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LSQA Scale: A Tool for Measuring Users' Perceptions of Service Quality in Libraries

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ABSTRACT

The main aim of the study is to develop library service quality assessment (LSQA) scale. Both qualitative and quantitative procedures are used to confirm the reliability and validity of the LSQA scale. Exploratory factor analysis (EFA) with varimax rotation is employed to indentify underlying dimensions of service quality of library. The LSQA scale includes four dimensions: (a) library infrastructure/environment, (b) library collection, (c) library services, and (d) library staff, which contains a total of 44 items. The reliability score Cronbach's alpha for the scale is found to be 0.969, which shows the excellent nature and a strong relationship of each item. The LSQA scale mean and standard deviation is found to be 162.61 and 35.077, respectively. Kaiser-Meyer-Olkin value of sampling adequacy of the scale is found to be 0.932. It is hoped that the LSQA scale could help library professionals and scholars better understand users' needs, to significantly improve and enhance the service quality of libraries.

Keywords: Engineering college, Odisha, LSQA, factor analysis, library service quality, service quality models

1. INTRODUCTION

A dramatic change is occurring in the scope and pace of technological advances that are contributing substantially to a fundamental shift in library and information products and services thereby affecting the role and responsibilities of professionals. The issues before library and information professionals are now to cope with the increasing demand for information from a variety of users and use of IT to redefine services. In this context, quality is a critical factor for achieving success, the concept of quality is not a new phenomenon for library and information science professionals as it is rooted in library principles, practices and activities. Though explicitly not stated, Ranganathan's five laws of library science, particularly, the fourth law (save the time of reader) implies the importance of quality in library services. The law emphasizes that library administration be simple and efficient to save user's time. Knowledgeable staff provides seamless access to information regardless of format, whether the user is in the library or at a remote location[1].

Historically, the quality of library has been measured in terms its use, budget and manpower, and services. In recent past, this concept has been changed towards the nature of service rendered by the librarians and not merely on the collection and size. However, in the present day context, satisfying the needs of the users is very important and the reliance on the traditional methods might not be sufficient to assess the quality and effectiveness of the library from customer's perspective. So, it is imperative for libraries to seek means to ensure that their services meet and preferably exceed user's expectations. A continuing program of assessment is essential to the overall development of a meaningful approach to meet service goals. Hence, it is imperative for the upcoming researchers to adopt new assessment methods to ensure qualitative service.

2. STATEMENT OF THE PROBLEM

Academic libraries of Odisha specially engineering college libraries are facing two major threats: Digital/ electronic environment and increasing competition for quality services. They must improve quality of their services to survive. Most of traditional statistics gathered by libraries lack relevance and don't measure the library's performance in terms of satisfaction to customers. They don't really describe performance or indicate whether service quality is good, indifferent or bad, even worse. They don't indicate any action that administration or any team could or should take to improve performance. So, to understand what library customers expect in terms of service quality is now necessary for good management. It is in this context, the present study on quality assessment of library services in Engineering College libraries is undertaken.

3. LITERATURE REVIEW

A distinct evolution in the conceptualisation and measures of library service quality has been brought about by many researchers. The traditional ways of examining

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academic library quality in terms of size of the library's holdings and counts of its use were becoming obsolete compared to the alternative approaches to measure quality emerging in the business sector[2]. User studies, including user information seeking behavior or needs and identification of user information search process models were being rigorously studied but those did not address the 'user-based' criteria for measuring service quality. In libraries, service quality applies to resources (information content); organisation (service environment and resource delivery) and service delivered by staff[3]. "Only customers judge quality; all other judgments are essentially irrelevant". Currently the service quality defines as "difference between customer's perceptions and expectations" user is the best judge to assess the quality of the services[4]. In defining customer service, the onus is on library to deliver service based on demonstrated customer expectations. The feedback from the customer provides the library with the necessary insight into how well the vision is being achieved, in terms of both traditional and innovative service delivery.

The SERVQUAL has evolved as an instrument to measure service quality and what customers value as important. The transferability of SERVQUAL, into the academic library setting has been carried out by Nitecki[2]. The fundamental objective of academic library is to link users with the information sources they need, regardless of the location or format of those sources. Making successful linkages requires attention to not only the identified sources but also the experience users have in obtaining them. Although, a lot of studies have been examined and practiced SERVQUAL model as a framework in measuring service quality, criticisms have been revolved around the interpretation and implementation of the instrument in library scenario. Colleen Cook, Bruce Thompson, and Fred Heath developed a modified protocol suitable for use in libraries, called LibQUAL+® -Lib (library) and QUAL (quality). Subsequently the Association of Research Libraries (ARL), promoted and named it as "LibQUAL+®," and used for non-profit use in improving library service quality.

A number of research studies on effectiveness, efficiency, satisfaction of users, and usefulness of services of libraries and information centers have been reported in professional literature. Most of these studies are aimed to assess the satisfaction of users or to evaluate the quality of library and information services offered. They used either existing methods for the study and research or devised new techniques for the purpose.

