



MASOOMEH TASOUJI **Avaliação da Qualidade do Serviço da Biblioteca da**
HASAN POUR **Universidade de Aveiro**

**Service Quality Assessment at Aveiro University
Library**



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Dissertação apresentado à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Administração e Gestão Pública, realizada sob a orientação científica da Doutora Cláudia Sofia Magalhães de Carvalho, Professora Auxiliar da Universidade portugalense.

I would like to dedicate this work to my husband, Behnam Bahmankhah, for his patience, love and endless support.

Furthermore, I would like to dedicate to my parents, Hasan Tasouji and Azar Torkinejad, for their always deep love and continued support in my life.

o júri

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palavras-chave

Serviço de Avaliação de Qualidade, LIBQUAL+, Sistema Bibliotecário da Universidade de Aveiro

resumo

Este estudo examina em termos gerais a qualidade do serviço prestado pela biblioteca da Universidade de Aveiro em Portugal baseado na perspetiva dos utilizadores da biblioteca com o intuito de investigar quais são os atributos essenciais para os quais os gestores da biblioteca devem alocar recursos de forma a garantir um serviço de qualidade e como é que se comporta o ranking da biblioteca em termos da perceção da qualidade do serviço prestado. Neste trabalho também são analisados os problemas que os utilizadores encontram quando utilizam os serviços prestados pela Biblioteca.

Os questionários Libqual+ foram distribuídos com o intuito de se recolher informação no campus da Universidade numa relação direta com os participantes. Entre os participantes no estudo participaram Estudantes, Professores e Colaboradores da biblioteca. As conclusões deste estudo mostram que nem todas as necessidades dos utilizadores são satisfeitas. Através da relação entre atributos e análise de dados foram extraídas três dimensões principais do programa Libqual+: "Affect of Service", "Information control" e "Library as Place". Os resultados revelam que os itens mais problemáticos se relacionam com os atributos físicos do serviço. As dimensões analisadas classificam-se como: muito bom para a "Affect of Service", bom para "Information Control" e mau ou fraco para "Library as Place". De acordo com a perceção dos utilizadores, as questões que obtiveram melhores resultados relacionam-se com os colaboradores da biblioteca.

Finalmente, são apresentadas algumas recomendações para a biblioteca no sentido de melhorar a qualidade do serviço prestado.

keywords

Service quality Assessment, LIBQUAL+, Aveiro University Library System

abstract

This study examines the overall service quality at the main library of Aveiro University in Portugal based on library users' perspectives to investigate which are the essential attributes that library managers should allocate the resource for good service quality and how is the ranking of library as a result of research in terms of perceived service quality. The problems users had encountered when involved in library service are also explored in this study.

The Libqual+ program questionnaires were distributed for data gathering in campus area of university in a face-to-face relationship with respondents. A survey of Students, Professors and Staff was used. Several insights gained from this study shown that all users' desired expectations are not met. Three main dimensions of Libqual+; "Affect of Service", "Information Control", and "Library as Place" were extracted by related attributes and data analyzing. The results reveal that the most problematic items are about physical service attributes. The dimensions were classified as very good for "Affect of Service", good for "Information Control" and bad or weak for "Library as Place". According the users ideas the highest ranking of questions belongs to library workers.

Finally, recommendations are presented to library in order to improve the quality of the provided service.

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CHAPTER I – INTRODUCTION

1. Introduction

1.1- Background

Libraries and particularly academic libraries play an important role in users' knowledge and education¹. Academic libraries are as a part of educational system of universities that is why they need to improve the quality of their service in order to increase users' satisfaction and ability of competition as one of the important threats in future. Traditionally, the quality of an academic library has been described in terms of its collection and measured by the size and activity scale of the library's holdings and various counts of its uses (Cullen, 2001). Nowadays, academic libraries are defined as a knowledge resource center to learn, research and do scientific activities that try to provide better service and information supply by focusing on the internal and external issues (Bulpitt, 2003). It is important for libraries to know how good their performance is by getting feedback from users. Because in real these feedbacks are like a source to better understand the level of their service quality during the time. As Cullen (2001) has noted "Academic libraries are currently facing their greatest challenge since the explosion in tertiary education and academic publishing which began after World War II... [T]he emergence of the virtual university, supported by the virtual library, calls into question many of our basic assumptions about the role of the academic library, and the security of its future. Retaining and growing their customer base, and focusing more energy on meeting their customers' expectations are the only way for academic libraries to survive in this volatile environment" (Cullen, 2001, p 662).

This study has used the last version of Libqual+ that was adopted by the Association of Research Libraries (ARL) in 2011. The Libqual+ is a suite of services that libraries use to solicit, track, understand, and act upon users' opinions of service quality (Cook *et al.*, 2011). It is used for the first time at the Aveiro University's library.

¹ Academic libraries as same as other public services have very important role at educational process of universities, especially in terms of the 2010 horizon of the European Higher Education Area (EHEA, 2010-2020).

1.2- Research objectives and research questions

At the library of the Aveiro University, quality performance evaluation has not yet systematically developed. The main goal of this research is to explain and explore the recent situation and key issues of Aveiro University's library about the performance quality of the services by following purposes:

- To assess the overall service quality of Aveiro University's library system based on users perspectives.
- Gathering and interpreting library users' feedbacks to identifying weak points, users' problems and most successful parts of work when users are involved in library service quality.
- Identify users' desired, perceived and expectations of service.
- Identify users' total satisfaction from the quality of Aveiro University's library services.
- Suggests and recommendations to improve the level of service quality at Aveiro University's library.

Findings from this case study can help Aveiro University's library managers to make a better strategic decision for future and may help them provide a systematically regular evaluation of the library services quality based on Libqual+.

The research study seeks to answer the following important research questions:

- Which are the dimensions that determine the users' evaluation and satisfaction of service quality in Aveiro University's library activities?
- How is the ranking of libraries surveyed in terms of perceived service quality?
- Which problems did the users encounter when involved in the library service?
- Which are the most important points that Aveiro University's library managers should pay more attention to in order to provide better quality of service?

1.3- Methodology and data collection

This research was conducted at Aveiro University's library system in Portugal during September 20/2011 – Jun 15/2012 and Libqual+ (version 2011) was used as a main methodology in carrying out the study. In this research has been tried to participate several people from all of the university departments in different level of work and education as respondents to complete the Libqual+ questionnaires. All of the necessary data was gathered from campus area of university and 262 respondents have participated in this research.

The structure of this research and the questionnaire that is used to assess the quality of the library at Aveiro University are based on the real world extracted data from case studied.

1.4- Outline of the dissertation

The dissertation compromises six chapters. In Chapter One an introduction is done to the outline of the study background, objectives and research questions, methodology and data collection.

In Chapter Two, we present a literature review about the most important related quality models and tools for evaluating the service quality of libraries regarding to more focus on academic libraries. This is followed by an overview of the noteworthy practically activities by researchers during the time and their idea about it.

Chapter Three presents some historical and service information about the main library of Aveiro University (biblioteca) that is selected as a case study in this research.

Chapter Four explains the methods used in carrying out the study with emphasising to the treatment and techniques used to analyse the gathered data and information. Briefly, this chapter explains the procedures, instruments, samples, and data analysis conducting to the research.

Chapter Five reports and discusses the result of Libqual+ application at the library of Aveiro University, which will answer the research questions. Data analysis will help to investigate the problems users encountered when involved in the library service.

The last chapter presents a summary of research findings, the conclusions, recommendations, limitations and possibility of future developments. This chapter attempts to deliver some concluding and suggestions regarding to research questions and discusses the pertinence of the dissertation.

CHAPTER II – LITERATURE REVIEW

2. Literature Review

2.1- Introduction

Most of the approaches about the term of quality may refer to goods but in service field quality is defined as meeting the specifications and expectations of customers (Parasuraman *et al.*, 1998). According to Merriam-Webster's Online Dictionary (2009), the general meaning of quality is defined as “a degree of excellence”. Considering the specific case of the library service, Hernon and Altman have focused on American academic libraries service quality in their research to make a new perspective for the library managers from the viewpoint of the library users (Hernon & Altman, 1996; Hernon & Altman, 2010) also in 1992, Whitehall based on quality management role in libraries has noted in his research: several measurement tools, models and techniques about the quality of service have been applied by librarians to listen the libraries users voice during the time (Whitehall, 1992). In 2007, Thakuria, from Gauhati University had a survey about the concept of quality in the library services and has noted that “The library is an organization to offer reference and information services to its users. Library service is the combination of the services- process and its delivery. In a library, the service offered from acquisition section, technical section, maintenance section etc. are the processes carried out there and thereafter delivered to users. The quality should start from the acquisition section, which should be carried uniformly to circulation section. A user who had an unpleasant experience from the library will tell it to many people, but a good experience will be told to very few. Therefore it is very necessary for librarian to understand the users, what they want, how they want, and when they want the documents and information” (Thakuria, 2007, p 413)

Nowadays, the level of the customer satisfaction is as an indicator for managers to understand the quality of their service and performance. In this way they need to global quality models, techniques and tools to assess their organization. They also need to satisfy those who are controlling the budget for them by providing best quality of service, continuously improvement and progress in work (Tan & Foo, 1999; Cook & Thompson, 2000a). Furthermore, the quality assessing of provided service by organization is essential too, because without service quality measuring the organization will not be able to ensure maximum utilization of opportunities and possible resources to provide a better service for customers. Also, the output

of quality and performance measuring will lead to meet the new needs of users (Johari & Zeinab, 2007). Different characterizations of service (compared with good) such as intangibility feature of service and difficulty of representing non physically facilities in service field is made it more different so it needs specific models for evaluation and assessment (Tan & Foo, 1999).

According to the ISO 11620, quality in libraries is defined as "totality of features and characteristics of a product or service that bear on the library's ability to satisfy stated or implied needs" (ISO 11620, 1998; ISO DIS 11620, 2006). The most important aspects of standards, quality tools, techniques and models are based on customer and user satisfaction. Some of the general standard quality tools and models (*i.e.*, TQM, Malcolm Baldrige, Benchmarking, ISO 9001, etc...) have ability to conduct in different type of industry and service fields such as libraries but, there are others which used more in the library system to assess the service quality, particularly in academic libraries (*i.e.*, ISO 11620, Servqual, Servperf, Libqual+, etc...). In following pages we present a literature review about the most important general and specific quality models and tools about service quality assessing in libraries, mainly focusing on academic libraries.

2.2- Total Quality Management

According to Wang (2006), Total Quality Management has got substantial attention in the library world since the early 1990s. In 1992, Whitehall based on quality management role in libraries has noted that, several measurement tools, models and techniques about the quality of service have been applied by librarians to "listen" to the libraries' users during the time (Whitehall, 1992). After Edward Deming principles in 1950s about Total Quality Management Japanese had a significant economic growth and progress in several types of markets, then American markets developed TQM systems and models to use in different business and fields of work such as military, academic, governmental and nonprofit organizations like libraries (Jurov & Barnard, 1993). TQM is a management philosophy that includes all of the relative activities with organization to monitor these activities in order the identified aims of organization and society. The object of TQM is effort to provide the best benefits to customers, stakeholders and employees by doing the mission of organization in best way. TQM represents "Total Quality Management" that contains a complex meaning of (i) Total: everything and everyone is involved in the organization that is able to affect the quality of the service (ii) Quality: the level of service and customer satisfaction from provided actions (individually or collectively) by organization that

users perception is identified it, and (iii) Management: managing the system to achieve the organization's objectives regarding people, resources, methodology, technology and good control of work by continuous improvement planning (Jurow & Barnard, 1993; Metreveli, 1998; Cook & Thompson, 2000a; Cook & Thompson, 2000b; Evans & Lindsay, 2008).

By definition, TQM is "a system of continuous improvement employing participative management and centered on the needs of customers" (Jurow & Barnard, 1993). The base of TQM is focused on meeting customer's needs and organizational objectives by finding and solving the problems that occur in the system and also by improving the existing opportunities to have a better quality system. The most important of TQM attitude is its' concentration on continuously improvement plan for system in the short-time and long-time strategies (Wang, 2006; Evans & Lindsay, 2008). According to the research of Jurow & Barnard, librarians can use the benefits of TQM implementation in libraries by focusing on three main issues: (i) breaking down interdepartmental obstacles; redefinition of the beneficiaries of the library services as internal customers (staff); (ii) monitoring the characterization, necessities and desire of external customers (users); (iii) planning a continuous improvement cycle or PDCA² (Jurow & Barnard, 1993). Heras *et al.* (2006) has shown the five main reasons for total quality management implementation in organizations as a part of their research result in Spain. They have found that there are variety reasons by managers to implement (compared with ISO 9000 and EFQM) but the most important items represented in Figure 1.

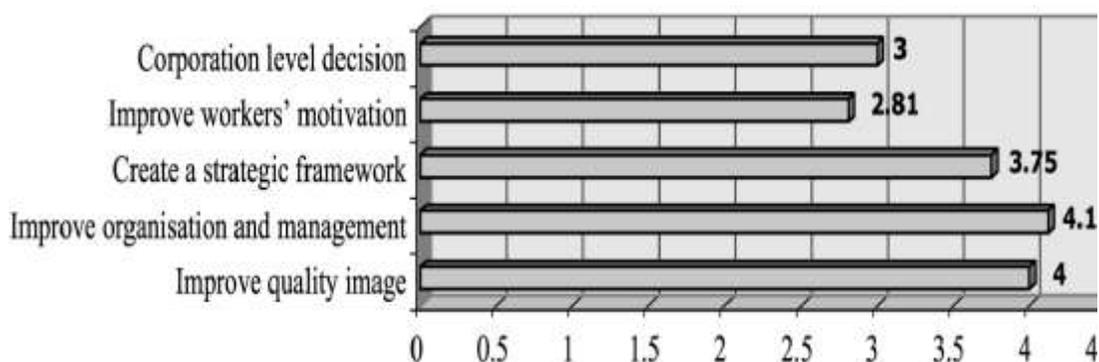


Figure 1: Reasons for implementing TQM models (Heras *et al.*, 2006).

