
<thead>
<tr>
<th></th>
<th>Environmental quality</th>
<th>Delivery quality</th>
<th>Outcome quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental quality</td>
<td>0.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery quality</td>
<td>0.51</td>
<td>0.55</td>
<td></td>
</tr>
<tr>
<td>Outcome quality</td>
<td>0.36</td>
<td>0.44</td>
<td>0.54</td>
</tr>
</tbody>
</table>

These psychometric properties have provided sufficient reason to continue to the structural model analysis.

Structural model assessment

Structural equation modelling (SEM) using Amos 18 was utilized to estimate the proposed structural model. Maximum likelihood estimation (MLE) was applied to generate the estimates of parameters of respective factors. A number of indices were applied to assess the overall fit of the model, including CMINDF with recommended value of below 5; the root mean square error of approximation (RMSEA) with recommended value of .08 or less; the goodness-of-fit index (GFI), the incremental fit index (IFI), the Tucker-Lewis Index (TLI), and the comparative-fit-index (CFI), which compared the estimated model with the null model. The recommended values
of these indices lie between 0 and 1.0, with larger values indicating higher level of goodness-of-fit.

Confirmatory factor analysis initially did not indicate a satisfactory model fit, so modification indices (MI) were employed. In outcome quality, two items C1 (Online document delivery requests are provided within the promised time) and C2 (Online interlibrary loan requests are provided within the promised time) were not considered for further analysis because of low factor loading.

Several model iterations were made to obtain a good model fit. In the modified structural model (Figure 2), there are five structural paths representing the hypothesized relationships. The model was evaluated based on error variance, modification indices, and residual covariance.

![Figure 2. Proposed structural model](image-url)
The revised model fit the data well with CMINDF = 1.792, GFI = 0.823, TLI = 0.892, CFI = 0.903, and RMSEA = 0.057. GFI and TLI are within the acceptable limit due to the fact that CMINDF indicates good model fit, as well as RMSEA being smaller than 0.08 (Kline, 2011).

**Table III.** Standardized estimates of the revised structural model

<table>
<thead>
<tr>
<th>Nonstd Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
<th>Std Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service_Quality</td>
<td>User_Satisfaction</td>
<td>0.084</td>
<td>0.035</td>
<td>2.374</td>
</tr>
<tr>
<td>Service_Quality</td>
<td>Service_Value</td>
<td>0.275</td>
<td>0.079</td>
<td>3.486 ***</td>
</tr>
<tr>
<td>Service_Value</td>
<td>User_Satisfaction</td>
<td>0.556</td>
<td>0.081</td>
<td>6.875 ***</td>
</tr>
<tr>
<td>Service_Value</td>
<td>User_Loyalty</td>
<td>-0.157</td>
<td>0.410</td>
<td>-0.383</td>
</tr>
<tr>
<td>User_Satisfaction</td>
<td>User_Loyalty</td>
<td>1.522</td>
<td>0.699</td>
<td>2.179</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nonstd Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
<th>Std Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web-based Service_Quality</td>
<td>Environmental_Quality</td>
<td>1.000</td>
<td></td>
<td>0.909</td>
</tr>
<tr>
<td>Web-based Service_Quality</td>
<td>Outcome_Quality</td>
<td>0.929</td>
<td>0.121</td>
<td>7.695 ***</td>
</tr>
<tr>
<td>Web-based Service_Quality</td>
<td>Delivery_Quality</td>
<td>0.977</td>
<td>0.136</td>
<td>7.202 ***</td>
</tr>
</tbody>
</table>

Table IV provides standard estimates and Hair *et al.* (2006) suggested that standardized regression weights should be used to compare the relative effect of each exogenous latent variable on the endogenous variable. The direct relationship path between service quality and user satisfaction was significant (β = 0.129, CR = 2.374, p < 0.01), and the relationship path between service quality and service value was also significant (β = 0.265, CR = 3.486, p <
0.001). Direct relationship paths between service value and user satisfaction ($\beta = .886$, CR = 6.875, $p < 0.001$) and between user satisfaction and user loyalty ($\beta = 0.888$, CR = 2.179, $p < 0.01$) were both significant. However, the relationship between service value and user loyalty was negative and not significant ($p > 0.01$). Table IV presents the results of the tested hypotheses.