The Quadrant analysis has been used[5], which plots data about service attributes into four quadrants defined by two dimensions: one reflects the importance that customers give service attributes, while the other indicates the extent to which customers think a particular service has the attributes. The attributes falling into Quadrant-1 are very important to the readers, and these users perceive the library as possessing them or as performing well in their delivery. Attributes falling into Quadrant-2 are also most important to the readers but are not perceived as being prominent features of a library service. The attributes present in Quadrant-3 are relatively unimportant to the readers, but readers associate those attributes with library service. Quadrant-4 includes attributes that are neither valued by readers not performed well by the library. The attributes are placed in the respective quadrants as per the scores received as a result of survey.

Martensen & Gronhold[6] describe in their study about the user satisfaction and loyalty model which apply the structural equation model which allows librarians to quantitatively measure library users' perceived quality, satisfaction and loyalty with a library as well as the degree to which specific elements of a library's services, collections and environment contribute to those perceptions. The model contains dimensions like; (a) Electronic resources, (b) printed publications, (c) technical facilities, (d) library environment, (e) human side of user service, (f) user value, (g) user satisfaction, and (h) user loyalty. The Rodski Customer Satisfaction Survey has been used as a performance and benchmarking tool by Australian university libraries since 1998. The Rodski survey methodology gives library management the opportunity to measure and assess any gaps between client expectations and service delivery[7]. Thirty-three variables are grouped into the following areas: (a) communication, (b) facilities and equipment, (c) service quality, (d) library staff, (e) service delivery, and (f) virtual library.

A specific tool, BiQual[8], is designed to find out users' opinions on service quality in university science and technology libraries, and to inquire about the specific information needs of this particular group. BiQual is structured in three key sections, based on five quality service dimensions and 44 items. Service accessibility: the library's capacity to provide access to its collections, products and services in any format. Functionality: this dimension measures the physical, technological and environmental conditions that guarantee optimal library use, such as via remote access. Communications: this mechanism measures the information flow between the library and its users, from librarian skills to channel to evaluate service quality. Use: the aim of this dimension is to identify the current use of the academic library. Value added services and trends: an extensive range of new products, facilities and services adapted to the needs and expectations of science and technology users are suggested to respondents.

Somartana & Peiris[9] used a modified version of SERVQUAL to ascertain the service quality of Colombo library system. The users were asked to assess the actual service delivered by the library; to establish the importance of the service to them as users; and, to identify to what extent the service met their expectations. Exploratory factor analysis with Varimax rotation was employed to identify underlying dimensions of service quality of the library.

TOPSIS[10] (Technique for Order Preference by Similarity to Ideal Solution) is used as satisfaction measurement tool to measure readers' judgment for performance of the library as an information resource provider. Library is a typical subject of information service, embodies the characteristics of information service. The first-level indexes of the library reader satisfaction evaluation system constructed are: (i) venue, (ii) information and resources, (iii) service quality. Second-level index of the library reader satisfaction evaluation system are: library environment, equipment, layout, literature, network resources and staffs' knowledge, instrumentation, and attitude.

This paper is to establish a new AHP approach[11] to measuring university libraries service. The method of evaluation of the university library service quality is based on AHP comprehensive evaluation. The proposed method produces a mechanism which can be applied to evaluate other system service quality. The First level Index constitutes (a) Collection; (b) Service; (c) Facilities. The Second Level Index constitutes (books stored, digital resources) under collection; (open time per week, readers' satisfaction) under service; and (area, quantity of seat, quantity of computer, quantity of reading room) under facilities.

Hossain[12] explore and evaluate users' experience of service performance of four private university libraries in Bangladesh. The study used a 26-item instrument based on five dimensional modified version of SERVPERF scale. The study develops a Service Performance Matrix (SPM) using SERVPERF scale. Result shows that some of the service items of these university libraries are seeking immediate improvement. The study emphasizes only perceived service experience from respective users groups rather than on collections and other things that a library possesses.

The quality of services to users in academic libraries in developing countries using ServQUAL model has been described[13]. The study revealed that in developing countries all the service indicators evaluated were negatively marked; there is significant difference between the perceptions and expectations of library users. Factors such as lack of modern facilities, poor funding, and weak leadership quality were negatively affecting the quality of library services. Greater efforts should be channeled towards closing the gaps between the perceptions and the expectations of library users.

4. OBJECTIVES

(a) To identify the underlying dimensions of service quality of the Engineering college libraries;

(b) To develop a scale for the measurement of library and information service quality; and

(c) To determine the importance of each dimension in general and items associated with in particular as per users' perception towards assessing the library service quality.