Furthermore, Sirkin (1993, p 82) has noted some important criteria for better implementation of total quality management system in libraries that may become important for academic libraries too. The identified criteria are represented in following table:

² The steps Deming cycle that is representing; plan, do, check, and act.

Table1: The success factors for better implementing TQM (Sirkin, 1993, p 82).

Success factors for better implementing TQM in libraries

- Create service brochures and information kits
 - Conduct a user survey about library services
 - Improve signage
 - Change hours of operation
 - Provide a more convenient material return
 - Simplify checkout of materials
 - Use flexibility in staff assignments
 - Cooperate with local government
 - Ask vendors to give product demonstrations
 - Give new staff a thorough orientation
 - Create interdepartmental library advisory groups
 - Improve the physical layout of the library
 - Track complaints
 - Develop an active outreach program
 - Open satellite offices
 - Publicize new or changed services
 - Develop user and staff training materials
 - Target services to specific groups
 - Offer electronic document delivery
 - Follow the mission statement
 - Smile
-

As a historically view, among the academic libraries it seems that Harvard College library was the first which has implemented the TQM principles successfully in order to develop a new structure of system with more focus on staff roles and the existence regulations inside the library. They have changed their organization by using TQM items and have implemented continues improvement plan to ensure about the future of quality system (Clack, 1993; Wang, 2006). Oregon State University Library was one of the other academic libraries which were

earliest in implementation of total quality management system to ensure about the progress and more success of provided service quality.

2.3- Malcolm Baldrige Award

During the 1980's American industries felt the lack of quality in their companies but also the U.S. government emphasized the focus on quality to help the progress of economy which was not very successful those days compared with global level. The Baldrige Award stood as a standard of excellence to help U.S. organizations to reach the world-class level of quality at products and services. Soon enough the Baldrige Award showed its positive role of quality progress in American industries and service which was significant even in education and health care fields. The principles of Baldrige have changed during the past times to adapt themselves with time and become more effective and useful like the other quality models, tools and techniques. The two main principles that the Malcolm Baldrige Award pays more attention about them are: delivering ever improving value to customers and improving overall performance in the organization (Stack, 1998; Hare & Cole, 2005).

Some researchers have used the Malcolm Baldrige National Quality Award's (MBNQA) criteria in academic libraries to measure the performance of quality and activities which the result of work were significant in providing the better service of quality in the library system (Hare & Cole, 2005). In 1997, the Los Alamos National Laboratory Research Library in US has applied Malcolm Baldrige quality criteria to self-assessment and the research library staff have benefited from both the application process and feedback as a result of change and new system (Stack, 1998). In 2005, Hare and Cole are used the Malcolm Baldrige National Quality Award's criteria to identify the processes and performance measures of quality in academic libraries (Hare & Cole, 2005). In other case as a different example of Malcolm Baldrige in academic libraries, in 2007 Wilson and his colleagues published a book with title of "The Measure of Library Excellence" about deployment of Internet terminals in libraries by a new model of Malcolm Baldrige and Balanced Scorecard technique (Wilson *et al.*, 2007).

2.4- Benchmarking

One of the other standards quality tools is Benchmarking which has been useful for libraries during the time. Evans (1994) has defined Benchmarking as a tool that taking your organization towards best practice by its principles and criteria. Libraries as same as other organizations have noticed to use the benefits of it. Benchmarking introduce five steps as a model that managers by following them will be able to incorporate it with their organizational activities inside the library activities. The five steps to benchmarking are: Planning, Identifying target organizations, Data collection, Analysis, and Implementation. This tool is as a complementary mechanism to existent activities of organization to identifying the excellence based on continuous improvement to adapt itself during the time (Brockman, 1998).

Benchmarking was applied in the early eighties but unfortunately it was not well documented until 1995. In 1995 the first guidelines of Benchmarking published as "Benchmarking Self-help Manual" that was very useful to develop it inside the organizations. It was an introduction for Benchmarking that was provided the details to implement step by step by focusing on organization process in different field of industries and services such as libraries. In real, the library service operations were clear inside the manual but in 1989 the first fully descriptive book about benchmarking was published by Camp with more details about the concept and the aims of implementation (Wilson et al., 2000).

Because of the Benchmarking useful and significant result in organization it is used as a tool for managers to achieve their organization objectives and most of the countries tried to create their own associations with useful Internet websites to introduce Benchmarking details and guidelines for sharing the information between manufactures and service organizations. After successful demonstration of Benchmarking result in several field of the work it is developed as a globally quality management tool (Wilson *et. al*, 2000) even to non-profit organizations and also as a discipline to academic environments.

According to the several surveys Benchmarking has been very useful resource to academic libraries (Kinnell & Garrod, 1995; Wilson *et al.*, 2000; Town, 2000). For example Benchmarking has been applied in academic libraries in the UK since 1995, with successful examples documented in the literature (Town, 2000) also Wilson *et al.* in 2000, were noted that "University libraries and information services around the world have recently (1998) participated in an Association of Commonwealth Universities Management Benchmarking Club exercise, which examine libraries using a specifically developed framework". Furthermore, with a benchmarking tool, Laeven and Smit (2003) had a useful survey in Dutch universities. By means of four performance indicators namely library resources, library facilities, process

efficiency in the library and library use, their survey was carried out and their results were analyzed. Finally, they stated that the value of benchmarking as a proven tool to achieve quality management should be very highly rated, indeed.

Considering the specific case of academic library, in 2010 all Australian university libraries participated in a survey that was done to measure the client satisfaction and performance of service by Council of Australian University Librarians (CAUL, 2010). In this project 4607 responses were attracted that obtained very useful result for libraries in national scale. The University Library recorded an overall score of 76.9 percent, which was showing 3 percent performance improvement rate, compared with same survey that was done in 2008. About the client satisfaction, academic libraries have shown a good progress compared with same value of 2008 survey and also against the national and public libraries, for instance overall satisfaction with the University Library of Melbourne averaged a score of 5.5 (out of 7.0), placing the Library in the second quartile or top 50 percent when compared with other university libraries. The specific result of Melbourne academic library has shown in Figure 2. Graph showing the University Library's performance against national benchmarks in five categories: communication, service delivery, facilities and equipment, staff, and information resources (collections). It is clear that the performance of Melbourne academic library has improved in all categories since 2008.

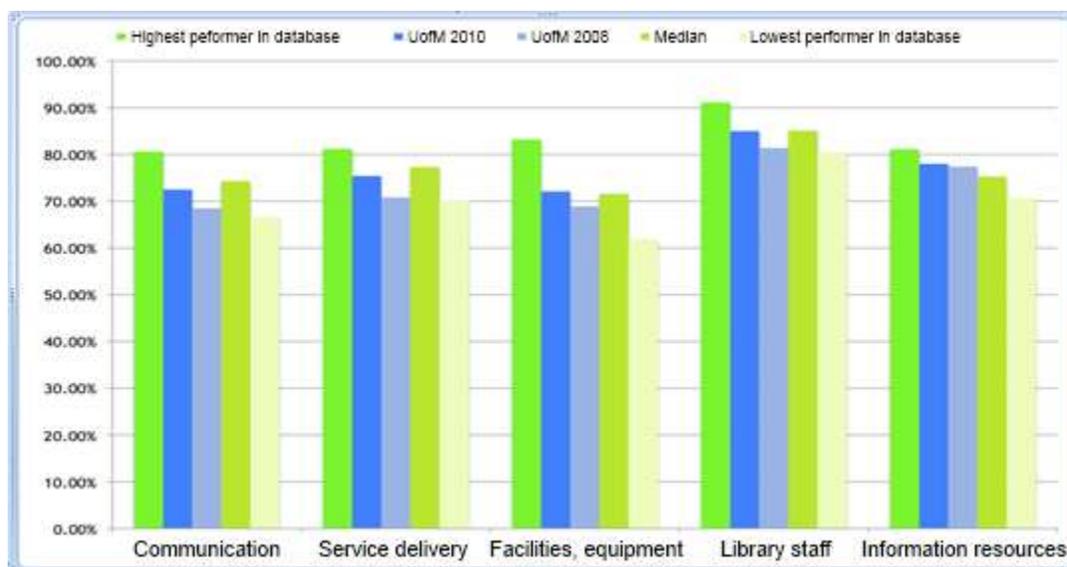


Figure 2: Melbourne University Library's performance against national benchmarks (CAUL, 2010).

A lot of researchers have used Benchmarking tool to improve their quality and performance of service in public academic libraries during the time. Examples of the successful application of benchmarking can be seen in universities in Australia (McKinnon *et al.*, 2000), China (Langa & Zhaa, 2004; Stewart, 2006), Benchmarking project benefits at Netherlands

university libraries (Laeven & Smit, 2003), the significant result of benchmarking quality systems at University Autònoma of Barcelona in Spain and Kuopio University Library in Finland (Balagué & Saarti, 2009) and Jilovsky online work based on Benchmarking effect on Asian academic libraries by linking 22 academic libraries from Hong Kong, Malaysia, Singapore and Thailand (Jilovsky, 2010) among others.

It seems that Benchmarking has broken the national and international borders and introduced itself as a useful managerial quality tool to bright and focus the strong and weak point of work with comparing the result of surveys in same filed of work. It is important to note that, although there are different type of Benchmarking in several specific fields of work but, generally Benchmarking principles follows same ways for all and following items are the major reasons to implement it in organizations (Garrod & Kinnell, 1996).

2.5- International Standardization for Organization

ISO series as a set of management tools has a globally accepted certificate which verifies quality management systems of organizations in different type of activities. In service field such as others ISO has specific guidelines for services that are issued by International Standardization for Organization (ISO) to establish and implement a quality system within a service organization such as an educational institution. The first publish of ISO is carried out in 1987 and during the time has increased in several field of work and has led to specific grow in industrial and service business. International Standardization for Organization has tried to improve and adopt the norms and principles of ISO by the members and several standards. Presently ISO 9001 is the only one which is applicable as a general type of ISO in organizations. A qualified principle of ISO which is provided for academic libraries is named ISO 11620 (ISO 11620, 1998; ISODIS 11620, 2006).

A survey based on ISO 11620 was conducted in 2004 by Bellini – chief librarian of the University of Trento Library, in Italy. He concludes that ISO 11620 is onerous and time-consuming, requiring commitment to overcome resistance from within and outside the library but the performance measurement has proven to be a useful and versatile tool for university management. For example the important role of staff was one of the main outputs with new information about multimedia (audio-visual materials, videocassette, CD-ROM network, and internet) inside the library among others (Balagué, 2007). Some other researchers in their

survey have found that ISO and IFLA³ (International Federation of the Library Associations and Institutions) guidelines are the most important and globally developed mechanism about the academic libraries performance and service quality (Derfert-Wolf *et al.*, 2005).

According to the ISO 11620 for Libraries, quality means "totality of features and characteristics of a product or services that bear on the library's ability to satisfy stated or implied needs" (ISO 11620, 1998). The role of norms, standards and procedures of ISO 11620 are evaluating the service activities and identifying the strong and weak point of service areas. It is working as a mechanism to ensure the quality of provided service for customer and main objective is to increase the user satisfaction (Balagué, 2007). In 2005 Derfert-Wolf *et al.* have evaluated the academic libraries of Polish universities based on ISO (ISO 11620, 1998) and found out a lot of useful points to show the success of ISO implementation in academic libraries. For instance they have found that most of the libraries have experienced their user expectations and satisfaction by ISO as an assessment tool for managers (Derfert-Wolf *et al.*, 2005). The significant result of similar surveys in different countries have changed this kind of ISO series globally and encouraged most of the academic librarians to implement and using the benefits.

Examples of the successful application of ISO can be seen at University of Pittsburgh in United States (Praditteera, 2001), in Italy (Bellini, 2004), Polish universities (Derfert-Wolf *et al.*, 2005), in Spain (Balagué, 2007) and in Iran (Babalhavaeji *et al.*, 2009) among others.

According to the PhD dissertation of Balagué from university of Barcelon in 2007 about "The use of ISO 9001 quality standard in higher education institution libraries" that was carried out between 27 countries (from Asia, Europe, United States and Australia) there are five main reasons for librarians to implementing the ISO 9001 in libraries:

- Promotion of the dynamics of continuous improvement
- Facilitation of data gathering for management
- Clear definition of responsibilities
- Standardization of work procedures
- Improvement of the documentation of processes.

³ The International Federation of Library Associations and Institutions (IFLA) is the leading international body representing the interests of library and information services and their users. It is the global voice of the library and information profession. It is founded in Edinburgh, Scotland, in 1927 at an international conference.

Also, regarding the survey of Bellini in 2004, he has noted three major objectives to implement ISO 11620 (1998) by academic librarians:

- ISO is a globally wide of management mechanism that is well known among the all libraries sector (as same as others) and the results yielded by an ISO standard enjoy more credence outside the limited area of the libraries.
- ISO 11620 as a supportive mechanism will lead to guarantee of system regarding to continuous improvement to adapt it.
- The ISO standard comprises a larger number of indicators. To show the weak and strong point of libraries area and activities.

Finally, as a main result: librarians endeavor to implement the ISO which would lead to better identification of the users' expectations and the output of the system would help them to make the best strategy decisions about their organization for future objectives.

