Analysis of LibQUAL+ Scores for Service Quality Assessment in Academic Libraries of Bangladesh

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By

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This is to certify that the thesis entitled "Analysis of LibQUAL+ scores for service quality assessment in academic libraries of Bangladesh" submitted by **Md. Zahid Hossain Shoeb** for the degree of Doctor of Philosophy (PhD) in Information Science and Library Management, University of Dhaka. To the best of my knowledge, the research and the writing embodied in the thesis are that of the Candidate except where due reference is made in the text. This thesis is an original study carried out by him under my supervision and guidance, and is worthy of examination.

Professor S. M. Zabed Ahmed, *PhD*
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Abstract

This research investigated the service quality scores through LibQUAL+ attributes to find out the users' thought of the services that a library might offer. This study additionally had a focus on improvement of services and strategic enhancement of academic libraries in Bangladesh. The assessment was conducted in six top-ranked university libraries in Bangladesh, i.e. University of Dhaka (DU), Rajshahi University (RU), Bangladesh Agricultural University (BAU), Bangladesh University of Engineering and Technology (BUET), Bangabandhu Sheikh Mujib Medical University (BSMMU), and Independent University, Bangladesh (IUB). Data were collected from the faculty, graduate, and undergraduate students. The research questions that framed the investigation were related to service adequacy, service superiority, service quality expectation, services in the tolerable areas, dimension-wise data reduction and validity of dimensions, and several significance differences by gender and individual user. Descriptive statistics, analysis of dimension reduction, and various nonparametric tests were conducted for different statistical measures.

The investigation revealed the overall scenario of service performance through the perception of the users. Overall, the users considered the library service operations are far behind from the minimum level except for one library, i.e. IUBL. The study found that most perceived service scores are low; these affected the minimum acceptable service performance by the libraries. The study revealed that the desired expectations are high, which affected service adequacy and service superiority scores. Statistically significant differences were found by gender and individual user groups. For two libraries, i.e. RUL and BUETL, more dimensions were extracted, whereas IUBL data revealed only two dimensions. The three-dimensional factors were loaded for the remaining three libraries. In-spite of the variations observed with the dimensionalities, confirmatory factor analysis endured overall LibQUAL+ original dimensions. Based on these analyses, this research made recommendations for the strategic and operational improvement of the libraries.

To

My parents, with love and gratitude,

My loving wife, with faith and

My affectionate children - Zareen & Safwan, with hope

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List of Acronyms

Acronym	Definition
AG	Adequacy Gap
AMOS	Analysis of Moment Structures
ANOVA	Analysis of Variance
ARL	Association of Research Libraries
AS	Affect of Service
BAUL	Bangladesh Agricultural University Library
BIPC	Bangladesh INASP-PERI Consortium
BSC	Balanced Scorecard
BSMMUL	Bangabandhu Sheikh Mujib Medical University Library
BUETL	Bangladesh University of Engineering & Technology Library
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
df	degree of freedom
DS	Desired Service
DUL	Dhaka University Library
EFA	Exploratory Factor Analysis
EP	Evaluated performance
FIPSE	Fund for the Improvement of Post-Secondary Education
IBM	International Business Machines
IC	Information Control
ICT	Information and Communication Technology
IL	Information Literacy
INASP-PERI	International Network for the Availability of Scientific Publications - Program for Enhancement of Research Information
ISO	International Organization for Standardization
IUBL	Independent University, Bangladesh Library
LIS	Library and Information Science
LP	Library as Place
LQ	Local Question

MS	Minimum Service
NFI	Normed Fit Index
OCLC	Online Computer Library Center
OPAC	Online Public Access Catalogue
P	Probability
PCP	Pivotal, Core and Peripheral
PS	Perceived Service
RATER	Reliability, Assurance, Tangibles, Empathy & Responsiveness
RMSEA	Root Mean Square Error of Approximation
ROI	Return of Investment
RUL	Rajshahi University Library
SA	Service Adequacy
SD	Standard Deviation
SG	Superiority Gap
SPSS	Statistical Package for the Social Science
SQ	Service Quality
SS	Service Superiority
THE–QS	Times Higher Education and Quacquarelli Symonds
TM	Trademark
TQM	Total Quality Management
UDL	UGC Digital Library
UGC	University Grants Commission
ZoT	Zone of Tolerance

Chapter 1

Introduction

1.1 Introduction

Traditionally, determining the success of library access has focused on the assessment of physical resources. But this practice has shifted towards the assessment of service quality, given a growing body of indication that suggests that quality library service is important for creating an environment for academic escalation and advancement (Thompson & Cook, 2002). Various findings like the mentioned one accelerated a need for a measurement or assessment of quality beyond internal appraisals, which lack the effectively evaluation of staff and the contentment of library users (Saunders, 2007). This dissertation is a report of an exploratory study of service quality assessment through LibQUAL+ model in academic libraries of Bangladesh. The scores of service quality were obtained from six university libraries in Bangladesh. This first Chapter will introduce the background and related contents of the study, identify the objective and statement of the problem that the research questions were intended to address, and outline the research questions.

1.2 Prologue

The most integral part of any university is its library, or it may be said that an academic library is a core unit of any university. This unit is imperative for supporting the objectives of the universities, as well their missions of teaching, learning, and research. Nowadays, academic libraries are facing challenges for increasing access, simultaneously they are also being asked to function with improved effectiveness and efficiency (Thompson, Cook, & Heath, 2003). This means providing access to and dissemination of scholarship to the broadest set of readers at affordable costs, while maintaining and improving quality of service to library patrons. The question then for academic libraries is how to achieve these goals while still meeting the service needs of its patrons.

Statistics on various aspects of library like number of users visit, circulation report (Kyrillidou, 2002), etc. were the approach of assessing library quality in the past. Such thinking focused both on resources and functions associated with the collection development. Title-by-title selection and acquisition gave way to approval plans that facilitated the arrival of titles in bulk. With one order to a subscription agent, thousands of

serials could be purchased and paid for within an annual check. Hernon and Altman (1998) stated that, because of regular requests for more funds to keep up with the publishing output, many academic libraries were regarded as bottomless pits during the 1970s by university administrators. From the 1980s, the request for more money centered around the large annual increases in the prices of scholarly and professional journal subscriptions and the need for electronically delivered resources and their requisite infrastructure.

1.3 Necessity of Assessment/Evaluation

Libraries are such organizations that required to be managed. Library Head or Chief Librarians' job are currently treated as managerial job also. This is a changing role paradigm, shifted from bibliographic responsibility to the managerial aspects. A huge change has been occurred since last three decades as libraries have become more complex with variety of resources along with services and therefore need more management (Powell, 2006). Matthews (2004) stated that without offering justification based upon pragmatic evidence the 'goodness' of a library is not enough to articulate. De Saez (2002) mentioned that more and better management case of libraries becomes apparent when a demand for more marketing of library services and more external communication is added.

Planning, organization, leading, and controlling are four functions of current management theory. Controlling, the final function cope with supervising tasks to make sure that they are done as designed. When the activities are not producing the desired outcomes, it also ensures to take proper action (Bartol, *et al.*, 2008). Capturing data about the organization and its activities are needed if managers are to 'control'. Then library managers can compare the actual performance to the goal planned. Data about the organization is obtained through various means, including organizational evaluation, service assessment, performance measurement so that library management has the preference of examine it (Poll & Boekhorst, 1996; Powell, 2006).

Evaluation is the process of determining the merit of something such as a service or process by comparing what it is to what it ought to be. Weiss (1998) defined evaluation as "the systematic assessment of the operation and/or the outcomes of a program or policy, compared to a set of explicit or implicit standards, as a means of contributing to the improvement of the program or policy". For the library, the definition can be stated: an

evaluation method is part of library management's overall planning and quality assurance processes (De Prospo, 1982; McClure, 1987; Ballard, 1989).

It has been mentioned earlier that like any service organization libraries must be managed. Libraries use resources that must be accounted for and the staff must be managed, as well as the buildings and equipment. Previously, people even library managers or staff had not thought about the necessity of performance assessment of library as everybody thought library was simply advantageous to all. The evidence for this assumption regarding assessment was present until the 1980s, and its significant mounts since then (Himmel & Wilson, 1998; Matthews, 2004; Wang, 2006). Like any other service organization, libraries and managers were under pressure to evaluate what they are doing (Matthews, 2002; Rowley, 2005; Brophy, 2006). The evaluation pressure and demand later has become global and integral part (Bawden, Petuchovaite, & Vilar, 2005).

Ideally, librarians should evaluate their whole organization on a regular basis (Bawden, 1990), although this seldom happens. Instead, parts of the library are evaluated on an irregular basis. The possibilities of overlooking the problems that come to management's attention are therefore not being evaluated. Blagden, (1975), in an early study, gave only two reasons for evaluation:

1. to influence the funders and the clients that the service is delivering the benefits that were expected when the investment was made; and
2. as an internal control mechanism.

Powell (2006) expanded the above mentioned reason in this following manner; he mentioned assessment is necessary because libraries need to:

- explanation for how they use their limited resources;
- describe what they do;
- improve their visibility;
- illustrate their impact;
- increase efficiency;
- avoid errors;
- support planning activities;
- articulate concern for their community;
- support decision making; and
- Strengthen their position;

The list shows that evaluation has advanced from a narrow focus to a broader one with multiple purposes. Managers now expect evaluation to provide them with information useful for several different management functions, and this has placed greater expectations on evaluation itself.

To evaluate qualitatively and quantitatively, assessment is the necessity. Standard component and instrument should be applied for clearly understandable and effective end result. If there is no standard evaluation process of assessment, i.e. for performance measurement or service quality, assessment can still take place but the results will have to be contextualized before they are comprehensible to others. Measurement itself doesn't solve any problems; this simply provides data on which action can be taken. Having gathered the data from assessment, library managers must then examine and analyze the data to notice that whether it identifies the problems within the library. If it does, the managers will then try to correct any problematic areas.

1.4 Can Library User be considered as Customer?

The people who come into the libraries may be identified as users, borrowers, patrons, readers, clients, and/or customers. These days libraries with hands-on service prefer using the term 'customer' rather than any other identification to all the people who use to come library for a single piece of service. Libraries using the word 'customer' believe that individuals have their own preference of the way of spending time, pattern of information seeking behavior, way of using leisure time, opinion about the comfort with service provider etc. Library authority now recognize that there are many ways and parallel service providers for the people by which people can find information and recreation. A library user (for example, a university student) seeks services at library and library tries to provide as promised. Here the relationship is simply considered as customer and service provider; the student is customer to the library personnel. In contrast, the same student or user is not customer to his/her teacher as the association is mainly related to teaching/learning and evaluation/grade oriented. The library customers may not always be right, but they do have right to express their opinion and to learn about the library service parameters. Sometimes customers make impractical demands to the service provider and personnel are placed in a complicated situation; this has happened ever since the first libraries opened their doors and has nothing to do with the service quality movement. Service quality assessment scores of a library that collected should be converted into a customer service pledge to give customers a clear idea of what level of service can be

expected. Libraries should inform their customer about the service approach, i.e. the scope and the mode of the service they may provide. This may protect library staffs from unrealistic expectations, and reduce some of their unreasonable demands.

One of the affective characteristics of loyalty is customer satisfaction. Hernon & Altman (1998) stated that:

> *"Time and attention ... are two of the most valuable assets that individuals have. Those who choose to spend those assets in the library or in using library resources should be recognized and treasured as valued customers, especially those who are frequent ones."*

Rowley and Dawes (1999) mentioned that the link between loyalty and satisfaction is not uncomplicated or neither direct but they recognize that strength of satisfaction is an element of customer loyalty. This directs to recognition of the significance of service quality, and so to the attention it received from librarians and researchers in past three decades. In this dissertation the term 'customer' and 'user' are used as interchangeable entity.

1.5 Statement of the Problem

Academic libraries in Bangladesh are facing the same challenges as most academic libraries in the world such as money cutback and more information and communication technology (ICT) enabled environment. University libraries have to go through by some sort of evaluation caused by the policy of the educational quality assurance. The librarians or library managers have to seek better way to improve the service quality in order to survive and obtain user's loyalty. In Bangladesh, the quality of educational development and its academic excellence has been emphasized continuously. But the goal to the excellence is far away from the reality or the real service quality in education; in order to achieve the quality, the policies are made but they are not implemented fully. However, in the sector of higher education all academic libraries in Bangladesh specially university libraries as academic service organizations would be in such an environment.

During the past three decades, libraries have experienced rapid changes tied to the development of ICT. The recent emphasis on formal assessment in higher education has prompted library decision makers to reconsider their assessment strategies and to develop more meaningful assessment methods and measures for libraries. The traditional measure of academic library quality has been obsolete nowadays as the process sensibly does not

upshot to the organizational advancement; however, in recognition of the substantial changes in libraries rapid by ICT developments, accreditation organizations have created different approaches to evaluating libraries. In light of mentioned changing environment, access to resources, vast electronic collections in academic libraries, specially in university libraries in Bangladesh the measurement of service delivery is required through standard structured assessment tools to see whether they are performing well or not. With a requirement described in this manner, universities are left to determine what constitutes adequacy without any traditional measures such as volume counts or numbers of professional staff. Such broad statements have left librarians and institutional effectiveness staff to figure out a new approach to measuring and determining library quality (Gratch-Lindauer, 2002). The search for meaningful assessment approaches and instruments has librarians looking for tools that provide evaluative data and can serve as evidence for the thoughtful use of assessment results; the LibQUAL+ model, which measures customer perceptions of library service quality, is such a tool.

1.6 Are Customer Satisfaction and Service Quality Interlinked?

The main aim of library is to provide information service to the users. Many library surveys ask about user satisfaction, sometimes in a general context and sometimes in relation to specific services. Usually, the questions about satisfaction allow for scaled responses. Too often, satisfaction surveys are really intended as library report cards. In fact, some surveys actually ask users to assign the library a grade from A to F. There is usually no intent to take any remedial action based on replies to these questions, but rather to use the responses in negotiations with administrators in the parent institution. The terms satisfaction and service quality are frequently used interchangeably; this mistake has led to more confusion. According to Elliot (1995), satisfaction is "the emotional reaction to a specific transaction of service encounter". On the other hand Service quality has been described as "a global judgment, or attitude, relating to the superiority of a service". The inference is that the satisfaction levels from a number of transactions or encounters that an individual experiences with a particular organization fuse to form an impression of service for that person. The collective experiences of many persons create an organization's reputation for service quality. Expectations change according to what users want and how urgently they want it. Sometimes they are seeking a quiet place to read, sometimes just a book for enjoyment, and sometimes a vital bit of information. Importance and urgency, though seldom considered, are likely to have strong influence on users' satisfaction with a

service. Service quality is a complex concept. It has several dimensions beyond the content/context and the performance/performance-expectations gap. Service quality is both personal to individual and collective among many users.

As mentioned, traditionally library quality has been synonymous with library resource size, an assessment of what the library "has" rather than with the library "does". Yet, library quality and service quality are very different measures. A parallel can be drawn with the observations made by Zammuto *et al*. (1996), who studied student services offices in universities: "The idea of service quality as opposed to educational quality has not received much attention in higher education". This situation is changing as most academic institutions now struggle to draw attention to the retained students. Service quality has become a topic of considerable interest for many service units on campus. For a library, service quality encompasses the interactive relationship between the library and the user whom it is supposed to serve. A library that adheres to all the professionally approved rules and procedures for acquiring, organizing, managing and preserving material but has no customers can claim quality because a major element is missing. Line (1996) defined librarianship as "managing information resources for people". How the library sees and interacts with those people, users or customers, clearly affects the quality and nature of the service delivered. As Hebert (1994) mentioned,

> *"When library and customer measures of quality are not congruent, the library may be meeting its internal standards of performance but may not be performing well in the eyes of its customers."*

So, like other service organization library should be aware of service quality. As academic libraries are endemic with higher education and effective learning, better service provision is a topic of better outcome.

1.7 Construction of the Process for Exploration

Expectancy disconfirmation is a process theory that creates a framework for examining the formation of customer expectations and the subsequent confirmation or disconfirmation of those expectations through comparisons with product performance. Consumers are thought to compare post-purchase performance to their expectations prior to purchase by using a 'better-than, worse-than' heuristic (Oliver & DeSarbo, 1998) to arrive at a judgment of simple confirmation if the product performs as expected. If performance is better than anticipated, there is a positive disconfirmation of the

consumer's expectations; if the performance is worse than anticipated, there is a negative disconfirmation.

On the other hand, Parasuraman *et al.* (1985, 1991) developed the 'Gaps Model of Service Quality'. The Gaps Model is based on the expectancy disconfirmation perspective with a focus on service quality rather than product quality. In his quality assessment review, Hernon (2002) mentioned that:

> *"…the confirmation/disconfirmation process, which influences the Gaps Model, suggests that expectations provide a frame of reference against which customers' experiences can be measured...customers form their expectations prior to purchasing or using a product or service. These expectations become a basis against which to compare actual performance."*

The Gap Model is an approach of measurement process of customers' perception of service quality by identifying differences between customer expectation/desire and customer perception of actual service. In this model, customers assess the service excellence by perception based on experience and judgment. Here, customers evaluate which attribute of service quality is essential for better service quality anchored in expectation. As mentioned earlier, expectations are rooted in experience and are transformative over time, where, customer perceptions are also the judgments about how well service was performed. It has been identified five types of gaps created by discrepancies in The Gaps Model, these are: (1) Customer expectations of service and management's perspective on these expectations; (2) Service quality specifications and management's perspective of customer expectations; (3) Service quality specifications and service delivery; (4) Service delivery and external communication to customers about that delivery; and (5) Customers' expectation of service and perceived service delivery (Hernon, 2002). SERVQUAL, the instrument to assess service quality in the for-profit sector is developed based on the fifth type of gap, between customers' expectation of service and perceived service delivery, by Parasuraman *et al.* (1985).

1.8 LibQUAL+

The LibQUAL+ instrument (Cook, Heath, Thompson, & Thompson, 2001) was designed to measure users' opinion on the service quality of libraries (Garthwait & Richardson, 2008). Basically, this instrument measures the gap between customer expectation and experience. The LibQUAL+ instrument has been refined a number of times and the current model of LibQUAL+ covers 22 items, clustered in three dimensions:

Affect of services, Information control and *Library as place.* Respondents are requested to rate each of the 22 items three times on a nine-point scale: *the Minimum Level* (the lowest acceptable level of service), *the Desired Level* (the level of service respondents want) and *the Perceived Level* (the level of service respondents think the library is currently providing). For each item, the *Service Adequacy gap score* is calculated by subtracting the minimum score from the perceived score. The *Superiority Gap score* is calculated by subtracting the desired score from the perceived score (Bower and Dennis, 2007; Davis & Kyrillidou, 2007; Green and Kyrillidou, 2010; Green and Kyrillidou, 2011).

LibQUAL+ scores use *Zones of Tolerance* as a framework for interpreting results. The zone of tolerance for an item is defined as: the distance between 'minimally-acceptable' and 'desired' service levels (Cook, Heath, & Thompson, 2003) for that item. Thompson *et al.* (2007) used the zones of tolerance framework in an analysis of responses from to explore - how tolerant library users are with respect to the library services described in the 22 LibQUAL+ core items.

The 22-service quality core items of LibQUAL+ are arranged into above stated three dimensions as: *Affect of Service* (nine items), *Information Control* (eight items), and *Library as Place* (five items) (Thompson, Cook, & Kyrillidou, 2006; DeVellis, 2012). *Affect of Service* refers to the quality of services provided by library staff. *Library as Place* measures the quality of physical aspects of a university's library. Lastly, *Information Control* examines faculty and student access to academic information, along with the quality of those resources. Together, these three dimensions allow library staff to better understand service perceptions; this information is then used to address customer needs, meet demands and strategic decisions. So, this instrument plays a vital role for the assessment and strategic decision for the improvement of the concern library.

In addition to the 22 scaled items, LibQUAL+ has a box for comments. Each participating library may choose five additional items for inclusion in the institution's survey to address local interests. Another section includes eight additional survey questions about information literacy and general satisfaction. Beside demographic data, the comment box has become an important source of qualitative data (Thompson, Kyrillidou, & Cook, 2007).

During 1990s, the SERVQUAL instrument had been widely used in the private sector for about 10 years for measuring service quality; moreover, SERVQUAL's creators, Parasuraman, *et al.,* (1985), were members of the Texas A&M University faculty

(Thompson, 2007). The Texas A&M University group approached ARL (Association of Research Libraries) about working jointly to adapt SERVQUAL for libraries, and they collaborated to apply for a grant from the Fund for the Improvement of Post-Secondary Education (FIPSE). The FIPSE award funded the effort to develop a modified instrument, which was named LibQUAL+. In 2000, it was implemented across a group of 13 research libraries for the first time. Later, the instrument was modified and adapted with more colleges and public libraries (Thompson, 2007). Since then, LibQUAL+ has been used by a growing number and extending variety of libraries every year to assess user perceptions of service quality. During 2012, more than 1,200 libraries worldwide participated in LibQUAL+ surveys, collecting over 1.7 million library user responses (LibQUAL+, 2013).

1.9 Objective of the Study

The main objective of the present study is to assess the service quality of academic (university) libraries in Bangladesh with the focus on improvement of its services and strategic enhancement. The sub-objectives arising out of it are to:

- assess the service quality of academic libraries through globally accepted library assessment procedure and model.
- assess different level of the service quality of university libraries from the perspective of each different respondent user group.
- examine any collapsed/extended dimensions or patterns which is/are changed related to the predefined dimensions those determine the customers' evaluation of service quality of libraries.
- investigate the essential attributes that library authority should allocate the resource for better service.
- To see if there any significance differences of service quality by different subgroups by user and gender

1.10 Research Questions

This research seeks answers to the following questions:

1. Which attributes of service quality are meeting minimum expectations, or adequate service by the group user?
2. Which attributes of service quality equal, exceed or fall short user perception (meeting desired expectation), by the group user?

3. In what way do the users expect for excellent service quality from the university library, by the group user?
4. What is the status of local questions response?
5. What are the most essential attributes that librarians or library managers should allocate the resources to support for improving excellent service quality?
6. What are the underlying dimensions that determine the users' evaluation of service quality? How do the predefined dimensions fit in the model?
7. Are there any significant differences between male and female users by user group gender for overall service quality?
8. Are there any significant differences between the users by individual group of user for overall service quality?

1.11 Importance of the Study

This is the first time an effort has been made to use LibQUAL+ at any library setting in Bangladesh, although it is the most used tool globally for library service quality assessment. There have been several research attempts on service quality assessment using SERVQUAL in Bangladesh. However, , LibQUAL+ protocol probably gives most reliable and valid score of response in terms of it development, maturity and precision. For library service quality assessment in diversified context, LibQUAL+ has been widely recognized as an instrument for better identifying the service quality level. This current research tried to assess the service quality of academic libraries from users' perspective in Bangladesh. This investigation is not aimed at to identify which library is good or which one is bad rather it aims at discovering where to make improvements. From this study data, library administrators of the surveyed libraries can successfully able to identify best practices, analyze discrepancy, and effectively allocate resources where needed. LibQUAL+ gives library users a chance to tell library administrators/managers where their services need improvement so they can respond to and better manage their expectations, i.e. the essential attributes that library authority should allocate the resource for better service. Moreover, exploring the user expectation scenario, aggregate data and reports will allow the library administrators/managers to compare their own library's performance with other surveyed libraries. In addition, this research tried to reveal whether there are any significant differences of service quality by different demographic groups. This research hopes to be able to identify the areas for improvement of the library services for the library managers or librarians from customers' perspective.

1.12 Research Area

The universities in Bangladesh are mainly categorized into public, private and international universities. The public universities are autonomous and funded by the government whereas private universities are funded by non-governmental organizations. However, private universities are approved by University Grants Commission (UGC) of Bangladesh. The framing of Education Policy of the country is the responsibility of the government. The University Grants Commission of Bangladesh is the statutory apex body in the field of higher education in Bangladesh. The primary objectives of the UGC are to supervise, maintain, promote and coordinate university education. It is also responsible for maintaining standard and quality of all public and private universities in Bangladesh. UGC plays a significant role in higher education by maintaining and improving their academic standards so that they can produce graduates who satisfy the need of employers.

At present, there are 114 universities (34 public, 77 private and 3 international universities) in Bangladesh. Among private universities few were closed by UGC because of inability to fulfill the requirements of UGC, but those have been functioning under stay order from the court (UGC, 2013). However, libraries of six leading university of multiple disciplines (5 public and 1 private) were chosen for the present study:

Table 1.1

Studied University Libraries (names are appeared as year of establishment)

Types of University	**University Library**
Public University:	University of Dhaka Library (DUL)
	Rajshahi University Library (RUL)
	Bangladesh Agricultural University Library (BAUL)
	Bangladesh University of Engineering and Technology Library (BUETL)
	Bangabandhu Sheikh Mujib Medical University Library (BSMMUL)
Private University:	Independent University, Bangladesh Library (IUBL)

1.12.1 University of Dhaka

The University of Dhaka, established in 1921, is the oldest and largest university in Bangladesh. It is a very well established university with 13 faculties, 71 departments and 10 institutions. It is a multi-disciplinary university and is among the top universities in the

region (DU, 2013). Today, it is the largest public university in Bangladesh, with a student body of about 33,000 and a faculty of 1,960 (UGC, 2013). The main purpose of the University was to create new areas of knowledge and disseminate this knowledge to the society through its students. The University of Dhaka is dedicated to the advancement of learning, and is committed to promoting research in all fields of knowledge. The curriculum of University of Dhaka fosters the transformation processes of the individual students and the country as a whole through its educational and research facilities keeping up with demands of the day and up-to-date (DU, 2013). In 2011-2012, the University of Dhaka made it into the list of "Top World Universities" in the ranking carried out by the ranking agency Times Higher Education and Quacquarelli Symonds (THE–QS), UK. Out of over 30,000 universities around the world, DU was placed as 551 (QS World, 2013). It was identified by AsiaWeek as one of the top 100 Universities in Asia (TIME, 2013).

1.12.1.1 University of Dhaka Library. As a part of the Dhaka University, Dhaka University Library (DUL) started its operation on the 1 July, 1921. The University Library, housed in three separate buildings, is the largest in Bangladesh. The Library holds a collection of more than 680,000 volumes, including bound volumes of periodicals. In addition, it has a collection of over 30,000 manuscripts on various languages, 20,000 old and rare books and large number of Tracts and a large number of microfilms, microfiche and CDs. It has subscription of a wide variety of electronic journals and e-books through Bangladesh INASP-PERI Consortium (BIPC) and UGC Digital Library (UDL) Consortium. DUL is always a leader in utilizing information technology and current trends in library. Beside different facilities and services the library has its Online Public Access Catalogue and Institutional Repository. The official website of this university library is: http://www.library.du.ac.bd/

1.12.2 Rajshahi University

Rajshahi University (RU) was established in 1953 as second university of the then time. The university's 53 departments are organised into 9 faculties, and it is also home to 6 institutes. Like other general public universities, it is also a multi-disciplinary university. With 32,000 students and close to 1,100 academic staff, it is one of the largest universities in Bangladesh (UGC, 2013). In July 2013 ranking of “Webometrics Ranking of World Universities” by Cybermetrics Lab, the university positioned 3rd in Bangladesh (Webometrics, 2013). This ranking is basically based on Web contents, visibility and impact.

1.12.2.1 Rajshahi University Library. The central library was established in 1955. This modern library has a collection of more than 306,000 books (UGC, 2013). Other than different learning resources, Rajshahi University Library (RUL) has a huge range of digital subscriptions Bangladesh INASP-PERI Consortium. Students are found studying both in the reading rooms of the library and on the spacious corridors encircling the library on the ground floor. In addition to the central library, there are seminar libraries in all institutes, departments and residential halls (RU, 2014). The university offers a wide range of facilities and services along with OPAC. The official website of this university library is: http://ru.ac.bd/library/

1.12.3 Bangladesh Agricultural University

Bangladesh Agricultural University (BAU) was established as the only university of its kind in Bangladesh in 1961. BAU is the premier seat of higher agricultural education and research in the country. The main task of the university is to tone up the quality and standard of higher agricultural education and to produce first-rate agriculturists, agricultural scientists and researchers for shouldering the responsibilities of agricultural development of the country. BAU's unparalleled research in agriculture has made it very recognized university in whole ASIA continent. BAU has 6 faculties with 43 departments and 2 institutes. The number of current enrolled student is about 5300 and number of faculty is about 570 (UGC, 2013).

1.12.3. 1 Bangladesh Agricultural University Library. BAU central library has a collection of over 1,86,000 (UGC, 2013).volumes and 2,000 periodicals. The number of journals is 151. BAU library (BAUL) library has a wide range of agricultural related resources in both printed and digital format. Huge number of electronic resources can be access through Bangladesh INASP-PERI Consortium subscriptions. Besides, the central library, the Faculty of Agricultural Economics & Rural Sociology has its own library which contains reference books and journals in the field of Agricultural Economics (BAU, 2014). During writing of this thesis, the library link was found unreachable due to site upgradation. However, the IP address was: http://192.168.2.100/

1.12.4 Bangladesh University of Engineering and Technology

In 1876, established as Dhaka Survey School, that upgraded as college in 1947 and later as university in 1962. In the passage of times, e.g. after 1971 it renamed to Bangladesh University of Engineering and Technology (BUET). BUET as it is commonly

known as The Pride Of Bangladesh, is a Public Engineering University in Bangladesh. Currently, about 8,000 students studying in different programmes e.g. undergraduate, post graduate course along with diploma, MPhil and PhD courses in different discipline. The total number of teachers is about 620. Academic activities are undertaken by 17 departments under 5 faculties. 5 institutes are operating at BUET. It is the oldest Engineering institution in the region (UGC, 2013). In July 2013 ranking of "Webometrics Ranking of World Universities" by Cybermetrics Lab, the university positioned 2nd in Bangladesh (Webometrics, 2013). This ranking is basically based on Web contents, visibility and impact.

1.12.4.1 Bangladesh University of Engineering and Technology Library. The library has a collection of 1,42,913 items of information materials of which 1,25,066 and 17,847 are books and bound periodicals respectively and 141 titles are in the current subscription list of journals. It is a compact library with built in facilities to provide various services to its academic community. It has subscription of Electronic journals and e-books through Bangladesh INASP-PERI Consortium (BIPC). BUET Library (BUETL) authority considered the library as fully functional and automated. Beside the basic facilities across the BUETL, it also provides customized OPAC to its user (BUET Library, 2014). The official website of this university library is: http://www.buet.ac.bd/library

1.12.5 Bangabandhu Sheikh Mujib Medical University

Bangabandhu Sheikh Mujib Medical University (BSMMU) is an upgrade of the Institute of Postgraduate Medicine and Research (IPGMR). IPGMR was established in 1965. BSMMU is the first and only medical university in Bangladesh, established as university in 1998. It has an enviable reputation for providing high quality postgraduate education in different specialties. Besides education, the university plays the vital role of promoting research activities in various discipline of medicine. The university offers MD, PhD, MS, MPhil, MDS, Diploma and FCPS Courses. BSMMU comprises 36 departments under 4 faculties. At present the number of enrolled students is about 1400 with more than 450 teachers (UGC, 2013).

1.12.5.1 Bangabandhu Sheikh Mujib Medical University Library. BSMMU Central Library attempts to support the teaching and research activities of the University. It provides the necessary human resources and ICT to meet the requirements of the technology oriented age, and serve as the encouragement of academic research, both locally and internationally. It has also subscription of Electronic journals and e-books

through Bangladesh INASP-PERI Consortium. BSMMU Library also has a modern electronic library known as Digital Library for the researchers (BSMMU Library, 2014). The Library holds a collection of more than 25,000 volumes (UGC, 2013). The current website of this university library is: http://www.bsmmu.edu.bd/library.html

1.12.6 Independent University, Bangladesh

Independent University, Bangladesh (IUB) is one of the oldest and leading private universities in Bangladesh. The university was established in 1993 by the Private University Act, 1992 where academic excellence is a tradition, teaching a passion and lifelong learning a habit. IUB has 6 schools, 21 departments and 5 institutions and/or centers. Hence the teaching approach of our world class community of faculty is distinctive. The university has more than 4,000 undergraduate and graduate enrolled students and 250 teachers. IUB is distinctive in its emphasis on a broad based curriculum based on a North American model which is significantly at variance with traditional discipline specific curricula of other universities in the country and the region. The mission of IUB is to deliver a high quality education which will help foster thinking across disciplines, encourage tolerance and understanding of diverse cultural and social traditions, nurture essential values and prepare students for a fast changing world (IUB, 2014).

1.12.6.1 Independent University, Bangladesh Library. Since the inception of IUB in 1993, the library emphasizes services to its vibrant faculty and students, at the same time trying to increase their self-help and self-service capacities. The Library is the major contributor to the university's aim of developing independent learners and critical thinker. The Library's collection is geared to the information pertinent to its curriculum and services. IUB Library (IUBL) occupies four floors for stacking with variety of resources and services. The Library resources include a wide range of resources and services to meet the need of the users. Currently, IUBL has accessed to around 25,000 books, and about 3,000 audio-visual Materials. Beside Bangladesh INASP-PERI Consortium, IUBL has subscription to more databases for electronic resources like Emerald and JSTOR through UGC Digital Library (UDL) consortium. ProQuest is also a prestigious resource that accessible for a long time here. So, IUBL users can access a broad collection of online resources. IUB is premier to exploit latest IT to improve services and to operate (IUB Library, 2014). The official website of this university library is: http://www.lib.iub.edu.bd

1.12 Summary

This Chapter introduced the background and related contents of the study, outlined the conceptual framework for the study, identified the objective and statement of the problem, specified the research question, described the importance of the study, and elaborated a brief introduction to research area.

Chapter 2

Review of Related Literature

2.1 Introduction

Over the past two decades, both academics and practitioners in the field of Library and Information Science (LIS) have recognized the significance of assessing library services. Library assessment applications have been encouraged at all scales, very big amounts of data have been collected and published, and processes and results have been reported. However, it is surprising that little comprehensive analysis of the current library assessment tools has been performed. This chapter mainly reviews service quality assessment related issues, relevance of LibQUAL+ and places them within the context of the literature on service quality assessment. This chapter also evaluates the literature that is related to the current study. The essentials of the study for this portion provides content regarding elements of literature on quality, service quality, total quality management, evaluation of service quality and satisfaction, component of service quality, relevance of library customer regarding service expectation, different mentionable approaches of service quality model, standard library service quality assessing tool LibQUAL+, interpreting validity and reliability of LibQUAL+.

2.2 Defining Quality

Quality is often used synonymously with excellence and it is traditionally considered as the conformance of a product or service to its specifications, features and performance. Quality is part of the concept of Total Quality Management. The concept of quality management originated initially in the manufacturing sector in Japan and later moved into the USA and the UK. Since then, the theory of quality management has been growing fast. It has become a management philosophy in its own right and the philosophy is increasingly being applied in the service sector, including libraries. Quality satisfies three Fs, e.g. Fit, Form and Function. This is a conventional and established definition of quality which is basically confined to a product satisfying the need for the required dimensions, fitment, required form and aesthetics. Quality has been defined variedly in different contexts. Parasuraman, Zeithaml and Berry (1985) concluded quality as a function of the difference between the expected and perceived performance determined by several indicators where a difference between customer's expected and perceived service

is strained. Juran (1989) defined quality as fitness of use, need satisfying product features and free from deficiencies. Here a product or service is considered to be of good quality if it is fit enough for intended use, i.e. it can be used satisfactorily. A product or service need not to be perfect. In spite of other drawbacks, if the product or service satisfies the end use conditions, it is said to be good quality. Deming (1986) observed quality as to meet consumer needs by focusing on regular improvement in consistency and lessening in variation. Brophy & Coulling (1996) pointed that quality has a relation with meeting the needs and demand of customers. In this explanation, quality highlighted a link between the customer or consumer, the intention and the product or service being received. They have also stated that:

> *"...quality can be achieved in any organization setting with any product or service ...what is needed is a clear definition of what the service is intended to achieve, agreement with customers that this will meet their needs and consistent delivery."*

Poll & Boekhorst (2007) ricocheted the earlier points with their own observation with two implications, first, quality does not always mean 'highest grade' and secondly, quality for one group of customers may be absent in other group.

Nunan and Calvert (1992) pointed out that:

> *"The term quality defies any definition which will be universally accepted. When it is linked to performance, quality implies evaluation for comparative purposes; 'measures' of quality involve norms and standards and judgments of quality are assisted through use of norm or criterion referenced indicators. Where measurement focuses on the student as a product of education, quality is seen as 'value-based' by the process of education. When the emphasis is management of quality, attention focuses on strategies for achieving or improving quality."*

To articulate quality, Garvin (1988) identified transcendent, product-based, user-based, manufacturing-based and value-based approach. But not all approaches are applied equally though these are important attribute underlying customer value. ISO 8402 (1994) defines quality as 'The totality of features and characteristics of a product, process of service that bear on its ability to satisfy stated or implied needs'. In simpler words, one can say when a product, process or service complies with the requirements specified by the client has good quality.

On the other hand, ISO Standard 11620 (2008) Performance Indicators for Libraries depicted that "Quality is the totality of features and characteristics of a product

or services that bear on the library's ability to satisfy stated or implied needs". For a set of quality criteria and performance indicator for the library as a service providing organization this definition possess all (Derfect-Wolf, Gorski & Marcinek, 2005). The quality of libraries is connected with services, product as well as staff, facilities, space (Pindlowa, 2002). Mowat (1996) stated, "High quality staff can transform even the poorest library into an operation offering excellent service". Because libraries are service organizations, the quality in the context of a library is often treated as the quality of service.

2.3 Defining Service Quality

Service quality has become a key area of concentration during the past few decades to practitioners, managers and researchers due to its strong impact on service delivery output, business performance, lower costs, customer satisfaction, customer loyalty and profitability (Leonard & Sasser, 1982; Cronin & Taylor, 1992; Gammie, 1992; Hallowell, 1996; Chang & Chen, 1998; Gummesson, 1998; Lasser, *et al.*, 2000; Silvestro & Cross, 2000; Newman, 2001; Sureshchander, *et al.*, 2002; Guru, 2003). Service quality has roots in the total quality management (TQM) movement. The importance on service improvement is coupled closely with the concept of organizational performance. There is a long tradition of assessment or evaluation of service performance historically which is shaping up day by day. Besides, there has been much discussion as to what represent service quality and how its actions can be operationalized in various service industries, yet no consensus has been reached (Chowdary & Prakash, 2007). In addition, due to the variety of discipline and multiple context of service being provided not a single complete definition of service quality has been settled.

The Balanced Scorecard (BSC) (Kaplan & Norton, 1992) that inspects the organization from four viewpoints, i.e. User, Finance, Internal Processes, and Learning and the Future. The BSC presents another way for viewing organizational performance with a separate stress on the user and the way the user experiences the quality of the services delivered (Self, 2003). These efforts are in the recent years having shaped the ways in which libraries are unfolding and assessing organizational performance. Lancaster (1993) documented extensively about library evaluation which has a rich tradition. Lancaster afforded to offer a theoretical framework of evaluation that links evaluation to the five laws of Ranganathan: "(1) books are for use, (2) every reader his book, (3) every book its reader, (4) save the time of the user, and (5) the library is a growing organism"

(Lancaster & Mehrotra, 1982). Since the 1990s, all five laws place a strong importance on the user approaches that have dominated the evaluation of library service quality.

Libraries collect and prepare statistical report about their collections, funds, and staff for decades. These statistics have, though, concentrated basically on finances, the resources purchased with those finances, and workloads. However, an information gap remains. These traditional statistics lack relevance. Most of the traditional statistics do not measure the library's performance in terms of elements important to the users. They do not really describe performance or indicate whether service is good, indifferent, or bad. Even worse, they do not indicate any action that the administration or any team could or should take to improve performance (Hernon, 1998). It is important to measure the performance of the organization from the perspective of its customer or user.

The traditional measure of business success is Profit, which accountants call Return of Investment (ROI). But these days ROI is not the only way to measure the business success, or performance of the business. Many businesses have adopted the concept of Balanced Scoreboard, which mentioned earlier, is a matrix of measurement or performance from the perspectives of the customers. This scoreboard asks questions about four key areas common to most organizations (Kaplan, 1992):

1. How do customers see us?
2. How do we look to decision makes and the community? (financial perspective)
3. What must we excel at? (this question looks to the internal working of the organization.)
4. Can we continue to improve and create value?

The balanced scoreboard is essentially a tool for strategic management. Implementing the balanced scoreboard requires that the administration answer the four preceding questions in terms of the present situation and desired outcomes for the future. The next step is to define the factors important for success and then to identify measures that indicate success. In case of a library, the balanced scoreboard may not work but its principle have merit that they encompass a wider variety of factors rather than the traditional statistical reports for a library.

Service quality definition hold that this is the result of the comparison that customers make between their expectations about a service and their perception of the way the service has been performed (Lewis & Booms, 1983; Lehtinen & Lehtinen, 1982;

Grönroos, 1984; Parasuraman, *et al.*, 1985, 1988, 1994). This concept of service quality is most cited and widely accepted. Schneider & White (2004) summarized the adoption of above service quality concept for any service regarding the characteristics of types of services to be assessed for quality in terms of expectations and performance. This are-

i) *Relative Intangibility* – pure services have no physical manifestation, they are essentially processes that are experiences.

ii) *Relative Inseparability* – pure services are produced by the organization and consumed by the consumer at the same time

iii) *Relative heterogeneity* – interaction between service personnel and customers can never be identical

However, library and its services can be viewed and assessed from different viewpoints with the relevant scope. Viewpoints normally referred to library and information science include input, output, outcomes, performance measures, effectiveness, and efficiency. All these terms are confusing rather than clarify the way to evaluate and cope with the results obtained from an assessment. These terms are confusing as for past few decades authors and researchers within and outside LIS have defined and used these terms in different ways.

The recipients of library service are library user. Faculty members and students are the primary user for the academic library. Some librarians equate the customers or the users with the principle that "customer is always right." Actually users are not always right to their judgment because sometime their opinions or expectations are unrealistic and unreasonable. However, the users do have right to express their opinion. In case of a library, the users should be conscious of the limit of their expectations. They should not expect such kind of services which is not offered by the library or is only rarely provided. The authority should tell the users what sort of services they would offer or which level of services or how much they will be provided. The users should aware about the excellence of services or quality of the services that provided by the library.

Quality is the basic philosophy and requirement of library service and all libraries strive to deliver the highest quality of service. The excellence of quality service is one that fully meets the expectations and requirements of the users. If a library provides appropriate information to the right user at the right time and in the required form, then it could be argued to be maintaining quality. In some way, quality library services mean

satisfying the query of each and every user accurately, exhaustively and expeditiously (Sharma, 2001). The rapid development of information technology, tremendous speed of socio-technical development and the changed needs of users have all added to the expectations of a service organization. It is evident that management skills must match these demands on and threats to library and information services. The application of quality management in libraries should establish a culture of never ending improvement of quality of products and services. Its implementation in libraries improves the image of the library staff and helps in public relations and marketing (Rajan & Ravi, 2001). Service quality has been defined from at least four perspectives:

1. *Excellence***:** State of the quality of excelling. It is superiority, or the state of being good to a high degree. Excellence is often externally defined.
2. *Value***:** It incorporates multiple attributes, but quality and value are different constructs--one the perception of meeting or exceeding expectations and the other stressing benefit to the recipient.
3. *Conformance to specifications***:** It facilitates precise measurement, but users of a service may not know or care about internal specifications.
4. *Meeting and/or exceeding expectations*: This definition is all-encompassing and applies across service industries, but expectations change and may be shaped by experiences with other service providers.

The last perspective has been concentrated by the most marketing and library and information science researchers (Hernon & Nitecki, 2001). According to Calvert (2001), service quality can be configured as follows:

The customer:

- past experience of the customers;
- word-of-mouth from other customers;
- personal needs of the customer; and
- national culture of the customer

The service provider:

- communications (direct and indirect) about what the customer can expect.

Competitors:

- service provided by other providers that acts as a benchmark.

Library service quality adopted the thoughts of librarians by focusing directly on the library user. Different research reports on the changing information-seeking user behavior patterns by Online Computer Library Center (OCLC) showed that more frequent library users are students and they are more aware about the library an information resources than other survey respondents. They further demonstrated that the more educated the respondents, the more they continue to use libraries day by day. (OCLC, 2005). Berry, Zeithaml & Parasuraman (1990) stated that customers are the exclusive evaluator of the service quality. Seay, Seaman & Cohen (1996) examined that service quality is determined by the consumers of the service and not the provider. The librarians are the knowledge custodians; the libraries are providing a variety of services and resource where the users have different choices to get these sorts of services of their interests. Though this is different from any service organization of the tasks of the librarians as well service offered by the libraries where there is no scope to ignore the users. Service quality is a concept and discipline of service marketing and adopted in the discipline of library and information services but, the indicators to be used to reveal library services quality are still not well accepted or well defined, as in other industries. Hernon & Altman (1996) stressed that for libraries, service quality applies to resources (information content); organization (service environment and resource delivery) and service delivered by staff. Evaluation of library service quality is always indicating the assessment of library service quality.

2.4 Evaluation of Service Quality and Satisfaction

Customer satisfaction assessment has been practiced for a long time in the commercial sector. Evaluation of service quality has its pedigree in customer satisfaction assessment. The concept of customer satisfaction has been changed several times in last few decades. For the progress or development of the company or organization customer satisfaction and perception of quality were indirectly included as a mean survey instruments. This assessment was mainly the index of customer attitude which was measured by product performance and feature importance. The current focus of satisfaction assessment can be marked out in last three decades when the total quality movement captured the attention of businesses in Western economies and businesses recognized the need for a model that addressed the fundamental shift to a service-based, rather than product-based, economy. There was no longer a specific, tangible product to

assess, and businesses turned to customer perceptions of whether their expectations were being met or exceeded (Crosby, 1993).

Comm & Mathaisel (2000) and Andaleeb & Simmonds (1998) in different studies pointed up their confusion over service quality with satisfaction. Various authors have also pointed service quality as proceeding to satisfaction; service quality and satisfaction are interrelated or discrete concepts (Anderson & Fornell, 1994; Bolton & Drew, 1991; Cronin & Taylor, 1992; Taylor & Cronin, 1994; Woodside & Wilson, 1994). White & Abels (1995) mentioned that customer satisfaction and service quality relationship is an ongoing question in service marketing. Both service quality and satisfaction can be an end in themselves; each is worthy of examination as a framework for evaluating library services from a customer's perspective. Service quality is an evaluation of specific attributes, and this judgment is cognitive. However, satisfaction focuses on a specific transaction or, in the case of overall satisfaction, it is a cumulative judgment based on collective encounters with a service provider over time. Satisfaction judgments are more affective and emotional reactions to an experience or collection of experiences: "Simply put, satisfaction is a sense of contentment that arises from an actual experience in relation to an expected experience" (Hernon & Whitman, 2001). Hernon & Nitecki (2001) explored that service quality serves as a planning and development tool, since it as a way of assessment investigates specific statements on which the library looks for customer input. Opinion on satisfaction, alternatively, is likely to be comprehensive in the type of questions enquired. Satisfaction highlights less on detailed statements and relies more on open-ended questions, in contrast to the service quality. The scope and the application of satisfaction is narrow where service quality deals with is much wider areas. In satisfaction studies, there can be a questioning of how customers rate the library in a few specific areas, though the list is much shorter and more general than found in a service quality questionnaire. The intention of satisfaction studies is to identify if some general areas require scrutiny, whereas service quality studies offer data to examine specific problem areas for improvement.

2.5 What and How to Measure Component of Service Quality?

A library and its services are always visible to its customers, which can be accessed from a variety of viewpoints. When referring to inputs, outputs and performance the categorization measures cannot be strictly applied. Childers & Van House (1993) analyzed effectiveness with a large scope and mentioned about goodness, accomplishing

success, and the quality performance". They defined effectiveness as "impact on the consumer or user and efficiency as the economy with which effect is achieved". When assessing effectiveness of an organization, they suggested the following significant questions:

- To what extent does the organization achieve its goals (input, process, output, or outcome goals)?
- To what extent is the organization a healthy operating unit?
- To what extent can the organization capture from the external environment the resources needed to survive or thrive?
- To what extent are the various stakeholders' priorities met? (Childers & Van House, 1993).

McDonald and Micikas (1994) stated that "no conceptualization of an effective organization is comprehensive". They delineated effectiveness as "successful organizational transactions," which they explicated, "include the interaction among all activities and people in the library, as well as those transactions between the library and its environment". Like Childers and Van House, McDonald and Micikas also advocated for multiple component approach to assessment. The same is applied for a library for the assessment as library serves with different services rather than a single. Although there are multiple perspectives and approaches to assessment, no single one will perform everything that the librarians would like. Beside, research in such areas as service quality and satisfaction, calls for new concepts and determination about the priorities for assessment. All assessment is composed of three parts:

1. The things to be measured.
2. The means by which the measurement is taken.
3. A judgment about the sufficiency or goodness of the thing being measured.

According to Lancaster (1988), "an evaluation is performed not as an intellectual exercise but to gather data useful in problem solving or decision making activities".

It has been stated that almost everything is assessable and measurable. Rossi & Freeman (1993) observed, "…systematic evaluations of both existing and new…programs are now common place". Librarian can assess or evaluate many things about they can make judgments relevant to planning, decision making, accountability, and documenting their activities. They can examine the following elements:

- *Resources* – personnel, collections, equipment, services, etc.
- *Physical environment* – lighting, temperature, humidity, noise level, seating, cleanliness, personal safety, etc.
- *Team or unit* – cataloguing team, reference unit, systems unit, etc.
- *Functions* – Identification, selection, acquisition, organization, preparation, storage, interpretation, utilization and dissemination.
- *Process* – preparation functions like, placing call number on the item, putting on a plastic jacket, pasting book slip/book card, inserting barcode, etc.
- *Customers* – customer attributes, such as age, gender, occupation, status, location of residency, preference in materials or services, etc.
- *Community* – data about community members such as their demographic characteristics, respective attitude toward or perception of library, etc.
- *Use* – use of Online Public Access Catalog (OPAC), electronic resources, equipment, furniture, etc.
- *Service* – circulation service, reader's service, reference service, information service, technical service, etc.
- *Consequence* – the focus is on what happens to customers as a result of interaction with the library.
- *Impact* – impact relates to mission, such as for academic library, effect on teaching, learning and research, etc. (Evans & Heft, 1995)

Rossi & Freeman (1993) also stated that most of the elements identified are somewhat interrelated. In particular, resources, or the lack of them, influence many of the elements. What library managers want to know about any of the elements determines how the measurement should be made. Measurement, a tool in the assessment or evaluation process, "…is the collection and analysis of objective data describing library performance on which evaluating judgments can be based. Measurement results are not in themselves '*good*' or '*bad*'; they simply describe what is" (Van House, Weil & McClure, 1990).

On the other hand, it may be simply stated, there are at least eleven questions about which assessment can be made. These eleven questions are outlined with different '*hows'* of assessment with the relation of input, output, performance and outcome measures (Hernon & Altman, 1998). These questions may be applied individually or in groups. In fact, few questions are related to other questions and results are obtained calculating other questions interrelated (Marshall, 1993).

1. *How much?* – the amount designated or spent for personnel, collection, purchased services, equipments etc. Also be used to evaluate the physical facilities such as, lighting, temperature, humidity, noise level.
2. *How many?* – related to workload, such as, number of items processed in cataloging, classifying, shelving, checking in. Another aspect may be incidences, e.g. building security, theft of customer property.
3. *How economical?* – related to cost; here thrift is the focus.
4. *How prompt?* – assesses speed in completing process of functions, e.g. average times for the completion of reference questions, interlibrary loans, cataloguing of materials, waiting time at a circulation or reference desk.
5. *How accurate?* – OPAC records, answers of reference questions, database content and its description, shelving of materials, the digitization of materials, the outsourcing of services.
6. *How responsive?* – associated with how well the library handles customers questions and problems. Helpfulness is another indication of responsiveness.
7. *How well?* – connected to how successfully a function or a service accomplishes its stated objectives and further library goals by the library staffs. Users may characterize in terms of how promptly, how courteously and how accurately their requests are handled.
8. *How valuable?* – related to measuring the experience against the time, effort, or money of library visit by the user which may inclusion of willingness to pay for the service.
9. *How reliable?* – related to dependability and consistency of library's service provides in term of physical and intellectual access of items.
10. *How courteous?* – beside the service actually delivered, this is linked to the transaction between customer and service organization where staff members are involved in transaction.
11. *How satisfied?* – this is related to the match between expectation and service delivered. Expectation is confined to those that the library is prepared to meet.

Service quality addresses a number of these questions. Undoubtedly, it is the decision for individual libraries how significant service quality and user satisfaction are in relation to their other evaluation activities. It may be that library authority or stakeholders (e.g., accrediting bodies) shape a library's approach to accountability and somewhat to

planning. However, customers should be neither ignored nor slighted; their opinions are important and worthy of hearing (Hernon & Nitecki, 2001).

2.6 Is Customer or User Always Accurate?

It has been said that customers are the key and that quality is what the customer remarks about it. Even using the word 'customer' seems to diminish the role of the professional, according to some librarians (Wang, 2006). They need to understand that library evaluation is a tool primarily for library managers, and secondarily for the stakeholders, to assist in making better decisions that improve service quality. It does not mean that the results of evaluation drive all decisions in the library and that the customer is accurate all the time. Butcher (1993) described that

> *"The value of the surveys was not to have the customer declare how the library should be run, but rather to help the library determine how closely its views of the wants of the users reflected the reality of what the library provided."*

Kinnell (1995) also stated this in fairly similar terms, saying that quality is determined by the customer rather than by the provider, but the library as provider has to set down standards of service first. Once the standards have been set, however, it is only the customers who can say how good the service is. Library managers then try to meet customer expectations. Kinnell's proposed method for achieving quality is based upon the TQM model. The first stage in her method is *planning*, in which the library sets it goals for the service. This will include identifying the target market sectors and their information needs. The elements of the service and the processes it will use are established at this point, and control mechanisms to monitor the processes are established. The second stage is *quality control* in which the actual monitoring is done using measures that are designed to obtain information needed to assess how well the service is performing. The third stage is *quality improvement*, which is largely a process for improving different elements of the service through projects and programmes (Kinnell, 1995).

Based upon what the customers say the organization has the chance to change its processes to bring service provision into closer alignment to customer expectations. This is standard in TQM, in which it is called 'continuous improvement' and is necessary because customers' needs and expectations are changing all the time (Wang, 2006). It is Kinnell's second stage that is closest to the focus of this research for it is there that most of the evaluation and measurement occurs, and it can usually be done with output measures

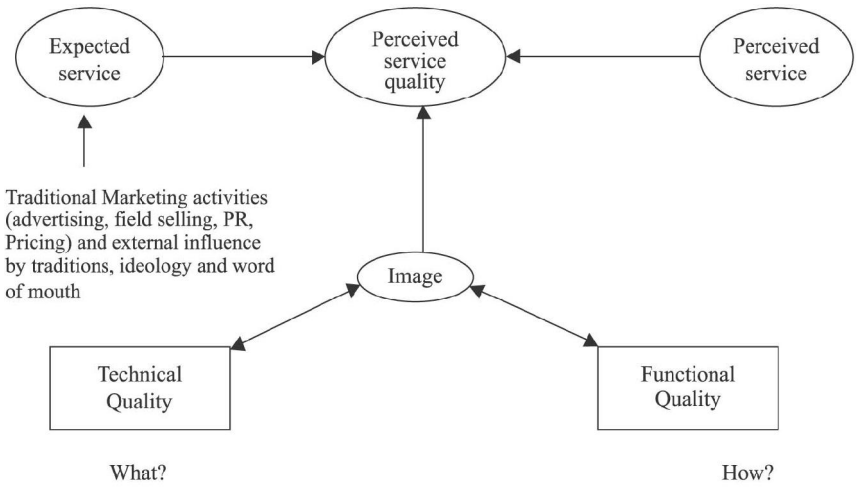
(Rowley, 2005). However, the first stage is an essential indication for it is there that the goals for the service, and the identification of key customer position, is made. If that is not done then it is hard to be sure that the organization or library is doing what it should be doing, and that is where the measurement of quality can lead to resources being used for the purposes of lower concern.

2.7 Service Quality Assessment Approach

In the literature, different conceptual and empirical approaches of service quality are observed. Among them following models are illustrated –

2.7.1 Technical and Functional Quality Model (Grönroos, 1984). Grönroos (1982, 1984), based his definition on technical quality (the outcome or *'what'*) and functional quality (the process or *'how'*). The functional quality represents how the service is delivered; in other words it focuses on the interaction that takes place during the service delivery. Whereas, the technical quality refers to what the customer receives in the service encounter. In order to compete successfully an organization must have an understanding of consumer perception of the quality and the way service quality is influenced. Managing perceived service quality means that the organization has to match the expected service and perceived service to each other so that consumer satisfaction is achieved. The author identified three components of service quality, namely:

i) Technical quality; ii) Functional quality; and iii) Image (see Figure 2.1)



Source: Grönroos (1984)
Figure 2.1 Grönroos Model

i) Technical quality is the quality of what consumer actually receives as a result

of his/her interaction with the service organization and is important to him/her and to his/her evaluation of the quality of service.

ii) Functional quality is how he/she gets the technical outcome. This is important to him and to his/her views of service he/she has received.

iii) Image is very important to service organization and this can be expected to build up mainly by technical and functional quality of service including the other factors (tradition, ideology, word of mouth, pricing and public relations).

2.7.2 GAP Model of Service Quality (Parasuraman, et al., 1985). Parasuraman, *et al.* (1985) proposed that service quality is a function of the differences between expectation and performance along the quality dimensions. It was consisted of twenty-two pairs of statements, the first of which measure the expectations of a service provider's customers by asking each respondent to rate, on a seven-point scale, how essential each item is for an excellent service provider to deliver. The second set to twenty-two identical statements ascertains the respondent's perceptions to the level of service given by the institution or organization examined. For each pair of statements, the difference between the ranked perception and the ranked expectation is calculated; the average of the gap scores is the overall quality score (Nitecki & Hernon, 2000).

They developed a service quality model (Figure 2) based on gap analysis. The various gaps visualized in the model are:

Gap 1: The difference between customers' expectations and management's perceptions of these expectations;

Gap 2: The difference between management's perceptions of customers' expectations and service quality specifications;

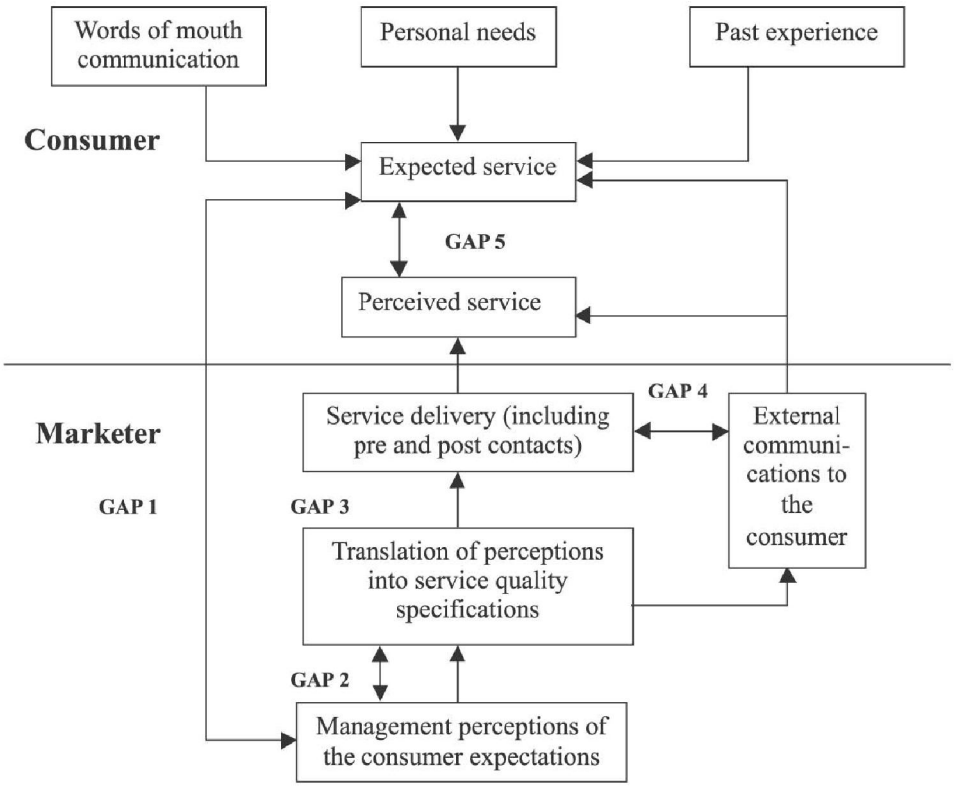
Gap 3: The difference between service quality specifications and actual service delivery;

Gap 4: The difference between actual service delivery and what is communicated to customers about it; and

Gap 5: The difference between Customers' expected services and perceived service delivered.

The first four gaps are the major approach to the service quality discrepancy that customers may perceive. The fifth gap is the base of a customer-oriented explanation of

service quality: the difference between customers' expectations for excellence, and their perceptions of actual service delivered. This discrepancy is the conceptual basis for this model (Nitecki, 1996). The narrower the gap is, the better service quality is provided. In case of libraries, regarding this model, library managers have to reduce the fifth gap as smallest as they can in order to provide excellent service to their customers.



Source: Parasuraman, *et al.* (1985)

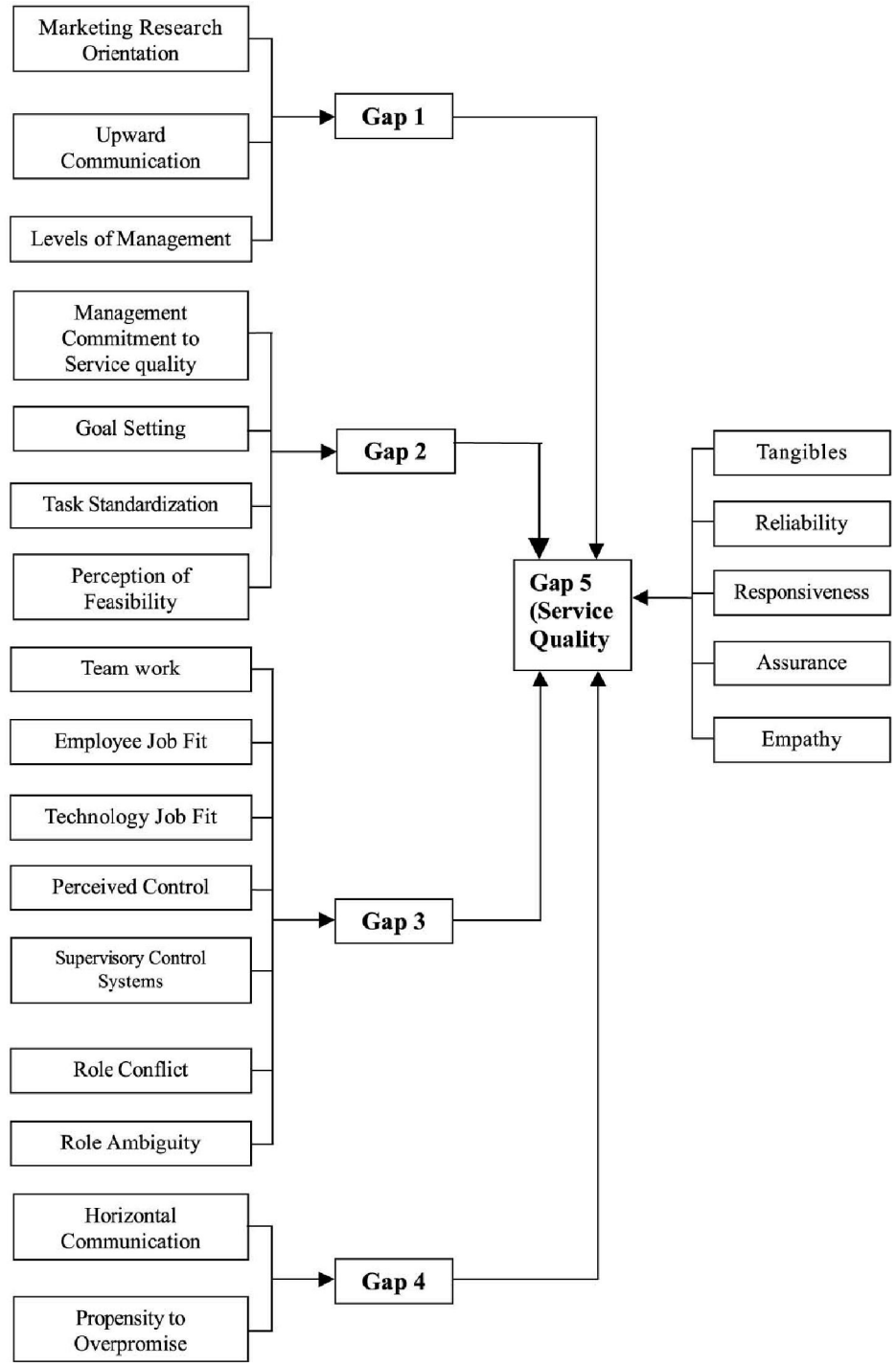
Figure 2.2 Gap Analysis Model

According to this model, the service quality is a function of perception and expectations and can be modeled as:

$$SQ = \Sigma_{j=1}^{k}(P_{ij} - E_{ij})$$

where: SQ = overall service quality; k = number of attributes. P_{ij} = Performance perception of stimulus i with respect to attribute j. E_{ij} = Service quality expectation for attribute j that is the relevant norm for stimulus i.

This exploratory research was refined with their subsequent scale named SERVQUAL for measuring customers' perceptions of service quality (Parasuraman, *et al.*, 1988). At this point the original ten dimensions of service quality collapsed in to five dimensions: **R**eliability, **A**ssurance (communication, competence, credibility, courtesy, and security), **T**angibles, **E**mpathy and **R**esponsiveness which capture access and understanding the customers. This is better known as the R.A.T.E.R. dimensions (Table 2.1). Later Parasuraman, Zeithaml, & Berry (1991) revised SERVQUAL by replacing "should" word by "would" and also ask respondents to rate statements from three contexts (minimum service expectations, desired service expectations, and the perception of service performance). In 1994, the scale was extended to a 9 point *Likert scale* with an addition of the 'no opinion' measure and by reducing the total number of items to 21, but five dimensional structure remaining the same. In addition to this empirical research, the authors characterized and further delineated the four gaps identified in their research of 1985. This led to extended service quality model (Figure 3). According to this extended model most factors involve communication and control process implemented in organizations to manage employees. McAlexander, Kaldenberg, and Koenig (1994) stated that the perception scores outperformed the gap scores in predictive power as agreed by Parasuraman, Zeithaml, and Berry (1994).



Source: Zeithamal, *et al.,* (1988)

Figure 2.3 Extended Model of Service Quality

This model has been vigorously tested and improved upon (Parasuraman, *et al.*, 1985, 1988, 1990, 1991, 1993, 1994, 2004; Zeithaml, *et al.*, 1996; Zeithaml, Parasuraman & Malhotra, 2002; Parasuraman, *et al.*, 2005).

Table 2.1
SERVQUAL R.A.T.E.R. Dimensions

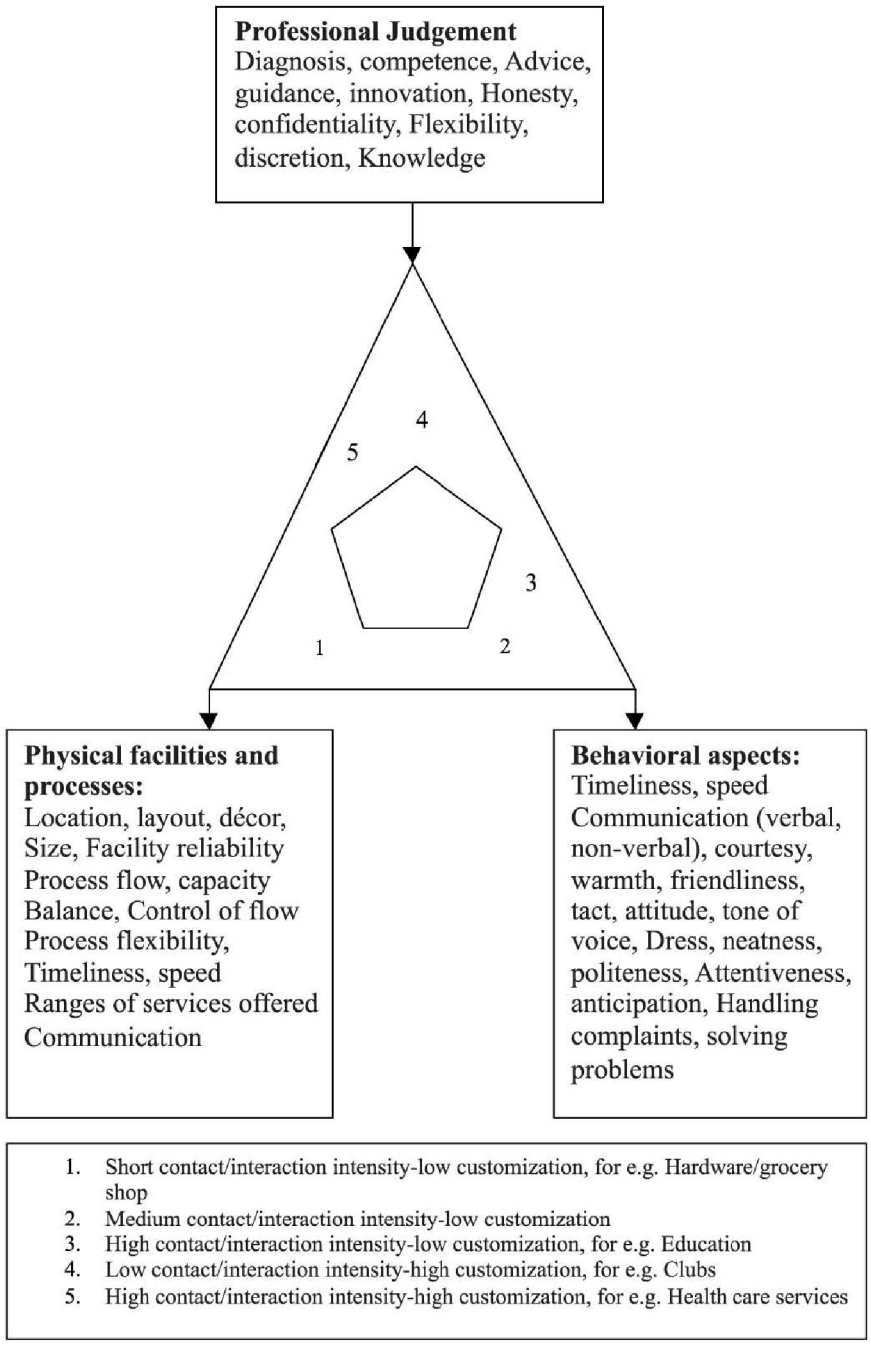
SQ Dimensions	Definition
Reliability	ability to perform the promised service dependably and accurately
Assurance	knowledge and courtesy of employees and their ability to inspire trust and confidence
Tangibles	the appearance of physical facilities, equipment, personnel, and communication material
Empathy	the caring, individualized attention that a firm provides its customers
Responsiveness	willingness to help customers and provide prompt service

These proposed five dimensions of service quality that are currently widely accepted and used over different service industries are.

The tool, SERVQUAL, has been since extensively accepted and used to assess service quality in selling (Barnes & Vidgen, 2002), health care (Carman, 1990; Yang, Peterson & Cai, 2003; Kilbourne, *et al.,* 2005), banking (Zhou, Zhang, and Xu, 2002; Al-Hawari, Hartley & Ward, 2005), education (Ruby, 1998; Tan & Kek, 2004), information systems (Kettinger, Lee & Lee, 1995; Jiang, Klein, & Carr, 2002), library (Edwards & Browne, 1995; Nitecki, 1996; Cook & Thompson, 2001; Landrum & Prybutok, 2004, Ahmed & Shoeb, 2009; Shoeb & Ahmed, 2010, and other areas of service across many countries.

2.7.3 Attribute Service Quality Model (Haywood-Farmer, 1988). This representation (Figure 2.4) described that a service organization has "high quality" if it meets customer fondness and expectations always. According to this, the separation of attributes into different groups is the first step towards the development of a service quality model. Generally, services have three basic attributes: physical facilities and processes; people's behavior; and professional judgment. Each attribute consists of several factors.