5. METHODOLOGY

The aim of this investigation is to design and develop the LSQA scale as an instrument to measure users' perception towards the library and information service quality. Measurement instrument that are collections of items combined into a composite score, and intended to reveal levels of theoretical variables not readily observable by direct means, are often referred to as scales[14]. From the literature review it is observed that various service quality models have been used by the researchers to judge the service quality as perceived by the users. All these models, in other words know as scales or tools, constitute dimensions and under each dimension, items are accommodated. Keeping in view the tools so far developed and status of engineering college libraries of Odisha, LSQA scale is designed. To do so scale development steps recommended by Churchil[15] and Parasuraman[4] are followed. Prior to development of any scale the first and foremost step is to understand the phenomenon under study, which is well established through reviewing various literatures available. Stress has been given to steps like (a) generation of item pool for service quality measurement; (b) reduction of number of items from the pool of items so generated keeping in view the aim of survey, and (c) identify dimensions of service quality of libraries.

5.1 Generation of Item Pool for Service Quality Measurement

The aim is to identify the construct domain of tool and to gain insights into how library users perceived the quality of library and information services. A clear research domain is necessary to develop a valid measurement scale[15]. If a concept is not formally defined, statistical analysis of causal characteristics and their measures cannot lead to a good measurement instrument[16]. To obtain a comprehensive overview of the existing literature, publications are searched dealing with quality of library and information service. Each article has been scrutinised to extract dimensions or proposed sub-dimensions. Attention is also paid to the definitions and conceptualisations of the constructs. One may look for existing instruments that can be modified to fit the themes and statements found in the qualitative exploratory phase of the study[17]. As stated earlier from among the literature reviewed, selected literatures have been chosen for this purpose of item pool generation. The process evolved with 42 dimensions of library service quality and 385 items (service quality attributes).

5.2 Reduction of Item Pool

Of the total 385 items, these cover 42 aspects (dimensions). After thorough revision of the aspects and their respective items, two main issues are observed: (a) use of similar terms but different meaning; (b) use of different terms to refer to the same meaning. These occurrences are unavoidable as each researcher's

interpretation of indicators may differ based on type of service[14]. One may look for existing instruments that can be modified to fit the themes and statements found in the qualitative exploratory phase of the study[17]. In this study some existing scales (SERVQUAL, LibQUAL, etc.), have been referred to when wording the items. The preliminary scale had 44 items representing all dimensions. Steps taken to get 44 items from the whole 385 items are thorough observation of the essence of the items and subsequent discussion with the experts and focus groups, as recommended by Moore & Benbasat[18]. Resulting 44-items transformed into questionnaire and used to collect data for the first stage of purification. This stage is mainly serving the confirmation purpose of newly developed scales' psychometric properties. A five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used.

5.3 Identification of Dimensions of Service Quality

This phase of the study is to examine the dimensionality of the measures or scale. A survey is conducted to collect data to identify the primary underlying dimensions for service quality and establishing the reliability and validity of the scale. The questionnaire has been designed by using the 44 items formulated. The aim is to have respondents' assertion which items are important to them in assessing library and information service quality. In sequencing the items, due consideration is given to keep respondents focused on a particular area of service.

6. SAMPLING AND DATA COLLECTION

There is no absolute rule for the number of sample for scale purification. According to Churchill[19] the sample size for factor analysis should between 200 - 500. At least five times as many observations as there are variables to analyse, so at least 220 (5 x 44 items) subjects are required[20]. The samples of the survey consist of 350 users of selected 35 Engineering College Libraries in Odisha, covering Faculty & Students (PG and UG) of the sampled colleges. Web survey has been undertaken for pilot survey. The questionnaire is developed using Google Docs and the link so generated was e-mailed to 350 library users. Purposive sampling has been used because the main aim is to judge library service quality and the respondents who are regular users of the library can better say about the positives and negatives of library services. The primary goal at this stage is to test the initial scale, not to generalise the findings to a broader population.

The questionnaire contained 2 sections. Section – A: includes demographic information about the respondents such as: name of the institute, gender, status (student or faculty), frequency of visiting library. Section – B: includes 44 items on library service quality aspect derived from the previous steps. The variables in this study are measured using a 5 point Likert-type statement anchored by 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), 5 (strongly agree) and NA (Not Applicable). This is to maintain consistency in scale measurement and to allow for correlations and factor analysis[21].

6.1 Response Rate

Of the total of 350 questionnaire distributed among library users, 270 (77 %) responses are received. Some of the responses are removed based on the criteria: (a) where all 44 items received either all '1' or '5' (total–30); (b) more than 50 % missing data (total–19). So, final data sets used for further analysis are: 270–(30+19) = 221 (82 %). A large percentage of the respondents belong to student category which counts 178 (81 %) whereas faculty response is 43 (19 %). From the students categories 62 (35 %) were PG students and 116 (65%) were UG students. From among the respondents 154 (70 %) are Male and 67 (30 %) are Female.