2.6- SERVQUAL

Quality in educational system can be defined as a determination of students, professors and staff needs and expectations to achieve their satisfaction (Kay & Sei., 2004) and in this way several concepts and models have been developed to measure educational service users' satisfaction and one of these worldwide tools is Servqual. It is a technique, an instrument and specific tool to assess the quality of services through the gap analysis between the customers' expectations (users) on the one hand and their perceptions of services on the other hand. It is used widely by service delivery organization to improve the quality of service (Parasuraman, *et al.*, 1988; Nitecki, 1998; Cullen, 2001). According to Parasuraman *at al.* "Servqual is defined as an instrument for assessing customer perceptions of service quality in service and relating organization" (*Parasuraman, et al., 1988, p14*).

Parasuraman, Zeithaml and Berry in their studies in 1985 (*Parasuraman et al., 1988*), indicated 10 aspects for quality of services: reliability, responsiveness, competence, access, courtesy, tangibles, communication, credibility, security and understanding the customer. It was consisted of 22 items (based on 22 pairs of statements) and each item measure both of the expectations of a service provider and the perception of customer or service users. For each pair of items, the existence difference and distance between the perceptions and expectations has shown as gaps with different scores for a particular service attribute.

$$\text{Service Quality (Q)} = \text{Perception (P)} - \text{Expectation (E)}$$

Then, in 1988 they accomplished the survey (Parasuraman *et al.*, 1988) and modified these ten aspects in five dimensions:

Table2: SERVQUAL dimensions (from Parasuraman *et al.*, 1988 & 1991).

Dimensions	Definition
Tangibles	Tangibles have been defined as the aspect of a service facilities, equipment and communication materials.
Reliability	The service firm provides the service performance right the first time and delivers the promised performance to its customers
Responsiveness	The staffs of the service firm are willing to help customers to give prompt services
Assurance	The behavior of the service firm's workers have the ability to engender customers' expectation, confidence and to make customers feel safe when they use the firm's service
Empathy	Customers feel that they are given personal attention by the staffs of the service firm and the staffs of the service firm have interest in dealing with customers' problem

In the specific context of libraries, managers have used the benefits of Servqual by users satisfaction evaluation in their organization to provide the better service quality and in this way the researchers had a significant contribute to improve and extent of Servqual during the time according to their new ideas and experiences (Nitecki, 1996; Nimsomboon, 2003; Awan & Azam, 2008). Nitecki (1996) has noted in her doctoral research that the library service quality measuring based just on collections has been obsolete. She applied the Servqual technique on different aspects of the library service such as loan, reference, and closed reserve and concluded that "the instrument was useful in determining how well service match user expectations" (Nitecki, 1996, p 183).

During the time some researchers has tried to modify this useful technique. For example Srisa-Ard (1997) evaluated users' expectations and perceptions of the library service quality at an academic library in Mahasarakham University (MSU), Thailand, focusing on three service areas: Circulation, reference, and computer information service. In this survey to collect the data 582 students from different faculty and level of study have participated and the result

has shown that responsiveness of librarians and reliability of offered services are important for users. The difference between provided and expected services was one of the important outputs of this survey for Mahasarakham University's librarians. Furthermore, Cullen (2001) has noted that the modified Servqual was introduced by Herson and Altman in 1998 to the academic library managers. They gathered groups of researchers to modify this technique according to the collected data to develop it in the library and information service also; in 2002 Banwet and Datta have done the same to measure the IT service quality in the library service.

Using Servqual in libraries (academic or non-academic) has developed as a global phenomenon, for example in United Kingdom, Northumbria university academic library (Nitecki, 1998), in United States, Yale university academic library (Nitecki & Herson, 2000), in Japan Thammasat university library (Nimsomboon, 2003), in India Karnataka university libraries (Sherikar *et al.*, 2006), in Turkey Osmangazi university libraries and Anadolu university library (Doç & Filiz, 2007), in Pakistan university libraries (Awan & Azam, 2008) and in Malaysian university libraries (Kiran, 2010).

2.7- SERVPERF

Besides the using of Servqual as a standard technique for measuring the quality of service in libraries and other organizations, some researchers have had some different idea about it. Some of them have believed that assessment of quality service is affected just by perception of performance level (Bolton & Drew, 1991) and measuring the disconfirmation of service is more important of expectation (that is the base in Servqual technique). Then, Boulding *et al.*, in 1993 have suggested that perceptions alone influence overall service quality (Landrum, *et al.*, 2009) or one of the other criticisms of some researchers was about Servqual dimensions that were instable and during the time it has appeared in different format. For example there are some reports from Parasuraman and his colleagues (Parasuraman *et al.*, 1988) that have used the Servqual on three different type also, Jiang and colleagues (2002) have used it with four main dimensions instead of five in their research field and Nitecki (1996) has used it in just three dimension (Landrum, *et al.*, 2009).

As it is noted above, they resolved these instabilities by noticing more to perception and eliminating of expectations from Servqual. The modified technique that in real is a subset of Servqual technique is called Servperf and introduced by Cronin and Taylor in 1992 (Cronin &

Taylor, 1992; Nitecki, 1996). Depend on the aim of research and survey (also the interest of researcher) in libraries the appropriate techniques such as Servqual, Libqual or Servperf can be selected to apply. Servperf measures service based solely on user's perception of actual performance (Johari & Zeinab, 2007) in five dimensions that are: (a) Tangibles, (b) Reliability, (c) Responsiveness, (d) Assurance and (d) Empathy. In 2000, Nitecki and Hernon have used the Servperf as a subset of Servqual in five dimension for assessing the library service quality at Yale University, and as a result they have reported that the users of library system ranked the reliability dimension of Servperf most important and empathy dimension had minimum level compared with others (Nitecki & Hernon, 2000; Landrum, *et al.*, 2008). Recent examples of the successful application of Servperf can be seen in Malaysia Tenaga Nasional Berhad university library (Johari & Zainab, 2007), in Iran university of Tehran central library (Nejati, 2008), in United States libraries (Landrum, *et al.*, 2009) and in India Kadapa public library (Konappa & Chandran, 2011).

2.8- LIBQUAL+

Although Servqual validity and reliability was carefully tested (Parasuraman, *et al.*, 1990) but, still there were doubts about its adaptability with different organizational contexts and service (Robinson, 1999). The usefulness of this tool was confirmed in commercial and industrial environments, but its application in libraries has made some doubts which maybe in some items Servqual is not able to fit in library environments (Cook & Thompson, 2000a & 2000b) and is not able to measure some issues of considerable interest to library users (Cook *et al.*, 2011). That is why some researchers have thought to create or develop this technique for libraries with changing some characteristics to be more specific and better tool for libraries environments. This variation has happened based on roughly 123 of the largest research libraries in the United States and Canada by the Association of Research Libraries (ARL) in collaboration with Libraries at Texas A&M University (TAMU) that was invited by ARL to participate in a Servqual modified survey in 1999 and the result led to restructuring the Servqual to Libqual+ (Cook & Thompson, 2000a & 2000b). In real, Libqual+ was modeled on the 22-items Servqual tool developed by Parasuraman, Berry and Zeithaml (Parasuraman *et al.*, 1991).

Preliminary studies and researches about Libqual+ were performed from 1999 to 2003. In the first year of survey 10 libraries and in 2003 more than 300 libraries were participated in this project from United States and European countries with using Libqual+

method to assess their libraries service quality (Libqual+ 2003 survey, 2003a & 2003b). The result of these variation and improved version of Libqual+ dimensions are defined (Cook & Heath, 2001) with four main dimensions: Service Affect, Library as Place, Personal Control, and Information Access. The Libqual+ dimensions were first based on the original Servqual survey technique but since then these dimensions have become more refined and more suitable for application to the library context. According to the Libqual+ surveys result from 2002 to 2003, ARL decided to collapse two dimensions - Access to Information and Personal Control- into one. The following three dimensions have been measured since then (Cook *et al.*, 2011): Affect of Service (customer services provided by the library staff or human dimension of service quality), Information Control (generally relates whether users are able to find the required information such as library resources, collections and access to resources), and Library as Place (deals with the physical environment of the library such as library spaces, facilities, etc.)

Table 3 is representing the Libqual+ dimensions and items (questions) variation during the time.

Table3: Libqual+ dimensions variation (Cook *et al.*, 2011).

2000	2001	2002	2003
41 – Items	56 - Items	25 - Items	22 – Items
Affect of Service	Affect of Service	Affect of Service	Affect of Service
Reliability	Reliability	Library as Place	Library as Place
Library as Place	Library as Place	Personal Control	Information Control
Provision of Physical Collection	Self-Reliance	Information Access	
Information Access	Information Access		

Measuring and analyzing the existence gap between expectations and perceptions of the library users by using Libqual+ technique is the most common way in libraries to know the level of service quality which is provided by the library to users. It is used widely in different type of libraries (i.e., academic, public, specific, private, and etc.). Since it began in 2000 more than 500 libraries have used Libqual+ to assess their quality of service, including college and university libraries, community college libraries, health sciences libraries, academic law libraries, and public libraries (Kalb, 2007) also, according to the report of ARL from their last survey they have noted that “Through 2010, we have had 1,492 surveys implemented in over 20 countries, 20 language translations, and well over 1 million surveys” (Cook *et al.*, 2011, p 668).

Virginia Tech University in United States was one of the first universities which have used Libqual+ to assess the service quality of library in 1999. The result of work was significant and they have found some large gap between desired and perceived levels of service which has emphasized on: (i) improving collection resources; (ii) renewing some part of the library for create a better space for users; (iii) developing services that equip the user for independent control of his/her information interactions (Hitchingham & Kenney, 2002; Babalhavaej *et al.*, 2009). Finally, they recommended that the library had better participate in such programs regularly.

Nowadays, Libqual+ is a worldwide standard technique which has been applied in different languages and countries. It is to be noted that ARL globally surveys shows the significant progress in using of Libqual+ from 2003-2010. For instance in 2003 for eleven groups of academic and public libraries, in 2004 by more than 112,000 users from 202 several type of libraries and institutions, in 2005 by more than 150,000 users from 255 institutions, including participants in the U.S., Canada, the U.K., Ireland, Australia, and Sweden, in 2006 by more than 176,000 users from 298 institutions including participants in Australia, Canada, Denmark, Finland, France, Ireland, Netherlands, Norway, South Africa, Sweden, Switzerland, United Kingdom and United States of America, and the same progress is exist until 2011, last survey of ARL with Texas A&M University (Thompson *et al.*, 2005; Cook *et al.*, 2011).

Libqual+ is the first total market survey developed specifically for academic research libraries and the main goals are defined by Libqual+ survey management center as following (Cook *et al.*, 2011):

- Foster a culture of excellence in providing library service
- Help libraries better understand user perceptions of library service quality
- Collect and interpret library user feedback systematically over time
- Provide libraries with comparable assessment information from peer institutions
- Identify best practices in library service
- Enhance library staff members' analytical skills for interpreting and acting on data

Survey management center of Libqual+ organization has focused on different programs to enhance the provided service for users of Libqual+ in future. Continuously improving of website is one of the main activities to make a better interface to users. Developing the program in more languages, providing more virtual workshops to better marketing and training, making a comprehensive system to focus on users' comments and feedbacks, and developing Libqual+ program to all of the world countries to introduce Libqual+ as the main and the best technique to assess the service performance of libraries, especially for academic libraries will be the most importance part of work for future of Libqual+ (Libqual+, 2011).

Table 4 is representing the literature review base references which are used in this dissertation.

Table 4: Related studies that were consulted in literature review.

Issues	Author
TQM	Whitehall 1992; Jurow & Barnard 1993; Clack 1993; Sirkin 1993; Metreveli 1998; Cook & Thompson 2000; Heras <i>et al.</i> 2006; Wang 2006; Evans & Lindsay 2008;
Malcolm Baldrige	Stack 1998; Hare & Cole 2005; Hare & Cole 2005; Wilson <i>et al.</i> 2007
Benchmarking	Evans 1994; Kinnell & Garrod 1995; Garrod & Kinnell 1996; Brockman 1998; Wilson <i>et al.</i> 2000; Town 2000; McKinnon <i>et al.</i> 2000; Laeven & Smit 2003; Langa & Zhaa 2004; Stewart 2006; Balagué & Saarti 2009; Jilovsky 2010
ISO series	ISO 11620, 1998; Praditteera 2001; Bellini 2004; Derfert-Wolf <i>et al.</i> 2005; ISODIS 11620, 2006; Balagué, 2007; Babalhavaej <i>et al.</i> 2009
SERVQUAL	Parasuraman <i>et al.</i> 1988; Parasuraman <i>et al.</i> 1991; Nitecki 1996; Srisa-Ard 1997; Nitecki 1998; Hernon & Altman 1998; Nitecki & Hernon 2000; Cullen 2001; Banwet & Datta 2002; Nimsomboon 2003; Kay & Sei 2004; Sherikar <i>et al.</i> 2006; Doç & Filiz, 2007; Awan & Azam 2008; Kiran 2010
SERVPERF	Parasuraman <i>et al.</i> 1988; Bolton & Drew 1991; Cronin & Taylor 1992; Boulding <i>et al.</i> 1993; Nitecki 1996; Nitecki & Hernon 2000; Jiang <i>et al.</i> 2002; Johari & Zeinab 2007; Landrum <i>et al.</i> 2008; Nejati 2008; Landrum <i>et al.</i> 2009; Konappa & Chandran 2011
LIBQUAL+	Parasuraman <i>et al.</i> 1990; Parasuraman <i>et al.</i> 1991; Robinson 1999; Cook & Thompson 2000a; Cook & Thompson 2000b; Cook & Heath 2001; Hitchingham & Kenney 2002; Libqual+ 2003 survey 2003a; Libqual+ 2003 survey 2003b; Thompson <i>et al.</i> 2005; Kalb 2007; Babalhavaej <i>et al.</i> 2009; Cook <i>et al.</i> 2011 (libqual+ 2011 survey)

CHAPTER III – CASE STUDY

3. Case Study

3.1- Presentation of case study

The main library of the University of Aveiro which is selected as a case study to evaluate the quality and performance of provided service in this research was inaugurated in 1995. The architect selected to put the new library project into practice was Álvaro Siza, as internationally recognized Portuguese architect. The project was assigned in 1987 (Lemos, 2000; Sbidm, 2012).

