# Reliability and validity of a modified LibQUAL+® survey in Pakistan: An Urdu language experience

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## ABSTRACT

*LibQUAL+® is a well-known and widely used tool to measure library service quality. This tool has been developed by the Association of Research Libraries (ARL) in partnership with Texas A&M University. The present study aims to present the implementation of a locally modified LibQUAL+® survey in Pakistan; its Urdu translation experience, and the reliability and validity analysis of the data collected in Urdu. The data was collected using two separate studies conducted on graduate and undergraduate students and faculty members of 29 universities in Pakistan. Users rated 22 core items on 1 (low) to 9 (high) scales for minimum, desired and perceived performance scores as defined in both the SERVQUAL and LibQUAL+® protocols. A total of 514 and 1,473 survey questionnaires were collected respectively from these two studies. Both studies found that the Urdu version of LibQUAL+® is reliable and valid in the Pakistani context. The factor analysis through Exploratory factor Analysis (EFA) and Confirmatory factor Analysis (CFA) confirmed the well-established three factor structure of library service quality: affect of service, information control and library as place. The current research focused on examining the psychometric integrity of LibQUAL+® in South Asia, a region representing one fifth of the worlds' population, yet there has not been any documented use of the web-based LibQUAL+® protocol. The current study is the first in South Asia to investigate the psychometric properties of LibQUAL+®.*

**Keywords:** Library service quality; LibQUAL+; Instrument validity and reliability; Urdu translation; Pakistan

## INTRODUCTION

LibQUAL+® is a well-known and recognized instrument that libraries use to "solicit, track, understand, and act upon users' opinions of service quality" (Association of Research Libraries 2011). More than 1.5 million library users from twelve hundred libraries have participated in LibQUAL+® since its inception in 2000. The instrument was developed through collaboration between the Association of Research Libraries (ARL) and Texas A&M University Libraries. The LibQUAL+® instrument is an attractive tool that allows libraries to easily identify and measure library service quality from the customer perspective. The

instrument measures library service quality through 22 core questions on three dimensions: affect of service, information control and library as place. Currently, LibQUAL+® supports 18 languages: Afrikaans, American English, British English, Chinese, Danish, Dutch, Finnish, French (France), French (Belgian), French (Canadian), German, Greek, Hebrew, Japanese, Norwegian, Spanish, Swedish and Welsh (Association of Research Libraries 2012). An Arabic version is currently in development. All the translated versions of LibQUAL+® are thoroughly examined for validity and reliability by ARL and these results have been published in the literature extensively. However, validity and reliability results from individual libraries are not reported as frequently in the literature. ARL has encouraged individual libraries to conduct and report validity and reliability analysis of LibQUAL+®. Given the extent of the use of the LibQUAL+® scale, Morales (2011) predicted more to be published as he indicates that "assessments of the structure and construct validity of these scales [LibQUAL+®] have rarely been reported" (p. 23). Ensuring that library service quality measurements results are based on good psychometric properties is of paramount importance, as libraries often engage in local surveys that produce unreliable and invalid data. Due to these reasons, establishing the internal reliability and validity of the instrument is necessary for trusting the information at hand as accurate and reliable. It is even more essential when a standardized instrument is being translated or applied in a new context. The close examination of relevant literature shows that beyond the studies reported by ARL and Texas A&M, there are not many published by local libraries on the translated versions and their reliability and validity.

LibQUAL+® has its origins in North America where the majority of the participating libraries exist. Every geographical area and culture has its unique features. It is not a necessary condition that one tool may be reliable and valid for all cultures and regions in the world, especially when there is vast diversity and variance among the users belonging to developed and developing countries. There is a need to verify whether the underlying factor structure is the same across variant geographical areas. Information needs, attitudes and behaviours may be context specific. Most academic work in library service quality focuses on industrialized nations; the current study shifts the lens towards the developing world. There is little research available, which reports the psychometric properties of LibQUAL+® in South Asia, in particular, Pakistan. In the current study, the researchers used the LibQUAL+® tool to measure library service quality of Pakistani libraries. The reliability and validity of the data was examined through two independent studies by using two very well-known and rigorous procedures in empirical research: (a) qualitative work in translating the survey into Urdu; and (b) quantitative analysis in analysing the psychometric properties of the Urdu data.

## LITERATURE REVIEW

### Development and Refinement of LibQUAL+

The LibQUAL+® protocol is based on the SERVQUAL scale, which defined the service quality as "difference between customers' perceptions and expectations" using disconfirmation/confirmation theory. Initially the LibQUAL+® developers selected SERVQUAL as a starting point for future development in assessing library service quality because many academic libraries had used variations of SERVQUAL, and because it was building on earlier experiences that demonstrated the statistical integrity of its results in applications at Texas A&M University Libraries (Cook and Heath 2001). The five dimensions of the modified SERVQUAL instrument adequately described the academic library context. Colleen Cook and Fred Heath (Cook and Heath 2001; Cook and Heath 2002; Cook and

Thompson 2000; Heath and Cook 2001; Thompson, Kyrillidou and Cook 2008) addressed many of the theoretical issues and started modification and refinements in the SERVQUAL tool for the academic library context through extensive qualitative and quantitative research that took place in an iterative fashion from 2000 to 2003. As a result of the first iteration in 2000, 18 new items were added in the already existing SERVQUAL tool. The instrument consisted of 41 items (22 SERVQUAL+19 new items) on five service quality dimensions: Affect of service, library as place, reliability, provision of physical collections and access to information. The 2001 refinement resulted in 51 items across five service quality dimensions: Affect of service, library as place, reliability, self-reliance, and access to information. LibQUAL+® was further refined in 2002 and its items were reduced to 25 across four dimensions: affect of service, library as place, personal control and information access. The final and present version has 22 core items across three service quality dimensions: a) affect of service, AS; b) information control, IC and c) library as place, LP.

The AS dimension consists of nine questions related to courtesy, knowledge, and helpfulness of library staff in delivering user services. The IC dimension addresses (through eight questions) the adequacy of print and electronic collections, easy to use access tools, availability of modern equipment, the utility of the library website as well as self-reliance in information access. The third, LP dimension focuses on user perceptions of quiet, comfortable, inviting and reflective study space that inspires study and learning. Users rate all LibQUAL+® items on three columns side by side on 1 (low) to 9 (high) scales for "perception", "desire" and "minimum" services. The response format is the one that was established in the SERVQUAL protocol as well. It is evident in the literature that studies measuring library service have reported somewhere between two to five dimensions based on the data analyzed. It is important to recognize that the data may yield different results when the questions are different or when the same questions may be applied in different contexts. Researchers have reported two dimensions (Shoeb 2011), three (Calvert 2001; Cook et al. 2009; Cook and Thompson 2000; Hernon and Niteck 2001; Nimsomboon and Nagata 2003; Nitecki and Hernon 2000; Thompson, Kyrillidou and Cook 2008; Yu et al. 2008), four (Ahmed and Shoeb 2009; Huriarte, Mendives, and Román 2008; Morales et al. 2011; Nagata et al. 2004; Thompson, Cook, and Thompson 2002), five and more dimensions (Cook and Heath 2001) as they investigate users' feedback on library service quality. These results show that the wording of the questions is of critical importance in that it affects the validity and reliability as well as the interpretation of the dimensions in the data. Developing a standardized survey that measures these constructs in a valid and reliable way cannot be asserted outside the specific dataset that is being analyzed. In other words, it is the data that are valid and reliable and the questions serve, as 'the ruler' the researchers use – the 'quality of the ruler' will affect the validity and reliability of the data. However, it is not the data that make good questions – it is the fact that we have good questions that have the potential to measure a construct in a valid and reliable manner.