6.2 Library Visit

Frequent visitors are always asset to library. Users' mode of visit to the library is tabulated in Table 1. It is observed that 100 (45.2 %) respondents are visiting library frequently (two or more visits per week) followed by occasionally (a few times a month) visitors which is 69 (31.2 %), 30 (13.6 %) respondents visit very frequently (daily) and 19 (8.6 %) respondents visit rarely (a few times a semester). Library visit by Faculty is highest in the category 'Occasionally (A few times a month)'. Mode of visit to library by PG and UG students is highest in the category 'Frequently (two or more visits per week)' which is 36 (58.1 %) and 48 (41.4 %) respectively.

6.3 Mean Score of Items

The mean score and standard deviations of items are analysed. The mean score range varies from 2.94-4.14 and Standard Deviation range varies from 1.04-1.45. Highest 84.1 % of items are having mean score >=3

Table 1. Frequency of library visit

Library visit	Faculty		PG		UG		Total	
	Visits	%	Visits	%	Visits	%	Visits	%
Frequently (two or more visits per week)	16	37.2	36	58.1	48	41.4	100	45.2
Occasionally (few times a month)	23	53.5	14	22.6	32	27.6	69	31.2
Rarely (few times a semester)	3	7.0	6	9.7	13	11.2	19	8.6
Very Frequently (daily)	1	2.3	6	9.7	23	19.8	30	13.6
Total	**43**	**100.0**	**62**	**100.0**	**116**	**100.0**	**221**	**100.0**

& <4, whereas lowest 4.5 % of items are having mean score >=2 and <3. Highest mean score i.e., >=4 & <5 is attained by 11.4 % of items (Table 2).

Table 2. Mean score range vs frequency

Mean score (x)	No. of items	Percentage (%)
x>=2 & x<3	2	4.5
x>=3 & x<4	37	84.1
x>=4 & x<=5	5	11.4
Total	**44**	100

6.4 Scale Purification

Scale purification involves factor analysis to explore the interrelationships among variables and to test for reliability and validity of the final scale. Based on Churchill[5] and DeVellis[14], an initial reliability analysis was conducted on the 44 items generated. For the statistical data elaboration and check the scale factorial structure SPSS 17.0 edition is used.

6.4.1 Reliability Analysis of Scale

Reliability refers to whether an assessment instrument gives the same results each time it is used in the same setting with the same type of subjects. Reliability is a part of the assessment of validity. DeVellis[14] recommends high inter-correlation among items in a scale. The higher the correlations among items, the higher are the individual item reliabilities, meaning increased reliability of the scale. One of the most important indicators of a scale's quality is the reliability coefficient, alpha (Cronbach's Alpha) Cronbach's alpha reliability coefficient normally ranges between 0 and 1. However, there is actually no lower limit to the coefficient. The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. DeVellis[14] provide the following rules of thumb: "- >0.9 – Excellent; - >0.8 – Good; - > 0.7 – Acceptable; - >0.6 – Questionable; - >0.5 – Poor; and -<0.5 – Unacceptable" (Table 3).

Table 3. Reliability statistics

Cronbach's Alpha	Cronbach's Alpha based on standardized items	No. of items
0.969	0.970	44

Cronbach's alpha for the scale was found to be 0.969 which showed the excellent nature and a strong relationship of each items. So the internal consistency of items is found to be strong.

Table 4 scale statistics gives the scores that are related to the scale's entirety, which presents a mean of the class of 162.61 and standard deviation of the class of 35.077.

In Appendix-A, the second column 'Scale Mean if Item deleted' shows mean values which is very closer to mean of class (162.61). Similarly the 'Cronbach's Alpha if Item deleted' column shows that the values are almost equal to the original Cronbach's alpha (0.969). So it is evident that all the items appear to be well fit to the scale and will not be omitted from the scale.

Table 4. Scale statistics

Mean	Variance	Standard deviation	No. of items
162.61	1230.382	35.077	44

6.4.2 Validity Testing of Scale

Validity is defined as the extent to which the instrument measures what it purposes to measure. Assessment instruments must be both reliable and valid for study results to be credible. Validity in research refers to how accurately a study answers the study question or the strength of the study conclusions. The process of validating an instrument varies depending upon what aspect(s) of validity are being assessed. The dimensionality assumptions about the measurement of the construct(s) composing the assessment have been validated by using methods like exploratory factor analysis (EFA) using principal component analysis (PCA).

6.4.2.1 Exploratory Factor Analysis (EFA)

Exploratory factor analysis (EFA) is used to gather information about (explore) the interrelationships among a set of variable[22]. The principal component analysis (PCA) technique is used in reducing a large number of variables to a smaller number of components and also as an initial step to reveal maximum number and nature of factors.[23] The extraction method has been carried out without any restriction on the number of factors to be extracted.

Pallant[22] suggested three steps in conducting factor analysis, a set of reliable items for web-based service quality measure were identified. The three steps are:

(i) Assessment of the suitability of the data for factor analysis
(ii) Factor extraction
(iii) Factor rotation and interpretation

To identify the naturally occurring dimensions of service quality, all 44 items are placed into an exploratory principal components analysis. This approach is recommended in the literature as a means of identifying actual, rather than perceived factor groupings[24].