The main library of University has a multidisciplinary collection of scientific technical subjects from interdisciplinary areas in science and engineering to humanities, arts and communication, management, economics and planning. The library is located in a good area that users can easily access to main canteen, bank, post office, book shops, health center of university, kiosks and snack-bars. The library building faces with beautiful natural surroundings. The building is designed according to an integrated model in a style coherent to the university campus (Lemos, 2000).

The main library is divided into four floors for users and staff (Sbidm, 2012):

- Ground floor (floor 1): Administration

The ground floor houses the offices of the administrative and support services, the library stacks, and the reading room for items in storage. Overlooking the Aveiro lagoon there is a reading room with some 20 comfortable seats for the consultation of magazines and newspapers, as well as the latest bibliographic acquisitions.

- First floor (floor 2): General

The main entry to the library is located on this floor, along with the Hélène de Beauvoir exhibition room, the cloakroom, and the general reading room. This room houses book and journal collections on open shelves in the areas of science and technology, sociology and planning, along with various reference works. There are also a number of individual study rooms, the copy center, and a computer cluster with free internet access.

- Second floor (floor 3): Humanities

Located on this floor is the Humanities reading room, which houses a large collection of books and journals on open shelves in the areas of languages and literatures, philosophy, history, music, film and television studies. Also located on this floor are further individual study rooms as well as group study rooms for student use, a video viewing room, two rooms specially equipped for visually-impaired users, a sheet music room, and a storage room with audiovisual materials.

- Third floor (floor 4): Advanced

The advanced reading room is located on this floor. It houses books and journals in science and technology for advanced study and research purposes. This floor also contains a reading room for special collections as well as the special collections storage room, the European documentation center, and several individual study rooms.

The library of Aveiro University has provided library service for Students, Professors and Staff in different level of work and education by following centers⁴:

- The main library that is located in Campus area (biblioteca)
- Media library (mediateca) that is located in the CIFOP building (teacher training center), the Mediateca houses all the collections dedicated to education, psychology, and related areas. The Mediateca has two open-shelf access reading rooms on two floors, containing books, scholarly journals, and audiovisual materials. On the entrance floor there are three comfortable group study rooms, a copy center, a computer workstation with free internet access, a special room with 20 computers (Universia room) for student use only, and the circulation desk (loans desk). On the ground floor can also be found the journal collections as well as the Mediateca stacks (Sbidm, 2012).
- Library of the higher institute of accounting and administration (ISCA-UA). Contains a collection in the fields of: accounting, law, economics, education, statistics, management, history, information technology, languages (French, English), mathematics and sociology.

⁴ There are two more library for public (and students) in out of the campus area; crc aveiro-norte and biblioteca da ESTGA.

3.2- Mission and service

The several service activities of the main library (biblioteca) include the following items (Sbidm, 2012):

- Free Internet access: Aveiro University library make available Internet access to users.
- Document reproduction: The Library provides self-service copy machines.
- Spaces: reading rooms, group work rooms, individual study rooms, room for the visually impaired and audiovisual consultation rooms.
- Interlibrary loan: The supply of monographs and copies of articles from scientific and academic journals to libraries and institutions throughout the country and abroad.
- Reading, assistance and borrowing: The lending service is assured by the library assistants who attempt to satisfy borrowers' needs about books, journals, CD and some of the software, and etc.
- Online resources: Library web page, catalogs, articles, e-books, e-journals, patents and trademarks, Aveiro University's digital library and etc.
- Equipment: Such as computers, scanners, copy machines and etc.

Finally, according to the official website of the Aveiro University's library (Sbidm, 2012):

The mission of the University of Aveiro's Documentation Services is to acquire, organize, and make widely available the information sources required by the modern university, as well as to maintain and preserve the bibliographic collections, in various formats, of the University's library network. Its essential mission is to develop and support learning and research, along with servicing the activities of the university community specifically, and those of the wider society more generally.

CHAPTER IV – METHODOLOGICAL OPTIONS

4. Method and Procedures

4.1- Instrumentation

This research was conducted at the library system of Aveiro University in Portugal during September 20/2011 – Jun 15/2012. Libqual+ (version 2011) method was used as a main method in carrying out the study and the respondents were selected randomly to complete the Libqual+ questionnaires. The Libqual+ was chosen from the outset for various reasons; it is specifically designed for libraries, it is one of the most recent developed methods, and it focuses on both inside and outside the library and finally, it fosters a systematically evaluation for librarians to better understand of their provided service level during the time (Libqual+, 2011).

The selected sample members were asked to fill out the printed questionnaires forms (Appendix A) in a face-to-face relationship and for distribution of questionnaires among 262 users all of the departments and campus area are used at the peak of their working hours. To better understand the concept of questions by respondents, the questionnaire form was translated from English to Portuguese and in this way it was reviewed by one of the professors from Aveiro University Language Department for the validation of translation. The original questionnaire form in English is same as last adopted questionnaire of Association of Research Libraries (ARL) that is used in University of Texas at Arlington in 2011 (Cook *et al*, 2011).

According to the questionnaire form three dimensions have been measured: Affect of Service, Information Control, and Library as Place. For each dimension users are asked to rate the related statements from 1 (lowest score) to 9 (highest score) in three level; (i) the minimum level of provided service by the library that users think would be acceptable, (ii) the desired level of service that they expect, and (iii) the perceived level or the level of service that they believe from the library. The three dimensions measured by the study are gathered together on the radar Charts, and are labeled: AS (Affect of Service), IC (Information Control) and LP (Library as Place). After gathering the survey data from questionnaire, all of the data transferred to Excel to find the result and statistical analysis in order to achieve the purpose of the study. Before transferring data to Excel program data treatment has done by correcting the wrong records and checking the scores of minimum, desired, and perceived service.

As a final point, to focus on the most essential attributes that the library managers could allocate the resource for better service quality, the “Zone of Tolerance” which is the range between respondents' minimum expectations and their desire of service quality is analyzed and shown graphically in following pages. To analyze and display aggregate results Radar Chart and Bar Chart are used in this research.

4.2- Samples and demographic information

The samples in this study include the three groups of the library system users: Students (undergraduate and graduated), Professors and Staff (from library, departments, rectorate and others). The table below represents the detail of survey respondents by sex, age and academic position based on user responses to the demographic questions in questionnaire. The number of respondents is represented by n. It is to be noted that for some of the respondents who stated never have used the service of library, just requested to fill out the demographic part of questionnaire. The questions that identified as "N/A" (not applicable) by respondents as same as missed data are not included in statistical evaluation.

Table 5: Respondents profile based on sex.

Sex	Respondents (n)	Respondents (%)
Female	157	62
Male	98	38
Total	255	100
Unknown	7	
Total	262	100

Table 6: Respondents profile based on age.

Age	Respondents (n)	Respondents (N)
Under 18	2	0.8
18 – 22	73	27.9
23 – 30	105	40
31 – 45	49	18.7
46 – 65	32	12.2
Over 65	1	0.4
Total	262	100

Table 7: Respondents profile according their academic position at Aveiro University.

	Respondents (n)	Respondents (%)
Student		
Bachelor	83	31.6
Master	81	31
PhD	33	12.6
Sub Total	197	75.2
Professors		
Professor	5	1.9
Associate Professor	15	5.7
Assistant Professor	13	5
Lecturer	7	2.7
Sub Total	40	15.3
Staff		
Library	7	2.7
Faculty	11	4.1
Administrative	5	1.9
Others	2	0.8
Sub Total	25	9.5
Total	262	100

Of the 262 respondents more than half are female (62%), (Represented in Table 5) and most of the respondents belong to age group 23-30 (40%) and 18-22 (27.9%), (Represented in Table 6). The majority of respondents are student (75.2%) and most of them are studying in the Bachelor (31.6%) and Master (31%) degree. About the group of professors nearly half of them (5.7%) have academic position as Associate Professor in university and about the group of staff most of them belong to faculty's staff (4.1%), (Represented in Table 7). It seems that the effect of the student group in achieved result of this research will be more than others.

4.3- Frequency of library use

After representing the demographic data of respondents (Sex, Age, and Academic position) the following tables represent profile of users based on frequency of the library use that are extracted from questionnaires. Table 8, 9 and 10 are representing the information about each sub groups and consequently in Table 11 total respondents profile based on frequency of the library use is represented. Separately analyzing of sub group data would help to find the priority of library use for each group and may help the library managers to classify their users to better understand their necessities based on each group attributes and characterizations.

It should be mentioned that, the use of library means the use of each provided service and resources such as materials, equipment, space, etc. on the library premises or access to the library service through a web page via internet.

Table 8: Student profile based on frequency of library use.

	Respondents (n) through library premises	Valid Percent (%)	Respondents (n) through library web-page	Valid Percent (%)
Bachelor				
Daily	7	3.6	4	2
Weekly	26	13.2	12	6.1
Monthly	14	7.1	19	9.6
Quarterly	16	8.1	27	13.7
Never	20	10.1	21	10.7
Sub Total	83	42.1	83	42.1
Master				
Daily	3	1.5	2	1
Weekly	19	9.6	8	4.1
Monthly	31	15.8	18	9.1
Quarterly	12	6.1	20	10.1
Never	16	8.1	33	16.8
Sub Total	81	41.1	81	41.1
PhD				
Daily	7	3.6	0	0
Weekly	18	9.1	3	1.5
Monthly	8	4.1	12	6.1
Quarterly	0	0	9	4.6
Never	0	0	9	4.6
Sub Total	33	16.8	33	16.8
Total	197	100	197	100

In the student group the percentage of the library use among the Bachelor students (42.1-10.1=32% through the library premises and 41.1-10.7=31.4% through the library web-page) are more than the others although the percentage of use through the library premises is approximately same between Bachelor and Master students. The students at Doctoral Program are using the service of library less than others.

Although the percentage of library use through the library premises among the Bachelor and Master degree students is approximately same but according to the extracted data about the daily and weekly use, it seems that the students of Bachelor degree have a better relationship with the library service than Master students. Also it seems that all the students prefer to use the library service through the library premises more than through web-page because the percentage and the frequency of library use (daily, weekly and monthly) through the library premises are more than through the library web-page at the main library of Aveiro University.

Table 9: Professors profile based on frequency of library use.

	Respondents (n) through library premises	Valid Percent (%)	Respondents (n) through library web-page	Valid Percent (%)
Full – Professor				
Daily	0	0	0	0
Weekly	4	10	0	0
Monthly	1	2.5	2	5
Quarterly	0	0	1	2.5
Never	0	0	2	5
Sub Total	5	12.5	5	12.5
Associate Professor				
Daily	2	5	0	0
Weekly	12	30	1	2.5
Monthly	1	2.5	3	7.5
Quarterly	0	0	6	15
Never	0	0	5	12.5
Sub Total	15	37.5	15	37.5
Assistant Professor				
Daily	4	10	0	0
Weekly	7	17.5	0	0
Monthly	2	5	4	10
Quarterly	0	0	5	12.5
Never	0	0	4	10
Sub Total	13	32.5	13	32.5
Lecturer				
Daily	1	2.5	0	0
Weekly	3	7.5	2	5
Monthly	2	5	2	5
Quarterly	1	2.5	1	2.5
Never	0	0	2	5
Sub Total	7	17.5	7	17.5
Total	40	100	40	100

The majority of the library users among the group members of professors at Aveiro University belong to Associate Professors (37.5-0=37.5% through the library premises and 37.5-12.5=25% through the library web-page) and then Assistant Professors (32.5-0=32.5% through the library premises and 32.5-10=22.5% through the library web-page). Also it seems that Associate Professors are using the service of library (Weekly use of the library is 30%) better than their colleagues. Maybe it would be interested to find the total percentage use of library service by Full-Professors (12.5%) of university that is less than the others. As same as the student group it seems that all the professors prefer to use the library service through the library premises more than electronically and online because the frequency of the library use (daily and weekly) through the library premises among them is more than the library use through the library web-page.

Table 10: Staff profile based on frequency of library use.

	Respondents (n) through library premises	Valid Percent (%)	Respondents (n) through library web-page	Valid Percent (%)
Library				
Daily	2	8	3	12
Weekly	3	12	4	16
Monthly	1	4	0	0
Quarterly	1	4	0	0
Never	0	0	0	0
Sub Total	7	28	7	28
Faculty				
Daily	0	0	0	0
Weekly	2	8	0	0
Monthly	3	12	1	4
Quarterly	4	16	3	12
Never	2	8	7	28
Sub Total	11	44	11	44
Administrative				
Daily	0	0	0	0
Weekly	0	0	1	4
Monthly	1	4	1	4
Quarterly	4	16	0	0
Never	0	0	3	12
Sub Total	5	20	5	20
Others				
Daily	0	0	0	0
Weekly	0	0	0	0
Monthly	0	0	0	0
Quarterly	1	4	0	0
Never	1	4	2	8
Sub Total	2	8	2	8
Total	25	100	25	100

Regarding to the frequency of library use among the staff group members, the staff of library and the staff of faculties (departments) are using the service of library more than the others. Regarding to the use of library through library premises the staff of faculties use library more than the others (44-8=36%) but regarding to the use of library through library web-page library staff use library more the than others (28-0=28).

Among all the sub-groups after Bachelor students who are using the library service through web-page more than the others (31.4%), the staff of library are on the second stage with 28% of using the library service through library web-page. It should be noted that the library is a place of work for library staff. That is why their daily and weekly use of the library service through web-page is more than the others.

Table 11: Total respondents profile based on frequency of library use.