In this model, each set of attributes forms an apex of the triangle as shown in Figure 2.4. Too much concentration on any one of these elements to the exclusion of other may be appropriate it may lead to disaster for e.g. too much emphasis on procedures may give an impression to the customer that he will be processed as per his sequence. The author tried to map different type of service settings as per degree of contact and interaction, degree of labour intensity and degree of service customization in to this model.

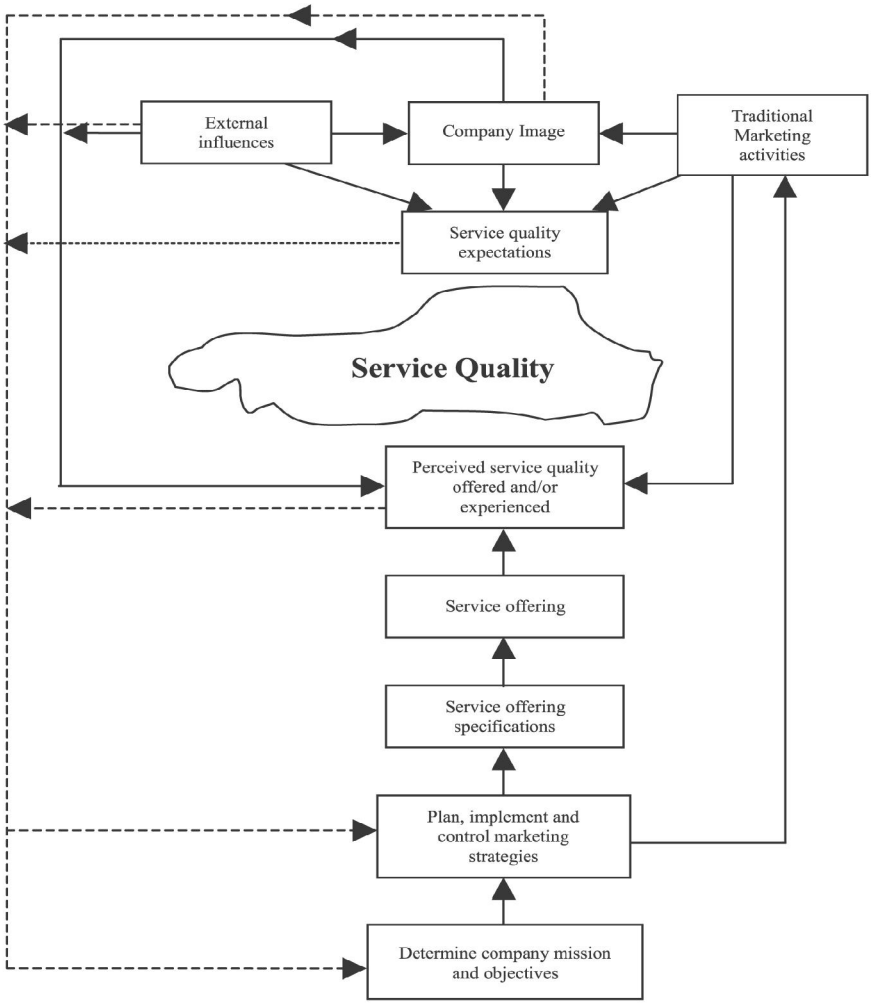


Source: Haywood-Farmer (1988)

Figure 2.4 Attribute Service Quality Model

For example, services, which are low in terms of customers' contact customization and labor intensity (utilities, transportation of goods etc.), are closer to physical facility and process attribute of the model. Thus, the model suggests that special care at this instant must be taken to make sure that equipment is reliable and easy for customer to use.

2.7.4 Synthesized Model of Service Quality (Brogowicz, et al., 1990). When a customer has not yet experienced the service but learned through word of mouth, advertising or through other media communications, a service quality gap may exist even. Therefore there is a need to integrate potential customers' perceptions of service quality offered as well as actual customers' perceptions of service quality experienced. This model attempts to incorporate traditional managerial framework, service design and operations and marketing activities. The purpose of this model is to identify the dimensions associated with service quality in a traditional managerial framework of planning, implementation and control. The synthesized model of service quality (Figure 2.5) considers three factors, as follows, company image, external influences and traditional marketing activities as the factors influencing technical and functional quality expectations.



Source: Brogowicz, *et al.* (1990)

Figure 2.5 Synthesized Model of Service Quality

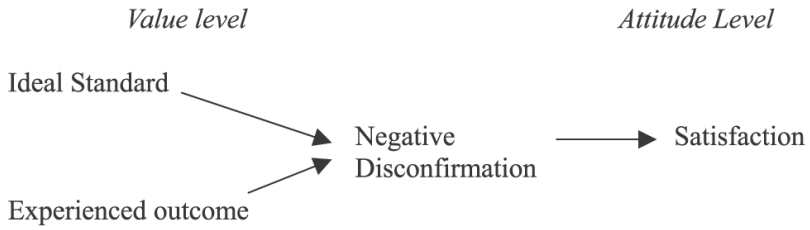
2.7.5 Performance Only Model (Cronin and Taylor, 1992). Cronin and Taylor (1992) examined the development and assessment of service quality and its relationship with consumer satisfaction and procurement intentions. They compared computed difference scores with perception to conclude that perceptions only are better predictor of service quality. They argued on the framework of Parasuraman, *et al.,* (1985), with respect to conceptualization and measurement of service quality and developed performance only measurement of service quality called SERVPERF by illustrating that service quality is a form of consumer attitude and the performance only measure of service quality is an enhanced means of measuring service quality. They argued that SERVQUAL confounds satisfaction and attitude. They stated that service quality can be conceptualized as "similar to an attitude", and can be operationalized by the adequacy-importance model. In particular, they maintained that Performance instead of "Performance-Expectation" determines service quality. This instrument includes the same 22 items in SERVQUAL, but with the perception only scores, excluding the scores of expectation. Studies have found SERVPREF to be able to explain more variance in overall service quality than SERVQUAL (Lee, Lee & Yoo, 2000) and accomplished of providing a more convergent and discriminant valid justification of service quality build (Jain & Gupta, 2004). Parasuraman, *et al.,* (1994b) observed that "…difference scores are by and large as sound as their direct measure counterparts, except in terms of predictive power ...". Several studies have adopted the performance-only measure by tested empirically (Dabholkar, 1996; Sureshchander, Chanrasekharan, and Anantharam, 2001; Janda, Trocchia & Gwinner, 2002; Gounaris, 2005; Parasuraman, *et al.*, 2005; Caro & Gracia, 2007; Wilkins, Merrilees, and Herington, 2007). Observation by Cook (2001) on service quality in academic research libraries also concluded that a perceived-only measure is also able to maintain the reliability of the perceived score.

Service quality is evaluated by perceptions only without expectations and without importance weights according to the formula:

$$SQ = \Sigma_{j=1}^{k} P_{ij}$$

where: SQ = overall service quality; k = the number of attributes; P_{ij} = performance perception of stimulus i with respect to attribute j.

2.7.6 Ideal Value Model of Service Quality (Mattsson, 1992). Expectation is treated as belief about having desired attributes as the standard for evaluation in most of the studies on service quality. On the other hand, this matter necessitates to be examined in the light of other standards such as experience based, ideal, minimum tolerable and desirable. The model argues for value approach to service quality, modeling it as an outcome of satisfaction process.



Source: Mattsson (1992)

Figure 2.6 Value and Attitude in Negative Disconfirmation

This value-based model of service quality proposes the use of a perceived ideal standard against which the experience is compared. Figure 6 shows that implicit negative disconfirmation on a pre-conscious value level, is then hypothesized to determine satisfaction on a "higher" approach level. This negative disconfirmation is the major determinant of customer satisfaction, more attention should be given to cognitive processes by which customers' service concepts are formed and changed.

2.7.7 Evaluated Performance and Normed Quality Model (Teas, 1993). Teas (1993) depicted that the conventional disconfirmation model has conceptual, theoretical and measurement problems. He criticized the subsequent issues in the measurement of service quality, i.e. SERVQUAL (Parasuraman, *et al.*, 1988) as: conceptual definition ambiguity;

i) theoretical justification of expectations in the measurement of service quality;

ii) the usefulness of the probability specification in the evaluated performance (EP) measurement; and

iii) the link between service quality and consumer satisfaction/dissatisfaction.

The author proposed the following two frameworks for service quality.

a. Evaluated performance (EP) framework: with the assumption that an individual evaluates object *i* with perceived certainty and that the object *I* has a constant amount of

each attribute also with Minkowski space parameter equals to unity. The perceived quality is modeled as:

$$Q_i = -1[\Sigma_{j=1}^{m} w_j|(A_{jk} - I_j)|]$$

where: Q_i = The individual's perceived quality of object *i*. w_j = Importance of attribute *j* as a determinant of perceived quality. A_{ij} = Individual's perceived amount of attribute *j* possessed by object *i*. I_j = The ideal amount of attribute *j* as conceptualized in classical ideal point attitudinal models. *m* = Number of attributes. With an assumption that perceived ability of the product to deliver satisfaction can be conceptualized as the product's relative congruence with the consumer's ideal product features.

b. Normed quality model: if the object *i* is defined as the excellence norm that is the focus of revised SERVQUAL concept, the above equations can be used to define the perceived quality of excellence norm Q_e in terms of the similarity between the excellence norm and the ideal object with respect to "*m*" attributes. The quality of another object *i*, Q_i relative to the quality of excellence norm then normed quality (*NQ*) is:

$$NQ = [Q_i - Q_e]$$

NQ = Normed quality index for object *i*. Q_e = The individual's perceived quality of the excellence norm object.

For infinite ideal points, normed quality is:

$$NQ = \sum_{j=1}^{m} w_j(A_{ij} - A_{ej})$$

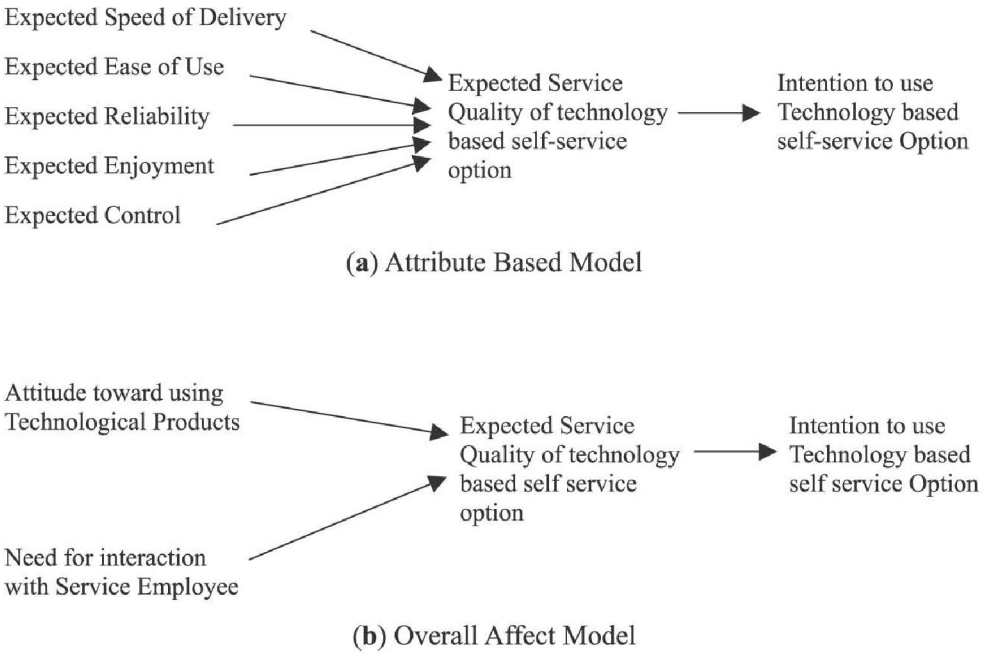
A_{ej} = individual's perceived amount of attribute "*j*" possessed by the excellence norm "*e*".

2.7.8 Attribute and Overall Affect Model (Dabholkar, 1996). In this model, the author anticipated two different approaches of service quality for technology-based self-service options. Now a day, self-service is becoming accepted owing to high cost of labour in service deliveries.

The attribute model (Figure 2.7(a)) is based on what customers would expect from such option. It is based on cognitive approach to decision making, where customers would use a compensatory process to appraise attributes associated with the technology based self service option in order to form expectations of service quality. The overall affect

model (Figure 2.7(b)) is based on the customers' feeling towards the use of technology. It is based on an effective approach to decision making where consumers would use overall predilection to form expectation self-service quality for a technology-based self-service option.

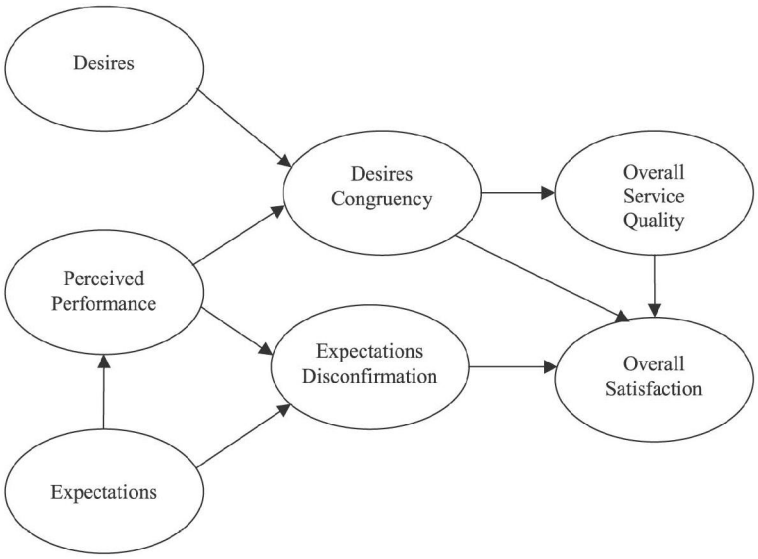
In both the models expected service quality would convince intentions to use technology-based self-service option.



Source: Dabholkar (1996)

Figure 2.7 (a) Attribute Based Model (b) Overall Affect Model

2.7.9 Model of Perceived Service Quality and Satisfaction (Spreng & Mackoy, 1996). The authors illustrated to enhance the understanding of the assembled perceived service quality and consumer satisfaction (Figure 2.8). This model is revision of Oliver's (1993) model.

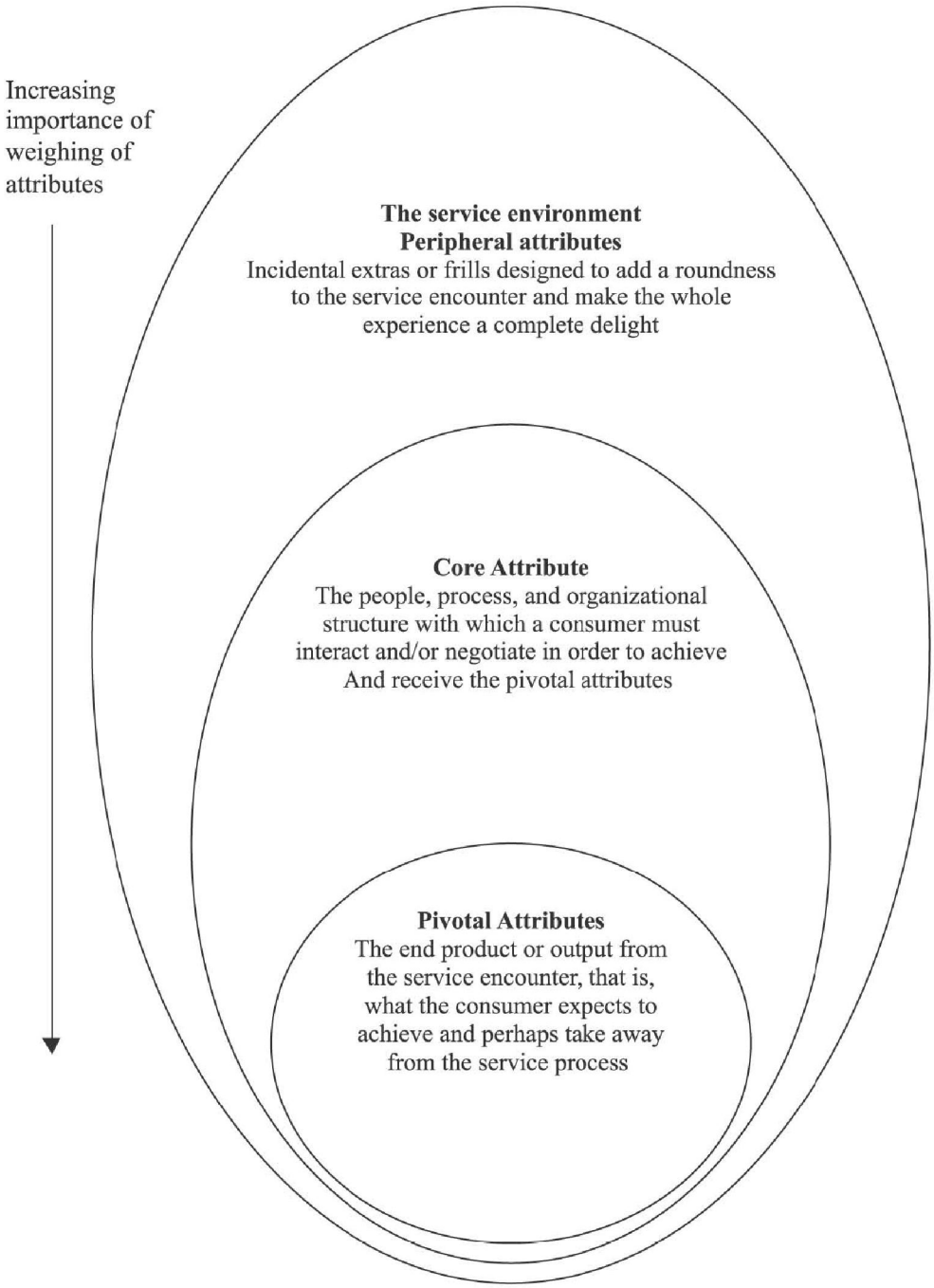


Source: Spreng & Mackoy (1996)

Figure 2.8 Satisfaction-Service Quality Model

The model has the effect of expectations, perceived performance desires, desired congruency and expectation disconfirmation on overall service quality and customer satisfaction. These are measured through set of ten attributes of advising (convenience in making an appointment, friendliness of the staff, advisor listened to my questions, the advisor provided accurate information, the knowledge of the advisor, the advice was consistent, advisor helped in long-range planning, the advisor helped in choosing the right courses for career, advisor was interested in personal life, and the offices were professional).

2.7.10 Pivotal, Core and Peripheral (PCP) Attribute Model (Philip & Hazlett, 1997). According to the model (Figure 2.9), every service consists of hierarchical construction, three overlapping areas where the vast majority of the dimensions and concepts which have thus far been used to define service quality. These ordered levels are defined as – *Pivotal* (outputs), *Core* and *Peripheral* (jointly representing inputs and processes). The pivotal attributes, positioned at the center, are considered collectively to be the single most determining influence on why the customer decided to approach a particular organization and apply the greatest influence on the satisfaction levels. They are defined as the "end product" or "output" from the service encounter; in other words, what the consumer expects to achieve and receive, perhaps even "take away", when the service process is duly completed.



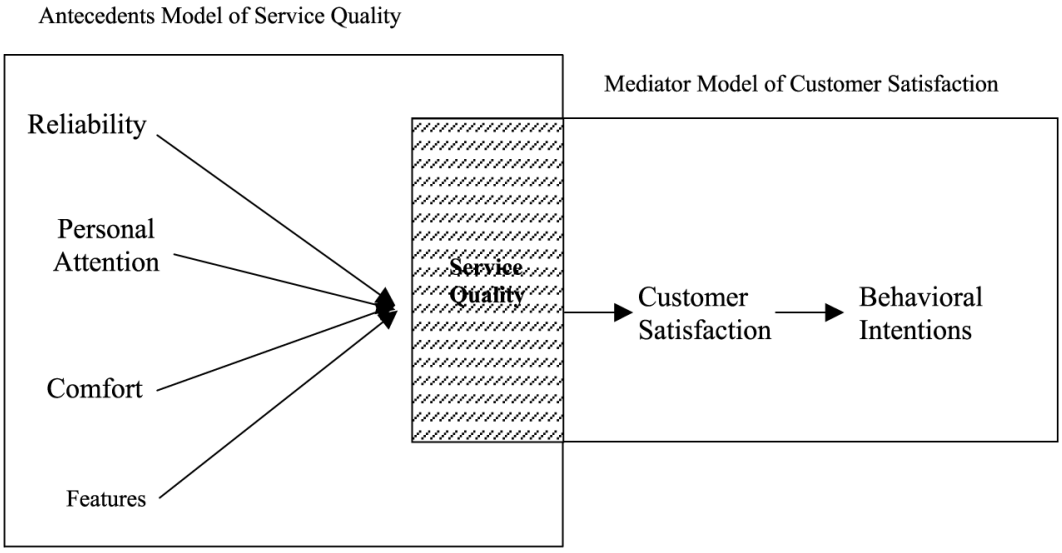
Source: Philip & Hazlett (1997)

Figure 2.9 PCP Attribute Model

Core attributes, centered around the pivotal attributes, can best be described as the combination of the people, processes and the service organizational structure through which customers must interact and/or confer so that they can achieve or receive the pivotal attribute. Peripheral attributes is the third level feature focuses on which can be nested as

the "incidental extras" or accompaniments designed to add a "roundness" to the service encounter and make the whole experience for the customer a complete happiness. When a consumer makes an evaluation of any service encounter, he is satisfied if the pivotal attributes are achieved, but as the service is used more frequently the core and peripheral attributes may began to gain importance.

2.7.11 Antecedents and Mediator Model (Dabholkar, et al., 2000). The authors illustrated a comprehensive model of service quality in Figure 2.10, which includes an inspection of its antecedents, consequences, and mediators to provide a deeper understanding of conceptual matter related to service quality. This model scans some conceptual issues in service quality as: the relevant aspects related to service quality better conceived as components or antecedents and the relationship of customer satisfaction with behavioral intentions.



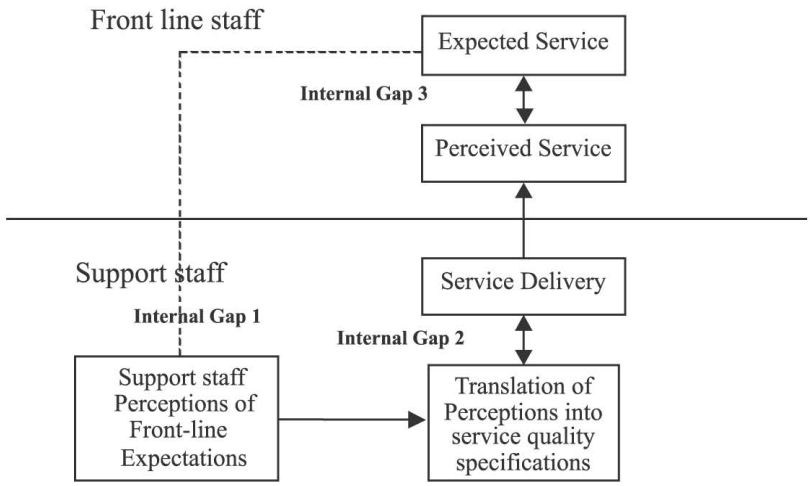
Source: Dabholkar, *et al.,* (2000)

Figure 2.10 Antecedents and Mediator Model

2.7.12 Internal Service Quality Model (Frost & Kumar, 2000). The authors have developed an internal service quality model based on the concept of GAP model (Parasuraman, *et al.*, 1985). The model (Figure 2.11) evaluated the dimensions, and their relationships, that determine service quality among internal customers (front-line staff) and internal suppliers (support staff) within a large service organization.

The internal gap 1 shows the difference in support staff's perception (internal supplier) of front-line staff's expectation (internal customers). Internal gap 2 is the

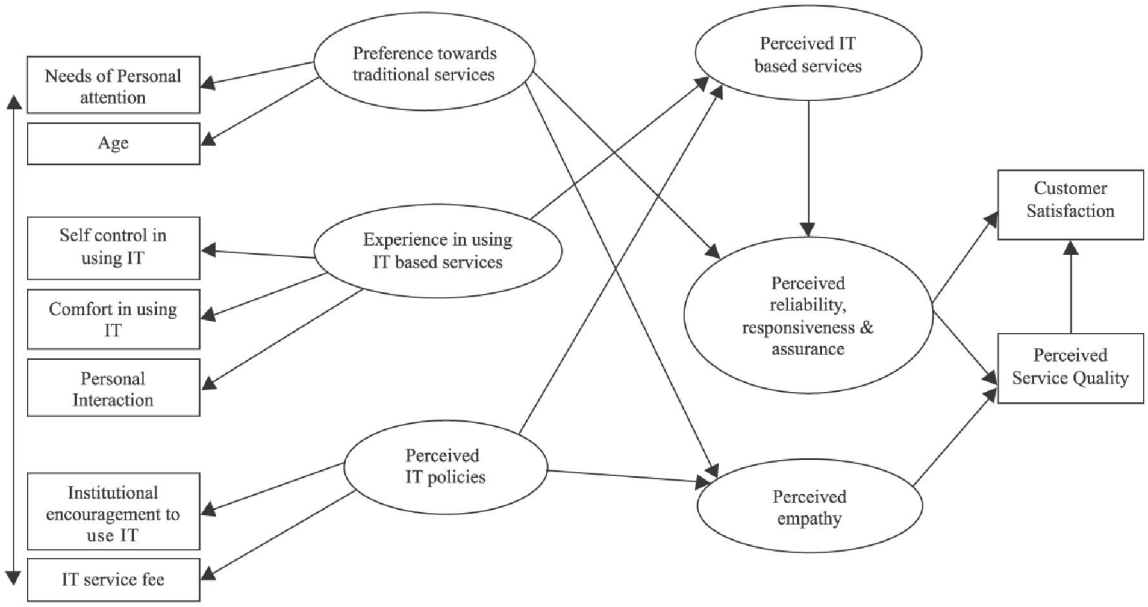
significant difference between service quality specifications and the service actually delivered resulting in an internal service performance gap. Internal gap 3 is the gap which focuses on the front-line staff (internal customers). The gap is based on the difference between front-line staff's expectations and perceptions of support staff's (internal supplier) service quality.



Source: Frost & Kumar, 2000

Figure 2.11 Internal Service Quality Model

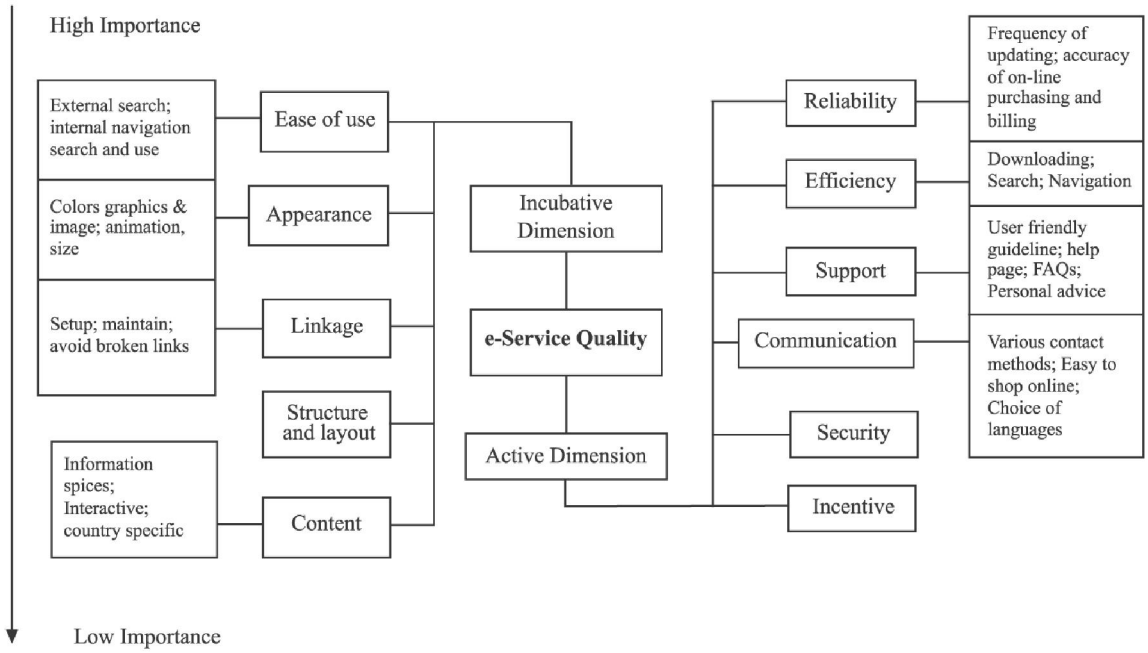
2.7.13 IT-based Model (Zhu, et al., 2002). Information technology (IT)-based service is the main option of this model. This representation proposes a service quality model (Figure 2.12) that associates customer perceived IT-based service options to traditional service dimensions. The model attempts to investigate the relationship between IT-based services and customers' perceptions of service quality. The IT-based service construct is linked to service quality as measured by SERVQUAL (Parasuraman, *et al.*, 1988, 1991). Various key variables affecting customers' views of IT-based services are identified and illustrated in Figure 2.12. The model highlights on the connection among the service dimensions as measured by SERVQUAL, the constructs representing the IT-based service quality, preferences towards traditional services, experiences in using IT-based services, and perceived IT policies. The impacts of these constructs on perceived service quality and customer satisfaction are also specified.



Source: Zhu, *et al.* (2002)

Figure 2.12 Information Technology-based Service Quality Model

2.7.14 e-Service Quality Model (Santos, 2003). In determining the success or failure of electronic commerce service quality is one of the key factors. E-service can be defined as the role of service in cyberspace (Rust & Lemon, 2001).



Source: Santos (2003)

Figure 2.13 e-Service Quality Model

This study proposes a conceptual model of e-service quality (Figure 2.13) with its determinants. It is proposed that e-service quality have incubative (proper design of a web site, how technology is used to provide consumers with easy access, understanding and attractions of a web site) and active dimensions (good support, fast speed, and attentive maintenance that a web site can provide to its customers) for increasing hit rates, stickiness, and customer retention.

An extensive review of different service quality models by Nitin, Deshmukh & Vrat's (2004) and Ladhari's (2008) overview of service quality measures in various studies, concludes that although various other service quality models have appeared in the literature over the past few years, it is still SERVQUAL that continues to be used widely despite criticism about its applicability in various industries and issues of psychometric properties. The next section discusses some of the criticism of the above mentioned models, service quality in library setting and justification of using library service quality model LibQUAL+ for assessment.

2.8 Criticism of SERVQUAL model

Much research have been conducted for the theoretical and operational issues of service quality models and the consequent assessment scales, particularly in the literature the widely used SERVQUAL scale and its variant scales, there has been much criticism. Some foremost doubt relate to use of disconfirmation theory, projecting power of the tool, validity of the dimension-wise structure, and the questionnaire length (Cronin & Taylor, 1992; Babakus & Boller, 1992; Teas, 1993, 1994; Buttle, 1996; Van Dyke, Prybutok & Kappelman, 1999; Dabholkar, *et al.*, 2000; Lee, *et al.*, 2000; Chi, Lewis and Park, 2003; Badri, Mohamed & Abdelwahab, 2005; Wilkins, *et al.*, 2007).

Buttle (1996), Ekinci & Riley (1998), Van Dyke, *et al.,* (1999) observed that the operationalization of the gap score, i.e. perception minus expectations (P-E), is a poor measure as a psychological score. Buttle (1996) stated that there is little support that customers assess service quality in terms of P - E (performance - expectations) gap. Moreover, it is added that there is a confusion of the 'expectation' construct in the gap theory adhered to by the SERVQUAL measure (Parasuraman, *et al.*, 1991; Babakus & Boller, 1992; Cronin & Taylor, 1992). Regarding 'expectation' there is no pre-determined definition and due to variety of discipline and understanding it may happens the validity problems of assessment (Cronin & Taylor 1992; Teas, 1993, 1994; Buttle, 1996). Dabholkar, (2000) depicted that expectations may not be present in the service in advance

and it may be seen during service delivery; beside, different way of interpretation mislead to its validity measurement. On the other hand, some researchers recommend that a performance-only outperform gap scores in predicting overall evaluation of service because it is more reliable and explains more variance than the disconfirmation model (Tse & Wilton, 1988; Cronin & Taylor, 1992, 1994; Babakus & Boller, 1992; Brown, Churchill, and Peter, 1993; Teas, 1993; Parasuraman, *et al.*, 1994a; Dabholkar, *et al.*, 2000; Lee, *et al.*, 2000; Page & Spreng, 2002; Roszkowski, Baky & Jones, 2005; Caro & Gracia, 2007; Wilkins, 2007).

Alternatively, It is very interesting to see that there is no uniformity of dimensionality as different researchers suggested different dimensions, i.e. one dimension (Cronin & Taylor, 1992; Lam, 1997); two dimensions (Babakus & Boller, 1992; Gounaris, 2005); three dimensions (Chi Cui, *et al.*, 2003; Arasli, *et al.,* 2005; Najjar & Bishu, 2006; Shoeb, 2010); four dimensions (Kilbourne, *et al.,* 2005; Ahmed & Shoeb, 2009); six dimensions (Carman, 1990; Headley & Miller, 1993); seven dimensions (Walbridge & Delene, 1993); and nine dimensions (Carman, 1990). Unbalanced dimensionality of the measurement scales are source of criticism for this. Though designed to be used as a base for service quality measure in various service settings and industry (Parasuraman, Berry, & Zeithaml, 1993), the five predetermined RATER dimensions are often not recoverable and do not load on to factors as expected, probably due to the scoring method (VanDyke, *et al.*, 1999). The RATER dimensions have failed to reemerge in library services (Nitecki, 1996; Cook 2001; Edwards & Browne, 1995; Nitecki, 1996; Ahmed & Shoeb, 2009; Shoeb & Ahmed, 2010) and higher education (Badri, *et al.*, 2005; Carman, 1990; Buttle, 1996, Green, 2006; O'neill, Wright & Fitz, 2001; Gounaris & Dimitriadis, 2003). Several researchers have suggested that service quality is a hierarchical construct with primary and sub-dimensions (Dabholkar, *et al.*, 1996; Brady & Cronin, 2001; Gounaris, 2005; Fassnacht & Koese, 2006; Collier & Beinstock, 2006; Caro & Gracia, 2007; Wilkins, *et al.*, 2007; Ho & Lee, 2007). Besides that, most of the studies in the present review focused on the functional quality of the service-delivery process (for example, Stevens, *et al.*, 1995; Engelland, *et al.,* 2000; Frochot & Hughes, 2000; Getty & Getty, 2003; Yoon & Suh, 2004; Markovic, 2006). Only a few number of studies incorporated the technical (outcome) dimension (Vaughan & Shiu, 2001; Aldlaigan & Buttle, 2002; Gounaris, 2005; Caro & Garcia, 2007).

Seth, *et al.,* (2005), Ladhari (2008) concluded that, service quality outcome and measurement is dependent on type of service setting, situation and time and need factor. So it is very important to state the context of the service settings to discover the dimensions and generalize the measurement.

2.9 SERVQUAL Used in Library Settings

The researchers from various subject areas contribute and adapt SERVQUAL as the instrument to measure service quality; and this tool been used in various public, academic and research libraries continually. A few example to measure service quality in a library setting by adapting SERVQUAL are, Edwards and Browne (1995); Nitecki (1995); Seay, *et al.*, (1996); Surithong (1997); Hernon and Nitecki (1998, 2001); Nitecki and Hernon (2000); O'neill, *et al.*, (2001), Narit & Nagata (2003); and recently, Ahmed & Shoeb (2009), Shoeb & Ahmed (2010), Kiran (2010), Abili, Thani, & Afarinandehbin (2012), Hossain & Islam (2012), Kumar (2012), Rehman & Sabir (2012), Awan & Mahmood (2013), Bahrainizadeh (2013), Enayati, *et al.,* (2013), Hossain & Ahmed (2014).

To see the sights of the distinction between academics and librarians on their perception of quality of an information service Edwards & Browne (1995) used SERVQUAL's five dimensions (Reliability, Assurance, Tangibles, Empathy & Responsiveness) which are in short named RATER. The finding of their research showed that for academic library information services does not embrace the dimensions that developed by Parasuraman, *et al.*, (1988). They wrapped up that there is similarity between librarians and academics in the way they use to see the characteristics of quality information service. They also affirmed that it was hard for users to distinguish conceptually library services which are attached to any library product.

Nitecki (1995) found that by 1994 the instrument SERVQUAL has been used in various types of academic, public and research libraries continually and explicitly. She tested the instrument on the three aspects of library service i.e. interlibrary loan, reference, and closed-reserve. Though her data supported the validity and reliability of the instrument scale, it suggested a three-factor relationship among the 22 SERVQUAL items rather than previously mentioned five collapsed dimensions that revealed by Parasuraman, *et al.,* (1988). In libraries the conceptualization of the dimension tangibles was similar to SERVQUAL, common characteristics were observed between reliability and

responsiveness and even between responsiveness, assurance and empathy. Further study was not attempted by Niteck; she suggested a model which explained library service quality dimensionality better. Her suggestion was another way to consider quality from traditional approach to a more psychological measurement. It was the beginning of the researchers and practitioners' of library science discipline to move forward the research in library service quality assessment.

Supporting Berry, *et al.*'s (1990) findings, Bitner (1990) had stated that, physical condition and responses of the employee have influence on customer reaction towards the service. The research also revealed that negative comments on the dimension 'reliability' had great influence on the rest of the responses. Weakness of this technique was that it focused on customer's negative comments and associated it with perceived weight of a particular service attribute, whereas, expectation and satisfaction have been convened as positive feeling about something.

In another research Seay, *et al.*, (1996) included original ten dimensions of SERVQUAL and restated each items in each dimension; they decided that the following seven service determinants could be adapted to library services: *reliability, responsiveness, assurance, access, communications, security* and *tangibles*. It has been found that *tangible* is less important dimension for library. Thapisa and Gamini (1999) and Ashok (2007) in their evaluation of their respective university library service quality used these seven dimensions and their definition.

Surithong (1997) used SERVQUAL in her doctoral dissertation to examine user expectations and perception of library service quality. She focused on 3 areas: circulation; reference and computer information services. The instrument was an adapted one used by Nitecki for academic library assessment. Her study's contribution was that the dimensions perceived most important by Thai library users were similar to users in the United States, thus supporting use of SERVQUAL across different cultures. Later Narit & Nagata (2003) also followed Surithong for their study.

In a study Coleman, Xiao, Blair, and Chollett, (1997) reported that even though the five RATER dimensions were extracted; neither *reliability* tests nor factor analysis was carried out. The point scores identified *reliability* as the most important dimension, and *tangibles* as the least important.

Hernon and Altman (1996) expressed that various but related studies by different researchers have examined library service quality by developing a basic framework for understanding and measuring service quality in academic libraries. In an attempt to produce global dimensions for customer expectations of academic library service quality, this framework was then used as a basis for subsequent gap analysis research in different countries, like, New Zealand (Hernon & Calvert, 1996), Singapore (Calvert, 1998) and China (Calvert, 2001). Calvert (2001) found that based on the studies in America, New Zealand, Singapore and China. He mentioned that there was sufficient evidence that the concept of service quality may vary between countries, but they share common core believes that do not change.

Accordingly, Nitecki and Hernon (2000) studied the viability of developing and testing the adaptation of SERVQUAL to reflect expectations of library users and staff at Yale University Libraries. They have a revised instrument to explore users' expectations and delivery perception. Their study revealed *Reliability* to be perceived as the most important attribute and *Empathy* the least important. They also concluded that the SERVQUAL dimensions failed to address the desire to be self-reliant or self-supporting, a very important characteristic of library users.

Hernon's (2002) research on service quality expanded to include measures of customer satisfaction and outcome assessment. The inability to recover the five dimensions of SERVQUAL accurately in library setting (Edwards & Browne, 1995; Nitecki, 1995; Andeleeb & Simmons, 1998; Hernon & Altman, 1998; Nitecki & Hernon, 2000) led to a comprehensive research into service quality measure by the Association of Research Libraries, ARL. As lead researcher, Colleen Cook and Bruce Thompson carried out inclusive study at the Texas A&M University Library for the years 1995, 1997 and 1999. Their main purpose was to determine if SERVQUAL was a reliable and valid instrument to be applied to the library context across different time and different respondent groups. They used the 22-item survey as originally constructed by Parasuraman, *et al.*, (1994a) with minor alteration in the words and statements to reflect the library environment. They found the *reliability* scores to be fairly reasonable across time and user group variations. Their research also reported that the recovery of the RATER dimensions was not supported. As in Nitecki's (1995, cited in Nitecki 1996) study, only *tangible* was distinctly individual. Interestingly, an overlap among *responsiveness, assurance* and *empathy*) was also found. Even Parasuraman, *et al.*,

(1994b) had revealed the possibility of a three-dimensional structure wherein *responsiveness, assurance* and *empathy* meld into a single factor. Cook and Thompson (2000b) concluded that the underlying factor structure of SERVQUAL may not be the same in research library context because using dissimilarity scores between minimum, desired and perceived responses typically have different factor structures from one application to another.

Following up her work with ARL, Colleen Cook (2001) revealed that the SERVQUAL constructs, RATER were affirmed in the research library context. However, this confirms that the SERVQUAL dimensions were not adequate to measure academic library service quality. Cook found that the long-form questionnaire (3 scales: minimum, desired, perceived) and the short form (1 scale: perceived only) are both able to maintain the integrity of the 'perceived' scores.

Conversely, researchers are still trying to replicate the SERVQUAL instrument to design scales to suit library services. Nagata, *et al.*, (2004) examined dimensions of service quality in four university libraries but they failed to extract the five dimensions of SERVQUAL. There study in Europe and Japan confirmed four dimensions of service quality: Effect of Service (Personal); Library as Ba; Collection and Access and Effect of Service (Organizational) which were similar to dimensions to additional dimensions found in Cook's PhD study. Later, Satoh, Nagata, Kytomaki, and Gerrad, (2005) confirmed the emergence of the four dimensions, but with additional items relating mostly to electronic service provision.

In Bangladesh, Shoeb (2008) used SERVQUAL first for library setting. He designed 30 item questionnaire based on the SERVQUAL instrument of the study of Narit & Nagata (2003).The modified questionnaire included items on current trends of library systems along-with conventional items. The predetermined dimensions were Assurance, Collection & Access, Empathy, Library as Place, Reliability, Responsiveness and Tangibles. For the study in a public university library the exploratory factor analysis was used where only four dimensions were emerged, those were Affect of service (organizational), Affect of service (personal), Collection & access, Library as a place (Ahmed & Shoeb, 2009). These dimensions were as same as the dimensions found in the study of Nagata, *et al.*, (2004). It is interesting that with the same instrument in case of a private university library only three collapsed dimensions were loaded, these are Affect of service, Collection & Access and Library as a place (Shoeb, 2010). So this variance of this

service dimensions are also identified here. Few studies have been observed recently on SERVQUAL for library settings where most of the studies have been done in the developing countries; but these are the replications of previous studies, so it is not mentionable due to less substance. However, in most of the cases, there was no empirical testing of the validity and reliability scores of SERVQUAL items in those studies to render support for SERVQUAL's suitability in academic libraries.

A specific application for the libraries, LIBQUAL+, was developed by Thompson, Cook & Heath (2001) as a derivative of SERVQUAL. The following section discusses with more detail the LIBQUAL + model.

2.10 LibQUAL+: Standard Measure of Library Service Quality

It has been formerly stated that in collaboration with Texas A&M University, LibQUAL+ was developed by the Association of Research Libraries (ARL) as a web-based tool for systematic assessment and measurement of library service quality (Cook, Heath, Kyrillidou & Webster, 2002). When SERVQUAL did not address all the important issues particularly relevant in libraries, the quest to discover better measures appeared (Cook & Thompson, 2000a, 2000b). The new measure intended to assist libraries in moving away from data that just described a library's inputs and outputs and towards data and programs that could help libraries measure their performance over time both to benchmark with peers and to improve their own operations (Blixrud, 2001).

To track, identify, facilitate and take steps upon users' judgment of library service quality, LibQUAL+ is developed as a suite of services that libraries use. The Web-based survey instrument helps libraries to assess and to get better library services, to modify organizational culture, and to promote the library. Huge number of libraries i.e. academic, research, public, special libraries as independent or through consortia have participated in LibQUAL+ assessment since the year 2000. In their website http://www.libqual.org, the objective of the LibQUAL+ program is expressed roughly to promote a culture of excellence in providing library service and to help libraries better understand user perceptions of library service quality. Through LibQUAL+ library user feedback can be collected and interpreted systematically over time and provide libraries with comparable assessment information from peer institutions. This method also identifies best practices in library service and improves library staff members' data analysis as well interpretation skill. LibQUAL+ was developed in the academic library environment at a time that was

matured for wide adoption of the standardized service quality survey instrument across libraries using the web. From the early days, a number of methodological survey issues were investigated systematically.

LibQUAL+ primarily is guided on the disconfirmation theory of service quality that users' perception of service quality is the difference between what they expect from a service and what they believe they have received. The scale asks respondents to indicate the *minimum level* of acceptable service; the *desired level* of service and the *perceived level* of service. Gap scores are calculated between *minimum* and *perceived* expectation and *desired* and *perceived* expectations for items or statement of services (Thompson, Kyrillidou & Cook, 2008).

The 22 items that form the core of the LibQUAL+ instrument that measure overall service quality along three dimensions:

1. *Affect of Service:* Affect of Service concerns "the human dimension of service quality" (ARL, 2012) and is operationalized with nine questions about user interactions with staff. Aspects of this dimension include user perceptions of staff helpfulness, competency, dependability, empathy, responsiveness, assurance and reliability and care for users.
2. *Information Control:* Information Control described as "whether users are able to find the required information in the library in the format of their choosing, in an independent and autonomous way" (ARL, 2012). The eight questions created to represent this construct involve having the right print and electronic materials in the collections, being able to access desired resources independently, and the extent to which access tools are modern and intuitive and,
3. *Library as Place:* Library as Place is defined as "the physical environment of the library as a place for individual study, group work, and inspiration" (ARL, 2012). The five LibQUAL+ questions assess the availability of quiet and community spaces, the comfort and welcoming feel of space, and the suitability of space for study, learning, and research..

As outlined in Table 2.2, the LibQUAL+ instrument has been refined a number of times and the current iteration, composed of 22 items that load on three dimensions, has been administered since 2003.

Table 2.2
Refinement of LibQUAL+ Dimensions

Year	**2000**	**2001**	**2002**	**2003-2013**
Number of items	41	56	25	22
Dimensions	Affect of Service	Affect of Service	Affect of Service	Affect of Service
	Library as Place	Library as Place	Library as Place	Library as Place
	Reliability	Reliability	Personal Control	Information Control
	Provision of Physical Collections	Self-Reliance	Information Access	
	Access to Information	Access to Information		

Standardization of the survey items, through iterative and extensive application of reliability and validity analysis has always been a hallmark LibQUAL+ implementations. Local control of LibQUAL+ has led to the development of customizable discipline categories that reflect the specific departmental or discipline offerings on different participating libraries.

A customization option for adding five optional questions was also introduced. There was a large pool of items in the early iterations of the LibQUAL+ survey when item development was emphasized to identify the optimal dimensions of measuring library service quality. These test items had practical utility but they were not among the 22 core items that measure the three dimensions of library service quality (Affect of Service, Information Control, and Library as Place) based on the validity and reliability iterative analysis results. The items that were not used as the 22 core questions together with items proposed by various consortia emphasizing aspects of interest to the consortium libraries were included in a list of more than 100+ optional items that libraries may choose from. A library may choose five questions or none according to the existing architecture of the survey.

Right from the outset, the point that LibQUAL+ is one measure among many tools and methods that libraries need to deploy was established by the practitioners in the early followers. LibQUAL+ is one of eleven ways of listening to users, called a total market survey. As Berry (1995) explained,

> *"When well-designed and executed total market surveys provide a range of information unmatched by any other method... A critical facet of total market surveys (and the reason for using the word total) is the measurement of*

> *competitors' service quality. This [also] requires using non-customers in the sample to rate the service of their suppliers."*

Although (i) measuring perceptions of both users and nonusers and (ii) collecting perceptions data with regard to peer institutions can provide important insights, Berry recommended using multiple listening methods and emphasized that "ongoing data collection ... is a necessity. Transactional surveys, total market surveys, and employee research should always be included".

2.10.1 LibQUAL+ Development. LibQUAL+ was created under the leadership of Fred Heath and Colleen Cook at Texas A&M University and in collaboration with ARL. In the year 2000, LibQUAL+ was commenced as a trial project of a standardization of perceptions of library service quality by both quantitative and qualitative methods. Primarily it was among thirteen ARL libraries and the methods were applied thoroughly in an iterative mode. This method resulted in a rich testimony of published articles documenting both the qualitative and the quantitative research cycles (Cook & Heath, 2001; Cook & Thompson, 2001; Cook, Heath, & Thompson, 2001; Cook, *et al.*, 2001b).

LibQUAL+ nurtured quickly, by encouraging by the financial support from the Fund for the FIPSE. The LibQUAL+ Web-based protocol was completed by 20,416 participants representing forty-three universities by 2002. A study examining the reliability of these scores and the dimensions underlying user perception showed that a more protocol with fewer survey questions could measure library service quality reliably along four basic dimensions of library service quality: *Affect of Service, Personal Control, Access to Information,* and *Library as Place*. For the library sector these dimensions were well-addressing the lack of fit of the conventional SERVQUAL instrument (Cook, *et al.*, 2001; Thompson, Cook, & Heath, 2001; Thompson & Cook, 2002; Thompson, Cook, & Heath, 2003; Wei, Thompson, & Cook, 2005; Lincoln, 2002).

Thompson, Cook, & Thompson (2002) mentioned that, the study demonstrated a number of other benefits in addition to establishing the key dimensions of library service quality:

> *"Large collections do not, in and of themselves, insure that library users always have positive service experiences. Thus, librarians interested in improving service quality need tools to help them benchmark current user perceptions, identify needed areas of improvement, and locate peer institutions obtaining more favorable outcomes. ... LibQUAL+ satisfies the major reasons for conducting*

> *total market surveys. First, non-local information can reveal how well other libraries perform services and can provide a basis for comparison. Secondly, exemplary libraries can be identified as models for service improvement planning. Finally, total market surveys permit performance tracking over time. Systematic listening to users improves decision making in allocation of scarce resources."*

Based on about twenty-five thousand respondents across forty-three universities further research showed that score norms could be developed, and such norm tables could help libraries interpret their scores with respect to typical profiles at other universities. Norms were developed for both *perceived* service scores and *gap* scores (e.g., perceived performance minus minimally acceptable performance). Norms such as these assist library managers in decision making by identifying:

- specific areas for needed improvement,
- specific areas of needed additional service quality information (e.g., focus groups), and
- peer institutions from which superior service practices can be modelled (Cook, Heath, & Thompson, 2002).

On the stability of the norms has shown in the earlier research that across associates and time LibQUAL+ norms are outstandingly stable so libraries that compare their institutional scores against group scores should be relatively certain that they are using a strong baseline (Thompson, Cook, & Kyrillidou, 2005).

Heath, *et al.* (2002) mentioned that LibQUAL+ data mainly was further dig to look for the answers of the following query:

1. LibQUAL+ subscale and total scores correlation with external validity scores (e.g., service and satisfaction related user response).
2. LibQUAL+ 25 item scores that most differentiate the participants.
3. Difference with frequency of library use and mean ratings of perceived library service quality, as measured by LibQUAL+ T-scores.
4. Difference with user types (e.g., faculty members, graduate students) and mean ratings of perceived library service quality, as measured by LibQUAL+ total T scores.
5. Correlation of the extent of institutional mean LibQUAL+ subscale and total scores with ARL Index scores.

Kyrillidou & Heath (2004) reported that in two independent sub samples LibQUAL+ subscale and total scores correlated highly with satisfaction scores. As predicated, respondents who mentioned they were never using the library systematically rated services lower than did other users. Also as expected, LibQUAL+ mean scores, intended primarily to measure perceived service quality, correlated less with institutional ARL Index scores. The relation of institutional characteristics and scores of service quality were explored in groups of libraries beyond the ARL member libraries. Service quality indices, especially as measured by the service affect dimension, appear to have a slightly inverse relation to collection investments reflecting the higher expectations and harder-to-meet demands of the research library user. Miller (2008) also confirmed these findings in his dissertation.

In the year 2003, therefore the LibQUAL+ dimensions have been shrunken in three important facets of library service quality measurement: *Affect of Service, Library as Place*, and *Information Control.* This has been established for the iterative approach of applying qualitative and quantitative methods of LibQUAL+. Town (2004) stated that in UK, a comparison was conducted between LibQUAL+ and other protocols used in the library where reliability and validity analysis show that in that context the LibQUAL+ implementation provides valuable indication for service quality improvement. Moreover, the research confirmed that due to the failure to distinguish between Access to Information and Personal Control by the users so those were collapsed into an Information Control dimension. These study and the findings were also affirmed the implementation of LibQUAL+ with reliability and validity in other culture, environment and languages worldwide equivalent to the original instrument. So, the three dimensions of library service quality were confidently established in a variety of diverse contexts (Kyrillidou, *et al.*, 2004; Cook, Heath, & Thompson, 2004). From the time being the LibQUAL+ protocol has continued to expand globally followed with cautious context-sensitive studies that report to its applicability to new environments (Kyrillidou & Persson, 2006).

The development and use of LibQUAL+ to improve service quality has been documented in more than one hundred articles published in the refereed and peer reviewed journal literature (Lane, Anderson, Ponce & Natesan, 2012). Approximately half these articles document psychometric properties of LibQUAL+ (Cook, Heath & Thompson, 2002; Thompson & Cook, 2002; Wei, Thompson & Cook, 2005; Thompson, 2006). The remaining half of the published articles describes how libraries are using LibQUAL+ results to improve services (Cook, 2002; Heath, Kyrillidou & Askew, 2004; Thompson,

Kyrillidou, & Cook, 2007**).** By 2012, the instrument has been administered to more than 1.7 million participants from more than 1,200 institutions. LibQUAL+ has been implemented in 28 different countries and has been translated into 21 different languages (libqual, 2013). LibQUAL's + breadth of use, however, places increasing responsibility on both its designers and users to understand its structural validity (Thompson, Kyrillidou, & Cook, 2007, 2010; Youhua, Thompson, & Cook, 2005).

2.10.2 Validity and Reliability

LibQUAL+ protocol has a great consistency and flexibility on its implementation and response. Thompson, *et al.*, (2008) described it as a

> *"…total market survey, because the protocol (a) seeks perceptions of all potential customers, regardless of frequency of use, including even nonusers and (b) uses benchmarking against peers."*

To produce reliable and valid standard for library service quality, the LibQUAL+ protocol is argued as the first measurement instrument. Cook, Heath, Thompson, & Thompson (2001a), Cook, *et al.,* (2001b), Thompson & Cook (2002), Thompson, Cook, & Thompson (2002) justified their studies in favor of LibQUAL+ for reliability. Then again, Thompson, Cook, & Kyrillidou (2005) tested validity persistently. To date, reliability of LibQUAL+ scores has been measured using only Cronbach's alpha (Lane, *et al.*, 2012; Kieftenbeld & Natesan, 2013; Thompson, Kyrillidou, & Cook, 2007). Reliabilities computed for scores for the three subscales have been generally quite good (i.e., above .70); Kieftenbeld and Natesan (2013) reported reliabilities for undergraduates of .93 for Affect of Service, .90 for Information Control, and .87 for Library as Place.

Library staff has also found the scores useful in improving library service quality (Cook, *et al.*, 2002; Jilovsky, 2006; Asemi, Kazempour, & Rizi, 2010, Helgesen, & Nesset, 2011; Rehman, 2012; Hinchliffe, Oakleaf, & Malenfant, 2012; Schwieder & Hinchliffe, 2012; Stemmer & Mahan, 2012). Roszkowsli, Baky, and Jones (2005) examined the validity of LibQUAL+ scores on different aspects. The investigation found that the perceived performance score was a more valid pointer of user satisfaction than the superiority gap (the difference between users' perceived and desired levels of performance) score. The study argued about the relevancy and validly of user perceptions of actual performance over user-defined desired levels of performance. Lewis (2011) used LibQUAL for the assessment of distance learning in compliance with accreditation standards.

In the literature there are many studies reported on the use, suitability, justification, consistency, rationale of LibQUAL+ to measure individual library's performance (Heath, Cook, Kyrillidou, & Thompson, 2002; Creaser, 2006; Jankowska, Hertel, & Young, 2006; Whang, & Ring, 2007; Johnson, 2007;Kayongo, & Jones, 2008; Nadjla, & Farideh, 2008; Garthwait, & Richardson, 2008; Jaggars, Jaggars, & Duffy, 2009; Rodrigues, *et al.,* 2011; Kumari, Khurana, & Arora, 2012; Pedramnia, Modiramani, & Ghanbarabadi, 2012). Beside academic libraries, findings in the different studies in public library, research library, health library and information services settings also revealed that the scores have high reliability coefficients in all these different settings which also support the validity of the LibQUAL+ measure used in this study and its relevance (Thompson, Kyrillidou, & Cook, 2007; Marshall, 2007; Ladhari & Morales, 2008; Morales, *et al.*,2011, Voorbij, 2012). This also justified the implementation in the consortium settings (Garthwait & Richardson, 2008).

Though LibQUAL+ has been gained huge popularity, very few researches have been accomplished by other researchers excluding the developer of this instrument on LibQUAL+ factors or components reduction which may be vital point for any local context. Though there are few researches where different factors have been grouped based on correlation among the components. Most of the studies combining groups three factors, two factors, or even one factor (e.g., Lane, *et al.*, 2012). But three-factor model fit well globally and locally (Fagan, 2014). So this area needs more research and exploration. Lane *et al.,* (2012)collected LibQUAL+ data in 2005, 2007, and 2009 at a large public university and conducted a multi-group CFA where year was the group; as with Hunter and Perret's (2011) concluded that the data from each year "adequately fit" the three-factor mode. Recently, Kieftenbeld and Natesan (2013) conducted an investigation into the measurement and structural invariance of LibQUAL+ across user groups.

2.10.3 Major Aspects of LibQUAL+ to the Success

LibQUAL+ is found as the drive for rethinking a library's service programs and operations by getting responds from the participants as long-term effort (Wall, 2002). Alongside supporting previously identified areas, it has prospect to give attention areas of strength of the library (Hitchingham & Kenney, 2002; Dole, 2002). Sanville (2004) appreciated the emergence LibQUAL+ tool, justifying it as the tool for scalable consumer (user) research that is badly needed in libraries.

After implementing LibQUAL+ protocol, LaBeause (2004), Forsman (2004), Peterson, *et al.*, (2004), Shedlock & Walton, (2004) observed that few libraries have been viewed as having a much stronger focus on the user and often are praised for superior service delivery. McNeil & Giesecke (2002), Knapp (2004) observed instant quick-fix actions resulting from LibQUAL+ scores such as the redesigning of public services. Several libraries have link in the implementation of LibQUAL+ to the library strategic planning processes within the universities (Shorb & Driscoll, 2004; Haricombe & Boettcher, 2004) which have directions for the libraries on actual facts, not hunch (Saunders, 2007a, 2007b).

Lessin (2004), Wilson (2004) stated about similar best practices regarding data analysis, these are: (1) comparison with other institutions, (2) summary group analysis for local responses, and (3) analysis across disciplines. Currently, LibQUAL+ may be considered as a strong international universal library brand. Similarities and differences on library users' desired service quality levels across undergraduate students, graduate students and faculty, across geographic regions and across time are always the most frequent investigation. The results are so stable that almost in all cases the range of the mean values was extremely narrow. The findings of similarities globally were not totally unexpected (Thompson, Kyrillidou, & Cook, 2008). There are many institutions which have placed LibQUAL+ within the context of the larger assessment and service improvement efforts conducted by a library within a multi-year perspective (Lewellen, 2006; Heath, 2009).

Dimension-wise LibQUAL+ measure is a much understandable way for the libraries. Along with *Affect of Service* and *Library as Place* the importance of *Information Control* has appeared in different recent studies. Saunders (2008) observed that faculty and students mainly want information resources. He also questioned whether academic libraries need to develop common satisfaction with the services that libraries provide or some other important services. In his study he analyzed 'access mechanisms' as very important predictors of information resource satisfaction, rather than 'library facilities' and 'library staff' which are negligible predictors. Across different groups of users, he found it right. Kayongo & Jones (2008) also highlighted on perceptions of *information control* from the faculty viewpoint. Undoubtedly, this is a dimension of mounting significance for important parts of the respondents.

The widespread 'international library brand' LibQUAL+ is mainly for reduced labor and cost along-with survey management throughout the straightforwardness of the web administration dashboard. Creativity and knowledge may be applied by the library staffs during sample process regarding local context, specially managing the process of survey notification and reminder, marketing campaign, and translating the results into positive actions for their organization (Davis, Groves, & Kyrillidou, 2006). LibQUAL+ can handle large numbers, survey result can be obtained instantly, local expert for the mechanical help is less required and additional analysis can be conducted both in terms of the quantitative and qualitative data collected via LibQUAL+ across the various demographic categories (Hoseth, 2007).

Kyrillidou (2009) reported that to the measurement of successful library services delivery LibQUAL+ has made a number of significant contributions. In particular:

- shifted the focus of assessment from mechanical expenditure-driven metrics to user-centered measures of quality,
- re-grounded gap theory for the library sector, especially academic libraries,
- grounded questions yield data of sufficient granularity to be of value at the local level,
- determined the degree to which information derived from local data can be generalized, providing much needed "best practices" information,
- demonstrated the efficacy of large-scale administration of user-centered assessment transparently across the Web, and
- makes little demand of local resources and expertise

Both at the local level and for cross institutional benchmarking Cook (2006) points out the contribution LibQUAL+:

> *"It has overcome the theoretical and practical obstacles that previously prevented large scale, multi institutional assessments in libraries. It assesses three overarching dimensions of library services … from a user perspective. As a web delivered and managed survey, it is easy and cost effective in terms of time and money… LibQUAL+ longitudinal data has also shown how quickly user perceptions and desired and minimum expectations have changed over the … years of survey administration. Finally, LibQUAL+ data have yielded the first glimpses into how users assess the value added by libraries for higher education outcomes in teaching, learning and research."*

2.11 Summary

This Chapter discussed the review of the relevant research that formed the foundation for this study. In addition, this Chapter established the conceptual framework for this investigation, and explained how this study extended the scholarly conversation about the meaning of LibQUAL+ tool. This Chapter also evaluates the literature on quality, service quality, total quality management, evaluation of service quality and satisfaction, component of service quality, whether customer or user is always right or not, different mentionable approaches of service quality model and SERVQUAL model beside LibQUAL+.

Chapter 3

Methodology

3.1 Introduction

The previous Chapter described service quality-related issues, relevance of survey instrument model and places them in the context of the literature on service quality assessment. In this Chapter, the methodology for this research will be depicted including problem statement and justification, objective of the study, research questions, sampling and response rates, data collection, data treatment, and statistical methods and techniques used for data analysis.

3.2 Problem Statement and Rationale

Service quality improvement as a management approach is a crucial issue in developed countries. Due to the lack of awareness and effective service delivery policy, this concern is missing in Bangladesh. As an organization, libraries are not ready to transform them into well-managed service quality operations and library managers are not also in this process of transformation. Beside, necessity for developing refined assessment skills to hear from the library users how libraries are performing is becoming urgent also. Internationally, the recent emphasis on assessment in higher education has prompted university administrators, including library administrators, to develop new ways of evaluating services and programmes. Academic libraries in Bangladesh are facing the same challenges as most academic libraries in the world such as reduced budget and inability to cope with emerging trends in libraries. Libraries are service-oriented organizations, so libraries in Bangladesh also in need for effective assessment process and tools that produce data that can be used for improvement continuously. LibQUAL+ model is one of the most reliable and an efficient method that libraries use to improve services across the globe within a consistent method i.e. “listening to users”. This assessment is worth to reveal that how well the service priorities of library staff of studied six university libraries are associated with the priorities of faculty members, graduate and undergraduates students. The goal is to identify among library staff about users’ desires and how closely staff service priorities align with those needs.

3.3 Sampling and Response

The study investigated LibQUAL+ scores for library service quality assessment at six university libraries. The sample population for the study consisted of users/customers (faculty members, graduate and undergraduate students) of the university libraries. As the original version of LibQUAL+ is a web-based survey tool which needs subscription for assessment, this research therefore created a mirror model of LibQUAL+ protocol by following all the conventions, especially data integrity of LibQUAL+ tool. The responses from the faculty members were collected through web-based instrument. The survey link of the web-based LibQUAL+ was sent to the faculty members of six universities through e-mail. For maximum response collection, four reminders on different logical time intervals have been sent requesting to take participate in the survey process. Alongside, for the students, paper–based or printed copy of same LibQUAL+ survey questionnaire was used. Student samples were selected randomly on a verbal approach basis and asked to complete the questionnaire voluntarily to help this investigation. To collect data from the students, volunteers were assigned. They had been given orientation regarding data collection process and approach. For DUL, BUETL and BSMMUL nine volunteers, all from the Department of Information Science and Library Management, DU were assigned. In case of RUL, one faculty member and two students of RU were engaged for this process. For BAUL, library staff and two students of BAU helped to collect data. At IUBL, three business students of IUB were assigned for data collection process. In this study, as library user, faculty member and faculty is used as synonymous term.

3.3.1 Sample Size and Response Rate. As user or customer participation is voluntarily, the difference between the numbers of *survey forms/questionnaires* distributed and number of completed must be considered. Another major factor is the confidence that evaluators can place in the results; confidence is evaluated by the size of the population to be surveyed and the number of forms completed. For this study, standard survey sample size was followed although the response somewhat varied narrowly. The sample size reflected 95 percent confidence level and ±5 standard deviation (e.g. Sample Size Calculator, 2013). The Table 3.1 shows the expected sample size considering the total number of students in each surveyed university.

Table 3.1
Population and Calculated & Expected Sample Size

S/N	University	Population	Expected Sample Size
1	University of Dhaka (DU)	34,960	380
2	Rajshahi University (RU)	33,100	380
3	Bangladesh Agricultural University (BAU)	5,870	361
4	Bangladesh University of Engineering and Technology (BUET)	8,620	368
5	Bangabandhu Sheikh Mujib Medical University (BSMMU)	1,850	318
6	Independent University, Bangladesh (IUB)	4,250	352

Source: (UGC, 2013)

The following table (Table 3.2) shows the details about six universities:

Table 3.2
Data Summary Regarding Sample

S/N	University	Category	Year of Est.	Number of Student	Number of faculty members	Total population
1	University of Dhaka (DU)	Public	1921	33,000	1,960	34,960
2	Rajshahi University (RU)	Public	1953	32,000	1,100	33,100
3	Bangladesh Agricultural University (BAU)	Public	1961	5,300	570	5,870
4	Bangladesh University of Engineering and Technology (BUET)	Public	1962	8,000	620	8,620
5	Bangabandhu Sheikh Mujib Medical University (BSMMU)	Public	1965	1,400	450	1,850
6	Independent University, Bangladesh (IUB)	Private	1993	4,000	250	4,250

Source: (UGC, 2013)

The table above shows the total population of six universities consists of students and faculty, e.g. DU (34,960), RU (33,100), BAU (5,870), BUET (8,620), BSMMU (1,850) and IUB (4,250).

Table 3.3 shows the summary regarding total responses by all respondents of six universities:

Table 3.3
Data Summary Regarding Sample (both questionnaire and web assessment tool, all respondents)

S/N	University	Questionnaire Distributed & Survey link Forwarded	Questionnaire Returned & Survey Responded	% Returned/ Response
1	University of Dhaka (DU)	767	373	48.63
2	Rajshahi University (RU)	624	364	58.33
3	Bangladesh Agricultural University (BAU)	562	340	60.50
4	Bangladesh University of Engineering and Technology (BUET)	535	349	65.23
5	Bangabandhu Sheikh Mujib Medical University (BSMMU)	413	313	75.79
6	Independent University, Bangladesh (IUB)	421	353	83.85

Above table demonstrates summary data regarding both LibQUAL+ printed questionnaire (for students) distribution for students and forwarded/sent invitation link for web assessment (for faculty) through faculty e-mail address. In-spite of no evidence of the correctness of all e-mail and it has been unknown whether how many faculties opened or ignored the assessment request, the number forwarded/sent e-mail addresses was counted as the part of the response rate. The following table (Table 3.4) shows the summary of LibQUAL+ Web tool regarding sample and response rate by faculty.

Table 3.4
Data Summary Regarding Sample (web tool, faculty members)

S/N	University	Survey link Forwarded	Survey Responded	% Returned/ Response
1	University of Dhaka (DU)	407	25	6.14
2	Rajshahi University (RU)	264	17	6.44
3	Bangladesh Agricultural University (BAU)	232	20	8.62
4	Bangladesh University of Engineering and Technology (BUET)	205	24	11.71
5	Bangabandhu Sheikh Mujib Medical University (BSMMU)	113	31	27.43
6	Independent University, Bangladesh (IUB)	101	38	37.62

From above table, it has been observed that, DU faculty response rate was the lowest (6.14%) whereas IUB faculty response rate was the highest (37.62%).

The Table 3.5 shows the summary of distributed and returned LibQUAL+ printed questionnaire by the students regarding sample and response rate.

Table 3.5
Data Summary Regarding Sample (printed questionnaire, students)

SL. No	University	Questionnaire Distributed	Questionnaire Returned	% Returned/ Response
1	University of Dhaka (DU)	360	348	96.67
2	Rajshahi University (RU)	360	347	96.39
3	Bangladesh Agricultural University (BAU)	330	320	96.97
4	Bangladesh University of Engineering and Technology (BUET)	330	320	96.97
5	Bangabandhu Sheikh Mujib Medical University (BSMMU)	300	282	94.00
6	Independent University, Bangladesh (IUB)	320	315	98.44

Above table demonstrates a very good response from the students. Almost all the libraries had more than 96% response rate by the students except BSMMUL (94%). The following table shows the response rate by each respondent group at DU, RU, BAU, BUET, BSMMU and IUB.

Table 3.6
Response rate by Each Respondent Group, all Samples

University	Respondent Groups	Questionnaire Distributed/ Survey link Forwarded	Questionnaire Returned/ Survey Responded	% Returned /Response
DU	Undergraduate	235	229	97.45
	Graduate	125	119	95.20
	Faculty	407	25	6.14
	Total	*767*	*373*	*48.63*
RU	Undergraduate	265	261	98.49
	Graduate	95	86	90.53
	Faculty	264	17	6.44
	Total	*634*	*364*	*58.33*
BAU	Undergraduate	235	233	99.15
	Graduate	95	87	91.58
	Faculty	232	20	8.62
	Total	*562*	*340*	*60.50*
BUET	Undergraduate	270	269	99.63
	Graduate	60	56	93.33
	Faculty	205	24	11.71
	Total	*535*	*349*	*65.23*
BSMMU	Graduate	300	282	94.00
	Faculty	113	31	27.43
	Total	*413*	*313*	*75.79*
IUB	Undergraduate	270	267	98.89
	Graduate	50	48	96
	Faculty	101	38	37.62
	Total	*421*	*353*	*83.85*

3.3.2. Minimum Response Rates. The response rates were computed by dividing the number of completed surveys at a library by the number of persons asked to complete the survey. However, it was difficult to determine the actual response rates on this web version of assessment for this study, because it was hard to make sure that how many e-mail addresses for users (faculty) were accurate. Besides, it was also hard to know how many messages to invite participation were actually opened. Though it was easy to estimate the response rate of printed questionnaire, but in case of web version, the study was unsure about exact response rate, especially from the faculty respondents. However, here this rate had computed by number of e-mail sent irrespective of knowing the status of email address and the mail sent.