(i) Assessment of the suitability of the data for factor analysis- Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is done. kaiser[25] recommends accepting values of greater than 0.5. As per KMO measure, a measure of > 0.9 is marvelous, > 0.8 is meritorious, > 0.7 is middling, > 0.6 is mediocre, > 0.5 is miserable and < 0.5 is unacceptable. In the present study it is 0.932 which shows the adequacy rate is marvelous (http://statistics.ats.ucla.edu/stat/spss/output/principal_components.htm). Bartlett's Test of Sphericity-this test provide a minimum standard which should be passed before a PCA (or a factor analysis) should be conducted. In the present study the values reached statistical significance, supporting

the factorability of the correlation matrix (Table 5). (ii) Factor extraction-The screen plot graphs shows eigenvalue against the component number. From the eight component onwards, the line is almost flat, meaning the each successive component is accounting for smaller and smaller amounts of the total variance. DeVellis[14] suggests two non-statistical guidelines for judging if enough factors have been extracted.

Table 5. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.932
Bartlett's Test of Sphericity	Approx. Chi-Square	6018.041
	Difference	946
	Significance	.000

The scree plot (Fig.1) presents a distinguished break up to the 7 factors, whereas after the 8th factor an almost linear part of the eigenvalue curve follows.

(i) Eigen value rule 14-factors with less than 1.0 should not be retained.

(ii) Scree test[26]-retain factors that lie above the elbow of the plot.

Thus, it was taken into consideration the eigenvalues, which are over 1 for all the 7 factors (19.53, 2.924, 2.329, 1.673, 1.386, 1.321, and 1.164 for 1st, 2nd, 3rd, 4th, 5th, 6th and 7th respectively) as depicted in the 'Total Variance Explained', (Appendix–B) and decide whether they interpret data in a satisfactory way. The reliability coefficient (Cronbach's alpha) is statistically significant and equals to 0.95, 0.94, 0.83, 0.82, 0.80, 0.80 and 0.72 for the 1st, 2nd, 3rd, 4th, 5th, 6th and 7th factorial axis correspondingly (Table 6). The Rotated Component Matrix (Appendix-C) presents the components and the factor loadings produced after PCA; more specifically, based on users perception on library and information service quality as presented by the factor analysis (Table 6).

6.4.3 Higher-Order Dimensions of Library Service Quality

Based on Dabholkar[27] multilevel model and Fassnacht & Koese[28] hierarchical model of service quality and the high correlations values among items, the presence of higher order dimensions are examined. It is observed that

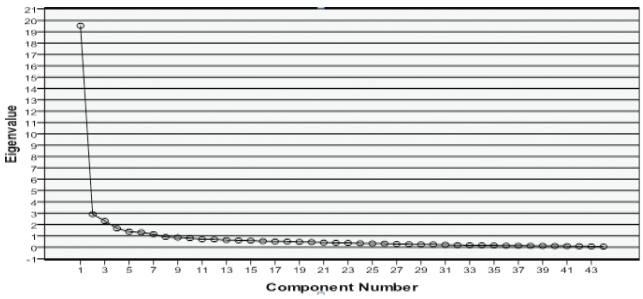

Figure 1. Scree plot.

the seven dimensions revolved around four main areas such as: (a) library as place, equipment & environment, (b) library collection/resources, (c) library staff & (d) library services. So, four higher order factors were proposed. (i) Factor-1 (Library staff)- Kept as it is.(ii) Factor-2 (Library Collection) -Kept as its is(iii) Factor-3 (ICT Facility) & Factor-6 (security) combined to form a higher factor termed 'Library Services'(iv) Factor-4 (Library Infrastructure/ Environment), Factor-5 (Users Convineience) & Factor-7 (Library Aesthetics) combined to form a higher order factor termed 'Library Environment'.

Minor alternations of the items, among the four factors, have been done keeping in view the users understanding and convenience while responding the questionnaire. The final scale so designed contains 4 dimensions of library and information service quality named as service (a) library staff, (b) library collection, (c) library services, and (d) library infrastructure/ environment. The internal consistency among the items was judged by finding out the reliability coefficient (Cronbach's alpha) of each dimension which is tabulated in Table 7. It is found that all the dimensions are passing the test with excellence.