	Respondents (n) through library premises	Valid Percent (%)	Respondents (n) through library web-page	Valid Percent (%)
Students				
Daily	17	6.5	6	2.3
Weekly	63	24.1	23	8.8
Monthly	53	20.2	49	18.7
Quarterly	28	10.7	56	21.4
Never	36	13.7	63	24
Sub Total	197	75.2	197	75.2
Professors				
Daily	7	2.7	0	0
Weekly	26	9.9	3	1.1
Monthly	6	2.3	11	4.2
Quarterly	1	0.4	13	5
Never	0	0	13	5
Sub Total	40	15.3	40	15.3
Staff				
Daily	2	0.8	3	1.1
Weekly	5	1.9	5	1.9
Monthly	5	1.9	2	0.8
Quarterly	10	3.8	3	1.1
Never	3	1.1	12	4.6
Sub Total	25	9.5	25	9.5
Total	262	100	262	100

Regarding to the frequency of library use among the three represented groups (Students, Professors and Staff) as shown in Table 11, the students use library service more than the others ($75.2-13.7=61.5\%$ through the library premises and $75.2-24=51.2\%$ through the library web-page) and the staff use library service less than the others ($9.5-1.1=8.4\%$ through the library premises and $9.5-4.6=4.9\%$ through the library web-page). Regarding to the samples of population it seems that the achieved data are logic at Aveiro University.

Also according to the extracted data (Table 11) about daily and weekly use of library, again the student group is in the first step of the library use but, it can be interested to note that 36 respondents (13.7%) among the student group (20 students from Bachelor and 16 students from Master) have indicated that never use the library service of university through the library premises and also 63 respondents (24%) among the student group (21 students from Bachelor, 33 students from Master and 9 students from Doctoral Program) have indicated that they never use the library service of university through the library web-page. They just filled out the demographic part of questionnaire and the questions which were related to information gateways.

Figure 3 shows a graphical presentation of the library use as a summary of the library use regarding to the respondents' answers in the both premises and electronically use of the library service also, regarding to their answers to use of non-library information gateways such as Yahoo™ and Google™. The Bars of chart are representing the frequency of library use by users and Table 12 represents the percentage of library use based on respondents' answers to related questions.

We should consider that all the respondents have answered the question “How often do you use Yahoo™ and Google™, or non-library gateways for information” even if they have stated that they never use the library service of university.

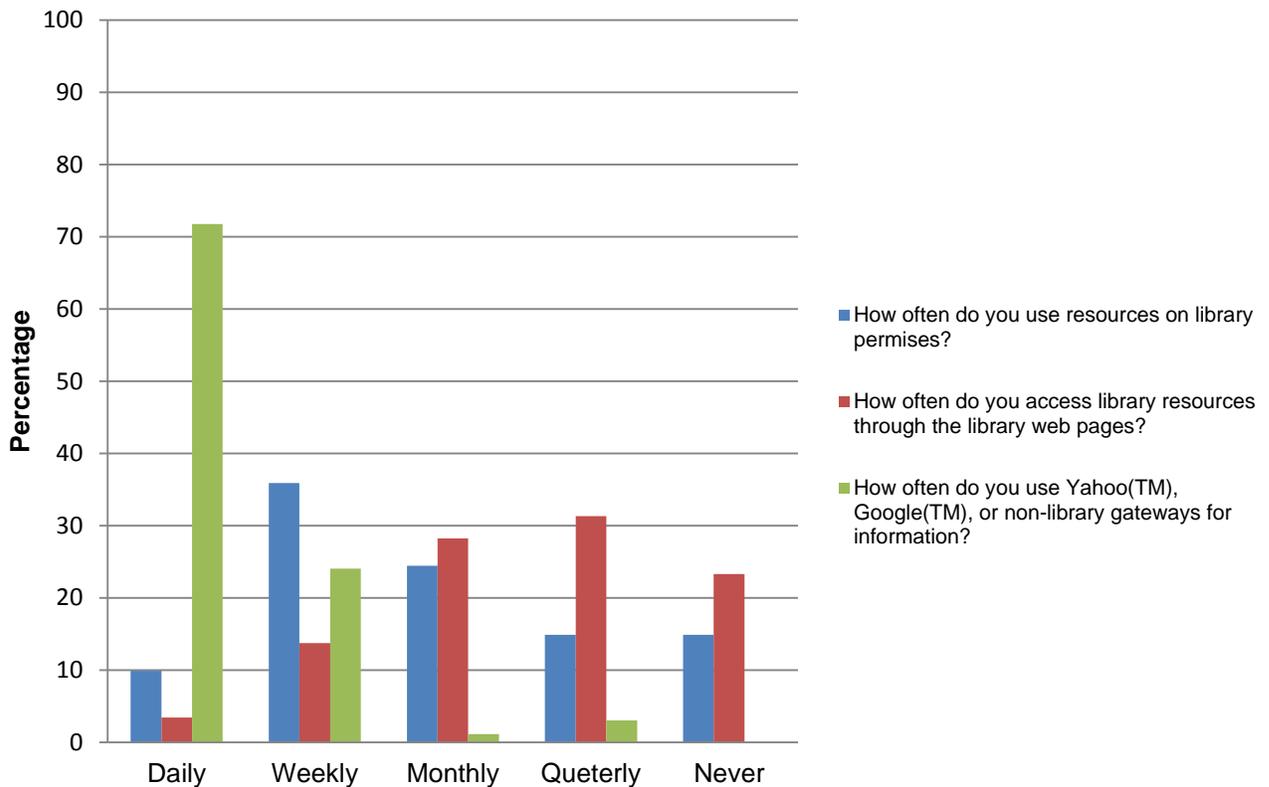


Figure 3: Library use summary based on respondents answers.

Table 12: Percentage of library use based on respondents answers.

	Daily	Weekly	Monthly	Quarterly	Never	n/%
How often do you use resources on library premises?	26 9.93%	94 35.88%	64 24.43%	39 14.88%	39 14.88%	262 100.00%
How often do you access library resources through a library web page?	9 3.44%	31 11.83%	62 23.66%	72 27.48%	88 33.59%	262 100.00%
How often do you use Yahoo(TM), Google(TM), or non-library gateways for information?	188 71.76%	63 24.05%	3 1.14%	8 3.05%	0 00.00	262 100.00%

It seems that use of non-library gateways such as Yahoo™ and Google™ to access for academic and non-academic information has a strong weight when compared with accessing the information through the library premises or the library web-page. 188 of respondents have indicated using of non-library gateways for information such as yahoo™ and Google™ every day and 63 of respondents have indicated weekly use (more than 95%).

It seems that trend of respondents to use non-library gateways for information access exist even when they are at university because the percentage of daily use for related questions shows significant difference between them (26% through the library premises, 9% through the library web-page and 71.76% through non-library gateways).

CHAPTER V – DATA ANALYSIS AND DISCUSSION

5. Data Analysis and Discussion

5.1- Research questions summary

All the questions about the identified dimensions of the library service quality are gathered into sections: "Affect of Service", "Information Control", and "Library as Place". Before transferring data from questionnaires to statistically and graphically analysis, it will be better to define the meaning of "zone of tolerance", "Minimum mean", "Desired Mean", "Perceived Mean", "Adequacy Mean", and "Superiority Mean" which are applied in Radar Chart, Bar Chart and related tables in this research.

- The space between the desired and minimum scores is called the "zone of tolerance". The distance between minimum level and desired level is representing the minimum expectations of users about provided service and their wish.
- There are two gaps scores provided by the Libqual+ survey. First one is the service superiority gap score, which is calculated by subtracting the score of desired from the perceived score of any question, so by subtracting the desired mean score from the perceived mean score the "Superiority Mean" would be achieved.

(Service Superiority = Perceived – Desired)

- The second gap score which is provided by Libqual+ is the service adequacy gap score that is calculated by subtracting the minimum score from the perceived score so, by subtracting the minimum mean score from the perceived mean score the "Adequacy Mean" would be achieved.

(Service Adequacy = Perceived – Minimum)

The following simple examples may help us to better understand the different possibilities of minimum, desired and perceived scores regarding to the adequacy and superiority gaps in Libqual+ program.

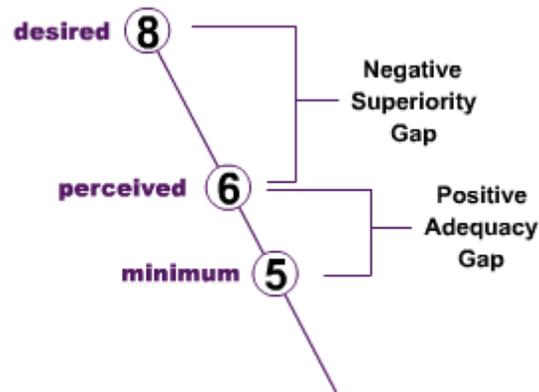


Figure 4: Gap scores when superiority gap is negative and adequacy gap is positive (Libqual+, 2011).

In this example (Figure 4) the superiority gap score is negative because the user's perception of service quality is below the desired score ($6 - 8 = -2$) but, the adequacy gap is positive because the users perceived more than minimum range of expectations score or more than minimum level of service which is indicated by users ($6 - 5 = 1$).

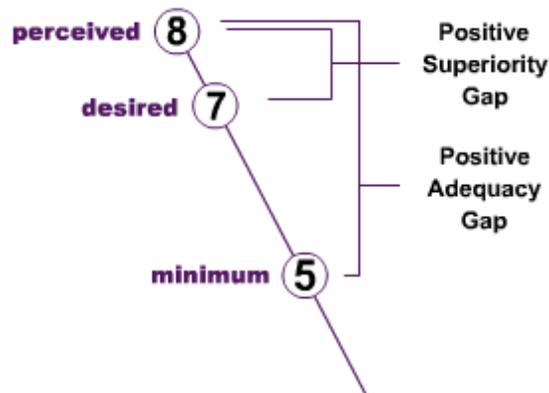


Figure 5: Gap scores when superiority gap and adequacy gap are positive (Libqual+, 2011).

In this example (Figure 5) the perceived score is higher than minimum and desired scores that means the user's perception is more than user's minimum expectations and desired. In this case both of adequacy and superiority gaps will be positive because ($8 - 7 = 1$) and ($8 - 5 = 3$).

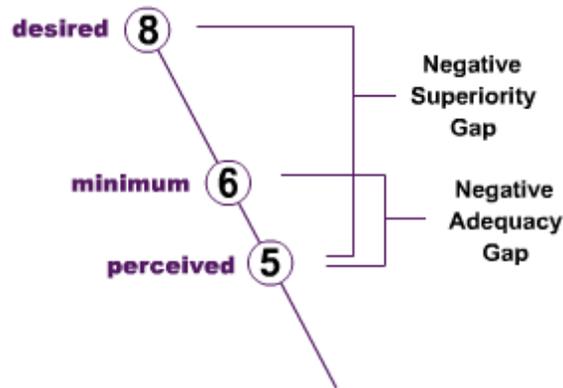


Figure 6: Gap scores when superiority gap and adequacy gap are negative (Libqual+, 2011).

In this example (Figure 6) negative service adequacy gap score represents the users' perceptions of provided service which fall below their minimum acceptable level. In this case two of the adequacy and superiority score gaps will be negative because $(5 - 6 = -1)$ and $(5 - 8 = -3)$.

All the represented examples can be seen in Libqual+ surveys depends on the sample of respondents and situation of the library in providing demand of users at different type of libraries.

5.1.1- Research questions summary for student group

Regarding to the significant role of the students in result of this study that represent more than 75% of respondents (Table 7) also the majority of the library users that are students (Table 11), before representing the details of mean scores for all of the respondents it is better to analyze students' feedbacks and ideas of the provided service attributes by the library. The following tables (Table 13 & Table 14) represent the mean scores and standard deviation values that are extracted from questionnaires of students' responses. The numbers of respondents are different for each question (n) because in some questions the respondents did not indicate any rate and in some of them the respondents just filled out the demographic part of questions because they stated that never have experienced provided service by the library. The represented values are calculated by Excel (version 2010) program.

Table 13: Result of mean scores, extracted from questionnaires of student group (Libqual+, 2011).

ID	Question Text	Minimum Mean	Desired Mean	Perceived Mean	Adequacy Mean	Superiority Mean	n
Affect of Service							
AS-1	Employees who instill confidence in users	6.58	8.31	7.14	0.56	-1.17	156
AS-2	Giving users individual attention	6.33	8.28	6.80	0.47	-1.48	152
AS-3	Employees who are consistently courteous	6.42	8.12	7.63	1.21	-0.76	159
AS-4	Readiness to respond to users' questions	6.85	8.85	7.55	0.7	-1.3	161
AS-5	Employees who have the knowledge to answer user questions	6.74	8.17	7.69	0.95	-0.48	156
AS-6	Employees who deal with users in a caring fashion	6.42	7.02	6.63	0.21	-0.39	158
AS-7	Employees who understand the needs of their users	6.00	8.22	6.01	0.01	-2.21	153
AS-8	Willingness to help users	7.23	8.41	7.63	0.4	-0.78	157
AS-9	Dependability in handling users' service problems	6.52	7.79	6.77	0.25	-1.02	160
Information Control							
IC-1	Making electronic resources accessible from my home or office	6.49	8.81	6.59	0.1	-2.22	160
IC-2	A library Web site enabling me to locate information on my own	6.66	8.64	6.17	<u>-0.49</u>	-2.47	156
IC-3	The printed library materials I need for my work	8.00	8.97	6.10	<u>-1.90</u>	-2.87	159
IC-4	The electronic information resources I need	6.32	7.48	6.52	0.2	-0.96	158
IC-5	Modern equipment that lets me easily access needed information	6.84	8.57	6.51	<u>-0.03</u>	-2.06	153
IC-6	Easy-to-use access tools that allow me to find things on my own	6.70	8.45	7.48	0.78	-0.97	159
IC-7	Making information easily accessible for independent use	6.45	7.42	7.13	0.68	-0.29	151
IC-8	Print and/or electronic journal collections I require for my work	6.61	8.83	6.12	<u>-0.49</u>	-2.71	157
Library as Place							
LP-1	Library space that inspires study and learning	7.42	8.89	7.12	<u>-0.3</u>	-1.68	151
LP-2	Quiet space for individual activities	7.54	8.92	5.62	<u>-1.92</u>	-3.30	152
LP-3	A comfortable and inviting location	7.22	8.67	6.17	<u>-1.05</u>	-2.50	159
LP-4	A getaway for study, learning, or research	6.75	7.86	6.80	0.05	-1.06	154
LP-5	Community space for group learning and group study	6.71	7.82	6.04	<u>-0.67</u>	-1.78	150
Overall:		6.73	8.61	6.52	-0.21	-2.09	197

Table 14: Standard deviations result, extracted from questionnaires of student group (Libqual+, 2011).