3.4 Data Collection

The research methodology used the "survey method" for collecting data. The research used the items from 2013 version of the LibQUAL+ scale. Within a service-quality assessment model, "only customers judge quality; all other judgments are essentially irrelevant" (Zeithaml, Parasuraman, Berry, 1990) and LibQUAL+ was developed based on this model. LibQUAL+ is a service quality assessment protocol that for libraries that used to implore, follow, recognize, and make action upon users' judgment of service quality. In this study,

The users were asked to complete the survey/questionnaires with three levels of services: *My Minimum Service Level (MS), My Desired Service Level (DS)* and *Perceived Service Performance (PS)*. *My Minimum Service Level* means the minimum level of service that the user consider adequate or sufficient for him/her though it is not equal the level of his/her expectation, *My Desired Service Level* means the level of service that the user expect from the library and *Perceived Service Performance* means the actual service provided by the library. There is 9-point scale from lowest to highest scores to find out the true outlook as a valued user of the University Library System. There is no right or wrong answers; any responded may ignore any statement by responding N/A.

All sample groups were asked to complete LibQUAL+ instrument. The instrument was divided into following sections:

3.4.1 Core Questions. The 22-items that form the core of the LibQUAL+ instrument were listed first. These include aspects of empathy, responsiveness, assurance, reliability, scope, convenience, ease of navigation, timeliness, equipment availability, self-

reliance, pragmatic, utilitarian, and symbolic terms and refuge. The items were focused under three dimensions, these are – (a) *Affect of Service* (9 items); (b) *Information Control* (8 items) and (c) *Library as Place* (5 items). The 22-core items are:

Table 3.7
22 –core items of LibQUAL+ model

LibQUAL+ 22-core items	
Affect of Service	
AS-1	Employees who instill confidence in users
AS-2	Giving users individual attention
AS-3	Employees who are consistently courteous
AS-4	Readiness to respond to users' questions
AS-5	Employees who have the knowledge to answer user questions
AS-6	Employees who deal with users in a caring fashion
AS-7	Employees who understand the needs of their users
AS-8	Willingness to help users
AS-9	Dependability in handling users' service problems
Information Control	
IC-1	Making electronic resources accessible from my home or office
IC-2	A library Web site enabling me to locate information on my own
IC-3	The printed library materials I need for my work
IC-4	The electronic information resources I need
IC-5	Modern equipment that lets me easily access needed information
IC-6	Easy-to-use access tools that allow me to find things on my own
IC-7	Making information easily accessible for independent use
IC-8	Print and/or electronic journal collections I require for my work
Library as Place	
LP-1	Library space that inspires study and learning
LP-2	Quiet space for individual activities
LP-3	A comfortable and inviting location
LP-4	A getaway for study, learning, or research
LP-5	Community space for group learning and group study

3.4.2 Local Questions. For this research five local questions have been adopted from a large pool of question for this context of Bangladesh academic library. The local questions are:

Table 3.8
Local Questions of LibQUAL+ model

	LibQUAL+ Local Questions
LQ-1	Library keeping me informed about resources and services
LQ-2	Librarians teaching me how to effectively use the electronically available databases, journals, and books
LQ-3	Adequate hours of service
LQ-4	Library orientations or instruction sessions
LQ-5	Providing services as promised

3.4.3 Information Literacy, General Satisfaction and Outcomes Questions. This short section includes eight additional survey questions about information literacy and general satisfaction. These are:

Table 3.9
Information Literacy & Satisfaction Questions of LibQUAL+ model

	LibQUAL+ Information literacy outcomes questions
IL-1	The library helps me stay abreast of developments in my field(s) of interest
IL-2	The library aids my advancement in my academic discipline
IL-3	The library enables me to be more efficient in my academic pursuits
IL-4	The library helps me distinguish between trustworthy and untrustworthy information
IL-5	The library provides me with the information skills I need in my work or study
	LibQUAL+ Satisfaction Questions
S-1	In general, I am satisfied with the way in which I am treated at the library
S-2	In general, I am satisfied with library support for my learning, research, and/or teaching needs
S-3	How would you rate the overall quality of the service provided by the library?

3.4.4 Library Use Questions. These questions ask how often the user patronizes the library (either in person or online) as well as how often they use non-library gateways such as Google™ or Yahoo! ™ for information.

3.4.5 Demographic Questions. It includes questions about age, sex, user group (undergraduate, graduate, faculty, etc.), discipline etc.

3.4.6 Comments. This open-ended comments box is a key feature of the LibQUAL+ survey instrument. Respondents can use this box to enter/write their comments about library service and related issues.

3.5 Charts, Tables and Methods used for Data Representation

Scores were mainly presented and explained through different charts and table. These are -

3.5.1 Radar Charts. Radar charts are used to represent several different factors all related to one item. Variations in the data are shown by distance from the center of the chart. Lines connect the data points for each series, forming a spiral around the center. In this study, LibQUAL+ scores (22 core survey questions), each axis represented a different survey question. Questions were identified by a code at the end of each axis. The three dimensions measured by the survey were grouped together on the radar charts, and each dimension was labeled: *Affect of Service* (AS), *Information Control* (IC), and *Library as Place* (LP). To show strengths and weaknesses graphically by enabling to observe symmetry or uniformity of data, radar charts are an effective way. Points close to the center indicate a low value, whereas points near the edge indicate a high value. The *Zone of Tolerance* (ZoT), which is the range between desired service expectation and minimum service expectation, is calculated to find such attributes. The attributes which are inside and outside ZoT were shown through radar charts.

3.5.2 Mean. The mean of a collection of numbers is their arithmetic average, computed by adding them up and dividing by their total number. For this study, means were provided for users' minimum, desired, and perceived levels of service quality for each item on the LibQUAL+ scores. Means were also provided for the general satisfaction and information literacy outcomes questions.

3.5.3 Standard Deviation. Standard deviation is a technique of measure data that spread around their mean. The standard deviation (SD) depends on calculating the average distance of each score from the mean. If all users rated an item identically, the SD would be zero. Larger SDs indicate more contrasting opinions of the users about library service quality. In this study, standard deviations were provided for every mean presented in the tables. In a very real sense, the SD indicates how well a given numerical mean does at representing all the data.

3.5.4 Service Adequacy. Service Adequacy (SA) is an indicator of the degree to which libraries are meeting the minimum expectations of users. SA gap score is called Adequacy Gap (AG) which is calculated by subtracting the minimum score (MS) from the perceived score (PS) on any given service quality statement, for each user. Both means

and standard deviations were provided for service adequacy gap scores on each item of LibQUAL+ scores of this study, as well as for each of the three dimensions of library service quality. A negative service adequacy gap score indicates that users' perceived level of service quality is below their minimum level of service quality.

3.5.5 Service Superiority. Service Superiority (SS) is an indicator of the degree to which libraries are exceeding the desired expectations of users. SS gap score is called Superiority Gap (SG) which is calculated by subtracting the desired score (DS) from the perceived score (PS) on any given service quality statement, for each user. Both means and standard deviations were provided for service superiority gap scores on each item LibQUAL+ scores of this study, as well as for each of the three dimensions of library service quality. A positive service superiority gap score indicates that users' perceived level of service quality is above their desired level of service quality.

3.5.6 Mann-Whitney Test. This test is used to compare differences between two independent groups or conditions or treatments when the dependent variable is either ordinal or continuous, but not normally distributed. This test is often considered the alternative to the independent t-test although this is not always the case. This test allows users to draw different conclusions about the data depending on the assumptions made about data distribution. These conclusions can range from simply stating whether the two populations differ through to determining if there are differences. Here, the service differences of two groups were analysed through *Mann-Whitney Test*.

3.5.7 Kruskal-Wallis Test. This is a nonparametric test used to compare differences between more than two independent groups or conditions or treatments. It is an extension of *Mann-Whitney* Test, equivalent to the *one-way ANOVA*. This test does not assume a normal distribution of the residuals, unlike the analogous one-way analysis of variance. However, the test does assume an identically shaped and scaled distribution for each group, and leads to significant results; at least one of the samples is different from the other samples. Here, the service differences of more than two groups were analysed through Kruskal-Wallis Test.

3.5.8 Exploratory Factor Analysis & Confirmatory Factor Analysis. The main aim of this analysis is to explore latent factors that account for variance and covariance among a set of observed variables (both based on common factor model). In social science research, two common statistical methods to observe variability among the variables are Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). EFA is a

statistical method of data reduction which infers presence of latent factors which are responsible for the shared variance in a set of observed variables. EFA is by definition 'exploratory', the user does not specify a structure, and assumes each variable could be related to each underlying factor. Confirmatory factor analysis CFA is used to test whether measures of any object/construct are consistent with researcher's understanding of the nature of that factor.

3.5.9 Degree of Scores. "Perceived" scores on the 22 core items, the three subscales, and the total score, are all scaled 1 to 9, with 9 being the most favorable. Both the gap scores (Adequacy = Perceived – Minimum; Superiority = Perceived – Desired) are scaled such that higher scores are more favorable. Thus, an *adequacy* gap score of +1.5 on an item, sub-scale, or total score is better than an adequacy gap score of +1.0. Similarly, a *superiority* gap score of -0.6 on an item, subscale, or total score is better than a superiority gap score of -1.0.

3.6 Data Treatment

In any survey whether web based tool or printed questionnaire used, some users provide incomplete data, inconsistent data, or both. In compiling the summary data reported here, several criteria were used to determine which respondents to omit from these analyses. After data collection, the survey data was entered into SPSS (Statistical Package for the Social Sciences), The following procedures of data treatment were set to validate the data for analysis. The processes of checking error:

3.6.1 Checking Error because of Wrong Input. Check data input by comparing with the original copies of questionnaires and from the web tool. Then correct the wrong records, irrelevant and noisy data.

3.6.2 Checking Complete Data. The Web tool that presents the core items monitors whether a given user has completed all items i.e. required item. in order to submit the survey successfully, users must provide a rating of all three scales or "not applicable" ("N/A") on each of these items. If these conditions are not met, when the user attempts to leave the Web page presenting the items, the items shows the user where missing data are located, and requests complete data. The user may of course abandon the assessment without completing all the items. In case of printed questionnaire, these things were supervised cautiously to avoid missing data.

3.6.3 Too Much "N/A" Responses. As the services of some libraries may not be as good as users' expectations or not close to their outlook, so in few cases completing the assessment survey, some users selected "N/A" choices for all or most of the items rather than evaluate their actual perceptions. Otherwise, some users might have views on such a small range of quality issues that their data were not very informative. It was decided that records of this assessment survey containing more than 11 "N/A" responses eliminated.

3.6.4 Excessive Inconsistent Responses. In this assessment survey, user perceptions can be interpreted by making relation of "Perceived" results within the "Zone of Tolerance" defined by data from the "Minimum" and the "Desired" ratings.

Logically, on a given item the "Minimum" scores should not be higher than the "Desired" scores on the same item. For each user a count of such inconsistencies was made. Data of the assessment survey containing more than 9 logical inconsistencies were eliminated. It is expected that "Desired" scores must be higher than "Minimum" or can be at the same level. Otherwise, it means erroneous occurrence caused by the response.

For core-22 items, in case of adequacy gap, e.g. PS (Perceived Service) - MS (Minimum Service), if values from PS1-22 – MS1-22 were all 0s, it intended the values in each section were the same so that record had to be checked and modified if necessary. In case of superiority gap, PS (Perceived Service) - DS (Desired Service) The gap difference between these two sections will help the administrators to provide excellent services so if the values from PS – ES were all 0s or too much gap difference, the record had to be checked and modified if necessary.

3.7 Statistical Methods and Techniques for Data Analysis

The data was analyzed in the following ways:

- First, to determine service adequacy, the gap difference of the Minimum Service and Perceived Service for any given service quality statement was calculated and ranked respectively, for each user.
- Second, to obtain which attributes of service quality equal, exceed or fall short user perception (meeting desired expectation), by the group users, the gap discrepancy between Desired Service and Perceived Service performance was calculated by individual group of users and ranked respectively.

- Third, to examine in what way the users expected for excellent service quality from university libraries, by individual group of users, the means of desired service expectations was ranked and compared among three groups of users.
- Fourth to explore the status of local questions responses, all three levels of service performances and gaps were calculated and ranked respectively.
- Fifth, to investigate which were the most essential attributes that library manager should allocate the resource for good service quality, the *Zone of Tolerance* which is the range between Desired Service Level and Minimum Service Level has been calculated.
- Sixth, to explore the underlying dimensions that determine the users' evaluation of service quality and the dimensions that are predefined, exploratory and confirmatory factor analysis were performed respectively.
- Finally, to see the significant differences, different nonparametric tests like, Kruskal-Wallis and Mann-Whitney tests were calculated.

Statistical analysis was performed using SPSS and MS Excel, and structural model was tested using IBM SPSS AMOS.

3.8 Summary

This Chapter illustrated methodology of the study, identified problem statement and rationale, specified the research questions, depicted sampling and response rates, data collection and data treatment, described assessment questions and dimension, and outlined statistical methods and techniques used for data analysis.

Chapter 4

Data Analysis and Findings

4.1 Introduction

The previous Chapter outlined the methodology of the study including sampling and data collection, survey instrument, and statistical procedures used for data analysis to address the research questions posed. This Chapter will illustrate the result of the data analyses against research questions.

4.2 Methodological Approach

The research used the items from 2013 version of the LibQUAL+ scale. LibQUAL+ is a service quality assessment protocol for libraries that used to implore, follow, recognize and make action upon users' judgment of service quality. In this study, the users were asked to complete the survey/questionnaires with three levels of services: *My Minimum Service Level (MS), My Desired Service Level (DS)* and *Perceived Service Performance (PS)*. "My Minimum Service Level" means the minimum level of service that the user consider adequate or sufficient for him/her though it is not equal the level of his/her expectation; "My Desired Service Level" means the level of service that the user expect from the library; and "Perceived Service Performance" means the actual service provided by the library. A 9-point scale from lowest to highest scores was used to find out the true outlook as a valued user of the university library system. There is no right or wrong answers; any responded may ignore any statement by responding "N/A". However, following research questions were investigated as a construction for this study:

1. *Which attributes of service quality are meeting minimum expectations, or adequate service by the group user?*

   First, the gap difference of the Minimum Service and Perceived Service for any given service quality statement was calculated and ranked respectively, for each user.

2. *Which attributes of service quality equal, exceed or fall short user perception (meeting desired expectation), by the group user?*

   Second, to obtain which attributes of service quality equal, exceed or fall short user perception (meeting desired expectation), the group user, the gap

discrepancy between Desired Service and Perceived Service performance was calculated by individual group of users and ranked respectively.

3. *In what way do the users expect for excellent service quality from the university library, by the group user?*

   Third, to examine in what way the users expected for excellent service quality from university libraries, by the group user, the means of desired service expectations was ranked and compared among three groups of users.

4. *What is the status of local questions response?*

   Fourth, to explore the status of local questions responses, all three levels of service performances and gaps were calculated and ranked respectively.

5. *What are the most essential attributes that librarians or library managers should allocate the resources to support for improving excellent service quality?*

   Fifth, to investigate which were the most essential attributes that library managers should allocate the resource for good service quality, the *Zone of Tolerance* which is the range between Desired Service Level and Minimum Service Level were calculated.

6. *What are the underlying dimensions that determine the users' evaluation of service quality? How do the predefined dimensions fit in the service quality assessment tool?*

   Sixth, to reveal the underlying dimensions those determine the users' evaluation of service quality and dimensions which are predefined, exploratory and confirmatory factor analysis were performed respectively.

7. *Are there any significant differences between male and female users by user group gender for overall service quality?*
8. *Are there any significant differences between the users by individual group of user for overall service quality?*

   Finally, in these cases, to see the significant differences different non-parametric statistical analysis like, Kruskal -Wallis and Mann-Whitney tests were calculated.

4.3 Characteristics of Sample Groups (Demographic Summary)

The study investigated LibQUAL+ scores for library service quality assessment at six university libraries, e.g. DUL, RUL, BAUL, BUETL, BSMMUL and IUBL. The samples of the study were the users/customers (undergraduate and graduate students, and faculty/researchers).

4.3.1 Number of Respondent Compared with Total Population

This research assembled required number of respondents where the sample size reflected 95 percent confidence level and ±5 standard deviation; the total respondents for DU, RU, BAU, BUET, BSMMU and IUB were 1.07%, 1.10%, 5.79%, 4.05%, 16.92% and 8.31% respectively of the total population in the universities. Table 4.1shows the comparison of respondents with the total population.

Table 4.1

Number of Respondent Compared to Total Population

University	Types of Population	Population	Respondents	%
DU	Students	33,000	348	1.05
	Faculty	1,960	25	1.28
	Total	*34,960*	*373*	*1.07*
RU	Students	32,000	347	1.08
	Faculty	1,100	17	1.55
	Total	*33,100*	*364*	*1.10*
BAU	Students	5,300	320	6.04
	Faculty	570	20	3.51
	Total	*5,870*	*340*	*5.79*
BUET	Students	8,000	325	4.06
	Faculty	620	24	3.87
	Total	*8,620*	*349*	*4.05*
BSMMU	Students	1,400	282	20.14
	Faculty	450	31	6.89
	Total	*1,850*	*313*	*16.92*
IUB	Students	4,000	515	7.88
	Faculty	250	38	15.20
	Total	*4,250*	*353*	*8.31*

4.3.2 Respondents by Gender and Group User

Table 4.2 and Table 4.3 below show the number of respondents by gender and group (undergraduate, graduate and faculty) of the users. Among 373 respondents at DU, 71.06% were male and 28.94% were female. The majority of the respondents represented students: undergraduate (61.39%) and graduate students (31.91 %), whereas 6.70%

respondents were faculty. At RU, among 364 respondents, male respondents were 60.71% and female were 39.29%, and most of the respondents were undergraduate (71.70%). The percentage of graduate students was 23.63 where faculty had a percentage of 4.67. In case of BAU, with 340 respondents, male and female percentages were 54.71 and 45.29 respectively. The percentages by status were 68.53 (undergraduate), 23.59 (graduate) and 5.88 (faculty). At BUET, along with 349 respondents, responses of male were 65.90% and female were 34.10%, consecutively regarding user group, whether, undergraduate, graduate and faculty response was 77.08%, 16.04% and 6.88% successively. At BSMMU, among 313 respondents, male respondents were 63.90 % and female were 36.10% and most of the respondents were graduate students (90.10%), where faculty response was 9.90%. For IUB, with 353 respondents, male and female response was 67.14% and 32.86% in the order. The percentage by status was 75.64 (undergraduate), 13.60 (graduate) and 10.76 (faculty) sequentially.

Table 4.2

Gender of the Respondents

University	Gender	Frequency	%
DU	Male	265	71.06
	Female	108	28.94
	Total	*373*	*100.00*
RU	Male	221	60.71
	Female	143	39.29
	Total	*364*	*100.00*
BAU	Male	186	54.71
	Female	154	45.29
	Total	*340*	*100.00*
BUET	Male	230	65.90
	Female	119	34.10
	Total	*349*	*100.00*
BSMMU	Male	200	63.90
	Female	113	36.10
	Total	*313*	*100.00*
IUB	Male	237	67.14
	Female	116	32.86
	Total	*353*	*100.00*

Table 4.3

User Group of the Respondents

University	User Group	Frequency	%
DU	Undergraduate	229	61.39
	Graduate	119	31.91
	Faculty	25	6.70
	Total	*373*	*100.00*
RU	Undergraduate	261	71.70
	Graduate	86	23.63
	Faculty	17	4.67
	Total	*364*	*100.00*
BAU	Undergraduate	233	68.53
	Graduate	87	23.59
	Faculty	20	5.88
	Total	*340*	*100.00*
BUET	Undergraduate	269	77.08
	Graduate	56	16.04
	Faculty	24	6.88
	Total	*349*	*100.00*
BSMMU	Graduate	282	90.10
	Faculty	31	9.90
	Total	*313*	*100.00*
IUB	Undergraduate	267	75.64
	Graduate	48	13.60
	Faculty	38	10.76
	Total	*353*	*100.00*

4.3.3 Respondents by User Sub-Group Status

Table 4.4 - 4.9 below show the number of respondents by user group, undergraduate, graduate and faculty (e.g. first year, masters, professor) respectively, based on user responses to the demographic questions at the end of the survey instrument. At DU, most of the undergraduate students were second year student (38.86%), for graduate students, 96.64% are from masters level, and in faculty group, associate professors (40.00%) were the top respondents (Table 4.4). At RU, from undergraduate, fourth year students were the highest respondents (37.55%), for graduate, all were masters students (100%) and from faculty group, assistant professors responded utmost (35.29%) (Table 4.5). From BAU, for undergraduate, third year students (36.05%), for graduate, masters (89.66) and for faculty, associate professor (35.00%) had the most response rate as sub-group status (Table 4.6). In BUET, from the undergraduate category most of the respondents were second year (36.80%) students, from graduate, most were the masters (92.86%) and from faculty, professors (41.67%) were the top respondent (Table 4.7). BSMMU library had no undergraduate users, master students were the highest respondents

(92.20%) from graduate sub-group and associate professors were the largest group (35.48%) (Table 4.8). Finally, at IUB, third year students were the highest (26.97%) respondent though second year students were very close to them (26.59%) for undergraduate sub-group, on the other hand, only masters students responded (100.00%) from the graduate category, whereas lecturers (42.11%) were the largest group (Table 4.9).

Table 4.4

User Sub-Group Status at DU

User Group	Status	Frequency	%
Undergraduate	First year	31	13.54
	Second year	89	38.86
	Third year	44	19.21
	Fourth year	65	28.38
	Total	*229*	*100.00*
Graduate	Masters	115	96.64
	Doctoral	4	3.36
	Total	*119*	*100.00*
Faculty	Professor	8	32.00
	Associate Professor	10	40.00
	Assistant Professor	4	16.00
	Lecturer	3	12.00
	Total	*25*	*100.00*

Table 4.5

User Sub-Group Status at RU

User Group	Status	Frequency	%
Undergraduate	First year	22	8.43
	Second year	51	19.54
	Third year	90	34.48
	Fourth year	98	37.55
	Total	*261*	*100.00*
Graduate	Masters	86	100.00
	Total	*86*	*100.00*
Faculty	Professor	5	29.41
	Associate Professor	3	17.65
	Assistant Professor	6	35.29
	Lecturer	3	17.65
	Total	*17*	*100.00*

Table 4.6

User Sub-Group Status at BAU

User Group	Status	Frequency	%
Undergraduate	First year	28	12.02
	Second year	73	31.33
	Third year	84	36.05
	Fourth year	48	20.60
	Total	*233*	*100.00*
Graduate	Masters	78	89.66
	Doctoral	9	10.34
	Total	*87*	*100.00*
Faculty	Professor	4	20.00
	Associate Professor	7	35.00
	Assistant Professor	5	25.00
	Lecturer	4	20.00
	Total	*20*	*100.00*

Table 4.7

User Sub-Group Status at BUET

User Group	Status	Frequency	%
Undergraduate	First year	12	4.46
	Second year	99	36.80
	Third year	96	35.69
	Fourth year	62	23.05
	Total	*269*	*100.00*
Graduate	Masters	52	92.86
	Doctoral	4	7.14
	Total	*56*	*100.00*
Faculty	Professor	10	41.67
	Assistant Professor	8	33.33
	Lecturer	6	25.00
	Total	*24*	*100.00*

Table 4.8

User Sub-Group Status at BSMMU

User Group	Status	Frequency	%
Graduate	Masters	260	92.20
	Doctoral	10	3.55
	Non-degree or undecided	1	.35
	Others	11	3.90
	Total	*282*	*100.00*
Faculty	Professor	1	3.23
	Associate Professor	11	35.48
	Assistant Professor	6	19.35
	Lecturer	10	32.26
	Adjunct Faculty	2	6.45
	Others	1	3.23
	Total	*31*	*100.00*

Table 4.9

User Sub-Group Status at IUB

User Group	Status	Frequency	%
Undergraduate	First year	65	24.34
	Second year	71	26.59
	Third year	72	26.97
	Fourth year	52	19.48
	Fifth year and above	7	2.62
	Total	*267*	*100.00*
Graduate	Masters	48	100.00
	Total	*48*	*100.00*
Faculty	Professor	4	10.53
	Associate Professor	6	15.79
	Assistant Professor	8	21.05
	Lecturer	16	42.11
	Adjunct Faculty	4	10.53
	Total	*38*	*100.00*

4.3.4 Respondents by Discipline

Table 4.10 – 4.15 below show the number of respondents by discipline, based on user responses to the demographic questions. In case of DU, most of the respondents were from arts/humanities (54.96%), whereas, at RU, most of the respondents were from business discipline (26.65%), for BAU, agriculture discipline comprised the largest group (78.82%), at BUET, engineering discipline responded most (74.50%), for IUB most of the respondents were from business discipline (69.97%), however all the users at BSMMU from the medical science discipline (100%).

Table 4.10

Discipline of the Respondents (all user groups) at DU

Discipline	Frequency	%
Arts/Humanities	205	54.96
Business	33	8.85
Law	4	1.07
Science	7	1.88
Social Science	124	33.24
Total	**373**	**100.00**

Table 4.11

Discipline of the Respondents (all user groups) at RU

Discipline	Frequency	%
Agriculture	26	7.14
Arts/Humanities	75	20.60
Business	97	26.65
Engineering	10	2.75
Science	47	12.91
Social Science	95	26.10
Others	14	3.85
Total	**364**	**100.00**

Table 4.12

Discipline of the Respondents (all user groups) at BAU

Discipline	Frequency	%
Agriculture	268	78.82
Fisheries	38	11.18
Veterinary	34	10.00
Total	**340**	**100.00**

Table 4.13

Discipline of the Respondents (all user groups) at BUET

Discipline	Frequency	%
Architecture	82	23.50
Arts/Humanities	1	.29
Engineering	260	74.50
Science	2	.57
Others	4	1.15
Total	**349**	**100.00**

Table 4.14

Discipline of the Respondents (all user groups) at BSMMU

Discipline	Frequency	%
Medical Science	313	100.00
Total	**313**	**100.00**

Table 4.15

Discipline of the Respondents (all user groups) at IUB

Discipline	Frequency	%
Arts/Humanities	3	.85
Business	247	69.97
Engineering	41	11.61
Science	38	10.76
Social Science	24	6.80
Total	**353**	**100.00**

4.3.5 Respondents by Age

The following tables (Table 4.16 - 4.21) show a breakdown of the respondents by age. At DU, jointly 42.90% respondents fell into "18-22" and "23-27" age categories as the highest number of respondents (Table 4.16). For RU, most of the respondents 61.81% were from "18-22" age category (Table 4.17). Likewise, at BAU and UB respectively, the highest number of 44.12% (Table 4.18) and, 61.76% (Table 4.21) users came from the same "18-22" category. The highest age category for BUET and BSMMU were different, where 49.28% (Table 4.19) and 42.49% (Table 4.20) came from "23-27" age group.

Table 4.16

Age of the Respondents (all user groups) at DU

Age (Year)	Frequency	%
<18	26	6.97
18-22	160	42.90
23-27	160	42.90
28-32	7	1.88
33-37	9	2.41
38-42	8	2.14
43-47	3	.80
Total	**373**	**100.00**

Table 4.17

Age of the Respondents (all user groups) at RU

Age (Year)	Frequency	%
<18	12	3.30
18-22	110	30.22
23-27	225	61.81
28-32	4	1.10
33-37	8	2.20
43-47	3	.82
48-52	2	.55
Total	**364**	**100.00**

Table 4.18

Age of the Respondents (all user groups) at BAU

Age (Year)	Frequency	%
<18	5	1.47
18-22	150	44.12
23-27	111	32.65
28-32	49	14.41
33-37	17	5.00
38-42	4	1.18
43-47	2	.59
58-62	2	.59
Total	**340**	**100.00**

Table 4.19

Age of the Respondents (all user groups) at BUET

Age (Year)	Frequency	%
18-22	129	36.96
23-27	172	49.28
28-32	34	9.74
33-37	2	.57
38-42	2	.57
43-47	2	.57
48-52	4	1.15
53-57	4	1.15
Total	**349**	**100.00**

Table 4.20

Age of the Respondents (all user groups) at BSMMU

Age (Year)	Frequency	%
23-27	63	20.13
28-32	133	42.49
33-37	89	28.43
38-42	22	7.03
43-47	4	1.28
48-52	2	.64
Total	**313**	**100.00**

Table 4.21

Age of the Respondents (all user groups) at IUB

Age (Year)	Frequency	%
<18 years	6	1.70
18-22	218	61.76
23-27	100	28.33
28-32	17	4.82
33-37	2	.57
38-42	6	1.70
43-47	4	1.13
Total	**353**	**100.00**

4.3.6 Library Use Summary

This section showed charts and tables of library use in different universities e.g. DU, RU, BAU, BUET, BSMMU and IUB (both on the premises and electronically), as well as use of non-library information gateways such as Yahoo! and Google. Bars represent the frequency with which respondents report using these resources: daily, weekly, monthly, quarterly, or never.

At DU (Table 4.22), regarding first question "How often do you use resources on library premises?", among the respondents, 42.09% users used library resources on library premise daily and 8% never used, whereas weekly, monthly and quarterly usage were in order of 36.46%, 15.01% and 4.29%.So, a good number of users used library resources at library premise regularly. For second question, "How often do you access library resources through a library Web page?" highest 27.88% respondents never used it, whereas quarterly user 21.45%, monthly user 22.79%, weekly 20.91% and daily user was 6.97%. So a small portion of user accessed library resources through a library web page commonly. Regarding third question, "How often do you use Yahoo!, Google, or non-library gateways for information?" the response shows that a good number of respondents

were (59.79%) daily user; the other frequencies of use were weekly (26.01%), monthly (7.77%), quarterly (3.22%) and never (3.22%). The graphical representation is shown in the Figure 4.1.

At RU (Table 4.23), concerning first question "How often do you use resources on library premises?", among the respondents, highest 47.53% were weekly user. Here, 23.90% respondents used library resources on library premise daily; monthly user 21.43%, quarterly user 5.77% and 1.37 user never used resources on library premises. For second question, "How often do you access library resources through a library Web page?" in this case, daily user was very poor; it was 9.62%. Most of the respondents used library resources through library web page monthly (30.49%), likewise, 26.65% used weekly, 6.59% used quarterly and 26.65% users never used it. More or less same scenario is observed for the third question, "How often do you use Yahoo!, Google, or non-library gateways for information?". Here, most of the respondents (32.97%) used weekly and lowest users were 9.34% from quarterly category. However, 16.48% users were from daily, 20.05% users from monthly category and 21.15% users never used. The graphical representation is shown in the Figure 4.2.

At BAU (Table 4.24), regarding first question "How often do you use resources on library premises?" among the respondents, weekly users were the highest (48.82%), whereas, 32.65% used daily, 16.76% used monthly, 1.76% used quarterly and there were none of the respondents who never used resources on library premises(0.00%). For second question, "How often do you access library resources through a library Web page?", among the respondents, highest 56.18% users never used it. Other scores order is daily (6.47%), weekly (14.12%), monthly (10.29%) and quarterly (12.94%). So, more than half portion of the respondents never used library resources through web page of the library. On the subject of third question, "How often do you use Yahoo!, Google, or non-library gateways for information?", about half (49.71%) of the respondents used non-library gateway; beside, 33.24% used weekly, 4.71% used monthly, 4.71% used quarterly and 5.59% respondents never used. The graphical representation is shown in the Figure 4.3.

At BUET (Table 4.25), regarding first question "How often do you use resources on library premises?" among the respondents, more than half (52.72%) of the users used library resources on library premise daily and 1.72% never used, whereas weekly, monthly and quarterly usage were 37.82%, 4.58% and 3.15%.So, like DU, a good number of users

used library resources at library premise regularly here at BUET. For second question, "How often do you access library resources through a library Web page?", highest 35.88% respondents never used it, whereas weekly user was 28.37%, monthly user 15.76%, daily 11.17% and 8.88% respondent as quarterly. Regarding third question, "How often do you use Yahoo!, Google, or non-library gateways for information?", the response demonstrates that more than half of the respondents were (54.15) daily user; while other respondents were 28.65% weekly, 6.88% monthly, 3.72% quarterly and 6.59% from never option. The graphical representation is shown in the Figure 4.4.

At BSMMU (Table 4.26), for first question "How often do you use resources on library premises?" among the respondents, a very good number of responses (69.33%) observed. There was no user who never (0.00%) had used resources on library premises. 22.36% respondents used weekly, 4.47% monthly and 3.83% quarterly. For second question, "How often do you access library resources through a library Web page?" in this case, Highest 35.15% respondents used resources on library premises. Other respondents' distribution are, weekly (16.93%), monthly (16.29%) and quarterly (9.90%). For the third question, "How often do you use Yahoo!, Google, or non-library gateways for information?", here, most of the respondents (46.01%) used daily and lowest users were 8.63% from never category. Anyway, 30.35% users were from weekly, 8.635% from monthly and 6.39% from quarterly category. The graphical representation is shown in the Figure 4.5.

At IUB (Table 4.27), regarding first question "How often do you use resources on library premises?" among the respondents, A good number of respondents fallen to daily (42.21%) category. Weekly users were also high (36.83%), other distribution are, monthly (15.58%), quarterly (4.53%), on the contrary, never (.58%) is very low. For second question, "How often do you access library resources through a library Web page?", among the respondents, highest user was from weekly (36.26%) category. Other scores order is daily (13.88%), monthly (20.40%), quarterly (16.71%) and 12.75% from never category. For third question, "How often do you use Yahoo!, Google, or non-library gateways for information?", more than half of the respondents (58.36%) used non-library gateway daily; beside, 27.48% used weekly, 9.35% used monthly, 3.97% used quarterly and .85% respondents never used. The graphical representation is shown in the Figure 4.6.

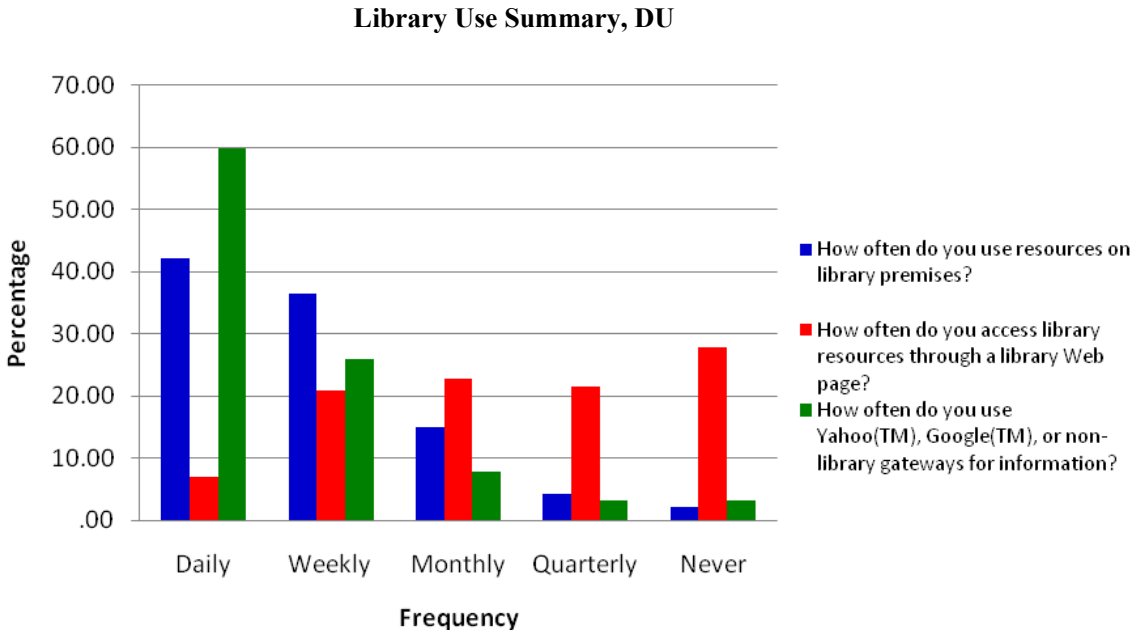


Figure 4.1 Library Use Summary at DU

Table 4.22

Library Use Summary at DU

Library Use Questions	Daily	Weekly	Monthly	Quarterly	Never	n/%
How often do you use resources on library premises?	157	136	56	16	8	373
	42.09	36.46	15.01	4.29	2.14	100.00
How often do you access library resources through a library Web page?	26	78	85	80	104	373
	6.97	20.91	22.79	21.45	27.88	100.00
How often do you use Yahoo!, Google, or non-library gateways for information?	223	97	29	12	12	373
	59.79	26.01	7.77	3.22	3.22	100.00

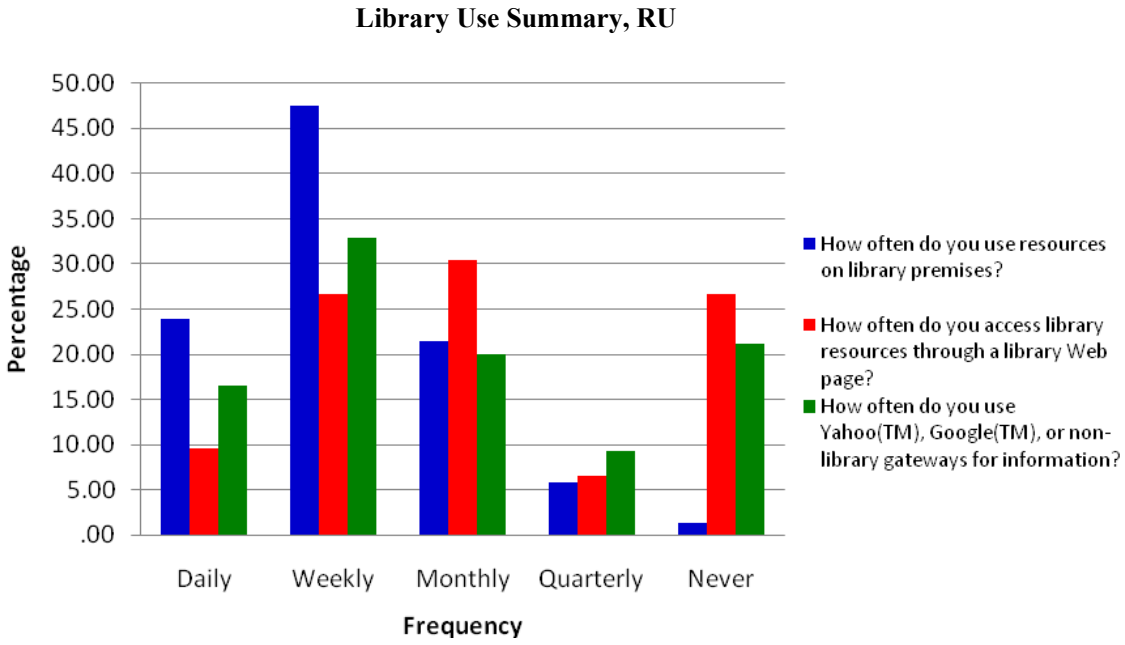


Figure 4.2 Library Use Summary at RU

Table 4.23

Library Use Summary at RU

Library Use Questions	Daily	Weekly	Monthly	Quarterly	Never	n/%
How often do you use resources on library premises?	87	173	78	21	5	364
	23.90	47.53	21.43	5.77	1.37	100.00
How often do you access library resources through a library Web page?	35	97	111	24	97	364
	9.62	26.65	30.49	6.59	26.65	100.00
How often do you use Yahoo!, Google, or non-library gateways for information?	60	120	73	34	77	364
	16.48	32.97	20.05	9.34	21.15	100.00

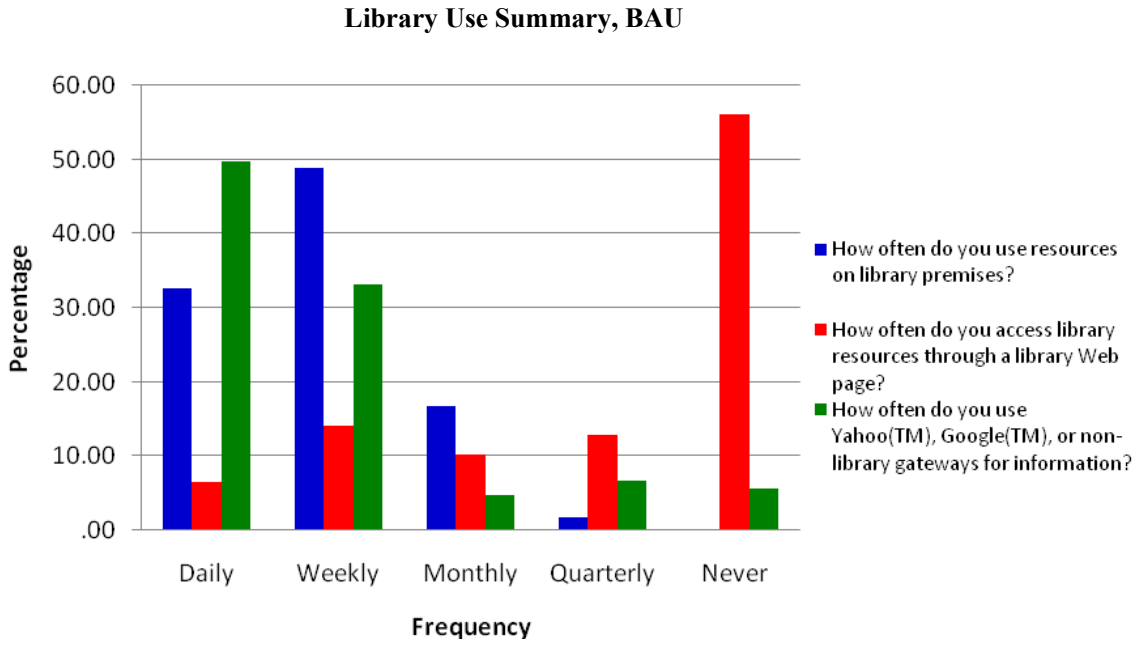


Figure 4.3 Library Use Summary at BAU

Table 4.24

Library Use Summary at BAU

Library Use Questions	Daily	Weekly	Monthly	Quarterly	Never	n/%
How often do you use resources on library premises?	111	166	57	6	0	340
	32.65	48.82	16.76	1.76	.00	100.00
How often do you access library resources through a library Web page?	22	48	35	44	191	340
	6.47	14.12	10.29	12.94	56.18	100.00
How often do you use Yahoo!, Google, or non-library gateways for information?	169	113	16	23	19	340
	49.71	33.24	4.71	6.76	5.59	100.00

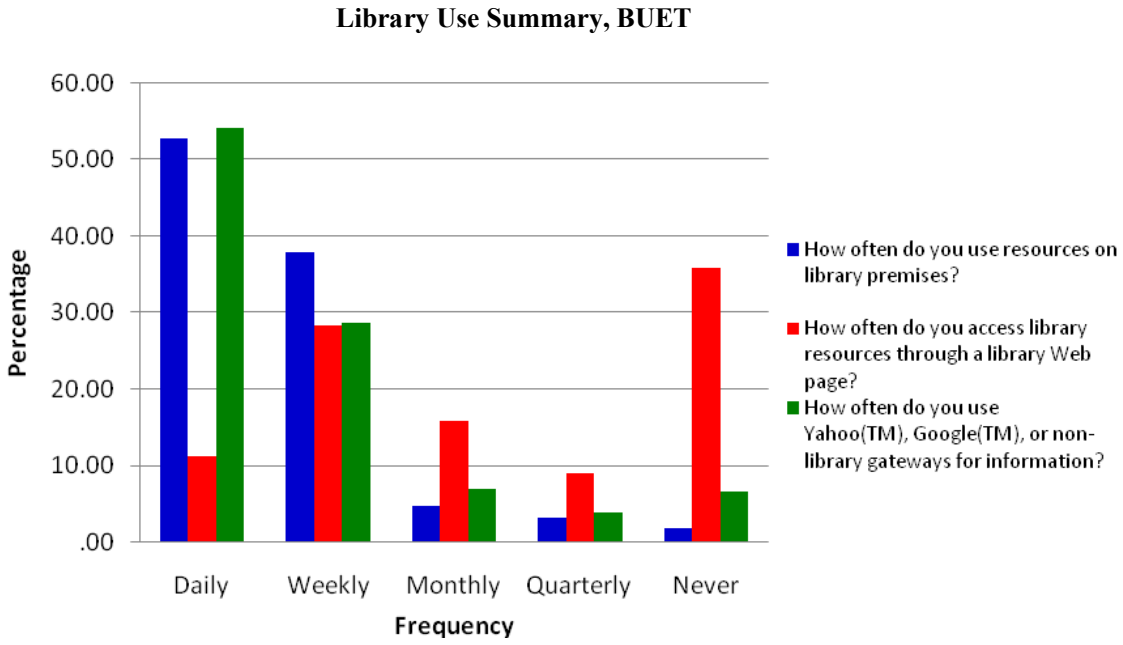


Figure 4.4 Library Use Summary at BUET

Table 4.25

Library Use Summary at BUET

Library Use Questions	Daily	Weekly	Monthly	Quarterly	Never	n/%
How often do you use resources on library premises?	184	132	16	11	6	349
	52.72	37.82	4.58	3.15	1.72	100.00
How often do you access library resources through a library Web page?	39	99	55	31	125	349
	11.17	28.37	15.76	8.88	35.82	100.00
How often do you use Yahoo!, Google, or non-library gateways for information?	189	100	24	13	23	349
	54.15	28.65	6.88	3.72	6.59	100.00

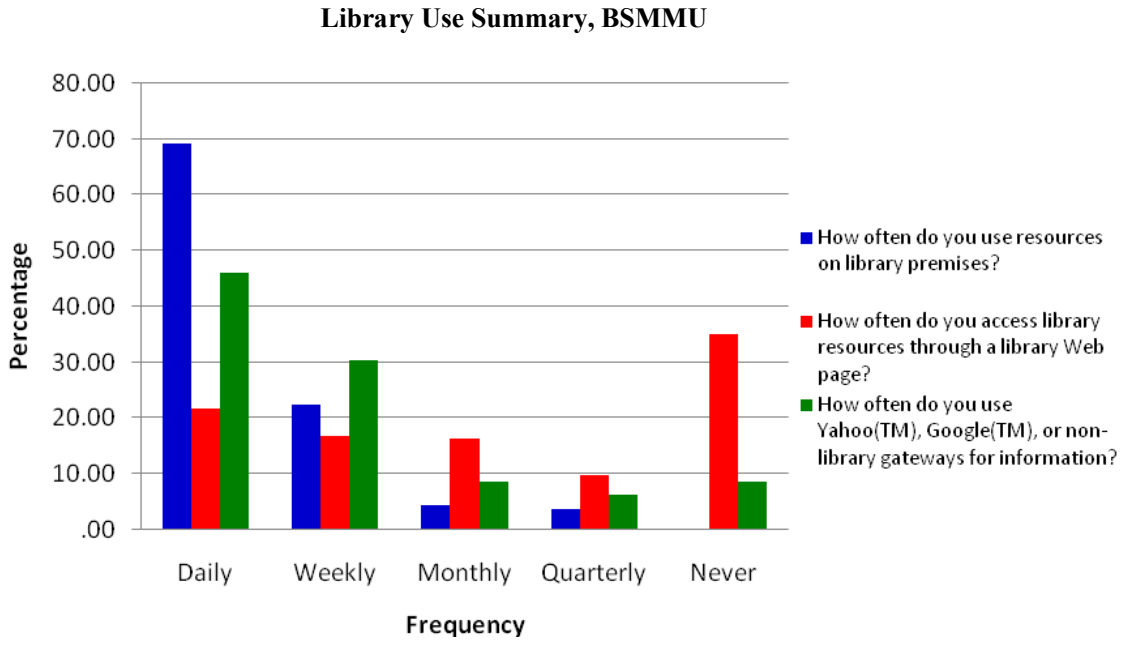


Figure 4.5 Library Use Summary at BSMMU

Table 4.26

Library Use Summary at BSMMU

Library Use Questions	Daily	Weekly	Monthly	Quarterly	Never	n/%
How often do you use resources on library premises?	217	70	14	12	0	313
	69.33	22.36	4.47	3.83	.00	100.00
How often do you access library resources through a library Web page?	68	53	51	31	110	313
	21.73	16.93	16.29	9.90	35.14	100.00
How often do you use Yahoo!, Google, or non-library gateways for information?	144	95	27	20	27	313
	46.01	30.35	8.63	6.39	8.63	100.00

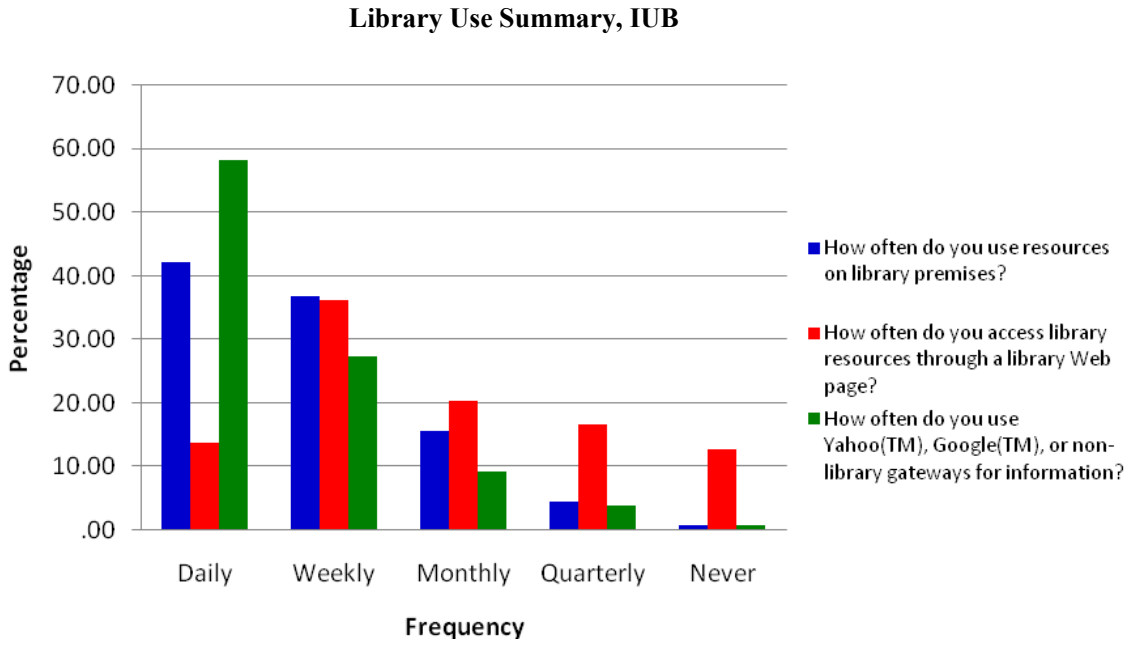


Figure 4.6 Library Use Summary at IUB

Table 4.27

Library Use Summary at IUB

Library Use Questions	Daily	Weekly	Monthly	Quarterly	Never	n/%
How often do you use resources on library premises?	149	130	55	16	3	353
	42.21	36.83	15.58	4.53	.85	100.00
How often do you access library resources through a library Web page?	49	128	72	59	45	353
	13.88	36.26	20.40	16.71	12.75	100.00
How often do you use Yahoo!, Google, or non-library gateways for information?	206	97	33	14	3	353
	58.36	27.48	9.35	3.97	.85	100.00

4.4 Information Literacy Outcomes Responses

Tables 4.28 display the Mean score and Standard Deviation (SD) for each of the information literacy (IL) outcomes questions, where *n* is the number of respondents for each question. The IL question scope was limited to user interest, progress, efficiency, evaluation and competency. The questions were in a 9-point scale from lowest to highest (1-strongly disagree, 9-strongly agree).

Table 4.28

Response to the Information Literacy Questions by all Universities, Mean (SD)

IL ID	DU	RU	BAU	BUET	BSMMU	IUB
IL-1	5.83 (1.59)	5.74 (1.61)	5.54 (1.33)	5.37 (1.76)	5.20 (1.88)	5.87 (2.19)
IL-2	6.40 (1.85)	5.86 (1.59)	5.57 (1.78)	5.58 (1.71)	5.28 (1.95)	6.09 (2.24)
IL-3	6.33 (2.02)	5.98 (1.67)	5.11 (1.64)	5.46 (1.80)	4.86 (1.72)	5.50 (2.20)
IL-4	4.75 (1.47)	5.94 (1.76)	4.85 (1.56)	4.92 (1.98)	4.80 (1.74)	5.48 (2.33)
IL-5	5.20 (1.38)	5.73 (1.63)	5.14 (2.01)	5.14 (2.10)	4.88 (1.83)	5.89 (2.24)

Figure 4.7 illustrates a comparison of the Mean scores of the responses to the information literacy (IL) outcome. Though Information Literacy classes are regularly held at IUB only, so the responses to this section was quite surprising which illustrates that somehow students were getting benefits from their libraries related and/or information related problem which is really absent to their library. However, regarding IL statement 1 (IL-1) "The library helps me stay abreast of developments in my field(s) of interest", IUB respondents had the highest score (5.87) followed by DU (5.83). BSMMU scored the lowest (5.20). Concerning IL statement 2 (IL-2) "The library aids my advancement in my academic discipline", DU was in the top position (6.40) to the comparison, where IUB was in the second (6.09) place. Like the IL-1, BSMMU scored the lowest also for IL-2. In support of IL-3, "The library enables me to be more efficient in my academic pursuits", mean value of DU respondents again on the top (6.33), where RU was in next (5.98) to them. BSMMU was again at the lowest position. For the IL-4, "The library helps me distinguish between trustworthy and untrustworthy information", RU was in the top position (5.94) for this statement where IUB was in the 2nd place (5.48). BSMMU (4.80) was the lowest with close to BAU (4.85) and BUET (4.92). Regarding IL-5, "The library provides me with the information skills I need in my work or study", IUB response was in

the highest position (5.89) and RU was behind them (5.73). As usual BSMMU was at the end of the place.

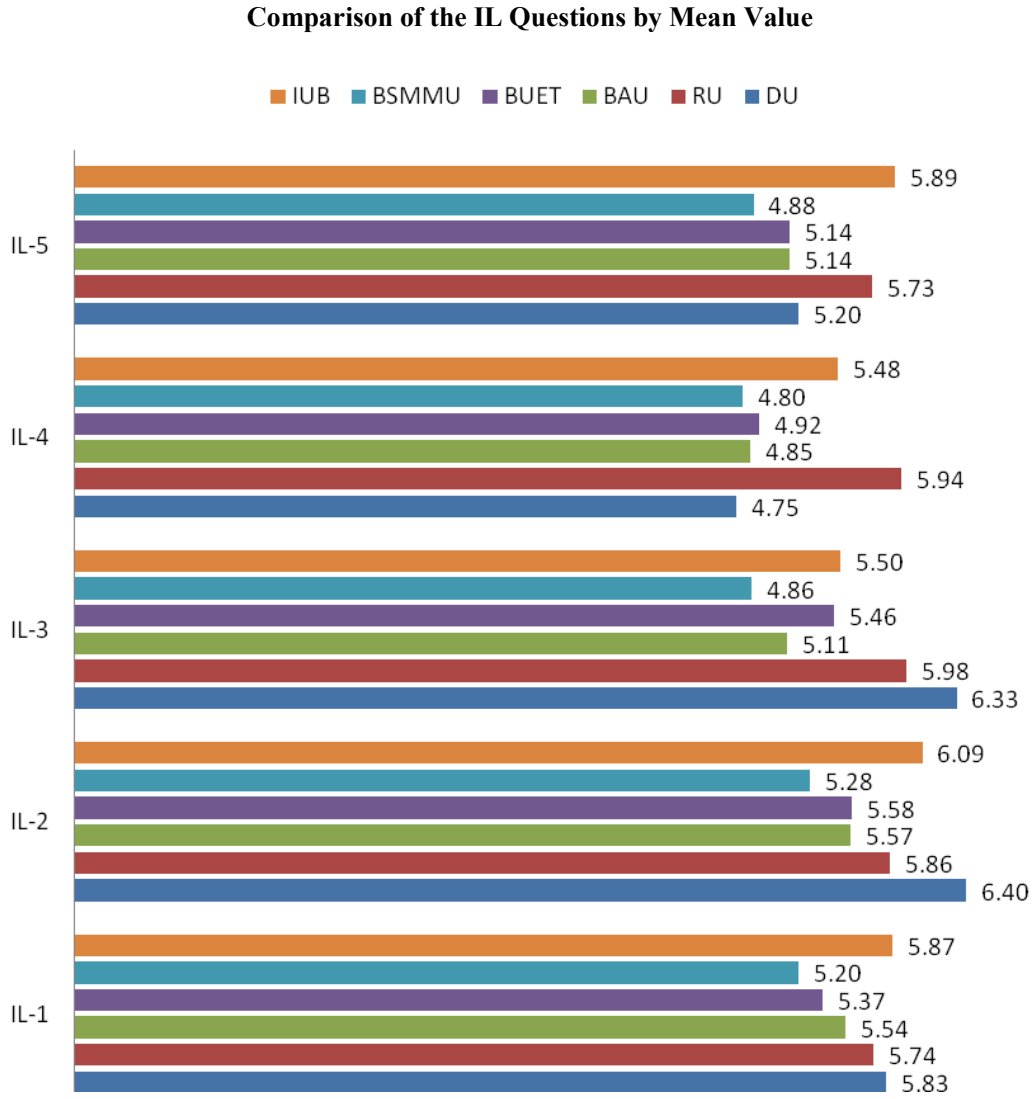


Figure 4.7 Comparison of the Information Literacy Questions Mean Scores by all University Libraries

4.5 General Satisfaction Responses

Table 4.29 display the Mean score and Standard Deviation (SD) for each of the general satisfaction questions, e.g. satisfaction with treatment, satisfaction with support and need and satisfaction with overall service quality... The questions were in a 9-point scale from lowest to highest (1-strongly disagree, 9-strongly agree).

Table 4.29

Response to the Satisfaction Questions by all Universities, Mean (SD)

ID	DU	RU	BAU	BUET	BSMMU	IUB
S-1	4.84 (1.31)	5.92 (1.64)	6.25 (1.18)	5.48 (1.80)	5.02 (1.80)	6.24 (2.06)
S-2	4.84 (1.44)	6.13 (1.85)	4.83 (1.82)	5.55 (1.69)	4.73 (1.49)	6.34 (2.02)
S-3	5.01 (1.24)	5.99 (1.67)	5.55 (1.13)	5.46 (1.30)	4.65 (1.59)	6.42 (1.82)

Figure 4.8 Shows comparison of the Mean scores of the responses. Regarding satisfaction question 1 "In general, I am satisfied with the way in which I am treated at the library", BAU respondents showed their satisfaction with the highest (6.25) though IUB respondents were very close to them (6.24).

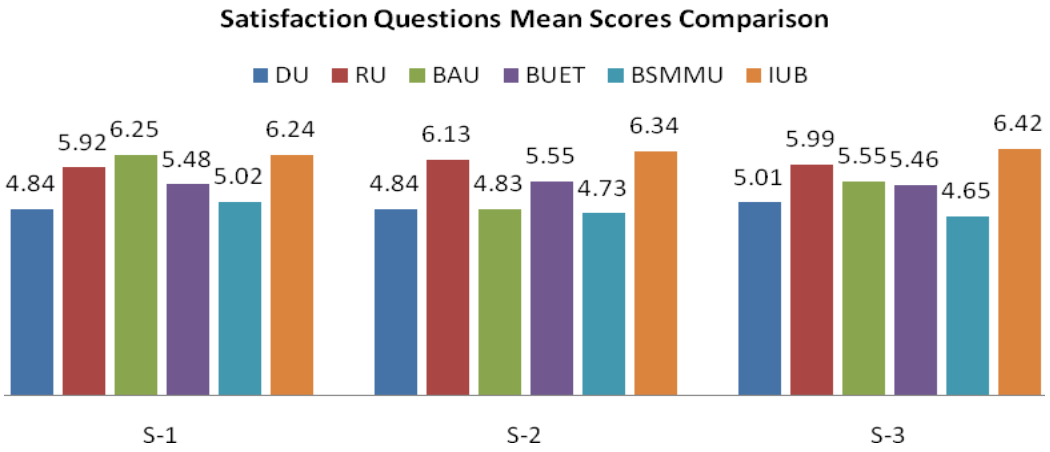


Figure 4.8 Comparison of the Satisfaction Questions Mean Scores by all University Libraries

DU respondents scored the least with 4.84 value. Regarding satisfaction question 2 In general, "I am satisfied with library support for my learning, research and/or teaching needs", IUB was on the top position (6.34) and the next position was for RU (6.13). Like the previous one, DU respondents were the least satisfied (4.84) among all the universities of the scope. Concerning satisfaction question 3, "How would you rate the overall quality of the service provided by the library?", IUB respondents rated their library with the highest score (6.42). The response of RU respondents placed their library in the second position (5.99) regarding question on overall service quality ranking. Other responses were in order of BAU (5.55), BUET (5.46) and DU (5.01), while BSMMU was in the lowest position (4.65).

4.6 LibQUAL+ Local Question Summary

For this research five local questions have been adopted from a large pool of questions for this context of academic libraries in Bangladesh. These local questions (Table 4.30) have been preferred considering the present status of academic libraries and other relevant factors of local context. The local questions are:

Table 4.30

LibQUAL+ Model: Local Questions

ID	LibQUAL+ Local Questions
LQ-1	Library keeping me informed about resources and services
LQ-2	Librarians teaching me how to effectively use the electronically available databases, journals, and books
LQ-3	Adequate hours of service
LQ-4	Library orientations or instruction sessions
LQ-5	Providing services as promised

The following table (Table 4.31) shows Mean scores and Standard Deviation of each of the local questions for Minimum Service (MS), Desired Service (DS), Perceived Service (PS), Adequacy Gap (AG), and Superiority Gap (SG). Almost in all cases, MS mean and DS mean are higher. While, as PS mean are low, so, it affects both Adequacy Service Gap and Superiority Gap badly. The perception varied on the characteristics of university, library, user, environment and their satisfaction and expectation from the time being.

At DU, regarding AG, there is no positive gap, all the gaps are negative. All SG gaps are too high. For AG, only LQ-3, "Adequate hours of service" has a narrower (-0.32) negative gap which is similar to SG, narrower (-2.15) than all other gaps. Respondents considered this service was very close to minimum service but they expect more opening hours as it also in the upmost DS (8.02). However, for both AG and SG, the largest negative gap is for LQ-4, "Library orientations or instruction sessions". AG (-2.68) and SG (-4.59) which are quite high. The respondents felt the necessity of library instruction badly. The second higher negative gap for both AG (-2.42) and SG (-4.34) is LQ-2 "Librarians teaching me how to effectively use the electronically available databases, journals and books". Here, respondents believed that they need instruction for using e-resources. As all the gaps of local question of service quality tools are negative and quite high and mean score of MS and DS are higher on the contrary of PS which is quite low so,

all the service quality attributes are problematic at DU. SDs are not much higher here which means the respondents rated the items of service quality as close to identical and representative.

At RU, Both AG and SG have negative gaps and all SG gaps are too high. Like DU, for AG, only LQ-3, "Adequate hours of service" has a narrower (-0.54) negative gap where for the same item SG has also narrower (-1.71) gap related to other gaps. Like DU, RU the top DS is LQ-3 (7.62). Respondents measured this item as an important service to them which is close to minimum level though SG gap is not much higher, means close desired service. Respondents rated LQ-2 "Librarians teaching me how to effectively use the electronically available databases, journals and books" as 1st and LQ-4 "Library orientations or instruction sessions" as second highest negative SG. Respondents considered that library should train their users for using library services and electronic resources. Since all local questions have higher negative gaps so, all the service quality attributes are challenging at RU. Here SDs of few items are higher and dissimilar, which means the respondents rated the items of service quality as different and contrast.

At, BAU, AG sores are better than previous two universities, e.g. DU and RU. BAU has three narrower AG gaps for LQ-1 (-0.96), LQ-4 (-0.69) and LQ-5 (-0.83). Where, the respondents considered three items of services quality regarding local questions are at least close to MS. The items are LQ-1 "Library keeping me informed about resources and services", LQ-4 "Library orientations or instruction sessions", and LQ-5 "Providing services as promised". The top Desired Service expectation is LQ-3 (8.14), followed by LQ-4 (8.08) with high expectation. On the other hand, SG scores are not good as all are with higher negative gaps. Most problematic items are LQ-2 "Librarians teaching me how to effectively use the electronically available databases, journals and books" and LQ-4 "Library orientations or instruction sessions". SDs are better than any other universities meaning identical and representative response comparatively.

At BUET, the top two DSs are LQ-3 "Adequate hours of service" and LQ-1 "Library keeping me informed about resources and services" with high scores 8.32 and 8.06 respectively. All AG gaps are negative, with two smaller negative gaps, these are LQ-3 (-0.82) and LQ-5 (-0.92) where respondents considered at least these two service items are close two minimum level. Alternatively, SG are also negative with higher gap. Most problematic gaps are LQ-4 (-4.07) "Library orientations or instruction sessions", LQ-1 (-

3.71) “Library keeping me informed about resources and services” and LQ-2 (-3.71) “Librarians teaching me how to effectively use the electronically available databases, journals and books”. All these are related to library resources and instruction. PS, AG and SG SDs are high which means the response were not identical and consistent enough comparatively.

AT BSMMU, all DSs are very high (above 8.0) and PSs are inversely very low, MS is also high (above 6.0), which resultant a huge negative AG and SG gap for all the items. Nothing to mention separately here, all the LQs are problematic, as respondents rated them as their perception. However here BSMMU respondents were aware of LQ-5 “Providing services as promised” as the smallest PS, highest DS and highest SG indicated to it. SDs are mixed, both low and high indicates data representation is not well what it need to be.

Only IUB has all AG scores positive. Though gaps are not so high but positive AG gaps ensured that IUBL meets the minimum expectation of the users for local question of service quality. The top positive AG score is for LQ-3 (0.39) “Adequate hours of service”. Here all the DSs are below 7.0. SGs are negative but gaps are not so high in comparison to other libraries. Most problematic SG is LQ-1 “Library keeping me informed about resources and services”. LQ-1 has the largest negative gap (-1.70) which is also lowest AG (0.07). SDs are mixed both low and high means data representation and ratings are not as representative and identical what it required to be. However IUBL service for local items is better than any other universities of this research.

Table 4.31
Mean and (SD) of Local Questions by all users (Minimum, Desired, Perceived, Adequacy & Superiority), all libraries

University Library	ID	Minimum Mean (SD)	Desired Mean (SD)	Perceived Mean (SD)	Adequacy Mean (SD)	Superiority Mean (SD)
DU	LQ-1	5.70 (1.30)	7.66 (1.01)	3.94 (1.47)	-1.76 (1.80)	-3.72 (1.48)
	LQ-2	5.68 (1.31)	7.59 (0.99)	3.24 (1.27)	-2.42 (1.75)	-4.34 (1.50)
	LQ-3	6.20 (1.33)	8.02 (1.00)	5.88 (2.03)	-0.32 (1.97)	-2.15 (1.73)
	LQ-4	5.80 (1.45)	7.71 (1.12)	3.11 (1.20)	-2.68 (1.86)	-4.59 (1.58)
	LQ-5	6.04 (1.53)	7.95 (1.29)	4.60 (1.52)	-1.44 (1.71)	-3.35 (1.60)
RU	LQ-1	6.11 (1.76)	7.58 (1.44)	4.89 (1.64)	-1.21 (1.88)	-2.69 (1.94)
	LQ-2	5.78 (1.90)	7.39 (1.46)	4.22 (1.66)	-1.56 (2.20)	-3.17 (2.15)
	LQ-3	6.45 (1.83)	7.62 (1.46)	5.91 (2.09)	-0.54 (1.92)	-1.71 (1.79)
	LQ-4	6.13 (1.78)	7.40 (1.43)	4.24 (1.90)	-1.89 (2.60)	-3.15 (2.41)
	LQ-5	6.41 (1.61)	7.48 (1.43)	5.14 (1.87)	-1.27 (2.06)	-2.34 (2.06)
BAU	LQ-1	6.01 (1.31)	7.68 (1.00)	5.05 (0.96)	-0.96 (1.76)	-2.63 (1.58)
	LQ-2	5.53 (1.17)	7.81 (0.86)	4.44 (1.44)	-1.09 (1.96)	-3.37 (1.89)
	LQ-3	6.27 (0.95)	8.14 (1.25)	5.21 (1.15)	-1.05 (1.28)	-2.93 (1.78)
	LQ-4	5.41 (1.08)	8.08 (1.00)	4.72 (1.33)	-0.69 (1.74)	-3.36 (1.92)
	LQ-5	5.82 (0.83)	7.54 (0.92)	4.99 (0.89)	-0.83 (1.21)	-2.55 (1.39)
BUET	LQ-1	5.71 (1.82)	8.06 (1.27)	4.35 (2.08)	-1.36 (1.97)	-3.71 (2.12)
	LQ-2	5.36 (1.62)	7.56 (1.53)	3.81 (2.16)	-1.51 (2.42)	-3.71 (2.40)
	LQ-3	6.62 (1.96)	8.32 (1.05)	5.80 (2.59)	-0.82 (2.44)	-2.52 (2.37)
	LQ-4	5.22 (1.79)	7.67 (1.28)	3.61 (1.99)	-1.62 (2.24)	-4.07 (2.25)
	LQ-5	5.91 (1.42)	7.91 (1.11)	5.00 (1.93)	-0.92 (2.04)	-2.92 (1.93)
BSMMU	LQ-1	6.63 (1.45)	8.20 (1.07)	4.43 (1.37)	-2.20 (1.84)	-3.77 (1.54)
	LQ-2	6.45 (1.74)	8.21 (1.12)	3.93 (1.63)	-2.52 (1.96)	-4.28 (1.90)
	LQ-3	6.71 (1.53)	8.21 (1.01)	4.38 (1.87)	-2.33 (1.94)	-3.82 (1.80)
	LQ-4	6.58 (1.40)	8.03 (1.29)	3.92 (1.66)	-2.66 (1.78)	-4.11 (1.83)
	LQ-5	6.58 (1.68)	8.35 (1.22)	4.00 (1.64)	-2.58 (1.84)	-4.34 (2.03)
IUB	LQ-1	5.83 (2.03)	7.59 (1.65)	5.90 (2.35)	0.07 (1.98)	-1.70 (2.43)
	LQ-2	5.78 (2.14)	7.53 (1.66)	5.93 (2.42)	0.14 (2.12)	-1.60 (2.46)
	LQ-3	6.29 (1.79)	7.70 (1.60)	6.68(2.03)	0.39 (1.50)	-1.02 (1.84)
	LQ-4	5.70 (2.08)	7.39 (1.84)	5.86 (2.44)	0.16 (2.07)	-1.52 (2.45)
	LQ-5	6.07 (1.96)	7.76 (1.69)	6.28 (2.09)	0.20 (1.77)	-1.48 (2.09)

Figure 4.9 and 4.10 on next pages represents comparison of AG and SG by all libraries by all users. From the figures, the position of the libraries can be exposed at a glance.