Table 7. Higher-order dimensions of library service quality

Factors	Name of the dimension	No. of items	Cronbach's alpha
Factor – 1	Library staff	13	0.950
Factor – 2	Library collection	11	0.919
Factor – 3	Library services	10	0.898
Factor – 4	Library infrastructure/environment	10	0.856

Table 6. Factor description after EFA

Factors	Item description	Name of the dimension	Number of items	Cronbach's alpha
Factor – 1	Attitude, behavior and professionalism shown by library staff	Library Staff	13	0.950989
Factor – 2	Information resources present in library and catering to the users need	Library Resources	13	0.936936
Factor – 3	ICT facilities provided at the library to facilitate state-of-the-art service to users	ICT Facilities	4	0.833376
Factor – 4	Library environment, access to resources etc	Library Environment	5	0.817850
Factor – 5	Reading room facilities and other user convenience	User Convenience	3	0.799451
Factor – 6	Security and safety measures at library	Security	3	0.802086
Factor – 7	Visually appealing facilities at library	Library Aesthetics	3	0.724075

6.5 Proposed Measurement Model for Library and Information Service Quality

The proposed library service quality assessment (LSQA) tool (Appendix-D) constitutes 4 dimension of library and information service quality and the 44 items are grouped under these dimensions. Based on the 4 dimensions of core dimension of LSQA, 44 items are arranged under respective sub-dimension like Library infrastructure/ Environment- location, facilities, equipments & security; Library collection-types (books, periodicals, non-book materials,etc), currency, nature (print or electronic); Library staff- knowledge, behavior, communication, appearance and library service—convenience & IT support (Fig. 2).

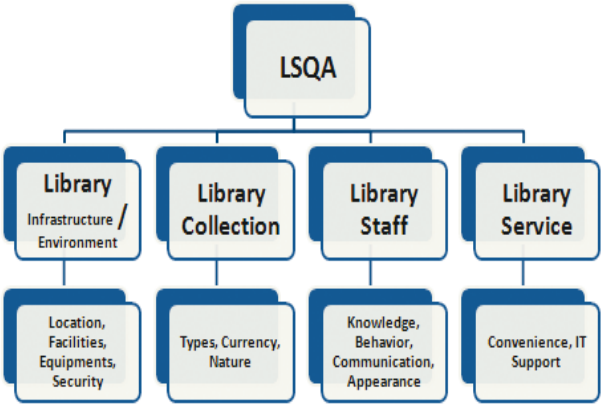

Figure 2. LSQA model.

7. CONCLUSIONS

The fundamental social function of the library is to serve. The goal of the library is to provide excellent service to the readers. The job onus is to understand and meet the requirements of readers, showing professionalism for promoting library service, exploring ICT and developing rich service contents to meet the requirements of different readers, adopting the strategy of service to promote and build high-quality service environment. The first principle of librarianship is to manage information resources in ways that will serve users, which incorporates Ranganathan's five laws and allows users who seek certain type of material or information within certain parameters. Academic librarianship faces challenges, problems and opportunities to satisfy users. Quantifiable data obtained from any tool is not an end in itself. Library staff should discuss user perceptions and expectations, using their experience to interpret service quality data and suggest how perceived shortfalls could be addressed. The proposed LSQA tool would definitely help in this regard. This can be used by the library professional to judge the quality of service provided to the users as per their perceptions in different library environment.

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Appendix – A

Item-total statistics

Items	Scale mean if item deleted	Scale variance if item deleted	Corrected Item-total correlation	Squared multiple correlation	Cronbach's Alpha if item deleted
Library is a pleasant, comfortable and inviting location to carry out study	158.59	1187.166	0.564	0.588	0.969
The library has visually appealing facilities	158.76	1184.634	0.577	0.568	0.969
A gateway for study, learning and research	158.58	1189.771	0.504	0.583	0.969
Library has convenient operating hours	158.62	1182.403	0.571	0.734	0.969
Facilities for using personal laptops are adequate	159.31	1191.044	0.409	0.553	0.969
Group study facilities are adequate	159.47	1186.594	0.447	0.495	0.969
Individual sit availability is adequate and comfortable	158.44	1187.372	0.498	0.574	0.969
Access to computers to support study / research is adequate	159.39	1175.897	0.587	0.612	0.969
Library has modern equipment (photocopiers, computers, printers) in good condition	159.64	1172.835	0.616	0.705	0.969
I feel safe and secure towards my personal belongings in Library	159.21	1169.422	0.589	0.625	0.969
Library has an appropriate collection of information resources for its users	158.79	1172.756	0.704	0.789	0.968
The resources I get from the library are current & accurate	158.75	1180.261	0.675	0.736	0.968
The printed library materials I need are available adequately as per my course need	158.98	1177.573	0.6	0.652	0.969
Handbooks, subject-dictionary, standards and other special reference collection are adequate	158.93	1170.634	0.693	0.785	0.968
The library materials are in good condition (not brittle or falling apart)	158.69	1175.622	0.648	0.704	0.968
Availability of printed magazines/journals are relevant to information needs	158.62	1181.562	0.642	0.713	0.968
Number of newspapers are adequate in library	158.46	1188.486	0.575	0.631	0.969
Library information guides are clear and useful	158.69	1183.908	0.617	0.655	0.969
Number and variety of electronic resources subscribed are adequate	159.31	1173.837	0.659	0.714	0.968