ID	Question Text	Minimum SD	Desired SD	Perceived SD	Adequacy SD	Superiority SD	n
Affect of Service							
AS-1	Employees who instill confidence in users	1.62	1.60	1.83	1.77	1.63	156
AS-2	Giving users individual attention	1.58	1.33	1.62	1.71	1.78	152
AS-3	Employees who are consistently courteous	1.62	1.60	1.55	1.45	1.67	159
AS-4	Readiness to respond to users' questions	1.55	1.41	1.73	1.62	1.73	161
AS-5	Employees who have the knowledge to answer user questions	1.57	1.35	1.60	1.53	1.59	156
AS-6	Employees who deal with users in a caring fashion	1.23	1.11	1.42	1.72	1.66	158
AS-7	Employees who understand the needs of their users	1.66	1.62	1.69	1.77	1.73	153
AS-8	Willingness to help users	1.55	1.20	1.33	1.66	1.55	157
AS-9	Dependability in handling users' service problems	1.42	1.42	1.80	1.81	1.69	160
Information Control							
IC-1	Making electronic resources accessible from my home or office	1.52	1.23	1.52	1.71	1.65	160
IC-2	A library Web site enabling me to locate information on my own	1.77	1.44	1.71	1.66	1.72	156
IC-3	The printed library materials I need for my work	1.65	1.67	1.58	1.49	1.69	159
IC-4	The electronic information resources I need	1.54	1.39	1.63	1.63	1.74	158
IC-5	Modern equipment that lets me easily access needed information	1.78	1.22	1.53	1.68	1.78	153
IC-6	Easy-to-use access tools that allow me to find things on my own	1.63	1.42	1.52	1.78	1.86	159
IC-7	Making information easily accessible for independent use	1.55	1.54	1.67	1.71	1.62	151
IC-8	Print and/or electronic journal collections I require for my work	1.67	1.55	1.71	1.82	1.70	157
Library as Place							
LP-1	Library space that inspires study and learning	1.68	1.33	1.74	1.97	1.83	151
LP-2	Quiet space for individual activities	1.62	1.62	1.78	2.02	2.11	151
LP-3	A comfortable and inviting location	1.90	1.61	1.85	1.89	1.92	159
LP-4	A getaway for study, learning, or research	1.79	1.55	1.72	2.14	2.14	154
LP-5	Community space for group learning and group study	1.75	1.58	1.86	1.91	1.86	150
Overall:		1.32	1.11	0.98	1.57	1.46	197

Except questions 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-5 (Modern equipment that lets me easily access needed information) and IC-8 (Print and/or electronic journal collections I require for my work) from dimension "Information Control" and LP-1 (Library space that inspires study and learning), LP-2 (Quiet space for individual activities), LP-3 (A comfortable and inviting location) and LP-5 (Community space for group learning and group study) from dimension "Library as Place" that have negative adequacy mean, the others have positive adequacy mean. As it is clear just in dimension "Affect of Service" all the adequacy means are positive (perceived is more than minimum expectation) and in the other dimensions particularly in dimension "Library as Place" it seems most of the rates indicate that students are not satisfied with services provided by the library.

Standard deviation is calculated for all the scores that are indicated by students in questionnaires. Standard Deviation represents the data separation around the mean of each question and shows how much respondent answers are different in same questions when comparing together. According to the represented data from table 14, it seems that the biggest distance of score around the means related to "Library as Place" dimensions' scores which the most of the standard deviation values are higher than other dimensions' standard deviation values.

5.1.2- Radar chart for student group findings

To easy show the aggregate result of work about the survey core questions Radar Chart is used to graphical representing the weak points and strong points of provided service by the library according to the respondents' ideas. A code to identify each question is displayed at the outer point of each axis. Radar Chart is one of the useful tools to summarize the 22 questions in three dimensions that are defined in Libqual+ questionnaire form (Libqual+, 2011). Areas of mean scores on the Radar Chart are shaded with different colors to better understand the gaps and the zone of tolerances. Negative adequacy gap scores are highlighted in red (the area that perceived is less than minimum), positive adequacy gap scores are highlighted in blue (the area that perceived is greater than minimum) and negative superiority gap scores are highlighted in yellow (the area that perceived is less than desired).

It should be noted that there was not any positive superiority score (when desired is less than perceived), because there is not any positive superiority area on represented Radar Chart for the student group (Figure 7).⁵

Mean scores of each question are mapped as points on a single line individually beside together and made the Radar Chart with three main sections: Affect of Service (AS), Information Control (IC) and Library as Place (PL).

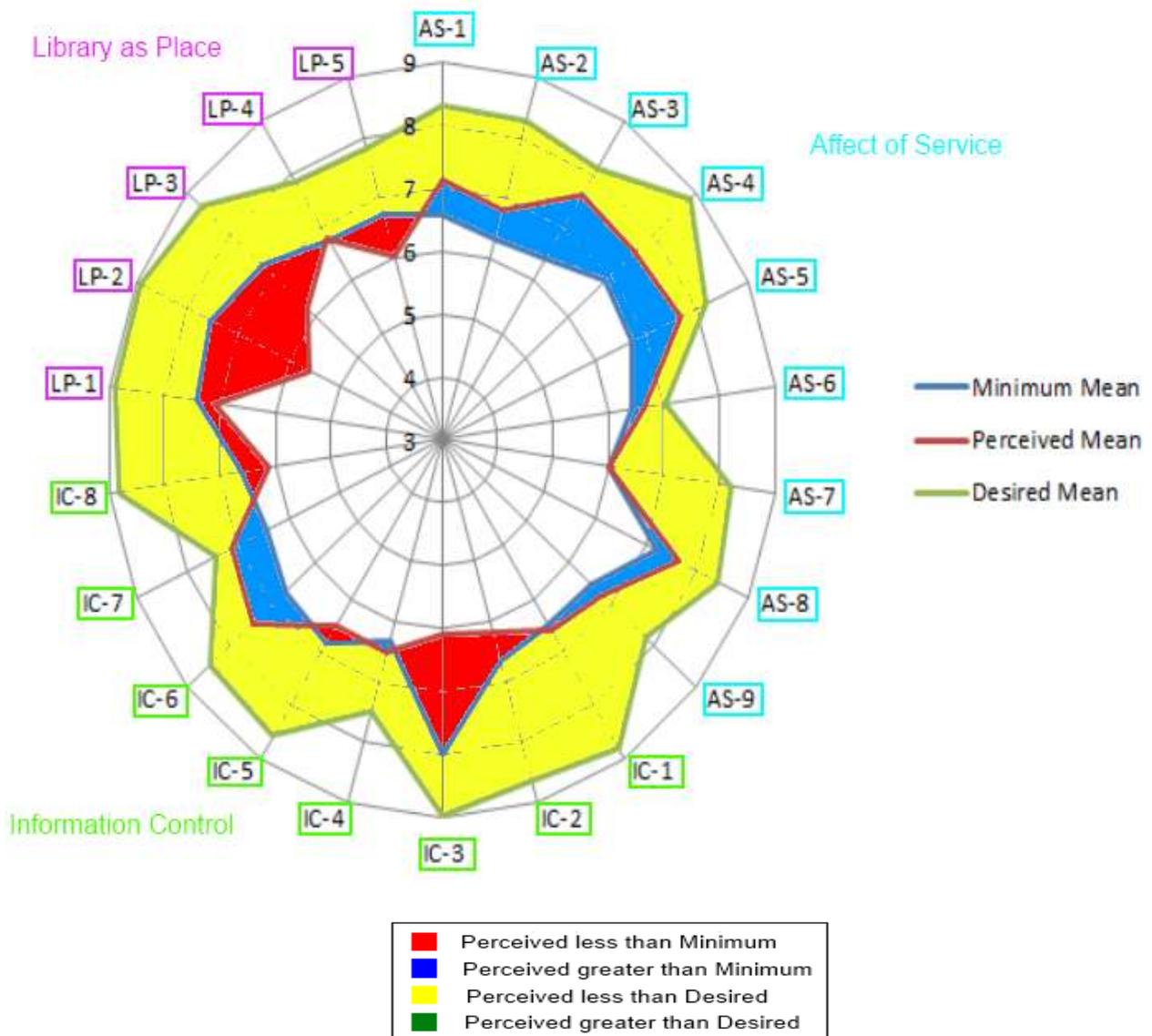


Figure 7: Radar chart for student group findings (Libqual+, 2011).

⁵ Normally according the standard norms of Libqual+ this area should be highlighted in Green color

On each axis, respondents' minimum, desired, and perceived levels of service quality are plotted, and the resulting "gaps" between the three levels are shaded in yellow, blue and red color.

The area that shaded in red color is problematic area because the perceived of users is less than their minimum expectations. It should be mentioned that the size of area shaded in red color represents the limit of negative adequacy gap. More area in red color represents more gaps between users' perceptions and their minimum expectations.

The area that is shaded in blue color represents positive adequacy gap because in this area the level of users' perception is more than their minimum expectations. More area in blue color means users received more or better service than their minimum expectations.

The area that is shaded in yellow color represents normal condition of users' perception and desired which the level of desired is higher than the level of perceived. More area in yellow color means more distance between users' perception and desired.

5.1.3- Research questions summary for total respondents

The following two tables (Table 15 & Table 16) represent the mean scores and Standard Deviation values for total respondents that are extracted from questionnaires. The values are calculated by Excel (version 2010) program. The numbers of respondents are different for each question (n) because in some questions respondents did not indicate any rate and in some of them the respondents just filled out the demographic part of questions because they stated that never have experienced provided service by the library.

Table 15: Result of mean scores, extracted from questionnaires for total respondents (Libqual+, 2011).

ID	Question Text	Minimum Mean	Desired Mean	Perceived Mean	Adequacy Mean	Superiority Mean	n
Affect of Service							
AS-1	Employees who instill confidence in users	6.73	8.18	7.36	0.63	-0.82	220
AS-2	Giving users individual attention	6.61	8.25	6.85	0.24	-1.4	214
AS-3	Employees who are consistently courteous	6.07	8.05	7.75	1.68	-0.3	221
AS-4	Readiness to respond to users' questions	7.12	8.80	7.80	0.68	-1	218
AS-5	Employees who have the knowledge to answer user questions	7.47	8.02	7.56	0.09	-0.46	208
AS-6	Employees who deal with users in a caring fashion	6.13	7.19	6.42	0.29	-0.77	212
AS-7	Employees who understand the needs of their users	5.85	8.00	6.50	0.65	-1.5	219
AS-8	Willingness to help users	7.05	8.32	7.97	0.92	-0.35	202
AS-9	Dependability in handling users' service problems	6.66	7.70	6.82	0.16	-0.88	214
Information Control							
IC-1	Making electronic resources accessible from my home or office	6.35	8.55	6.40	0.05	-2.15	216
IC-2	A library Web site enabling me to locate information on my own	6.58	8.22	6.60	0.02	-1.62	210
IC-3	The printed library materials I need for my work	7.75	8.91	6.55	<u>-1.20</u>	-2.36	220
IC-4	The electronic information resources I need	6.15	7.76	6.28	0.13	-1.48	222
IC-5	Modern equipment that lets me easily access needed information	6.60	8.45	6.65	0.05	-1.8	211
IC-6	Easy-to-use access tools that allow me to find things on my own	6.52	8.25	7.20	0.68	-1.05	207
IC-7	Making information easily accessible for independent use	6.27	8.04	7.33	1.06	-0.71	213
IC-8	Print and/or electronic journal collections I require for my work	6.85	8.71	6.62	<u>-0.23</u>	-2.09	219
Library as Place							
LP-1	Library space that inspires study and learning	7.05	8.86	7.35	0.3	-1.51	220
LP-2	Quiet space for individual activities	7.00	8.97	5.28	<u>-1.72</u>	-3.69	213
LP-3	A comfortable and inviting location	6.58	8.14	6.76	0.18	-1.38	201
LP-4	A getaway for study, learning, or research	6.45	7.50	6.58	0.13	-0.92	221
LP-5	Community space for group learning and group study	6.40	7.05	6.10	<u>-0.3</u>	-0.95	216
Overall:		6.67	8.18	6.78	0.11	-1.40	262

Table 16: Standard deviation result extracted from questionnaires for total respondents (Libqual+, 2011).

