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# eUtlibQual: the instrument for evaluating e-service quality of academic library

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**Abstract:** The aim of this article is to present the instrument for the evaluation of e-service quality in academic library, based on the case study – service quality monitoring in the University of Tartu Library, Estonia. The article offers practical help to researchers and practitioners for e-service quality evaluating and improvement. The proposed approach allows gathering necessary information to focus strategic planning on services important for users and to efficiently allocate the library's resources.

**Keywords:** *e-service quality;academic libraries;library users; quality evaluating*

## 1. Introduction

In recent years, interest in quality management, user satisfaction, service and e-service quality evaluation has considerably increased in the academic libraries (see Hernon and Calvert (2005), Shachaf et al (2008), Kyrillidou and Giersch (2004). At the same time libraries are still in search of an optimal model of e-service quality and effective e-quality measurement tool. The aim of this article is to present the instrument for the evaluation of e-service quality in academic library. The instrument eUTLib Qual is based on the theoretical analyses of the existing models of (e-)service quality and their suitability in the context of academic libraries, and on the results of a qualitative and quantitative studies, conducted in the University of Tartu Library, Estonia.

## 2. The complexity of defining and assessment (e-)service quality

Many researchers (Grönroos (1998, 2001), Edvardsson (1998), Parasuraman *et al*. (1985, 1988) argue that the process of service quality evaluation is complicated. The decomposition of service quality (SQ) is complicated by certain specific characteristics of services, due to which the user of the service is unable to evaluate the service prior to consuming it. Parasuraman et al (1985: 41) have developed the following classification of service specificities:

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- *intangibility* - the service is difficult to get hold of; it is a non-material phenomenon, which cannot be touched, owned, stored or displayed prior to its delivery, thus, it is difficult to find sufficiently objective grounds from which to define service quality;

- *heterogeneity* – the service lacks uniform quality at its delivery, as it is composed of several interactions, and hence, service quality could be comprised of a number of "sub-qualities", which could be individual for each service as well as for each service user;

- *inseparability* – the service is a holistic process which cannot be delivered without the user, who influences the process of service delivery as well as service quality. The direct participation of the user in the service process compels us to think about service quality not only as meeting certain standards, but to consider how the user contributes to the service result.

These characteristics are also relevant to the e-services, furthermore, the virtual environment may even enhance their effect.

## 3. The models of SQ and their suitability to the library context

The most prominent conceptions of SQ are based on the disconfirmation model, according to which SQ is defined as the difference between the expected and received service quality (Brady & Cronin 2001: 57). Disconfirmation happens because of the difference between expected and received service quality. The latter position is the basis of the two major theoretical frameworks of service quality of American and Nordic schools.

The "Total Service Quality" approach by the Nordic school, Grönroos (1998), Ojasalo (2010) defines SQ in terms of functional quality and technical quality. Technical quality is defined as **what** the customer receives in the service outcome. According to this model, in the academic library context the technical quality may be associated with real objects – the building, furnishings, books, computers, etc. Functional quality is defined as **how** the user perceived the service.

According to Grönroos (1998), the functional aspect plays a decisive role in the evaluation of services. However, the library practice demonstrates that in the academic library context the perception of the SQ much depends on the academic competence of the user. University lecturers are objective experts in evaluating the quality of the information sources in their field, or the technical quality. For students, it could still be too difficult, therefore students rely on other criteria of quality associated with the service process and communication – the "how".

Another aspect, which could influence the ratio of the technical and functional quality of academic library services, is the depth of user-librarian contact. The more intensive is the user's contact with the librarian, the more important is the

way how the service is carried out, meaning its functional quality. This seems to be an important aspect in studying the quality of e-services, because the more services are transformed into the virtual environment, the lower is the contact ratio between the user and the librarian and the importance of functional quality may change as well. For example, polite answers to e-inquiries do not draw a similar communicative response from library users as the librarian's sincere smile or attentive look in face-to-face communication. As Radford (2001: 29) noted, "interpersonal communication between librarian and library user is becoming more complicated in today's rapidly evolving reference environment".

An advantage of the theoretical model of the American school, developed by the North American scholars Parasuraman et al. (1988), is that it focusses on identifying the features which the service user expects from a high-quality service, and on finding out where these expectations may clash with the reality. Based on this model, researchers of the American School developed the tool SERVQUAL for SQ assessment. According to Parasuraman et al. (1988: 41-50), service quality is affected by five factors: tangibility (physical facilities, equipment), reliability (ability to perform the promised service dependably and accurately), responsiveness (willingness to help customer), assurance (knowledge and courtesy of employees), and empathy (caring individualised attention the firm provides to its customers).