## Translations of LibQUAL®

Currently, the LibQUAL+® protocol supports 18 languages: Afrikaans, American English, British English, Chinese, Danish, Dutch, Finnish, French (France), French (Belgian), French (Canadian), German, Greek, Hebrew, Japanese, Norwegian, Spanish, Swedish and Welsh (Kyrillidou 2011). ARL researchers have thoroughly analysed the validity and reliability of the data they receive and they confirm that the three factor structure is emerging repeatedly. They have published a number of studies but the most comprehensive study that combines both the qualitative and the quantitative grounding of a translated version, is the one published for the French translation. For example, the French language work conducted originally in Quebec reports thoroughly both the qualitative and the

quantitative regrounding (Kyrillidou et al. 2004). This study has been published in both English and French. This methodology, though not published for subsequent languages deployed by LibQUAL+®, is exactly the same as the language translations deployed in the LibQUAL+® service. Also, an independent study on an indepdent Spanish language version (Morales et al. 2011) comprehensively reported translation and psychometric related issues in the respective culture through established standard procedures.

There are also other studies in the literature that tend to focus on different aspects of specific implementations. For example Kyrillidou and Persson (2006) described the implementation of the LibQUAL+® Swedish translated version with an emphasis on the utility of the qualitative data received in the form of comments; however they did not report detailed results about the psychometric properties of the tool in that study. Other studies (Hariri and Afnani 2008; Moon 2007) deploying Africans and Persian language translations were silent on the translation procedures and psychometric properties of protocol. The study conducted in Iran (Hariri and Afnani 2008) used a locally modified instrument. The one from South Africa (Moon 2007) was the first group of libraries that worked collaboratively for the implementations of the protocol through ARL, one of the only a few studies (Kyrillidou et al. 2004; Morales et al 2011; Thompson et al. 2008) comprehensively reported both the translation process and the reliability and validity of the data in the same article. For example, the validity and reliability of the Swedish LibQUAL+® survey implemented through ARL, is reported as part of a later article that aims at presenting a model for conducting such analysis to all libraries implementing surveys and collecting data, including all those implementing LibQUAL+® through ARL. In that article the validity and reliability of the 2006 data collected in the first half of the year is presented for American English, British English, Dutch, Swedish, French, German, Norwegian, Finnish, and Danish (Thompson, Kyrillidou and Cook 2008). The order of the language signifies the historical order in which these languages were translated in the LibQUAL+® system supported by ARL. More recently the researchers also see studies that combine the reporting of the quantitative and qualitative approaches as it relates to their specific institution across time (Dennis, Greenwood and Watson 2013).

## Reliability and Validity of the LibQUAL+® Scale

The reliability and validity of the data instrument is very important so that reliable and valid findings can be drawn from that data. Researchers and practitioners should always perform validity and reliability analysis on the data used and should preferably use tools with known and published results regarding the validity and reliability unless they aim at establishing the measurement of a new concept (Thompson, Kyrillidou and Cook 2008). It cannot be assumed that acquired scores from respondents are valid and reliable. “Knowing the number of dimensions that users employ in evaluating library services is important, because it is critical to use scoring dimensions that correspond to users’ perceptions rather than librarians’ preconceptions” (Thompson, Cook and Heath 2001, p. 37).

Various studies (Cook, et al. 2001; Thompson & Cook 2002; Thompson, Cook, & Heath 2003; Thompson, Cook and Kyrillidou 2005; Thompson, Cook and Kyrillidou 2006; Thompson, Kyrillidou and Cook 2008) confirm the psychometric integrity of the LibQUAL+® instrument with different well known approaches such as “structural equation modeling, reliability analysis, factor analysis, taxonometric analysis and latent trait item response theory”(Miller 2008, p. 37). The LibQUAL+® scale has steadily produced results that are highly reliable. As mentioned by Thompson, Kyrillidou and Cook (2008), the Cronbach’s alpha coefficients (α) of LibQUAL+® is very high for all three dimensions: AS (α =0.94), LP (α= 0.89), IC (α = 0.91) and for the overall scale of 22 items (α = 0.96).

## Validity of LibQUAL+®

The reliability of scale alone is not sufficient. Scales need to be valid. Validity concerns the "soundness of the inferences based on the scores, that is, whether the scores measure what they are supposed to measure, but also do not measure what they are not supposed to measure" (Kline 2004, as cited in Green 2007, p. 160). There are different types of validities: criterion-related validity (such as convergent validity, discriminant validity). The discriminant validity refers to the extent to which measures of different constructs are distinct (Barki and Hartwick 1994). Thompson (2008) has explained validity as "statistical methods to help evaluate whether our scales measure something, measure the correct something and only the correct something" (p. 12). The most common and widely used method to confirm the validity of data is factor analysis. Quantitative researchers have used this method extensively to confirm the validity of data.

Two studies (Lane et al. 2012; Thompson et al. 2008) confirm the three factor structure of the LibQUAL+®protocol. Thompson concludes that "as a general rule, the three factors consist of the expected variables. Thus the present results are supportive of a conclusion that the LibQUAL+® scale is valid" (p. 14). The above mentioned studies confirm the validity of the LibQUAL+® Protocol and its three dimensions but its factor structure can be different in different translations due to specific cultural and linguistic contexts. Even after following well established standard translation procedures it is necessary to test whether the translation provides the same psychometric properties of the original language version.

LIBQUAL was developed in North America and has been extensively used in the USA and Canada especially during the first five years of its deployment (from 2000 to 2005). By 2011, half of the libraries participating in that year were non-US based. Every culture has some unique features. It is not necessary that one tool is reliable and valid for all cultures of the world. Especially, it is worth focusing on potential differences among the users belonging to developed and developing countries. The information needs, attitudes and behaviours may differ in specific contexts. Yet do library service quality perceptions and expectations differ? Therefore it is necessary to follow the standard procedures for translation and establish the psychometric properties of the instrument when applied to new cultures and languages. The standard procedure for translation includes:

a) Forward translation carried out by native-speaker of the target language.
b) Backward translation carried out by native-speaker of the target language.
c) Expert or panel of experts to solve the discrepancies (if any) through consensus.

The well-known and established procedure (Kyrillidou et al. 2004) to assess the psychometric properties of instrument includes:

- Standard factor structure of instrument
- Reliability and correlation analysis
- Convergent and discriminant validity
- Construct validity

Therefore, the authors in this study followed the above-mentioned standard procedures for translation and for establishing the validity of the data for the Urdu translation deployed in Pakistan to meet the study objectives.

## METHODOLOGY

### Research Design

The researchers used cross sectional design in this empirical study and the survey method was used to collect the data on a self-reporting questionnaire. The data used in this research were collected in the context of a larger project where a wide range of variables were included. The larger project is work in progress. Data were collected by the first author through personal visits to selected universities in Pakistan.

### Sample and Sampling Procedure

#### a) Sample and Sampling (Study 1)

For the first study, seven university libraries with a central location were randomly selected from 43 universities in the Punjab province and federal capital of Pakistan (Islamabad). Next, the researchers conveniently selected 560 respondents comprising faculty members, graduates and undergraduate students.

#### b) Sample and Sampling (Study 2)

Sampling was done in two stages for the second study. In first stage, random sampling was carried out at 43 universities of Punjab province and federal capital of Pakistan having central libraries. In the second stage, from each of the 22 selected universities, 25 undergraduates, 25 graduates and 25 teachers in different age, experience, department, gender and qualification groups were conveniently selected to administer the questionnaires. The convenient sampling method was selected due to non-availability of the complete list of population. However, researchers made every possible effort to collect data representing different user groups. The sample fairly represents various types of users (faculty, graduate and undergraduate students), public/private sector, geographical location, age, academic disciplines, gender and qualification.