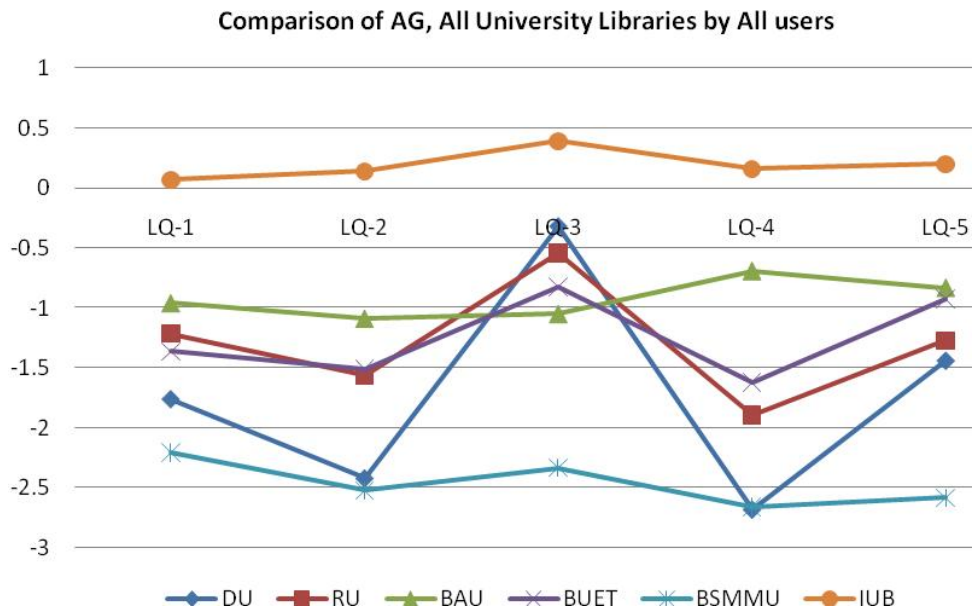


Figure 4.9 Comparison of Adequacy Gap, all Universities *(local questions)*

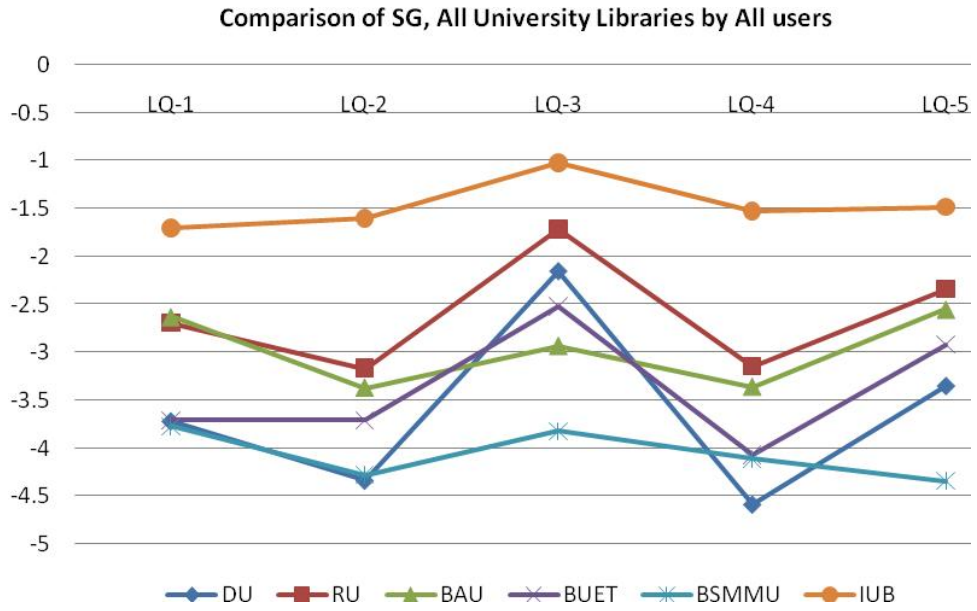


Figure 4.10 Comparison of Superiority Gap, all Universities *(local questions)*

4.7 Reliability Analysis

Cronbach's alpha is the most common measure of internal consistency or reliability, which is most commonly used in a survey/questionnaire with multiple Likert questions that form a scale to determine if the scale is reliable. To examine the reliability of LibQUAL+ core items, Cronbach's alpha coefficients were acquired for the values of Minimum Service Level, Desired Service Level and Perceived Service Performance for all the surveyed samples. Table 4.32 shows that almost all the values are above 0.90 which are higher than the general standard of 0.70, suggesting a good reliability of overall questionnaire items.

Table 4.32

Result of Reliability Analysis of LibQUAL+ model core items

University	Service Level	Cronbach's Alpha(α)
DU	Minimum	0.98
	Desired	0.93
	Perceived	0.96
RU	Minimum	0.95
	Desired	0.94
	Perceived	0.95
BAU	Minimum	0.90
	Desired	0.95
	Perceived	0.96
BUET	Minimum	0.95
	Desired	0.93
	Perceived	0.95
BSMMU	Minimum	0.97
	Desired	0.97
	Perceived	0.95
IUB	Minimum	0.97
	Desired	0.97
	Perceived	0.97

4.8 Summary of Missing Values (MS, DS & PS) of LibQUAL+ Core Questions

Summary of user responses for each level of services of LibQUAL+ core questions (Table 4.33) by all libraries are illustrated below (Table 4.34).

Table 4.33

LibQUAL+ model: 22 –core items

Dimension	ID	LibQUAL+ 22-core items
Affect of Service	AS-1	Employees who instill confidence in users
	AS-2	Giving users individual attention
	AS-3	Employees who are consistently courteous
	AS-4	Readiness to respond to users' questions
	AS-5	Employees who have the knowledge to answer user questions
	AS-6	Employees who deal with users in a caring fashion
	AS-7	Employees who understand the needs of their users
	AS-8	Willingness to help users
	AS-9	Dependability in handling users' service problems
Information Control	IC-1	Making electronic resources accessible from my home or office
	IC-2	A library Web site enabling me to locate information on my own
	IC-3	The printed library materials I need for my work
	IC-4	The electronic information resources I need
	IC-5	Modern equipment that lets me easily access needed information
	IC-6	Easy-to-use access tools that allow me to find things on my own
	IC-7	Making information easily accessible for independent use
	IC-8	Print and/or electronic journal collections I require for my work
Library as Place	LP-1	Library space that inspires study and learning
	LP-2	Quiet space for individual activities
	LP-3	A comfortable and inviting location
	LP-4	A getaway for study, learning, or research
	LP-5	Community space for group learning and group study

Missing values are a common occurrence and can have a significant effect on the ending of any research, so cases with missing values pose an important challenge. The missing values that observed for this research are not remarkable or significant as the number is tolerable. In most cases, the users did not respond to some statements that they have not experienced whereas there are few services where missing values are absent.

For all the libraries, the order and frequency of missing values among all three levels MS, ES and PS are more or less same; the values are likely close to each statement at DU. RU and BAU have few missing values but distributions are scattered. BUET has a small number of missing values related to each other through more or less all the service levels. Surprisingly, BSMMU has no missing value, whereas IUB has unmentionable numbers. It may be assumed that the tendency of the keeping blank of any statement is due

to the lack of experience or lack interest to any statement or services. These missing values are ranked and compared among each level of services.

Table 4.34

Comparison of the Number of Missing Values among Three Levels (MS, DS & PS) at DU, RU, BAU, BUET and IUB

ID	DU			RU			BAU			BUET			IUB		
	MS	DS	PS	MS	DS	PS	MS	DS	PS	MS	DS	PS	MS	DS	PS
AS-1	1	1	1	0	0	0	0	0	1	0	1	1	0	0	1
IC-1	4	5	8	1	0	0	0	1	0	5	4	1	0	0	0
LP-1	3	1	2	0	0	0	0	0	1	1	0	0	0	0	0
AS-2	1	1	2	3	1	0	0	1	2	4	1	1	0	1	0
IC-2	2	7	4	1	0	0	0	0	1	5	0	0	0	0	0
AS-3	0	0	1	1	1	0	0	0	0	6	1	1	1	1	0
IC-3	0	0	2	3	2	1	0	0	1	1	0	1	0	0	0
LP-2	1	2	5	1	1	0	0	0	1	0	0	0	0	0	0
AS-4	0	0	1	0	2	0	0	0	0	1	0	0	0	0	0
IC-4	0	0	0	0	1	1	0	1	1	5	5	3	0	1	0
AS-5	0	1	2	0	1	2	0	0	0	1	1	0	1	0	1
LP-3	0	3	4	0	0	0	0	0	1	0	0	0	0	1	0
AS-6	2	3	2	0	2	1	0	0	0	3	5	2	0	0	1
IC-5	2	3	3	1	0	0	0	0	0	0	0	1	1	0	0
AS-7	0	1	2	3	0	1	0	0	0	0	1	1	0	0	0
IC-6	6	7	7	3	1	1	0	0	0	2	2	3	0	0	0
LP-4	2	1	2	3	0	0	0	0	0	6	5	1	0	0	1
AS-8	0	0	0	0	0	0	0	0	0	0	5	3	0	0	0
IC-7	2	1	3	1	0	1	0	0	0	0	2	2	0	0	1
IC-8	2	1	0	5	0	3	0	0	0	4	4	1	0	0	0
LP-5	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
AS-9	3	3	3	0	0	0	0	0	0	1	1	4	0	0	0

4.9 Users Responses of Minimum (MS), Desired (DS) and Perceived Service (PS)

Table 4.35 - 4.40 represent users' responses of LibQUAL+ core question to three levels of services for all six university libraries. Though here there is no ranking of Mean scores rather than maintaining the order of the core items as they appeared in the survey form. Idea may be drawn from the comparison of all three services against each service quality score to see how Mean values and SDs are distributed. DU and BAU have comparatively low SD which means comparatively representative data. RU and BSMMU also have lower SD than IUB and BUET. SDs for BUET is too high for few service quality items than any other universities ensuing less identical response.

Table 4.35

Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), DU, all Users

Order	ID	MS		DS		PS	
		Mean	SD	Mean	SD	Mean	SD
1	AS-1	5.45	1.32	7.59	1.10	4.47	1.28
2	IC-1	5.53	1.26	7.52	1.06	3.18	1.28
3	LP-1	6.01	1.42	8.06	1.01	4.37	1.34
4	AS-2	5.47	1.33	7.51	0.87	3.33	1.30
5	IC-2	5.54	1.47	7.70	1.01	4.05	1.46
6	AS-3	6.11	1.59	8.08	1.07	4.91	1.62
7	IC-3	5.98	1.31	7.86	0.97	4.85	1.36
8	LP-2	5.80	1.41	7.84	1.08	4.31	1.50
9	AS-4	5.86	1.33	7.76	0.90	4.50	1.37
10	IC-4	5.95	1.37	7.83	0.93	4.06	1.31
11	AS-5	5.85	1.42	7.91	0.91	4.53	1.38
12	LP-3	5.30	1.30	8.14	0.95	4.92	1.48
13	AS-6	5.64	1.32	7.47	1.03	4.36	1.43
14	IC-5	5.93	1.42	7.94	0.99	4.40	1.53
15	AS-7	6.09	1.54	8.03	1.10	4.59	1.55
16	IC-6	5.56	1.28	7.46	1.03	3.84	1.17
17	LP-4	6.09	1.49	8.04	1.00	4.95	1.61
18	AS-8	6.22	1.59	8.23	1.05	4.83	1.65
19	IC-7	5.61	1.35	7.51	1.12	3.90	1.30
20	IC-8	5.83	1.34	7.79	1.07	4.47	1.41
21	LP-5	5.52	1.31	7.56	1.24	3.24	1.63
22	AS-9	5.40	1.49	6.30	2.26	4.55	1.51

Table 4.36

Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), RU, all Users

Order	ID	MS		DS		PS	
		Mean	SD	Mean	SD	Mean	SD
1	AS-1	5.73	1.62	7.42	1.36	4.74	1.36
2	IC-1	6.11	1.69	7.54	1.44	4.57	1.85
3	LP-1	6.46	1.61	7.70	1.35	5.42	1.68
4	AS-2	6.34	1.64	7.45	1.51	5.18	1.67
5	IC-2	5.88	1.76	7.36	1.43	4.93	1.84
6	AS-3	6.17	1.50	7.52	1.36	5.05	1.61
7	IC-3	6.30	1.57	7.53	1.27	5.28	1.68
8	LP-2	6.27	1.61	7.53	1.37	5.13	1.66
9	AS-4	6.20	1.78	7.69	1.33	4.95	1.84
10	IC-4	6.09	1.63	7.48	1.45	4.76	1.63
11	AS-5	6.00	1.68	7.52	1.33	4.72	1.62
12	LP-3	6.32	1.60	7.58	1.45	5.37	1.99
13	AS-6	6.01	1.49	7.26	1.26	4.62	1.75
14	IC-5	6.05	1.72	7.51	1.39	4.47	1.74
15	AS-7	6.24	1.61	7.52	1.40	4.92	1.65
16	IC-6	6.10	1.75	7.28	1.49	4.97	1.71
17	LP-4	6.47	1.59	7.67	1.45	5.29	1.66
18	AS-8	6.16	1.88	7.40	1.31	4.54	1.56
19	IC-7	6.28	1.60	7.57	1.27	5.18	1.70
20	IC-8	6.41	1.73	7.59	1.43	4.91	1.74
21	LP-5	5.88	1.86	7.29	1.42	4.14	1.92
22	AS-9	5.92	1.66	7.12	1.57	4.53	1.68

Table 4.37

Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BAU, all Users

Order	ID	MS		DS		PS	
		Mean	SD	Mean	SD	Mean	SD
1	AS-1	5.79	0.88	7.14	.80	4.95	1.15
2	IC-1	5.70	1.38	7.90	1.02	4.86	1.31
3	LP-1	6.01	1.21	8.02	1.16	5.66	1.17
4	AS-2	5.34	0.95	7.22	1.02	5.34	1.27
5	IC-2	5.96	1.18	7.88	0.93	4.50	1.58
6	AS-3	6.01	1.06	7.98	1.11	5.17	1.14
7	IC-3	6.31	1.25	8.02	1.19	4.88	1.36
8	LP-2	6.19	1.26	8.04	0.84	5.06	1.00
9	AS-4	5.36	0.87	7.26	0.99	5.31	1.13
10	IC-4	5.91	1.26	7.97	0.90	5.45	1.13
11	AS-5	5.24	1.09	7.36	1.04	5.29	0.91
12	LP-3	6.12	1.06	8.11	1.01	5.62	1.21
13	AS-6	5.56	1.06	7.83	0.85	5.22	1.26
14	IC-5	5.70	1.36	8.07	0.95	5.14	1.20
15	AS-7	5.81	0.97	7.77	0.88	5.29	1.20
16	IC-6	5.56	1.07	8.04	1.05	4.75	1.42
17	LP-4	5.44	0.99	8.27	1.12	5.19	1.24
18	AS-8	5.53	0.96	7.97	1.03	4.19	1.58
19	IC-7	6.22	1.30	8.36	1.02	4.58	1.48
20	IC-8	5.78	0.91	8.21	1.01	4.22	1.48
21	LP-5	5.70	0.94	8.23	1.17	5.09	1.05
22	AS-9	5.71	0.86	7.71	0.95	4.93	1.09

Table 4.38

Mean and SD of LibQUAL+ Core Questions ((MS, DS & PS), BUET, all Users

Order	ID	MS		DS		PS	
		Mean	SD	Mean	SD	Mean	SD
1	AS-1	5.02	1.47	7.57	1.25	4.99	1.55
2	IC-1	5.71	1.72	8.00	1.26	5.20	2.11
3	LP-1	5.88	1.62	8.05	1.26	5.57	1.82
4	AS-2	5.14	1.80	7.45	1.70	4.32	1.89
5	IC-2	5.53	1.80	7.99	1.35	4.55	1.84
6	AS-3	5.52	1.67	7.71	1.27	4.86	1.82
7	IC-3	5.92	1.64	7.80	1.35	4.95	1.81
8	LP-2	5.82	1.62	8.19	1.19	5.13	1.88
9	AS-4	5.70	1.80	7.75	1.27	4.85	1.70
10	IC-4	5.92	1.77	7.96	1.34	5.09	1.98
11	AS-5	5.65	1.85	7.74	1.34	4.41	1.81
12	LP-3	6.07	1.42	8.11	1.11	5.16	2.28
13	AS-6	5.58	1.62	7.77	1.12	4.72	1.95
14	IC-5	5.90	1.77	8.09	1.31	4.56	1.99
15	AS-7	5.79	1.51	7.91	1.20	4.57	2.05
16	IC-6	5.96	1.52	7.86	1.26	4.66	2.05
17	LP-4	5.96	1.44	8.26	1.21	5.13	2.14
18	AS-8	6.18	1.47	7.94	1.16	4.90	2.19
19	IC-7	6.08	1.37	8.05	0.93	5.04	1.98
20	IC-8	5.96	1.69	8.20	1.14	4.93	2.12
21	LP-5	5.93	1.60	7.97	1.19	5.05	2.00
22	AS-9	5.46	1.67	7.49	1.26	4.52	1.67

Table 4.39

Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BSMMU, all Users

Order	ID	MS		DS		PS	
		Mean	SD	Mean	SD	Mean	SD
1	AS-1	6.62	1.59	8.01	1.28	4.86	1.49
2	IC-1	6.62	1.56	7.86	1.38	4.37	1.52
3	LP-1	6.63	1.49	8.14	1.16	4.72	1.47
4	AS-2	6.43	1.59	7.96	1.37	4.27	1.54
5	IC-2	6.59	1.50	8.10	1.26	4.19	1.68
6	AS-3	6.59	1.38	7.95	1.34	4.36	1.55
7	IC-3	6.57	1.58	8.10	1.20	4.11	1.72
8	LP-2	6.72	1.44	8.19	1.11	4.41	1.42
9	AS-4	6.47	1.48	8.10	1.26	4.30	1.38
10	IC-4	6.50	1.47	7.81	1.35	4.07	1.44
11	AS-5	6.35	1.72	7.95	1.31	4.01	1.72
12	LP-3	6.66	1.41	8.05	1.21	4.12	1.60
13	AS-6	6.59	1.60	8.20	1.24	4.28	1.43
14	IC-5	6.63	1.59	8.00	1.24	4.19	1.67
15	AS-7	6.65	1.42	8.19	1.29	3.86	1.67
16	IC-6	6.60	1.36	7.97	1.41	4.07	1.63
17	LP-4	6.58	1.51	8.10	1.16	4.28	1.59
18	AS-8	6.83	1.36	8.02	1.33	4.15	1.64
19	IC-7	6.60	1.51	7.86	1.33	4.17	1.46
20	IC-8	6.77	1.53	8.05	1.34	4.13	1.47
21	LP-5	6.71	1.55	8.14	1.20	4.13	1.52
22	AS-9	6.66	1.39	8.08	1.31	3.93	1.66

Table 4.40

Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), IUB, all Users

Order	ID	MS		DS		PS	
		Mean	SD	Mean	SD	Mean	SD
1	AS-1	5.33	1.64	7.48	1.54	5.87	1.45
2	IC-1	5.72	1.85	7.49	1.80	5.63	1.87
3	LP-1	6.30	1.92	7.81	1.67	6.58	1.83
4	AS-2	5.83	1.83	7.36	1.78	5.83	1.84
5	IC-2	5.84	1.82	7.45	1.75	5.82	1.86
6	AS-3	6.00	1.83	7.40	1.89	5.73	1.92
7	IC-3	6.05	1.97	7.56	1.77	5.52	1.71
8	LP-2	6.09	1.99	7.62	1.81	6.81	1.70
9	AS-4	5.94	1.97	7.43	1.77	6.45	1.82
10	IC-4	5.99	1.92	7.49	1.69	6.20	1.78
11	AS-5	6.07	1.87	7.68	1.60	6.65	1.77
12	LP-3	6.37	1.85	7.84	1.51	6.88	1.81
13	AS-6	5.85	1.95	7.42	1.75	6.33	1.79
14	IC-5	5.94	1.97	7.63	1.69	6.33	1.91
15	AS-7	5.87	1.54	7.62	1.72	6.31	1.79
16	IC-6	5.94	1.97	7.59	1.78	6.27	1.81
17	LP-4	6.13	1.92	7.67	1.64	6.31	1.80
18	AS-8	6.06	1.97	7.58	1.71	6.37	1.89
19	IC-7	6.01	1.85	7.54	1.63	6.39	1.75
20	IC-8	5.94	1.84	7.48	1.67	6.10	1.90
21	LP-5	6.33	1.83	7.88	1.51	6.85	1.74
22	AS-9	5.92	1.87	7.50	1.72	6.32	1.72

Table 4.41 – 4.63 illustrate the Mean value and SD for all three level of services and ranked by Mean values from highest to lowest. For each university, the responses of all types of users, e.g. undergraduate and graduate students and faculty and all three categories of users collectively have been demonstrated. Most of the attributes are common among all three groups in case of their MS, DS and PS.

At DU (Table 4.41 – 4.44), DSs are very high in comparison to PSs which are too low. DU respondents rated MS values also high. Among three groups, graduate students DS level is higher most, and faculty DS is lower. On the other hand, undergraduate students PS level is higher and faculty PS is very low. At RU, (Table 4.45 – 4.48), faculty DSs are highest and undergraduate is the lowest. On the other hand, graduate students PSs are higher and faculty PSs are very low. At BAU (Table 4.49 – 4.52), DSs are very high. Undergraduate students DSs are on the upmost and graduates have lower DSs. Graduate PSs are higher and faculty PSs are lower. For BUET, (Table 4.53 – 4.56), faculty have high DSs and undergraduate have lower. Regarding PS, undergraduate is on the top and graduates are the lowest. At BSMMU, (Table 4.57 – 4.59), faculty rated both DSs and PSs as high and graduates ranked both DSs and PSs as low. For IUB (Table 4.60 – 4.63), faculty perception for DSs and PSs are both high and undergraduate DSs and graduate PSs are the lowest.

Table 4.41
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), DU, all Users (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	AS-8	6.22	1.59	AS-8	8.23	1.05	LP-4	4.95	1.61
2	AS-3	6.11	1.59	LP-3	8.14	0.95	LP-3	4.92	1.48
3	LP-4	6.09	1.49	AS-3	8.08	1.07	AS-3	4.91	1.62
4	AS-7	6.09	1.54	LP-1	8.06	1.01	IC-3	4.85	1.36
5	LP-1	6.01	1.42	LP-4	8.04	1.00	AS-8	4.83	1.65
6	IC-3	5.98	1.31	AS-7	8.03	1.10	AS-7	4.59	1.55
7	IC-4	5.95	1.37	IC-5	7.94	0.99	AS-9	4.55	1.51
8	IC-5	5.93	1.42	AS-5	7.91	0.91	AS-5	4.53	1.38
9	AS-4	5.86	1.33	IC-3	7.86	0.97	AS-4	4.50	1.37
10	AS-5	5.85	1.42	LP-2	7.84	1.08	AS-1	4.47	1.28
11	IC-8	5.83	1.34	IC-4	7.83	0.93	IC-8	4.47	1.41
12	LP-2	5.80	1.41	IC-8	7.79	1.07	IC-5	4.40	1.53
13	AS-6	5.64	1.32	AS-4	7.76	0.90	LP-1	4.37	1.34
14	IC-7	5.61	1.35	IC-2	7.70	1.01	AS-6	4.36	1.43
15	IC-6	5.56	1.28	AS-1	7.59	1.10	LP-2	4.31	1.50
16	IC-2	5.54	1.47	LP-5	7.56	1.24	IC-4	4.06	1.31
17	IC-1	5.53	1.26	IC-1	7.52	1.06	IC-2	4.05	1.46
18	LP-5	5.52	1.31	IC-7	7.51	1.12	IC-7	3.90	1.30
19	AS-2	5.47	1.33	AS-2	7.51	0.87	IC-6	3.84	1.17
20	AS-1	5.45	1.32	AS-6	7.47	1.03	AS-2	3.33	1.30
21	AS-9	5.40	1.49	IC-6	7.46	1.03	LP-5	3.24	1.63
22	LP-3	5.30	1.30	AS-9	6.30	2.26	IC-1	3.18	1.28

Table 4.42
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), DU, Undergraduate Students (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	AS-8	6.56	1.53	AS-8	8.15	1.12	LP-4	5.14	1.57
2	AS-3	6.50	1.35	LP-3	8.11	0.93	AS-3	5.03	1.60
3	AS-7	6.36	1.43	AS-3	8.10	1.01	IC-3	4.97	1.31
4	IC-3	6.36	1.13	LP-1	8.10	0.85	LP-3	4.96	1.49
5	LP-4	6.34	1.40	LP-4	8.07	0.99	AS-8	4.91	1.50
6	LP-1	6.31	1.25	AS-7	7.98	1.02	AS-9	4.77	1.50
7	IC-4	6.29	1.24	IC-5	7.94	0.89	AS-7	4.67	1.47
8	AS-4	6.22	1.07	AS-5	7.90	0.86	AS-4	4.65	1.34
9	AS-5	6.18	1.36	LP-2	7.89	0.96	AS-1	4.64	1.29
10	IC-5	6.17	1.41	IC-3	7.86	0.90	AS-5	4.63	1.34
11	IC-8	6.14	1.12	IC-4	7.78	0.90	IC-5	4.61	1.56
12	LP-2	6.03	1.43	IC-8	7.77	1.06	AS-6	4.54	1.30
13	IC-2	5.92	1.43	AS-4	7.76	0.85	LP-1	4.49	1.47
14	AS-6	5.92	1.26	IC-2	7.70	0.91	IC-8	4.46	1.36
15	IC-7	5.90	1.28	AS-1	7.63	0.99	LP-2	4.36	1.41
16	IC-6	5.89	1.27	AS-2	7.53	0.87	IC-2	4.24	1.32
17	LP-5	5.77	1.17	LP-5	7.52	1.23	IC-4	4.09	1.29
18	IC-1	5.76	1.10	IC-1	7.51	1.03	IC-7	4.07	1.23
19	AS-1	5.65	1.24	AS-6	7.48	1.01	IC-6	3.91	1.13
20	AS-9	5.64	1.41	IC-7	7.45	1.12	AS-2	3.55	1.30
21	AS-2	5.61	1.24	IC-6	7.43	0.99	LP-5	3.46	1.56
22	LP-3	5.45	1.38	AS-9	5.94	2.34	IC-1	3.28	1.31

Table 4.43
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), DU, Graduate Students (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	AS-8	6.56	1.53	AS-8	8.41	0.85	AS-8	5.03	1.78
2	AS-3	6.50	1.35	LP-3	8.23	0.97	AS-3	4.97	1.58
3	AS-7	6.36	1.43	AS-7	8.20	1.03	LP-3	4.91	1.33
4	IC-3	6.36	1.13	AS-3	8.10	1.15	LP-4	4.86	1.60
5	LP-4	6.34	1.40	LP-1	8.08	0.95	IC-3	4.83	1.39
6	LP-1	6.31	1.25	AS-5	8.01	0.74	AS-7	4.73	1.61
7	IC-4	6.29	1.24	IC-5	8.00	0.92	IC-8	4.65	1.48
8	AS-4	6.22	1.07	LP-4	8.00	1.00	AS-5	4.54	1.42
9	AS-5	6.18	1.36	IC-4	7.95	0.87	AS-4	4.49	1.34
10	IC-5	6.17	1.41	IC-3	7.88	1.08	AS-9	4.43	1.37
11	IC-8	6.14	1.12	AS-4	7.82	0.77	AS-1	4.38	1.13
12	LP-2	6.03	1.43	IC-8	7.82	1.02	LP-1	4.34	1.01
13	IC-2	5.92	1.43	IC-2	7.78	0.82	IC-5	4.32	1.29
14	AS-6	5.92	1.26	LP-2	7.76	1.21	LP-2	4.30	1.60
15	IC-7	5.90	1.28	LP-5	7.66	1.09	AS-6	4.29	1.53
16	IC-6	5.89	1.27	IC-7	7.64	0.93	IC-4	4.10	1.34
17	LP-5	5.77	1.17	AS-1	7.57	1.16	IC-2	3.90	1.55
18	IC-1	5.76	1.10	IC-1	7.55	0.79	IC-6	3.81	1.19
19	AS-1	5.65	1.24	IC-6	7.52	0.88	IC-7	3.81	1.27
20	AS-9	5.64	1.41	AS-6	7.48	0.95	IC-1	3.03	1.20
21	AS-2	5.61	1.24	AS-2	7.45	0.84	AS-2	2.99	1.15
22	LP-3	5.45	1.38	AS-9	6.68	2.12	LP-5	2.92	1.74

Table 4.44
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), DU, Faculty (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	LP-2	6.12	1.09	AS-8	8.04	1.17	LP-3	4.68	1.99
2	AS-8	6.04	1.21	LP-4	7.92	1.12	LP-2	3.88	1.79
3	LP-4	5.96	1.17	LP-3	7.88	1.05	IC-3	3.84	1.40
4	IC-3	5.92	0.86	IC-8	7.84	1.43	LP-4	3.64	1.47
5	IC-4	5.92	1.15	AS-9	7.80	0.65	IC-8	3.64	1.32
6	LP-3	5.92	1.04	LP-2	7.76	1.39	AS-5	3.60	1.22
7	IC-5	5.84	1.46	IC-4	7.76	1.36	IC-4	3.56	1.36
8	AS-7	5.84	1.52	AS-3	7.72	1.14	AS-3	3.52	1.39
9	IC-8	5.84	1.21	AS-7	7.72	1.86	LP-1	3.48	1.16
10	LP-1	5.80	1.68	IC-3	7.72	1.14	AS-1	3.36	1.25
11	AS-3	5.80	1.19	IC-5	7.68	1.82	IC-6	3.36	1.35
12	AS-5	5.64	1.41	LP-1	7.56	2.02	AS-4	3.24	1.23
13	IC-2	5.63	1.56	AS-2	7.56	1.00	AS-7	3.20	1.29
14	AS-6	5.60	1.12	AS-5	7.52	1.71	AS-6	3.16	1.40
15	IC-7	5.56	1.36	LP-5	7.48	1.85	AS-8	3.16	1.46
16	IC-6	5.52	1.36	AS-4	7.44	1.64	AS-9	3.08	1.35
17	AS-1	5.40	1.35	IC-7	7.40	1.80	IC-2	3.00	1.73
18	IC-1	5.32	1.57	IC-1	7.40	2.06	IC-1	2.96	1.40
19	LP-5	5.32	1.52	IC-6	7.40	1.78	IC-5	2.96	1.54
20	AS-2	5.24	1.59	IC-2	7.33	2.12	AS-2	2.88	1.54
21	AS-9	5.24	1.71	AS-6	7.28	1.54	IC-7	2.84	1.46
22	AS-4	5.24	1.42	AS-1	7.24	1.69	LP-5	2.72	1.31

Table 4.45
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), RU, all Users (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	LP-4	6.47	1.59	LP-1	7.70	1.35	LP-1	5.42	1.68
2	LP-1	6.46	1.61	AS-4	7.69	1.33	LP-3	5.37	1.99
3	IC-8	6.41	1.73	LP-4	7.67	1.45	LP-4	5.29	1.66
4	AS-2	6.34	1.64	IC-8	7.59	1.43	IC-3	5.28	1.68
5	LP-3	6.32	1.60	LP-3	7.58	1.45	AS-2	5.18	1.67
6	IC-3	6.30	1.57	IC-7	7.57	1.27	IC-7	5.18	1.70
7	IC-7	6.28	1.60	IC-1	7.54	1.44	LP-2	5.13	1.66
8	LP-2	6.27	1.61	IC-3	7.53	1.27	AS-3	5.05	1.61
9	AS-7	6.24	1.61	LP-2	7.53	1.37	IC-6	4.97	1.71
10	AS-4	6.20	1.78	AS-3	7.52	1.36	AS-4	4.95	1.84
11	AS-3	6.17	1.50	AS-5	7.52	1.33	IC-2	4.93	1.84
12	AS-8	6.16	1.88	AS-7	7.52	1.40	AS-7	4.92	1.65
13	IC-1	6.11	1.69	IC-5	7.51	1.39	IC-8	4.91	1.74
14	IC-6	6.10	1.75	IC-4	7.48	1.45	IC-4	4.76	1.63
15	IC-4	6.09	1.63	AS-2	7.45	1.51	AS-1	4.74	1.36
16	IC-5	6.05	1.72	AS-1	7.42	1.36	AS-5	4.72	1.62
17	AS-6	6.01	1.49	AS-8	7.40	1.31	AS-6	4.62	1.75
18	AS-5	6.00	1.68	IC-2	7.36	1.43	IC-1	4.57	1.85
19	AS-9	5.92	1.66	LP-5	7.29	1.42	AS-8	4.54	1.56
20	LP-5	5.88	1.86	IC-6	7.28	1.49	AS-9	4.53	1.68
21	IC-2	5.88	1.76	AS-6	7.26	1.26	IC-5	4.47	1.74
22	AS-1	5.73	1.62	AS-9	7.12	1.57	LP-5	4.14	1.92

Table 4.46
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), RU, Undergraduate Students (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	IC-8	6.48	1.71	AS-4	7.83	1.25	LP-1	5.42	1.49
2	AS-2	6.41	1.60	LP-1	7.72	1.32	LP-4	5.34	1.55
3	LP-4	6.38	1.59	LP-4	7.72	1.39	IC-3	5.33	1.61
4	LP-1	6.37	1.54	IC-8	7.68	1.35	AS-2	5.30	1.51
5	IC-3	6.31	1.49	IC-7	7.63	1.20	LP-3	5.29	1.87
6	IC-7	6.26	1.55	IC-1	7.62	1.39	IC-7	5.18	1.52
7	AS-7	6.25	1.59	IC-3	7.62	1.13	AS-3	5.17	1.52
8	LP-3	6.17	1.55	AS-3	7.58	1.28	IC-2	5.12	1.67
9	AS-4	6.15	1.76	LP-2	7.57	1.21	LP-2	5.09	1.59
10	AS-3	6.12	1.43	LP-3	7.57	1.38	AS-7	5.06	1.44
11	AS-8	6.10	1.89	AS-7	7.56	1.36	IC-6	5.05	1.59
12	IC-1	6.10	1.70	IC-5	7.55	1.28	IC-8	5.00	1.63
13	LP-2	6.08	1.57	AS-5	7.54	1.23	AS-4	4.91	1.84
14	IC-6	6.05	1.72	AS-2	7.53	1.50	AS-1	4.90	1.34
15	AS-9	6.01	1.56	IC-4	7.51	1.32	AS-5	4.80	1.57
16	IC-4	5.93	1.55	AS-1	7.49	1.19	IC-4	4.78	1.51
17	AS-6	5.93	1.44	AS-8	7.39	1.26	AS-9	4.66	1.69
18	IC-5	5.88	1.70	IC-2	7.36	1.43	IC-1	4.64	1.86
19	IC-2	5.83	1.72	LP-5	7.28	1.34	AS-6	4.61	1.77
20	AS-5	5.83	1.61	AS-6	7.25	1.17	AS-8	4.61	1.46
21	LP-5	5.82	1.81	AS-9	7.22	1.54	IC-5	4.55	1.60
22	AS-1	5.63	1.61	IC-6	7.17	1.43	LP-5	4.18	1.81

Table 4.47
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), RU, Graduate Students (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	LP-4	6.87	1.58	LP-3	7.79	1.30	LP-3	5.97	1.98
2	LP-3	6.84	1.63	LP-1	7.77	1.21	LP-1	5.81	1.88
3	LP-2	6.84	1.59	IC-6	7.62	1.49	IC-7	5.67	1.83
4	LP-1	6.83	1.68	AS-5	7.55	1.48	LP-2	5.53	1.65
5	IC-4	6.55	1.78	LP-4	7.51	1.51	IC-3	5.44	1.71
6	IC-5	6.53	1.72	AS-3	7.51	1.41	LP-4	5.43	1.91
7	AS-4	6.49	1.88	LP-2	7.48	1.64	AS-4	5.33	1.80
8	AS-5	6.49	1.79	IC-5	7.45	1.59	AS-2	5.30	1.76
9	IC-7	6.40	1.74	IC-7	7.43	1.32	IC-4	5.08	1.75
10	AS-8	6.40	1.88	IC-4	7.42	1.72	IC-6	5.07	1.80
11	AS-3	6.39	1.70	AS-8	7.42	1.42	AS-3	5.05	1.55
12	IC-3	6.37	1.81	AS-1	7.38	1.32	IC-8	4.95	1.98
13	IC-6	6.34	1.80	AS-2	7.37	1.53	AS-6	4.91	1.52
14	IC-1	6.27	1.66	IC-2	7.36	1.37	AS-7	4.84	1.89
15	IC-8	6.27	1.70	AS-7	7.36	1.49	IC-1	4.81	1.55
16	AS-2	6.24	1.74	IC-3	7.35	1.50	IC-2	4.80	1.95
17	AS-6	6.23	1.58	IC-1	7.33	1.57	AS-5	4.74	1.69
18	AS-7	6.23	1.71	AS-6	7.33	1.41	AS-8	4.65	1.61
19	AS-1	6.10	1.69	LP-5	7.32	1.58	AS-1	4.53	1.20
20	LP-5	6.06	1.97	AS-4	7.31	1.41	IC-5	4.52	1.84
21	IC-2	5.93	1.93	IC-8	7.22	1.60	AS-9	4.51	1.52
22	AS-9	5.72	1.84	AS-9	6.97	1.44	LP-5	4.26	2.21

Table 4.48
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), RU, Faculty (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	IC-2	6.35	1.46	IC-8	7.94	1.43	IC-3	3.82	1.91
2	LP-2	6.24	1.82	LP-4	7.76	1.95	LP-2	3.76	1.99
3	IC-5	6.24	1.68	AS-7	7.65	1.46	LP-4	3.76	1.35
4	IC-4	6.12	1.62	AS-8	7.47	1.59	AS-4	3.71	1.53
5	AS-6	6.12	1.76	IC-1	7.41	1.42	LP-3	3.59	2.67
6	AS-7	6.12	1.50	AS-4	7.35	1.73	LP-1	3.47	2.12
7	IC-8	6.12	2.12	IC-4	7.35	1.90	AS-5	3.35	1.69
8	LP-3	6.06	1.68	IC-2	7.35	1.73	AS-1	3.29	1.45
9	LP-5	6.06	2.14	IC-7	7.35	1.84	AS-6	3.24	1.95
10	AS-5	6.06	1.85	LP-5	7.29	1.90	IC-8	3.24	1.39
11	LP-4	6.00	1.32	IC-5	7.24	1.86	IC-6	3.24	2.17
12	LP-1	5.94	2.05	IC-6	7.18	2.19	AS-7	3.24	2.33
13	IC-3	5.94	1.64	IC-3	7.12	1.87	AS-3	3.18	2.07
14	AS-3	5.88	1.36	LP-2	7.06	2.11	IC-5	2.94	2.46
15	AS-8	5.88	1.73	LP-1	7.06	2.22	LP-5	2.94	1.78
16	IC-7	5.88	1.73	AS-5	7.00	1.84	AS-8	2.88	1.90
17	IC-6	5.76	1.82	AS-6	6.94	1.75	IC-4	2.88	1.54
18	AS-2	5.76	1.79	AS-2	6.71	1.31	AS-2	2.76	1.89
19	IC-1	5.59	1.70	AS-3	6.71	2.02	AS-9	2.71	1.16
20	AS-9	5.53	2.03	LP-3	6.59	2.53	IC-7	2.65	1.41
21	AS-4	5.53	1.28	AS-1	6.59	2.96	IC-2	2.59	2.27
22	AS-1	5.41	1.28	AS-9	6.35	2.29	IC-1	2.29	1.61

Table 4.49
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BAU, all Users (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	IC-3	6.31	1.25	IC-7	8.36	1.02	LP-1	5.66	1.17
2	IC-7	6.22	1.30	LP-4	8.27	1.12	LP-3	5.62	1.21
3	LP-2	6.19	1.26	LP-5	8.23	1.17	IC-4	5.45	1.13
4	LP-3	6.12	1.06	IC-8	8.21	1.01	AS-2	5.34	1.27
5	LP-1	6.01	1.21	LP-3	8.11	1.01	AS-4	5.31	1.13
6	AS-3	6.01	1.06	IC-5	8.07	0.95	AS-5	5.29	0.91
7	IC-2	5.96	1.18	IC-6	8.04	1.05	AS-7	5.29	1.20
8	IC-4	5.91	1.26	LP-2	8.04	0.84	AS-6	5.22	1.26
9	AS-7	5.81	0.97	IC-3	8.02	1.19	LP-4	5.19	1.24
10	AS-1	5.79	0.88	LP-1	8.02	1.16	AS-3	5.17	1.14
11	IC-8	5.78	0.91	AS-3	7.98	1.11	IC-5	5.14	1.20
12	AS-9	5.71	0.86	AS-8	7.97	1.03	LP-5	5.09	1.05
13	IC-5	5.70	1.36	IC-4	7.97	0.90	LP-2	5.06	1.00
14	LP-5	5.70	0.94	IC-1	7.90	1.02	AS-1	4.95	1.15
15	IC-1	5.70	1.38	IC-2	7.88	0.93	AS-9	4.93	1.09
16	IC-6	5.56	1.07	AS-6	7.83	0.85	IC-3	4.88	1.36
17	AS-6	5.56	1.06	AS-7	7.77	0.88	IC-1	4.86	1.31
18	AS-8	5.53	0.96	AS-9	7.71	0.95	IC-6	4.75	1.42
19	LP-4	5.44	0.99	AS-5	7.36	1.04	IC-7	4.58	1.48
20	AS-4	5.36	0.87	AS-4	7.26	0.99	IC-2	4.50	1.58
21	AS-2	5.34	0.95	AS-2	7.22	1.02	IC-8	4.22	1.48
22	AS-5	5.24	1.09	AS-1	7.14	0.80	AS-8	4.19	1.58

Table 4.50
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BAU, Undergraduate Students (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	IC-7	6.59	0.55	IC-7	8.67	0.47	LP-1	5.39	0.87
2	LP-2	6.37	1.00	LP-4	8.62	0.65	LP-3	5.35	0.82
3	IC-3	6.33	1.23	LP-5	8.56	0.59	IC-4	5.23	0.63
4	LP-3	6.26	0.83	IC-8	8.43	0.62	AS-7	5.15	0.97
5	IC-4	6.18	0.91	LP-3	8.33	0.76	AS-2	5.10	1.03
6	IC-2	6.14	0.82	IC-6	8.32	0.57	AS-5	5.10	0.58
7	LP-1	6.14	0.73	IC-3	8.31	0.87	AS-4	5.09	0.74
8	AS-3	5.99	1.00	IC-5	8.24	0.65	LP-4	5.03	0.86
9	IC-1	5.97	1.01	LP-1	8.21	0.99	AS-6	4.94	0.88
10	IC-8	5.92	0.63	AS-8	8.18	0.49	IC-5	4.90	0.75
11	IC-5	5.90	1.08	AS-3	8.18	0.89	LP-5	4.86	0.50
12	AS-1	5.87	0.63	LP-2	8.15	0.67	AS-3	4.78	0.60
13	AS-7	5.87	0.85	IC-4	8.15	0.61	LP-2	4.77	0.58
14	LP-5	5.86	0.48	IC-1	8.02	0.92	AS-9	4.67	0.56
15	AS-9	5.71	0.56	AS-9	7.95	0.37	AS-1	4.66	0.78
16	IC-6	5.56	0.79	IC-2	7.95	0.71	IC-1	4.52	0.70
17	AS-6	5.48	0.89	AS-7	7.89	0.46	IC-3	4.41	0.75
18	AS-8	5.41	0.73	AS-6	7.87	0.38	IC-6	4.37	0.90
19	AS-2	5.38	0.69	AS-5	7.43	0.64	IC-2	4.16	1.16
20	LP-4	5.29	0.80	AS-2	7.20	0.85	IC-7	4.09	0.99
21	AS-4	5.23	0.58	AS-4	7.18	0.54	IC-8	3.62	0.65
22	AS-5	5.18	0.83	AS-1	7.06	0.56	AS-8	3.55	0.83

Table 4.51
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BAU, Graduate Students (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	IC-3	6.44	1.21	AS-6	7.90	0.89	LP-1	6.44	1.29
2	AS-3	6.15	1.16	IC-5	7.83	0.88	LP-3	6.40	1.49
3	LP-4	5.86	1.14	IC-8	7.82	0.87	AS-3	6.20	1.55
4	AS-8	5.86	1.05	IC-2	7.80	0.95	IC-4	6.16	1.47
5	LP-3	5.84	1.27	LP-2	7.78	0.87	AS-2	6.14	1.55
6	AS-7	5.80	1.01	IC-7	7.75	1.10	AS-6	6.13	1.42
7	AS-1	5.78	1.19	LP-4	7.66	0.96	IC-3	6.07	1.70
8	LP-2	5.76	1.70	LP-3	7.66	0.94	AS-4	5.98	1.56
9	AS-6	5.76	1.29	AS-3	7.66	0.94	LP-5	5.97	1.41
10	AS-9	5.76	1.23	IC-1	7.65	0.88	AS-5	5.97	1.07
11	IC-2	5.71	1.70	LP-5	7.64	1.47	LP-2	5.94	1.21
12	LP-1	5.68	1.89	LP-1	7.63	1.16	IC-1	5.94	1.69
13	AS-4	5.64	1.26	AS-7	7.59	0.93	IC-7	5.93	1.69
14	IC-6	5.57	1.40	AS-8	7.59	1.11	AS-1	5.89	1.33
15	AS-5	5.46	1.31	IC-6	7.55	1.11	IC-5	5.89	1.54
16	IC-8	5.43	1.19	IC-4	7.53	0.89	AS-7	5.83	1.30
17	IC-7	5.39	1.91	AS-4	7.52	1.32	LP-4	5.77	1.65
18	AS-2	5.36	1.38	IC-3	7.33	1.25	AS-8	5.76	1.82
19	LP-5	5.30	1.42	AS-9	7.30	1.15	IC-6	5.74	1.80
20	IC-4	5.23	1.63	AS-2	7.24	1.15	IC-8	5.72	1.79
21	IC-5	5.21	1.71	AS-5	7.17	1.37	AS-9	5.72	1.56
22	IC-1	5.00	1.90	AS-1	7.14	1.16	IC-2	5.62	1.69

Table 4.52
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BAU, Faculty (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	LP-1	5.90	1.62	AS-1	8.00	0.79	LP-1	5.37	2.01
2	LP-2	5.90	1.21	LP-2	7.90	1.80	AS-3	5.30	1.22
3	LP-3	5.75	1.89	IC-4	7.80	2.26	LP-3	5.25	1.94
4	IC-8	5.70	1.66	IC-3	7.70	2.41	IC-3	5.05	1.93
5	IC-4	5.65	1.76	IC-1	7.65	2.01	AS-4	5.00	1.62
6	AS-3	5.60	1.19	LP-3	7.50	2.28	IC-6	4.90	2.31
7	AS-6	5.60	1.60	IC-2	7.45	2.21	AS-8	4.90	2.07
8	AS-4	5.60	1.23	LP-1	7.45	2.16	IC-4	4.80	2.21
9	LP-5	5.60	1.60	AS-5	7.40	2.37	IC-5	4.70	2.11
10	AS-9	5.60	1.60	IC-7	7.40	2.58	IC-8	4.70	2.05
11	IC-1	5.55	1.43	AS-2	7.40	1.88	LP-2	4.70	1.49
12	IC-3	5.55	1.47	IC-8	7.30	2.81	AS-2	4.60	0.88
13	IC-6	5.55	1.99	AS-8	7.20	2.95	AS-9	4.60	1.54
14	IC-7	5.55	2.14	IC-5	7.20	2.44	AS-5	4.60	1.54
15	IC-5	5.50	2.04	AS-7	7.20	2.57	LP-4	4.60	1.90
16	AS-8	5.50	2.06	AS-3	7.10	2.59	AS-6	4.55	2.16
17	LP-4	5.35	1.57	AS-6	7.10	2.63	AS-7	4.50	2.06
18	AS-7	5.25	1.68	AS-4	7.00	2.36	IC-7	4.50	1.73
19	IC-2	5.00	1.45	IC-6	7.00	2.62	AS-1	4.25	1.59
20	AS-5	4.95	2.19	LP-5	6.90	2.43	IC-1	4.05	2.09
21	AS-1	4.90	1.25	LP-4	6.90	2.83	LP-5	3.90	1.41
22	AS-2	4.85	1.18	AS-9	6.80	2.48	IC-2	3.55	2.61

Table 4.53
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BUET, all Users (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	AS-8	6.18	1.47	LP-4	8.26	1.21	LP-1	5.57	1.82
2	IC-7	6.08	1.37	IC-8	8.20	1.14	IC-1	5.20	2.11
3	LP-3	6.07	1.42	LP-2	8.19	1.19	LP-3	5.16	2.28
4	LP-4	5.96	1.44	LP-3	8.11	1.11	LP-4	5.13	2.14
5	IC-6	5.96	1.52	IC-5	8.09	1.31	LP-2	5.13	1.88
6	IC-8	5.96	1.69	LP-1	8.05	1.26	IC-4	5.09	1.98
7	LP-5	5.93	1.60	IC-7	8.05	0.93	LP-5	5.05	2.00
8	IC-3	5.92	1.64	IC-1	8.00	1.26	IC-7	5.04	1.98
9	IC-4	5.92	1.77	IC-2	7.99	1.35	AS-1	4.99	1.55
10	IC-5	5.90	1.77	LP-5	7.97	1.19	IC-3	4.95	1.81
11	LP-1	5.88	1.62	IC-4	7.96	1.34	IC-8	4.93	2.12
12	LP-2	5.82	1.62	AS-8	7.94	1.16	AS-8	4.90	2.19
13	AS-7	5.79	1.51	AS-7	7.91	1.20	AS-3	4.86	1.82
14	IC-1	5.71	1.72	IC-6	7.86	1.26	AS-4	4.85	1.70
15	AS-4	5.70	1.80	IC-3	7.80	1.35	AS-6	4.72	1.95
16	AS-5	5.65	1.85	AS-6	7.77	1.12	IC-6	4.66	2.05
17	AS-6	5.58	1.62	AS-4	7.75	1.27	AS-7	4.57	2.05
18	IC-2	5.53	1.80	AS-5	7.74	1.34	IC-5	4.56	1.99
19	AS-3	5.52	1.67	AS-3	7.71	1.27	IC-2	4.55	1.84
20	AS-9	5.46	1.67	AS-1	7.57	1.25	AS-9	4.52	1.67
21	AS-2	5.14	1.80	AS-9	7.49	1.26	AS-5	4.41	1.81
22	AS-1	5.02	1.47	AS-2	7.45	1.70	AS-2	4.32	1.89

Table 4.54
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BUET, Undergraduate Students (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	AS-8	6.35	1.45	LP-4	8.29	1.25	LP-1	5.93	1.67
2	LP-3	6.15	1.39	IC-8	8.28	1.22	LP-4	5.63	1.87
3	LP-5	6.09	1.58	LP-2	8.26	1.09	LP-3	5.59	2.05
4	IC-8	6.08	1.65	LP-1	8.12	1.23	IC-7	5.49	1.78
5	IC-7	6.07	1.27	LP-3	8.11	1.17	IC-4	5.48	1.82
6	IC-6	6.05	1.47	LP-5	8.10	1.05	AS-8	5.45	1.96
7	LP-4	6.04	1.43	IC-7	8.07	0.84	LP-5	5.45	1.90
8	IC-3	6.03	1.65	IC-5	8.06	1.31	LP-2	5.43	1.80
9	LP-1	6.00	1.59	IC-2	8.05	1.31	IC-8	5.34	2.02
10	IC-4	5.95	1.82	IC-4	8.03	1.34	IC-1	5.31	2.14
11	LP-2	5.94	1.58	IC-1	7.99	1.24	IC-3	5.23	1.78
12	IC-5	5.93	1.69	AS-7	7.91	1.21	AS-6	5.09	1.73
13	AS-7	5.92	1.53	AS-8	7.91	1.21	AS-3	5.09	1.72
14	AS-4	5.81	1.88	IC-6	7.88	1.28	AS-4	5.07	1.65
15	IC-1	5.78	1.81	IC-3	7.83	1.41	IC-6	5.05	1.96
16	AS-5	5.74	1.90	AS-5	7.78	1.37	AS-1	5.01	1.62
17	IC-2	5.63	1.81	AS-4	7.77	1.34	IC-5	4.94	1.87
18	AS-6	5.55	1.61	AS-6	7.70	1.14	AS-7	4.91	1.98
19	AS-9	5.52	1.70	AS-3	7.61	1.34	AS-9	4.87	1.51
20	AS-3	5.52	1.70	AS-1	7.53	1.30	IC-2	4.73	1.92
21	AS-2	5.17	1.91	AS-9	7.46	1.30	AS-5	4.65	1.79
22	AS-1	5.01	1.54	AS-2	7.45	1.83	AS-2	4.59	1.86

Table 4.55
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BUET, Graduate Students (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	IC-7	6.50	1.13	IC-5	8.27	0.59	IC-1	4.93	2.09
2	IC-5	6.38	1.26	IC-1	8.23	0.71	AS-1	4.68	1.08
3	AS-6	6.09	1.12	AS-8	8.14	0.72	LP-1	4.27	1.67
4	IC-4	6.04	1.08	LP-3	8.13	0.69	IC-2	4.18	0.86
5	LP-3	5.95	1.02	LP-4	8.11	1.12	LP-2	4.11	1.53
6	IC-6	5.89	1.26	LP-2	8.05	1.20	AS-4	4.04	1.74
7	LP-1	5.88	0.90	IC-7	8.05	0.88	IC-3	3.73	1.36
8	LP-2	5.84	0.95	AS-1	8.04	0.38	AS-3	3.68	1.49
9	AS-8	5.82	0.94	AS-6	8.04	0.97	LP-5	3.64	1.53
10	IC-3	5.82	0.86	AS-7	8.02	0.73	AS-5	3.45	1.49
11	LP-4	5.77	0.91	AS-3	7.96	0.79	IC-7	3.43	1.98
12	IC-8	5.68	1.24	IC-2	7.95	0.96	IC-4	3.36	1.87
13	AS-4	5.63	0.84	LP-1	7.93	0.87	LP-3	3.20	2.35
14	AS-5	5.63	1.23	IC-8	7.86	0.62	AS-2	3.18	1.42
15	AS-7	5.57	0.85	AS-5	7.84	0.80	IC-8	3.14	1.87
16	IC-2	5.55	0.91	IC-6	7.79	0.87	AS-6	3.13	2.16
17	LP-5	5.52	1.08	AS-4	7.64	0.82	AS-7	3.13	1.86
18	AS-3	5.48	0.71	IC-4	7.61	1.22	IC-5	3.11	1.86
19	AS-2	5.32	1.01	AS-9	7.50	1.08	AS-9	3.07	1.40
20	AS-9	5.30	1.03	AS-2	7.48	1.11	IC-6	3.05	1.67
21	IC-1	5.16	1.04	LP-5	7.45	1.14	LP-4	2.73	1.83
22	AS-1	5.02	0.94	IC-3	7.41	1.09	AS-8	2.70	1.93

Table 4.56
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BUET, Faculty (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	IC-1	6.17	1.66	LP-4	8.33	0.96	AS-1	5.46	1.50
2	AS-3	5.67	2.71	IC-3	8.33	1.05	LP-4	5.17	1.88
3	LP-4	5.50	2.23	AS-3	8.25	1.19	AS-3	5.08	2.55
4	LP-3	5.46	2.28	LP-3	8.17	1.17	LP-3	4.83	2.14
5	IC-8	5.25	2.64	IC-8	8.17	1.09	IC-4	4.71	1.78
6	IC-4	5.21	2.36	IC-5	8.08	2.26	IC-3	4.67	1.93
7	AS-8	5.17	2.04	IC-4	8.00	1.47	IC-1	4.67	1.79
8	IC-7	5.17	2.24	AS-6	7.88	1.19	LP-1	4.58	2.10
9	AS-9	5.17	2.37	IC-7	7.83	1.71	IC-8	4.54	1.50
10	AS-1	5.17	1.66	AS-9	7.83	1.13	AS-6	4.33	1.97
11	LP-5	5.13	2.33	IC-6	7.83	1.79	AS-4	4.25	1.51
12	IC-6	5.04	2.22	AS-4	7.79	1.35	AS-9	4.13	1.98
13	IC-3	4.92	2.41	AS-8	7.75	1.33	LP-2	4.08	2.30
14	AS-7	4.92	2.10	LP-2	7.71	1.94	IC-6	4.04	1.85
15	AS-6	4.83	2.32	LP-5	7.67	2.14	AS-7	4.04	1.73
16	AS-4	4.67	2.22	AS-7	7.63	1.81	AS-2	4.00	2.17
17	AS-5	4.67	2.30	IC-1	7.58	2.10	AS-5	4.00	1.87
18	LP-1	4.50	2.45	LP-1	7.58	2.06	AS-8	3.92	1.47
19	IC-5	4.46	2.72	AS-2	7.42	1.28	LP-5	3.92	2.22
20	AS-2	4.42	1.98	IC-2	7.42	2.26	IC-7	3.83	1.71
21	IC-2	4.42	2.75	AS-5	7.08	1.79	IC-5	3.67	1.83
22	LP-2	4.38	2.46	AS-1	6.92	1.59	IC-2	3.42	2.15

Table 4.57
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BSMMU, all Users (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	AS-8	6.83	1.36	AS-6	8.20	1.24	AS-1	4.86	1.49
2	IC-8	6.77	1.53	AS-7	8.19	1.29	LP-1	4.72	1.47
3	LP-2	6.72	1.44	LP-2	8.19	1.11	LP-2	4.41	1.42
4	LP-5	6.71	1.55	LP-1	8.14	1.16	IC-1	4.37	1.52
5	LP-3	6.66	1.41	LP-5	8.14	1.20	AS-3	4.36	1.55
6	AS-9	6.66	1.39	IC-3	8.10	1.20	AS-4	4.30	1.38
7	AS-7	6.65	1.42	AS-4	8.10	1.26	LP-4	4.28	1.59
8	IC-5	6.63	1.59	IC-2	8.10	1.26	AS-6	4.28	1.43
9	LP-1	6.63	1.49	LP-4	8.10	1.16	AS-2	4.27	1.54
10	AS-1	6.62	1.59	AS-9	8.08	1.31	IC-2	4.19	1.68
11	IC-1	6.62	1.56	LP-3	8.05	1.21	IC-5	4.19	1.67
12	IC-7	6.60	1.51	IC-8	8.05	1.34	IC-7	4.17	1.46
13	IC-6	6.60	1.36	AS-8	8.02	1.33	AS-8	4.15	1.64
14	IC-2	6.59	1.50	AS-1	8.01	1.28	IC-8	4.13	1.47
15	AS-3	6.59	1.38	IC-5	8.00	1.24	LP-5	4.13	1.52
16	AS-6	6.59	1.60	IC-6	7.97	1.41	LP-3	4.12	1.60
17	LP-4	6.58	1.51	AS-2	7.96	1.37	IC-3	4.11	1.72
18	IC-3	6.57	1.58	AS-3	7.95	1.34	IC-6	4.07	1.63
19	IC-4	6.50	1.47	AS-5	7.95	1.31	IC-4	4.07	1.44
20	AS-4	6.47	1.48	IC-1	7.86	1.38	AS-5	4.01	1.72
21	AS-2	6.43	1.59	IC-7	7.86	1.33	AS-9	3.93	1.66
22	AS-5	6.35	1.72	IC-4	7.81	1.35	AS-7	3.86	1.67

Table 4.58
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BSMMU, Graduate Students (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	AS-8	6.83	1.36	AS-6	8.24	1.22	AS-1	4.80	1.43
2	IC-8	6.77	1.53	LP-2	8.20	1.13	LP-1	4.71	1.43
3	LP-2	6.72	1.44	AS-7	8.20	1.32	LP-2	4.42	1.33
4	LP-5	6.71	1.55	LP-5	8.15	1.23	AS-3	4.41	1.51
5	LP-3	6.66	1.41	LP-4	8.13	1.15	IC-1	4.38	1.47
6	AS-9	6.66	1.39	AS-9	8.13	1.33	AS-4	4.37	1.22
7	AS-7	6.65	1.42	LP-1	8.12	1.19	AS-6	4.31	1.34
8	IC-5	6.63	1.59	AS-4	8.12	1.28	AS-2	4.27	1.48
9	LP-1	6.63	1.49	IC-3	8.10	1.23	LP-4	4.26	1.53
10	AS-1	6.62	1.59	IC-2	8.08	1.29	IC-2	4.20	1.66
11	IC-1	6.62	1.56	AS-1	8.06	1.28	IC-5	4.18	1.60
12	IC-7	6.60	1.51	IC-8	8.05	1.38	IC-7	4.13	1.42
13	IC-6	6.60	1.36	LP-3	8.04	1.25	LP-3	4.12	1.56
14	IC-2	6.59	1.50	AS-8	8.02	1.38	LP-5	4.09	1.42
15	AS-3	6.59	1.38	IC-5	8.01	1.24	IC-3	4.09	1.68
16	AS-6	6.59	1.60	AS-5	7.99	1.32	IC-8	4.07	1.43
17	LP-4	6.58	1.51	AS-3	7.98	1.35	IC-4	4.06	1.40
18	IC-3	6.57	1.58	IC-6	7.96	1.45	AS-8	4.06	1.56
19	IC-4	6.50	1.47	AS-2	7.94	1.41	IC-6	4.05	1.57
20	AS-4	6.47	1.48	IC-1	7.85	1.42	AS-5	3.98	1.61
21	AS-2	6.43	1.59	IC-7	7.85	1.38	AS-9	3.92	1.56
22	AS-5	6.35	1.72	IC-4	7.84	1.35	AS-7	3.79	1.55

Table 4.59
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), BSMMU, Faculty (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	AS-8	6.83	1.36	LP-1	8.32	.91	AS-1	5.39	1.93
2	IC-8	6.77	1.53	IC-2	8.23	0.84	AS-8	4.97	2.07
3	LP-2	6.72	1.44	AS-2	8.19	0.91	LP-1	4.81	1.80
4	LP-5	6.71	1.55	AS-7	8.19	1.05	IC-8	4.65	1.78
5	LP-3	6.66	1.41	IC-3	8.16	0.93	LP-4	4.52	2.10
6	AS-9	6.66	1.39	LP-3	8.13	0.76	IC-7	4.48	1.84
7	AS-7	6.65	1.42	LP-5	8.10	0.87	LP-5	4.48	2.22
8	IC-5	6.63	1.59	IC-6	8.06	1.00	AS-7	4.45	2.45
9	LP-1	6.63	1.49	IC-8	8.06	0.93	IC-5	4.35	2.20
10	AS-1	6.62	1.59	LP-2	8.03	0.87	IC-1	4.32	1.99
11	IC-1	6.62	1.56	AS-8	8.00	0.73	IC-6	4.29	2.12
12	IC-7	6.60	1.51	AS-4	7.94	1.00	AS-2	4.26	2.00
13	IC-6	6.60	1.36	IC-5	7.94	1.29	LP-2	4.26	2.08
14	IC-2	6.59	1.50	IC-1	7.90	0.94	IC-3	4.26	2.13
15	AS-3	6.59	1.38	IC-7	7.90	0.75	AS-5	4.26	2.52
16	AS-6	6.59	1.60	AS-6	7.81	1.38	IC-4	4.13	1.78
17	LP-4	6.58	1.51	LP-4	7.77	1.18	LP-3	4.13	1.94
18	IC-3	6.57	1.58	AS-3	7.68	1.14	IC-2	4.13	1.88
19	IC-4	6.50	1.47	AS-9	7.65	1.08	AS-6	4.03	2.11
20	AS-4	6.47	1.48	AS-5	7.61	1.15	AS-9	3.97	2.40
21	AS-2	6.43	1.59	IC-4	7.55	1.29	AS-3	3.94	1.84
22	AS-5	6.35	1.72	AS-1	7.52	1.12	AS-4	3.68	2.30

Table 4.60
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), IUB, all Users (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	LP-3	6.37	1.85	LP-5	7.88	1.51	LP-3	6.88	1.81
2	LP-5	6.33	1.83	LP-3	7.84	1.51	LP-5	6.85	1.74
3	LP-1	6.30	1.92	LP-1	7.81	1.67	LP-2	6.81	1.70
4	LP-4	6.13	1.92	AS-5	7.68	1.60	AS-5	6.65	1.77
5	LP-2	6.09	1.99	LP-4	7.67	1.64	LP-1	6.58	1.83
6	AS-5	6.07	1.87	IC-5	7.63	1.69	AS-4	6.45	1.82
7	AS-8	6.06	1.97	LP-2	7.62	1.81	IC-7	6.39	1.75
8	IC-3	6.05	1.97	AS-7	7.62	1.72	AS-8	6.37	1.89
9	IC-7	6.01	1.85	IC-6	7.59	1.78	IC-5	6.33	1.91
10	AS-3	6.00	1.83	AS-8	7.58	1.71	AS-6	6.33	1.79
11	IC-4	5.99	1.92	IC-3	7.56	1.77	AS-9	6.32	1.72
12	IC-6	5.94	1.97	IC-7	7.54	1.63	AS-7	6.31	1.79
13	AS-4	5.94	1.97	AS-9	7.50	1.72	LP-4	6.31	1.80
14	IC-8	5.94	1.84	IC-1	7.49	1.80	IC-6	6.27	1.81
15	IC-5	5.94	1.97	IC-4	7.49	1.69	IC-4	6.20	1.78
16	AS-9	5.92	1.87	AS-1	7.48	1.54	IC-8	6.10	1.90
17	AS-7	5.87	1.54	IC-8	7.48	1.67	AS-1	5.87	1.45
18	AS-6	5.85	1.95	IC-2	7.45	1.75	AS-2	5.83	1.84
19	IC-2	5.84	1.82	AS-4	7.43	1.77	IC-2	5.82	1.86
20	AS-2	5.83	1.83	AS-6	7.42	1.75	AS-3	5.73	1.92
21	IC-1	5.72	1.85	AS-3	7.40	1.89	IC-1	5.63	1.87
22	AS-1	5.33	1.64	AS-2	7.36	1.78	IC-3	5.52	1.71

Table 4.61
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), IUB, Undergraduate Students (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	LP-3	6.30	1.95	LP-5	7.73	1.64	LP-5	6.81	1.74
2	LP-5	6.27	1.91	LP-3	7.67	1.62	LP-3	6.80	1.83
3	LP-1	6.19	1.98	LP-1	7.64	1.80	LP-2	6.73	1.72
4	LP-4	6.15	2.00	AS-5	7.58	1.75	AS-5	6.67	1.76
5	AS-5	6.04	1.96	LP-4	7.54	1.78	LP-1	6.39	1.86
6	IC-3	6.04	2.07	AS-7	7.52	1.87	AS-4	6.38	1.85
7	LP-2	6.01	2.11	IC-5	7.46	1.82	AS-9	6.36	1.71
8	IC-7	5.99	1.94	LP-2	7.46	1.94	AS-8	6.29	1.91
9	AS-8	5.96	2.07	IC-3	7.45	1.86	LP-4	6.28	1.83
10	AS-7	5.93	1.59	AS-8	7.42	1.80	IC-7	6.27	1.85
11	AS-3	5.92	1.92	AS-9	7.42	1.83	AS-7	6.27	1.84
12	IC-8	5.89	1.95	IC-6	7.42	1.93	IC-6	6.23	1.91
13	AS-9	5.88	1.97	IC-7	7.42	1.75	AS-6	6.21	1.82
14	IC-6	5.88	2.09	AS-1	7.40	1.61	IC-5	6.17	2.00
15	AS-4	5.87	2.04	IC-1	7.35	1.90	IC-4	6.14	1.82
16	IC-4	5.85	2.02	IC-2	7.35	1.80	IC-8	6.03	1.92
17	IC-5	5.84	2.08	IC-8	7.33	1.76	AS-1	5.79	1.52
18	IC-2	5.79	1.88	IC-4	7.30	1.78	IC-2	5.70	1.92
19	AS-6	5.78	2.07	AS-6	7.30	1.89	AS-2	5.64	1.85
20	AS-2	5.77	1.91	AS-3	7.28	2.04	IC-1	5.53	1.94
21	IC-1	5.70	1.92	AS-4	7.25	1.92	AS-3	5.53	1.88
22	AS-1	5.17	1.71	AS-2	7.16	1.92	IC-3	5.46	1.74

Table 4.62
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), IUB, Graduate Students (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	IC-4	6.46	1.58	LP-3	8.31	0.95	LP-3	6.67	1.63
2	LP-1	6.40	1.71	LP-1	8.19	1.14	IC-5	6.63	1.67
3	LP-3	6.40	1.65	IC-3	8.19	0.94	LP-1	6.63	1.61
4	IC-6	6.33	1.53	IC-6	8.15	0.99	AS-5	6.58	1.85
5	IC-3	6.29	1.61	LP-5	8.15	1.01	LP-2	6.52	1.74
6	AS-3	6.27	1.27	IC-4	8.13	1.06	LP-5	6.44	1.65
7	AS-5	6.23	1.67	AS-8	8.10	1.17	IC-7	6.44	1.53
8	AS-8	6.23	1.55	LP-4	8.10	1.12	IC-6	6.42	1.64
9	IC-5	6.19	1.66	IC-5	8.08	1.13	AS-9	6.35	1.52
10	IC-8	6.19	1.44	LP-2	8.06	1.17	AS-8	6.35	1.66
11	IC-2	6.17	1.75	AS-7	8.04	1.17	AS-6	6.33	1.73
12	LP-5	6.10	1.68	AS-5	8.00	0.95	AS-7	6.23	1.73
13	LP-2	6.08	1.75	IC-1	7.98	1.36	IC-4	6.23	1.74
14	LP-4	6.08	1.77	AS-2	7.98	0.86	AS-4	6.15	1.62
15	AS-4	6.04	1.64	AS-4	7.96	0.90	LP-4	6.08	1.75
16	IC-1	5.98	1.52	IC-7	7.94	1.02	IC-8	6.06	1.84
17	AS-9	5.98	1.56	IC-2	7.90	1.34	AS-1	5.98	1.38
18	AS-2	5.96	1.46	IC-8	7.90	1.34	AS-2	5.96	1.84
19	IC-7	5.96	1.49	AS-9	7.85	1.15	AS-3	5.88	1.81
20	AS-1	5.92	1.35	AS-1	7.73	1.28	IC-2	5.75	1.82
21	AS-6	5.88	1.50	AS-6	7.73	1.09	IC-1	5.69	1.72
22	AS-7	5.65	1.54	AS-3	7.71	1.30	IC-3	5.25	1.54

Table 4.63
Mean and SD of LibQUAL+ Core Questions (MS, DS & PS), IUB, Faculty (Ranked by Mean Value)

Order	ID	MS		ID	DS		ID	PS	
		Mean	SD		Mean	SD		Mean	SD
1	LP-5	7.00	1.23	LP-5	8.58	0.68	LP-1	7.82	1.39
2	LP-1	6.95	1.63	LP-1	8.50	0.86	LP-2	7.76	1.13
3	LP-3	6.79	1.30	LP-3	8.42	0.83	LP-3	7.74	1.75
4	LP-2	6.63	1.26	IC-5	8.21	0.96	LP-5	7.61	1.69
5	AS-8	6.55	1.66	LP-2	8.18	1.23	AS-4	7.29	1.71
6	IC-4	6.39	1.39	LP-4	8.11	0.80	AS-6	7.16	1.41
7	AS-4	6.32	1.86	IC-6	8.11	1.16	IC-7	7.16	0.95
8	AS-6	6.32	1.54	AS-8	8.05	1.35	IC-5	7.11	1.20
9	IC-5	6.32	1.44	IC-8	8.05	1.06	AS-3	7.00	1.86
10	AS-3	6.24	1.81	AS-4	8.03	1.13	AS-2	6.95	1.35
11	IC-7	6.21	1.56	AS-5	8.03	1.03	AS-8	6.92	1.96
12	AS-2	6.13	1.65	IC-4	7.97	1.42	LP-4	6.82	1.64
13	AS-9	6.05	1.45	IC-7	7.95	1.21	IC-2	6.79	1.12
14	LP-4	6.03	1.57	AS-2	7.95	1.25	AS-7	6.71	1.39
15	AS-5	6.00	1.38	AS-6	7.89	1.23	IC-4	6.63	1.51
16	IC-8	5.95	1.49	AS-3	7.87	1.21	AS-5	6.63	1.82
17	IC-6	5.89	1.54	IC-1	7.82	1.39	IC-8	6.61	1.79
18	IC-2	5.84	1.50	AS-7	7.76	1.08	IC-6	6.39	1.22
19	IC-3	5.84	1.65	AS-1	7.74	1.29	AS-1	6.27	0.90
20	AS-7	5.76	1.22	IC-2	7.58	1.76	IC-1	6.24	1.38
21	AS-1	5.68	1.30	AS-9	7.58	1.52	IC-3	6.21	1.56
22	IC-1	5.55	1.74	IC-3	7.47	1.75	AS-9	6.03	2.03

4.10 Top Common Desired Services of each University by All Groups of Users

From university libraries, by all and individual group of users, the Mean value of the top ten common DSs are ranked and compared (See Table 4.64 - 4.69). In most of the cases, DS expectations have the similarities among all and each group. For DU, by all users, the upmost ten DSs are AS-8 LP-3, AS-3, LP-1, LP-4, AS-7, IC-5, AS-5, IC-3 and LP-2. For undergraduate students the top ten DSs are AS-8, LP-3, AS-3, LP-1, LP-4, AS-7, IC-5, AS-5, LP-2, and IC-3. For graduate students, the top ten DSs are AS-8, LP-3, AS-7, AS-3, LP-1, AS-5, IC-5, LP-4, IC-4, and IC-3. For faculty, the top ten DSs are AS-8, LP-4, LP-3, IC-8, AS-9, LP-2, IC-4, AS-3, AS-7, and IC-3. Among the upmost attributes of service quality, almost all groups are very close to their desire services except faculty. Though faculty differs with few attributes, but most of their DS match with others. Here, the top DS are related to library staff's willingness, library location, Library space, library place, library equipment, library print materials, and quiet place (see Table 4.64).