ID	Question Text	Minimum SD	Desired SD	Perceived SD	Adequacy SD	Superiority SD	n
Affect of Service							
AS-1	Employees who instill confidence in users	1.71	1.55	1.78	1.82	1.76	220
AS-2	Giving users individual attention	1.66	1.14	1.72	1.88	1.79	214
AS-3	Employees who are consistently courteous	1.53	1.50	1.46	1.37	1.51	221
AS-4	Readiness to respond to users' questions	1.68	1.38	1.64	1.90	1.72	218
AS-5	Employees who have the knowledge to answer user questions	1.50	1.17	1.62	1.75	1.63	208
AS-6	Employees who deal with users in a caring fashion	1.48	1.08	1.59	1.62	1.58	212
AS-7	Employees who understand the needs of their users	1.94	1.81	1.72	1.66	1.60	219
AS-8	Willingness to help users	1.50	1.20	1.73	1.97	1.79	202
AS-9	Dependability in handling users' service problems	1.55	1.24	1.70	1.92	1.74	214
Information Control							
IC-1	Making electronic resources accessible from my home or office	1.46	1.17	1.40	1.61	1.55	216
IC-2	A library Web site enabling me to locate information on my own	1.73	1.50	1.65	1.73	1.72	210
IC-3	The printed library materials I need for my work	1.75	1.58	1.67	1.84	1.78	220
IC-4	The electronic information resources I need	1.45	1.25	1.66	1.77	1.70	222
IC-5	Modern equipment that lets me easily access needed information	1.38	1.04	1.42	1.63	1.62	211
IC-6	Easy-to-use access tools that allow me to find things on my own	1.57	1.33	1.61	1.91	1.83	207
IC-7	Making information easily accessible for independent use	1.49	1.12	1.52	1.68	1.59	213
IC-8	Print and/or electronic journal collections I require for my work	1.77	1.52	1.65	1.90	1.82	219
Library as Place							
LP-1	Library space that inspires study and learning	1.62	1.20	1.86	2.03	2.01	220
LP-2	Quiet space for individual activities	1.74	1.59	1.92	2.21	2.12	213
LP-3	A comfortable and inviting location	1.80	1.72	2.14	2.34	2.19	201
LP-4	A getaway for study, learning, or research	1.75	1.48	1.88	1.98	2.05	221
LP-5	Community space for group learning and group study	1.82	1.65	2.08	2.19	1.98	216
Overall:		1.12	0.83	0.94	1.62	1.39	262

Except questions IC-3 (The printed library materials I need for my work) and IC-8 (Print and/or electronic journal collections I require for my work) from "Information Control" dimension also questions LP-2 (Quiet space for individual activities) and LP-5 (Community space for group learning and group study) from dimension "Library as Place", other questions have positive adequacy mean gap. In all the questions there is negative superiority mean but, in some of them the values are more close to zero (positive side). The existence distance between the level of perceived and desired is not too much, it means that in these items the library was able to provide better service to users such as questions AS-3 (Employees who are consistently courteous) and AS-5 (Employees who have the knowledge to answer user questions) that perception of users is closer to their desired.

It is to be noted that there was not any positive superiority score (perceived are less than desired), because there is not any positive superiority area on represented Radar Chart for total respondents (Figure 8).

Standard deviation is calculated for all the scores that are indicated by respondents from different groups. According to the represented data from table 16, it seems that the biggest distance of score around the means is related to "Library as Place" dimensions' scores where the most of the standard deviation values are higher than the other dimensions' standard deviation values like the student group and it shows these items received different ideas (different scores) from respondents.

5.1.4- Radar chart for total respondents findings

As same as the student group's Radar Chart the Mean scores of each question are mapped as points on a single line individually beside together and made the Radar Chart with three main sections: Affect of Service (AS), Information Control (IC) and Library as Place (PL).

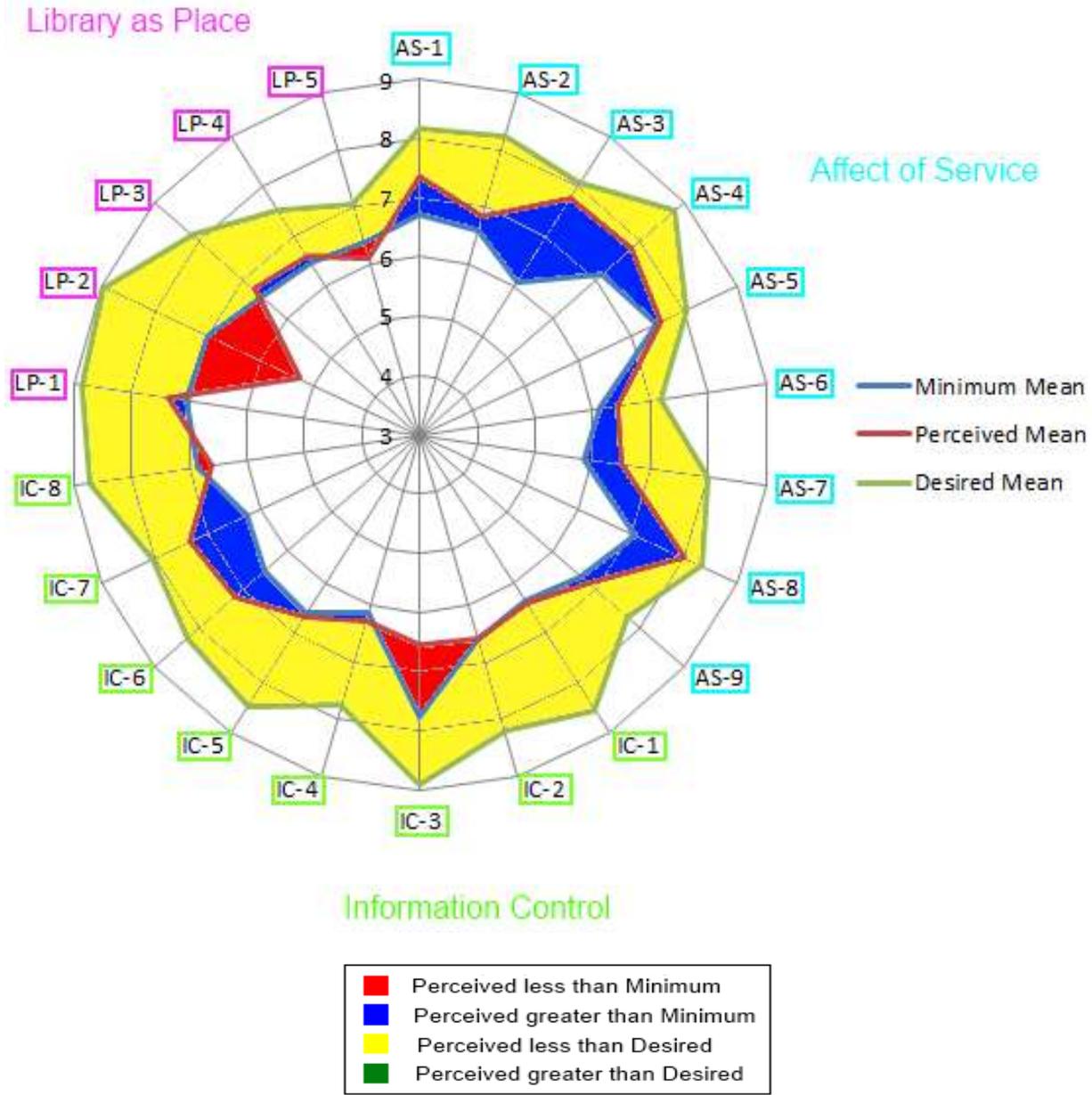


Figure 8: Radar Chart for total respondents.

On each axis, respondents' minimum, desired, and perceived levels of service quality are plotted, and the resulting "gaps" between the three levels (representing service adequacy or service superiority) are shaded in blue, yellow, green, and red.

“By looking at the Radar Chart as a whole, you can gain an overall understanding of user perceptions of service quality at your library. The color-coded differences make it easy to identify areas where improvements may be needed or where you are already meeting user expectation”.

(Libqual+ Survey, 2011, p10)

5.1.5 – Bar Chart for total respondents

Bar Chart is a tool to easy look at aggregate result of Libqual+ survey in different way of Radar Chart. In all the Libqual+ surveys it is used after Radar Chart to complete and better understand of achieved result (Libqual+, 2011). In this chart the result of dimensions' data (Affect of Service, Information Control and Library as Place) are represented in Bar Chart format.

Each bars of Bar Chart, is representing the zone of tolerance, the distance between minimum and desired scores, also the adequacy gaps are shown in the other color inside the bars. The adequacy gap represents the difference between perceptions and minimum acceptance of provided service. It seems that to analyze the zone of tolerance, the Bar Chart represents better and easy way to understand the users' minimum and desired level. Figure 9 represents the graphical information of Bar Chart in Libqual+ program.

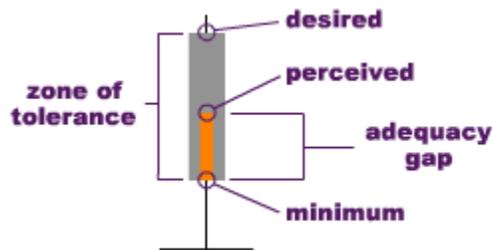


Figure 9: Graphical information of normal Bar Chart in Libqual+ program (Libqual+, 2011).

The following simple examples may help to better understand the different possibilities of minimum, desired, perceived, and adequacy scores in Libqual+ program.

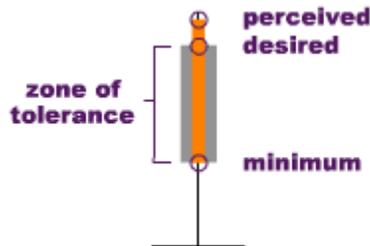


Figure 10: Gap scores of Bar Chart when superiority and adequacy gaps are positive (Libqual+, 2011).

In this example (Figure 10) the perceived score is higher than minimum and desired score that means the users' perceptions are more than users' expectations. In this case both the adequacy and superiority gaps will be positive. Normally perceived score falls within the zone of tolerance (between desired and minimum) but it is possible to find this situation when the provided service by the library is more than users' desired.

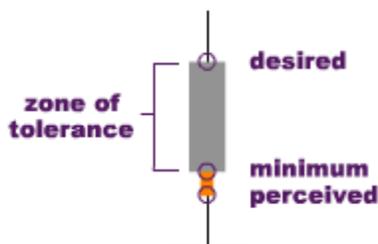


Figure 11: Gap scores of Bar Chart when superiority and adequacy gaps are negative (Libqual+, 2011).

In this example (Figure 11) negative service adequacy gap score represents that the users' perceptions of provided service falls below their minimum acceptable level. In this case both the adequacy and superiority score gaps will be negative. Perceptions of users fall below the minimum scores and it shows the opposite situation of previous example (Figure 10).

Table 17 represents the mean scores for each dimension where n represents the number of respondents for each particular dimension.

Table 17: Mean scores for each dimension of library service.

Dimension	Minimum Mean	Desired Mean	Perceived Mean	Adequacy Mean	Superiority Mean	n
Affect of Service	6.64	7.86	7.05	0.41	- 0.81	202
Information Control	6.60	8.06	6.91	0.31	- 1.15	207
Library as Place	6.62	8.21	6.41	-0.21	- 1.80	201
Total	6.67	8.18	6.78	0.11	- 1.40	262

Table 18 represents the standard deviation for each particular dimension where n represents the number of respondents for each particular dimension based on their mean.

Table 18: Standard deviation for each dimension of library service.

Dimension	Minimum SD	Desired SD	Perceived SD	Adequacy SD	Superiority SD	n
Affect of Service	1.41	1.11	1.43	1.61	1.48	202
Information Control	1.36	1.31	1.34	1.39	1.32	207
Library as Place	1.59	1.43	1.74	2.01	1.87	201
Total	1.12	0.83	0.94	1.62	1.39	262

All the necessary data for Bar Chart is extracted from questionnaires with Excel program (version 2010). Figure 12 represents the mean of each dimension (not the mean of each question) individually, and scores for each dimension of the library service quality have been plotted graphically for total respondents. The exterior bars represent the range of minimum to desired mean scores (zone of tolerance) for each dimension and the interior bars represent the range of minimum to perceived mean scores (the service adequacy gap) for each dimension of provided service quality by the library.

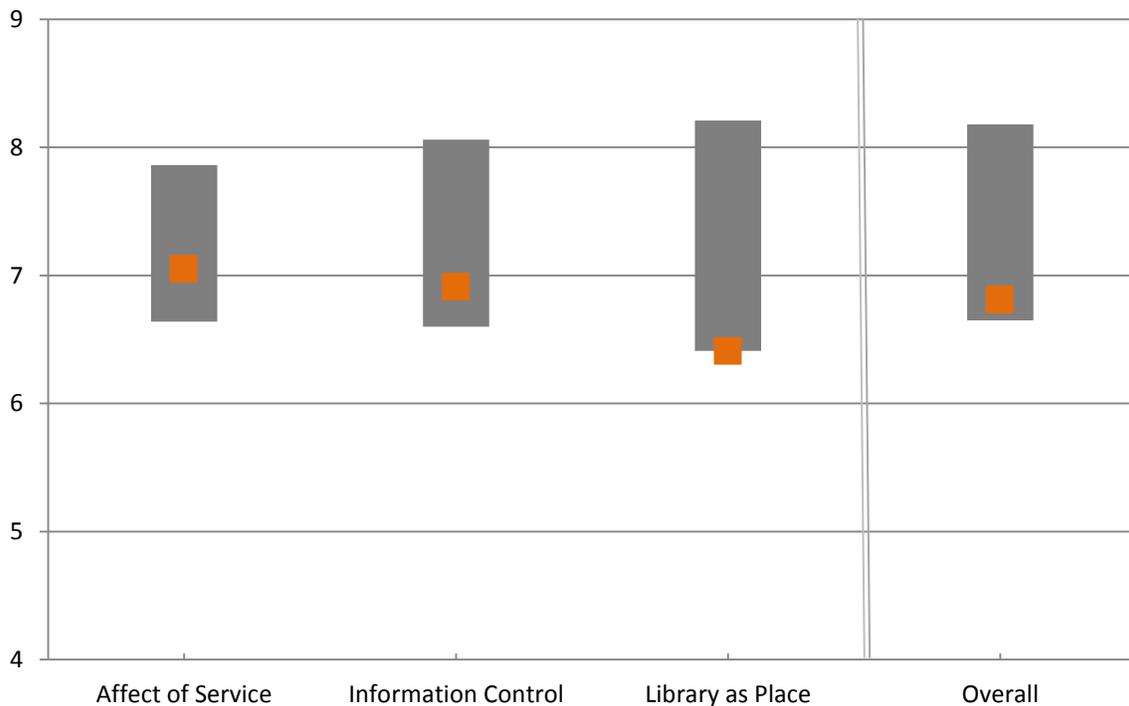


Figure 12: Dimensions' mean gaps and the zone of tolerance for the library of Aveiro University.