### Instrument

#### a) Modifications and Adaptation of the LibQUAL® American English Version

The researchers conducted a focus group study for modification and adaptation of the LibQUAL+® American English version to the Pakistani context. The language of the original American English was slightly modified based on the focus group that consisted of nine participants, including three head librarians, two Library & Information Science (LIS) professors, two scale development experts and two doctoral research students. The researchers also looked into other translated versions of LibQUAL+® for interpretation and refinement (Cook et al. 2009; Kyrillidou et al. 2004; Morales et al. 2011).

#### b) Pre-Testing of Modified Version

A pre-test of the modified LibQUAL+® English version was conducted to check the effectiveness of the instrument for the current study. On pre-testing, it was found that students faced great difficulty in understanding the English language, especially the undergraduate students. As a result of the pre-test and informal discussions with professional experts, it was decided to translate the LibQUAL+® scale in Urdu (Urdu is the national language of Pakistan). It was hoped that this step would also improve the accuracy of responses to the questions. The modified English language version was used for translation purpose. The researchers contacted ARL and obtained permission for its translation and utilization. Similarly, the researchers followed the guidelines of Churchill (1979) and Fornell and Larcker (1981) for assessment of content validity, convergent and discriminant validity of the LibQUAL+® Urdu version.

### c) Translation Process for the LibQUAL+® Urdu Version

The translation of the instrument from one language into another is not an easy task. It is a complex process. It requires bilingual, subject, technical and cultural expertise. Effective translation of instruments can be done only through collaboration among translation experts, scale development experts and subject experts. There is a standard procedure for the translation of instrument from one language to another. The procedure includes: forward-backward translation, separately carried out by native-speaker of the target language. In the case of difference or disagreement in forward backward translation, a third expert solved the discrepancies through consensus.

Important techniques for eliminating translation-related problems include back translation, consultation and collaboration with other people during the translation process, and pretesting or piloting whenever possible. How to ask the same question in different languages while retaining the same meaning is a concern that comes up whenever a researcher seeks to use an instrument that was originally prepared in another language. The goal is to achieve semantic, conceptual, and normative equivalence when translating a questionnaire (Kyrillidou et al. p. 2).

For the translation of the LibQUAL+® (modified) English into Urdu, the authors engaged and collaborated with many experts: professional translators, scale developers and LIS experts from university of the Punjab, Lahore, Pakistan. The researchers tried to achieve semantic, conceptual, and normative equivalence to the original version. The whole concept was the focus instead of word-by-word translation. The researchers also kept in mind the accuracy, clarity, style, meaning, and culture.

### d) Forward Translation

The translation process started with forward translation. As a first step, one translation expert who was fluent in both English and Urdu and was the native speaker of Urdu translated the English version into Urdu. The translation expert collaborated regarding professional and technical issues. For verifying the correctness of the translation, the researchers used three verification procedures: (a) back-translation into English, (b) judgment by a panel of experts, and (c) pre-testing.

### e) Backward Translation

Forward translation of a questionnaire does not guarantee data accuracy. Therefore, the researchers implemented a backward translation. Backward translation is a process in which the translated text is retranslated into the language of the original text without reference to the original text. Back-translation of the questionnaire was done by a bilingual speaker fluent in English and Urdu who was not shown the original version. The researchers compared the original and the back-translated English versions. After deep analysis of both versions, only a few minor discrepancies were found with respect to the meaning of the question.

### f) Panel of Experts

A panel of experts was formed to review the minor discrepancies between the original and backward translation version of the LibQUAL+® Scale. The panel comprised two bilingual translation experts, two LIS experts, two experts on scale development and two potential respondents. All discrepancies in the original and backward translation were discussed in detail during a meeting held in Lahore, Pakistan. After deliberations, the expert panel solved the discrepancies and agreed on the final version.

### g) Pre -Test and Final Translated Instrument

The translated version of the questionnaire was distributed to 50 respondents for pre-testing. Ten of them were also interviewed. They identified several items that were confusing or difficult to understand. After their feedback, the researchers removed all language or context related difficulties faced by the respondents. Thus, the final translated scale consisted of 22 core items measuring the library service quality in three dimensions: Affect of Service (AS), Information Control (IC) and Library as Place (LP) (see Appendix 1).

## DATA COLLECTION

Churchill (1979) suggested eight steps for scale development: (a) a literature review to specify the target construct; (b) the production of scale items based on literature search, personal experience and feedback from experts through qualitative methods such as interviews and focus groups; (c) data collection, (d) internal reliability and validity to purify the scale (Cronbach's alpha , EFA); (e) data collection; (f) analysis of scale reliability; (g) confirmation of scale validity; and (h) descriptive statistics of scales to check the score distribution and correlation among scale items**.** The first four steps are used when new scales are developed; the later four steps are normally used to determine if a theoretical model is backed by the data from the sample (Byrne 2001; Green 2007; Kline 2004; Lomax and Schumacker 2004). The research methodology employed in this study was primarily confirmatory and focused on the last four steps of a mixed-methods approach. For this purpose, the researchers conducted two research studies. The details of these studies are described below under separate headings.

### Demographic Characteristics of Respondents (Study 1)

A paper-and-pencil questionnaire method was used to collect data from both students and faculty members of seven universities (i.e., 4 public and 3 private) of Pakistan. Out of 560 total distributed questionnaires, 526 of them were successfully received with a response rate of 94%. Acquired responses revealed that 61.5% of the subjects were male and 38.5% were female; 51 % of the responses were from graduate students, 36% were from undergraduate students, and 13% were from faculty members. A population of 59% from public universities, and 41% from private universities responded to the questionnaire (Table 1)

### Demographic Characteristics of Respondents (Study 2)

In this phase, the researchers again used the paper-and-pencil questionnaire method to collect data from undergraduates, graduate students and faculty members of 22 universities (i.e., 13 public and 9 private) of Pakistan. Out of 1,650 total distributed questionnaires, 1,497 filled questionnaires were returned successfully, a response rate of 91%. Acquired responses revealed that 66% of the respondents were male and 34% were female; 34 % of the respondents were graduate students, 37 % were undergraduate students and 29 % were faculty members. Fifty nine percent (59 %) of the respondents were from public and 41% were from private universities. These respondents represented seven major categories of academic disciplines (sciences 10%, engineering and technology 22%, management 29%, social sciences 17%, agriculture 4%, health 10%, education 4%, and 3% other than mentioned above) (Table 1).

Table 1: Demographic Profile of Respondents

| | | Study 1 | | Study 2 | |
|---|---|---|---|---|---|
| | | Frequency | % age | Frequency | % age |
| Gender | Male | 316 | 61.5 | 969 | 65.8 |
| | Female | 198 | 38.5 | 504 | 34.2 |
| | Total | 514 | 100 | 1473 | 100 |
| User Type | Faculty | 68 | 13.2 | 426 | 28.9 |
| | Graduate Student | 262 | 51.0 | 501 | 34.0 |
| | Undergraduate Student | 184 | 35.8 | 546 | 37.1 |
| | Total | 514 | 100 | 1473 | 100 |
| University Type | Public Sector | 301 | 58.6 | 876 | 59.5 |
| | Private Sector | 213 | 41.4 | 597 | 40.5 |
| | Total | 514 | 100 | 1473 | 100 |
| Discipline | Science | 50 | 9.7 | 151 | 10.3 |
| | Eng. & Technology | 123 | 23.9 | 324 | 22.0 |
| | Management Sciences | 194 | 37.7 | 427 | 29.0 |
| | Social Sciences | 97 | 18.9 | 247 | 16.8 |
| | Agriculture | 3 | 0.6 | 65 | 4.4 |
| | Health Sciences | 2 | 0.4 | 143 | 9.7 |
| | Education | 22 | 4.3 | 65 | 4.4 |
| | Others | 23 | 4.4 | 51 | 3.5 |
| | Total | 514 | 100 | 1473 | 100 |

## DATA ANALYSIS

### Data Analysis (Study 1)

The main objective of the current study was to test the dimensionality and reliability of the LibQUAL+® scale in Urdu in Pakistan. For this purpose, the researchers used the Statistical Product and Service Solutions (SPSS) version 17 and conducted the exploratory factor analysis. First the initial data screening, e.g., missing values, descriptive statistics, normality, detection of multivariate outliers, and correlation analysis was performed. The final data set of 514 respondents was subjected to further analysis.