Table 4.64

Top Ten Common Attributes of Desired Service by All and Individual Users at DU

Order	ID	Items	All	Under Graduate	Graduate	Faculty
1	AS-8	Willingness to help users	X	X	X	X
2	LP-3	A comfortable and inviting location	X	X	X	X
3	AS-3	Employees who are consistently courteous	X	X	X	X
4	LP-1	Library space that inspires study and learning	X	X	X	
5	LP-4	A getaway for study, learning, or research	X	X	X	X
6	AS-7	Employees who understand the needs of their users	X	X	X	X
7	IC-5	Modern equipment that lets me easily access needed information	X	X	X	
8	AS-5	Employees who have the knowledge to answer user questions	X	X	X	
9	IC-3	The printed library materials I need for my work	X	X	X	X
10	LP-2	Quiet space for individual activities	X	X		X

Table 4.65

Top Ten Common Attributes of Desired Service by All and Individual Users at RU

Order	ID	Items	All	Under Graduate	Graduate	Faculty
1	LP-1	Library space that inspires study and learning	X	X	X	
2	AS-4	Readiness to respond to users' questions	X	X		X
3	LP-4	A getaway for study, learning, or research	X	X	X	X
4	IC-8	Print and/or electronic journal collections I require for my work	X	X		X
5	LP-3	A comfortable and inviting location	X	X	X	
6	IC-7	Making information easily accessible for independent use	X	X	X	X
7	IC-1	Making electronic resources accessible from my home or office	X	X		X
8	IC-3	The printed library materials I need for my work	X	X		
9	LP-2	Quiet space for individual activities	X	X	X	
10	AS-3	Employees who are consistently courteous	X	X	X	

For RU, by all users, the upmost ten DSs are LP-1, AS-4, LP-4, IC-8, LP-3, IC-7, IC-1, IC-3, LP-2, and AS-3. For undergraduate students, the top ten DSs are AS-4, LP-1,

LP-4, IC-8, IC-7, IC-1, IC-3, AS-3, LP-2, and LP-3. For graduate students, the top ten DSs are LP-3, LP-1, IC-6, AS-5, LP-4, AS-3, LP-2, IC-5, IC-7, and IC-4. For faculty, the upmost ten DSs are IC-8, LP-4, AS-7, AS-8, IC-1, AS-4, IC-4, IC-2, IC-7, and LP-5. Among the top attributes of service quality, almost all groups are very close to their desire services though among graduates and faculty have few missing. Most of their DS match with each others. Here, with few differences, the top DS are related to Library space, library staff, library place, library location, easy to access, quiet space and printed books (see Table 4.65).

Table 4.66

Top Ten Common Attributes of Desired Service by All and Individual Users at BAU

Order	ID	Items	All	Under graduate	Graduate	Faculty
1	IC-7	Making information easily accessible for independent use	X	X	X	X
2	LP-4	A getaway for study, learning, or research	X	X	X	
3	LP-5	Community space for group learning and group study	X	X		
4	IC-8	Print and/or electronic journal collections I require for my work	X	X	X	
5	LP-3	A comfortable and inviting location	X	X	X	X
6	IC-5	Modern equipment that lets me easily access needed information	X	X	X	
7	IC-6	Easy-to-use access tools that allow me to find things on my own	X	X		
8	LP-2	Quiet space for individual activities	X		X	X
9	IC-3	The printed library materials I need for my work	X	X		X
10	LP-1	Library space that inspires study and learning	X	X		X

At BAU, by all users, the upmost ten DSs IC-7, LP-4, LP-5, IC-8, LP-3, IC-5, IC-6, LP-2, IC-3, and LP-1. For undergraduate students, the top ten DSs are IC-7, LP-4, LP-5, IC-8, LP-3, IC-6, IC-3, IC-5, LP-1, and AS-8. For graduate students, the top ten DSs are AS-6, IC-5, IC-8, IC-2, LP-2, IC-7, LP-4, LP-3, AS-3, and IC-1. For faculty, the top ten DSs are AS-1, LP-2, IC-4, IC-3, IC-1, LP-3, IC-2, LP-1, AS-5, and IC-7. Among the top attributes of service quality, most of the attributes in the top ten are here. Though graduates and faculty diverged with few items, but most of their DS match with others. Here, the upmost DSs are related to easy to use information, library place, group study, library print materials, library location, modern equipment, easy access library staff,

library location, Library space, library place, library equipment, , and quiet place, access to resources (see Table 4.66).

Table 4.67

Top Ten Common Attributes of Desired Service by All and Individual Users at BUET

Order	ID	Items	All	Under graduate	Graduate	Faculty
1	LP-4	A getaway for study, learning, or research	X	X	X	X
2	IC-8	Print and/or electronic journal collections I require for my work	X	X		X
3	LP-2	Quiet space for individual activities	X	X	X	
4	LP-3	A comfortable and inviting location	X	X	X	X
5	IC-5	Modern equipment that lets me easily access needed information	X	X	X	X
6	LP-1	Library space that inspires study and learning	X	X		
7	IC-7	Making information easily accessible for independent use	X	X	X	X
8	IC-1	Making electronic resources accessible from my home or office	X		X	
9	IC-2	A library Web site enabling me to locate information on my own	X	X		
10	LP-5	Community space for group learning and group study	X	X		

At BUET, by all users, the top ten DSs IC-7, LP-4, LP-5, IC-8, LP-3, IC-5, IC-6, LP-2, IC-3, and LP-1. For undergraduate students, the top ten DSs are AS-2, AS-9, AS-1, AS-3, AS-6, AS-4, AS-5, IC-3, IC-6, and AS-7. For graduate students, the upmost ten DSs are IC-5, IC-1, AS-8, LP-3, LP-4, LP-2, IC-7, AS-1, AS-6, and AS-7. For faculty, the top ten DSs are LP-4, IC-3, AS-3, LP-3, IC-8, IC-5, IC-4, AS-6, IC-7, and AS-9. Among the top attributes of service quality, most of the attributes in the top ten are here. Though both graduate and faculty groups differed with few items, but most of their DS match with others. Here, the top DSs are related to library as research support, relevant library resources, quiet place, comfortable location, modern instrument, information and electron resource related, effective web site and group learning facilities etc (see Table 4.67).

Table 4.68

Top Ten Common Attributes of Desired Service by All and Individual Users at BSMMU

Order	ID	Items	All	Graduate	Faculty
1	AS-6	Employees who deal with users in a caring fashion	X	X	
2	AS-7	Employees who understand the needs of their users	X	X	X
3	LP-2	Quiet space for individual activities	X	X	X
4	LP-1	Library space that inspires study and learning	X	X	X
5	LP-5	Community space for group learning and group study	X	X	X
6	IC-3	The printed library materials I need for my work	X	X	X
7	AS-4	Readiness to respond to users' questions	X	X	
8	IC-2	A library Web site enabling me to locate information on my own	X	X	X
9	LP-4	A getaway for study, learning, or research	X	X	
10	AS-9	Dependability in handling users' service problems	X	X	

For BSMMU, by all users, the top ten DSs are AS-6, AS-7, LP-2, LP-1, LP-5, IC-3, AS-4, IC-2, LP-4, and AS-9. As all users are from graduate category, there are no undergraduate students here. For graduate students, the upmost ten DSs are AS-6, LP-2, AS-7, LP-5, LP-4, AS-9, LP-1, AS-4, IC-3, and IC-2. For faculty, the top ten DSs are AS LP-1, IC-2, AS-2, AS-7, IC-3, LP-3, LP-5, IC-6, IC-8, and LP-2. Undergraduates have the same DS with the all group ranking but there are few attributes which are absent for faculty. Here, top DS scores are related to library staff regarding user care and user need, quiet library place, group study area, printed materials, staff response, library web site, research and learning support and dependability (see Table 4.68).

At IUB, by all users, the top ten DSs are LP-5, LP-3, LP-1, AS-5, LP-4, IC-5, LP-2, AS-7, IC-6, and AS-8. For undergraduate students, the top ten DSs are LP-5, LP-3, LP-1, AS-5, LP-4, AS-7, IC-5, LP-2, IC-3 and AS-8. For graduate students, the top ten DSs are LP-3, LP-1, IC-3, IC-6, LP-5, IC-4, AS-8, LP-4, IC-5 and LP-2. For faculty, the upmost ten DSs LP-5, LP-1, LP-3, IC-5, LP-2, LP-4, IC-6, AS-8, IC-8, and AS-4. Among the top attributes of DS score of service quality, almost all groups similar DSs. Though few attributes are absent in both graduate and faculty columns, but most of their DS match with others. Here, the highest DS are related to group study facilities, library location,

Library space, knowledgeable staff, research support, modern equipment, quiet place, understandable staff, easy access tool and willingness of the staff (see Table 4.69).

Table 4.69

Top Ten Common Attributes of Desired Service by All and Individual Users at IUB

Order	ID	Items	All	Under graduate	Graduate	Faculty
1	LP-5	Community space for group learning and group study	X	X	X	X
2	LP-3	A comfortable and inviting location	X	X	X	X
3	LP-1	Library space that inspires study and learning	X	X	X	X
4	AS-5	Employees who have the knowledge to answer user questions	X	X		
5	LP-4	A getaway for study, learning, or research	X	X	X	X
6	IC-5	Modern equipment that lets me easily access needed information	X	X	X	X
7	LP-2	Quiet space for individual activities	X	X		X
8	AS-7	Employees who understand the needs of their users	X	X		
9	IC-6	Easy-to-use access tools that allow me to find things on my own	X		X	X
10	AS-8	Willingness to help users	X	X	X	X

4.11 LibQUAL+ Core Questions: Service Adequacy

The gap differences between Perceived Service and Minimum Service is calculated to see whether minimum service quality is met or the service falls short. Following tables (Table 4.70 - 4.75) represent Service Adequacy Gap (AG) by all and each group of users for all university libraries. Above mentioned tables demonstrated Mean values and SDs against each item of service quality core question. In the comparison, the Mean values are observed to find the difference of scores concerning users group against any items.

Table 4.70

Service Adequacy, by All and Individual Users, at DU

Order	ID	All		Undergraduate		Graduate		Faculty	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	AS-1	-0.98	1.61	-0.71	1.62	-1.27	1.36	-2.04	1.99
2	IC-1	-2.35	1.72	-2.16	1.75	-2.71	1.59	-2.36	1.89
3	LP-1	-1.65	1.72	-1.39	1.82	-2.02	1.46	-2.32	1.55
4	AS-2	-2.15	1.73	-1.87	1.83	-2.63	1.41	-2.36	1.63
5	IC-2	-1.48	2.09	-1.08	1.96	-2.03	2.07	-2.63	2.43
6	AS-3	-1.21	1.57	-0.91	1.61	-1.55	1.32	-2.28	1.51
7	IC-3	-1.14	1.60	-0.83	1.46	-1.53	1.61	-2.08	2.02
8	LP-2	-1.50	1.72	-1.28	1.49	-1.77	1.84	-2.24	2.54
9	AS-4	-1.36	1.53	-1.10	1.57	-1.74	1.34	-2.00	1.53
10	IC-4	-1.89	1.60	-1.68	1.56	-2.19	1.51	-2.36	2.08
11	AS-5	-1.33	1.57	-1.08	1.47	-1.67	1.66	-2.04	1.57
12	LP-3	-0.40	1.84	-0.21	1.77	-0.59	1.83	-1.24	2.26
13	AS-6	-1.28	1.59	-0.96	1.53	-1.64	1.44	-2.44	1.94
14	IC-5	-1.53	1.89	-1.22	1.89	-1.85	1.67	-2.88	2.07
15	AS-7	-1.51	1.64	-1.32	1.55	-1.63	1.66	-2.64	1.91
16	IC-6	-1.73	1.49	-1.48	1.45	-2.12	1.47	-2.16	1.49
17	LP-4	-1.15	1.82	-.85	1.87	-1.47	1.55	-2.32	1.93
18	AS-8	-1.38	1.81	-1.14	1.69	-1.53	1.85	-2.88	2.01
19	IC-7	-1.71	1.70	-1.40	1.59	-2.09	1.75	-2.72	1.74
20	IC-8	-1.35	1.66	-1.21	1.67	-1.46	1.56	-2.20	1.78
21	LP-5	-2.29	2.13	-1.96	2.05	-2.86	2.18	-2.60	2.10
22	AS-9	-0.85	1.93	-0.52	1.88	-1.21	1.87	-2.16	1.82

Table 4.71

Service Adequacy, by All and Individual Users, at RU

Order	ID	All		Undergraduate		Graduate		Faculty	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	AS-1	-1.00	1.58	-0.74	1.48	-1.57	1.56	-2.12	1.96
2	IC-1	-1.54	1.98	-1.45	1.99	-1.46	1.66	-3.29	2.62
3	LP-1	-1.04	1.71	-0.95	1.50	-1.01	2.01	-2.47	2.50
4	AS-2	-1.16	1.97	-1.12	1.88	-0.94	1.92	-3.00	2.52
5	IC-2	-0.95	2.27	-0.71	2.17	-1.13	2.12	-3.76	2.68
6	AS-3	-1.12	1.82	-0.95	1.59	-1.34	2.14	-2.71	2.49
7	IC-3	-1.02	1.80	-0.98	1.74	-0.93	1.82	-2.12	2.34
8	LP-2	-1.13	1.91	-0.99	1.79	-1.29	1.84	-2.47	3.24
9	AS-4	-1.24	2.10	-1.23	2.13	-1.16	2.04	-1.82	1.91
10	IC-4	-1.32	2.11	-1.15	1.88	-1.45	2.49	-3.24	2.63
11	AS-5	-1.28	2.10	-1.03	1.97	-1.79	2.11	-2.71	2.93
12	LP-3	-0.95	1.94	-0.88	1.82	-0.87	1.88	-2.47	3.18
13	AS-6	-1.40	1.99	-1.32	1.84	-1.34	2.04	-2.88	3.24
14	IC-5	-1.58	2.18	-1.33	1.99	-2.00	2.32	-3.29	3.18
15	AS-7	-1.31	2.08	-1.19	1.91	-1.37	2.34	-2.88	2.64
16	IC-6	-1.13	1.88	-1.00	1.65	-1.25	2.29	-2.53	2.37
17	LP-4	-1.18	1.73	-1.03	1.57	-1.41	2.10	-2.24	1.79
18	AS-8	-1.63	2.19	-1.50	2.12	-1.74	2.32	-3.00	2.00
19	IC-7	-1.10	1.98	-1.08	1.83	-0.75	2.10	-3.24	2.39
20	IC-8	-1.51	2.15	-1.47	2.07	-1.33	2.18	-2.88	2.76
21	LP-5	-1.75	2.43	-1.64	2.35	-1.82	2.46	-3.12	3.14
22	AS-9	-1.38	2.23	-1.35	2.24	-1.21	2.10	-2.82	2.35

Table 4.72

Service Adequacy, by All and Individual Users, at BAU

Order	ID	All		Undergraduate		Graduate		Faculty	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	AS-1	-0.83	1.36	-1.19	0.90	0.10	1.82	-0.65	1.57
2	IC-1	-0.84	2.18	-1.45	1.30	0.94	2.87	-1.50	2.69
3	LP-1	-0.35	1.76	-0.75	1.22	0.76	2.33	-0.47	2.32
4	AS-2	-0.01	1.59	-0.28	1.25	0.77	2.16	-0.25	1.21
5	IC-2	-1.47	2.02	-1.99	1.52	-0.09	2.13	-1.45	3.44
6	AS-3	-0.84	1.35	-1.21	1.04	0.05	1.56	-0.30	1.63
7	IC-3	-1.44	1.86	-1.92	1.43	-0.37	2.25	-0.50	2.09
8	LP-2	-1.12	1.64	-1.60	1.07	0.18	2.18	-1.20	1.28
9	AS-4	-0.04	1.23	-0.13	0.87	0.33	1.74	-0.60	1.76
10	IC-4	-0.46	1.81	-0.95	1.01	0.93	2.43	-0.85	2.62
11	AS-5	0.05	1.33	-0.09	0.90	0.51	1.78	-0.35	2.41
12	LP-3	-0.50	1.66	-0.91	1.24	0.56	2.17	-0.50	1.40
13	AS-6	-0.34	1.59	-0.55	1.30	0.37	1.93	-1.05	1.99
14	IC-5	-0.56	1.81	-1.00	1.36	0.68	2.14	-0.80	2.38
15	AS-7	-0.53	1.54	-0.72	1.33	0.02	1.76	-0.75	2.27
16	IC-6	-0.81	1.76	-1.19	1.11	0.16	2.54	-0.65	2.28
17	LP-4	-0.25	1.61	-0.26	1.26	-0.09	2.08	-0.75	2.63
18	AS-8	-1.34	1.71	-1.86	0.95	-0.10	2.19	-0.60	2.95
19	IC-7	-1.64	2.30	-2.50	1.15	0.54	2.93	-1.05	2.87
20	IC-8	-1.56	2.01	-2.30	0.80	0.30	2.63	-1.00	3.15
21	LP-5	-0.61	1.58	-1.00	0.68	0.67	2.38	-1.70	1.59
22	AS-9	-0.78	1.47	-1.04	0.89	-0.03	2.17	-1.00	2.05

Table 4.73

Service Adequacy, by All and Individual Users, at BUET

Order	ID	All		Undergraduate		Graduate		Faculty	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	AS-1	-0.04	1.70	0.00	1.73	-0.34	1.39	0.29	1.90
2	IC-1	-0.49	1.78	-0.45	1.72	-0.23	1.95	-1.50	1.84
3	LP-1	-0.31	1.83	-0.08	1.78	-1.61	1.70	0.08	1.53
4	AS-2	-0.81	2.00	-0.56	1.89	-2.14	1.91	-0.42	2.22
5	IC-2	-0.98	1.64	-0.89	1.64	-1.38	1.21	-1.00	2.36
6	AS-3	-0.67	1.94	-0.44	1.91	-1.80	1.58	-0.58	2.22
7	IC-3	-0.98	1.88	-0.81	1.84	-2.09	1.40	-0.25	2.25
8	LP-2	-0.69	2.11	-0.51	2.17	-1.73	1.54	-0.29	1.88
9	AS-4	-0.86	1.78	-0.75	1.77	-1.59	1.52	-0.42	2.06
10	IC-4	-0.85	1.95	-0.48	1.76	-2.68	1.63	-0.50	2.23
11	AS-5	-1.24	2.10	-1.09	2.16	-2.18	1.63	-0.67	1.83
12	LP-3	-0.91	2.39	-0.55	2.32	-2.75	2.17	-0.63	1.69
13	AS-6	-0.87	2.20	-0.46	2.03	-2.96	1.76	-0.50	2.30
14	IC-5	-1.35	2.33	-1.00	2.11	-3.27	2.28	-0.79	2.64
15	AS-7	-1.23	1.97	-1.00	1.83	-2.45	1.82	-0.88	2.71
16	IC-6	-1.31	2.22	-1.02	2.22	-2.84	1.32	-1.00	2.48
17	LP-4	-0.83	2.15	-0.41	1.87	-3.04	1.84	-0.33	2.57
18	AS-8	-1.27	2.00	-0.88	1.82	-3.13	1.47	-1.25	2.57
19	IC-7	-1.03	2.15	-0.58	1.94	-3.07	1.80	-1.33	2.41
20	IC-8	-1.02	2.30	-0.73	2.23	-2.54	1.94	-0.71	2.44
21	LP-5	-0.88	2.11	-0.65	2.13	-1.88	1.83	-1.21	1.74
22	AS-9	-0.90	1.86	-0.61	1.78	-2.23	1.61	-1.04	1.88

Table 4.74

Service Adequacy, by All and Individual Users, at BSMMU

Order	ID	All		Graduate		Faculty	
		Mean	SD	Mean	SD	Mean	SD
1	AS-1	-1.76	2.23	-1.95	2.09	-.06	2.73
2	IC-1	-2.25	2.08	-2.35	1.99	-1.29	2.61
3	LP-1	-1.91	2.19	-2.03	2.12	-.87	2.59
4	AS-2	-2.17	1.95	-2.24	1.86	-1.48	2.59
5	IC-2	-2.40	2.16	-2.52	2.09	-1.32	2.48
6	AS-3	-2.23	1.84	-2.33	1.81	-1.29	1.88
7	IC-3	-2.46	2.21	-2.51	2.23	-1.97	1.94
8	LP-2	-2.31	1.85	-2.39	1.81	-1.58	2.08
9	AS-4	-2.17	1.75	-2.16	1.67	-2.29	2.34
10	IC-4	-2.43	1.81	-2.55	1.76	-1.39	1.93
11	AS-5	-2.34	2.07	-2.48	1.84	-1.03	3.26
12	LP-3	-2.54	1.70	-2.61	1.68	-1.90	1.76
13	AS-6	-2.31	1.80	-2.35	1.76	-1.97	2.12
14	IC-5	-2.44	1.92	-2.52	1.82	-1.65	2.55
15	AS-7	-2.80	2.02	-2.91	1.86	-1.77	2.95
16	IC-6	-2.53	1.86	-2.61	1.80	-1.74	2.18
17	LP-4	-2.30	2.00	-2.40	1.94	-1.42	2.32
18	AS-8	-2.68	2.02	-2.85	1.91	-1.19	2.39
19	IC-7	-2.43	1.73	-2.54	1.69	-1.52	1.79
20	IC-8	-2.64	1.84	-2.74	1.82	-1.77	1.80
21	LP-5	-2.58	1.69	-2.68	1.54	-1.68	2.51
22	AS-9	-2.73	2.11	-2.79	2.06	-2.19	2.55

Table 4.75

Service Adequacy, by All and Individual Users, at IUB

Order	ID	All		Undergraduate		Graduate		Faculty	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	AS-1	0.53	1.76	0.62	1.86	0.06	1.44	0.51	1.33
2	IC-1	-0.09	1.91	-0.16	1.88	-0.29	2.05	0.68	1.82
3	LP-1	0.27	2.09	0.20	2.14	0.23	2.18	0.87	1.53
4	AS-2	-0.01	2.11	-0.12	2.20	0.00	1.90	0.82	1.50
5	IC-2	-0.02	1.97	-0.09	2.05	-0.42	1.69	0.95	1.37
6	AS-3	-0.26	2.05	-0.38	2.08	-0.40	1.77	0.76	1.92
7	IC-3	-0.54	2.08	-0.58	2.17	-1.04	1.57	0.37	1.70
8	LP-2	0.73	2.02	0.72	2.08	0.44	2.06	1.13	1.44
9	AS-4	0.51	2.20	0.51	2.31	0.10	1.85	0.97	1.70
10	IC-4	0.22	2.22	0.29	2.31	-0.23	2.08	0.24	1.67
11	AS-5	0.59	2.14	0.62	2.13	0.34	2.10	0.63	2.28
12	LP-3	0.51	1.90	0.49	1.86	0.27	1.91	0.95	2.13
13	AS-6	0.49	2.07	0.44	2.19	0.46	2.06	0.84	1.00
14	IC-5	0.39	2.11	0.32	2.20	0.44	2.14	0.79	1.28
15	AS-7	0.44	1.88	0.34	1.93	0.58	1.94	0.95	1.29
16	IC-6	0.33	1.87	0.35	1.95	0.08	1.35	0.50	1.91
17	LP-4	0.18	2.02	0.13	2.00	0.00	2.08	0.79	1.97
18	AS-8	0.31	2.05	0.33	2.14	0.13	1.30	0.37	2.19
19	IC-7	0.38	1.91	0.27	1.97	0.48	1.82	0.95	1.49
20	IC-8	0.16	2.12	0.14	2.19	-0.13	2.12	0.66	1.53
21	LP-5	0.52	2.08	0.54	2.12	0.33	1.91	0.61	2.07
22	AS-9	0.41	1.88	0.48	1.87	0.38	1.71	-0.03	2.11

To see whether libraries are meeting the users' expectation of Minimum Service Level by each group of users through LibQUAL+ Service Adequacy indicator is applied. Following tables (Table 4.76-4.81) show the Service Adequacy through calculating Adequacy Gap. Ranking of Mean Values with SD of Adequacy Gaps (AG) are represented in the tables with the concerned ID and Items. It has been mentioned before that the gap score ("Adequacy" = "Perceived" - "Minimum") is scaled such that higher scores are more favorable. Thus, an Adequacy Gap score of +1.5 on an item, subscale, or total score is better than an Adequacy Gap score of +1.0, or an Adequacy Gap score of -.40 is better than -.85. Below, the ID representing the items along with Mean score or SA gaps are shown, if there are any repeating items in the rank or list, than only IDs and scores are described.

Table 4.76 shows Service Adequacy for DU Library. SDs are high generally but comparatively lower than all other universities. This ensuing the response comparatively better representative and identical. After scanning all the tables of AG scores, it has been observed that in response of perception and expectation, there are not enough variations; there are different gap sizes along with different items with ranks for different groups of users. All the items of MSs are lagged behind the PSs, so the negative values are emerged. For all users, the top five better and lower negative AG scores are LP-3 (-0.40)"A comfortable and inviting location", AS-9 (-0.85) "Dependability in handling users' service problems", AS-1 (-0.98) "Employees who instill confidence in users", IC-3 (-.1.14)"The printed library materials I need for my work", and LP-4 (-1.15)"A getaway for study, learning, or research". The longest negative AG gap is IC-1 (-2.35) "Making electronic resources accessible from my home or office". Undergraduate students have the same ranking and items for the top five negative AG score though gap scores are different. The scores are LP-3 (-0.21), AS-9 (-0.52), AS-1 (-0.71), IC-3 (-0.83) and LP-4 (-0.85). For graduate students, top three and five have the same items with different gaps. The fourth item is IC-8 (-1.46) "Print and/or electronic journal collections I require for my work". The other scores are LP-3 (-0.59), AS-9 (-1.21), AS-1 (-1.27), and LP-4 (-1.47). Faculty group has very high negative gap. The top item is as same as for others score. The items are ranked as LP-3 (-1.24), AS-4 (-2.00) "Readiness to respond to users' questions", AS-1 (-2.04), AS-5 (-2.04) "Employees who have the knowledge to answer user questions", and IC-3 (-2.08).

Table 4.76

Service Adequacy, by All & Individual Users, DU (Ranked by Mean)

Order	ID	All User		ID	Undergraduate		ID	Graduate		ID	Faculty	
1	LP-3	-0.40	(1.84)	LP-3	-0.21	(1.77)	LP-3	-0.59	(1.83)	LP-3	-1.24	(2.26)
2	AS-9	-0.85	(1.93)	AS-9	-0.52	(1.88)	AS-9	-1.21	(1.87)	AS-4	-2.00	(1.53)
3	AS-1	-0.98	(1.61)	AS-1	-0.71	(1.62)	AS-1	-1.27	(1.36)	AS-1	-2.04	(1.99)
4	IC-3	-1.14	(1.60)	IC-3	-0.83	(1.46)	IC-8	-1.46	(1.56)	AS-5	-2.04	(1.57)
5	LP-4	-1.15	(1.82)	LP-4	-0.85	(1.87)	LP-4	-1.47	(1.55)	IC-3	-2.08	(2.02)
6	AS-3	-1.21	(1.57)	AS-3	-0.91	(1.61)	IC-3	-1.53	(1.61)	IC-6	-2.16	(1.49)
7	AS-6	-1.28	(1.59)	AS-6	-0.96	(1.53)	AS-8	-1.53	(1.85)	AS-9	-2.16	(1.82)
8	AS-5	-1.33	(1.57)	IC-2	-1.08	(1.96)	AS-3	-1.55	(1.32)	IC-8	-2.20	(1.78)
9	IC-8	-1.35	(1.66)	AS-5	-1.08	(1.47)	AS-7	-1.63	(1.66)	LP-2	-2.24	(2.54)
10	AS-4	-1.36	(1.53)	AS-4	-1.10	(1.57)	AS-6	-1.64	(1.44)	AS-3	-2.28	(1.51)
11	AS-8	-1.38	(1.81)	AS-8	-1.14	(1.69)	AS-5	-1.67	(1.66)	LP-1	-2.32	(1.55)
12	IC-2	-1.48	(2.09)	IC-8	-1.21	(1.67)	AS-4	-1.74	(1.34)	LP-4	-2.32	(1.93)
13	LP-2	-1.50	(1.72)	IC-5	-1.22	(1.89)	LP-2	-1.77	(1.84)	IC-1	-2.36	(1.89)
14	AS-7	-1.51	(1.64)	LP-2	-1.28	(1.49)	IC-5	-1.85	(1.67)	AS-2	-2.36	(1.63)
15	IC-5	-1.53	(1.89)	AS-7	-1.32	(1.55)	LP-1	-2.02	(1.46)	IC-4	-2.36	(2.08)
16	LP-1	-1.65	(1.72)	LP-1	-1.39	(1.82)	IC-2	-2.03	(2.07)	AS-6	-2.44	(1.94)
17	IC-7	-1.71	(1.70)	IC-7	-1.40	(1.59)	IC-7	-2.09	(1.75)	LP-5	-2.60	(2.10)
18	IC-6	-1.73	(1.49)	IC-6	-1.48	(1.45)	IC-6	-2.12	(1.47)	IC-2	-2.63	(2.43)
19	IC-4	-1.89	(1.60)	IC-4	-1.68	(1.56)	IC-4	-2.19	(1.51)	AS-7	-2.64	(1.91)
20	AS-2	-2.15	(1.73)	AS-2	-1.87	(1.83)	AS-2	-2.63	(1.41)	IC-7	-2.72	(1.74)
21	LP-5	-2.29	(2.13)	LP-5	-1.96	(2.05)	IC-1	-2.71	(1.59)	IC-5	-2.88	(2.07)
22	IC-1	-2.35	(1.72)	IC-1	-2.16	(1.75)	LP-5	-2.86	(2.18)	AS-8	-2.88	(2.01)

Table 4.77 shows Service Adequacy for RU Library. Most of the SDs are too high. It has been observed that the diversity in perception and expectation, like other library there are different gap sizes along with different items with ranks for different groups of users. Faculty gaps are much higher than others gaps. All the items of MSs are lagged behind the PSs, so the negative values are appeared. For all users, the most lowest negative AG score are IC-2 (-0.95) "A library Web site enabling me to locate information on my own", LP-3 (-0.95) "A comfortable and inviting location", AS-1 (-1.00) "Employees who instill confidence in users", IC-3 (-1.02) "The printed library materials I need for my work", and LP-1 (-1.04) "Library space that inspires study and learning". For undergraduate students, the scores are IC-2 (-0.71), AS-1 (-0.74), LP-3 (-0.88), LP-1 (-0.95), and AS-3 (-0.95) "Employees who are consistently courteous", where the upmost four items are in the list of all user group ranking. For graduate students, the top five IDs are IC-7 (-.75) "Making information easily accessible for independent use", LP-3 (-0.87), IC-3 (-0.93), AS-2 (-0.94) "Giving users individual attention", and LP-1 (-1.01). For the faculty group, their gaps are very high. The top items have similarities with other groups. The items are ranked AS-4 (-1.82) "Readiness to respond to users' questions", AS-1 (-2.12), IC-3 (-2.12), LP-4 (-2.24) "A getaway for study, learning, or research", and LP-1 (-2.47).

Table 4.77

Service Adequacy, by All & Individual User, RU (Ranked by Mean)

Order	ID	All User		ID	Undergraduate		ID	Graduate		ID	Faculty	
1	IC-2	-0.95	(2.27)	IC-2	-0.71	(2.17)	IC-7	-0.75	(2.10)	AS-4	-1.82	(1.91)
2	LP-3	-0.95	(1.94)	AS-1	-0.74	(1.48)	LP-3	-0.87	(1.88)	AS-1	-2.12	(1.96)
3	AS-1	-1.00	(1.58)	LP-3	-0.88	(1.82)	IC-3	-0.93	(1.82)	IC-3	-2.12	(2.34)
4	IC-3	-1.02	(1.80)	LP-1	-0.95	(1.50)	AS-2	-0.94	(1.92)	LP-4	-2.24	(1.79)
5	LP-1	-1.04	(1.71)	AS-3	-0.95	(1.59)	LP-1	-1.01	(2.01)	LP-1	-2.47	(2.50)
6	IC-7	-1.10	(1.98)	IC-3	-0.98	(1.74)	IC-2	-1.13	(2.12)	LP-2	-2.47	(3.24)
7	AS-3	-1.12	(1.82)	LP-2	-0.99	(1.79)	AS-4	-1.16	(2.04)	LP-3	-2.47	(3.18)
8	LP-2	-1.13	(1.91)	IC-6	-1.00	(1.65)	AS-9	-1.21	(2.10)	IC-6	-2.53	(2.37)
9	IC-6	-1.13	(1.88)	AS-5	-1.03	(1.97)	IC-6	-1.25	(2.29)	AS-3	-2.71	(2.49)
10	AS-2	-1.16	(1.97)	LP-4	-1.03	(1.57)	LP-2	-1.29	(1.84)	AS-5	-2.71	(2.93)
11	LP-4	-1.18	(1.73)	IC-7	-1.08	(1.83)	IC-8	-1.33	(2.18)	AS-9	-2.82	(2.35)
12	AS-4	-1.24	(2.10)	AS-2	-1.12	(1.88)	AS-3	-1.34	(2.14)	AS-6	-2.88	(3.24)
13	AS-5	-1.28	(2.10)	IC-4	-1.15	(1.88)	AS-6	-1.34	(2.04)	AS-7	-2.88	(2.64)
14	AS-7	-1.31	(2.08)	AS-7	-1.19	(1.91)	AS-7	-1.37	(2.34)	IC-8	-2.88	(2.76)
15	IC-4	-1.32	(2.11)	AS-4	-1.23	(2.13)	LP-4	-1.41	(2.10)	AS-2	-3.00	(2.52)
16	AS-9	-1.38	(2.23)	AS-6	-1.32	(1.84)	IC-4	-1.45	(2.49)	AS-8	-3.00	(2.00)
17	AS-6	-1.40	(1.99)	IC-5	-1.33	(1.99)	IC-1	-1.46	(1.66)	LP-5	-3.12	(3.14)
18	IC-8	-1.51	(2.15)	AS-9	-1.35	(2.24)	AS-1	-1.57	(1.56)	IC-4	-3.24	(2.63)
19	IC-1	-1.54	(1.98)	IC-1	-1.45	(1.99)	AS-8	-1.74	(2.32)	IC-7	-3.24	(2.39)
20	IC-5	-1.58	(2.18)	IC-8	-1.47	(2.07)	AS-5	-1.79	(2.11)	IC-1	-3.29	(2.62)
21	AS-8	-1.63	(2.19)	AS-8	-1.50	(2.12)	LP-5	-1.82	(2.46)	IC-5	-3.29	(3.18)
22	LP-5	-1.75	(2.43)	LP-5	-1.64	(2.35)	IC-5	-2.00	(2.32)	IC-2	-3.76	(2.68)

Table 4.78 shows Service Adequacy for BAU Library. SDs are as usual high but not too much. It is good so far to observe that by all users a positive SA gap is explored, and other the upmost negative gaps are also not too high. For graduate students' response, seventeen items have positive gaps. There are similarities and dissimilarities of the perception among the groups, faculty gaps are much higher than others gaps. The items of MSs, which are lagged behind the PSs, those showed as negative gaps. For all, only AS-4 (0.05) "Employees who have the knowledge to answer user questions" has the positive SA score. Other top four scores are (lowest negative) AS-2 (-0.01) "Giving users individual attention", AS-4 (-0.04) "Readiness to respond to users' questions", LP-4 (-0.25) "A getaway for study, learning, or research", and AS-6 (-0.34) "Employees who deal with users in a caring fashion". Undergraduate students, have the same items in the ranking but the different AG gaps, though all are negative. The scores are AS-5 (-0.09), AS-4 (-0.13), LP-4 (-0.26), AS-2 (-0.28), and AS-6 (-0.55). Graduate students perception towards Service Adequacy was positive for most of the attributes of service quality. There are seventeen positive SA gaps observed for this user group. The positive AG are ranked as IC-1 (0.94), IC-4 (0.93), AS-2 (0.77), LP-1 (0.76), IC-5 (0.68), LP-5 (0.67), LP-3 (0.56), IC-7 (0.54), AS-5 (0.51), AS-6 (0.37), AS-4 (0.33), IC-8 (0.30), LP-2 (0.18), IC-6 (0.16), AS-1 (0.10), AS-3 (0.05), and AS-7(0.02). So, the top five AGs are IC-1 "Making electronic resources accessible from my home or office", IC-4 "The electronic information resources I need", AS-2 "Giving users individual attention", LP-1 "Library space that inspires study and learning", IC-5 "Modern equipment that lets me easily access needed information". The upmost five SA items for faculty are AS-2 (-0.25), AS-3(-0.30) "Employees who are consistently courteous", AS-5 (-0.35), LP-1 (-0.47), and IC-3 (-0.50) "The printed library materials I need for my work", all are negative.

Table 4.78

Service Adequacy, by All & Individual Users, BAU (Ranked by Mean)

Order	ID	All User		ID	Undergraduate		ID	Graduate		ID	Faculty	
1	AS-5	0.05	(1.33)	AS-5	-0.09	(0.90)	IC-1	0.94	(2.87)	AS-2	-0.25	(1.21)
2	AS-2	-0.01	(1.59)	AS-4	-0.13	(0.87)	IC-4	0.93	(2.43)	AS-3	-0.30	(1.63)
3	AS-4	-0.04	(1.23)	LP-4	-0.26	(1.26)	AS-2	0.77	(2.16)	AS-5	-0.35	(2.41)
4	LP-4	-0.25	(1.61)	AS-2	-0.28	(1.25)	LP-1	0.76	(2.33)	LP-1	-0.47	(2.32)
5	AS-6	-0.34	(1.59)	AS-6	-0.55	(1.30)	IC-5	0.68	(2.14)	IC-3	-0.50	(2.09)
6	LP-1	-0.35	(1.76)	AS-7	-0.72	(1.33)	LP-5	0.67	(2.38)	LP-3	-0.50	(1.40)
7	IC-4	-0.46	(1.81)	LP-1	-0.75	(1.22)	LP-3	0.56	(2.17)	AS-4	-0.60	(1.76)
8	LP-3	-0.50	(1.66)	LP-3	-0.91	(1.24)	IC-7	0.54	(2.93)	AS-8	-0.60	(2.95)
9	AS-7	-0.53	(1.54)	IC-4	-0.95	(1.01)	AS-5	0.51	(1.78)	AS-1	-0.65	(1.57)
10	IC-5	-0.56	(1.81)	IC-5	-1.00	(1.36)	AS-6	0.37	(1.93)	IC-6	-0.65	(2.28)
11	LP-5	-0.61	(1.58)	LP-5	-1.00	(0.68)	AS-4	0.33	(1.74)	AS-7	-0.75	(2.27)
12	AS-9	-0.78	(1.47)	AS-9	-1.04	(0.89)	IC-8	0.30	(2.63)	LP-4	-0.75	(2.63)
13	IC-6	-0.81	(1.76)	AS-1	-1.19	(0.90)	LP-2	0.18	(2.18)	IC-5	-0.80	(2.38)
14	AS-1	-0.83	(1.36)	IC-6	-1.19	(1.11)	IC-6	0.16	(2.54)	IC-4	-0.85	(2.62)
15	IC-1	-0.84	(2.18)	AS-3	-1.21	(1.04)	AS-1	0.10	(1.82)	IC-8	-1.00	(3.15)
16	AS-3	-0.84	(1.35)	IC-1	-1.45	(1.30)	AS-3	0.05	(1.56)	AS-9	-1.00	(2.05)
17	LP-2	-1.12	(1.64)	LP-2	-1.60	(1.07)	AS-7	0.02	(1.76)	AS-6	-1.05	(1.99)
18	AS-8	-1.34	(1.71)	AS-8	-1.86	(.95)	AS-9	-0.03	(2.17)	IC-7	-1.05	(2.87)
19	IC-3	-1.44	(1.86)	IC-3	-1.92	(1.43)	IC-2	-0.09	(2.13)	LP-2	-1.20	(1.28)
20	IC-2	-1.47	(2.02)	IC-2	-1.99	(1.52)	LP-4	-0.09	(2.08)	IC-2	-1.45	(3.44)
21	IC-8	-1.56	(2.01)	IC-8	-2.30	(.80)	AS-8	-0.10	(2.19)	IC-1	-1.50	(2.69)
22	IC-7	-1.64	(2.30)	IC-7	-2.50	(1.15)	IC-3	-0.37	(2.25)	LP-5	-1.70	(1.59)

Table 4.79 shows Service Adequacy for BUET Library. Several number of SDs are high. There are few SA gaps that are positive, for which one in the undergraduate students' response and two in the faculty. Rests of the gaps are negative with higher value. There are similarities and dissimilarities of the perception among the groups. For all users, AS-1 (-0.04) "Employees who instill confidence in users", LP-1 (-0.31) "Library space that inspires study and learning", IC-1 (-0.49) "Making electronic resources accessible from my home or office", AS-3 (-0.67) "Employees who are consistently courteous", and LP-2 (-0.69) "Quiet space for individual activities" score as the top five position. Undergraduate students, have almost all the items same ranked with different negative gaps excluding third item LP-4 ("A getaway for study, learning, or research"). ID and AGs are AS-1 (0.00), LP-1 (-0.08), LP-4 (-0.41), AS-3 (-0.44), and IC-1 (-0.45). Though negative zero and positive zero are same, but it is better than any negative numbers for this case of AG. BUET graduate students AG scores have high gap. Among the top five IDs three have been in the all user group ranking. The IDs of the items are IC-1 (-0.23), AS-1 (-0.34), IC-2 (-1.38) "A library Web site enabling me to locate information on my own", AS-4 (-1.59) "Readiness to respond to users' questions", and LP-1 (-1.61). Two positive AG are observed in the faculty ranking of SA. Faculty scores for the upmost five IDs are AS-1 (0.29), LP-1 (0.08), IC-3 (-0.25) "The printed library materials I need for my work", LP-2 (-0.29), and LP-4 (-0.33) among them excluding IC-3 all other four items have in the ranking of other user groups of this university library.

Table 4.79

Service Adequacy, by All & Individual Users, BUET (Ranked by Mean)

Order	ID	All User		ID	Undergraduate		ID	Graduate		ID	Faculty	
1	AS-1	-0.04	(1.70)	AS-1	0.00	(1.73)	IC-1	-0.23	(1.95)	AS-1	0.29	(1.90)
2	LP-1	-0.31	(1.83)	LP-1	-0.08	(1.78)	AS-1	-0.34	(1.39)	LP-1	0.08	(1.53)
3	IC-1	-0.49	(1.78)	LP-4	-0.41	(1.87)	IC-2	-1.38	(1.21)	IC-3	-0.25	(2.25)
4	AS-3	-0.67	(1.94)	AS-3	-0.44	(1.91)	AS-4	-1.59	(1.52)	LP-2	-0.29	(1.88)
5	LP-2	-0.69	(2.11)	IC-1	-0.45	(1.72)	LP-1	-1.61	(1.70)	LP-4	-0.33	(2.57)
6	AS-2	-0.81	(2.00)	AS-6	-0.46	(2.03)	LP-2	-1.73	(1.54)	AS-2	-0.42	(2.22)
7	LP-4	-0.83	(2.15)	IC-4	-0.48	(1.76)	AS-3	-1.80	(1.58)	AS-4	-0.42	(2.06)
8	IC-4	-0.85	(1.95)	LP-2	-0.51	(2.17)	LP-5	-1.88	(1.83)	IC-4	-0.50	(2.23)
9	AS-4	-0.86	(1.78)	LP-3	-0.55	(2.32)	IC-3	-2.09	(1.40)	AS-6	-0.50	(2.30)
10	AS-6	-0.87	(2.20)	AS-2	-0.56	(1.89)	AS-2	-2.14	(1.91)	AS-3	-0.58	(2.22)
11	LP-5	-0.88	(2.11)	IC-7	-0.58	(1.94)	AS-5	-2.18	(1.63)	LP-3	-0.63	(1.69)
12	AS-9	-0.90	(1.86)	AS-9	-0.61	(1.78)	AS-9	-2.23	(1.61)	AS-5	-0.67	(1.83)
13	LP-3	-0.91	(2.39)	LP-5	-0.65	(2.13)	AS-7	-2.45	(1.82)	IC-8	-0.71	(2.44)
14	IC-3	-0.98	(1.88)	IC-8	-0.73	(2.23)	IC-8	-2.54	(1.94)	IC-5	-0.79	(2.64)
15	IC-2	-0.98	(1.64)	AS-4	-0.75	(1.77)	IC-4	-2.68	(1.63)	AS-7	-0.88	(2.71)
16	IC-8	-1.02	(2.30)	IC-3	-0.81	(1.84)	LP-3	-2.75	(2.17)	IC-2	-1.00	(2.36)
17	IC-7	-1.03	(2.15)	AS-8	-0.88	(1.82)	IC-6	-2.84	(1.32)	IC-6	-1.00	(2.48)
18	AS-7	-1.23	(1.97)	IC-2	-0.89	(1.64)	AS-6	-2.96	(1.76)	AS-9	-1.04	(1.88)
19	AS-5	-1.24	(2.10)	IC-5	-1.00	(2.11)	LP-4	-3.04	(1.84)	LP-5	-1.21	(1.74)
20	AS-8	-1.27	(2.00)	AS-7	-1.00	(1.83)	IC-7	-3.07	(1.80)	AS-8	-1.25	(2.57)
21	IC-6	-1.31	(2.22)	IC-6	-1.02	(2.22)	AS-8	-3.13	(1.47)	IC-7	-1.33	(2.41)
22	IC-5	-1.35	(2.33)	AS-5	-1.09	(2.16)	IC-5	-3.27	(2.28)	IC-1	-1.50	(1.84)

Table 4.80 shows Service Adequacy for BSMMU Library. About fifty percent of the SDs are high, which means most of the responses are scattered and not identical. The tables demonstrate that in the responses there are not enough variations; there are different gap sizes along with same/different items with ranks for different groups of users. All the items of MSs are lagged behind the PSs, so the negative values are emerged. All negative values are very high and highest among all the universities. For all users, the top five better and low negative AG scores are AS-1 (-1.76) "Employees who instill confidence in users", LP-1 (-1.91) "Library space that inspires study and learning", AS-2 (-2.17) "Giving users individual attention", AS-4 (-2.17) "Readiness to respond to users' questions", and AS-3 (-2.23) "Employees who are consistently courteous". Here most of the top-ranked items are related to library staff. For graduate students, all the top five items are same, only scores are different AS-1 (-1.95), LP-1 (-2.03), AS-4 (-2.16), AS-2 (-2.24), and AS-3 (-2.33). For the faculty, the upmost five gaps are AS-1 (-.06), LP-1 (-.87), AS-5 (-1.03) "Employees who have the knowledge to answer user questions", AS-8 (-1.19),"Willingness to help users" and AS-3 (-1.29) where AS-1 has very low negative value. Here excluding AS-1, LP-1 and AS-3 items are in the other group also.

Table 4.80

Service Adequacy, by All & Individual Users, BSMMU (Ranked by Mean)

Order	ID	All Users		ID	Graduate		ID	Faculty	
1	AS-1	-1.76	(2.23)	AS-1	-1.95	(2.09)	AS-1	-0.06	(2.73)
2	LP-1	-1.91	(2.19)	LP-1	-2.03	(2.12)	LP-1	-0.87	(2.59)
3	AS-2	-2.17	(1.95)	AS-4	-2.16	(1.67)	AS-5	-1.03	(3.26)
4	AS-4	-2.17	(1.75)	AS-2	-2.24	(1.86)	AS-8	-1.19	(2.39)
5	AS-3	-2.23	(1.84)	AS-3	-2.33	(1.81)	AS-3	-1.29	(1.88)
6	IC-1	-2.25	(2.08)	AS-6	-2.35	(1.76)	IC-1	-1.29	(2.61)
7	LP-4	-2.30	(2.00)	IC-1	-2.35	(1.99)	IC-2	-1.32	(2.48)
8	AS-6	-2.31	(1.80)	LP-2	-2.39	(1.81)	IC-4	-1.39	(1.93)
9	LP-2	-2.31	(1.85)	LP-4	-2.40	(1.94)	LP-4	-1.42	(2.32)
10	AS-5	-2.34	(2.07)	AS-5	-2.48	(1.84)	AS-2	-1.48	(2.59)
11	IC-2	-2.40	(2.16)	IC-3	-2.51	(2.23)	IC-7	-1.52	(1.79)
12	IC-4	-2.43	(1.81)	IC-2	-2.52	(2.09)	LP-2	-1.58	(2.08)
13	IC-7	-2.43	(1.73)	IC-5	-2.52	(1.82)	IC-5	-1.65	(2.55)
14	IC-5	-2.44	(1.92)	IC-7	-2.54	(1.69)	LP-5	-1.68	(2.51)
15	IC-3	-2.46	(2.21)	IC-4	-2.55	(1.76)	IC-6	-1.74	(2.18)
16	IC-6	-2.53	(1.86)	LP-3	-2.61	(1.68)	IC-8	-1.77	(1.80)
17	LP-3	-2.54	(1.70)	IC-6	-2.61	(1.80)	AS-7	-1.77	(2.95)
18	LP-5	-2.58	(1.69)	LP-5	-2.68	(1.54)	LP-3	-1.90	(1.76)
19	IC-8	-2.64	(1.84)	IC-8	-2.74	(1.82)	IC-3	-1.97	(1.94)
20	AS-8	-2.68	(2.02)	AS-9	-2.79	(2.06)	AS-6	-1.97	(2.12)
21	AS-9	-2.73	(2.11)	AS-8	-2.85	(1.91)	AS-9	-2.19	(2.55)
22	AS-7	-2.80	(2.02)	AS-7	-2.91	(1.86)	AS-4	-2.29	(2.34)

Table 4.81 shows Service Adequacy for IUB Library. Several SDs are as usual high like other library but not too much. Responses are scattered to different values. But the good thing is by all users seventeen positive SA gaps, by undergraduate students seventeen, by graduate sixteen, and by faculty respondents almost all (21) SA values have positive gaps. Both similarities and dissimilarities are observed in the responses. Faculty positive gaps are higher than other gaps. There are similarities and dissimilarities of the perception among the groups, faculty gaps are much higher than others gaps. For all users, the top positive gaps are LP-2 (0.73) "Quiet space for individual activities", AS-5 (0.59) "Employees who have the knowledge to answer user questions", AS-1 (0.53) "Employees who instill confidence in users", LP-5 (0.52) "Community space for group learning and group study", and LP-3 (0.51) "A comfortable and inviting location". The top rankings are related to library space, and library staff. As per ranking, other positive items are AS-4 (0.51), AS-6 (0.49), AS-7 (0.44), AS-9 (0.41), IC-5 (0.39), IC-7 (0.38), IC-6 (0.33), AS-8 (0.31), LP-1 (0.27), IC-4 (0.22), LP-4 (0.18), and IC-8 (0.16). The upmost five AGs of undergraduate students are LP-2 (0.72), AS-5 (0.62), AS-1 (0.62), LP-5 (0.54), and AS-4 (0.51) "Readiness to respond to users' questions". Except AS-4 all four attributes are in the list of all groups. Among seventeen positive AGs, rest of them are LP-3 (0.49), AS-9 (0.48), AS-6 (0.44), IC-6 (0.35), AS-7 (0.34), AS-8 (0.33), IC-5 (0.32), IC-4 (0.29), IC-7 (0.27), LP-1 (0.20), IC-8 (0.14), LP-4 (0.13). For graduates, AS-7 (0.58) "Employees who understand the needs of their users", IC-7 (0.48) "Making information easily accessible for independent use", AS-6 (0.46) "Employees who deal with users in a caring fashion", LP-2 (0.44), and IC-5 (0.44) "Quiet space for individual activities" items are in the top five rank of AG. Except LP-2, none of rest of the four items is in the previous group, though AS-7, IC-7 and IC-5 have been observed in the faculty ranking later. Among sixteen positive AGs other positive items are AS-9 (0.38), AS-5 (0.34), LP-5 (0.33), LP-3 (0.27), LP-1 (0.23), AS-8 (0.13), AS-4 (0.10), IC-6 (0.08), AS-1 (0.06), LP-4 (0.00), AS-2 (0.00). For faculty, LP-2 (1.13), AS-4 (0.97) "Readiness to respond to users' questions", IC-2 (0.95) "A library Web site enabling me to locate information on my own", AS-7 (0.95), and IC-7 (0.95) are in the top five SA ranking. Here LP-2, AS-7 and IC-7 items are in the previous other groups for this library. In this group, there are highest and most positive ranking AG scores (21) and only AS-9 (-0.03) "Dependability in handling users' service problems" has negative gap, though it is very narrow.

Table 4.81

Service Adequacy, by All & Individual Users, IUB (Ranked by Mean)

Order	ID	All User		ID	Undergraduate		ID	Graduate		ID	Faculty	
1	LP-2	0.73	(2.02)	LP-2	0.72	(2.08)	AS-7	0.58	(1.94)	LP-2	1.13	(1.44)
2	AS-5	0.59	(2.14)	AS-5	0.62	(2.13)	IC-7	0.48	(1.82)	AS-4	0.97	(1.70)
3	AS-1	0.53	(1.76)	AS-1	0.62	(1.86)	AS-6	0.46	(2.06)	IC-2	0.95	(1.37)
4	LP-5	0.52	(2.08)	LP-5	0.54	(2.12)	LP-2	0.44	(2.06)	AS-7	0.95	(1.29)
5	LP-3	0.51	(1.90)	AS-4	0.51	(2.31)	IC-5	0.44	(2.14)	IC-7	0.95	(1.49)
6	AS-4	0.51	(2.20)	LP-3	0.49	(1.86)	AS-9	0.38	(1.71)	LP-3	0.95	(2.13)
7	AS-6	0.49	(2.07)	AS-9	0.48	(1.87)	AS-5	0.34	(2.10)	LP-1	0.87	(1.53)
8	AS-7	0.44	(1.88)	AS-6	0.44	(2.19)	LP-5	0.33	(1.91)	AS-6	0.84	(1.00)
9	AS-9	0.41	(1.88)	IC-6	0.35	(1.95)	LP-3	0.27	(1.91)	AS-2	0.82	(1.50)
10	IC-5	0.39	(2.11)	AS-7	0.34	(1.93)	LP-1	0.23	(2.18)	IC-5	0.79	(1.28)
11	IC-7	0.38	(1.91)	AS-8	0.33	(2.14)	AS-8	0.13	(1.30)	LP-4	0.79	(1.97)
12	IC-6	0.33	(1.87)	IC-5	0.32	(2.20)	AS-4	0.10	(1.85)	AS-3	0.76	(1.92)
13	AS-8	0.31	(2.05)	IC-4	0.29	(2.31)	IC-6	0.08	(1.35)	IC-1	0.68	(1.82)
14	LP-1	0.27	(2.09)	IC-7	0.27	(1.97)	AS-1	0.06	(1.44)	IC-8	0.66	(1.53)
15	IC-4	0.22	(2.22)	LP-1	0.20	(2.14)	LP-4	0.00	(2.08)	AS-5	0.63	(2.28)
16	LP-4	0.18	(2.02)	IC-8	0.14	(2.19)	AS-2	0.00	(1.90)	LP-5	0.61	(2.07)
17	IC-8	0.16	(2.12)	LP-4	0.13	(2.00)	IC-8	-0.13	(2.12)	AS-1	0.51	(1.33)
18	AS-2	-0.01	(2.11)	IC-2	-0.09	(2.05)	IC-4	-0.23	(2.08)	IC-6	0.50	(1.91)
19	IC-2	-0.02	(1.97)	AS-2	-0.12	(2.20)	IC-1	-0.29	(2.05)	AS-8	0.37	(2.19)
20	IC-1	-0.09	(1.91)	IC-1	-0.16	(1.88)	AS-3	-0.40	(1.77)	IC-3	0.37	(1.70)
21	AS-3	-0.26	(2.05)	AS-3	-0.38	(2.08)	IC-2	-0.42	(1.69)	IC-4	0.24	(1.67)
22	IC-3	-0.54	(2.08)	IC-3	-0.58	(2.17)	IC-3	-1.04	(1.57)	AS-9	-0.03	(2.11)

Figure 4.11 represents comparison of AG for LibQUAL+ core question for all libraries by all users. From the figures, the position of the libraries can be exposed at a glance. Here in all aspects IUB is seen as top by SA through AG.

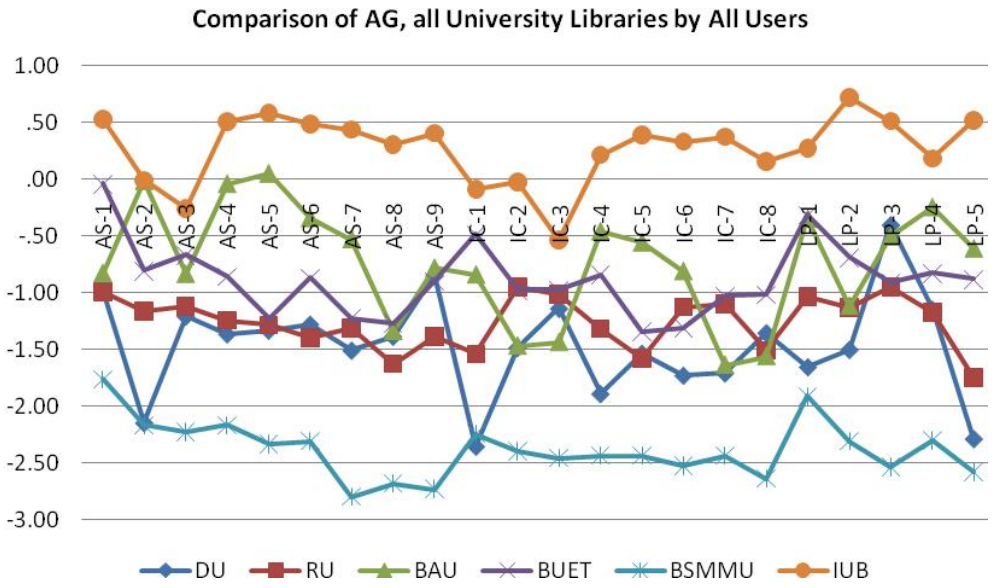


Figure 4.11 Comparison of Adequacy Gap, all Universities by all Users *(Core Questions)*

4.12 LibQUAL+ Core Questions: Service Superiority

Service Superiority (SS) is an indicator of the degree to which libraries are exceeding the desired expectations of users. SS gap score is called Superiority Gap (SG) which is calculated by subtracting the Desired Service (DS) from the Perceived Service (PS) on any given service quality statement. Following tables (Table 4.82-4.87) represent Service Superiority Gap (SG) by all and each group of users for all university libraries. Above mentioned tables demonstrated Mean values and SDs against each item of service quality core question. In the comparison, the Mean values are observed to find the difference of scores concerning users group against any items.

Table 4.82

Service Superiority, by All and Individual Users, at DU

Order	ID	All		Undergraduate		Graduate		Faculty	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	AS-1	-3.11	1.50	-2.99	1.37	-3.19	1.60	-3.88	1.88
2	IC-1	-4.33	1.57	-4.23	1.62	-4.50	1.32	-4.44	2.10
3	LP-1	-3.69	1.30	-3.61	1.36	-3.75	1.05	-4.08	1.80
4	AS-2	-4.18	1.40	-3.98	1.46	-4.47	1.17	-4.68	1.49
5	IC-2	-3.66	1.51	-3.46	1.44	-3.91	1.39	-4.33	2.28
6	AS-3	-3.17	1.50	-3.07	1.48	-3.16	1.35	-4.20	1.91
7	IC-3	-3.01	1.42	-2.89	1.27	-3.05	1.47	-3.88	2.11
8	LP-2	-3.53	1.67	-3.52	1.49	-3.46	1.76	-3.88	2.59
9	AS-4	-3.26	1.37	-3.12	1.30	-3.33	1.27	-4.20	1.94
10	IC-4	-3.77	1.47	-3.69	1.44	-3.85	1.34	-4.20	2.16
11	AS-5	-3.37	1.32	-3.27	1.24	-3.47	1.36	-3.92	1.73
12	LP-3	-2.79	1.79	-2.76	1.76	-2.89	1.48	-2.58	3.06
13	AS-6	-3.11	1.44	-2.95	1.34	-3.20	1.36	-4.12	2.20
14	IC-5	-3.54	1.58	-3.33	1.49	-3.68	1.37	-4.72	2.49
15	AS-7	-3.45	1.50	-3.32	1.33	-3.47	1.52	-4.52	2.29
16	IC-6	-3.63	1.40	-3.53	1.41	-3.73	1.27	-4.04	1.81
17	LP-4	-3.09	1.46	-2.93	1.38	-3.14	1.37	-4.28	2.05
18	AS-8	-3.39	1.62	-3.24	1.44	-3.38	1.64	-4.88	2.26
19	IC-7	-3.61	1.48	-3.38	1.38	-3.85	1.36	-4.56	2.22
20	IC-8	-3.31	1.54	-3.31	1.45	-3.14	1.46	-4.20	2.29
21	LP-5	-4.32	1.66	-4.06	1.53	-4.74	1.68	-4.76	2.18
22	AS-9	-1.75	3.18	-1.17	3.22	-2.25	2.92	-4.72	1.57

Table 4.83

Service Superiority, by All and Individual Users, at RU

Order	ID	All		Undergraduate		Graduate		Faculty	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	AS-1	-2.68	1.75	-2.59	1.64	-2.85	1.47	-3.29	3.70
2	IC-1	-2.97	2.16	-2.98	2.20	-2.51	1.73	-5.12	2.34
3	LP-1	-2.28	1.80	-2.31	1.73	-1.95	1.76	-3.59	2.40
4	AS-2	-2.27	1.97	-2.23	1.96	-2.07	1.89	-3.94	1.89
5	IC-2	-2.44	2.14	-2.25	2.02	-2.56	2.23	-4.76	2.28
6	AS-3	-2.47	1.79	-2.41	1.75	-2.46	1.80	-3.53	2.10
7	IC-3	-2.25	1.90	-2.29	1.96	-1.90	1.55	-3.29	2.14
8	LP-2	-2.39	1.91	-2.48	1.86	-1.94	1.80	-3.29	2.69
9	AS-4	-2.74	2.18	-2.92	2.19	-1.99	1.98	-3.65	2.18
10	IC-4	-2.73	2.09	-2.73	1.93	-2.37	2.31	-4.47	2.60
11	AS-5	-2.80	1.99	-2.74	1.96	-2.81	2.13	-3.65	1.69
12	LP-3	-1.99	2.52	-2.07	2.58	-1.40	2.13	-3.76	2.51
13	AS-6	-2.65	2.07	-2.65	2.12	-2.46	1.76	-3.71	2.54
14	IC-5	-3.04	2.04	-3.00	1.82	-2.93	2.37	-4.29	2.93
15	AS-7	-2.59	1.87	-2.50	1.77	-2.52	1.92	-4.41	2.35
16	IC-6	-2.30	1.95	-2.12	1.84	-2.55	2.15	-3.94	1.78
17	LP-4	-2.38	1.93	-2.37	1.94	-2.08	1.78	-4.00	1.90
18	AS-8	-2.87	1.93	-2.79	1.86	-2.77	1.93	-4.59	2.27
19	IC-7	-2.39	1.87	-2.44	1.74	-1.75	1.77	-4.71	2.44
20	IC-8	-2.70	2.10	-2.69	2.09	-2.30	1.97	-4.71	1.86
21	LP-5	-3.15	2.21	-3.10	2.12	-3.08	2.48	-4.35	1.69
22	AS-9	-2.59	2.25	-2.56	2.33	-2.45	2.01	-3.65	2.09

Table 4.84

Service Superiority, by All and Individual Users, at BAU

Order	ID	All		Undergraduate		Graduate		Faculty	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	AS-1	-2.18	1.43	-2.40	1.00	-1.25	1.71	-3.75	1.97
2	IC-1	-3.04	1.80	-3.50	1.21	-1.67	1.91	-3.60	3.44
3	LP-1	-2.36	1.72	-2.82	1.37	-1.20	1.88	-2.00	2.29
4	AS-2	-1.89	1.62	-2.10	1.25	-1.13	2.10	-2.80	2.02
5	IC-2	-3.38	1.97	-3.78	1.37	-2.18	2.15	-3.90	4.08
6	AS-3	-2.81	1.72	-3.40	1.09	-1.46	1.80	-1.80	3.09
7	IC-3	-3.15	2.07	-3.90	1.25	-1.26	2.22	-2.65	3.39
8	LP-2	-2.97	1.35	-3.38	0.88	-1.84	1.49	-3.20	2.17
9	AS-4	-1.94	1.43	-2.09	0.82	-1.54	1.85	-2.00	3.43
10	IC-4	-2.52	1.48	-2.91	0.80	-1.37	1.45	-3.00	3.70
11	AS-5	-2.07	1.51	-2.33	0.71	-1.21	1.89	-2.80	3.65
12	LP-3	-2.27	1.31	-2.59	0.98	-1.40	1.57	-2.20	1.77
13	AS-6	-2.61	1.63	-2.94	0.99	-1.77	1.54	-2.55	4.52
14	IC-5	-2.93	1.61	-3.33	0.96	-1.94	1.67	-2.50	3.94
15	AS-7	-2.49	1.62	-2.74	1.05	-1.76	1.60	-2.70	4.27
16	IC-6	-3.29	2.03	-3.94	1.15	-1.82	2.23	-2.10	4.20
17	LP-4	-3.08	1.78	-3.59	1.02	-1.89	1.85	-2.30	4.22
18	AS-8	-3.78	2.11	-4.64	1.06	-1.83	2.01	-2.30	4.29
19	IC-7	-3.77	2.04	-4.58	1.06	-1.82	2.14	-2.90	3.70
20	IC-8	-3.98	2.06	-4.81	0.88	-2.09	2.26	-2.60	4.02
21	LP-5	-3.14	1.64	-3.70	0.78	-1.68	2.00	-3.00	2.99
22	AS-9	-2.78	1.50	-3.28	0.60	-1.57	1.59	-2.20	3.76

Table 4.85

Service Superiority, by All and Individual Users, at BUET

Order	ID	All		Undergraduate		Graduate		Faculty	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	AS-1	-2.58	1.49	-2.51	1.46	-3.36	1.20	-1.46	1.67
2	IC-1	-2.79	1.99	-2.68	1.93	-3.30	2.16	-2.92	2.02
3	LP-1	-2.48	1.82	-2.19	1.69	-3.66	1.73	-3.00	2.28
4	AS-2	-3.13	2.17	-2.85	2.10	-4.30	1.91	-3.42	2.69
5	IC-2	-3.44	2.08	-3.32	2.16	-3.77	1.18	-4.00	2.64
6	AS-3	-2.85	1.90	-2.52	1.79	-4.29	1.29	-3.17	2.57
7	IC-3	-2.85	2.10	-2.60	2.09	-3.68	1.63	-3.67	2.51
8	LP-2	-3.06	2.00	-2.83	1.94	-3.95	1.63	-3.63	2.75
9	AS-4	-2.90	1.86	-2.70	1.80	-3.61	1.60	-3.54	2.45
10	IC-4	-2.90	1.93	-2.57	1.75	-4.25	2.13	-3.29	1.92
11	AS-5	-3.33	1.96	-3.13	1.95	-4.39	1.27	-3.08	2.55
12	LP-3	-2.83	2.63	-2.46	2.45	-4.75	2.10	-2.58	3.63
13	AS-6	-3.04	2.12	-2.59	1.75	-4.91	2.50	-3.54	2.36
14	IC-5	-3.54	2.06	-3.12	1.86	-5.16	1.95	-4.42	2.38
15	AS-7	-3.35	1.96	-3.00	1.76	-4.89	1.88	-3.58	2.39
16	IC-6	-3.21	2.15	-2.84	2.04	-4.73	1.88	-3.79	2.30
17	LP-4	-3.14	2.21	-2.67	1.93	-5.38	2.08	-3.17	2.22
18	AS-8	-3.04	2.12	-2.45	1.81	-5.45	1.55	-3.83	2.28
19	IC-7	-3.01	1.99	-2.58	1.76	-4.63	1.96	-4.00	2.25
20	IC-8	-3.27	2.12	-2.93	2.08	-4.71	1.71	-3.63	1.93
21	LP-5	-2.92	1.92	-2.66	1.77	-3.80	1.75	-3.75	2.89
22	AS-9	-3.01	1.85	-2.64	1.72	-4.43	1.46	-3.71	2.26

Table 4.86

Service Superiority, by All and Individual Users, at BSMMU

Order	ID	All		Graduate		Faculty	
		Mean	SD	Mean	SD	Mean	SD
1	AS-1	-3.15	1.98	-3.26	1.90	-2.13	2.38
2	IC-1	-3.49	1.79	-3.48	1.78	-3.58	1.93
3	LP-1	-3.43	1.76	-3.42	1.74	-3.52	1.91
4	AS-2	-3.70	1.77	-3.67	1.77	-3.94	1.81
5	IC-2	-3.90	1.88	-3.88	1.88	-4.10	1.94
6	AS-3	-3.59	1.83	-3.57	1.82	-3.74	1.93
7	IC-3	-4.00	2.07	-4.01	2.07	-3.90	2.18
8	LP-2	-3.78	1.68	-3.78	1.64	-3.77	2.04
9	AS-4	-3.80	1.74	-3.75	1.64	-4.26	2.45
10	IC-4	-3.75	1.91	-3.78	1.88	-3.42	2.13
11	AS-5	-3.94	1.97	-4.01	1.88	-3.35	2.63
12	LP-3	-3.97	1.74	-3.96	1.72	-4.10	1.97
13	AS-6	-3.92	1.87	-3.93	1.82	-3.77	2.28
14	IC-5	-3.81	1.89	-3.83	1.86	-3.58	2.22
15	AS-7	-4.34	2.15	-4.40	2.07	-3.74	2.71
16	IC-6	-3.90	2.01	-3.91	1.99	-3.77	2.25
17	LP-4	-3.81	1.77	-3.87	1.73	-3.26	2.00
18	AS-8	-3.87	1.88	-3.96	1.84	-3.03	2.04
19	IC-7	-3.69	1.75	-3.72	1.71	-3.42	2.05
20	IC-8	-3.92	1.87	-3.97	1.87	-3.42	1.84
21	LP-5	-4.01	1.73	-4.05	1.67	-3.61	2.17
22	AS-9	-4.15	2.04	-4.21	1.98	-3.68	2.53

Table 4.87

Service Superiority, by All and Individual Users, at IUB

Order	ID	All		Undergraduate		Graduate		Faculty	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	AS-1	-1.62	1.87	-1.61	1.92	-1.75	1.91	-1.46	1.35
2	IC-1	-1.86	2.34	-1.82	2.43	-2.29	2.14	-1.58	1.81
3	LP-1	-1.23	2.11	-1.25	2.23	-1.56	1.77	-0.68	1.51
4	AS-2	-1.53	2.26	-1.51	2.39	-2.02	1.85	-1.00	1.66
5	IC-2	-1.63	2.39	-1.65	2.52	-2.15	2.08	-0.79	1.47
6	AS-3	-1.66	2.25	-1.75	2.28	-1.83	2.07	-0.87	2.20
7	IC-3	-2.04	2.25	-1.99	2.35	-2.94	1.77	-1.26	1.73
8	LP-2	-0.81	2.15	-0.73	2.21	-1.54	2.03	-0.42	1.57
9	AS-4	-0.99	2.24	-0.87	2.39	-1.81	1.70	-0.74	1.46
10	IC-4	-1.28	2.32	-1.15	2.42	-1.90	2.11	-1.34	1.68
11	AS-5	-1.03	2.21	-0.90	2.32	-1.42	1.51	-1.39	2.03
12	LP-3	-0.57	2.32	-0.55	2.37	-1.23	1.96	0.16	2.25
13	AS-6	-1.09	1.99	-1.08	2.14	-1.40	1.67	-0.74	1.03
14	IC-5	-1.29	2.23	-1.29	2.37	-1.46	1.92	-1.11	1.41
15	AS-7	-1.31	2.08	-1.25	2.21	-1.81	1.67	-1.05	1.47
16	IC-6	-1.32	2.17	-1.19	2.30	-1.73	1.59	-1.71	1.75
17	LP-4	-1.36	2.11	-1.26	2.20	-2.02	1.87	-1.29	1.52
18	AS-8	-1.22	2.23	-1.13	2.25	-1.75	2.05	-1.13	2.24
19	IC-7	-1.17	1.98	-1.17	2.11	-1.50	1.56	-0.79	1.42
20	IC-8	-1.39	2.35	-1.30	2.44	-1.83	2.24	-1.45	1.78
21	LP-5	-1.03	2.06	-0.92	2.16	-1.71	1.54	-0.97	1.70
22	AS-9	-1.18	2.08	-1.06	2.13	-1.50	1.76	-1.55	2.06

To see libraries performance whether they are meeting the users' expectation of Desired Service Level by each group of users through LibQUAL+ Service Superiority indicator is applied. Following tables (Table 4.88-4.93) show the Service Superiority through calculating Superiority Gap. Ranking of Mean Values with SD of Superiority Gaps (SG) are represented in the tables with the concerned ID and Items. It has been mentioned prior that the gap score ("Superiority" = "Perceived" – "Desired") is scaled such that higher scores are more favorable. Thus, a Superiority Gap score of +1.1 on an item, subscale, or total score is better than a Superiority Gap score of +1.0, or an Superiority Gap score of -.40 is better than -.90. But, larger negative values are not good at all. In this research, SGs are ranked from low to high, where larger negative gaps are appeared in the top. Below, the ID representing the items along with Mean score or SS gaps are shown, if there are any items with repetition in the rank or list, than only IDs and scores are described. By all or different individual user groups the worst and best scores are observed as, at DU worst (-4.88), best (-1.17); at RU worst (-5.12), best (-1.40); at BAU worst (-4.81), best (-1.13); at BUET worst (-5.45), best (-1.46); at BSMMU worst (-4.4), best (-2.13) and at IUB worst (-2.94), best (.16).