Library acquires information resource as per user demand	159.04	1173.791	0.74	0.709	0.968
Library is well stocked with collections on Competitive Examinations	158.93	1177.746	0.596	0.623	0.969
Library staff are approachable and welcoming	158.96	1162.608	0.736	0.832	0.968
Library staff understand the needs of users	158.92	1167.768	0.695	0.82	0.968
Library staff have knowledge and skills to provide answer to user questions	158.69	1166.592	0.704	0.749	0.968
Library staff are well dressed and having neat appearance	158.49	1185.435	0.599	0.639	0.969
When user have problem Library staff are sympathetic and reassuring	159	1162.746	0.707	0.806	0.968
Library staff treat users fairly and without discrimination	158.82	1165.203	0.687	0.767	0.968
Library staff use technology (IT) efficiently	158.76	1172.87	0.69	0.662	0.968
Library staff are making users feel secure about transactions	158.62	1173.385	0.696	0.776	0.968
Library staff are having users' best interest in heart and mind	158.92	1165.863	0.761	0.83	0.968
Library staff provide user education programmes to help users making more effective use of resources of their interests	159.18	1168.079	0.695	0.73	0.968
Library staff are committed to their duty and responsibility	158.98	1167	0.694	0.766	0.968
The library provides services at the promised time	158.58	1173.049	0.778	0.82	0.968
Library staff arranges documents, if not available in the library, from other sources	158.69	1169.847	0.732	0.752	0.968
Taking photocopies and printouts is easy and cost effective	159.57	1167.11	0.623	0.716	0.969
Convenient access to library collections	158.65	1175.401	0.702	0.738	0.968
Service hours fixed keeping in view the users convenience	158.65	1179.271	0.626	0.781	0.969
Quality of collection in terms of currency and subject relevance is up to the mark	158.72	1178.45	0.706	0.842	0.968
Quantity of collection in terms of currency and subject relevance is adequate	158.79	1178.756	0.686	0.843	0.968
Library online catalogue is an accurate source of information	159.25	1170.604	0.62	0.769	0.969
Library has a well organized library web page	159.55	1179.385	0.498	0.766	0.969
Items such as photo copiers, printer and computers are kept in good operating condition	158.99	1172.473	0.711	0.773	0.968
Course specific resources are maintained in easily accessible way	158.72	1179.752	0.708	0.696	0.968
There is convenient facility to access electronic eesources	159.32	1176.1	0.632	0.674	0.969

Appendix – B

Total Variance Explanation

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	19.53	44.376	44.376	19.53	44.376	44.376	8.54	19.418	19.418
2	2.924	6.645	51.021	2.924	6.645	51.021	6.61	15.015	34.433
3	2.329	5.294	56.315	2.329	5.294	56.315	4.31	9.804	44.237
4	1.673	3.803	60.118	1.673	3.803	60.118	3.44	7.807	52.044
5	1.386	3.149	63.267	1.386	3.149	63.267	3.15	7.161	59.205
6	1.321	3.003	66.27	1.321	3.003	66.27	2.24	5.09	64.295
7	1.164	2.646	68.916	1.164	2.646	68.916	2.03	4.621	68.916
8	0.916	2.082	70.998						
9	0.873	1.983	72.982						
10	0.812	1.845	74.827						

11	0.711	1.615	76.442
12	0.704	1.599	78.041
13	0.65	1.478	79.519
14	0.617	1.402	80.921
15	0.59	1.342	82.263
16	0.547	1.244	83.507
17	0.521	1.184	84.691
18	0.513	1.165	85.857
19	0.482	1.096	86.953
20	0.467	1.062	88.015
21	0.42	0.955	88.97
22	0.398	0.904	89.873
23	0.385	0.875	90.749
24	0.356	0.81	91.559
25	0.338	0.768	92.327
26	0.326	0.74	93.067
27	0.29	0.658	93.725
28	0.27	0.614	94.339
29	0.257	0.584	94.923
30	0.253	0.575	95.498
31	0.225	0.511	96.009
32	0.197	0.449	96.457
33	0.186	0.424	96.881
34	0.183	0.415	97.296
35	0.169	0.384	97.68
36	0.148	0.337	98.017
37	0.139	0.315	98.332
38	0.136	0.309	98.642
39	0.126	0.287	98.929
40	0.117	0.266	99.195
41	0.109	0.249	99.444
42	0.097	0.22	99.664
43	0.079	0.18	99.844
44	0.069	0.156	100

Appendix – C

Rotated Component Matrix[a]

	Component						
Items	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Library staff understand the needs of users	0.85						
Library staff treat users fairly and without discrimination	0.79						
Library staff are making users feel secure about transactions	0.78						
Library staff are having users' best interest in heart and mind	0.77						
Library staff are approachable and welcoming	0.77						