### a) Exploratory Factor Analysis (EFA)

Exploratory factor analysis (EFA principal component analysis with varimax rotation) was conducted on 22 items translated in Urdu. The descriptive statistics of the Urdu version of LibQUAL+® are presented in Table 2. It is important to mention here that the researchers used perception scores for the factor analysis based on some of the experiences reported in the literature (Babakus and Boller 1992; Carman 1990; Chiu and Lin 2004; Green 2007; Roszkowski, Baky and Jones 2005). These scores are a better choice as they have high predictive and diagnostic value. ARL has done internal research confirming that the desired and minimum expectations scales also show similar dimensionality to perceptions.

Our sample size of 514 was greater than the recommended value (22x10=220) of ten cases for each item (Nunnally 1978). The factor solution was extracted with suppression level adjusted at .35, which is suitable for a sample size of approximately 514. The result of Kaiser-Meyer-Olkin (KMO) test coefficient was 0.957, which is well over the recommended value of 0.6 (Hair et al. 1998) and Bartlett's test of sphericity was also significant ($\chi^2 = 8136.072$, p < .000) which demonstrated the sample adequacy for conducting EFA.

Factors were extracted based on Kaiser's criterion of Eigenvalues equal to or greater than one and screen test plot. Both criteria showed a three factor solution with total 65.72% variance explained by the three dimensions of the measure (AS= 26.94%, IC = 24.90%, LP = 15.13%). One item of the AS dimension i.e., AS-6 "library staff deals with users in a caring fashion" had cross loadings on LP factor. In order to resolve the problem of cross loading it was removed from the analysis to select final items with no cross loading. Finally 21 items (AS = 8 items, IC= 8 items, LP = 5 items) were selected. In the final factor solution with 21 items, all items were loaded on the constructs for which they were initially included in the study. The three factor solution confirmed our conceptualization of service quality. The total variance explained mounted to 66.12% and factor loadings (shown in Table 3) were also improved after removing item AS-6.

Table 2: Descriptive Statistics of 22 Items of the Locally Modified LibQUAL+® Urdu Version

| Item Code | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| AS-1 | 1 | 9 | 5.46 | 2.08 |
| AS-2 | 1 | 9 | 5.37 | 2.26 |
| AS-3 | 1 | 9 | 6.10 | 2.20 |
| AS-4 | 1 | 9 | 5.78 | 2.24 |
| AS-5 | 1 | 9 | 5.74 | 2.15 |
| AS-6 | 1 | 9 | 5.97 | 2.05 |
| AS-7 | 1 | 9 | 5.70 | 2.10 |
| AS-8 | 1 | 9 | 5.89 | 2.18 |
| AS-9 | 1 | 9 | 5.81 | 2.06 |
| IC-1 | 1 | 9 | 4.67 | 2.52 |
| IC-2 | 1 | 9 | 5.36 | 2.28 |
| IC-3 | 1 | 9 | 5.09 | 2.16 |
| IC-4 | 1 | 9 | 5.10 | 2.16 |
| IC-5 | 1 | 9 | 5.06 | 2.24 |
| IC-6 | 1 | 9 | 5.42 | 2.20 |
| IC-7 | 1 | 9 | 5.70 | 2.01 |
| IC-8 | 1 | 9 | 5.27 | 2.22 |
| LP-1 | 1 | 9 | 6.49 | 2.00 |
| LP-2 | 1 | 9 | 6.69 | 1.99 |
| LP-3 | 1 | 9 | 6.72 | 1.92 |
| LP-4 | 1 | 9 | 6.35 | 1.90 |
| LP-5 | 1 | 9 | 5.89 | 2.42 |

## b) Reliability of the LibQUAL+® Urdu Version

To check the score reliability, the researchers used the Cronbach's alpha coefficient calculated with the SPSS software. Nunnally (1978) recommended at least 0.70 alpha coefficients for social science research. The researchers examined the internal reliabilities of the overall LibQUAL+® score and its sub-scales. All three dimensions had high internal consistency and reliability in the Pakistani context because Cronbach's alpha (Cronbach 1951) coefficients for AS, IC, LP and the overall scale were equal to .936, .931, .814 and .946 respectively and were adequately greater than the recommended value of 0.7 (Nunnally 1978).The reliability of the overall scale is high due to having more items (22 items) and comparatively lower for the library as place as this sub-scale has only five items (Thompson et al. 2008). Summary of inter-correlations and reliability of scales (Cronbach's alpha) is demonstrated in Table 4. Values of α (Cronbach'salpha) are mentioned in ***italics & bold*** on the diagonal of inter-correlations table.

Table 3: Results of Principal Component Analysis of Final 21 Items

| Item Code | Scale items | I C | AS | LP |
|---|---|---|---|---|
| AS-4 | Library staff is always ready to respond to users' questions | | **0.86** | |
| AS-9 | Library staff shows dependability in handling users' service problems | | **0.80** | |
| AS-1 | Library staff instill confidence in users | | **0.79** | |
| AS-8 | Library staff is always willing to help users | | **0.79** | |
| AS-7 | Library staff understands the needs of its users | | **0.78** | |
| AS-5 | Library staff has knowledge to answer users' questions | | **0.72** | |
| AS-2 | Library staff gives individual attention to the users | | **0.68** | |
| AS-3 | Library staff is consistently courteous | | **0.62** | |
| IC-1 | Electronic resources of the library are accessible from my home or office | **0.90** | | |
| IC-4 | The library has electronic information resources, I need | **0.86** | | |
| IC-3 | The library has printed materials, I need for my work | **0.84** | | |
| IC-5 | The library has modern equipment that lets me easy access to the needed information | **0.80** | | |
| IC-6 | The library has easy-to-use access tools that allow me to find things on my own | **0.79** | | |
| IC-8 | The library has print and/or electronic journal collections, I require for my work | **0.79** | | |
| IC-7 | The library makes the information easily accessible for independent use | **0.75** | | |
| IC-2 | The web site of library enables me to locate information on my own | **0.43** | | |
| LP-3 | The library has comfortable and inviting location | | | **0.76** |
| LP-1 | The Library has space that inspires study and learning | | | **0.71** |
| LP-2 | The library has quiet space for individual activities | | | **0.69** |
| LP-4 | The library is a getaway for study, learning, or research | | | **0.64** |
| LP-5 | The library has community spaces for group learning and group study | | | **0.62** |

Note. Factor loading > .40 are in boldface. AS= affect of service; IC= information control; LP= library as place

Table 4: Inter-correlations and Reliability of Scales

| | Mean | SD | AS | IC | LP |
|---|---|---|---|---|---|
| **AS** | 5.73 | 1.77 | **.931** | | |
| **IC** | 5.20 | 1.83 | .544** | **.931** | |
| **LP** | 6.42 | 1.55 | .657** | .509** | **.814** |