Table 4.88 shows Service Superiority for DU Library. SDs are high generally but comparatively lower than all other universities which resulting that responses are comparatively better representative. But in all groups, Service Superiority is not good, very frustrating as Superiority Gaps are all negative with very large gaps. So, all the SSs are problematic here. After scanning all the tables of SG scores, it has been observed that in response of perception and expectation, there are not enough variations; only faculty group has varied with other groups. There are different gap sizes along with different items with ranks for different groups of users. All the items of Desired Services are lagged behind the Perceived Service, so the negative values are emerged. Faculty gaps are comparatively higher than any other group. For all users, the upmost five problematic and higher negative SG scores are IC-1 (-4.33) "Making electronic resources accessible from my home or office", LP-5 (-4.32) "Community space for group learning and group study", AS-2 (-4.18) "Giving users individual attention", IC-4 (-3.77) "The electronic information resources I need", LP-1 (-3.69) "Library space that inspires study and learning". For undergraduate students, the ranking and the items are as same as the previous group though gap sizes are slight different IC-1 (-4.23), LP-5 (-4.06), AS-2 (-3.98), IC-4 (-3.69), and LP-1 (-3.61). For the graduate group, the top five problematic attributes are LP-5 (-4.74), IC-1 (-4.50), AS-2 (-4.47), IC-2 (-3.91) "A library Web site enabling me to locate

information on my own", and IC-4 (-3.85). Other than IC-2, all items are in the previous groups. Faculty group complained through highest negative SG. The upmost five items are with high negative gaps are AS-8 (-4.88) "Willingness to help users", LP-5 (-4.76), IC-5 (-4.72) "Modern equipment that lets me easily access needed information", AS-9 (-4.72) "Dependability in handling users' service problems", AS-2 (-4.68) where LP-5 and AS-2 items are in the previous groups.

Table 4.88

Service Superiority, by All & Individual Users, DU (Ranked by Mean)

Order	ID	All User		ID	Undergraduate		ID	Graduate		ID	Faculty	
1	IC-1	-4.33	(1.57)	IC-1	-4.23	(1.62)	LP-5	-4.74	(1.68)	AS-8	-4.88	(2.26)
2	LP-5	-4.32	(1.66)	LP-5	-4.06	(1.53)	IC-1	-4.50	(1.32)	LP-5	-4.76	(2.18)
3	AS-2	-4.18	(1.40)	AS-2	-3.98	(1.46)	AS-2	-4.47	(1.17)	IC-5	-4.72	(2.49)
4	IC-4	-3.77	(1.47)	IC-4	-3.69	(1.44)	IC-2	-3.91	(1.39)	AS-9	-4.72	(1.57)
5	LP-1	-3.69	(1.30)	LP-1	-3.61	(1.36)	IC-4	-3.85	(1.34)	AS-2	-4.68	(1.49)
6	IC-2	-3.66	(1.51)	IC-6	-3.53	(1.41)	IC-7	-3.85	(1.36)	IC-7	-4.56	(2.22)
7	IC-6	-3.63	(1.40)	LP-2	-3.52	(1.49)	LP-1	-3.75	(1.05)	AS-7	-4.52	(2.29)
8	IC-7	-3.61	(1.48)	IC-2	-3.46	(1.44)	IC-6	-3.73	(1.27)	IC-1	-4.44	(2.10)
9	IC-5	-3.54	(1.58)	IC-7	-3.38	(1.38)	IC-5	-3.68	(1.37)	IC-2	-4.33	(2.28)
10	LP-2	-3.53	(1.67)	IC-5	-3.33	(1.49)	AS-5	-3.47	(1.36)	LP-4	-4.28	(2.05)
11	AS-7	-3.45	(1.50)	AS-7	-3.32	(1.33)	AS-7	-3.47	(1.52)	AS-3	-4.20	(1.91)
12	AS-8	-3.39	(1.62)	IC-8	-3.31	(1.45)	LP-2	-3.46	(1.76)	AS-4	-4.20	(1.94)
13	AS-5	-3.37	(1.32)	AS-5	-3.27	(1.24)	AS-8	-3.38	(1.64)	IC-4	-4.20	(2.16)
14	IC-8	-3.31	(1.54)	AS-8	-3.24	(1.44)	AS-4	-3.33	(1.27)	IC-8	-4.20	(2.29)
15	AS-4	-3.26	(1.37)	AS-4	-3.12	(1.30)	AS-6	-3.20	(1.36)	AS-6	-4.12	(2.20)
16	AS-3	-3.17	(1.50)	AS-3	-3.07	(1.48)	AS-1	-3.19	(1.60)	LP-1	-4.08	(1.80)
17	AS-1	-3.11	(1.50)	AS-1	-2.99	(1.37)	AS-3	-3.16	(1.35)	IC-6	-4.04	(1.81)
18	AS-6	-3.11	(1.44)	AS-6	-2.95	(1.34)	LP-4	-3.14	(1.37)	AS-5	-3.92	(1.73)
19	LP-4	-3.09	(1.46)	LP-4	-2.93	(1.38)	IC-8	-3.14	(1.46)	AS-1	-3.88	(1.88)
20	IC-3	-3.01	(1.42)	IC-3	-2.89	(1.27)	IC-3	-3.05	(1.47)	IC-3	-3.88	(2.11)
21	LP-3	-2.79	(1.79)	LP-3	-2.76	(1.76)	LP-3	-2.89	(1.48)	LP-2	-3.88	(2.59)
22	AS-9	-1.75	(3.18)	AS-9	-1.17	(3.22)	AS-9	-2.25	(2.92)	LP-3	-2.58	(3.06)

Table 4.89 shows Service Superiority for RU Library. SDs are generally higher than all other universities which resulting that responses are comparatively less representative. Throughout all the groups, Service Superiority is not good. Superiority Gaps are all negative with very large gaps. Faculty SGs are with the highest negative gap. So, all the SSs are problematic here. After screening all the tables of SG scores, it has been observed that in response, there have not enough variations except faculty group. Like other libraries and groups, there are different gap sizes along with different items with ranks. All the items of Desired Services are lagged behind the Perceived Service. For all users, the top five highest negative SG score which are problematic are LP-5 (-3.15) "Community space for group learning and group study", IC-5 (-3.04) "Modern equipment that lets me easily access needed information", IC-1 (-2.97) "Making electronic resources accessible from my home or office", AS-8 (-2.87) "Willingness to help users", and AS-5 (-2.80) "Employees who have the knowledge to answer user questions". For undergraduate students, other than AS-4 other four attributes are as same as previous All user group. Items are, LP-5 (-3.10), IC-5 (-3.00), IC-1 (-2.98), AS-4 (-2.92) "Readiness to respond to users' questions", and AS-8 (-2.79). Again, for graduate group, excluding AS-1, all other items are in the previous group of this library. The items are LP-5 (-3.08), IC-5 (-2.93), AS-1 (-2.85), "Employees who instill confidence in users" AS-5 (-2.81), and AS-8 (-2.77). All the SGs are badly high with negative values and the upmost score is more than -5.00. However, faculty group complained with the items among them the top three are different with other problematic SS top items. The items are IC-1 (-5.12), IC-2 (-4.76) "A library Web site enabling me to locate information on my own", IC-7 (-4.71) "Making information easily accessible for independent use", IC-8 (-4.71) "Print and/or electronic journal collections I require for my work", AS-8 (-4.59).

Table 4.89

Service Superiority, by All & Individual Users, RU (Ranked by Mean)

Order	ID	All User		ID	Undergraduate		ID	Graduate		ID	Faculty	
1	LP-5	-3.15	(2.21)	LP-5	-3.10	(2.12)	LP-5	-3.08	(2.48)	IC-1	-5.12	(2.34)
2	IC-5	-3.04	(2.04)	IC-5	-3.00	(1.82)	IC-5	-2.93	(2.37)	IC-2	-4.76	(2.28)
3	IC-1	-2.97	(2.16)	IC-1	-2.98	(2.20)	AS-1	-2.85	(1.47)	IC-7	-4.71	(2.44)
4	AS-8	-2.87	(1.93)	AS-4	-2.92	(2.19)	AS-5	-2.81	(2.13)	IC-8	-4.71	(1.86)
5	AS-5	-2.80	(1.99)	AS-8	-2.79	(1.86)	AS-8	-2.77	(1.93)	AS-8	-4.59	(2.27)
6	AS-4	-2.74	(2.18)	AS-5	-2.74	(1.96)	IC-2	-2.56	(2.23)	IC-4	-4.47	(2.60)
7	IC-4	-2.73	(2.09)	IC-4	-2.73	(1.93)	IC-6	-2.55	(2.15)	AS-7	-4.41	(2.35)
8	IC-8	-2.70	(2.10)	IC-8	-2.69	(2.09)	AS-7	-2.52	(1.92)	LP-5	-4.35	(1.69)
9	AS-1	-2.68	(1.75)	AS-6	-2.65	(2.12)	IC-1	-2.51	(1.73)	IC-5	-4.29	(2.93)
10	AS-6	-2.65	(2.07)	AS-1	-2.59	(1.64)	AS-3	-2.46	(1.80)	LP-4	-4.00	(1.90)
11	AS-7	-2.59	(1.87)	AS-9	-2.56	(2.33)	AS-6	-2.46	(1.76)	AS-2	-3.94	(1.89)
12	AS-9	-2.59	(2.25)	AS-7	-2.50	(1.77)	AS-9	-2.45	(2.01)	IC-6	-3.94	(1.78)
13	AS-3	-2.47	(1.79)	LP-2	-2.48	(1.86)	IC-4	-2.37	(2.31)	LP-3	-3.76	(2.51)
14	IC-2	-2.44	(2.14)	IC-7	-2.44	(1.74)	IC-8	-2.30	(1.97)	AS-6	-3.71	(2.54)
15	LP-2	-2.39	(1.91)	AS-3	-2.41	(1.75)	LP-4	-2.08	(1.78)	AS-4	-3.65	(2.18)
16	IC-7	-2.39	(1.87)	LP-4	-2.37	(1.94)	AS-2	-2.07	(1.89)	AS-5	-3.65	(1.69)
17	LP-4	-2.38	(1.93)	LP-1	-2.31	(1.73)	AS-4	-1.99	(1.98)	AS-9	-3.65	(2.09)
18	IC-6	-2.30	(1.95)	IC-3	-2.29	(1.96)	LP-1	-1.95	(1.76)	LP-1	-3.59	(2.40)
19	LP-1	-2.28	(1.80)	IC-2	-2.25	(2.02)	LP-2	-1.94	(1.80)	AS-3	-3.53	(2.10)
20	AS-2	-2.27	(1.97)	AS-2	-2.23	(1.96)	IC-3	-1.90	(1.55)	AS-1	-3.29	(3.70)
21	IC-3	-2.25	(1.90)	IC-6	-2.12	(1.84)	IC-7	-1.75	(1.77)	IC-3	-3.29	(2.14)
22	LP-3	-1.99	(2.52)	LP-3	-2.07	(2.58)	LP-3	-1.40	(2.13)	LP-2	-3.29	(2.69)

Table 4.90 shows BAU Library Service Superiority. SDs are mixed, among them few are high and few are the lowest among any other responses of other libraries. Like previous libraries, Service Superiority is not good, very wearisome as Superiority Gaps are all negative with large gaps. So, like other libraries, all the SSs are problematic here. After examining all the tables of SG scores, it has been observed that in response of perception and expectation, both graduate and faculty group have variation to the responses. There are different gap sizes along with different items with ranks for different groups of users. Undergraduate gaps are higher and graduate students gaps are lower than others. All the items of Desired Services are lagged behind the Perceived Service. For all users, the upmost five higher negative SG scores are IC-8 (-3.98) "Print and/or electronic journal collections I require for my work", AS-8 (-3.78) "Willingness to help users", IC-7 (-3.77) "Making information easily accessible for independent use", IC-2 (-3.38) "A library Web site enabling me to locate information on my own" and IC-6 (-3.29) "Easy-to-use access tools that allow me to find things on my own". For undergraduate students, excluding IC-3, all four items have been in the top five ranking by all users. The top five items are IC-8 (-4.81) "Print and/or electronic journal collections I require for my work" AS-8 (-4.64) "Willingness to help users" IC-7 (-4.58) "Making information easily accessible for independent use" IC-6 (-3.94) "Easy-to-use access tools that allow me to find things on my own" and IC-3 (-3.90). For the graduate group, the upmost five negative SGs are IC-2 (-2.18), IC-8 (-2.09), IC-5 (-1.94) "Modern equipment that lets me easily access needed information" LP-4 (-1.89) "A getaway for study, learning, or research" and LP-2 (-1.84) "Quiet space for individual activities". Items IC-2, IC-8 and LP-2 are found in the other groups of this library. Faculty group has the following top five highest negative SGs. These are IC-2 (-3.90), AS-1 (-3.75) "Employees who instill confidence in users", IC-1 (-3.60) "Making electronic resources accessible from my home or office", LP-2 (-3.20), IC-4 (-3.00) "The electronic information resources I need".

Table 4.90

Service Superiority, by All & Individual Users, BAU (Ranked by Mean)

Order	ID	All User		ID	Undergraduate		ID	Graduate		ID	Faculty	
1	IC-8	-3.98	(2.06)	IC-8	-4.81	(0.88)	IC-2	-2.18	(2.15)	IC-2	-3.90	(4.08)
2	AS-8	-3.78	(2.11)	AS-8	-4.64	(1.06)	IC-8	-2.09	(2.26)	AS-1	-3.75	(1.97)
3	IC-7	-3.77	(2.04)	IC-7	-4.58	(1.06)	IC-5	-1.94	(1.67)	IC-1	-3.60	(3.44)
4	IC-2	-3.38	(1.97)	IC-6	-3.94	(1.15)	LP-4	-1.89	(1.85)	LP-2	-3.20	(2.17)
5	IC-6	-3.29	(2.03)	IC-3	-3.90	(1.25)	LP-2	-1.84	(1.49)	IC-4	-3.00	(3.70)
6	IC-3	-3.15	(2.07)	IC-2	-3.78	(1.37)	AS-8	-1.83	(2.01)	LP-5	-3.00	(2.99)
7	LP-5	-3.14	(1.64)	LP-5	-3.70	(0.78)	IC-6	-1.82	(2.23)	IC-7	-2.90	(3.70)
8	LP-4	-3.08	(1.78)	LP-4	-3.59	(1.02)	IC-7	-1.82	(2.14)	AS-2	-2.80	(2.02)
9	IC-1	-3.04	(1.80)	IC-1	-3.50	(1.21)	AS-6	-1.77	(1.54)	AS-5	-2.80	(3.65)
10	LP-2	-2.97	(1.35)	AS-3	-3.40	(1.09)	AS-7	-1.76	(1.60)	AS-7	-2.70	(4.27)
11	IC-5	-2.93	(1.61)	LP-2	-3.38	(0.88)	LP-5	-1.68	(2.00)	IC-3	-2.65	(3.39)
12	AS-3	-2.81	(1.72)	IC-5	-3.33	(0.96)	IC-1	-1.67	(1.91)	IC-8	-2.60	(4.02)
13	AS-9	-2.78	(1.50)	AS-9	-3.28	(0.60)	AS-9	-1.57	(1.59)	AS-6	-2.55	(4.52)
14	AS-6	-2.61	(1.63)	AS-6	-2.94	(0.99)	AS-4	-1.54	(1.85)	IC-5	-2.50	(3.94)
15	IC-4	-2.52	(1.48)	IC-4	-2.91	(0.80)	AS-3	-1.46	(1.80)	LP-4	-2.30	(4.22)
16	AS-7	-2.49	(1.62)	LP-1	-2.82	(1.37)	LP-3	-1.40	(1.57)	AS-8	-2.30	(4.29)
17	LP-1	-2.36	(1.72)	AS-7	-2.74	(1.05)	IC-4	-1.37	(1.45)	LP-3	-2.20	(1.77)
18	LP-3	-2.27	(1.31)	LP-3	-2.59	(0.98)	IC-3	-1.26	(2.22)	AS-9	-2.20	(3.76)
19	AS-1	-2.18	(1.43)	AS-1	-2.40	(1.00)	AS-1	-1.25	(1.71)	IC-6	-2.10	(4.20)
20	AS-5	-2.07	(1.51)	AS-5	-2.33	(0.71)	AS-5	-1.21	(1.89)	LP-1	-2.00	(2.29)
21	AS-4	-1.94	(1.43)	AS-2	-2.10	(1.25)	LP-1	-1.20	(1.88)	AS-4	-2.00	(3.43)
22	AS-2	-1.89	(1.62)	AS-4	-2.09	(0.82)	AS-2	-1.13	(2.10)	AS-3	-1.80	(3.09)

Table 4.91 shows BUET Library Service Superiority. SDs are mixed, among them few are very high and few are the as usual like other libraries. Like previous libraries, Service Superiority is very shocking as Superiority Gaps are all negative with large scores. So, like other libraries, all the SSs are problematic here. After examining all the tables of SG scores, it has been noticed that in the response, both graduate and faculty group have variation of expectation. There are different gap sizes along with different items with ranks for different groups of users. Graduate students gaps are the highest among all the groups. All the items of Desired Services are lagged behind the Perceived Service so negative SGs are emerged. For all users, the top five higher negative SG scores are IC-5 (-3.54) "Modern equipment that lets me easily access needed information", IC-2 (-3.44) "A library Web site enabling me to locate information on my own", AS-7 (-3.35) "Employees who understand the needs of their users", AS-5 (-3.33) "Employees who have the knowledge to answer user questions", and IC-8 (-3.27) "Print and/or electronic journal collections I require for my work". For undergraduate students, all five items have been in the upmost five ranking by all users. The top five items are IC-2 (-3.32), AS-5 (-3.13), IC-5 (-3.12), AS-7 (-3.00), and IC-8 (-2.93). For the graduate group, the top five negative SGs are AS-8 (-5.45) "Willingness to help users", LP-4 (-5.38), IC-5 (-5.16) "Modern equipment that lets me easily access needed information", AS-6 (-4.91) "Employees who deal with users in a caring fashion", and AS-7 (-4.89). Among the items, LP-4 and AS-6 are absent in the other group of this library. All the gaps of this group are tremendously high with negative value. Faculty group has the following top five negative SGs. These are IC-5 (-4.42), IC-2 (-4.00), IC-7 (-4.00) "Making information easily accessible for independent use", AS-8 (-3.83), and IC-6 (-3.79) "Easy-to-use access tools that allow me to find things on my own".

Table 4.91

Service Superiority, by All & Individual Users, BUET (Ranked by Mean)

Order	ID	All User		ID	Undergraduate		ID	Graduate		ID	Faculty	
1	IC-5	-3.54	(2.06)	IC-2	-3.32	(2.16)	AS-8	-5.45	(1.55)	IC-5	-4.42	(2.38)
2	IC-2	-3.44	(2.08)	AS-5	-3.13	(1.95)	LP-4	-5.38	(2.08)	IC-2	-4.00	(2.64)
3	AS-7	-3.35	(1.96)	IC-5	-3.12	(1.86)	IC-5	-5.16	(1.95)	IC-7	-4.00	(2.25)
4	AS-5	-3.33	(1.96)	AS-7	-3.00	(1.76)	AS-6	-4.91	(2.50)	AS-8	-3.83	(2.28)
5	IC-8	-3.27	(2.12)	IC-8	-2.93	(2.08)	AS-7	-4.89	(1.88)	IC-6	-3.79	(2.30)
6	IC-6	-3.21	(2.15)	AS-2	-2.85	(2.10)	LP-3	-4.75	(2.10)	LP-5	-3.75	(2.89)
7	LP-4	-3.14	(2.21)	IC-6	-2.84	(2.04)	IC-6	-4.73	(1.88)	AS-9	-3.71	(2.26)
8	AS-2	-3.13	(2.17)	LP-2	-2.83	(1.94)	IC-8	-4.71	(1.71)	IC-3	-3.67	(2.51)
9	LP-2	-3.06	(2.00)	AS-4	-2.70	(1.80)	IC-7	-4.63	(1.96)	LP-2	-3.63	(2.75)
10	AS-6	-3.04	(2.12)	IC-1	-2.68	(1.93)	AS-9	-4.43	(1.46)	IC-8	-3.63	(1.93)
11	AS-8	-3.04	(2.12)	LP-4	-2.67	(1.93)	AS-5	-4.39	(1.27)	AS-7	-3.58	(2.39)
12	IC-7	-3.01	(1.99)	LP-5	-2.66	(1.77)	AS-2	-4.30	(1.91)	AS-4	-3.54	(2.45)
13	AS-9	-3.01	(1.85)	AS-9	-2.64	(1.72)	AS-3	-4.29	(1.29)	AS-6	-3.54	(2.36)
14	LP-5	-2.92	(1.92)	IC-3	-2.60	(2.09)	IC-4	-4.25	(2.13)	AS-2	-3.42	(2.69)
15	AS-4	-2.90	(1.86)	AS-6	-2.59	(1.75)	LP-2	-3.95	(1.63)	IC-4	-3.29	(1.92)
16	IC-4	-2.90	(1.93)	IC-7	-2.58	(1.76)	LP-5	-3.80	(1.75)	AS-3	-3.17	(2.57)
17	AS-3	-2.85	(1.90)	IC-4	-2.57	(1.75)	IC-2	-3.77	(1.18)	LP-4	-3.17	(2.22)
18	IC-3	-2.85	(2.10)	AS-3	-2.52	(1.79)	IC-3	-3.68	(1.63)	AS-5	-3.08	(2.55)
19	LP-3	-2.83	(2.63)	AS-1	-2.51	(1.46)	LP-1	-3.66	(1.73)	LP-1	-3.00	(2.28)
20	IC-1	-2.79	(1.99)	LP-3	-2.46	(2.45)	AS-4	-3.61	(1.60)	IC-1	-2.92	(2.02)
21	AS-1	-2.58	(1.49)	AS-8	-2.45	(1.81)	AS-1	-3.36	(1.20)	LP-3	-2.58	(3.63)
22	LP-1	-2.48	(1.82)	LP-1	-2.19	(1.69)	IC-1	-3.30	(2.16)	AS-1	-1.46	(1.67)

Table 4.92 shows Service Superiority for BSMMU Library. SDs are generally high that follow-on that responses rates are comparatively not representative. Throughout all the groups, Service Superiority is very unpleasant. All the gaps from different respondents at BSMMUL are negative and very high. Undergraduate students are absent here. After investigating all the tables of SG scores, it has been observed that concerning response, faculty responses are mostly dissimilar with other or all groups. Like other libraries and groups, there are different gap sizes along with different items with ranks. For all users, the upmost five highest negative SG scores which are most problematic are AS-7 (-4.34) "Employees who understand the needs of their users", AS-9 (-4.15) "Dependability in handling users' service problems", LP-5 (-4.01) "Community space for group learning and group study", IC-3 (-4.00) "The printed library materials I need for my work", and LP-3 (-3.97) "A comfortable and inviting location". Regarding graduate students group, the top five negative SGs are AS-7 (-4.40), AS-9 (-4.21), LP-5 (-4.05), IC-3 (-4.01), AS-5 (-4.01) "Employees who have the knowledge to answer user questions". Only AS-5 is absent in the previous table. Faculty group has the following top five negative SGs; AS-4 (-4.26) "Readiness to respond to users' questions", IC-2 (-4.10) "A library Web site enabling me to locate information on my own", LP-3 (-4.10), AS-2 (-3.94) "Giving users individual attention", and IC-3 (-3.90). Among them, items LP-3 and IC-4 are present in the previous groups of this library.

Table 4.92

Service Superiority, by All & Individual Users, BSMMU (Ranked by Mean)

Order	ID	All User		ID	Graduate		ID	Faculty	
1	AS-7	-4.34	(2.15)	AS-7	-4.40	(2.07)	AS-4	-4.26	(2.45)
2	AS-9	-4.15	(2.04)	AS-9	-4.21	(1.98)	IC-2	-4.10	(1.94)
3	LP-5	-4.01	(1.73)	LP-5	-4.05	(1.67)	LP-3	-4.10	(1.97)
4	IC-3	-4.00	(2.07)	IC-3	-4.01	(2.07)	AS-2	-3.94	(1.81)
5	LP-3	-3.97	(1.74)	AS-5	-4.01	(1.88)	IC-3	-3.90	(2.18)
6	AS-5	-3.94	(1.97)	IC-8	-3.97	(1.87)	LP-2	-3.77	(2.04)
7	AS-6	-3.92	(1.87)	LP-3	-3.96	(1.72)	AS-6	-3.77	(2.28)
8	IC-8	-3.92	(1.87)	AS-8	-3.96	(1.84)	IC-6	-3.77	(2.25)
9	IC-2	-3.90	(1.88)	AS-6	-3.93	(1.82)	AS-3	-3.74	(1.93)
10	IC-6	-3.90	(2.01)	IC-6	-3.91	(1.99)	AS-7	-3.74	(2.71)
11	AS-8	-3.87	(1.88)	IC-2	-3.88	(1.88)	AS-9	-3.68	(2.53)
12	IC-5	-3.81	(1.89)	LP-4	-3.87	(1.73)	LP-5	-3.61	(2.17)
13	LP-4	-3.81	(1.77)	IC-5	-3.83	(1.86)	IC-1	-3.58	(1.93)
14	AS-4	-3.80	(1.74)	LP-2	-3.78	(1.64)	IC-5	-3.58	(2.22)
15	LP-2	-3.78	(1.68)	IC-4	-3.78	(1.88)	LP-1	-3.52	(1.91)
16	IC-4	-3.75	(1.91)	AS-4	-3.75	(1.64)	IC-4	-3.42	(2.13)
17	AS-2	-3.70	(1.77)	IC-7	-3.72	(1.71)	IC-7	-3.42	(2.05)
18	IC-7	-3.69	(1.75)	AS-2	-3.67	(1.77)	IC-8	-3.42	(1.84)
19	AS-3	-3.59	(1.83)	AS-3	-3.57	(1.82)	AS-5	-3.35	(2.63)
20	IC-1	-3.49	(1.79)	IC-1	-3.48	(1.78)	LP-4	-3.26	(2.00)
21	LP-1	-3.43	(1.76)	LP-1	-3.42	(1.74)	AS-8	-3.03	(2.04)
22	AS-1	-3.15	(1.98)	AS-1	-3.26	(1.90)	AS-1	-2.13	(2.38)

Table 4.93 shows Service Superiority for IUB Library. Most of the SDs are high that resultant that responses are comparatively scattered and less identical. Throughout all the groups, Service Superiority is not good but better than all other responding libraries, which means better service provider than any other responding libraries. It is good to see that, among any other libraries or groups IUBL faculty respondents scored positive SG for an item. However, all other gaps from different respondents at IUBL are negative but not much higher. After exploring all the tables of SG scores, it has been observed that concerning response, graduate and faculty responses are dissimilar with other or all groups. Like other libraries and groups, there are different gap sizes along with different items with ranks. It has been mentioned earlier that except one item by faculty, all other items of Desired Services are lagged behind the Perceived Service. For all users, the top five highest negative SG scores which are problematic are IC-3 (-2.04) "The printed library materials I need for my work", IC-1 (-1.86) "Making electronic resources accessible from my home or office", AS-3 (-1.66) "Employees who are consistently courteous", IC-2 (-1.63) "A library Web site enabling me to locate information on my own", and AS-1 (-1.62) "Employees who instill confidence in users". Undergraduate students response echoed with the top five SSs, with very close scores. The score of the items are IC-3 (-1.99), IC-1 (-1.82), AS-3 (-1.75), IC-2 (-1.65), and AS-1 (-1.61). Graduate students have partially differed with the items in the upmost five rankings. The top five negative SGs are IC-3 (-2.94), IC-1 (-2.29), IC-2 (-2.15), AS-2 (-2.02) "Giving users individual attention", and LP-4 (-2.02) "A getaway for study, learning, or research". Unlike other university's faculty, IUB faculties SGs are comparatively narrower negative scores. A positive SG score is also observed e.g. LP-3 (0.16) "A comfortable and inviting location" which ensuring that at least this attribute exceeds the desire expectation for faculty. The top five negative scores for this group are IC-6 (-1.71) "Easy-to-use access tools that allow me to find things on my own", IC-1 (-1.58), AS-9 (-1.55) "Dependability in handling users' service problems", AS-1 (-1.46), IC-8 (-1.45) "Print and/or electronic journal collections I require for my work". Items IC-1 and AS-1 are in the other groups of this library.

Table 4.93

Service Superiority, by All & Individual Users, IUB (Ranked by Mean)

Order	ID	All User		ID	Undergraduate		ID	Graduate		ID	Faculty	
1	IC-3	-2.04	(2.25)	IC-3	-1.99	(2.35)	IC-3	-2.94	(1.77)	IC-6	-1.71	(1.75)
2	IC-1	-1.86	(2.34)	IC-1	-1.82	(2.43)	IC-1	-2.29	(2.14)	IC-1	-1.58	(1.81)
3	AS-3	-1.66	(2.25)	AS-3	-1.75	(2.28)	IC-2	-2.15	(2.08)	AS-9	-1.55	(2.06)
4	IC-2	-1.63	(2.39)	IC-2	-1.65	(2.52)	AS-2	-2.02	(1.85)	AS-1	-1.46	(1.35)
5	AS-1	-1.62	(1.87)	AS-1	-1.61	(1.92)	LP-4	-2.02	(1.87)	IC-8	-1.45	(1.78)
6	AS-2	-1.53	(2.26)	AS-2	-1.51	(2.39)	IC-4	-1.90	(2.11)	AS-5	-1.39	(2.03)
7	IC-8	-1.39	(2.35)	IC-8	-1.30	(2.44)	AS-3	-1.83	(2.07)	IC-4	-1.34	(1.68)
8	LP-4	-1.36	(2.11)	IC-5	-1.29	(2.37)	IC-8	-1.83	(2.24)	LP-4	-1.29	(1.52)
9	IC-6	-1.32	(2.17)	LP-4	-1.26	(2.20)	AS-4	-1.81	(1.70)	IC-3	-1.26	(1.73)
10	AS-7	-1.31	(2.08)	LP-1	-1.25	(2.23)	AS-7	-1.81	(1.67)	AS-8	-1.13	(2.24)
11	IC-5	-1.29	(2.23)	AS-7	-1.25	(2.21)	AS-1	-1.75	(1.91)	IC-5	-1.11	(1.41)
12	IC-4	-1.28	(2.32)	IC-6	-1.19	(2.30)	AS-8	-1.75	(2.05)	AS-7	-1.05	(1.47)
13	LP-1	-1.23	(2.11)	IC-7	-1.17	(2.11)	IC-6	-1.73	(1.59)	AS-2	-1.00	(1.66)
14	AS-8	-1.22	(2.23)	IC-4	-1.15	(2.42)	LP-5	-1.71	(1.54)	LP-5	-0.97	(1.70)
15	AS-9	-1.18	(2.08)	AS-8	-1.13	(2.25)	LP-1	-1.56	(1.77)	AS-3	-0.87	(2.20)
16	IC-7	-1.17	(1.98)	AS-6	-1.08	(2.14)	LP-2	-1.54	(2.03)	IC-2	-0.79	(1.47)
17	AS-6	-1.09	(1.99)	AS-9	-1.06	(2.13)	IC-7	-1.50	(1.56)	IC-7	-0.79	(1.42)
18	AS-5	-1.03	(2.21)	LP-5	-0.92	(2.16)	AS-9	-1.50	(1.76)	AS-4	-0.74	(1.46)
19	LP-5	-1.03	(2.06)	AS-5	-0.90	(2.32)	IC-5	-1.46	(1.92)	AS-6	-0.74	(1.03)
20	AS-4	-0.99	(2.24)	AS-4	-0.87	(2.39)	AS-5	-1.42	(1.51)	LP-1	-0.68	(1.51)
21	LP-2	-0.81	(2.15)	LP-2	-0.73	(2.21)	AS-6	-1.40	(1.67)	LP-2	-0.42	(1.57)
22	LP-3	-0.57	(2.32)	LP-3	-0.55	(2.37)	LP-3	-1.23	(1.96)	LP-3	0.16	(2.25)

Figure 4.12 represents comparison of SG for LibQUAL+ core question for all libraries by all users. From the figures, the position of the libraries can be exposed at a glance. Here in aspects IUB is seen as top by SS through SG.

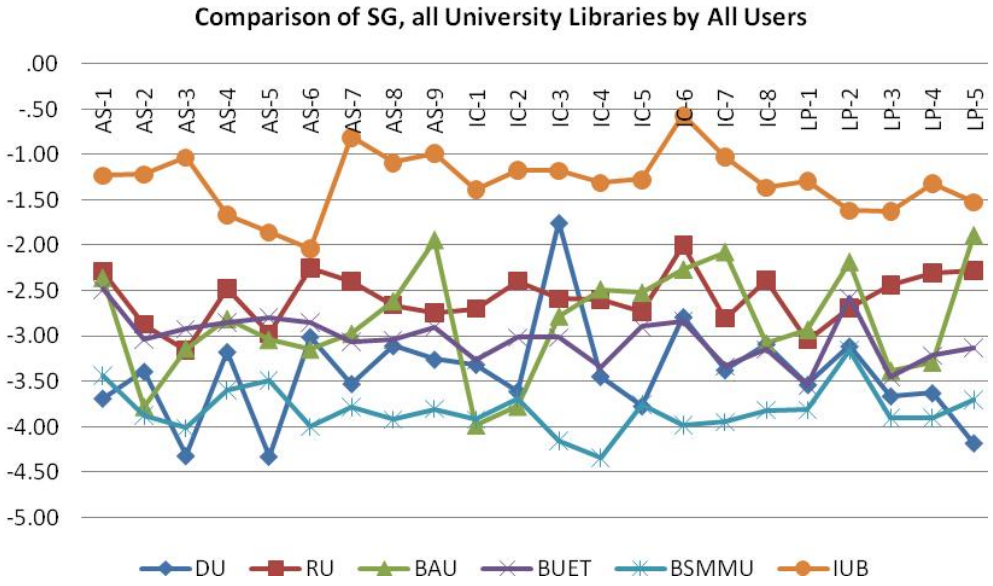


Figure 4.12 Comparison of Superiority Gap, all Universities by All Users *(Core Questions)*

4.13 LibQUAL+ Core Questions: Zone of Tolerance

Zone of Tolerance (ZoT) is a service range by which user can find any service satisfactory. Service outside this zone frustrated users and decreases their loyalty to service organization. Any LibQUAL+ core items or service attributes that outside the ZoT resultant users' frustration which is undesirable. Service attributes or Perceived Service in the range of Desired Service and Minimum levels are acceptable. To identify the *Zone of Tolerance* among all and three user groups of all the respondent libraries i.e. DUL, RUL, BAUL, BUETL, BSMMUL and IUBL, the mean value of three service levels, Desired Service, Perceived Service and Minimum Service are compared and shown in the Radar Chart (see Figure 4.13-4.35).

At DUL, for any users group, e.g. undergraduate students, graduate students, faculty and all users, not a single attribute is inside the ZoT. The total scenario is very frustrating, as all the service attributes are outside the ZoT (Figure 4.13-4.16). Like DUL, RUL has the same unsatisfactory situation where not a single item for any user group, e.g. undergraduate students, graduate students, faculty and all users are inside ZoT (Figure

4.17-4.20). Faculty PSs are unpleasantly lower. BAUL (Figure 4.21-4.24) ZoT status is comparatively better than previously mentioned two libraries, though there are no items inside ZoT for undergraduate students and faculty. For graduate students, other than IC-3, LP-4, and AS-8 all nineteen items are inside the ZoT. For all users, only the item AS-5 is within the ZoT. Regarding BUETL (Figure 4.25-4.28), faculty considered AS-1 and LP-1 satisfactory but all other items are outside the range. For other groups the condition is also disappointing as none of the items can qualify for ZoT safe zone. The most substandard and inferior is BSMMUL (Figure 4.29-4.31) ZoT condition. As PSs are badly small sized that BSMMUL needs to improve a lot. Not a single item by any user groups is inside the ZoT. IUBL is comparatively better (Figure 4.32-4.35). At IUB, for undergraduate students the items (seventeen items) AS-1, AS-4, AS-5, AS-6, AS-7, AS-8, AS-9, IC-4, IC-5, IC-6, IC-7, IC-8, LP-1, LP-2, LP-3, LP-4 and LP-5 are inside the ZoT. Unsatisfactory items identified by them are, AS-2, AS-3, IC-1, IC-2, IC-3. Unsatisfactory items recognized by graduate students are AS-3, IC-1, IC-2, IC-3, IC-4, IC-6, and LP-4 whereas other fifteen attributes are inside ZoT. IUBL users found service at least adequate to them in some range. It is the most pleasing matter that IUB faculty found all the 22 service quality core items reasonable. By all users, AS-1, AS-2, AS-4, AS-5, AS-6, AS-7, AS-8, AS-9, IC-1, IC-2, IC-3, IC-4, IC-5, IC-6, IC-7, IC-8, LP-1, LP-2, LP-3, LP-4 and LP-5 (twenty one) items are safe, only the items AS-3 are outside the Zone of Tolerance. So, except IUBL other ZoT state is very disappointing.

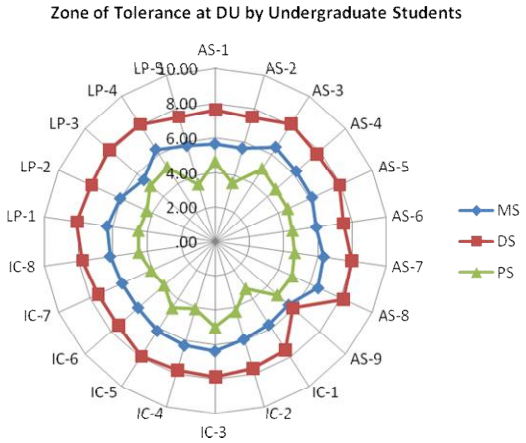


Figure 4.13 Zone of Tolerance, DU, Undergraduate

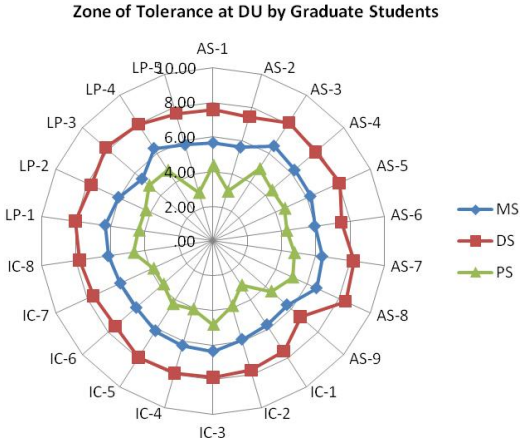


Figure 4.14 Zone of Tolerance, DU, Graduate

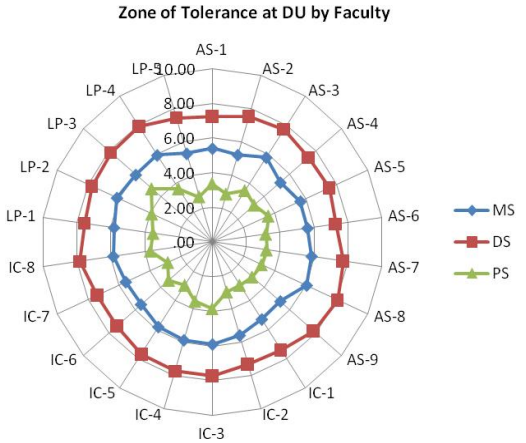


Figure 4.15 Zone of Tolerance, DU, Faculty

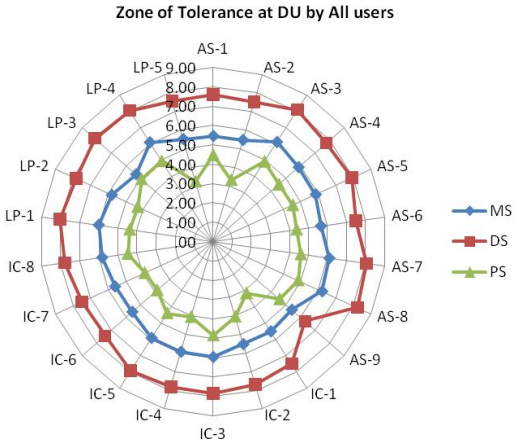


Figure 4.16 Zone of Tolerance, DU, All users

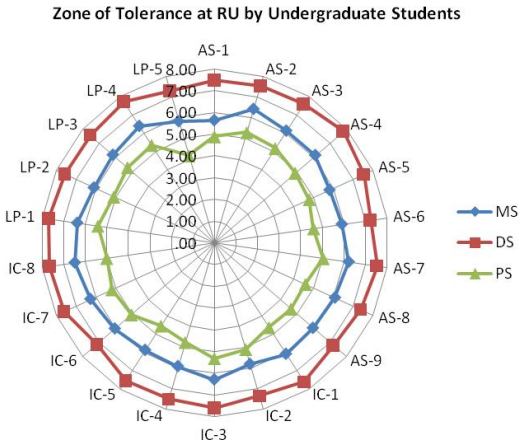


Figure 4.17 Zone of Tolerance, RU, Undergraduate

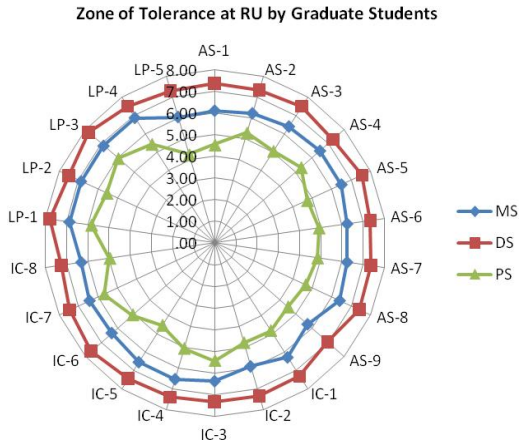


Figure 4.18 Zone of Tolerance, RU, Graduate

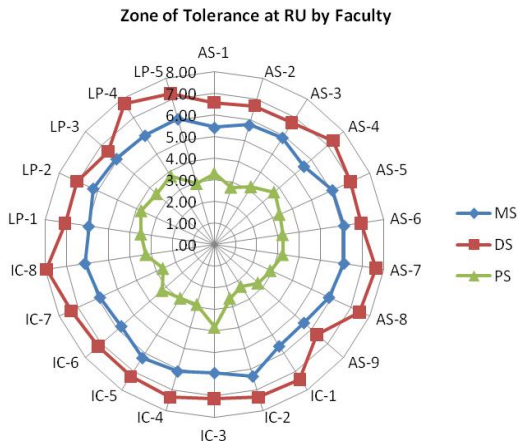


Figure 4.19 Zone of Tolerance, RU, Faculty

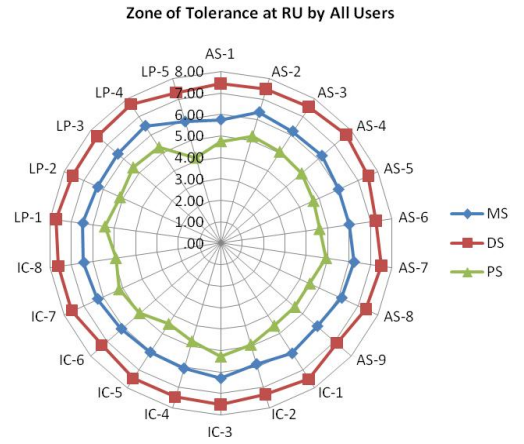


Figure 4.20 Zone of Tolerance, RU, All users

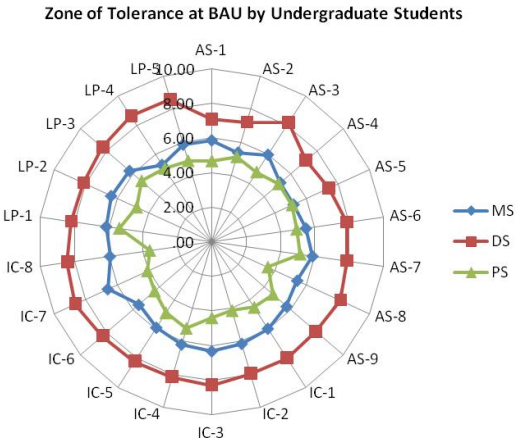


Figure 4.21 Zone of Tolerance, BAU, Undergraduate

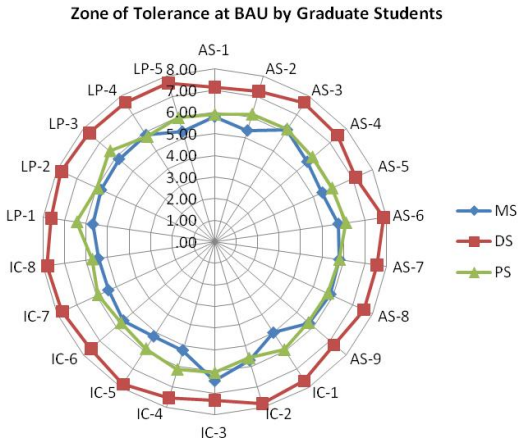


Figure 4.22 Zone of Tolerance, BAU, Graduate

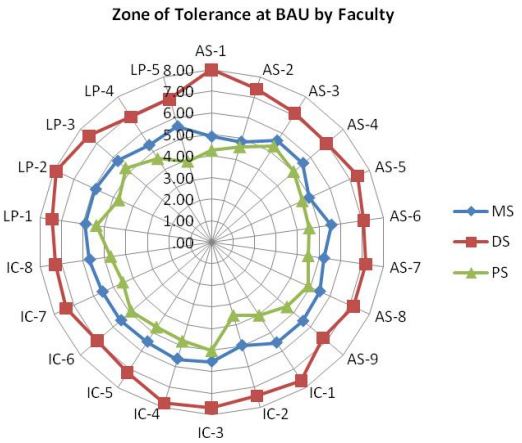


Figure 4.23 Zone of Tolerance, BAU, Faculty

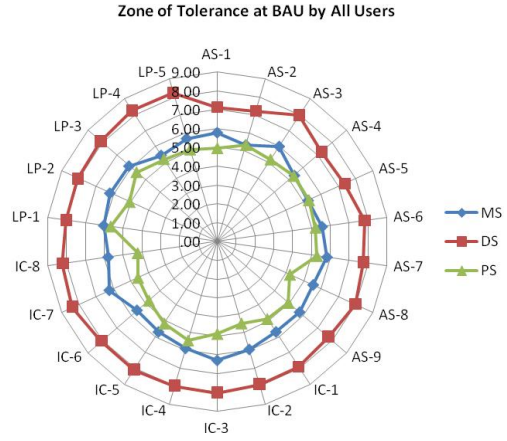


Figure 4.24 Zone of Tolerance, BAU, All users

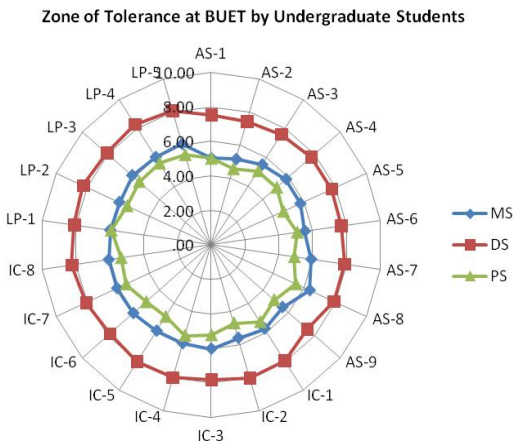


Figure 4.25 Zone of Tolerance, BUET, Undergraduate

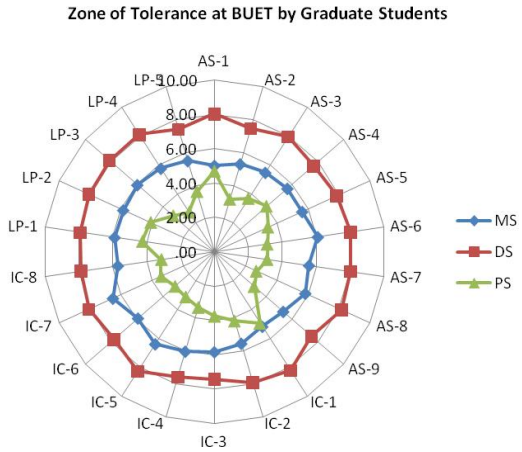


Figure 4.26 Zone of Tolerance, BUET, Graduate

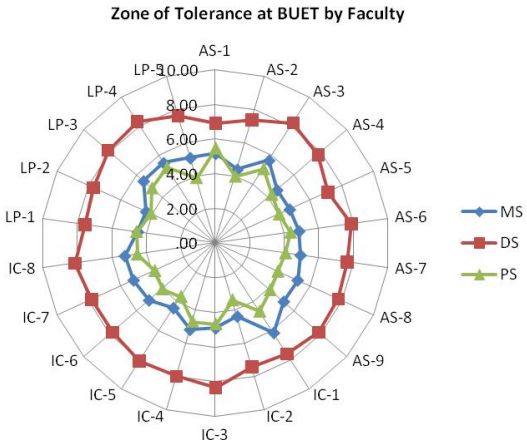


Figure 4.27 Zone of Tolerance, BUET, Faculty

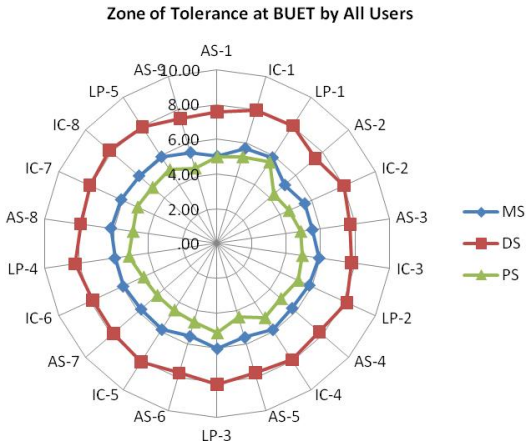


Figure 4.28 Zone of Tolerance, BUET, All users

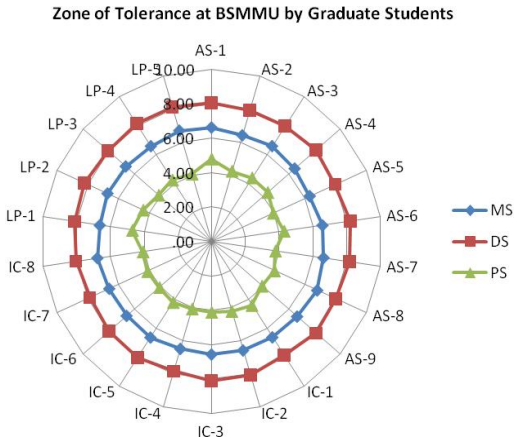


Figure 4.29 Zone of Tolerance, BSMMU, Graduate

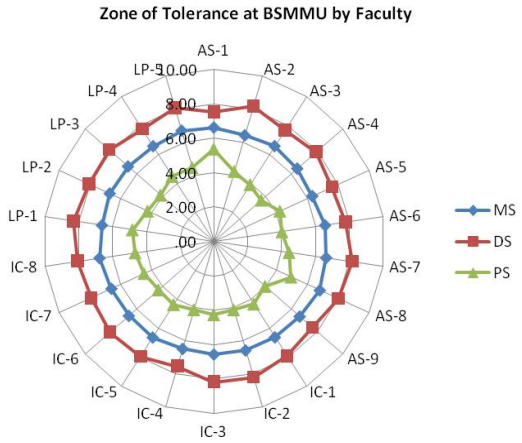


Figure 4.30 Zone of Tolerance, BSMMU, Faculty

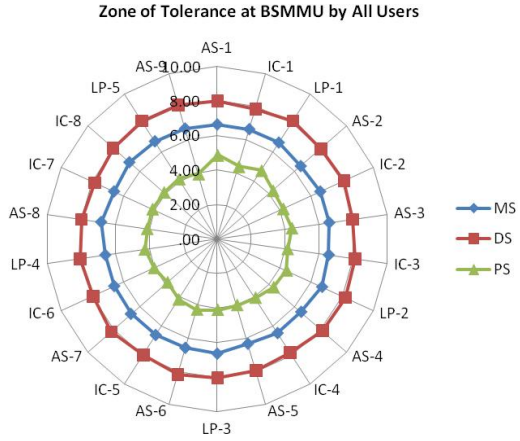


Figure 4.31 Zone of Tolerance, BSMMU, All users

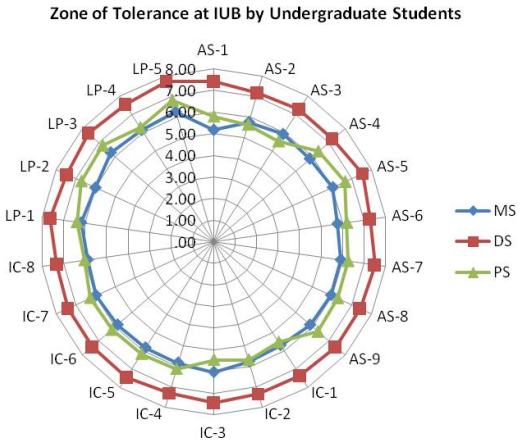


Figure 4.32 Zone of Tolerance, IUB, Undergraduate

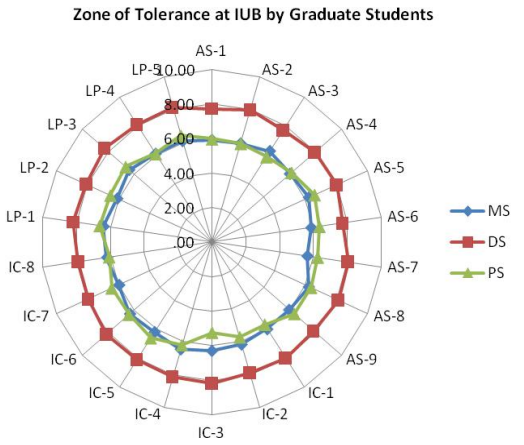


Figure 4.33 Zone of Tolerance, IUB, Graduate

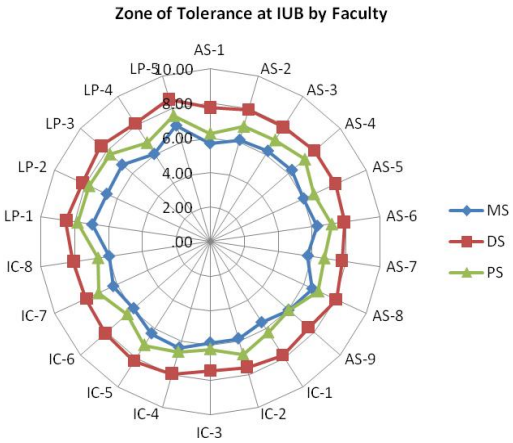


Figure 4.34 Zone of Tolerance, IUB, Faculty

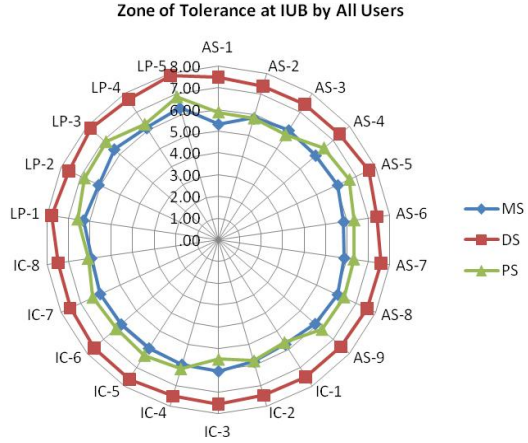


Figure 4.35 Zone of Tolerance, IUB, All users

4.14 LibQUAL+ Core Questions: Dimension-wise Investigation

The LibQUAL+ tool has been adopted worldwide by libraries to evaluate user perceptions of library service quality. Combining groups as data reduction or factor are depending on factor correlation or factor loading. Also analysis of local misfit of factors is a matter of exploration. Factors defined by the LibQUAL+ developer may not be suitable due to the different reasons where it may be varied according to the user type, their group, environment, institution and other different contexts and issues.

4.14.1 Exploratory Factor Analysis

To determine underlying factors or dimensions, Exploratory Factor Analysis (EFA) has been applied that is a statistical approach to determining the correlation among the variables in a dataset. This type of analysis provides a factor structure (a grouping of variables based on strong correlations). Table 4.94 – Table 4.99 present the EFA Pattern Matrix and Factor Correlation Matrix of Desired Services for DUL, RUL, BAUL, BUETL, BSMMUL and IUBL accordingly. The Principal Component Analysis extraction method and Oblimin with Kaiser Normalization rotation method were used. The LibQUAL+ predefined three dimensions are Affect of Service (AS), Information Control (IC) and Library as Place (LP), where all the service quality statements are condensed. From the year 2000 LibQUAL+ five factors or dimensions have several advancements to the current dimensions. Factor loadings are numerical values that indicate the strength and direction of a factor on a measured variable or attribute. High values mean strong influence of the attribute and low loading means lower influences whereas negative has inverse influence. As a 'rule of thumb', it may be considered that loading above 0.6 to be very high, above 0.3 to be high, and less than 0.3 to be irrelevant whether positive or negative. However negative value reduces correlation also.

It has been observed that different numbers of factors have been loaded for different libraries. At DUL, 3 factors have been constructed, the item distribution are Factor 1 (LP-3, AS-3, AS-8, AS-7, IC-3, IC-8, IC-4, AS-4, LP-4, LP-2, AS-6, and IC-5), Factor 2 (AS-9), and Factor 3 (IC-1, IC-7, IC-2, IC-6, AS-1, LP-5, AS-5, LP-1, and AS-2). Four factors have been loaded for RUL; construction of factors are, Factor 1 (AS-7, IC-5, IC-6, AS-8, AS-9, IC-4, LP-4, LP-3, AS-6, and IC-3), Factor 2 (IC-2, IC-1, AS-2, LP-2, AS-3, AS-4, and IC-8), Factor 3 (AS-1, IC-7, LP-1, and AS-5) and Factor 4 (LP-5). In the Factor 3, there are negative correlations. Three factors have been explored for BAUL, these are Factor 1 (AS-8, AS-7, IC-6, AS-6, AS-9, LP-4, IC-8, LP-5, IC-5, IC-7, LP-2,

IC-4, and LP-3), Factor 2 (AS-1, AS-2, AS-4, and AS-5), and Factor 3 (LP-1, AS-3, IC-1, IC-2, and IC-3). At BUETL, highest five factors have been assembled, formation is Factor 1 (LP-2, LP-5, IC-7, LP-1, IC-5, IC-2, and IC-4), Factor 2 (LP-3, AS-1, AS-2, AS-3, and AS-5), Factor 3 (AS-9, IC-8, LP-4, and IC-3), Factor 4 (AS-6, AS-8, AS-4, and AS-7), Factor 5 (IC-1, IC-6). Negative correlation has been identified for Factor -4 and Factor 5 here. At BSMMUL, attributes are reduced to 3 factors. These are Factor 1 (AS-6, LP-2, AS-4, AS-9, AS-5, IC-3, and AS-7), Factor 2 (IC-1, AS-1, and LP-1), and Factor 3 (IC-8, IC-7, AS-8, LP-5, LP-4, AS-3, IC-6, AS-2, IC-4, LP-3, IC-5, and IC-2); Factor threes values are negative here. On the other hand, IUBL constructed lowest number of factors, i.e. 2. The formation is Factor 1 (AS-4, AS-6, IC-5, IC-7, AS-7, IC-8, IC-6, LP-3, AS-3, AS-9, IC-3, IC-4, AS-5, AS-8, LP-4, LP-5, and LP-2) and Factor 2 (IC-1, AS-1, LP-1, IC-2, and AS-2).

Table 4.94

Exploratory Factor Analysis for Service Quality (Desired Service), DU (Pattern Matrix & Factor Correlation Matrix)

Pattern Matrix[a]

Items with corresponding dimensions	Factor 1	Factor 2	Factor 3
(LP-3) A comfortable and inviting location	.972	.056	-.262
(AS-3) Employees who are consistently courteous	.843	-.054	-.125
(AS-8) Willingness to help users	.748	.249	.122
(AS-7) Employees who understand the needs of their users	.676	.198	.225
(IC-3) The printed library materials I need for my work	.663	-.215	.035
(IC-8) Print and/or electronic journal collections I require for my work	.632	-.082	.177
(IC-4) The electronic information resources I need	.631	.009	.235
(AS-4) Readiness to respond to users' questions	.580	-.118	.234
(LP-4) A getaway for study, learning, or research	.578	-.150	.205
(LP-2) Quiet space for individual activities	.480	-.415	.209
(AS-6) Employees who deal with users in a caring fashion	.426	-.068	.386
(IC-5) Modern equipment that lets me easily access needed information	.416	-.026	.388
(AS-9) Dependability in handling users' service problems	.051	.872	.029
(IC-1) Making electronic resources accessible from my home or office	-.148	.029	.920
(IC-7) Making information easily accessible for independent use	.151	.047	.739
(IC-2) A library Web site enabling me to locate information on my own	-.104	-.073	.735
(IC-6) Easy-to-use access tools that allow me to find things on my own	.220	.052	.705
(AS-1) Employees who instill confidence in users	.153	-.046	.574
(LP-5) Community space for group learning and group study	.112	-.421	.539
(AS-5) Employees who have the knowledge to answer user questions	.454	.280	.536
(LP-1) Library space that inspires study and learning	.320	-.256	.453
(AS-2) Giving users individual attention	.143	-.276	.422

Factor Correlation Matrix

Factor	1	2	3
1	1.000	-.139	.571
2	-.139	1.000	-.283
3	.571	-.283	1.000

Notes: Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 21 iterations.

Table 4.95

Exploratory Factor Analysis for Service Quality (Desired Service), RU (Pattern Matrix & Factor Correlation Matrix)

Pattern Matrix[a]

Items with corresponding dimension	Factor 1	2	3	4
(AS-7) Employees who understand the needs of their users	.920	.059	.179	.071
(IC-5) Modern equipment that lets me easily access needed information	.723	.101	.026	-.141
(IC-6) Easy-to-use access tools that allow me to find things on my own	.674	-.148	-.221	.121
(AS-8) Willingness to help users	.665	.231	.132	.219
(AS-9) Dependability in handling users' service problems	.541	-.101	-.318	-.107
(IC-4) The electronic information resources I need	.515	.322	.012	.025
(LP-4) A getaway for study, learning, or research	.467	.049	-.360	-.025
(LP-3) A comfortable and inviting location	.450	.126	-.375	-.178
(AS-6) Employees who deal with users in a caring fashion	.435	.006	-.427	.131
(IC-3) The printed library materials I need for my work	.411	.340	-.042	-.035
(IC-2) A library Web site enabling me to locate information on my own	-.074	.824	-.031	.229
(IC-1) Making electronic resources accessible from my home or office	.122	.787	.178	.048
(AS-2) Giving users individual attention	.072	.694	-.097	.008
(LP-2) Quiet space for individual activities	-.035	.497	-.338	-.127
(AS-3) Employees who are consistently courteous	.310	.485	-.111	-.282
(AS-4) Readiness to respond to users' questions	.158	.403	-.319	-.196
(IC-8) Print and/or electronic journal collections I require for my work	.106	.373	-.364	-.023
(AS-1) Employees who instill confidence in users	-.092	.122	-.700	.182
(IC-7) Making information easily accessible for independent use	.234	-.033	-.654	.000
(LP-1) Library space that inspires study and learning	.023	.404	-.462	-.087
(AS-5) Employees who have the knowledge to answer user questions	.339	.116	-.378	-.029
(LP-5) Community space for group learning and group study	.156	.124	-.222	.813

Factor Correlation Matrix

Factor	1	2	3	4
1	1.000	.491	-.468	.013
2	.491	1.000	-.386	.028
3	-.468	-.386	1.000	.036
4	.013	.028	.036	1.000

Notes: Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 32 iterations.

Table 4.96

Exploratory Factor Analysis for Service Quality (Desired Service), BAU (Pattern Matrix & Factor Correlation Matrix)

Pattern Matrix[a]

Items with corresponding dimension	Factor		
	1	2	3
(AS-8) Willingness to help users	.888	-.083	-.054
(AS-7) Employees who understand the needs of their users	.819	.102	-.081
(IC-6) Easy-to-use access tools that allow me to find things on my own	.807	.004	.065
(AS-6) Employees who deal with users in a caring fashion	.803	-.053	-.154
(AS-9) Dependability in handling users' service problems	.796	.102	-.014
(LP-4) A getaway for study, learning, or research	.756	-.102	.170
(IC-8) Print and/or electronic journal collections I require for my work	.728	.133	.119
(LP-5) Community space for group learning and group study	.710	.003	.115
(IC-5) Modern equipment that lets me easily access needed information	.691	-.192	.073
(IC-7) Making information easily accessible for independent use	.641	.158	.185
(LP-2) Quiet space for individual activities	.615	-.032	.091
(IC-4) The electronic information resources I need	.594	.081	.174
(LP-3) A comfortable and inviting location	.524	.070	.352
(AS-1) Employees who instill confidence in users	-.009	.746	-.104
(AS-2) Giving users individual attention	-.176	.699	.284
(AS-4) Readiness to respond to users' questions	.509	.526	-.187
(AS-5) Employees who have the knowledge to answer user questions	.401	.523	.039
(LP-1) Library space that inspires study and learning	-.087	.076	.879
(AS-3) Employees who are consistently courteous	.261	.057	.621
(IC-1) Making electronic resources accessible from my home or office	.189	-.180	.564
(IC-2) A library Web site enabling me to locate information on my own	.267	.119	.489
(IC-3) The printed library materials I need for my work	.378	.227	.411

Factor Correlation Matrix

Factor	1	2	3
1	1.000	.253	.466
2	.253	1.000	.167
3	.466	.167	1.000

Notes: Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Table 4.97

Exploratory Factor Analysis for Service Quality (Desired Service), BUET (Pattern Matrix & Factor Correlation Matrix)

Pattern Matrix[a]

Items with corresponding dimension	Factor 1	2	3	4	5
(LP-2) Quiet space for individual activities	.867	.022	.170	-.186	.303
(LP-5) Community space for group learning and group study	.677	.078	-.305	.088	.072
(IC-7) Making information easily accessible for independent use	.653	.160	-.033	.155	-.147
(LP-1) Library space that inspires study and learning	.534	.052	-.183	-.088	-.348
(IC-5) Modern equipment that lets me easily access needed information	.518	-.014	-.120	-.378	-.065
(IC-2) A library Web site enabling me to locate information on my own	.512	-.107	-.160	-.274	-.252
(IC-4) The electronic information resources I need	.376	.022	-.292	-.175	-.325
(LP-3) A comfortable and inviting location	.128	.669	-.375	.031	.104
(AS-1) Employees who instill confidence in users	.225	.648	.207	.054	-.243
(AS-2) Giving users individual attention	.015	.597	-.071	-.367	.084
(AS-3) Employees who are consistently courteous	-.170	.592	-.165	-.067	-.283
(AS-5) Employees who have the knowledge to answer user questions	.136	.568	-.036	-.285	-.064
(AS-9) Dependability in handling users' service problems	.013	.070	-.772	-.031	.166
(IC-8) Print and/or electronic journal collections I require for my work	.118	.027	-.760	.143	-.263
(LP-4) A getaway for study, learning, or research	-.047	.135	-.688	-.228	.042
(IC-3) The printed library materials I need for my work	.204	-.245	-.444	-.403	-.025
(AS-6) Employees who deal with users in a caring fashion	-.054	.262	.115	-.803	.012
(AS-8) Willingness to help users	.006	.047	-.108	-.705	-.038
(AS-4) Readiness to respond to users' questions	.184	-.051	-.148	-.629	-.193
(AS-7) Employees who understand the needs of their users	.159	.040	-.156	-.463	-.353
(IC-1) Making electronic resources accessible from my home or office	-.137	.182	.140	-.043	-.811
(IC-6) Easy-to-use access tools that allow me to find things on my own	.162	.038	-.096	-.268	-.540

Factor Correlation Matrix

Factor	1	2	3	4	5
1	1.000	.202	-.406	-.368	-.204
2	.202	1.000	-.180	-.279	-.312
3	-.406	-.180	1.000	.361	.188
4	-.368	-.279	.361	1.000	.234
5	-.204	-.312	.188	.234	1.000

Notes: Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 16 iterations.

Table 4.98

Exploratory Factor Analysis for Service Quality (Desired Service), BSMMU (Pattern Matrix & Factor Correlation Matrix)

Pattern Matrix[a]

Items with corresponding dimension	Factor 1	Factor 2	Factor 3
(AS-6) Employees who deal with users in a caring fashion	.821	-.022	.056
(LP-2) Quiet space for individual activities	.752	-.023	-.050
(AS-4) Readiness to respond to users' questions	.742	.048	-.026
(AS-9) Dependability in handling users' service problems	.640	-.112	-.337
(AS-5) Employees who have the knowledge to answer user questions	.640	.237	.027
(IC-3) The printed library materials I need for my work	.627	.235	-.036
(AS-7) Employees who understand the needs of their users	.540	.131	-.203
(IC-1) Making electronic resources accessible from my home or office	-.029	.754	-.267
(AS-1) Employees who instill confidence in users	.205	.694	-.054
(LP-1) Library space that inspires study and learning	.366	.600	-.020
(IC-8) Print and/or electronic journal collections I require for my work	-.069	.023	-.897
(IC-7) Making information easily accessible for independent use	-.120	.135	-.845
(AS-8) Willingness to help users	.013	.056	-.816
(LP-5) Community space for group learning and group study	.246	-.223	-.703
(LP-4) A getaway for study, learning, or research	.193	-.091	-.677
(AS-3) Employees who are consistently courteous	-.048	.315	-.639
(IC-6) Easy-to-use access tools that allow me to find things on my own	.187	.202	-.581
(AS-2) Giving users individual attention	.035	.398	-.565
(IC-4) The electronic information resources I need	.284	.113	-.481
(LP-3) A comfortable and inviting location	.381	-.137	-.450
(IC-5) Modern equipment that lets me easily access needed information	.440	-.088	-.446
(IC-2) A library Web site enabling me to locate information on my own	.326	.224	-.378

Factor Correlation Matrix

Factor	1	2	3
1	1.000	.331	-.665
2	.331	1.000	-.417
3	-.665	-.417	1.000

Notes: Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 20 iterations.

Table 4.99

Exploratory Factor Analysis for Service Quality (Desired Service), IUB (Pattern Matrix & Factor Correlation Matrix)

Pattern Matrix[a]

Items with corresponding dimension	Factor 1	Factor 2
(AS-4) Readiness to respond to users' questions	.911	-.100
(AS-6) Employees who deal with users in a caring fashion	.897	-.076
(IC-5) Modern equipment that lets me easily access needed information	.883	-.007
(IC-7) Making information easily accessible for independent use	.856	-.011
(AS-7) Employees who understand the needs of their users	.855	.003
(IC-8) Print and/or electronic journal collections I require for my work	.835	-.067
(IC-6) Easy-to-use access tools that allow me to find things on my own	.827	.054
(LP-3) A comfortable and inviting location	.826	-.012
(AS-3) Employees who are consistently courteous	.813	-.009
(AS-9) Dependability in handling users' service problems	.803	.008
(IC-3) The printed library materials I need for my work	.794	-.042
(IC-4) The electronic information resources I need	.790	.056
(AS-5) Employees who have the knowledge to answer user questions	.758	.101
(AS-8) Willingness to help users	.732	.145
(LP-4) A getaway for study, learning, or research	.680	.150
(LP-5) Community space for group learning and group study	.668	.125
(LP-2) Quiet space for individual activities	.426	.386
(IC-1) Making electronic resources accessible from my home or office	-.064	.798
(AS-1) Employees who instill confidence in users	-.063	.775
(LP-1) Library space that inspires study and learning	.116	.669
(IC-2) A library Web site enabling me to locate information on my own	.171	.627
(AS-2) Giving users individual attention	.280	.476

Factor Correlation Matrix

Factor	1	2
1	1.000	.699
2	.699	1.000

Notes: Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 4 iterations.