American School perspective has found the widest use in librarianship and information sciences. The model and method SERVQUAL were adapted for the library SQ measuring instrument LibQUAL+™ by the ARL (Association of Research Libraries) New Measures Initiative. LibQUAL+™ is based on the library SQ model which consists of four dimensions: access to information, personal control, affect of service, library as a place (Kyrillidou 2006: 4). According to Miller (2008: 55), the users' perceptions about library staff competency and helpfulness compose the *service affect* dimension score. The *information control* dimension focusses on whether the library's collections are adequate to meet customer needs. The *library as a place* dimension addresses user perceptions regarding the facility's functionality and adequacy for academic activities.

Not all theoreticians agree that SQ and library SQ can be called the gap between expectations and performance. Various other models of service quality can be found in the relevant literature, for example Seth et al. (2005) observed and evaluated 19 different SQ models. The most promising for the library e-service context seems to be the Meyer and Mattmüller (1987) SQ model where service quality is defined by both the service organisation and the customer quality potential. In their view, the service provider can only release this potential through the active involvement of the customer. So, according to Meyer and Mattmüller (1987: 191), the service quality consists of four sub-qualities: potential quality of the service provider and of the customer (i.e. their

capabilities, technical and personal skills and willingness), the process quality and the outcome quality. While the Meyer-Mattmüller model is not as widespread and implemented as the SERVQUAL and the Nordic School models, this approach seems especially relevant because the Meyer-Mattmüller model takes into account both the service provider's and the service user's roles.

The Nordic School and the American perspective of SQ see the user of service primarily as the evaluator of quality; with such an approach, the users' expectations and their actual experiences with the services are of primary importance. However, the academic library e-service is born in the communication and cooperation between two contributing parties – the user and the library. So we can use the term "service quality" together with the term "relation quality", examining quality primarily as a successful interaction with the service user.

Hernon and Calvert (2005) pioneered the library e-service research. They prepared a questionnaire for students asking them about the perceived quality of e-service in order to develop a tool for quality assessment. The problem is under serious scrutiny in American academic libraries (see, e.g., Kyrillodou et al. (2007, 2011), where DigiQual(R) was prepared for assessing digital libraries. Kiran and Diljit (2012) focussed on the assessment of the quality of library web pages. Shachaf et al. (2008) studied the quality of library e-reference. The geography of such studies is quite wide including different countries, such as Malaysia, New Zealand, Portugal, Taiwan, etc. Notable research on the subject is summarised by Einasto (2016) and demonstrated that library e-SQ studies do not fully agree about quality dimensions yet, but they converge in one: library e-service quality is a multidimensional construct.

## 4. The Zone of Tolerance concept for evaluating SQ

The Zone of Tolerance (ZoT) is recognized in both the service quality and customer satisfaction literature as the area between the two degrees of customer expectation standards. According to Parasuraman et al. (1994), the service user's expectations are based on two different levels:

- *Desired service* – the level of service the customer hopes to receive, consisting of what the user believes should and could be provided by an excellent service organisation.
- *Adequate service* – the minimal level of service the customer will expect and accept.

A customer uses these levels as comparative standards in evaluating perceived service quality. Hence, we can talk about SQ only if the perceived service level lies higher than the minimal level of expectations. The practical value of the ZoT concept lays in the fact that general customer satisfaction with the service organisation is achieved as long as quality evaluations remain anywhere within the ZoT boundaries. Empirical research – Devlin et al. (2002), Teas and

DeCarlo (2004), Einasto (2009) – has proved that if the perceived quality is located within the Zone of Tolerance, then the customer feels satisfied. Moreover, research by and Johnston (1995) demonstrated that fluctuations of quality estimations within the ZoT have only a marginal effect. The customer foremost perceives whether his expectations were met or not, and to a lesser extent, to what degree they were met. The service user should only sense when the perceived service drops out of the ZoT, both up and down.

## 5. eUTLib Qual instrument description and evaluation scales

The eUTLib Qual instrument does not use the gap score approach utilised in classic SERVQUAL and LibQUAL+™ tools. A review of relevant literature indicates that measuring the gap between expectations and performance can be extremely complicated – several empirical studies (see Babakus and Boller (1992), Boulding et al. (1997) indicated that the performance-based scale in most cases outperforms the disconfirmation-based SERVQUAL scale. Therefore, the eUTLib Qual implements Cronin and Taylor SERVPERF approach to measure library service performance directly, which makes the instrument much more simple and clear for survey participants.

The eUTLib Qual direct relative evaluation scale has verbal labels for its five points. The focus group participants found that this method was the only possible way for them to adequately evaluate whether the e-SQ level/**library performance** is acceptable, lower or higher. The level of service, sufficient for acceptance (the bottom of the ZoT), is taken as the middle of the scale (see Figure 1). The scale end points correspond to user total satisfaction (perfect level) and total dissatisfaction (unacceptable level).