According to the represented data in Figure 12 for total respondents, the zone of tolerance for dimension "Library as Place" has more gap when comparing with the other dimensions and it means that the distance between the level of users' minimum expectations and the level of users' desired is more than the others. Also, just in this dimension the library was not able to cover the minimum expectations of the users and like the student group there is a significant gap of the provided service by the library. Although "Library as Place" is received the weakest adequacy mean score by the respondents among the other dimensions but as an overall view, the library provided acceptable quality of service for users because the total adequacy mean is positive (0.11) for total respondents and it shows that total perceived of users was more than their minimum expectations.

5.2 – Users' comments

Among the 262 distributed questionnaires 43 respondents have commented their ideas, suggestions and complain which most of them were about the Internet service of the library among the others. 11 respondents have noted that the internet service of library has problems in place and in most of the time when the library is crowded it would be very difficult to use wireless system of internet in the place of study. 6 respondents have noted that the place of the library is not quite to study and concentration. Also 5 respondents have noted that the number of provided computers for study is not enough for them at peak hours of study in the library.

It seems that the most of the comments by users or respondents are focused on one of the dimensions of Libqual+ that is "Library as Place".

CHAPTER VI – CONCLUSION

6. Summary of Findings

6.1- Demographic findings

This chapter reports the results of the study which answers to the research questions and the problems users encountered when involved in library service.

As expected, more than 75.2% of respondents belong to the student group and the achieved results of this research were based on their ideas more than on the others (Table 7).

According to the extracted information (Table 5) the majority of respondents are females (62%) and it shows that the female respondents' ideas have more effect on achieved result of Libqual+ survey at the library of Aveiro University. On the, other hand the young people (under 30 years) represent most of the respondents (68.7%) that can influence the achieved result of this research because their desires can be considered high when compared with other age groups (Table 6). The reason is that it is a natural trend for people to wish more than they have and among young people this tendency may become more evident.

6.2- Use of library

The represented information and result in Table 12 and Figure 3 show that the non-library information gateways such as Yahoo™ and Google™ can be defined as the main threat or competitor of academic libraries. The access to information via internet is easier for users and internet gateways provide a global service and an unlimited information source for users. The contacts established between internet users and the fact they can share their experiences and data online may happen easily and it may be defined as one of the main advantages of these information gateways which are more developed when compared with digital libraries of universities.

The answers obtained (Table 12 & Figure 3) have shown that the trend and interest of using the non-library information gateways is significant among Aveiro University library users because more than 95% of respondents have indicated daily and weekly use of non-library gateways. It seems that users generally prefer to use the library service through library premises more than the library web-page. Although the percentage of users that never use both

of them (library premises & library website) is important too (14.88% of respondents never use the library premises and 33.59% of them never use the library website).

It seems that users need more knowledge and information about the library website and even how to use the library website for information access. The awareness of virtual library advantages may help increase the users' interest in the service provided by the library.

6.3- Libqual+ dimensions

As an overall view, the main library of Aveiro University (biblioteca) was able to cover the users' expectations according to the total result achieved in Libqual+ dimensions. The total adequacy means was positive (0.11) and it means that the provided service satisfies library users (Table 17). However it can be better.

Amongst the represented dimensions to evaluate the quality of provided service by the main library of Aveiro University, "Library as Place" has the weakest perceived mean (6.41) compared with the other two dimensions - "Affect of Service" and "Information Control" with perceived means 7.05 and 6.91, respectively. Regarding adequacy means value among represented dimensions, "Library as Place" unlike the other dimensions has negative adequacy mean (-0.21) and it means that the library was not able to satisfy the users in this dimension (Table 17). Also, as shown in Table 15, the related questions of this dimension (LP-1 to LP-5) have weak adequacy means when compared with others.

Among all the questions that are representing different attributes of service quality there are some attributes which the library of Aveiro University was not able to provide more than the minimum expectations of the users. These attributes that have negative adequacy mean are: "Quiet space for individual activities" (-1.72) from dimension "Library as Place"; "The printed library materials I need for my work" (-1.20) from dimension "Information Control"; "Community space for group learning and group study" (-0.3) from dimension "Library as Place"; and "Print and/or electronic journal collections I require for my work" (-0.23) from dimension "Information Control" respectively (Table 15).

It seems that there is a logic relationship between the comments made by some of the respondents and the achieved result of Libqual+ implementation. The internet service problems, unquiet place for study and shortage of computers for work are the statements which are related to the "library as place" dimension of Libqual+.

The best rates of service attributes belong to the questions: "Employees who are consistently courteous" from dimension "Affect of Service" and "Making information easily accessible for independent use" from dimension "Information Control" with adequacy means (1.68) and (1.06), respectively (Table 15).

By analyzing the Radar Chart of total respondents (Figure 8) the same result will achieve because the blue color area, which represents perceived greater than minimum expectation for "Affect of Service" dimension, is bigger than others and the red color area, which represents perceived less than minimum expectations for "Library as Place" dimension, is bigger than the others, too. Also, the gaps between minimum, desired and perceived level of provided service by library for total respondents shows the same result for each dimension as it is clear in Bar Chart (Figure 12).

According to the represented data in table 15, there is not any positive superiority value for the represented dimensions and it means that the main library of Aveiro University was not able to provide any more service beyond that desired by the users. For this reason there is not any green color area represented in the Radar Chart for total respondents (Figure 8). Also, by analyzing graphically the represented Bar Chart (Figure 12) the same result is clear. By comparing the dimensions' superiority gaps defined between the range of desired and perceived, we realize the perceived level is less than the desired one ("Affect of Service" and "Information Control") or even when the perceived level is less than minimum expectation ("Library as Place").

Finally, according to the information obtained, the represented dimensions may be classified as very good for "Affect of Service", good for "Information Control" and bad or weak for "Library as Place".

The details of Standard Deviation of each item of total respondents' questionnaire (Table 16) show that the values for "Library as Place" dimension have more variation compared with the other dimensions. But the variations of scores around the means of "Affect of Library" and "Information Control" dimensions' questions are closer together (Table 16).

The overall result for the student group, the main part of respondents (more than 75%), represents significant problems in the quality of provided service to users. The total adequacy mean for this group is negative (-0.21) and it means that the main library of Aveiro University was not able to cover the minimum expectations of users, because the perceived mean is less than minimum mean. Although the overall adequacy mean for total respondents is

positive (0.11), it is clear that it was just because of Staff and Professors scores effect (Table 17).

When comparing the result of the Radar Chart for the student group (Figure 7) and the total respondents (Figure 8), it is clear that the problematic area shown in red for the student group is bigger. It shows that there are more questions in the student group with negative adequacy mean and the represented data in table 13 approves this situation. As to "Information Control" dimensions' questions, there are four service attributes with negative adequacy mean (IC-2, IC-3, IC-5 and IC-8) and in "Library as Place" dimensions' questions there are four service attributes with negative adequacy mean (LP-1, LP-2, LP-3 and LP-5), too.

It should be noted that the gaps of the student group are bigger than the total respondents' gaps. Moreover, all the attributes with negative adequacy means (IC-3, IC-8, LP-2 and LP-5) are in the student group as well. The same final result of total respondents may be extended to the student group, too: the dimensions may be classified as very good for "Affect of Service", good for "Information Control" and bad or weak for "Library as Place".

6.4- Research questions

The research findings can answer the research questions and can be summarized as the following:

- Which are the dimensions that determine the users' evaluation and satisfaction of service quality in Aveiro University's library activities?

All the questions about the identified dimensions of library service quality are gathered into sections: "Affect of Service" (customer services provided by library staff or human dimension of service quality); "Information Control" (generally relates whether users are able to find the required information such as library resources, collections and access to resources); and "Library as Place" (deals with the physical environment of the library such as library spaces, facilities and amenities). Also the related questions for each dimension represent the different attributes of service which the library is providing to users.

- How is the ranking of libraries surveyed in terms of perceived service quality?

According to the achieved results, the represented dimensions may be classified as very good for "Affect of Service", good for "Information Control" and bad or weak for "Library as Place". The service adequacy that is representing the difference level between perceived and minimum expectations of users in "Library as Place" dimension is negative (Table 17) and it means that the library of Aveiro University was not able to cover the related attributes of service in this dimension. This dimension represents physical attributes of the library and the librarians could pay more attention and try to improve them.

- Which problems did the users encounter when involved in the library service?

Quiet space for individual activities, the printed library materials, journals and references that users need to work and community space for group learning and group study, internet service problems and the shortage of computers to use in the library are most of the problems for users when involved in library service.

- Which are the most important points that Aveiro University's library managers should pay more attention to in order to provide better quality of service?

The service attributes which the library managers could allocate resources to improve the service quality are related to physical attributes of service, such as quiet place for study, internet service problems, materials and references that users need and the number of computers that are provided at the place. If the library budget is not enough, the library could try to make strategic decisions to minimize the gaps between users' perception and their minimum desired.

The library managers try to make some decisions to better introduce the library web page attributes and advantages to enhance remote access service.

It seems that the student group need more attention compared with other users, because the identified problems by them as the main users of the library service were significant and more than the problems identified by the other users.

6.5- Recommendations and suggestions

Because most of the users' problems are related to the physical attributes of the library service, it seems the librarians could pay more attention to them, for example, by providing convenient wireless internet service and more computers they will be able to increase the users' satisfaction. The ability to better provide internet service at the library is possible for the university since the Information Technology Department of the university is one of the famous and well-known institutions in Europe and the library of Aveiro University may ask for their help and ideas to solve this problem. If the library is not able to increase the number of computers because of space problems, it is better to increase the number of computers in the study rooms of each department based on their population.

It seems that sometimes even the references provided by the professors to students do not exist in the library and students are not able to find their necessary materials in the library. To solve this problem maybe the library could try to update the existing materials (books, journals, etc.) based on the references that are given by the professors.

Furthermore, the data reveals that the majority of the users are not interested in accessing the remote service of library. It seems that they do not have enough information and knowledge to use the advantages of this attribute of service and maybe more advertising or workshops organized by the library can increase the number of users in this field.

Sometimes, even in the area of the library that should be silent users have noise problem and it seems that the environment is not convenient to study, at least for a long time. This problem increases when students are in exam periods, because students occupy the maximum capacity of the library. The library staff can train users to find the best place to study based on their request from the library map. In the map of the library, the different parts of space are identified for different behavior of users (collaborative, quiet and silent).

There are some useful attributes for information access at library of Aveiro University that it seems some of the users are not aware of or do not have any experience of use, such as information sharing, training workshops, provided equipment, virtual environment and digital part of library, etc.

As a suggestion for future work a similar study can be carried out with a larger sample including all Aveiro University Libraries, so that the results can be generalized to a larger population. To sum up, further research could be conducted in order to enhance the

understanding of the library users' demands, since the results can be really important to the library managers to make strategic and financial decisions.

6.6- Limitations

This study has been carried out to assess the service quality of the main library of Aveiro University with the purpose of helping the library managers and staff to better understand user differences and similarities and problems. All of the raw material and data collected should not be seen as value judgments as indicators "good" or "bad" service for all the libraries of Aveiro University.

The subjects in this study include 15 departments and 1 autonomous section (Health Sciences) at Aveiro University and the findings cannot be generalized beyond the University of Aveiro.

Normally, the invitation of users to take the Libqual+ survey and complete the forms is online via e-mail or a link but in this case all the questionnaire forms were filled out in papers in face-to-face relationship with respondents.

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APPENDIX A

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

Minimum -- the number that represents the minimum level of service that you would find acceptable

Desired -- the number that represents the level of service that you personally want

Perceived -- the number that represents the level of service that you believe library currently provides

For each item, you must EITHER rate the item in all three columns OR identify the item as "N/A" (not applicable). Selecting "N/A" will override all other answers for that item

When it comes to...	My Minimum Service Level is									My Desired Service Level is									Perceived Service Performance									N/A			
	Low	1	2	3	4	5	6	7	8	9	Low	1	2	3	4	5	6	7	8	9	Low	1	2	3	4	5	6		7	8	9
[AS-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
[AS-2] 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
[AS-3] 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
[AS-4] 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
[AS-5] 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
[AS-6] 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
[AS-7] 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
[AS-8] 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
[AS-9] 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
[IC-1] 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
[IC-2] 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
[IC-3] 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
[IC-4] 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
[IC-5] 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
[IC-6] 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
[IC-7] 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
[IC-8] 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
[LP-1] 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

[LP-2] 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
[LP-3] 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
[LP-4] 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
[LP-5] 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

Please enter any comments about library service in the box below:

Responder profile:

Sex: Male Female

Age: Under 18 18-22 23-30 31-45 46-65 Over 65

Position:

Student	Professor	Staff
Bachelor <input type="radio"/>	Full – Professor <input type="radio"/>	Library <input type="radio"/>
Master <input type="radio"/>	Associate Professor <input type="radio"/>	Faculty <input type="radio"/>
PhD <input type="radio"/>	Assistant Professor <input type="radio"/>	Administrative <input type="radio"/>
	Lecturer <input type="radio"/>	Others <input type="radio"/>

How often do you use resources within the library?

Daily Weekly Monthly Quarterly Never

How often do you accesses library resources through a library webpage?

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