4.14.2 Confirmatory Factor Analysis (Exploring Model Fit)

Item correlations are presented in Table 4.100 – Table 4.105. All items were moderately and positively correlated with one another, which was a good sign that they shared variance due to one or more underlying constructs. The correlation matrix showed higher and moderate correlations among indicators representing the same factor; therefore, the ability of the three-factor model to reproduce these relationships was potential. The relationships between all three dimensions were consistent in their strength across the three samples, suggesting that relationship of these latent variables was stable across time, and supported the underlying theoretical relationship in the model. The factor structure coefficients are also scored good suggesting generally strong relationships between the items and this construct (Figure 4.36 -4.41).

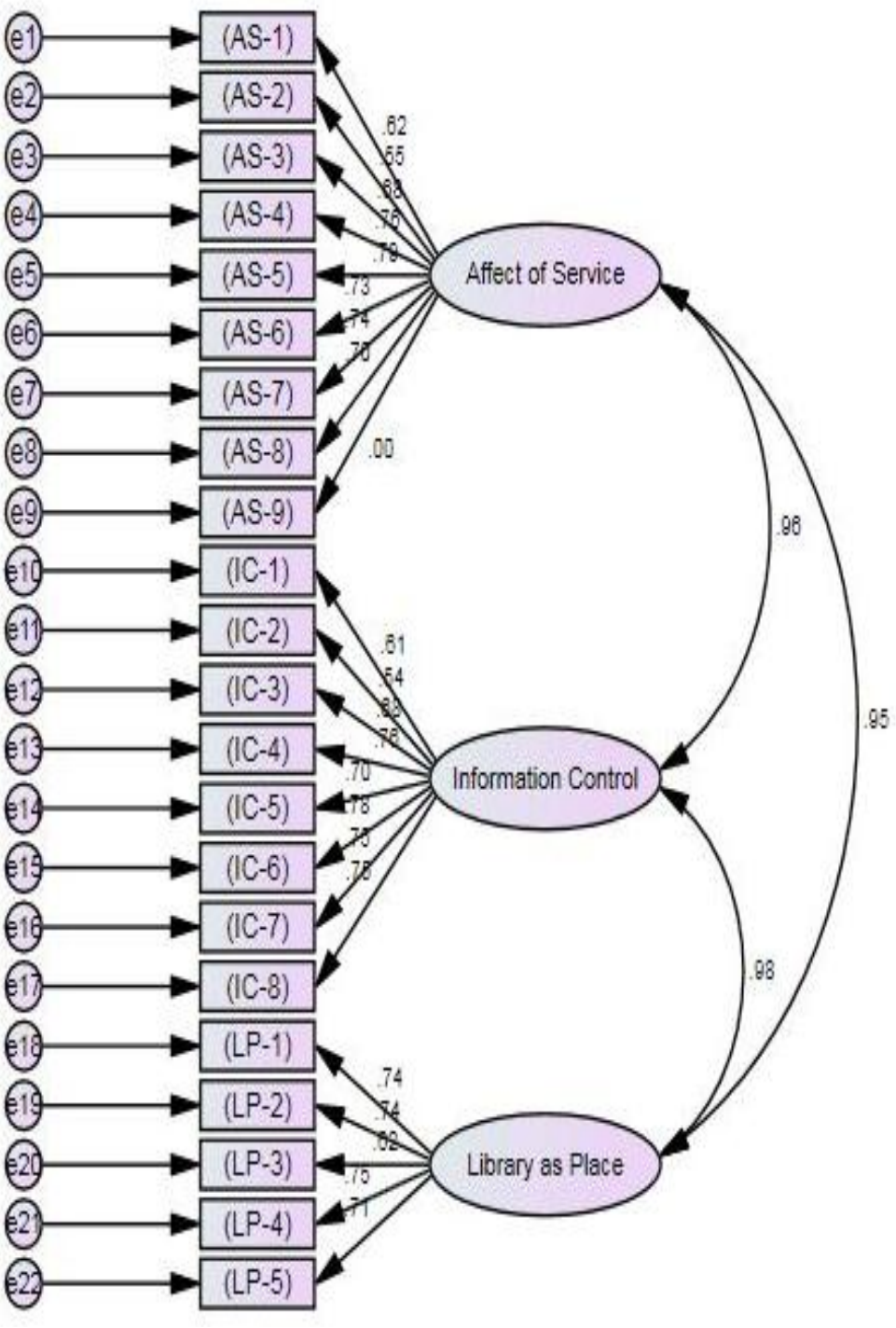


Figure 4.36 Structural Model of LibQUAL+, DUL Scores

Table 4.100

Item Correlation Matrix, DUL

Items	LP-1	LP-2	LP-3	LP-4	LP-5	IC-1	IC-2	IC-3	IC-4	IC-5	IC-6	IC-7	IC-8	AS-1	AS-2	AS-3	AS-4	AS-5	AS-6	AS-7	AS-8	AS-9
LP-1	-																					
LP-2	.550	-																				
LP-3	.462	.461	-																			
LP-4	.557	.556	.467	-																		
LP-5	.526	.525	.441	.532	-																	
IC-1	.439	.438	.368	.444	.419	-																
IC-2	.392	.392	.329	.397	.375	.329	-															
IC-3	.491	.490	.412	.496	.469	.412	.368	-														
IC-4	.550	.549	.461	.556	.525	.461	.412	.515	-													
IC-5	.506	.505	.424	.512	.483	.424	.379	.474	.531	-												
IC-6	.562	.561	.471	.569	.537	.471	.421	.527	.590	.543	-											
IC-7	.546	.545	.458	.552	.521	.458	.409	.512	.573	.527	.586	-										
IC-8	.545	.544	.457	.551	.520	.457	.408	.511	.572	.526	.585	.568	-									
AS-1	.442	.441	.370	.446	.421	.364	.325	.407	.456	.420	.466	.453	.452	-								
AS-2	.386	.385	.324	.390	.368	.318	.284	.356	.399	.367	.408	.396	.395	.340	-							
AS-3	.479	.478	.402	.485	.457	.395	.353	.442	.495	.455	.506	.492	.490	.423	.369	-						
AS-4	.537	.536	.450	.543	.512	.443	.396	.495	.554	.510	.567	.551	.550	.474	.414	.514	-					
AS-5	.560	.558	.469	.566	.534	.462	.412	.516	.578	.532	.591	.574	.573	.494	.431	.536	.600	-				
AS-6	.516	.515	.433	.522	.493	.426	.380	.476	.533	.490	.545	.529	.528	.455	.398	.494	.554	.577	-			
AS-7	.527	.526	.442	.533	.503	.435	.388	.486	.544	.501	.556	.540	.539	.465	.406	.504	.565	.589	.543	-		
AS-8	.495	.494	.415	.501	.472	.408	.365	.456	.511	.470	.523	.508	.507	.437	.382	.474	.531	.553	.510	.521	-	
AS-9	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	-

Note: n=373

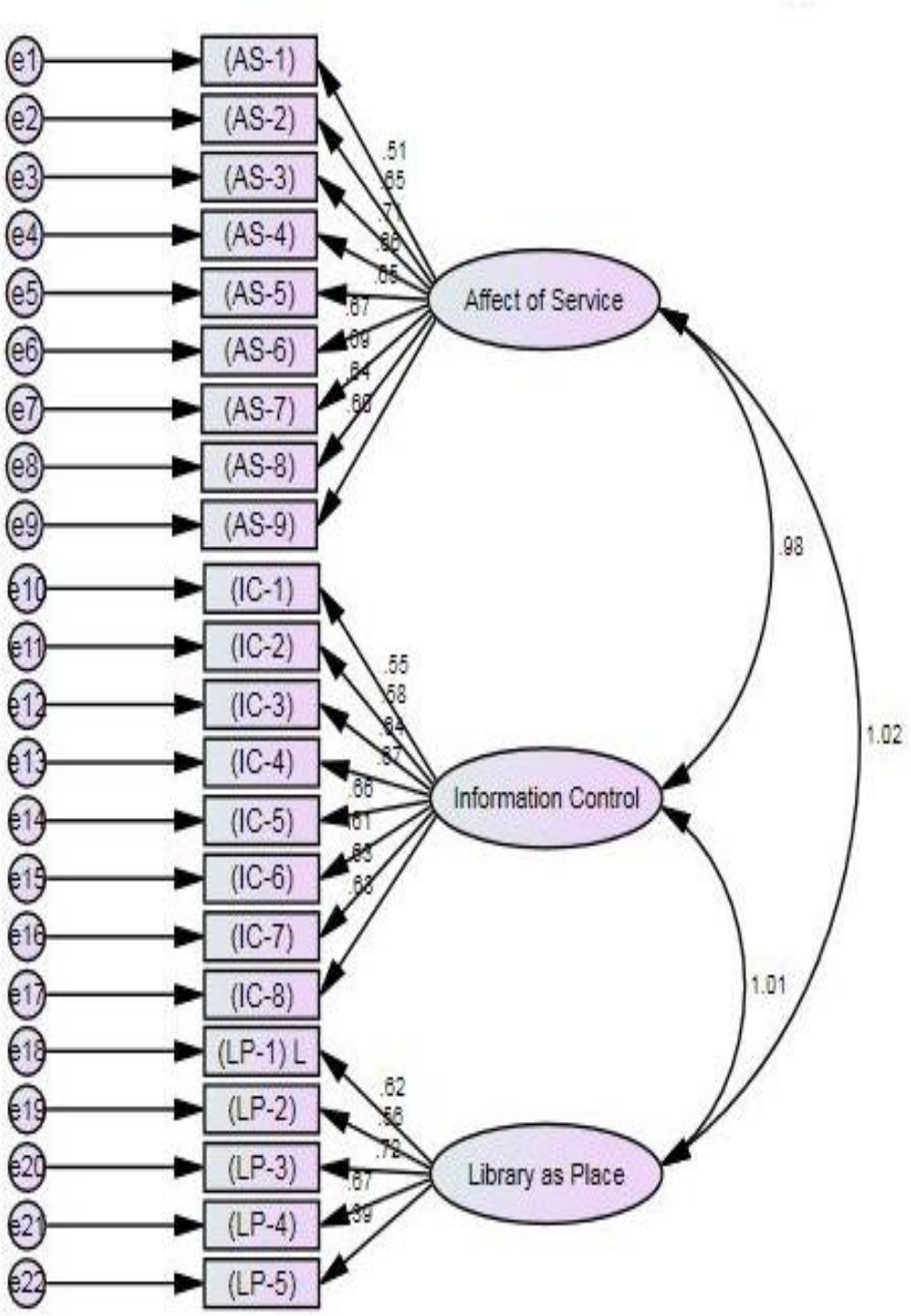


Figure 4.37 Structural Model of LibQUAL+, RUL Scores

Table 4.101

Item Correlation Matrix, RUL

Items	LP-1	LP-2	LP-3	LP-4	LP-5	IC-1	IC-2	IC-3	IC-4	IC-5	IC-6	IC-7	IC-8	AS-1	AS-2	AS-3	AS-4	AS-5	AS-6	AS-7	AS-8	AS-9
LP-1	-																					
LP-2	.347	-																				
LP-3	.442	.405	-																			
LP-4	.414	.379	.483	-																		
LP-5	.239	.219	.279	.261	-																	
IC-1	.342	.313	.399	.374	.216	-																
IC-2	.360	.329	.420	.393	.227	.319	-															
IC-3	.395	.361	.461	.431	.249	.350	.368	-														
IC-4	.418	.383	.488	.457	.264	.371	.390	.428	-													
IC-5	.413	.378	.481	.450	.260	.366	.385	.422	.447	-												
IC-6	.376	.345	.439	.411	.238	.334	.351	.385	.408	.402	-											
IC-7	.389	.356	.454	.425	.246	.345	.363	.398	.422	.416	.380	-										
IC-8	.389	.356	.454	.425	.246	.345	.363	.398	.422	.416	.380	.392	-									
AS-1	.322	.295	.376	.352	.203	.275	.289	.317	.336	.332	.303	.313	.313	-								
AS-2	.407	.372	.475	.444	.257	.348	.366	.401	.425	.419	.383	.396	.395	.330	-							
AS-3	.446	.409	.521	.487	.282	.382	.401	.440	.466	.460	.420	.434	.434	.362	.458	-						
AS-4	.414	.379	.483	.452	.261	.354	.372	.408	.433	.427	.389	.403	.402	.336	.425	.466	-					
AS-5	.408	.373	.475	.445	.257	.349	.366	.402	.426	.420	.383	.396	.396	.331	.418	.458	.425	-				
AS-6	.419	.384	.489	.458	.265	.359	.377	.414	.438	.432	.394	.408	.408	.340	.430	.472	.438	.431	-			
AS-7	.433	.396	.505	.473	.273	.370	.389	.427	.453	.446	.407	.421	.421	.351	.444	.487	.452	.445	.458	-		
AS-8	.401	.367	.468	.438	.253	.343	.360	.395	.419	.413	.377	.390	.390	.325	.411	.451	.418	.412	.424	.437	-	
AS-9	.380	.347	.443	.415	.240	.325	.341	.374	.397	.391	.357	.369	.369	.308	.389	.427	.396	.390	.401	.414	.383	-

Note: n=364

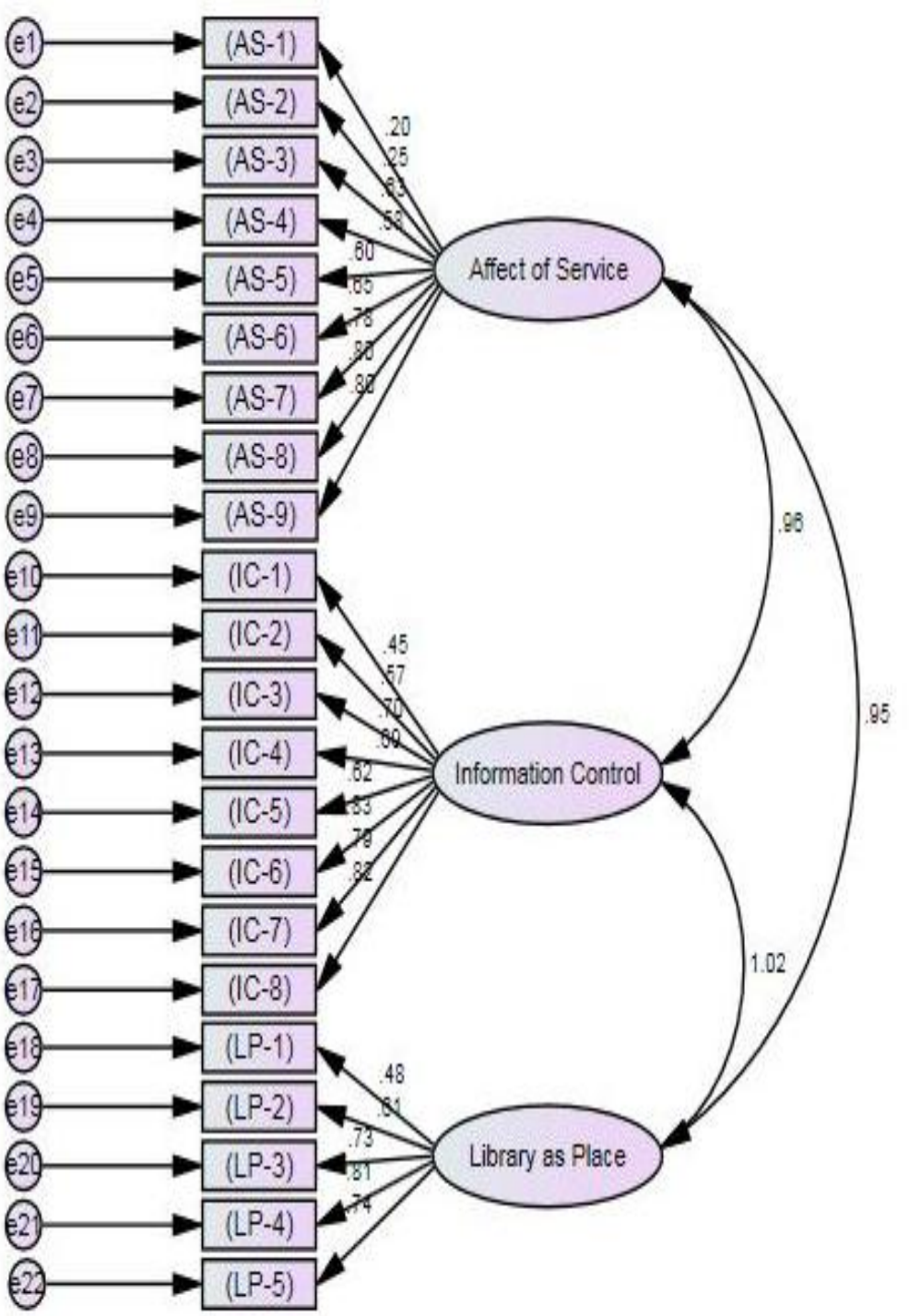


Figure 4.38 Structural Model of LibQUAL+, BAUL Scores

Table 4.102

Item Correlation Matrix, BAUL

Items	LP-1	LP-2	LP-3	LP-4	LP-5	IC-1	IC-2	IC-3	IC-4	IC-5	IC-6	IC-7	IC-8	AS-1	AS-2	AS-3	AS-4	AS-5	AS-6	AS-7	AS-8	AS-9
LP-1	-																					
LP-2	.297	-																				
LP-3	.355	.451	-																			
LP-4	.392	.499	.595	-																		
LP-5	.359	.457	.545	.602	-																	
IC-1	.224	.285	.340	.375	.344	-																
IC-2	.281	.357	.426	.471	.431	.256	-															
IC-3	.346	.441	.526	.581	.532	.316	.396	-														
IC-4	.342	.435	.519	.574	.526	.312	.391	.483	-													
IC-5	.309	.393	.469	.518	.475	.282	.353	.436	.431	-												
IC-6	.411	.522	.623	.688	.631	.374	.469	.579	.573	.517	-											
IC-7	.393	.500	.597	.660	.604	.359	.450	.555	.549	.495	.658	-										
IC-8	.404	.514	.613	.678	.621	.369	.462	.570	.564	.509	.676	.648	-									
AS-1	.091	.116	.138	.152	.140	.086	.108	.133	.132	.119	.158	.151	.156	-								
AS-2	.115	.147	.175	.193	.177	.109	.137	.169	.167	.151	.200	.192	.197	.050	-							
AS-3	.289	.368	.439	.485	.444	.274	.344	.424	.419	.378	.503	.482	.495	.124	.158	-						
AS-4	.265	.338	.403	.445	.408	.252	.316	.390	.385	.347	.462	.442	.455	.114	.145	.363	-					
AS-5	.276	.351	.418	.462	.424	.262	.328	.405	.400	.361	.480	.460	.472	.119	.150	.377	.347	-				
AS-6	.300	.382	.455	.503	.461	.285	.357	.440	.435	.393	.522	.500	.514	.129	.164	.411	.377	.392	-			
AS-7	.361	.459	.547	.605	.554	.342	.429	.529	.523	.472	.627	.601	.618	.155	.197	.494	.453	.471	.512	-		
AS-8	.368	.468	.558	.617	.565	.349	.437	.540	.533	.481	.640	.613	.630	.158	.201	.503	.462	.480	.522	.628	-	
AS-9	.369	.469	.559	.618	.567	.350	.438	.541	.535	.483	.641	.615	.632	.159	.201	.505	.463	.481	.524	.630	.642	-

Note: n=340

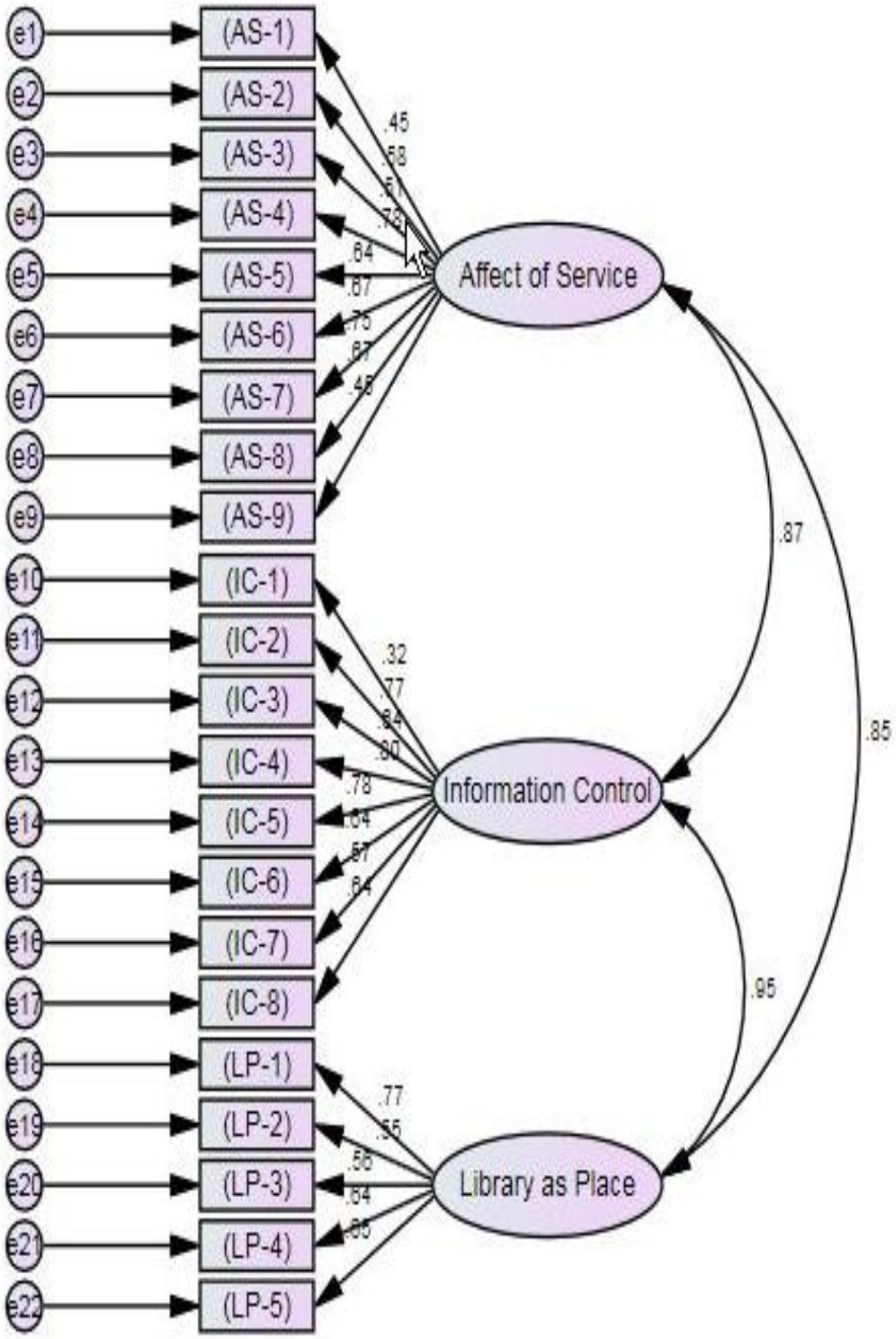


Figure 4.39 Structural Model of LibQUAL+, BUETL Scores

Table 4.103

Item Correlation Matrix, BUETL

Items	LP-1	LP-2	LP-3	LP-4	LP-5	IC-1	IC-2	IC-3	IC-4	IC-5	IC-6	IC-7	IC-8	AS-1	AS-2	AS-3	AS-4	AS-5	AS-6	AS-7	AS-8	AS-9
LP-1	-																					
LP-2	.418	-																				
LP-3	.433	.308	-																			
LP-4	.488	.348	.360	-																		
LP-5	.495	.352	.365	.411	-																	
IC-1	.232	.165	.171	.193	.195	-																
IC-2	.560	.399	.413	.466	.472	.244	-															
IC-3	.471	.335	.347	.391	.396	.205	.495	-														
IC-4	.582	.414	.429	.483	.490	.253	.612	.514	-													
IC-5	.568	.405	.419	.472	.478	.247	.598	.502	.620	-												
IC-6	.470	.335	.347	.391	.396	.205	.495	.416	.513	.501	-											
IC-7	.420	.299	.309	.349	.353	.183	.441	.371	.458	.447	.370	-										
IC-8	.469	.334	.346	.390	.395	.204	.493	.414	.512	.500	.414	.369	-									
AS-1	.294	.210	.217	.244	.248	.124	.300	.252	.311	.304	.252	.224	.251	-								
AS-2	.375	.267	.277	.312	.316	.158	.383	.321	.397	.388	.321	.286	.320	.259	-							
AS-3	.333	.237	.246	.277	.281	.141	.340	.285	.352	.344	.285	.254	.284	.230	.294	-						
AS-4	.510	.364	.376	.424	.430	.215	.520	.437	.540	.527	.436	.389	.435	.352	.449	.399	-					
AS-5	.417	.297	.307	.346	.351	.176	.425	.357	.441	.431	.356	.318	.356	.288	.367	.326	.499	-				
AS-6	.438	.312	.323	.364	.369	.185	.446	.375	.463	.452	.374	.334	.373	.302	.386	.342	.524	.428	-			
AS-7	.490	.349	.361	.407	.413	.207	.500	.420	.518	.506	.419	.374	.418	.338	.432	.383	.587	.480	.504	-		
AS-8	.437	.312	.322	.363	.368	.184	.446	.374	.462	.452	.374	.334	.373	.302	.385	.342	.524	.428	.449	.503	-	
AS-9	.294	.209	.217	.244	.248	.124	.299	.252	.311	.303	.251	.224	.251	.203	.259	.230	.352	.287	.302	.338	.301	-

Note: n=349

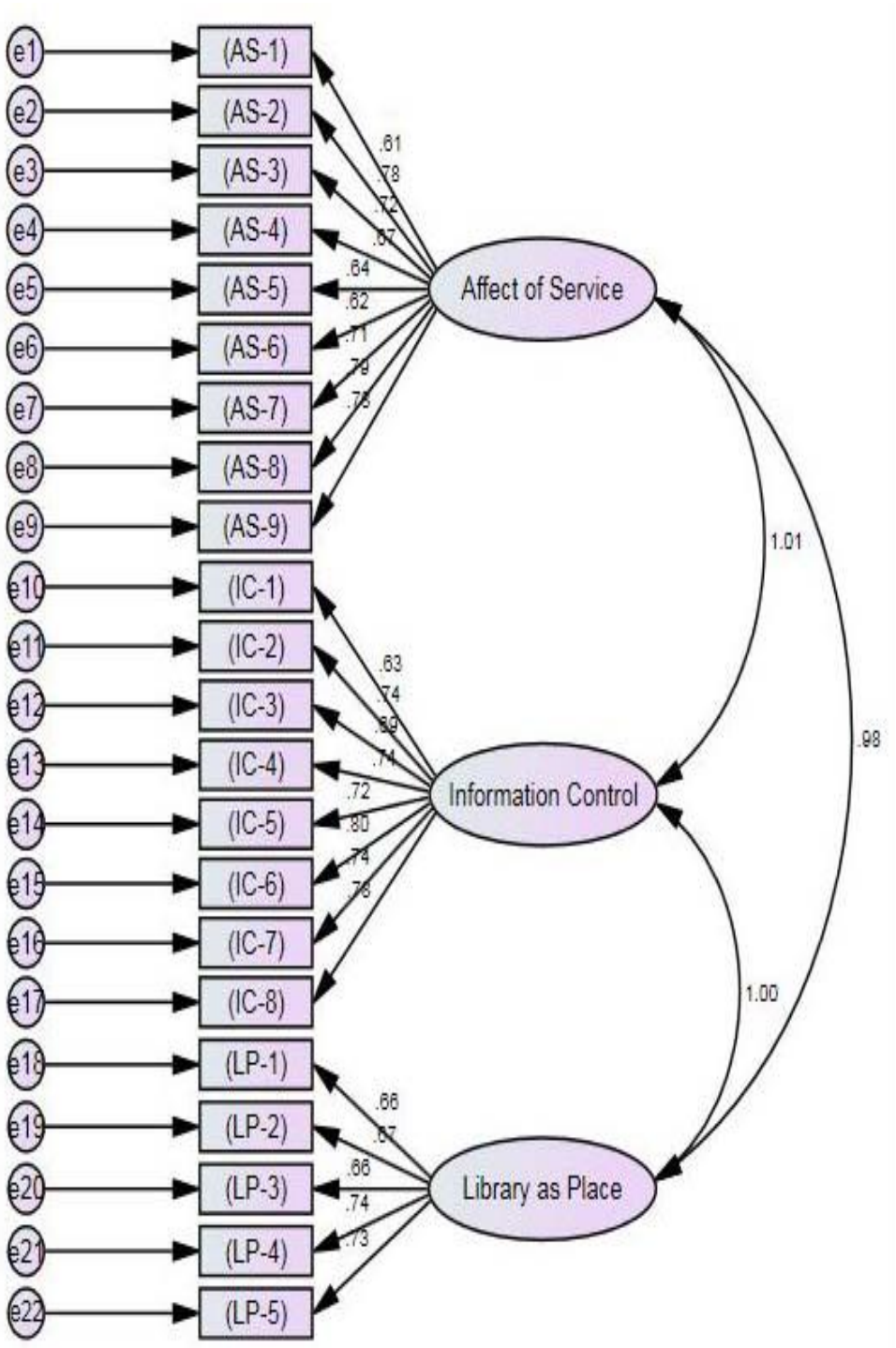


Figure 4.40 Structural Model of LibQUAL+, BSMMUL Scores

Table 4.104

Item Correlation Matrix, BSMMUL

Items	LP-1	LP-2	LP-3	LP-4	LP-5	IC-1	IC-2	IC-3	IC-4	IC-5	IC-6	IC-7	IC-8	AS-1	AS-2	AS-3	AS-4	AS-5	AS-6	AS-7	AS-8	AS-9
LP-1	-																					
LP-2	.440	-																				
LP-3	.433	.440	-																			
LP-4	.487	.495	.487	-																		
LP-5	.480	.487	.480	.540	-																	
IC-1	.414	.420	.414	.466	.459	-																
IC-2	.487	.494	.486	.547	.539	.468	-															
IC-3	.453	.460	.453	.510	.502	.436	.512	-														
IC-4	.483	.491	.483	.544	.536	.464	.546	.508	-													
IC-5	.475	.483	.475	.535	.527	.457	.537	.500	.533	-												
IC-6	.527	.535	.527	.593	.584	.506	.595	.554	.591	.581	-											
IC-7	.487	.494	.486	.547	.539	.468	.550	.512	.546	.537	.595	-										
IC-8	.509	.517	.509	.572	.564	.489	.575	.535	.571	.561	.622	.575	-									
AS-1	.389	.395	.389	.438	.431	.386	.454	.423	.451	.443	.491	.454	.474	-								
AS-2	.499	.506	.498	.561	.553	.494	.581	.541	.577	.568	.629	.581	.608	.469	-							
AS-3	.466	.473	.465	.524	.516	.462	.543	.505	.539	.530	.588	.543	.567	.438	.561	-						
AS-4	.429	.435	.429	.482	.475	.425	.500	.466	.496	.488	.541	.500	.523	.404	.517	.483	-					
AS-5	.409	.416	.409	.460	.454	.406	.477	.444	.474	.466	.517	.477	.499	.385	.493	.461	.424	-				
AS-6	.397	.403	.397	.447	.440	.394	.463	.431	.460	.452	.501	.463	.484	.374	.479	.447	.412	.393	-			
AS-7	.458	.465	.458	.515	.507	.454	.534	.497	.530	.521	.578	.534	.558	.431	.552	.516	.475	.453	.440	-		
AS-8	.511	.519	.511	.574	.566	.506	.595	.554	.591	.581	.645	.595	.622	.481	.616	.575	.530	.506	.491	.565	-	
AS-9	.503	.511	.503	.566	.557	.499	.586	.546	.582	.572	.635	.586	.613	.473	.606	.566	.521	.498	.483	.557	.621	-

Note*:* n=313

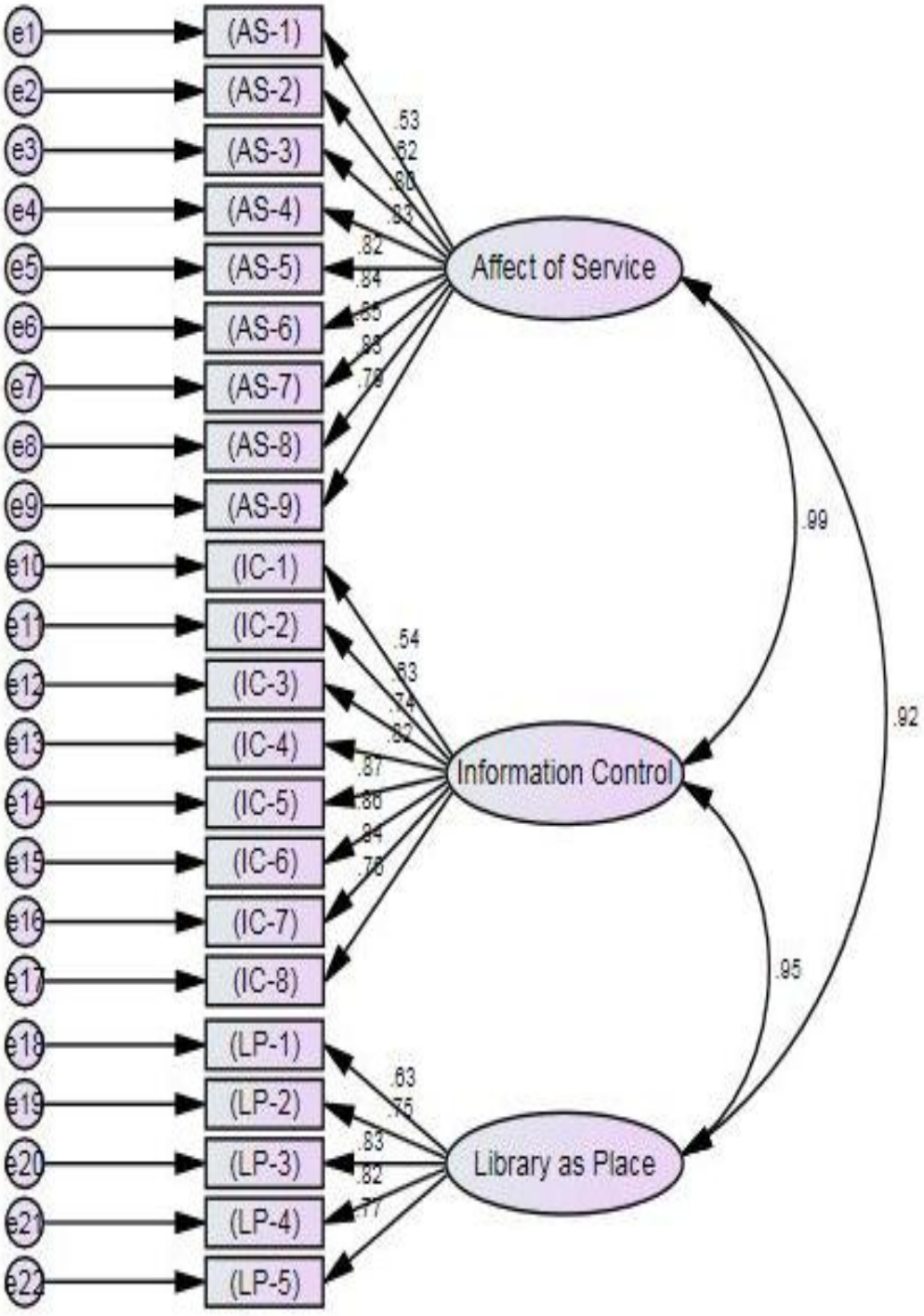


Figure 4.41 Structural Model of LibQUAL+, IUBL Scores

Table 4.105

Item Correlation Matrix, IUBL

Items	LP-1	LP-2	LP-3	LP-4	LP-5	IC-1	IC-2	IC-3	IC-4	IC-5	IC-6	IC-7	IC-8	AS-1	AS-2	AS-3	AS-4	AS-5	AS-6	AS-7	AS-8	AS-9
LP-1	-																					
LP-2	.471	-																				
LP-3	.524	.622	-																			
LP-4	.515	.610	.679	-																		
LP-5	.488	.579	.644	.632	-																	
IC-1	.322	.382	.425	.417	.395	-																
IC-2	.376	.446	.496	.487	.461	.337	-															
IC-3	.442	.525	.584	.573	.543	.397	.463	-														
IC-4	.491	.583	.648	.636	.603	.441	.514	.605	-													
IC-5	.520	.617	.686	.674	.639	.466	.544	.641	.712	-												
IC-6	.517	.613	.682	.670	.635	.464	.541	.637	.707	.749	-											
IC-7	.501	.594	.662	.649	.616	.450	.525	.618	.686	.726	.722	-										
IC-8	.456	.540	.601	.590	.560	.409	.477	.562	.624	.660	.656	.636	-									
AS-1	.309	.366	.408	.400	.379	.283	.331	.389	.432	.457	.455	.441	.401	-								
AS-2	.359	.426	.474	.465	.441	.329	.384	.453	.502	.532	.529	.513	.466	.326	-							
AS-3	.466	.553	.615	.604	.573	.427	.499	.587	.652	.690	.686	.665	.605	.424	.493	-						
AS-4	.482	.572	.637	.625	.593	.442	.516	.608	.675	.714	.710	.689	.626	.439	.510	.662	-					
AS-5	.479	.569	.633	.621	.589	.440	.513	.604	.671	.710	.706	.685	.622	.436	.507	.658	.681	-				
AS-6	.492	.583	.649	.637	.604	.451	.526	.620	.688	.728	.724	.702	.638	.447	.520	.675	.698	.694	-			
AS-7	.496	.588	.654	.642	.609	.455	.530	.625	.694	.734	.730	.708	.643	.451	.524	.680	.704	.700	.717	-		
AS-8	.482	.572	.636	.625	.592	.442	.516	.608	.675	.714	.710	.688	.626	.438	.510	.662	.685	.681	.698	.704	-	
AS-9	.462	.549	.611	.599	.568	.424	.495	.583	.647	.685	.681	.660	.600	.421	.489	.635	.657	.653	.669	.675	.656	-

Note*:* n=353

Table 4.106

Model Fit Statistics for LibQUAL+ Data (DUL, RUL, BAUL, BUETL, BSMMUL and IUBL)

Fit indices	**DUL**	**RUL**	**BAUL**	**BUETL**	**BSMMUL**	**IUBL**
χ^2	1226.695*	833.3*	1109.9*	1350.482*	732.9*	680.634*
df	206	206	206	206	206	206
P	.000	.000	.000	.000	.000	.000
χ^2/df	5.95	4.045	5.388	6.556	3.558	3.304
RMSEA	.115	.092	.114	.126	.091	.081
CFI	.800	.826	.799	.716	.882	.924
NFI	.771	.784	.767	.685	.843	.896

Note*:* * p <.001

The model fit for Confirmatory Factor Analysis (CFA) is shown here by both Structural Equation Modeling (SEM) and as text output through fit indices. The adequacy of the CFA models was examined using Chi-square ($\chi^{2)}$, which "assesses the magnitude of discrepancy between the sample and fitted covariances matrices" (Hu & Bentler, 1999). Given the sensitivity of χ^2 to the sample size, Relative/Normed chi-square (χ^2/df), Normed Fit Index (NFI), the Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA).There is no consensus regarding an acceptable ratio for the Relative/Normed chi-square statistic. The literature generally suggests, however, that values from as low as 2.0 to as high as 5.0 are adequate (Tabachnick & Fidell, 2007). RMSEA values should generally be less than .05 to demonstrate good fit (Schumacker & Lomax, 2004), but have been modified in recent years to suggest that values between .05 and .08 are acceptable (Kline, 2005). Lastly, comparative-fit indices (NFI and CFI) should be greater than .95 (Hu & Bentler, 1999). Recently to test for significant difference between nested models, the S–Bx2 difference test was conducted using a critical value of p<.05 (Bryant & Satorra, 2012). However, here, Table 4.106 illustrates Model Fit Statistics for LibQUAL+ Data for all six university libraries.

At DUL, initially, items are moderately and positively correlated with one another (Table 4.100) and structure coefficients (Figure 4.36.) are also scored good suggesting generally strong relationships between the items and this construct. The examination for this library depicts that three factor model found suitable here. Only

AS-9 has found very low score for which it is needed to re-examine the environment. At RUL, structure coefficient (Figure 4.37) and item correlation matrix (Table 4.101) represent that items and factors has a good relationship, only LP-5 found comparatively low scores, anyway, the observation for this library suggests that the model is acceptable. Structure coefficient (Figure 4.38) and item correlation matrix (Table 4.102) for BAUL showed that items and factors have a good relationship among them, as all they strongly and positively correlated. The model seems applicable for this library after the examination. For BUET, structure coefficient (Figure 4.39) and item correlation matrix (Table 4.103) illustrate that items and factors has a moderate relationship for this construct. The model found moderately acceptable after examination. At BSMMUL, item correlation matrix (Table 4.104) and structure coefficient (Figure 4.40) demonstrate that items and factors have a very good and strong relationship. Observation suggests the model good fit. At IUBL, items are strongly and positively correlated with one another (Table 4.105) and structure coefficients (Figure 4.41) are also scored excellent suggesting generally very good association between the items and this construct. Testing recommends the model superior fit here.

4.15 Exploring Significant Differences

This section illustrates the individual differences among user group e.g. Gender and Status towards Desired Service Level and service quality gaps. To explore the statistical differences by user group Gender for Desired Service (DS) and differences of gap scores of Service Adequacy and Service Superiority, Mann-Whitney test was performed (for DU, Table 4.107 and Table 4.114; RU, Table 4.108 and Table 4.115; BAU, Table 4.109 and Table 4.116; BUET, Table 4.110 and Table 4.117; BSMMU, Table 4.111 and Table 4.118 and IUB, Table 4.112 and Table 4.119). For investigating statistical differences by user group Status for the above mentioned services and gaps, Kruskal-Wallis test was conducted (Table 4.113 and Table 4.120).

Regarding significant differences for DS by user group Gender, at DU, as shown in Table 4.107, there are significant differences. The differences are observed statistically for the items, IC-1, AS-3, LP-3, AS-7, LP-5 and AS-9. For RU, excluding, AS-1, IC-2 and LP-5, all other service quality attributes have differences

(Table 4.108). AS-2, IC-2, AS-5, AS-6, AS-7, LP-4, and LP-5 are observed for the BAU users (4.109). At BUET (Table 4.110), the items that have the significant difference are AS-1, IC-1, AS-3, AS-5, IC-7, and LP-5. BSMMUL library (Table 4.111) users have also pointed significant difference of fifteen service attributes by male and female. At IUB, it has been revealed that the items AS-2. AS-8 and AS-9 have significant differences (Table 4.112) for the user group Gender.

To observe significant difference for DS by user group Status (Table 4.113), only the item AS-9 is found for DU. The items AS-2, AS-4, IC-6, IC-8 and AS-9 have the differences for RU. At BAU, only AS-2, IC-3, AS-5 and AS-6 have no significant differences whereas the rest of the items were significant. The significant items for BUET are AS-1, AS-3, IC-3, IC-4, IC-8 and LP-5. The items AS-1, AS-3, AS-5, AS-6, LP-4, and AS-9 are found for BSMMU as significant. At IUB, the attributes IC-1, LP-1, AS-2, LP-2, AS-4, IC-4, LP-3, IC-5, IC-6, AS-8, IC-8 and LP-5 are observed significant across user group Status.

Regarding significant difference for dimension-wise gap score e.g. AG (SA) and SG (SS) as well overall by user group Gender, the test depicts that only the dimension "Information Control" of SG is significant at DU (Table 4.114) . Table 4.115 shows that for RU, the dimension "Affect of Service" and "Information Control" is significant for Service Adequacy (SA); Service Superiority (SS) has only the dimension "Library as Place" and as overall, both SA and SS are significant. Table 4.116, Table 4.117 and Table 4.119 depict that there is no significant differences among the user group Gender at BAU, BUET and IUB respectively. BSMMUL library users' significance is demonstrated in the Table 4.118, where for SA, "Affect of Service", for SS all three dimensions and overall SS is significant.

Concerning significance for dimension-wise gap score by user group Status (Table 4.120), excluding SS "Library as Place" all other dimensions of gaps are significant at DU and excluding SA "Library as Place" all other dimensions of gaps are significant at RU. All the dimensions and gaps showed significant for BAU and for BUET for user group Status. All three dimensions for SA and overall SA are significant at BSMMU. At IUB excluding the dimension "Affect of Service", all other dimensions of SAs and SSs are significant.

Table 4.107

Mann-Whitney Test for Desired Service Level by Gender, DU

SQ ID	Mann-Whitney U	Wilcoxon W	Z-value	Asymp. Sig. (2-tailed)
AS-1	13479.000	19257.000	-.815	.415
IC-1	11643.500	45834.500	-2.678	.007*
LP-1	13994.500	19880.500	-.313	.754
AS-2	13162.500	48142.500	-1.250	.211
IC-2	13036.500	46706.500	-.963	.336
AS-3	11207.000	17093.000	-3.535	.000*
IC-3	14293.500	20179.500	-.020	.984
LP-2	13206.000	48186.000	-1.039	.299
AS-4	13567.500	19453.500	-.882	.378
IC-4	13899.000	49144.000	-.504	.614
AS-5	12916.500	18694.500	-1.562	.118
LP-3	11534.500	17205.500	-2.849	.004*
AS-6	13471.000	19142.000	-.598	.550
IC-5	12644.500	47097.500	-1.802	.072
AS-7	12275.000	18161.000	-2.264	.024*
IC-6	12439.500	45850.500	-1.749	.080
LP-4	13622.500	48867.500	-.635	.526
AS-8	12958.500	18844.500	-1.567	.117
IC-7	13416.000	48396.000	-.962	.336
IC-8	14086.000	19972.000	-.205	.838
LP-5	11647.500	46892.500	-2.928	.003*
AS-9	11101.500	16987.500	-3.385	.001*

Note: * Significant at $p < 0.05$

Table 4.108

Mann-Whitney Test for Desired Service Level by Gender, RU

SQ ID	Mann-Whitney U	Wilcoxon W	Z-value	Asymp. Sig. (2-tailed)
AS-1	14782.000	39313.000	-1.116	.264
IC-1	13375.500	37906.500	-2.557	.011*
LP-1	12418.500	36949.500	-3.589	.000*
AS-2	12547.000	36857.000	-3.356	.001*
IC-2	15021.500	39552.500	-.823	.411
AS-3	11160.500	35470.500	-4.835	.000*
IC-3	12119.000	36209.000	-3.818	.000*
LP-2	11760.000	36070.000	-4.197	.000*
AS-4	12174.000	36264.000	-3.717	.000*
IC-4	13013.000	37323.000	-2.869	.004*
AS-5	12062.000	36372.000	-3.875	.000*
LP-3	10406.000	34937.000	-5.710	.000*
AS-6	11747.500	35837.500	-4.196	.000*
IC-5	11135.000	35666.000	-4.918	.000*
AS-7	11397.000	35928.000	-4.647	.000*
IC-6	9926.500	34457.500	-6.072	.000*
LP-4	11589.500	36120.500	-4.468	.000*
AS-8	12496.000	37027.000	-3.475	.001*
IC-7	11982.500	36513.500	-4.042	.000*
IC-8	12494.500	37025.500	-3.490	.000*
LP-5	14736.000	25032.000	-.974	.330
AS-9	12580.000	37111.000	-3.398	.001*

Note: * Significant at $p < 0.05$

Table 4.109

Mann-Whitney Test for Desired Service Level by Gender, BAU

SQ ID	Mann-Whitney U	Wilcoxon W	Z-value	Asymp. Sig. (2-tailed)
AS-1	13794.000	25729.000	-.674	.500
IC-1	12883.000	30088.000	-1.633	.102
LP-1	13531.500	25466.500	-.931	.352
AS-2	11937.000	29328.000	-2.702	.007*
IC-2	12914.500	24849.500	-1.931	.053*
AS-3	13328.000	25263.000	-1.189	.234
IC-3	13303.500	30694.500	-1.203	.229
LP-2	12952.500	24887.500	-1.728	.084
AS-4	14163.000	26098.000	-.202	.840
IC-4	14220.000	26001.000	-.011	.991
AS-5	10897.500	28288.500	-4.205	.000*
LP-3	12738.500	30129.500	-1.894	.058
AS-6	12880.500	24815.500	-2.014	.044*
IC-5	13969.000	25904.000	-.451	.652
AS-7	12069.500	24004.500	-2.886	.004*
IC-6	12903.500	30294.500	-1.734	.083
LP-4	12557.000	29948.000	-2.172	.030*
AS-8	14138.000	31529.000	-.241	.810
IC-7	13442.500	30833.500	-1.098	.272
IC-8	13975.000	31366.000	-.424	.671
LP-5	10405.000	27796.000	-4.788	.000*
AS-9	13411.000	30802.000	-1.326	.185

Note: * Significant at $p < 0.05$

Table 4.110

Mann-Whitney Test for Desired Service Level by Gender, BUET

SQ ID	Mann-Whitney U	Wilcoxon W	Z-value	Asymp. Sig. (2-tailed)
AS-1	11170.000	37505.000	-2.869	.004*
IC-1	11546.000	37424.000	-2.241	.025*
LP-1	13376.000	20516.000	-.375	.707
AS-2	11991.000	38326.000	-1.903	.057
IC-2	13016.500	39581.500	-.805	.421
AS-3	11024.000	37589.000	-2.984	.003*
IC-3	13477.500	40042.500	-.243	.808
LP-2	12812.500	39377.500	-1.079	.280
AS-4	13196.500	39761.500	-.571	.568
IC-4	12780.000	38886.000	-.545	.586
AS-5	11725.000	38060.000	-2.230	.026*
LP-3	12574.500	39139.500	-1.337	.181
AS-6	12615.000	38950.000	-.671	.502
IC-5	12324.500	38889.500	-1.653	.098
AS-7	12030.000	38365.000	-1.885	.059
IC-6	12975.000	39081.000	-.701	.483
LP-4	11923.000	37801.000	-1.788	.074
AS-8	12190.500	38296.500	-1.257	.209
IC-7	11579.000	37685.000	-2.489	.013*
IC-8	12251.500	37902.500	-1.498	.134
LP-5	11397.000	37962.000	-2.713	.007*
AS-9	13419.500	20559.500	-.240	.811

Note: * Significant at $p < 0.05$

Table 4.111

Mann-Whitney Test for Desired Service Level by Gender, BSMMU

SQ ID	Mann-Whitney U	Wilcoxon W	Z-value	Asymp. Sig. (2-tailed)
AS-1	8866.000	15307.000	-3.394	.001*
IC-1	9388.000	15829.000	-2.621	.009*
LP-1	8818.000	15259.000	-3.509	.000*
AS-2	8533.500	14974.500	-3.857	.000*
IC-2	8274.000	14715.000	-4.306	.000*
AS-3	9994.500	16435.500	-1.815	.070*
IC-3	9019.000	15460.000	-3.207	.001*
LP-2	8869.500	15310.500	-3.444	.001*
AS-4	9328.500	15769.500	-2.782	.005*
IC-4	10109.000	16550.000	-1.623	.104
AS-5	9215.500	15656.500	-2.881	.004*
LP-3	9721.000	16162.000	-2.204	.028*
AS-6	8430.000	14871.000	-4.179	.000*
IC-5	10330.500	16771.500	-1.348	.178
AS-7	9383.500	15824.500	-2.788	.005*
IC-6	9099.000	15540.000	-3.076	.002*
LP-4	10202.500	16643.500	-1.545	.122
AS-8	9995.000	16436.000	-1.822	.068
IC-7	10094.000	16535.000	-1.651	.099
IC-8	9997.000	16438.000	-1.843	.065
LP-5	10112.000	16553.000	-1.721	.085
AS-9	9241.000	15682.000	-2.895	.004*

Note: * Significant at $p < 0.05$

Table 4.112

Mann-Whitney Test for Desired Service Level by Gender, IUB

SQ ID	Mann-Whitney U	Wilcoxon W	Z-value	Asymp. Sig. (2-tailed)
AS-1	12338.000	40541.000	-1.624	.104
IC-1	12632.500	40835.500	-1.288	.198
LP-1	13490.500	41693.500	-.304	.761
AS-2	11459.000	39425.000	-2.559	.010*
IC-2	12852.000	41055.000	-1.027	.304
AS-3	13407.000	20193.000	-.324	.746
IC-3	13078.000	41281.000	-.772	.440
LP-2	13252.500	41455.500	-.575	.565
AS-4	12810.500	41013.500	-1.073	.283
IC-4	12257.000	40460.000	-1.585	.113
AS-5	13716.500	20502.500	-.034	.973
LP-3	12644.000	40847.000	-1.159	.246
AS-6	13474.000	41677.000	-.312	.755
IC-5	13472.500	41675.500	-.317	.751
AS-7	12321.500	40524.500	-1.656	.098
IC-6	12462.500	40665.500	-1.491	.136
LP-4	13209.500	41412.500	-.622	.534
AS-8	11972.500	40175.500	-2.054	.040*
IC-7	13068.000	41271.000	-.780	.435
IC-8	13033.500	19819.500	-.818	.414
LP-5	13253.500	41456.500	-.583	.560
AS-9	11901.500	40104.500	-2.122	.034*

Note: * Significant at $p < 0.05$

Table 4.113

Kruskal-Wallis Test for Desired Service Level by Each Group of User, All libraries

SQ ID	DUL		RUL		BAUL		BUETL		BSMMUL		IUBL	
	χ^2	Asymp. Sig.	χ^2	Asymp. Sig.	χ^2	Asymp. Sig.	χ^2	Asymp. Sig.	χ^2	Asymp. Sig.	χ^2	Asymp. Sig.
AS-1	.760	.684	.363	.834	27.546	.000*	11.370	.003*	10.127	.001*	1.218	.544
IC-1	1.809	.405	2.781	.249	13.596	.001*	.164	.921	.548	.459	6.321	.042*
LP-1	1.370	.504	1.074	.584	17.747	.000*	5.719	.057	.484	.487	10.620	.005*
AS-2	2.030	.362	7.481	.024*	3.107	.212	2.587	.274	.118	.731	8.620	.013*
IC-2	.407	.816	.411	.814	2.490	.288	4.118	.128	.030	.863	4.234	.120
AS-3	4.498	.105	3.047	.218	26.552	.000*	9.844	.007*	3.983	.046*	1.582	.453
IC-3	1.937	.380	1.656	.437	48.826	.000*	17.068	.000*	.039	.843	5.719	.057
LP-2	.153	.927	.413	.813	15.121	.001*	1.243	.537	2.986	.084	7.132	.028*
AS-4	.263	.877	10.449	.005*	24.524	.000*	3.807	.149	3.361	.067	8.202	.017*
IC-4	5.676	.059	.287	.866	43.641	.000*	10.612	.005*	2.567	.109	14.652	.001*
AS-5	2.057	.358	1.329	.515	5.300	.071	3.856	.145	6.390	.011*	1.905	.386
LP-3	4.096	.129	3.643	.162	39.737	.000*	2.233	.327	.263	.608	15.028	.001*
AS-6	.377	.828	1.022	.600	2.226	.329	4.625	.099	4.670	.031*	3.081	.214
IC-5	.871	.647	.191	.909	17.607	.000*	4.590	.101	.208	.648	8.811	.012*
AS-7	5.866	.053	1.318	.517	12.479	.002*	.017	.992	.725	.395	2.991	.224
IC-6	1.068	.586	9.734	.008*	36.974	.000*	3.945	.139	.128	.721	8.624	.013*
LP-4	.654	.721	2.569	.277	84.028	.000*	3.531	.171	3.901	.048*	4.821	.090
AS-8	5.497	.064	.570	.752	24.598	.000*	.904	.636	2.290	.130	9.758	.008*
IC-7	1.254	.534	1.376	.503	61.665	.000*	.191	.909	.775	.379	4.022	.134
IC-8	2.232	.328	6.860	.032*	35.882	.000*	29.862	.000*	.970	.325	9.017	.011*
LP-5	.957	.620	.996	.608	54.025	.000*	17.134	.000*	1.148	.284	11.861	.003*
AS-9	17.301	.000*	6.405	.041*	47.593	.000*	1.898	.387	11.022	.001*	1.011	.603

Note: * Significant at $p < 0.05$

Table 4.114

Mann-Whitney Test for Dimension-wise Gap Scores by Gender, DU

Gap	Dimension	Mann-Whitney U	Wilcoxon W	Z-value	Asymp. Sig. (2-tailed)
SA	AS	11730.000	44626.000	-1.636	.102
	IC	11433.500	41814.500	-1.572	.116
	LP	12360.000	45513.000	-.844	.399
SS	AS	12586.500	17942.500	-.672	.501
	IC	11063.000	16628.000	-2.131	.033*
	LP	11676.500	16929.500	-1.405	.160
SA	Over all	9922.000	38363.000	-1.605	.109
SS	Over all	10487.500	15143.500	-1.284	.199

Note: * Significant at $p < 0.05$

Table 4.115

Mann-Whitney Test for Dimension-wise Gap Scores by Gender, RU

Gap	Dimension	Mann-Whitney U	Wilcoxon W	Z-value	Asymp. Sig. (2-tailed)
SA	AS	11991.500	22287.500	-3.466	.001*
	IC	11556.500	20872.500	-3.431	.001*
	LP	14729.500	25025.500	-.886	.376
SS	AS	14455.000	37675.000	-.957	.339
	IC	13756.000	37192.000	-1.223	.221
	LP	11198.500	35069.500	-4.531	.000*
SA	Over all	11610.000	20926.000	-3.127	.002*
SS	Over all	12644.000	35222.000	-2.145	.032*

Note: * Significant at $p < 0.05$

Table 4.116

Mann-Whitney Test for Dimension-wise Gap Scores by Gender, BAU

Gap	Dimension	Mann-Whitney U	Wilcoxon W	Z-value	Asymp. Sig. (2-tailed)
SA	AS	13993.500	25774.500	-.093	.926
	IC	13890.000	31095.000	-.191	.848
	LP	12797.500	24578.500	-1.443	.149
SS	AS	13678.000	30698.000	-.347	.729
	IC	13718.500	25194.500	-.197	.844
	LP	12754.500	24535.500	-1.492	.136
SA	Over all	13486.000	24811.000	-.189	.850
SS	Over all	13314.500	29785.500	-.093	.926

Note: * Significant at $p < 0.05$

Table 4.117

Mann-Whitney Test for Dimension-wise Gap Scores by Gender, BUET

Gap	Dimension	Mann-Whitney U	Wilcoxon W	Z-value	Asymp. Sig. (2-tailed)
SA	AS	10666.500	33244.500	-1.627	.104
	IC	10699.500	33490.500	-1.403	.161
	LP	12051.000	37702.000	-1.223	.221
SS	AS	11348.000	35219.000	-.921	.357
	IC	11147.500	34583.500	-1.414	.157
	LP	12260.000	37911.000	-1.105	.269
SA	Over all	9620.500	30326.500	-1.653	.098
SS	Over all	10396.500	32551.500	-1.215	.224

Note: * Significant at $p < 0.05$

Table 4.118

Mann-Whitney Test for Dimension-wise Gap Scores by Gender, BSMMU

Gap	Dimension	Mann-Whitney U	Wilcoxon W	Z-value	Asymp. Sig. (2-tailed)
SA	AS	9669.500	29769.500	-2.122	.034*
	IC	10308.500	30408.500	-1.290	.197
	LP	10371.500	30471.500	-1.210	.226
SS	AS	8344.000	28444.000	-3.846	.000*
	IC	8639.000	28739.000	-3.463	.001*
	LP	7911.500	28011.500	-4.420	.000*
SA	Over all	9876.000	29976.000	-1.852	.064
SS	Over all	8180.500	28280.500	-4.057	.000*

Note: * Significant at $p < 0.05$

Table 4.119

Mann-Whitney Test for Dimension-wise Gap Scores by Gender, IUB

Gap	Dimension	Mann-Whitney U	Wilcoxon W	Z-value	Asymp. Sig. (2-tailed)
SA	AS	13345.500	20015.500	-.059	.953
	IC	12824.000	19610.000	-.902	.367
	LP	13165.500	19835.500	-.517	.605
SS	AS	12575.000	19361.000	-.996	.319
	IC	13078.000	19748.000	-.552	.581
	LP	13351.000	20021.000	-.309	.757
SA	Over all	12927.000	19482.000	-.275	.783
SS	Over all	12612.500	19167.500	-.636	.525

Note: * Significant at $p < 0.05$

Table 4.120

Kruskal WalisTest for Dimension-wise Gap Scores by Each Group of User, All libraries

Gap	Dimension	DUL		RUL		BAUL		BUETL		BSMMUL		IUBL	
		χ^2	Asymp. Sig.	χ^2	Asymp. Sig.	χ^2	Asymp. Sig.	χ^2	Asymp. Sig.	χ^2	Asymp. Sig.	χ^2	Asymp. Sig.
SA	AS	28.079	.000*	6.696	.035*	51.822	.000*	49.390	.000*	9.518	.002*	4.712	.095
	IC	29.850	.000*	10.940	.004*	88.851	.000*	51.377	.000*	15.156	.000*	11.199	.004*
	LP	18.400	.000*	3.274	.195	64.675	.000*	54.709	.000*	12.049	.001*	6.244	.044*
SS	AS	23.186	.000*	9.441	.009*	88.911	.000*	67.529	.000*	2.157	.142	5.602	.061
	IC	9.427	.009*	15.106	.001*	105.542	.000*	48.476	.000*	1.623	.203	6.367	.041*
	LP	5.709	.058	13.528	.001*	105.472	.000*	55.607	.000*	.664	.415	10.491	.005*
SA	Over all	31.026	.000*	8.120	.017*	90.961	.000*	52.173	.000*	14.757	.000*	8.517	.014*
SS	Over all	17.622	.000*	11.751	.003*	101.624	.000*	59.439	.000*	1.794	.180	7.194	.027*

Note: * Significant at $p < 0.05$

4.16 Research Findings & Discussion

The research findings discussed above can answer the research questions and can be summarized as follows:

4.16.1 Research Question 1: **Which attributes of service quality are meeting minimum expectations, or adequate service by the group user?**

To see whether library service quality meeting the minimum expectations of users or not, Service Adequacy (SA) indicator is applied. SA gap score is called Adequacy Gap (AG) which is calculated by subtracting the minimum score (MS) from the perceived score (PS) on any given service quality attribute, for each user. Both Means and Standard Deviations were presented for AG scores on each item of LibQUAL+ scores of this study, as well as for each of the three dimensions of library service quality. A negative service adequacy gap score indicates that users' perceived level of service quality is below their minimum level of service quality. Table 4.70 - 4.75 demonstrated Service Adequacy Gap (AG) by all and each group of users for all university libraries. Table 4.121 shows overall Adequacy Gap status by all users, Table 4.122 represents the upmost five AG scores of by each user group and Table 4.123 shows the details of all libraries performance towards Service Adequacy.

Regarding DUL, all the items of MSs are lagged behind the PSs, so the negative values are appeared. And as all the AGs are negative, so, by any group of users or overall examination, it has been revealed that, DUL doesn't meet the minimum expectation of service quality. Though far away from the Minimum Service, DUL respondents considered the attribute close to Adequate Service are, better library location, dependable and reliable staff, adequate printed library material, research and study support, good resource collection and subscription, responsive, and knowledgeable library staff. At RUL, like DUL, all are negative AG, which means, all MSs are behind the PSs. So, RUL is also not meeting minimum expectation. The attributes close to Adequate Service are, library web site for information location, comfortable library location, reliable library staff, adequate printed library material, inspiring library support, courteous staff, easily accessible information, caring staff, quick response by library staff, and research support. For BAUL, by all user, a positive SA gap is explored. For graduate students' response, seventeen items have positive gaps. So, BAUL has better perception by its user for

MS, though by user group undergraduate and faculty, all are negative AG. So, it may be said that BAUL partially meets the minimum service expectation by user group graduate and for AS-4 by all users, whereas, other indicated as not meeting. However, responses close SA are related to knowledgeable, responsive staff, personal care, research support, caring staff, remote access to e-resources, required information, inspiring library space, modern equipments, and required printed material. At BUETL, it has been observed that, one in the undergraduate students' response and two in the faculty AGs are positive. So, beside these very fewer scores, for other attributes or other user group, BUETL is not meeting minimum expectation excluding AS-1 for undergraduate and AS-1, and LP-1 for faculty. However, response close to SA are related to reliable staff, inspiring library place, remote access of e-resources, courteous staff, Research support, required printed materials, quiet library space, Library web site for information location, and responsive staff. Regarding BSMMUL, all the items of MSs are lagged behind the PSs, so all AGs are negative. These negative values suggested that BSMMUL is not meeting minimum service expectation by any user. Services which are close to minimum services here are related to inspiring library space, personal care, responsive, helpful and courteous library staff. IUBL scored best among all the libraries. Here, for all users seventeen positive SA gaps, by undergraduate students seventeen, by graduate sixteen, and by faculty respondents almost all (21) SA values have positive gaps. So, excluding few attributes, IUBL is moderately meeting minimum expectation by all individual users and all users. The top attributes that the respondents have rated are, quiet library space, knowledgeable, responsive, understandable, caring and reliable library staff, group study space, comfortable location, modern equipments, web site enables to locate information.

Table 4.121

Overall AG status comparison against each of all items by All user

ID	DUL	RUL	BAUL	BUETL	BSMMUL	IUBL
AS-1	-0.98	-1.00	-0.83	-0.04	-1.76	0.53
AS-2	-2.15	-1.16	-0.01	-0.81	-2.17	-0.01
AS-3	-1.21	-1.12	-0.84	-0.67	-2.23	-0.26
AS-4	-1.36	-1.24	-0.04	-0.86	-2.17	0.51
AS-5	-1.33	-1.28	0.05	-1.24	-2.34	0.59
AS-6	-1.28	-1.40	-0.34	-0.87	-2.31	0.49
AS-7	-1.51	-1.31	-0.53	-1.23	-2.80	0.44
AS-8	-1.38	-1.63	-1.34	-1.27	-2.68	0.31
AS-9	-0.85	-1.38	-0.78	-0.90	-2.73	0.41
IC-1	-2.35	-1.54	-0.84	-0.49	-2.25	-0.09
IC-2	-1.48	-0.95	-1.47	-0.98	-2.40	-0.02
IC-3	-1.14	-1.02	-1.44	-0.98	-2.46	-0.54
IC-4	-1.89	-1.32	-0.46	-0.85	-2.43	0.22
IC-5	-1.53	-1.58	-0.56	-1.35	-2.44	0.39
IC-6	-1.73	-1.13	-0.81	-1.31	-2.53	0.33
IC-7	-1.71	-1.10	-1.64	-1.03	-2.43	0.38
IC-8	-1.35	-1.51	-1.56	-1.02	-2.64	0.16
LP-1	-1.65	-1.04	-0.35	-0.31	-1.91	0.27
LP-2	-1.50	-1.13	-1.12	-0.69	-2.31	0.73
LP-3	-0.40	-0.95	-0.50	-0.91	-2.54	0.51
LP-4	-1.15	-1.18	-0.25	-0.83	-2.30	0.18
LP-5	-2.29	-1.75	-0.61	-0.88	-2.58	0.52

Table 4.122

Top five AG scores by All and each group of user

Library	Top five	All		Under-graduate		Graduate		Faculty	
		ID	Mean	ID	Mean	ID	Mean	ID	Mean
DUL	1	LP-3	-0.40	LP-3	-0.21	LP-3	-0.59	LP-3	-1.24
	2	AS-9	-0.85	AS-9	-0.52	AS-9	-1.21	AS-4	-2.00
	3	AS-1	-0.98	AS-1	-0.71	AS-1	-1.27	AS-1	-2.04
	4	IC-3	-1.14	IC-3	-0.83	IC-8	-1.46	AS-5	-2.04
	5	LP-4	-1.15	LP-4	-0.85	LP-4	-1.47	IC-3	-2.08
RUL	1	IC-2	-0.95	IC-2	-0.71	IC-7	-0.75	AS-4	-1.82
	2	LP-3	-0.95	AS-1	-0.74	LP-3	-0.87	AS-1	-2.12
	3	AS-1	-1.00	LP-3	-0.88	IC-3	-0.93	IC-3	-2.12
	4	IC-3	-1.02	LP-1	-0.95	AS-2	-0.94	LP-4	-2.24
	5	LP-1	-1.04	AS-3	-0.95	LP-1	-1.01	LP-1	-2.47
BAUL	1	AS-5	0.05	AS-5	-0.09	IC-1	0.94	AS-2	-0.25
	2	AS-2	-0.01	AS-4	-0.13	IC-4	0.93	AS-3	-0.30
	3	AS-4	-0.04	LP-4	-0.26	AS-2	0.77	AS-5	-0.35
	4	LP-4	-0.25	AS-2	-0.28	LP-1	0.76	LP-1	-0.47
	5	AS-6	-0.34	AS-6	-0.55	IC-5	0.68	IC-3	-0.50
BUETL	1	AS-1	-0.04	AS-1	0.00	IC-1	-0.23	AS-1	0.29
	2	LP-1	-0.31	LP-1	-0.08	AS-1	-0.34	LP-1	0.08
	3	IC-1	-0.49	LP-4	-0.41	IC-2	-1.38	IC-3	-0.25
	4	AS-3	-0.67	AS-3	-0.44	AS-4	-1.59	LP-2	-0.29
	5	LP-2	-0.69	IC-1	-0.45	LP-1	-1.61	LP-4	-0.33
BSMMUL	1	AS-1	-1.76			AS-1	-1.95	AS-1	-0.06
	2	LP-1	-1.91			LP-1	-2.03	LP-1	-0.87
	3	AS-2	-2.17			AS-4	-2.16	AS-5	-1.03
	4	AS-4	-2.17			AS-2	-2.24	AS-8	-1.19
	5	AS-3	-2.23			AS-3	-2.33	AS-3	-1.29
IUBL	1	LP-2	0.73	LP-2	0.72	AS-7	0.58	LP-2	1.13
	2	AS-5	0.59	AS-5	0.62	IC-7	0.48	AS-4	0.97
	3	AS-1	0.53	AS-1	0.62	AS-6	0.46	IC-2	0.95
	4	LP-5	0.52	LP-5	0.54	LP-2	0.44	AS-7	0.95
	5	LP-3	0.51	AS-4	0.51	IC-5	0.44	IC-7	0.95

Table 4.123

Are the Libraries Meeting Minimum Service Expectation?