**Table IV. Research hypotheses summary**

<table>
<thead>
<tr>
<th>Hypothesis no.</th>
<th>Hypothesis</th>
<th>Supported or not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis 1</td>
<td>There is a positive relationship between web-based service quality and user satisfaction.</td>
<td>Supported</td>
</tr>
<tr>
<td>Hypothesis 2</td>
<td>There is a positive relationship between web-based service quality and service value.</td>
<td>Supported</td>
</tr>
<tr>
<td>Hypothesis 3</td>
<td>There is a positive relationship between service value and user satisfaction.</td>
<td>Supported</td>
</tr>
<tr>
<td>Hypothesis 4</td>
<td>There is a positive relationship between service value and user loyalty.</td>
<td>Not supported</td>
</tr>
<tr>
<td>Hypothesis 5</td>
<td>There is a positive relationship between user satisfaction and user loyalty to the libraries.</td>
<td>Supported</td>
</tr>
</tbody>
</table>

Based on the findings, the initial proposed model is modified and presented in Figure 3. The $R^2$ for user loyalty was 57 percent, reflecting that the model provides a strong explanation of the variance in user satisfaction towards user loyalty.
Discussion

The present study empirically tested the LibWebSQ measurement scale and its structural model developed by Kiran and Diljit (2011, 2012) in the context of Nigerian university libraries. It was proposed that service quality, service value, and user satisfaction predict user loyalty. Results supported four of the five hypotheses in the proposed model. Specifically, user satisfaction directly and positively affected user loyalty towards library web-based services. Both service quality and service value are important antecedents of user satisfaction. Ensuring service quality and realization of the value of the service to its customers will gain customer satisfaction. Satisfied library users will then continue to use the services and further recommend use to others, portraying loyalty.

The study evidently contributes to the measurement of web-based service quality and user loyalty. Arguments in the literature that user satisfaction mediates the effect of service quality on loyalty (Bakti and Sumaedi, 2013; Kiran and Diljit, 2011) are also supported by this study, implying that a user with a greater perceived web-based service quality is not guaranteed to patronize the library service again, if the library fails to implement satisfactory service quality. It

** Figure 3. Revised web-based library service quality model **

\[ R^2 = 0.07 \]

\[ R^2 = 0.86 \]

\[ R^2 = 0.57 \]

\[ p < 0.01; \quad *** p < 0.001 \]
is to be noted that both libraries in this study provide online databases, web OPACs, online reference services, electronic access to their digitized collection, and online help/feedback services. User satisfaction with these services is a determining factor to the re-use of the services. Other libraries in Nigeria, especially those facing limited Internet connectivity and availability of adequate computer facilities to access web-based library services (Emmanuel et al., 2014), may not reach the warranted satisfaction level of the service and this will cause a lower level of re-use or continued use of library services.

The construct service value was found to have a strong effect on user satisfaction, implying that customers are satisfied when they perceive the service to be of value to their needs and tasks. University libraries in Nigeria must overcome the issues of poor Internet connectivity, disruptive electrical supply, and lack of accessible devices to fully utilize web-based library services. Inability to access web services will certainly influence the perceived quality of the services rendered even if the service is considered of value. The ultimate goal of any service institution, such as the library, is user loyalty. Satisfied and loyal users are more likely to spread positive comments and recommend the use of library services to others (Bontis et al., 2007; Mansori et al., 2014). Increase in the number of users and a higher return rate may be used to justify accountability and budget to the parent organizations (Kiran and Diljit, 2011).

The results add to the existing literature on the assessment of web-based library service quality and enhance the reliability of the LibWebSQ measurement scale. Overall, this measurement scale is accepted in terms of reliability and validity, thus supporting the psychometric properties of Kiran and Dilkit’s (2012) LibWebSQ scale’s applicability in the Nigerian university library context.
**Conclusion**

The growing trend towards digital and hybrid library activities and the rising use of online library resources have prompted the need to assess the role played by web-based library service quality in interacting with users. To library professionals, the environment, delivery, and outcome service quality are a virtually equally significant aspect of web-based library service quality. The three measurements employed substantial influence on the total web-based service quality perceptions, leading to user satisfaction and loyalty towards the services. Overall, this study reinforces that user satisfaction and service value mediate the effect of service quality on user loyalty. The study confirms LibWebSQ as a valid and reliable scale to measure web-based library service quality.

This study was conducted on selected Federal universities in the north-western zone of Nigeria. Therefore, the findings are limited to these universities, but the study reveals a seeming conviction that the findings may be applicable in other university libraries in Nigeria with similar demographics. Based on the findings of this study, it is recommended that further studies be conducted using samples from the Federal universities and other non-Federal university libraries on a much larger sample. Library management must work to bring back users to the library. Now it is better to invest to maintain user loyalty than to invest later in attracting new users (Masitah *et al.*, 2011). This study serves as a building block for further research.

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