Library staff have knowledge and skills to provide answer to user questions	0.74						
When user have problem Library staff are sympathetic and reassuring	0.71						
Library staff are committed to their duty and responsibility	0.66						
Library staff use technology (IT) efficiently	0.65						
Library staff are well dressed and having neat appearance	0.62						
The library provides services at the promised time	0.57						
Library staff provide user education programmes to help users making more effective use of the resource of their interests	0.53						
Library staff arranges documents, if not available in the library, from other sources	0.45						
The printed library materials I need are available adequately as per my course need		0.75					
Handbooks, subject-dictionary, standards and other special reference collection are adequate		0.74					
The library materials are in good condition (not brittle or falling apart)		0.65					
Availability of printed magazines/journals are relevant to information needs		0.63					
The resources I get from the library are current & accurate		0.62					
Quality of collection in terms of currency and subject relevance is up to the mark		0.6					
Library is well stocked with collections on competitive examinations		0.56					
Quantity of collection in terms of currency and subject relevance is adequate		0.56					
Convenient access to library collections		0.56					
Course specific resources are maintained in easily accessible way		0.53					
Library information guides are clear and useful		0.51					
Library has an appropriate collection of information resources for its users		0.49					
Library acquires information resource as per user demand		0.44					
Library has a well organised library web page			0.768				
Library online catalogue is an accurate source of information			0.747				
Number and variety of electronic resources subscribed are adequate			0.678				
Access to computers to support study/research is adequate			0.647				
A gateway for study, learning and research				0.71			
Individual sit availability is adequate and comfortable				0.67			
Library has convenient operating hours				0.61			
Library is a pleasant, comfortable and inviting location to carry out study				0.51			
Number of newspapers are adequate in library				0.5			
Service hours fixed keeping in view the users convenience					0.75		
There is convenient facility to access Electronic Resources					0.48		
Items such as photo copiers, printer and computers are kept in good operating condition					0.45		
Taking photocopies and printouts is easy and cost effective						0.65	
Library has modern equipment (photocopiers, computers, printers) in good condition						0.63	
I feel safe and secure towards my personal belongings in library						0.52	
Facilities for using personal laptops are adequate							0.73
Group study facilities are adequate							0.68
The library has visually appealing facilities							0.47

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

a. Rotation converged in 11 iterations.

Appendix - D

LSQA Tool

(Please tick the in the box of your choice) (Score 1 for "Strongly Disagree" and 5 for "Strongly Agree")

Library Infrastructure / Environment (LP)

Items	Code	1	2	3	4	5	NA
Library is a pleasant, comfortable and inviting location to carry out study	LP1						
The library has visually appealing facilities	LP2						
A gateway for study, learning and research	LP3						
Library has convenient operating hours	LP4						
Facilities for using personal laptops are adequate	LP5						
Group study facilities are adequate	LP6						
Individual sit availability is adequate and comfortable	LP7						
Access to computers to support study / research is adequate	LP8						
Library has modern equipment (photocopiers, computers, printers) in good condition	LP9						
I feel safe and secure towards my personal belongings in Library	LP10						

Library Collection (LC)

Items	Code	1	2	3	4	5	NA
Library has an appropriate collection of information resources for its users	LC1						
The resources I get from the library are current & accurate	LC2						
The printed library materials I need are available adequately as per my course need	LC3						
Handbooks, subject-dictionary, standards and other special reference collection are adequate	LC4						
The library materials are in good condition (not brittle or falling apart)	LC5						
Availability of printed magazines/journals are relevant to information needs	LC6						
Number of newspapers are adequate in library	LC7						
Library information guides are clear and useful	LC8						
Number and variety of electronic resources subscribed are adequate	LC9						
Library acquires information resource as per user demand	LC10						
Library is well stocked with collections on competitive examinations	LC11						

Library Staff (LF)

Items	Code	1	2	3	4	5	NA
Library staff are approachable and welcoming	LF1						
Library staff understand the needs of users	LF2						
Library staff have knowledge and skills to provide answer to user questions	LF3						
Library staff are well dressed and having neat appearance	LF4						
When user have problem, library staff are sympathetic and reassuring	LF5						
Library staff treat users fairly and without discrimination	LF6						
Library staff use technology (IT) efficiently	LF7						
Library staff are making users feel secure about transactions	LF8						
Library staff are having users' best interest in heart and mind	LF9						
Library staff provide user education programmes to help users making more effective use of their interests	LF10						
Library staff are committed to their duty and responsibility	LF11						
Library provides services at the promised time	LF12						
Library staff arranges documents, if not available in the library, from other sources	LF13						

Library Service (LS)

Items	Code	1	2	3	4	5	NA
Taking photocopies and printouts is easy and cost effective	LS1						
Convenient access to library collections	LS2						
Service hours fixed keeping in view the users convenience	LS3						
Quality of collection in terms of currency and subject relevance is up to the mark	LS4						
Quantity of collection in terms of currency and subject relevance is adequate	LS5						
Library online catalogue is an accurate source of information	LS6						
Library has a well organised library web page	LS7						
Items such as photocopiers, printer and computers are kept in good operating condition	LS8						
Course specific resources are maintained in easily accessible way	LS9						
There is convenient facility to access electronic resources	LS10						

Contributors

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