**correlation is significant at the 0.01 level (2-tailed)

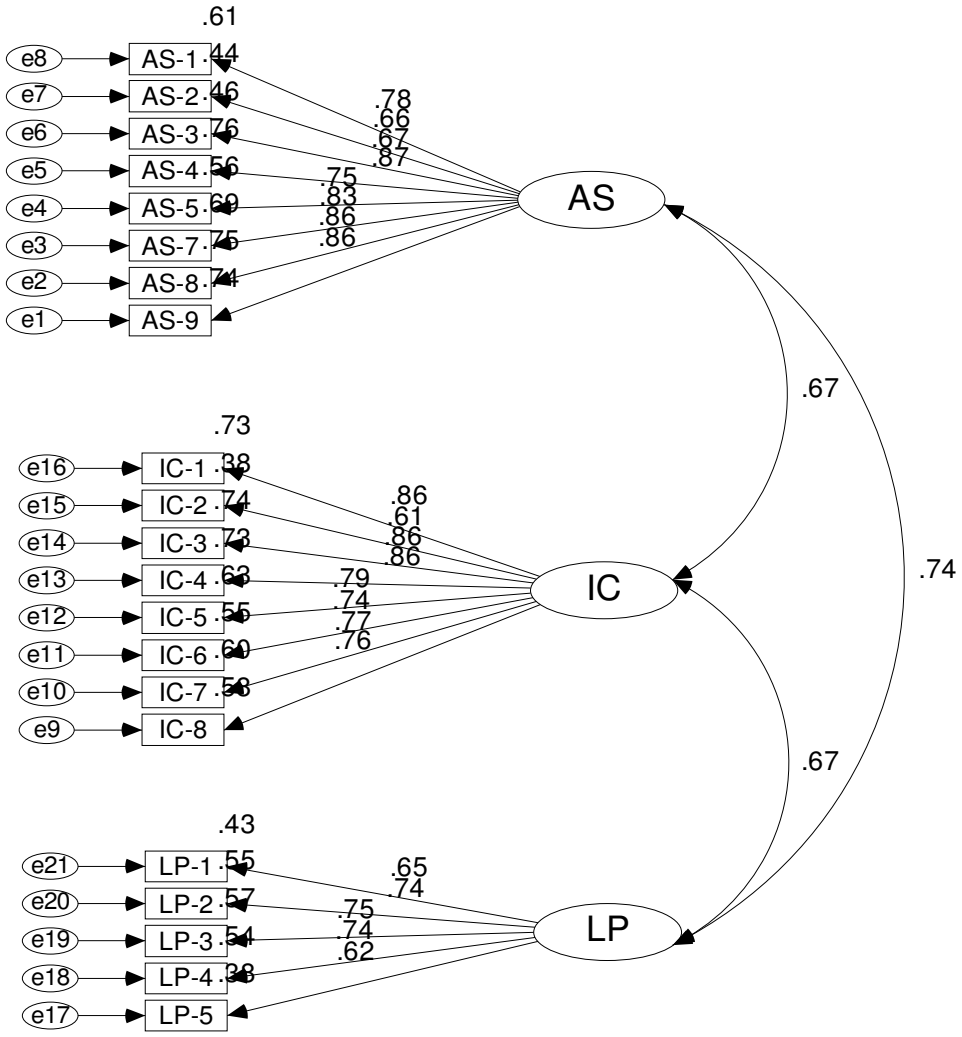
## Data Analysis (Study 2)

### a) Confirmatory Factor Analysis

After checking the reliability and validity of the LibQUAL+® Urdu version through EFA, the researchers again collected the data with the finally selected 21 items (i.e. selected in EFA conducted in the first study) from 22 universities (N=1497). Churchill's (1979) survey steps (second-phase, step five) also recommend the data collection, to determine, if a developed scale is supported by the data in the sample. A total of 1,497 responses were received with 91% response rate.

The researchers used Structural Equation Modeling (SEM) to check the dimensionality of the LibQUAL+® Urdu version i.e., AS, IC, and LP. First, the initial data screening was performed including identification of missing values, descriptive statistics, normality, detection of multivariate outliers, and correlation analysis. A total of 1,473 cases were finally selected for further analysis. First, CFA was run with the three factors of the LibQUAL+® Urdu version. The initial model with eight items of AS, eight items of IC, and five items of LP had good fit. The value of Tucker-Lewis Index (TLI) equal to .92 and CFI equal to .93 were adequately above the recommended level of .90. In addition, the 'Root Mean Square Error of Approximation' (RMSEA) equal to .07 was also within the recommended range of .05 to .08. Subsequently, the researchers examined the standardized factor loadings; all items had factor loadings between .61 and .87. According to Kline (2004) a standardized value higher than .60 on its respective factor demonstrates a reasonably high factor loading. Since the fit indices were good and factor loadings were found to be higher than .60 on their respective factors, it was concluded that all 21 items representing the three dimensions had adequate loadings (.61 to .87) (See Figure 1). The model with all retained items for these three measures is shown Figure 1.

Figure 1: CFA of Three-factor Model of LIBQUAL Urdu Version



## b) Internal Consistency and Validities (Convergent and Discriminant)

The internal consistency (reliability) was measured using Joreskog rho coefficient. Excellent reliability was demonstrated by the Urdu version of the LibQUAL+®overall scale and its three subscales with reliabilities greater than .8 (Table 5). The results exhibited that the sub-scales were consistently reliable. The Researchers also examined the "convergent" and "discriminant validity" of the three LibQUAL+® dimensions suggested by Fornell and Larcker (1981). To assess the "convergent validity", the researchers computed the pvc index, which denotes the proportion of variance in the items explained by the underlying factor. The values of the pvc index for the AS dimension (pvc= 63%), the IC dimension (pvc= 62%), and the LP dimension (pvc= 50%) met the 50% criterion outlined by Fornell and Larcker (1981). Therefore, the three-dimensional model of the LibQUAL+® Urdu version showed convergent validity.

Fornell and Larcker (1981) suggest that if the average variance extracted by each dimension is greater than the squared correlations between constructs then discriminant validity is present. The researchers calculated the shared variance between each of the three factors and found that the variance shared by two factors was less than the variance extracted for each of the dimension (except between the AS and the LP dimensions). Therefore, discriminant validity of dimensions was established (Table 5). The researchers again conducted a CFA Model by combining AS and LP dimensions. The two-factor model (model 1) fitted the data poorly as compared to the three-factor model (model 0). A Chi-square difference test was conducted to assess the better model. The result showed that the model with the three dimensions was better as compared to the two dimensional model of the LibQUAL+® Urdu Version (Table 6). Hence the three dimensional model of LibQUAL+® (i.e., AS, IC and LP) is recommended in the Urdu version.

Table 5: Internal Consistency, Discriminant and Convergent Validity

| | AS | IC | LP | Joreskog rho |
|---|---|---|---|---|
| Affect of Service | (.63) | | | .93 |
| Information Control | .45 | (.62) | | .93 |
| Library as Place | .55 | .45 | (.50) | .83 |

Note: Pvc values are presented in parenthesis as diagonal items.

Table 6: Model Comparison of the Locally Modified LibQUAL+® Urdu Version

| | Chi-Square | Df | P |
|---|---|---|---|
| Model 0 (3 factors) | 1510 | 186 | 000% |
| Model 1 (2 Factors) | 2468 | 188 | 000% |
| Chi-Square | 958 | 2 | 000% |

## c) Content Validity

The researchers also assessed the content validity of our scale. According to Haynes, Richard and Kubany (1995) "content validity is the degree to which elements of an assessment instrument are relevant to and representative of the targeted construct for a particular assessment purpose" (p. 239). Thus construct validity refers to whether a scale or instrument adequately measures or represents the construct. The content validity of the locally modified LibQUAL+® Urdu version was established by a 9-member focus group and

by 50 respondents during pre-testing. The original version was developed through a series of quantitative and qualitative studies as well corroborating this approach. More than 132 published studies and 10 doctoral theses (Cook 2001; Green 2007; Kim 2003; Kyrillidou 2009; Lee 2006; Lin 2006; Lovato-Gassman 2007; Miller 2008; Posey 2009; Yu 2006) used the LibQUAL+® scale. Furthermore, the instrument was refined based on feedback from 1.5 million users and twelve hundred libraries across the world. Many experts of library service quality, scale development, and practical users were involved and validated the construct over the last decade. Thus, the LibQUAL+® scale has a very high content validity.