Library	User	Positive (+) /Negative (–) AG	Meeting Minimum Expectation?	Item/Attribute that has positive AG
DUL	All	– 22 (all)	Not meeting (All negative)	-
	Undergraduate	– 22 (all)	Not meeting (All negative)	-
	Graduate	– 22 (all)	Not meeting (All negative)	-
	Faculty	– 22 (all)	Not meeting (All negative)	-
RUL	All	– 22 (all)	Not meeting (All negative)	-
	Undergraduate	– 22 (all)	Not meeting (All negative)	-
	Graduate	– 22 (all)	Not meeting (All negative)	-
	Faculty	– 22 (all)	Not meeting (All negative)	-
BAUL	All	+ 1, – 21	Only 1 attribute is meeting, rest of the 21 is not	AS-4
	Undergraduate	– 22 (all)	Not meeting (All negative)	-
	Graduate	+ 17, – 5	17 attribute is meeting, rest of the 5 is not	IC-1, IC-4, AS-2, LP-1, IC-5, LP-5, LP-3, IC-7, AS-5, AS-6, AS-4, IC-8, LP-2, IC-6, AS-1, AS-3, and AS-7
	Faculty	– 22 (all)	Not meeting (All negative)	-
BUETL	All	– 22 (all)	Not meeting (All negative)	-
	Undergraduate	+ 1, – 21	Only 1 attribute is meeting, rest of the 21 is not	AS-1
	Graduate	– 22 (all)	Not meeting (All negative)	-
	Faculty	+2, – 20	Only 2 attribute is meeting, rest of the 20 is not	AS-1, and LP-1
BSMMUL	All	– 22 (all)	Not meeting (All negative)	-
	Graduate	– 22 (all)	Not meeting (All negative)	-
	Faculty	– 22 (all)	Not meeting (All negative)	-
IUBL	All	+17, – 5	17 attribute is meeting, rest of the 5 is not	LP-2, AS-5, AS-1, LP-5, LP-3, AS-4, AS-6, AS-7, AS-9, IC-5, IC-7, IC-6, S-8, LP-1, IC-4, LP-4, and IC-8
	Undergraduate	+17, – 5	17 attribute is meeting, rest of the 5 is not	LP-2, AS-5, AS-1, LP-5, AS-4, LP-3, AS-9, AS-6, IC-6, AS-7, AS-8, IC-5, IC-4, IC-7, LP-1, IC-8, and LP-4
	Graduate	+16, – 6	16 attribute is meeting, rest of the 6 is not	AS-7, IC-7, AS-6, LP-2, IC-5, AS-9, AS-5, LP-5, LP-3, LP-1, AS-8, AS-4, IC-6, AS-1, LP-4, and AS-2
	Faculty	+21, – 1	21 attribute is meeting, rest of the 1 is not	LP-2, AS-4, IC-2, AS-7, IC-7, LP-3, LP-1, AS-6, AS-2, IC-5, LP-4, AS-3, IC-1, IC-8, AS-5, LP-5, AS-1, IC-6, AS-8, IC-3, and IC-4

4.16.2 Research Question 2: **Which attributes of service quality equal, exceed or fall short user perception (meeting desired expectation), by individual group of users?**

To see which attribute of service quality meet desired expectation, Service Superiority (SS) indicator is applied. SS gap score is called Superiority Gap (SG) which is calculated by subtracting the Desired Service (DS) from the Perceived Service (PS) on any given service quality statement. Both Means and Standard Deviations were presented for SG scores on each item of LibQUAL+ scores of this study, as well as for each of the three dimensions of library service quality. A negative service superiority gap score indicates that users' perceived level of service quality is below their desired level of service quality. Table 4.82 - 4.87 demonstrated Service Superiority Gap (SG) by All and each group of users for all university libraries. Table 4.124 shows overall Superiority Gap status by all users, Table 4.125 shows the top five SG scores by all types of users and Table 4.126 shows the details of all libraries performance towards Service Superiority.

Regarding DU Library, Service Superiority status is extremely frustrating as Superiority Gaps are all negative with very large gaps by all and each group of user. So, all the SSs are problematic here. Faculty followed by the graduate students has the largest negative SG. For the undergraduate group, the top five negative SS are IC-1, LP-5, AS-2, IC-4, and LP-1; the top five negative SS for graduate group are LP-5, IC-1, AS-2, IC-2, and IC-4; for the group faculty, the top five negative SGs are AS-8, LP-5, IC-5, AS-9, and AS-2; on the other hand by all user group the top five problematic SSs are IC-1, LP-5, AS-2, IC-4, and LP-1. The few top problematic SSs that identified by the DUL user are related to remote access of electronic resources, group study facilities, personal care, required electronic resources, inspiring library space, informative and resourceful web site, helpfulness, modern equipment and dependability. However from the data obtained it may be summarized that DUL does not meet the desired expectation by any user group and service superiority is consistently poor as all the superiority gaps are negatively appeared with high differences.

For the RUL, throughout all or each user group, Service Superiority is awful like DUL. Superiority Gaps are all negative with very large gaps and faculty SGs are with the highest negative gap. For the user group undergraduate, the upmost five

negative SS are LP-5, IC-5, IC-1, AS-4, and AS-8; in case of graduate group, the top five problematic SSs raked as IC-1, IC-2, IC-7, IC-8, and AS-8; for the user group faculty, the top five are IC-1, IC-2, IC-7, IC-8, and AS-8; whereas by all user group the top five problematic SSs are LP-5, IC-5, IC-1, AS-8 and AS-5. The most terrible items with high negative SGs at RUL are related to group study facilities, modern equipment, remote access of electronic resources, willingness of library staff, reliable, knowledgeable and responsive library staff, informative and resourceful web site, easily accessible information and required printed or electronic journal. In case of RUL, it may be summed up that RUL does not meet the desired expectation by any user group and service superiority is extremely poor as all the superiority gaps emerged as large negative gap.

Unlike other libraries, BAUL undergraduate students SGs are the highest among all user groups. Like previous libraries, Service Superiority status is not good, very wearisome as Superiority Gaps are all negative with large gaps. So, like other libraries, all the SSs are problematic here. For undergraduate student, the upmost five large negative SS gaps are IC-8, AS-8, IC-7, IC-6, and IC-3; for graduate students, the top five high SGs are IC-2, IC-8, IC-5, LP-4, and LP-2; for faculty, the upmost ranked five SGs are IC-2, AS-1, IC-1, LP-2, and IC-4; at last by all user group, the top five negative SGs are IC-8, AS-8, IC-7, IC-2, and IC-6. At BAUL higher desired expectation for the attributes connected to required printed or electronic journal, library staff's willingness, easily accessible information, informative and resourceful web site, user-friendly usable tool for find things, needed printed library materials, modern equipments, research support, quiet library space, reliable library staff, and remote access of electronic resources. It may be figured out that BAUL does not meet the desired expectation by any user group and service superiority is very poor as all the superiority gaps found as large negative gap.

At BUETL, like other previous libraries for this measurement, Service Superiority is very outrageous as Superiority Gaps are all negative with large scores. Graduate students have the highest negative SG values. For the undergraduate group, the upmost five negative SS are IC-2, AS-5, IC-5, AS-7, and IC-8; the top five negative SS for graduate group are AS-8, LP-4, IC-5, AS-6, and AS-7; for the group faculty, the upmost five negative SGs are IC-5, IC-2, IC-7, AS-8, and IC-6; on the other hand by all user group the top five problematic SSs are IC-5, IC-2, AS-7, AS-5, and IC-8. At

BUETL, most of the top attributes that highly expected by the respondents, are related to modern equipment, informative and resourceful web site, understandable and knowledgeable library staff, required printed or electronic journal, willingness, research support, personal care, easily accessible information, and user-friendly usable tool for find things. From the data investigated, it has been proved that BUETL does not meet the desired expectation by any user group and service superiority is also poor as all the superiority gaps found negative and with high gap.

For BSMMUL, throughout all the groups, Service Superiority status is very unpleasant. All the gaps from different respondents at BSMMUL are negative and very high. Students SGs are higher than faculty gaps. For the user group graduate, the top five problematic SSs raked as AS-7, AS-9, LP-5, IC-3, and AS-5; for the user group faculty AS-4, IC-2, LP-3, AS-2, and IC-3, the upmost five are; whereas by all user group the top five problematic SSs are AS-7, AS-9, LP-5, IC-3, and LP-3. At BSMMUL, the items which are most desirable but with negative SGs that have been observed as understandable, knowledgeable, responsive and dependable library staff, group discussion facilities, printed library materials, comfortable location, informative and resourceful web site, and personal caring. From the data examined, it has been figured out that BSMMUL does not meet the desired expectation by any user group and service superiority status is also poor as all the superiority gaps found negative and with high difference.

At IUBL, throughout all the groups, Service Superiority status is not good but better than all other responding libraries, which means better service provider than any other responding libraries. It is good to see that, among any other libraries or groups IUBL faculty respondents scored positive SG against an item. However, all other gaps from different respondents at IUBL are negative but not much higher. For undergraduate student, the upmost five large negative SS gaps are IC-3, IC-1, AS-3, IC-2, and AS-1; for graduate students, the top five highest SGs are IC-3, IC-1, IC-2, AS-2, and LP-4; for faculty, the upmost ranked five SGs are IC-6, IC-1, AS-9, AS-1, and IC-8; lastly, by all user group, the top five negative SGs are IC-3, IC-1, AS-3, IC-2, and AS-1. At IUBL, the items which are most desirable but with negative SGs that have been observed as needed printed library materials, remote access of electronic resources, courteous and reliable library staff, informative and resourceful web site, personal care, user-friendly usable tool for find things, dependability and required

printed or electronic journal. From the data studied for this library, it has been revealed that IUBL does not meet the desired expectation though service superiority status is not up to the mark; superiority gaps found moderately negative and not very high. Only by faculty, the item LP-3 "A comfortable and inviting location" found positive SG, which exposed the attribute that meets desired expectation.

Table 4.124

Overall SG status comparison against each of the items by All user

ID	DU	RU	BAU	BUET	BSMMU	IUB
AS-1	-3.69	-2.28	-2.36	-2.48	-3.43	-1.23
AS-2	-3.39	-2.87	-3.78	-3.04	-3.87	-1.22
AS-3	-4.32	-3.15	-3.14	-2.92	-4.01	-1.03
AS-4	-3.17	-2.47	-2.81	-2.85	-3.59	-1.66
AS-5	-4.33	-2.97	-3.04	-2.79	-3.49	-1.86
AS-6	-3.01	-2.25	-3.15	-2.85	-4.00	-2.04
AS-7	-3.53	-2.39	-2.97	-3.06	-3.78	-0.81
AS-8	-3.11	-2.65	-2.61	-3.04	-3.92	-1.09
AS-9	-3.26	-2.74	-1.94	-2.90	-3.80	-0.99
IC-1	-3.31	-2.70	-3.98	-3.27	-3.92	-1.39
IC-2	-3.61	-2.39	-3.77	-3.01	-3.69	-1.17
IC-3	-1.75	-2.59	-2.78	-3.01	-4.15	-1.18
IC-4	-3.45	-2.59	-2.49	-3.35	-4.34	-1.31
IC-5	-3.77	-2.73	-2.52	-2.90	-3.75	-1.28
IC-6	-2.79	-1.99	-2.27	-2.83	-3.97	-0.57
IC-7	-3.37	-2.80	-2.07	-3.33	-3.94	-1.03
IC-8	-3.09	-2.38	-3.08	-3.14	-3.81	-1.36
LP-1	-3.54	-3.04	-2.93	-3.54	-3.81	-1.29
LP-2	-3.11	-2.68	-2.18	-2.58	-3.15	-1.62
LP-3	-3.66	-2.44	-3.38	-3.44	-3.90	-1.63
LP-4	-3.63	-2.30	-3.29	-3.21	-3.90	-1.32
LP-5	-4.18	-2.27	-1.89	-3.13	-3.70	-1.53

Table 4.125

Top five SG scores by All and each group of user

Library	Top five	All		Under-graduate		Graduate		Faculty	
		ID	Mean	ID	Mean	ID	Mean	ID	Mean
DUL	1	IC-1	-4.33	IC-1	-4.23	LP-5	-4.74	AS-8	-4.88
	2	LP-5	-4.32	LP-5	-4.06	IC-1	-4.50	LP-5	-4.76
	3	AS-2	-4.18	AS-2	-3.98	AS-2	-4.47	IC-5	-4.72
	4	IC-4	-3.77	IC-4	-3.69	IC-2	-3.91	AS-9	-4.72
	5	LP-1	-3.69	LP-1	-3.61	IC-4	-3.85	AS-2	-4.68
RUL	1	LP-5	-3.15	LP-5	-3.1	LP-5	-3.08	IC-1	-5.12
	2	IC-5	-3.04	IC-5	-3.00	IC-5	-2.93	IC-2	-4.76
	3	IC-1	-2.97	IC-1	-2.98	AS-1	-2.85	IC-7	-4.71
	4	AS-8	-2.87	AS-4	-2.92	AS-5	-2.81	IC-8	-4.71
	5	AS-5	-2.80	AS-8	-2.79	AS-8	-2.77	AS-8	-4.59
BAUL	1	IC-8	-3.98	IC-8	-4.81	IC-2	-2.18	IC-2	-3.90
	2	AS-8	-3.78	AS-8	-4.64	IC-8	-2.09	AS-1	-3.75
	3	IC-7	-3.77	IC-7	-4.58	IC-5	-1.94	IC-1	-3.60
	4	IC-2	-3.38	IC-6	-3.94	LP-4	-1.89	LP-2	-3.20
	5	IC-6	-3.29	IC-3	-3.90	LP-2	-1.84	IC-4	-3.00
BUETL	1	IC-5	-3.54	IC-2	-3.32	AS-8	-5.45	IC-5	-4.42
	2	IC-2	-3.44	AS-5	-3.13	LP-4	-5.38	IC-2	-4.00
	3	AS-7	-3.35	IC-5	-3.12	IC-5	-5.16	IC-7	-4.00
	4	AS-5	-3.33	AS-7	-3.00	AS-6	-4.91	AS-8	-3.83
	5	IC-8	-3.27	IC-8	-2.93	AS-7	-4.89	IC-6	-3.79
BSMMUL	1	AS-7	-4.34			AS-7	-4.4	AS-4	-4.26
	2	AS-9	-4.15			AS-9	-4.21	IC-2	-4.10
	3	LP-5	-4.01			LP-5	-4.05	LP-3	-4.10
	4	IC-3	-4.00			IC-3	-4.01	AS-2	-3.94
	5	LP-3	-3.97			AS-5	-4.01	IC-3	-3.90
IUBL	1	IC-3	-2.04	IC-3	-1.99	IC-3	-2.94	IC-6	-1.71
	2	IC-1	-1.86	IC-1	-1.82	IC-1	-2.29	IC-1	-1.58
	3	AS-3	-1.66	AS-3	-1.75	IC-2	-2.15	AS-9	-1.55
	4	IC-2	-1.63	IC-2	-1.65	AS-2	-2.02	AS-1	-1.46
	5	AS-1	-1.62	AS-1	-1.61	LP-4	-2.02	IC-8	-1.45

Table 4.126

Are the Libraries Meeting Desired Service Expectation?

Library	User	Positive (+) /Negative (–) SG	Meeting Desired Expectation?	Item/Attribute that has positive SG
DUL	All	– 22 (all)	Not meeting (All negative)	-
	Undergraduate	– 22 (all)	Not meeting (All negative)	-
	Graduate	– 22 (all)	Not meeting (All negative)	-
	Faculty	– 22 (all)	Not meeting (All negative)	-
RUL	All	– 22 (all)	Not meeting (All negative)	-
	Undergraduate	– 22 (all)	Not meeting (All negative)	-
	Graduate	– 22 (all)	Not meeting (All negative)	-
	Faculty	– 22 (all)	Not meeting (All negative)	-
BAUL	All	– 22 (all)	Not meeting (All negative)	-
	Undergraduate	– 22 (all)	Not meeting (All negative)	-
	Graduate	– 22 (all)	Not meeting (All negative)	-
	Faculty	– 22 (all)	Not meeting (All negative)	-
BUETL	All	– 22 (all)	Not meeting (All negative)	-
	Undergraduate	– 22 (all)	Not meeting (All negative)	-
	Graduate	– 22 (all)	Not meeting (All negative)	-
	Faculty	– 22 (all)	Not meeting (All negative)	
BSMMUL	All	– 22 (all)	Not meeting (All negative)	-
	Graduate	– 22 (all)	Not meeting (All negative)	-
	Faculty	– 22 (all)	Not meeting (All negative)	-
IUBL	All	– 22 (all)	Not meeting (All negative)	-
	Undergraduate	– 22 (all)	Not meeting (All negative)	-
	Graduate	– 22 (all)	Not meeting (All negative)	-
	Faculty	+1, – 21	1 attribute is meeting, rest of the 21 is not	LP-3

4.16.3 Research Question 3: In what way do the users expect for excellent service quality from the university library, by individual group of users?

To examine in what way the users expected for excellent service quality from university libraries, by individual group of users, the means of desired service expectations was ranked and compared among three groups of users. The top ten DSs by individual and all users are shown in the Table 4.127 whereas the top ten common DSs are shown in the Table 4.64-4.69.

Table 4.127

Top Ten DS Items for all Libraries by All User Group

Library	User Group	Top Ten Desired Items
DUL	ALL users	AS-8 LP-3, AS-3, LP-1, LP-4, AS-7, IC-5, AS-5, IC-3, LP-2
	Undergraduate	AS-8, LP-3, AS-3, LP-1, LP-4, AS-7, IC-5, AS-5, LP-2, IC-3
	Graduate	AS-8, LP-3, AS-7, AS-3, LP-1, AS-5, IC-5, LP-4, IC-4, IC-3
	Faculty	AS-8, LP-4, LP-3, IC-8, AS-9, LP-2, IC-4, AS-3, AS-7, IC-3
RUL	ALL users	LP-1, AS-4, LP-4, IC-8, LP-3, IC-7, IC-1, IC-3, LP-2, AS-3.
	Undergraduate	AS-4, LP-1, LP-4, IC-8, IC-7, IC-1, IC-3, AS-3, LP-2, LP-3
	Graduate	LP-3, LP-1, IC-6, AS-5, LP-4, AS-3, LP-2, IC-5, IC-7, IC-4
	Faculty	IC-8, LP-4, AS-7, AS-8, IC-1, AS-4, IC-4, IC-2, IC-7, LP-5
BAUL	ALL users	IC-7, LP-4, LP-5, IC-8, LP-3, IC-5, IC-6, LP-2, IC-3, LP-1
	Undergraduate	IC-7, LP-4, LP-5, IC-8, LP-3, IC-6, IC-3, IC-5, LP-1, AS-8
	Graduate	AS-6, IC-5, IC-8, IC-2, LP-2, IC-7, LP-4, LP-3,,AS-3, IC-1
	Faculty	AS-1, LP-2, IC-4, IC-3, IC-1, LP-3, IC-2, LP-1, AS-5, IC-7
BUETL	ALL users	IC-7, LP-4, LP-5, IC-8, LP-3, IC-5, IC-6, LP-2, IC-3, LP-1
	Undergraduate	AS-2, AS-9, AS-1, AS-3, AS-6, AS-4, AS-5, IC-3, IC-6, AS-7
	Graduate	IC-5, IC-1, AS-8, LP-3, LP-4, LP-2, IC-7, AS-1, AS-6, AS-7
	Faculty	LP-4, IC-3, AS-3, LP-3, IC-8, IC-5, IC-4, AS-6, IC-7, AS-9
BSMMUL	ALL users	AS-6, AS-7, LP-2, LP-1, LP-5, IC-3, AS-4, IC-2, LP-4, AS-9
	Graduate	AS-6, LP-2, AS-7, LP-5, LP-4, AS-9, LP-1, AS-4, IC-3, IC-2
	Faculty	LP-1, IC-2, AS-2, AS-7, IC-3, LP-3, LP-5, IC-6, IC-8, LP-2
IUBL	ALL users	LP-5, LP-3, LP-1, AS-5, LP-4, IC-5, LP-2, AS-7, IC-6, AS-8
	Undergraduate	LP-5, LP-3, LP-1, AS-5, LP-4, AS-7, IC-5, LP-2, IC-3, AS-8
	Graduate	LP-3, LP-1, IC-3, IC-6, LP-5, IC-4, AS-8, LP-4, IC-5, LP-2
	Faculty	LP-5, LP-1, LP-3, IC-5, LP-2, LP-4, IC-6, AS-8, IC-8, AS-4

At DUL, among the user groups, graduate students DS level is the highest, and faculty DSs are lowest. For RUL, faculty DSs are the highest and undergraduate is the lowest. BAUL DSs are very high. Undergraduate students DSs are on the top and graduates have lower DSs. For BUETL, faculty has the high DSs and undergraduate has the lowest. At BSMMU, faculty rated DSs as the highest and graduates ranked DSs as the lowest. For IUBL, faculty perceptions for DSs are the highest and undergraduate DSs are the lowest.

Among DUL users, for topmost Desired Services for all types of users, i.e. undergraduate, graduate and faculty, items related to *Affect of Service* (AS) are placed as most. This may be assumed that DUL users desired for the interaction with the library staff most by all individual users. RUL undergraduate and graduate students topmost Desired Service dealt with *Library as Place* (LP) and *Information Control* (IC) whereas *Information Control* is the most desired factor for the faculty. So, RUL student users most desired items are connected to the physical environment and resources of the library, whereas library resources for the faculty. At BAUL, all topmost DSs for all individual users are in the dimension *Information Control*, which means, users perceptions are related to library collections and resources. BUETL undergraduate and graduate users topmost DS attributes *Affect of Service* and for faculty, *Information Control*, which depicts that, students are most concerned with library staff related interaction while faculty are connected to library resource. *Affect of Service* and *Library as Place* factors for the items are jointly in the topmost rating for BSMMUL graduate student users, whereas *Library as Place* and *Information Control* are for the user group faculty. At IUBL, all *Library as Place* items are in the topmost rating of all individual user group which ensuing perception regarding the availability of quiet and community spaces, the comfort and welcoming feel of space, and the suitability of space for study, learning, and research.

4.16.4 Research Question 4: What is the status of local questions response?

Considering the status of academic libraries (university libraries) in Bangladesh, five questions have been chosen from a pool of LibQUAL+ tools, which were responded by the users along-with the 22 core questions. Table 4.31 shows the details about the analysis regarding MS, DS, PS, SA and SS for all and individual user group for all the libraries. AT DUL, the top DS is LQ-4, “Library orientations or instruction sessions”. There is no positive AG and SG. Lowest AG is LQ-3 “Adequate hours of service” and highest SG is LQ-4. The upmost DS for RUL is LQ-3 which is also lowest AG value. Highest SS gap for the item LQ-2 “Librarians teaching me how to effectively use the electronically available databases, journals, and books”. For BAUL, LQ-3 is in the top of DS level. The lowest AG is LQ-4 and highest negative SG LQ-2. The top DS for BUETL is LQ-3. On the other hand, LQ-3 and LQ-4 are the narrowest AG and highest negative SG respectively. In case of BSMMUL, the topmost DS is jointly LQ-2 and LQ-3; while narrowest AG is LQ-1 “Library keeping

me informed about resources and services" and widest negative SG is LQ-5 "Providing services as promised". At IUBL, the upmost ranked DS is LQ-5. There were no positive AG and SG found in the Local Questions for previous libraries. Like other libraries, IUBL has also all negative SGs; the topmost negative SG is LQ-1. At least one library found where all AGs are positive. So, only IUBL is meeting minimum service expectation regarding LibQUAL+ local items by all users as AGs are positive for all local question/attributes. All other libraries are lagged behind for Service Adequacy for these attributes. On the other hand all six libraries are behind Service Superiority as all the Superiority Gaps are negative.

4.16.5 Research Question 5: **What are the most essential attributes that librarians or library managers should allocate the resources to support for improving excellent service quality?**

At DUL, for any user group, e.g. undergraduate students, graduate students, faculty and all users, not a single attribute is inside the ZoT. The total scenario is very frustrating, as all the service attributes are outside the ZoT (Figure 4.13-4.16). Like DUL, RUL has the same unsatisfactory situation where not a single item for any user group, e.g. undergraduate students, graduate students, faculty and all users are inside ZoT (Figure 4.17-4.20). Faculty PSs are unpleasantly lower. BAUL (Figure 4.21-4.24) ZoT status is comparatively better than previously mentioned two libraries, though there are no items inside ZoT for undergraduate students and faculty. For graduate students, other than IC-3, LP-4, and AS-8 all nineteen items are inside the ZoT. For all users, only the item AS-5 is within the ZoT. Regarding BUETL (Figure 4.25-4.28), faculty considered AS-1 and LP-1 satisfactory but all other items are outside the range. For other groups the condition is also disappointing as none of the items can qualify for ZoT safe zone. The most substandard and inferior is BSMMUL (Figure 4.29-4.31) ZoT condition. As PSs are badly small sized that BSMMUL needs to improve a lot. Not a single item by any user groups is inside the ZoT. IUBL is comparatively better (Figure 4.32-4.35). At IUB, for undergraduate students the items (seventeen items) AS-1, AS-4, AS-5, AS-6, AS-7, AS-8, AS-9, IC-4, IC-5, IC-6, IC-7, IC-8, LP-1, LP-2, LP-3, LP-4 and LP-5 are inside the ZoT. Unsatisfactory items identified by them are, AS-2, AS-3, IC-1, IC-2, IC-3. Unsatisfactory items recognized by graduate students are AS-3, IC-1, IC-2, IC-3, IC-4, IC-6, and LP-4 whereas other fifteen attributes are inside ZoT. IUBL users found service at least adequate to them

in some range. It is the most pleasing matter that IUB faculty found all the 22 service quality core items reasonable. By all users, AS-1, AS-2, AS-4, AS-5, AS-6, AS-7, AS-8, AS-9, IC-1, IC-2, IC-3, IC-4, IC-5, IC-6, IC-7, IC-8, LP-1, LP-2, LP-3, LP-4 and LP-5 (twenty one) items are safe, only the items AS-3 are outside the Zone of Tolerance. So, Except IUBL, ZoT states of other libraries are very unpleasant. All the attributes are so much poor that it is not needed to mention individually one by one, however all the service quality attributes need to give necessary attention for almost all the libraries for the support to excellent service quality.

4.16.6 Research Question 6: **What are the underlying dimensions that determine the users' evaluation of service quality? How do the predefined dimensions fit in the service quality assessment tool?**

Exploratory Factor Analysis: Table 4.128 shows the Exploratory Factor Analysis output summary, i.e. loaded Factors for each library with the item and number.

Table 4.128
Top Ten DS Items for all Libraries by All User Group

Library	Factor Loaded	No. of Items	Items
DUL	3	Factor1 (12)	LP-3, AS-3, AS-8, AS-7, IC-3, IC-8, IC-4, AS-4, LP-4, LP-2, AS-6, and IC-5
		Factor 2 (1)	AS-9
		Factor 3 (9)	IC-1, IC-7, IC-2, IC-6, AS-1, LP-5, AS-5, LP-1, and AS-2
RUL	4	Factor1 (10)	AS-7, IC-5, IC-6, AS-8, AS-9, IC-4, LP-4, LP-3, AS-6, and IC-3
		Factor 2 (7)	IC-2, IC-1, AS-2, LP-2, AS-3, AS-4, and IC-8
		Factor 3 (-4)	AS-1, IC-7, LP-1, and AS-5
		Factor 4 (1)	LP-5
BAUL	3	Factor1 (13)	AS-8, AS-7, IC-6, AS-6, AS-9, LP-4, IC-8, LP-5, IC-5, IC-7, LP-2, IC-4, and LP-3
		Factor 2 (4)	AS-1, AS-2, AS-4, and AS-5
		Factor 3 (5)	LP-1, AS-3, IC-1, IC-2, and IC-3
BUETL	5	Factor1 (7)	LP-2, LP-5, IC-7, LP-1, IC-5, IC-2, and IC-4
		Factor 2 (5)	LP-3, AS-1, AS-2, AS-3, and AS-5
		Factor 3 (-4)	AS-9, IC-8, LP-4, and IC-3
		Factor 4 (-4)	AS-6, AS-8, AS-4, and AS-7
		Factor 5 (-2)	IC-1, IC-6
BSMMUL	3	Factor1 (7)	AS-6, LP-2, AS-4, AS-9, AS-5, IC-3, and AS-7
		Factor 2 (3)	IC-1, AS-1, and LP-1
		Factor 3 (-12)	IC-8, IC-7, AS-8, LP-5, LP-4, AS-3, IC-6, AS-2, IC-4, LP-3, IC-5, and IC-2
IUBL	2	Factor 1 (17)	AS-4, AS-6, IC-5, IC-7, AS-7, IC-8, IC-6, LP-3, AS-3, AS-9, IC-3, IC-4, AS-5, AS-8, LP-4, LP-5, and LP-2
		Factor 2 (5)	IC-1, AS-1, LP-1, IC-2, and AS-2

The Pattern Matrix for DUL (Table 4.94) shows that three factors have been loaded. The attributes which were at the end of the questionnaire constructed Factor 1, the last attribute, AS-9 constructed Factor2 alone and other attributes constructed Factor 3. The factors with the attributes have scattered and attributes of same predefined dimensions are rarely loaded as same factor. The largest factor or dimension, which is constructed with attributes, related to Library as a mental peace and resourceful place, both printed and electronic resources, along with the cooperative and caring staff. Though it is tough for such kind of factor loading to rename or assign any new factor name, but the loaded factors have a good correlation among the variables. Table 4.95 represents the Pattern Matrix for RUL. Here four factors were loaded. All the attributes are spread in the four factors dispersedly. Factor 1 loaded with the items of all variations where library resources, library staff who are associated with the service and the comfortable library place. Factor 2 also a mix attributes of all dimensions though loaded a several factor but tough to rename though few variables have low correlation. All the attributes are important, but loaded as per perception of the users or how they responded to it. Factor 3 has negative correlation among them as other values are very low so factorized here. Factor 4 consisted with LP-5 only with high value. Comparatively BAUL factors are constructed in a better way to reduce data (Table 4.96). Three factors have been loaded here. Factor1has a combination of mainly library staff's service related efficiencies, library information and resources, and library as utilitarian place which are very common. Factor 2 has basically service affect which is mainly personal. This factor consists of all the AS dimensions. Factor 3 also has a mixed attributes but the items ICs are most in number. BUETL EFA (Table 4.97) loaded highest five factors. The top two factors are quite good but other three factors are negatively correlated in maximum cases by themselves and by attributes. Factor 1 made by Library as utilitarian place and information, resource and equipment related attributes. First factor is very clear. Factor 2 consists of Library staff's service related attributes excluding LP-3. Other three factors, Factor, 3, Factor 4 and Factor 5 have inverse influence over the attributes. BSMMU Pattern Matrix (Table 4.98) shows three factors loaded. Along with one library space related and printed resource related attribute, five AS attributes constructed Factor 1. Factor 2 consists of first statement of service quality questionnaire of all three services and Factor 3 has a loading of negative values by rest of the attributes which is twelve in number. The EFA result for

IUBL shows two loaded factors (Table 4.99) which is minimum factor construction among other libraries. Factors are very high and only two factors have the most related correlation for the attributes observed. All are positive values like DUL and BAUL, the factors those loaded. But here the attributes are spread again for which renaming for Factor 1 and Factor 2 is tough. Attributes of predefined dimensions are spread in the newly constructed or condensed factors.

So, a variety of factor construction is observed for six sample libraries in Bangladesh which may is influenced by the respondents' way of understanding to the service quality attributes, the way of they are treated at library, their needs and perception, library environment etc. However, it is matter of future research to work on LibQUAL+ dimensionality reduction and attribute distribution as per requirement.

Confirmatory Factor Analysis: Earlier, EFA Pattern Matrix data reduction shows factor analysis and factor loading, where attributes were assembled by the output of users' perception of service quality. Again, Structural Equation Modeling (SEM) and text output through fit indices shows the model fit for Confirmatory Factor Analysis (CFA). Table 4.106 represents Model Fit Statistics for LibQUAL+ Data for all six university libraries. The observation and findings are as follows-

At DUL, regarding model fit and goodness fit, the data and the model-implied covariance matrices were statistically significantly different, χ 2 =1226.695, p<.001, and χ2/df =5.95, RMSEA=.115, CFI =.800, and NFI =.771 which indicate that the three factor model is acceptable. For RUL, data and the model-implied covariance matrices were statistically significantly different; examination of comparative and additional fit indices suggested acceptable model fit, where χ 2 =833.3, p<.001, and χ2/df =4.045, RMSEA=.092, CFI =.826, and NFI =.784. By BAUL data and the model-implied covariance matrices were statistically significantly different. Exploration of model fit indices, χ 2 =1109.9, p<.001, and χ2/df =5.388, RMSEA=.114, CFI =.799, and NFI =.767 suggested that model is moderately acceptable. Here at BUETL, data and the model-implied covariance matrices were statistically significantly different; investigation of model fit indices, χ 2 =1350.482, p<.001, and χ2/df =6.556, RMSEA=.126, CFI =.716, and NFI =.685 suggested that model is moderately acceptable. For BSMMUL, data and the model-implied covariance matrices were statistically significantly different; examination of comparative and additional fit indices suggested default model fit, χ 2 =732.9, p<.001,

and $\chi 2/df$ =3.558, RMSEA=..091, CFI =.882, and NFI =.843. At IUBL, regarding model fit and goodness fit, the data and the model-implied covariance matrices were statistically significantly different, χ 2 =680.634, p<.001, and $\chi 2/df$ =3.304, RMSEA=.081, CFI =.924, and NFI =..896 which demonstrated the model superior fit. So, as a global and standard instrument, it has been observed that in most of the cases these findings suggest three-factor model adequately fits the data, and provides evidence of sound psychometric integrity of the current version of the instrument. As such, this evidence supports the three factor model of LibQUAL+ as a valid measure of library service quality. However, it is needed to increase more awareness and understanding among the library users with better instructions regarding LibQUAL+ service attributes and the services they use to get by respective libraries.

4.16.7 Research Question 7: Are there any significant differences between male and female users by user group gender for overall service quality?

Earlier research in Bangladesh (Shoeb & Ahmed, 2009) found no differences significantly regarding Gender and user group like faculty, graduate and undergraduate. The findings in this study confirmed the significant differences by both male/female and user group faculty, graduate and undergraduate students. Though, it is believed that the service organizations (libraries) do not make any discrimination to their service delivery by any gender, cultural, social or economic circumstances to their user. However, as the significance is emerged, so it should be considered by the libraries for their future service delivery regarding these differences. Table 4.129 demonstrates significant Attributes of Desired Service Level and Dimensions with Quality Gaps by male/ female User.

Table 4.129

Significant DS Attributes and Dimensions with Quality Gaps by Male/ Female User

Library	Significant Attributes	Significant Dimension and Quality Gaps
DUL	AS-3, AS-7, AS-9, IC-1, LP-3, and LP-5	Information Control (SA)
RUL	AS-2, AS-3, AS-4, AS-5, AS-6, AS-7, AS-8, AS-9, IC-1, IC-3, IC-4, IC-5, IC-6, IC-7, IC-8, LP-1, LP-2, LP-3, and LP-4	Affect of Service (SA), Information Control (SA), Library as Place (SS), Overall (SA), Overall (SS)
BAUL	AS-2, AS-5, AS-6, AS-7, IC-2, LP-4, and LP-5	-
BUETL	AS-1, AS-3, AS-5, IC-1, IC-7, and LP-5	-
BSMMUL	AS-1, AS-2, AS-3, AS-4, AS-5, AS-6, AS-7, AS-9, IC-1, IC-2, IC-3, IC-6, LP-1, LP-2, and LP-3	Affect of Service (SA), Affect of Service (SS), Information Control (SS), Library as Place (SS), Overall (SS)
IUBL	AS-2. AS-8 and AS-9	-

RUL (19 attributes) users DSs are found significant most that followed by the BSMMUL (15 attributes). Few attributes have been noticed for DUL (6 attributes), BAUL (7 attributes) and BUETL (6 attributes) which are significant though IUBL (3 attributes) attributes are very little. Likewise, both RUL and BSMMUL, dimension-wise quality gaps emerged as most significant. SA AS, SA IC, SS LP, SA overall and SS overall gaps are significant for RUL and SA AS, SS AS, SS IC, SS LP and SS overall are significant for BSMMUL DUL has only SA IC. BAUL, BUETL and IUBL have no differences for dimension-wise quality gaps. This is very clear that the differences in DSs affect the differences in quality gaps. As the users' context varied from their contextual background to current standing of perceptive so, it is quite natural see these differences as findings.

4.16.8 Research Question 8: Are there any significant differences between the users by individual group of user for overall service quality?

Table 4.130 demonstrates significant attributes of Desired Service Level and Dimensions with Quality Gaps by individual group of user.

Table 4.130

Significant DS Attributes and Dimensions with Quality Gaps by Individual User Group

Library	Significant Attributes	Significant Dimension and Quality Gaps
DUL	AS-9	Affect of Service (SA), Information Control (SA), Library as Place (SA), Affect of Service (SS), Information Control (SS), Overall (SA), Overall (SS)
RUL	AS-2, AS-4, AS-9, IC-6, and IC-8	Affect of Service (SA), Information Control (SA), Affect of Service (SS), Information Control (SS), Library as Place (SS), Overall (SA), Overall (SS)
BAUL	AS-1, AS-2, AS-3, AS-5, AS-6, AS-7, AS-8, IC-1, IC-2, IC-3, IC-4, IC-5, IC-7, LP-1, LP-2, LP-3, LP-4, and LP-5	Affect of Service (SA), Information Control (SA), Library as Place (SA), Affect of Service (SS), Information Control (SS), Library as Place (SS), Overall (SA), Overall (SS)
BUETL	AS-1, AS-3, IC-3, IC-4, IC-8, and LP-5	Affect of Service (SA), Information Control (SA), Library as Place (SA), Affect of Service (SS), Information Control (SS), Library as Place (SS), Overall (SA), Overall (SS)
BSMMUL	AS-1, AS-3, AS-5, AS-6, AS-9, and LP-4	Affect of Service (SA), Information Control (SA), Library as Place (SA), Overall (SA)
IUBL	AS-2, AS-4, AS-8, IC-1, IC-4, IC-5, IC-6, IC-8, LP-1, LP-2, LP-3, and LP-5	Information Control (SA), Library as Place (SA), Information Control (SS), Library as Place (SS), Overall (SA), Overall (SS)

It has been observed that, the libraries those have less or no significant items for both DS and service quality gaps in the previous research question have more items. On the other hand, libraries those containing more significant items have less or few items. Here by individual group of user, BAUL has the highest attributes (18 attributes) for DS level significance, whereas IUBL is next to BAUL by number of significant attributes (12 attributes).BSMMUL and BUETL both have six attributes and RUL has five attributes significant. DUL found as only one item. For individual group of user, the difference identified as, for DUL, SA AS, SA IC, SA LP, SS AS, SS IC, SA overall and SS overall. RUL gaps are SA AS, SA IC, SS AS, SS IC, SS LP, SA overall and SS overall are significant. For BAUL, SA AS, SA IC, SA LP, SS AS, SS IC, SS LP, SA overall and SS overall while BUETL has the same combination. IUBL dimensions are SA IC, SA LP, SS IC, SS LP, SA overall and SS overall, whereas BSMMUL has SA AS, SS IC, and SA overall.

4.17 Summary

This Chapter illustrated the characteristics of the respondents by gender, user type, status, discipline, age and library use. It depicted reliability analysis, summary of information literacy outcome, general satisfaction responses, and the local questions. This Chapter also explored the service quality gaps, *zone of tolerance*, factorial analysis, and finally discussed the result of the data analyses which were calculated for the research questions.

Chapter 5

Summary, Recommendations and Conclusion

5.1 Introduction

The previous Chapter explores the results of the data analyses and findings. This Chapter will present the scope and limitation, summary of the research findings, recommendations and conclusion.

5.2 Objective of the Study

The main objective of the present study was to assess the service quality of university libraries in Bangladesh using LibQUAL+ with the focus on improvement of their services and strategic enhancement. Particularly, this study addressed LibQUAL+ scores for service quality assessment with various indicators for the exploration of how the academic libraries in Bangladesh are performing and where their services need improvement.

5.3 Research Area

The libraries of six top-ranked universities in Bangladesh (five public and one private) were chosen for the present study. They were: University of Dhaka Library (DUL), Rajshahi University Library (RUL), Bangladesh Agricultural University Library (BAUL), Bangladesh University of Engineering and Technology Library (BUETL), Bangabandhu Sheikh Mujib Medical University Library (BSMMUL), and Independent University, Bangladesh Library (IUBL). These libraries are functioning since the inception of their parent organizations to serve their respective academic communities.

5.4 Sampling and Response Rates

The samples of the study were the users (undergraduate and graduate students, and faculty) of the above mentioned university libraries. The LibQUAL+ questionnaire used in this study had two versions, web-based (for the faculty), and printed (for undergraduate and graduate students). The sample size reflected approximately 95 percent confidence level and ±5 standard deviation. The number of overall returned/responded questionnaire were, 373 (DUL), 364 (RUL), 340 (BAUL), 349 (BUETL), 313 (BSMMUL), and 353 (IUBL) with the response rate of 48.63%, 58.33%, 60.50%, 65.23%, 75.79% and 83.85% respectively. The survey link of the web-based LibQUAL+ was sent to the faculty of the

universities through e-mail, whereas students' assessment outcome was collected through printed instrument. The response rates from faculty were 6.14% (DUL), 6.44% (RUL), 8.62% (BAUL), 11.71% (BUETL), 27.43% (BSMMUL), and 37.62% (IUBL). Conversely, the response rates from students were 96.67% (DUL), 96.39% (RUL), 96.97% (BAUL), 96.97% (BUETL), 94.00% (BSMMUL), and 98.44% (IUBL).

5.5 LibQUAL+ Tool

All participants were asked to complete LibQUAL+ tool as questionnaire of this study. The instrument was divided into 22 fixed core questions, five local statements, eight additional questions about information literacy and general satisfaction, three library use questions, demographics questions and comments box. The users were asked to rate 22 fixed and five local questions at three levels of services: *My Minimum Service Level (MS), My Desired Service Level (DS)* and *Perceived Service Performance (PS)*. The items that form the core of the LibQUAL+ instrument include aspects of empathy, responsiveness, assurance, reliability, scope, convenience, ease of navigation, timeliness, equipment availability, self-reliance, pragmatic, utilitarian, and symbolic terms and refuge. The items were categorized under three dimensions, these are: (a) *Affect of Service;* (b) *Information Control*; and (c) *Library as Place*. Additionally, information literacy, general satisfaction and outcomes questions were added in the survey questionnaire. Library use questions asked how often the users use the library resource either in person or through online, and they use non-library gateways such as Google or Yahoo! for information. Demographic questions included questions about age, gender, user group (undergraduate, graduate, faculty, etc.), discipline, etc. Finally, an open-ended comments box was placed at the end of the questionnaire to enter comments about library service and related issues.

5.6 Statistical Analysis

Statistical analysis was performed using SPSS and MS Excel, and structural model was tested using IBM SPSS AMOS. After collecting the completed questionnaires (both electronic and printed), all data were entered into SPSS from the questionnaires. The procedures of data treatment were set to validate the data for further analysis. After data treatment, statistical analysis was done in order to accomplish the purposes of the study. The data was analyzed in the following ways: first, the gap difference between the Minimum Service and Perceived Service for any given service quality statement was calculated and ranked respectively to determine service adequacy; second, the gap

discrepancy between Desired Service and Perceived Service performance was calculated by individual group of users and ranked respectively to see whether libraries are meeting the desired expectation; third, the means of desired service expectations was ranked and compared among three groups of users to explore the research question; fourth, all three levels of service performances and gaps were calculated and ranked respectively to explore the status of local questions responses; fifth, the *Zone of Tolerance* was calculated to investigate which were the most essential attributes; sixth, to explore the underlying dimensions that determine the users' evaluation of service quality and the dimensions that are predefined, exploratory and confirmatory factor analysis were performed respectively. Finally, nonparametric tests like, Kruskal-Wallis and Mann-Whitney tests were calculated to see the significant differences among different user groups. The scores for different measures were calculated using Mean, Standard Deviation, Pattern Matrix, Factor Correlation Matrix, Structure Coefficient, Item Correlation Matrix, P value, Degree of Freedom, Chi-Square, Relative Chi Square, Root Mean Square Error of Approximation, Normed Fit Index, and Comparative Fit Index.

5.7 Scope and Limitation

The study was conducted for the analysis of LibQUAL+ scores for the selected academic libraries in Bangladesh which assess the service quality through the eyes of library users. Service quality, in LibQUAL+ and for the purposes of this study, is a construct defined as the result of the consumer's evaluation of desired service with perceived service generally. To ensure the quality education, university libraries should go through an evaluation process of their service as they promised to serve. The study tried to make a connection of understanding with the library's performance with their customer. It is believed that the librarian or library managers may seek better way to improve the service quality in order to survive and derive user's loyalty. The assessment data that evaluated and indicated for all the sector of libraries service quality which is badly needed improvement can serve as evidence for the thoughtful use of assessment results.

Data was collected with the help of different category of volunteers, i.e. faculty and student from library users of the selected libraries. Though all the volunteers had gone through an orientation for approaching and collecting data but it was quite hard to know how much the users understood the questionnaire attributes and research objectives as this is very alien to the library users in Bangladesh. Beside, few comments were made for the

necessity of using a translated questionnaire, i.e. Bangla. Here, this research used a model LibQUAL+ instrument keeping the originality of attributes, dimensions, standard, and norms. Eventually, two format of data collection process may affect the outcome of the research, although it was beyond the scope for this current research. On the other hand, as the sample of the university libraries and the respondent was self-selected from the subset of population, this subset and the sample may not be representative of the population of all Bangladesh academic libraries.

5.8 Summary of Findings

Research question 1 asked, "Which attributes of service quality are meeting minimum expectations, or adequate service by the group user?" As, all the AGs are negative by individual users or overall examination, DUL, RUL, and BSMMUL are not meeting the minimum expectation of service quality. For these three libraries, all the attributes of Minimum Services are lagged behind the Perceive Services with high difference individually or by the all group of users. BAUL partially meets the minimum service expectation by graduate and for AS-4 by all users, whereas, other attributes are not met. BUETL is not meeting minimum expectation excluding AS-1 for undergraduate and AS-1, and LP-1 for faculty. Only IUBL is moderately meeting minimum expectation by all individual user groups and by all users.

Research question 2 asked, "Which attributes of service quality equal, exceed or fall short user perception (meeting desired expectation), by the group user?" DUL, RUL, BAUL, BUETL and BSMMUL are not meeting desired expectation by any individual or all user groups and service superiority is extremely poor as all the superiority gaps are negatively appeared with high differences. All the Desired Services values are lagged behind the Perceived Services awfully. IUBL also does not meet the desired expectation though service superiority status is not up to the mark; superiority gaps found moderately negative and not very high. Only, the item LP-3 "A comfortable and inviting location" found positive SG by faculty, indicating that the attribute met desired expectation. Thus, the attribute LP-3 exceed user perception by faculty at IUBL among the libraries.

Research question 3 asked, "In what way do the users expect for excellent service quality from the university library, by the group user?" There are some similarities and dissimilarities among the individual user groups in any given library and by all libraries. Among DUL users, all types of users, i.e. undergraduate, graduate, faculty and all, they

have top priority desire for the interaction with the library staff by all individual users. RUL undergraduate and graduate users most desired attributes are connected to the physical environment and resources of the library, whereas library resources are for faculty. At BAUL, all and individual users desired expectations are related to library collections and resources. BUETL undergraduate and graduate users are most concerned with library staff related interaction while faculty have the affinity on library resources. Library staff interaction and better library environment is mostly desired by BSMMUL graduate students whereas library physical environment and resources related services are in the top most desired area by faculty. At IUBL, all individual user group ensured perception regarding the quiet and community spaces, the comfort and welcoming feel of space, and the suitability of space for study, learning, and research.

Research question 4 asked, "What is the status of local questions response?" At DUL, top DS is LQ-4, "Library orientations or instruction sessions". There is no positive AG and SG; lowest AG is LQ-3 "Adequate hours of service" and highest SG is LQ-4. At RUL, top DS is LQ-3 which is also lowest AG; highest SS gap is by LQ-2 "Librarians teaching me how to effectively use the electronically available databases, journals, and books". For BAUL, LQ-3 is in the top of DS level; the lowest AG is LQ-4 and highest negative SG LQ-2. At BUETL, top DS is LQ-3; LQ-3 and LQ-4 are the narrowest AG and highest negative SG respectively. For BSMMUL, topmost DS is jointly LQ-2 and LQ-3; narrowest AG is LQ-1 "Library keeping me informed about resources and services" and widest negative SG is LQ-5 "Providing services as promised". At IUBL, top ranked DS is LQ-5; All AGs are positive whereas all SGs are negative; topmost negative SG is LQ-1. Highest AG is LQ-3 followed by LQ-5. So, only IUBL is meeting minimum service expectation regarding LibQUAL+ local items, All other libraries are lagged behind for Service Adequacy for these attributes On the other hand all six libraries are lagged behind Service Superiority where IUBL has very low negative SG in contrast to other libraries.

Research question 5 asked, "What are the most essential attributes that librarians or library managers should allocate the resources to support for improving excellent service quality?" At DUL, for any individual user group, and by all users, not a single attribute is inside the ZoT. For RUL, all the items are also outside ZoT and in very disappointing state. All PSs are terribly lower. For BAUL, ZoT status is comparatively better than previously mentioned two libraries, though there are no items inside ZoT for undergraduate students and all; for graduate students, excluding IC-3, LP-4, and AS-8 all

other nineteen (19) items are inside the ZoT. At BUETL, for all users, only the item AS-5 is within the ZoT. Except AS-1 and LP-1 all other items are outside the range. Conditions for rest of the users are also disappointing as none of the items qualified for ZoT secured zone. BSMMUL has the most substandard and inferior ZoT status among all six libraries. As PSs are badly small sized that BSMMUL needs to improve a lot. Not a single item by any user groups is inside the ZoT. Total scenario is comparatively better at IUBL and in the acceptable situation. For undergraduate students, the items (seventeen items) AS-1, AS-4, AS-5, AS-6, AS-7, AS-8, AS-9, IC-4, IC-5, IC-6, IC-7, IC-8, LP-1, LP-2, LP-3, LP-4 and LP-5 are in the ZoT protected area. Intolerable items recognized by graduate students are AS-3, IC-1, IC-2, IC-3, IC-4, IC-6, and LP-4 whereas other fifteen (15) attributes are found tolerable. IUBL users believed library service at least acceptable to them in some range. IUB all considered all the 22 service quality core items reasonable which is a very good testimonial for IUBL. By all users, AS-1, AS-2, AS-4, AS-5, AS-6, AS-7, AS-8, AS-9, IC-1, IC-2, IC-3, IC-4, IC-5, IC-6, IC-7, IC-8, LP-1, LP-2, LP-3, LP-4 and LP-5 (twenty one items) are safe, only the items AS-3 are outside the ZoT. So, except IUBL, ZoT states of other libraries are very unpleasant and almost all the attributes need resource or special attention to improve service quality.

Research question 6 asked, "What are the underlying dimensions that determine the users' evaluation of service quality? How do the predefined dimensions fit in the service quality assessment tool?" regarding underlying dimensions, a multiplicity of factor structure is observed for six sample libraries in Bangladesh, i.e. 3 factor (DUL), 4 factor (RUL), 3 factor (BAUL), 5 factor (BUETL), 3 factor (BSMMUL), and 2 factor (IUBL). All are separated and diverse from one another. This diversification of factor construction is unpredictable and impulsive. There have not any reason observed directly rather than it is assumed that this is influenced by the respondents' way of understanding to the service quality attributes as well LQUAL+ statements, the way of they are treated at library, their needs and perception, library environment etc. But this investigation is not limited to here, it is further investigated for the goodness and model fit exploration of present three dimension model. From the exploration and observation it has been revealed that, by DUL, RUL and BSMMUL data, the three factor model is acceptable. BAUL and BUETL data depicted that this model is moderately fit. On the other hand, IUBL data revealed that this model is super fit for this context.

Research question 7 asked, "Are there any significant differences between male and female users by gender for overall service quality?" DUL, RUL, and BSMMUL have significant differences with various items and by dimension-wise gaps. BAUL, BUETL, and IUBL found less significant, only few attributes are significant but not a single dimension-wise service quality gap observed for these three libraries.

Research question 8 asked, "Are there any significant differences between the users by individual group of user for overall service quality?" Differences are also observed here but it is interesting to see that the libraries those have less or no significant items for both DS and service quality gaps in the findings of previous research question - have more attributes found here as statistically significant. On the other hand, libraries those containing more significant items, which have less or few attributes. However, it has been observed that DUL, RUL, and BSMMUL have less significant attributes and dimension-wise gaps, whereas BAUL, BUETL, and IUBL have more differences than the previous three libraries.

5.9 Recommendations

All the libraries of this study are resourceful and functional, but they are not doing well as they are not meeting the minimum level of services. The libraries should focus on its core activities and consider their functions which support its organizational mission. After investigating and reviewing the result, the recommendations are presented below for the improvement of service quality.

a. Allocate resources to the service attributes for better service quality. Service Adequacy, Service Superiority and the state of the Zone of Tolerance proved that excluding IUBL, almost all the attributes of service quality of other libraries needed improvement a lot. For excellent service quality output library managers should try to minimize the gaps. The library is the only centralized location where new and emerging information technologies can be combined with traditional knowledge resources in a user-focused, service-rich environment. The attributes those should be considered for the development include remote access to electronic resources, an informative and well-structured library website, required printed library material especially books and journal, up-to-date equipment and user-friendly tools for accessing information, access to required electronic journal, etc. The functions of the libraries should invite sustained engagement with intellectual pursuits by individual or group of students.

b. Make the library a utilitarian place. Now-a-days, library space is a matter of psychosocial aspects of an academic community. The library's primary role is to advance and enrich the student's educational experience. The library should be treated as a logical extension of the classroom. It is a place to access and explore information with fellow students in a variety of formats, analyze the information in group discussion, and produce a publication or a presentation for the next day's seminar and so on. As library is place of resources and service alongside a place of mental peace, the place, timing and environment should be such that encourage users to their study work and research. Libraries are considered as learning laboratories, it is expected that students should use their time in the library thinking analytically, besides searching for information and study.

c. Library staff. Like other services, library users also assess the staff related to services and activities. The finding indicates that library staff may treat each user group differently so the library staff should consider this finding. Most of the time users complained about the ignorance and lack of willingness to cooperate by staff members. However, for the improvement of service quality, undoubtedly all the section of library staff-related attributes should be addressed. It is true that staff should be knowledgeable and updated regularly to handle the users' variety of query and demand. As the staff of the reference and readers service sections have to deal with the users most, so the library staff of those sections must be proactive. The leadership quality, interpersonal skills, accountability, responsiveness, personal caring and understandability of the staff should be developed. The deployment of staff within the library might be reviewed to encourage greater flexibility and to reduce dependence on individual staff members. On the other hand, there is a need for a staff development policy which will take account of the current situation and the future needs of the libraries, especially the IT-related needs.

d. Library instruction/orientation & information literacy session. At the beginning of the academic session or semester, the users should be instructed about the services provided by the library, i.e. how to use those services, a proper guideline for library's functionalities, creating awareness among the users, and how to communicate with the library staff and librarians. The users should be informed in advance about the services what they are allowed to receive and what the scope is. There is a need for providing continuous user education for the various resources of the library including OPAC, institutional repositories, search engines, e-resources, social communication, micro blogs, web 2.0 etc, Moreover, many users seem unaware of the excellent resources

available in the Audio-Visual Sections, this needs to be made more visible and accessible. Information literacy is crucial and the library has a key role to play to research support for developing independent learner and critical thinker through effective learning. It is required for the students to build capacities for information literacy that support life-long learning and creativity.

e. Public relations and marketing of library services. Whether physical or virtual, an academic library's collection and services are relevant only to the extent that they are used by their intended audience. For libraries marketing plan that includes a project description, an analysis of the current market, the target market, goals, objectives, strategies, action plans, evaluation/assessment techniques, and a SWOT (strengths, weaknesses, opportunities and threats) analysis. To build or enhance a library brand image, consistent library communications, slogans, staff behaviour, and facilities must be maintained as they all contribute to the sum of customer perceptions of the perceived value and mission of the library. To outreach library services, web site is a great media; the libraries should announce services and resources via library homepage/social communication sites. The library homepages need to be improved and updated regularly; they must be informative and well-organized. The layout and presentation of the homepage should be clear and easy to use.

f. Resource sharing and inter-library loan service. Resources are the main driving force for any library. Scarcity of resources frustrates the users which lessen their loyalty to the library. It is true with regard to both printed and electronic resources, by all the libraries. It is a fact that no library has complete collection of its own to support its academic community. There are only two consortia currently operational in Bangladesh: INASP-PERI and UGC Digital Library (UDL). Effective resource sharing and interlibrary loan service may enhance to the availability of library resources.

5.10 Conclusion

The objective of this study was not aimed to judge any library as 'good' or 'bad', rather it was intended to explore and analyze the service quality attributes. The scope of the research was to conduct this study within the norms of LibQUAL+ tool in Bangladesh context for the first time. LibQUAL+ has enabled to find out what a broad range of users thought of the services a library may offer; what level of service-delivery quality a library had achieved in their eyes, and to get a clear picture of what they actually wanted the

library to deliver (as opposed to what the library authority thought they wanted). The top ranked renown academic libraries of this study are may be good as they all are following standard way of working process but the investigation revealed the frustrating scenario from the perception of the users that their service operation is far behind the excellence of service quality even bellow minimum level (except IUBL). Most of perceived performances are much lower; these affect the minimum acceptable service performance badly. On the other hand, the desired expectations of the users are high which affect both the service adequacy and the service superiority. Underlying dimensions extended for two libraries (for RUL and BUETL), collapsed for one library (IUBL) and changes were not observed for the remaining three libraries (for DUL, BAUL and BSMMUL). As the attributes were scattered, it was beyond the scope for this current research to rename the dimensions. However, the variations in dimensional factor loadings across universities are assumed to be as arbitrary In-spite of the variations observed with the dimensionalities, confirmatory factor analysis endured overall LibQUAL+ original dimensions. Libraries serve society and so they should be dynamic organizations that do necessary changes as and when required. As the organizational environment is changing, so the libraries must change. This means nothing is constant, from the characteristics, services, assessment everything must keep pace with the rate of change considering the change requirement and institutional mission. Library service quality is what the user says it is; it is their judgment, their expression of experiences and thoughts.

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Appendix

LibQUAL+ Survey Instrument used for this study

LibQUAL+ print version used for this study to collect graduate and undergraduate students responses

Welcome to the service quality survey!

Based on your experiences as a user in your University Library, please think about the kind of University Library that would deliver excellent quality of service. This survey is conducted to measure the service quality and to identify best practices of this Library, through Library Assessment Tool. Please answer all items. This survey will take about 8-10 minutes to complete. Thank you for your participation!

Please encircle (O) to rate the following **statements** (1 is lowest, 9 is highest) by indicating:

Minimum Service Level- the number that represents the minimum level of service that you would find acceptable
Desired Service Level- the number that represents the level of service that you personally want
Perceived Service Performance- the number that represents the level of service that you believe this library currently provides

	When it comes to use your university library…	**My Minimum Service Level Is** *Low* *High*	**My Desired Service Level Is** *Low* *High*	**Perceived Service Performance Is** *Low* *High*	N/A
1)	Employees who instill confidence in users	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
2)	Making electronic resources accessible from my home or office	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
3)	Library space that inspires study and learning	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
4)	Giving users individual attention	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
5)	A library Web site enabling me to locate information on my own	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
6)	Library keeping me informed about resources and services	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
7)	Employees who are consistently courteous	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
8)	The printed library materials I need for my work	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
9)	Quiet space for individual activities	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
10)	Readiness to respond to users' questions	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
11)	The electronic information resources I need	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
12)	Librarians teaching me how to effectively use the electronically available databases, journals, and books	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
13)	Employees who have the knowledge to answer user questions	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
14)	Adequate hours of service	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
15)	A comfortable and inviting location	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
16)	Employees who deal with users in a caring fashion	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
17)	Modern equipment that lets me easily access needed information	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
18)	Library orientations or instruction sessions	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
19)	Employees who understand the needs of their users	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
20)	Easy-to-use access tools that allow me to find things on my own	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
21)	A getaway for study, learning, or research	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
22)	Willingness to help users	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
23)	Making information easily accessible for independent use	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
24)	Print and/or electronic journal collections I require for my work	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
25)	Community space for group learning and group study	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
26)	Providing services as promised	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A
27)	Dependability in handling users' service problems	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	N/A

Please indicate the degree to which you agree with the following statements:		
28)	The library helps me stay abreast of developments in my field(s) of interest.	1 2 3 4 5 6 7 8 9 *Strongly Disagree* *Strongly Agree*
29)	The library aids my advancement in my academic discipline.	1 2 3 4 5 6 7 8 9 *Strongly Disagree* *Strongly Agree*
30)	The library enables me to be more efficient in my academic pursuits.	1 2 3 4 5 6 7 8 9 *Strongly Disagree* *Strongly Agree*
31)	The library helps me distinguish between trustworthy and untrustworthy information.	1 2 3 4 5 6 7 8 9 *Strongly Disagree* *Strongly Agree*
32)	The library provides me with the information skills I need in my work or study.	1 2 3 4 5 6 7 8 9 *Strongly Disagree* *Strongly Agree*
33)	In general, I am satisfied with the way in which I am treated at the library.	1 2 3 4 5 6 7 8 9 *Strongly Disagree* *Strongly Agree*
34)	In general, I am satisfied with library support for my learning, research, and/or teaching needs.	1 2 3 4 5 6 7 8 9 *Strongly Disagree* *Strongly Agree*
35)	How would you rate the overall quality of the service provided by the library?	1 2 3 4 5 6 7 8 9 *Extremely Poor* *Extremely Good*

Please indicate your library usage patterns:	
36)	How often do you use resources on library premises? ___ Daily ___ Weekly ___ Monthly ___ Quarterly ___ Never
37)	How often do you access library resources through a library Web page? ___ Daily ___ Weekly ___ Monthly ___ Quarterly ___ Never
38)	How often do you use Yahoo(TM), Google(TM), or non-library gateways for information? ___ Daily ___ Weekly ___ Monthly ___ Quarterly ___ Never

39)	**Name of your University**:

Please answer a few questions about yourself:	
40)	**Age in the range:** ___ Under 18 ___ 18 – 22 ___ 23 – 27 ___ 28 – 32 ___ 33 – 37 ___ 38 – 42 ___ 43 – 47 ___ 48 – 52 ___ 53 – 57 ___ 58 – 62 ___ Over 62
41)	**Gender:** ___ Male ___ Female

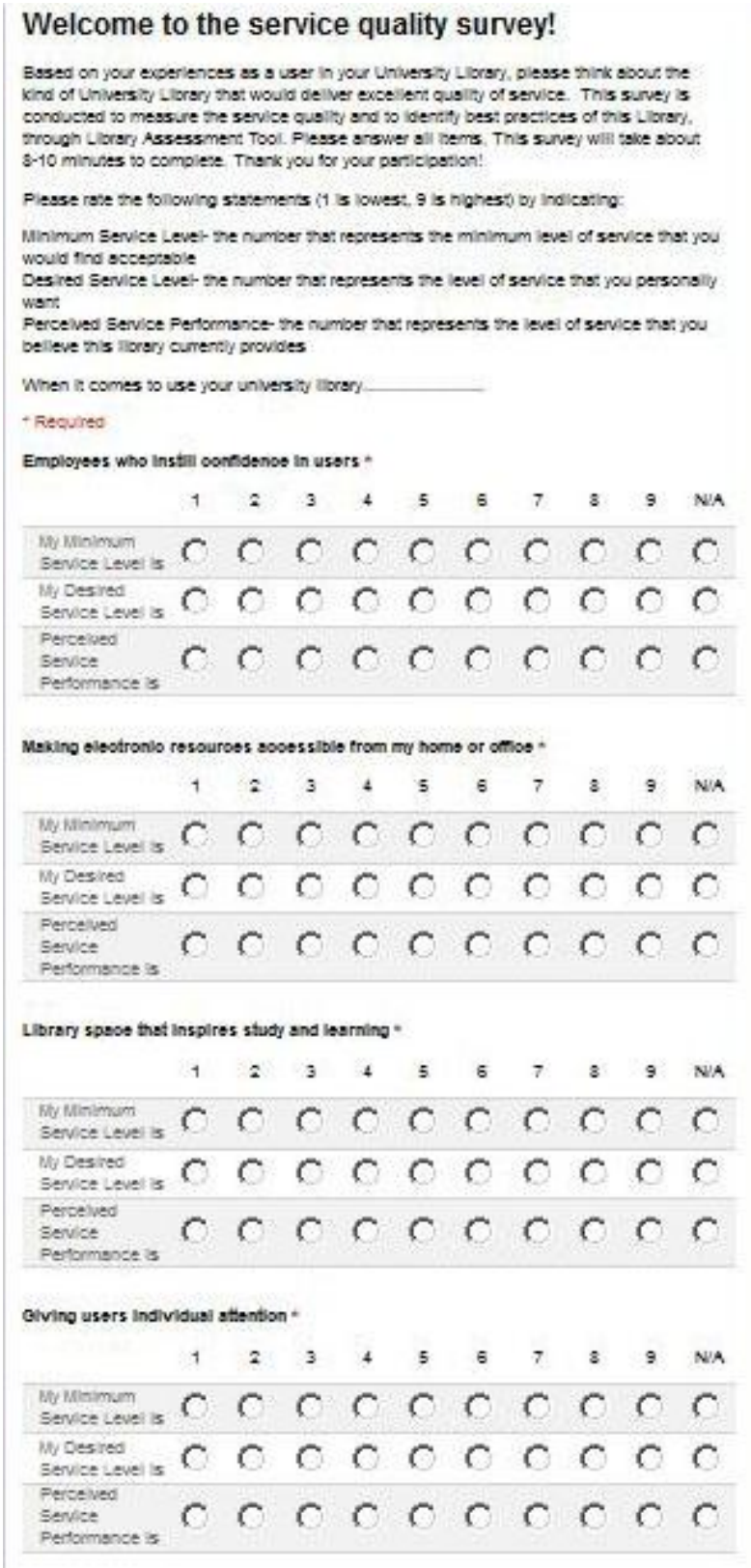
42)	**Discipline**: ___ Arts/Humanities ___Agriculture ___ Business ___ Applied Sciences / Engineering ___ Medical Science ___ Social Science ___ Others (Please specify)

43)	**Position:** (Select the ONE option that best describes you.)
	Undergraduate: ___ First year ___ Second year ___ Third year ___ Fourth year ___ Fifth year and above ___ Non-degree
	Graduate: ___ Masters ___ Doctoral ___ Non-degree or Undecided ___ Others (Please specify)
	Faculty: ___ Professor ___ Associate Professor ___ Assistant Professor ___ Lecturer ___ Adjunct Faculty ___ Others (Please specify)

44) Please enter any comments about library services below:

Thank you for participating in this library service quality survey!

Screenshot of LibQUAL+ web version used for this study to collect faculty members responses (partial view of core attributes, IL, general satisfaction and library use questions)



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Desired Service Level- the number that represents the level of service that you personally want
Perceived Service Performance- the number that represents the level of service that you believe this library currently provides

When it comes to use your university library.....

* Required

Employees who instill confidence in users *

	1	2	3	4	5	6	7	8	9	N/A
My Minimum Service Level is	○	○	○	○	○	○	○	○	○	○
My Desired Service Level is	○	○	○	○	○	○	○	○	○	○
Perceived Service Performance is	○	○	○	○	○	○	○	○	○	○

Making electronic resources accessible from my home or office *

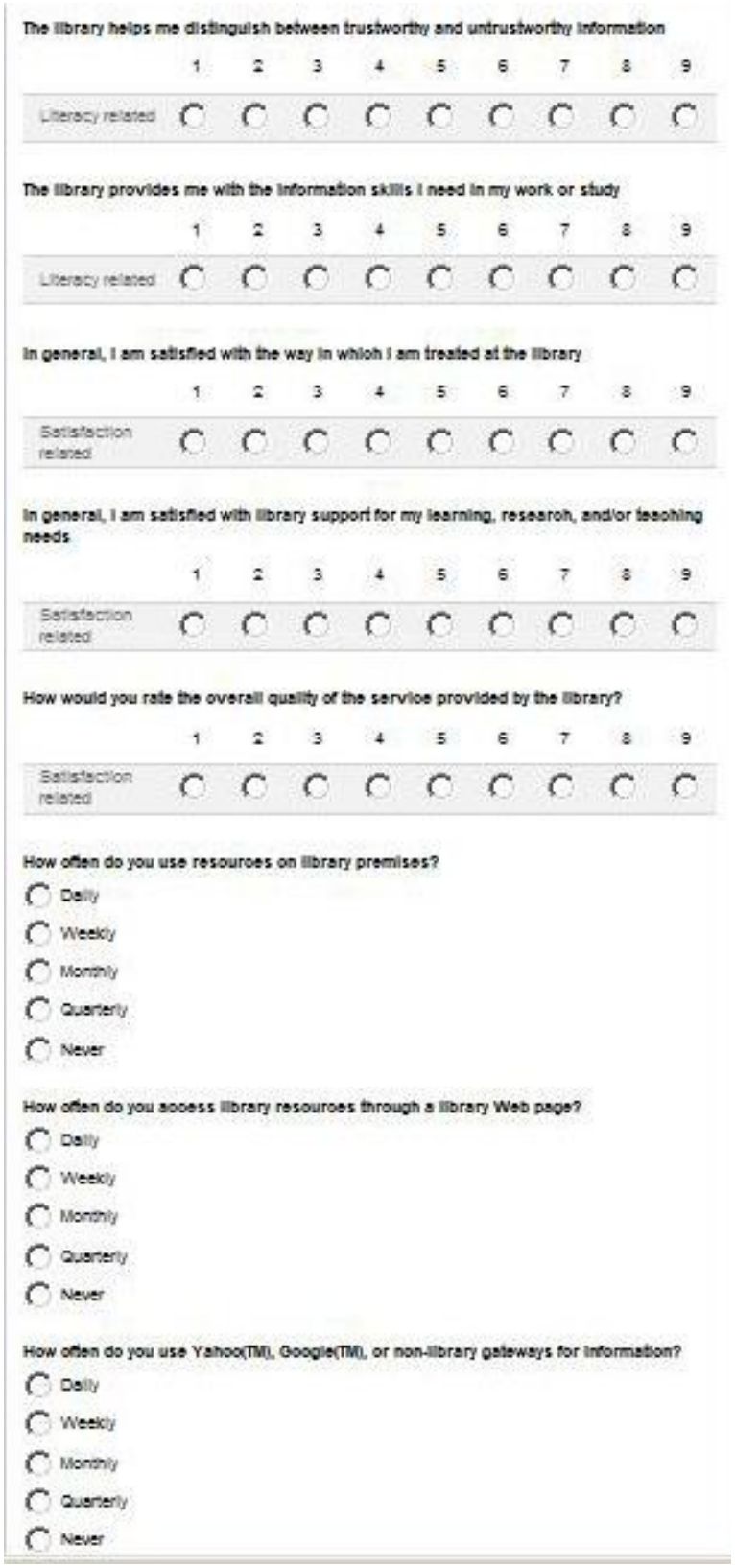
	1	2	3	4	5	6	7	8	9	N/A
My Minimum Service Level is	○	○	○	○	○	○	○	○	○	○
My Desired Service Level is	○	○	○	○	○	○	○	○	○	○
Perceived Service Performance is	○	○	○	○	○	○	○	○	○	○

Library space that inspires study and learning *

	1	2	3	4	5	6	7	8	9	N/A
My Minimum Service Level is	○	○	○	○	○	○	○	○	○	○
My Desired Service Level is	○	○	○	○	○	○	○	○	○	○
Perceived Service Performance is	○	○	○	○	○	○	○	○	○	○

Giving users individual attention *

	1	2	3	4	5	6	7	8	9	N/A
My Minimum Service Level is	○	○	○	○	○	○	○	○	○	○
My Desired Service Level is	○	○	○	○	○	○	○	○	○	○
Perceived Service Performance is	○	○	○	○	○	○	○	○	○	○



The library helps me distinguish between trustworthy and untrustworthy information

	1	2	3	4	5	6	7	8	9
Literacy related	○	○	○	○	○	○	○	○	○

The library provides me with the information skills I need in my work or study

	1	2	3	4	5	6	7	8	9
Literacy related	○	○	○	○	○	○	○	○	○

In general, I am satisfied with the way in which I am treated at the library

	1	2	3	4	5	6	7	8	9
Satisfaction related	○	○	○	○	○	○	○	○	○

In general, I am satisfied with library support for my learning, research, and/or teaching needs

	1	2	3	4	5	6	7	8	9
Satisfaction related	○	○	○	○	○	○	○	○	○

How would you rate the overall quality of the service provided by the library?

	1	2	3	4	5	6	7	8	9
Satisfaction related	○	○	○	○	○	○	○	○	○

How often do you use resources on library premises?

- ○ Daily
- ○ Weekly
- ○ Monthly
- ○ Quarterly
- ○ Never

How often do you access library resources through a library Web page?

- ○ Daily
- ○ Weekly
- ○ Monthly
- ○ Quarterly
- ○ Never

How often do you use Yahoo(TM), Google(TM), or non-library gateways for information?

- ○ Daily
- ○ Weekly
- ○ Monthly
- ○ Quarterly
- ○ Never