## DISCUSSION

The researchers conducted two separate studies to test the validity and reliability of the locally modified LibQUAL+® Urdu version. The first study (N=514) explored the underlying factor structure with EFA, whereas the second study (N=1473) confirmed the obtained factor structure with CFA.

### Exploratory Factor Analysis of the LibQUAL+® Urdu Version

Exploratory factor analysis results suggested three dimensions of library service quality. These dimensions were IC, AS and LP. The first dimension (IC) which consisted on adequacy, organization, access of library collection to meet users' needs and self-reliance of library users strongly emerged (8 items) from our data as the best predictor of the service quality construct as it explained 25% of total variance. The second dimension (AS) covered human aspect of library services and was concerned with abilities, skills and attitude of library staff for delivery of services. Eight (out of nine) items were found valid in the Pakistani context. Lastly, all five items of LP had reasonable loadings in the Pakistani settings. The highest factor loading values on IC-1, IC-3, IC-4, and IC-5 suggested that collection and access related attributes played a major role in determining the library service quality. Our results supported the existing research studies conducted by Thompson, Cook and Kyrillidou (2005) and Thompson, Kyrillidou and Cook (2008). These findings were also in accordance with the results reported for the French version of LibQUAL+® (Kyrillidou et al. 2003; Kyrillidou et al. 2004) which report a three-dimensional structure for LibQUAL+®. However, another independent and locally modified version of LibQUAL+® reported by Morales et al. (2011) reports four dimensions in a Spanish translation done by them. The four dimensions have also been replicated in earlier LibQUAL+® studies but the three-dimension results are more parsimonious and robust. Although, results are consistent with most of the recent studies but one of the items relating to affect of service dimension (AS-6: library staff deals with users in a caring fashion) cross-loaded on the dimension of library as place. There are two possible explanations of this cross loading. First, Pakistani users do not have any experience of such kind of service. So, they could not understand and distinguish it clearly from library as place. Some users considered it as part of LP dimension instead of the AS dimension, as they did not receive or had any experience of dealing with caring fashion by any library staff. Therefore, they did not expect 'care' to be part of the delivery from library staff but part of the experience of visiting the library. The other potential reason could be the new culture and context as there is a vast diversity and variance between the users in the developed world and developing countries. This item was removed from the analysis which focused on items with no cross loading. Finally 21 items (AS = 8 items, IC= 8 items, LP = 5 items) were selected. The three factor solution confirmed our three dimensional conceptualization of service quality.

### Discussion on CFA

After establishing the validity of the locally modified LibQUAL+® Urdu version through EFA, the researchers again collected the data with the 21 items (i.e. selected in the EFA conducted in the first study) from 22 universities (n=1473). The researchers ran CFA to confirm the three-factor structure of the locally modified LibQUAL+® Urdu version. Results validated the findings of the first study with the reasonably larger sample. The initial model with eight items of AS, eight items of IC and five items of LP had good fit. Thus, the researchers established the validity of the locally modified LibQUAL+® Urdu version through two independent studies with two most powerful and rigorous procedures (EFA, CFA). Therefore, our 21 item scale had high validity and the findings were consistent with the existing body of literature such as Kyrillidou et al. (2003), Kyrillidou et al. (2004), Thompson, et al. (2008) and Wei et al. (2005).

### Reliability and Internal Consistency of the Locally Modified LibQUAL+® Urdu Version

The Cronbach's alpha coefficient result showed that all three dimensions of LibQUAL+® had high internal consistency and reliability in the Pakistani context because Cronbach alpha coefficients for AS, IC and LP scales and total scale were equal to .931, .931, .814 and .943 respectively and that they were adequately greater than the recommended value of 0.7 (Nunnally 1978). Due to non-availability of relevant LibQUAL+® studies in South Asia, the researchers compared our findings with similar studies in other countries. Our reliability results were consistent with existing research studies (Cook et al. 2001; Cook et al. 2009; Kyrillidou et al. 2004; Thompson and Cook 2002; Thompson, Cook and Heath 2003; Thompson et al. 2008). Thus, our results of the reliability of the scale are highly consistent with the existing literature and supported our hypothetical belief that the LibQUAL+® Urdu version is highly reliable in the Pakistani context.

## IMPLICATION FOR PRACTITIONER AND ACADEMICIANS

The current study proposes an Urdu version of LibQUAL+® to measure library service quality, which is an enormous contribution. Now researchers in Pakistan can use the locally modified Urdu version of LibQUAL+® for scientific research. In addition, the practitioners can use this instrument with confidence for assessment of service quality as it was found reliable and valid in the Pakistani context. Secondly, the present study has developed a systematic process that any organization attempting to implement the LibQUAL+® survey in a new culture, context, and language can use to assist in developing a more viable model for their specific context, which has sound psychometric properties and whose reliability and validity is assessed and reported. The above-mentioned process can be used by others to validate previous findings of other LibQUAL+® implementations and determine if inferences can be made from the results.Practitioners can use this instrument to understand the highest and lowest thresholds of their services. The understanding of these thresholds will enhance their ability to implement sound decisions. Library management should consider how to minimize the gap between users' expectations and actual service perceptions.

## LIMITATION OF STUDY AND FUTURE RESEARCH DIRECTIONS

The study has a number of limitations. First, the researchers used convenient sampling, as the method for data collection thus the sample may not be truly representative of the population. Second, the data was found to be quasi normal that may have effect on the

results of the study. Third, the study focused only on one library sector i.e. university libraries of Punjab and federal capital of Pakistan (Islamabad). The results of the study, therefore, may be applied with caution to the other types of libraries i.e. public, special and college. The future research may be conducted to check the reliability and validity of the locally modified LibQUAL+®Urdu version in other types of libraries (public, special) and other geographical areas of Pakistan.

## CONCLUSION

The researchers developed a locally modified LibQUAL+® Urdu version of the widely used LibQUAL+® standardized survey using standard procedure prescribed by Churchill (1979); Fornell and Larcker (1981). Our Urdu version of LibQUAL+® was tested using a large sample size of 1,987. The researchers provided empirical evidence regarding internal consistency, construct reliability, convergent validity, and discriminant validity (Fornell and Larcker 1981). The Urdu version of LibQUAL+® was found to be valid and reliable. This is the first such study in South Asia for investigating the psychometric properties of LibQUAL+®. Furthermore, the researchers first time tested a print version through two independent studies with heterogeneous samples. No such extensive psychometric analysis had previously been conducted on this instrument in Pakistan.

The results of EFA and CFA found that library service quality consists of three dimensions i.e. affect of service, information control and library as place in Pakistan. Thus, the researchers can safely conclude that the three-factor model fits the Pakistani context. Pakistani users want comprehensive collection (book, journals electronic resources) in print and electronic format. They also expect tools and modern equipment for easy and remote access through library websites. Moreover, users want comfortable space for individual and group learning, research and study. Additionally knowledgeable, cooperative and courteous staff is also considered very important by the users.

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## REFERENCES

Ahmed, S. M. Z., & Shoeb, M. Z. H. 2009. Measuring service quality of a public university library in Bangladesh using SERVQUAL. *Performance Measurement and Metrics,* Vol. 10, no. 1: 17-32.

Association of Research Libraries. 2011. *What is LIBQUAL*. Available at: http://www.libqual.org/about/about_lq/general_info

Association of Research Libraries. 2012. *LibQUAL+® Monthly Update*. Available at: https://www.libqual.org/news/1295

Babakus, E., and Boller, G. W. 1992. An empirical assessment of the SERVQUAL scale. *Journal of Business Research,* Vol.24, no.3: 253-268.

Barki, H., and Hartwick, J. 1994. User participation, conflict, and conflict resolution: the mediating roles of influence. *Information Systems Research.* Vol. 5, no.4: 422-438.

Byrne, B. M. 2001. Structural equation modeling with AMOS, EQS, and LISREL: Comparative approaches to testing for the factorial validity of a measuring instrument. *International Journal of Testing*, Vol. 1, no.1: 55-86.

Calvert, P. J. 2001. International variations in measuring customer expectations. *Library Trends,* Vol. 49, no.4: 732-757.

Carman, J. M. 1990. Consumer perceptions of service quality: An assessment of the SERVQUAL dimensions. *Journal of Retailing,* Vol. 66, no.1: 33-55.

Chiu, H. C., and Lin, N. P. 2004. A service quality measurement derived from the theory of needs. *The Service Industries Journal,* Vol.24, no.1: 187-204.

Churchill Jr, G. A. 1979. A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research,* Vol.16, no.1: 64-73.

Cook, C., and Heath, F. 2001. Users' perceptions of library service quality: A LibQUAL+ qualitative study. *Library Trends,* Vol.49, no.4: 548-584.

Cook, C., and Heath, F. 2002. SERVQUAL and the Quest for New Measures. *Journal of Library Administration,* Vol.35, no.4: 37-40.

Cook, C., and Thompson, B. 2000. Reliability and validity of SERVQUAL scores used to evaluate perceptions of library service quality. *Journal of Academic Librarianship,* Vol.26, no.4: 248-258.

Cook, C., Heath, F., Thompson, B. and Thompson, R. 2001. LibQUAL+: Service Quality Assessment in Research Libraries. *IFLA journal* /, 27(4), 264.

Cook, C., Heath, F., Thompson, B., Davis, M., Kyrillidou, M., and Roebuck, G. 2009. *LIBQUAL 2009 Survey: LibQUAL France.* Association of Research Libraries / Texas A&M University.

Cronbach, L. J. 1951. Coefficient alpha and the internal structure of tests. *Psychometrika,* Vol.16, no.3: 297-334.

Fornell, C. and Larcker, D. F. 1981. Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of marketing research,* Vol. 18, no.3: 382-388.

Green, J. P. 2007. *Determining the reliability and validity of service quality scores in a public library context: A confirmatory approach*. Ph.D thesis, Capella University, Minnesota United States. Available at: proquest.umi.com/pqdweb?did=1225158431&Fmt =7&clientId=45564&RQT=309&VName=PQD.

Dennis, M., Greenwood, J., and Watson, A. 2013. LibQUAL Revisited: Further Analysis of Qualitative and Quantitative Survey Results at the University of Mississippi. *The Journal of Academic Librarianship,* Vol. 39, no.6: 512-516.

Hair, J. F., Anderson, R. E., Tatham, R. L., and Black, W. C.1998. *Multivariate data analysis*. (5th. ed.). Englewood Cliffs: Prentice-Hall.

Hariri, N., and Afnani, F. 2008. LibQUAL+ in Iran: a subgroup analysis by gender. *Performance Measurement and Metrics,* Vol.9, no.2: 80-93.

Haynes, S. N., Richard, D., and Kubany, E. S. 1995. Content validity in psychological assessment: A functional approach to concepts and methods. *Psychological Assessment,* Vol. 7, no.3: 238.

Heath, F. M., and Cook, C. 2001. A brief LibQUAL+ phase one progress report. *ARL: A Bimonthly Report on Research Library Issues and Actions from ARL, CNI, and SPARC* 219 no.7.

Hernon, P., and Nitecki, D. A. 2001. Service Quality: A Concept not Fully Explored. *Library Trends,* Vol. 49, no.4: 687-708.

Huriarte, R. H., Mendives, K. A., and Román, C. V. 2008. Evaluación de la calidad del servicio de una biblioteca universitaria: La experiencia del LibQUAL+ en cinco facultades de la Universidad Nacional Mayor de San Marcos. *Biblios,* Vol. 31, no. 2008: 1-13.

Kim, Y. 2003. *Measuring and assessing Internet service quality at public libraries.* Unpublished doctoral dissertation, The University of Wisconsin, Madison, United States.

Kline, R. B. 2004. *Principles and practice of structural equation modeling.* New York: The Guilford press.

Kyrillidou, M. 2009. *Item sampling in service quality assessment surveys to improve response rates and reduce respondent burden:The "LIBQUAL Lite" randomized control trial.* Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign, Urbana.

Kyrillidou, M. 2011. *LibQUAL+® Survey Introduction.* Available at: http://www.libqual.org/documents/LibQual/publications/2011_ALA_SanDiego_SurveyIntro.pdf

Kyrillidou, M., and Persson, A. C. 2006. The new library user in Sweden: A LibQUAL+™ study at Lund University. *Performance Measurement and Metrics,* Vol.7, no.1: 45-53.

Kyrillidou, M., Olshen, T., Heath, F., Bonnelly, C., and Cote, J.P. 2003. Cross-Cultural Implementation of LibQUAL+™: The French Language Experience. Paper presented at the *5th Northumbria International Conference on Performance Measurement in Libraries and Information Services*, Durham, UK. Available at: http://www.libqual.org/documents/ admin/Town-Filling_the_void.doc.

Kyrillidou, M., Olshen, T., Heath, F., Bonnelly, C., and Côte, J.-P. 2004. Cross-Cultural Implementation of LibQUAL+™: The French Language Experience, ed. (Bradford, UK: Emerald, 2004). Paper presented at the *5th Northumbria International Conference on Performance Measurement in Libraries and Information Services*, Durham, UK. Available at: http://www.libqual.org/documents/admin/Town-Filling_the_void.doc.

Lane, F. C., Anderson, B., Ponce, H. F., and Natesan, P. 2012. Factorial invariance of LibQUAL+® as a measure of library service quality over time. *Library & Information Science Research,* Vol. 34, no.1: 22-30.

Lee, H. 2006. *Factors related to grantee perception of service quality in the Community Chest of Korea.* Unpublished doctoral dissertation, Case Western Reserve University, Ohio, United States.

Lin, S.C. 2006. *Perceptions of United States academic library services of first-year graduate students from Taiwan: A photo-elicitation study.* Unpublished doctoral dissertation, The University of Wisconsin, Madison, Wisconsin, United States.

Lovato-Gassman, B. 2007. *The Physical Community College Library: A single institution study of the relationship between user satisfaction and library use.* Unpublished doctoral dissertation, New Mexico State University, New Mexico, United States.

Miller, K. 2008. *Service quality in academic libraries: An analysis of LibQUAL+(TM) scores and institutional characteristics*. University of Central Florida, Florida, United States. Available at: proquest.umi.com/pqdweb?did=1568964431&Fmt=7&clientId=45564&RQT=309&VName=PQD

Moon, A. 2007. LibQUAL+™ at Rhodes University Library: An overview of the first South African implementation. *Performance Measurement and Metrics,* Vol. 8,no.2: 72-87.

Morales, M., Ladhari, R., Reynoso, J., Toro, R., and Sepulveda, C. 2011. Factor structure and psychometric properties of a Spanish version of LibQUAL+™. *Performance Measurement and Metrics*, Vol. 12, no.1: 23-37.

Nagata, H., Satoh, Y., Gerrard, S., and Kytömäki, P. 2004. The dimensions that construct the evaluation of service quality in academic libraries. *Performance Measurement and Metrics,* Vol. 5, no.2: 53-65.

Nimsomboon, N., andNagata, H. 2003. *Assessment of library service quality at Thammasat University Library System*. Japan: Research Center for Knowledge Communities,

University of Library and Information Science. Available at: http://www.kc.tsukuba.ac.jp/div-comm/pdf/report0403.pdf

Nitecki, D. A., and Hernon, P. 2000. Measuring service quality at yale university's libraries. *The Journal of Academic Librarianship,* Vol. 26 no. 4: 259-273.

Nunnally, J. C. 1978. Psychometric theory. New York: McGraw-Hill.

Posey, J. 2009. *Student perceptions and expectations of library services quality and user satisfaction at Walters State Community College.* Unpublished doctoral dissertation, East Tennessee State University, Tennessee, United States.

Roszkowski, M. J., Baky, J. S., and Jones, D. B. 2005. So which score on the LibQual+#8482 tells me if library users are satisfied? *Library & Information Science Research,* Vol.27, no.4: 424.

Schumacher R.E., Lomax R.G. 1996. *A beginner's guide to structural equation modeling*. Mahwah, NJ: Lawrence Erlbaum Associates.

Shoeb, M. 2011. Identifying service superiority, zone of tolerance and underlying dimensions: Service quality attributes in a private university library of Bangladesh. *Library Review,* Vol.60, no.4: 293-311.

Thompson, B., and Cook, C. 2002. Stability of the reliability of LIBQUAL scores: A reliability generalization meta-analysis study. *Educational and Psychological Measurement*, Vol. 62, no. 4: 735-743.

Thompson, B., Cook, C., and Heath, F. 2001. How many dimensions does it take to measure users' perceptions of libraries?: A LibQUAL+ study. *Portal,* Vol.1, no.2: 129-138.

Thompson, B., Cook, C., and Heath, F. 2003. Two short forms of the LIBQUAL survey: Assessing users' perceptions of library service quality. *Library Quarterly*, Vol. 73, no. 4: 453- 465.

Thompson, B., Cook, C., and Thompson, R. L. 2002. Reliability and structure of LibQUAL+TM scores: Measuring perceived library service quality. Portal: *Libraries and the Academy,* Vol.2, no.1: 3-12.

Thompson, B., Cook, C., and Kyrillidou, M. 2005. Concurrent validity of LibQUAL+™ scores: What do LibQUAL+™ scores measure? *Journal of Academic Librarianship,* Vol. 31, no.6: 517-522.

Thompson, B., Cook, C., and Kyrillidou, M. 2006. Using localized survey items to augment standardized benchmarking measures: A LibQUAL+™ study. *Portal,* Vol.6, no.2: 219-230.

Thompson, B., Kyrillidou, M., and Cook, C. 2008. How you can evaluate the integrity of your library service quality assessment data: Intercontinental LibQUAL+® analyses used as concrete heuristic examples. *Performance Measurement and Metrics,* Vol. 9, no.3: 202-215.

Wei, Y., Thompson, B., and Cook, C. 2005. Scaling users' perceptions of liprary service quality using item response theory: A LibQUAL+ study. *Portal,* Vol.5, no.1: 93-104.

Yu, F. 2006. *Users' emotional and material satisfaction at the micro/macro levels in an academic library.* Unpublished doctoral dissertation, University of Pittsburgh, Pennsylvania United States.

Yu, L., Hong, Q., Gu, S., and Wang, Y. 2008. An epistemological critique of gap theory based library assessment: the case of SERVQUAL. *Journal of Documentation,* Vol.64, no.4: 511-551.

**Appendix 1**

Locally modified LibQUAL+® Urdu and English (modified) Versions

| Items Code | English Version | Urdu Version |
|---|---|---|
| | **Affect of Service** | |
| AS-1 | Library staff instill confidence in users | لائبریری سٹاف قارئین میں اعتماد پیدا کرتا ہے۔ |
| AS-2 | Library staff gives individual attention to the users. | لائبریری سٹارف قارئین کوانفرادی توجہ دیتا ہے۔ |
| AS-3 | Library staff is consistently courteous | لائبریری سٹاف مسلسل اچھے رویے کا مظاہرہ کرتا ہے۔ |
| AS-4 | Library staff is always ready to respond to users' questions | لائبریری سٹاف قارئین کے سوالات کے جوابات کے لیے ہروقت مستعد رہتا ہے۔ |
| AS-5 | Library staff has knowledge to answer users' questions | لائبریری سٹاف قارئین کے سوالات کا جواب دینے کی اہلیت رکھتا ہے۔ |
| AS-6 | Library staff deals with users in a caring fashion | قارئین کا خیال رکھنے والا لائبریری سٹاف موجود ہے۔ |
| AS-7 | Library staff understands the needs of its users | لائبریری سٹاف قارئین کی ضروریات سمجھتا ہے۔ |
| AS-8 | Library staff is always willing to help users | لائبریری سٹاف قارئین کی مدد کیلئے ہردم تیار رہتا ہے۔ |
| AS-9 | Library staff shows dependability in handling users' service problems | لائبریری سٹاف قارئین کے مسائل حل کرنے کی اہلیت رکھتا ہے۔ |
| | **Information Control** | |
| IC-1 | Electronic resources of the library are accessible from my home or office | لائبریری کے الیکٹرونک ذرائع گھر یا دفتر سے قابل رسائی ہیں۔ |
| IC-2 | The web site of library enables me to locate information on my own | لائبریری ویب سائٹ مجھے خود سے معلومات تک رسائی فراہم کرتی ہے۔ |
| IC-3 | The library has printed materials, I need for my work. | لائبریری میں میری ضروریات کا پرینٹڈ مواد موجود ہے۔ |
| IC-4 | The library has electronic information resources, I need | لائبریری میں میری مطلوبہ معلومات کے الیکٹرونک ذرائع موجود ہیں۔ |
| IC-5 | The library has modern equipment that lets me easy access to the needed information | لائبریری میں معلومات تک رسائی کا جدید سامان موجود ہے۔ |
| IC-6 | The library has easy-to-use access tools that allow me to find things on my own | لائبریری میں مواد کی تلاش میں معاون قابل رسائی آلات موجود ہیں۔ |
| IC-7 | The library makes the information easily accessible for independent use | لائبریری خود سے استعمال کیلئے معلومات تک آسان رسائی مہیا کرتی ہے۔ |
| IC-8 | The library has print and/or electronic journal collections, I require for my work | لائبریری میں میری ضرورت کے پرنٹ اور الیکٹرونک جرائد موجود ہیں۔ |
| | **Library as Place** | |
| LP-1 | The Library has space that inspires study and learning | لائبریری کی عمارت مطالعہ اور علم کا شوق پیدا کرتی ہے۔ |
| LP-2 | The library has quiet space for individual activities. | لائبریری انفرادی سرگرمیوں کے لیے پرسکون جگہ ہے۔ |
| LP-3 | The library has comfortable and inviting location | لائبریری آرام دہ اور دلکش جگہ ہے۔ |
| LP-4 | The library is a getaway for study, learning, or research | لائبریری مطالعہ علم اور تحقیق کا مرکز ہے۔ |
| LP-5 | The library has community spaces for group learning and group study | لائبریری میں اجتماعی مطالعہ اور تحقیق کیلئے مناسب جگہ میسر ہے۔ |