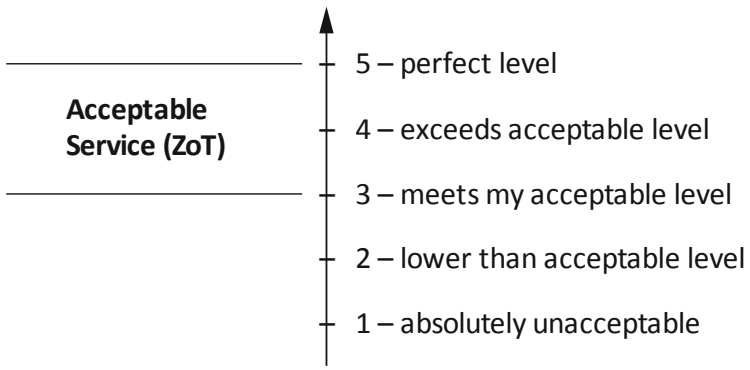


**Figure 1. Evaluation scale of service quality survey eUTLib Qual (by author)**

Users also were asked to evaluate **the importance** of e-service quality criteria. Landrum and Prybutok (2003: 11) stressed that a good quality research should examine how importance scores might be used together with performance

scores for management purposes: ‘‘researches should examine the use of importance/performance maps and gauge how useful this information is for managers compared to expectations’’. Their study indicated that importance and expectations are definitely not the same construct. In addition to performance measurement, eUTLib Qual explores the importance of chosen quality components for library users. Each e-quality criterion is examined directly on a five-level Likert type scale, with items named from 1 - ‘Not Important’ to 5 - ‘Very Important’.

## 6. The empirical research setting in the University of Tartu Library

The research setting is related to the e-services offered by the University of Tartu Library (UT Library, UTL), the oldest and largest of Estonia’s academic libraries (the size of its collections is over 3.7 million items; it has about 55 000 users, and registers over 800 000 visits and over 750 000 loans a year). Currently, the library is actively developing e-services, providing the self-service module My ESTER of the e-catalogue; the services of electronic document delivery, e-Book on Demand and online reference are heavily used. The library website provides a convenient overview of the opening hours, events and exhibitions at the library, services, and options to use the conference centre. Through its home page the Library also mediates access to a representative collection of electronic scholarly information – more than 100 databases, ca 90 000 e-books, ca 84 000 e-journals, and the collection of Estonian e-textbooks. The Library also manages the University of Tartu Repository on DSpace, which has joined the e-theses portal DART-Europe.

UT Library has long-term traditions of library user surveys, for example Loorits and Dubjeva (1995) reported about the users’ satisfaction with the quality of UTL reference services, and Miil (1998) described the UT Library study of performance quality. The library also participated in the study “Library performance measurement and evaluation in Estonian research libraries” in 1995–2000, Lepik (2002). UT Library started monitoring its service quality in 2005 developed the quality assessment tool UTLib Qual and eUTLib Qual, see Einasto (2005, 2009, 2016). Based on empirical research, a four-component conceptual model was designed for UTL service quality assessment, and a relative evaluation scale proposed. The UTLib Qual and e-UTLib Qual surveys provide a simple and clear agenda for improvement actions in the academic library: reallocating resources, resetting service priorities.

*Research design*

The studies in library e-SQ use a variety of methodologies, but in the main, libraries employ a mixed methodology as a combination of qualitative (focus groups, interviews, content analysis) study on the first stage of research and quantitative (e-mail questionnaire, web-survey) study on the next stage. In this mixed research, the main stress was laid on the qualitative method, followed by quantitative collecting of data, its analysis and drawing of final conclusions.

Such methodology helps to specify the essence of the e-services and their quality, and to test the results with a larger sample.

Focus groups were used to identify the most significant criteria for the library e-service quality. According to Walden (2006), focus groups can be effectively used as assisting factors in hypothesis formulation, research design and questionnaire development. The task of this focus groups study was to discuss the most important issues of using library online. For the data analysis was used the coding according to research by Santos (2003) and Krueger (1994).

Discussing the good e-service criteria, the participants of focus groups identified 15 significant criteria: *user-friendliness, access reliability, security, speed, credibility, relevance of e-information, clarity of e-information, competence, feedback, dialogue, user participation, responsiveness, courtesy, empathy/support, and aesthetics.* The list of these quality criteria, specified by the focus groups, was complemented with eight additional items selected from relevant literature: *navigation, accuracy, assurance, sufficiency, completeness, easy access, personalisation/customisation and entertainment.*

Focus group discussions were followed by a quantitative study – online survey. The quantitative study made use of the importance-performance approach by O'Neill et al. (2001) for investigating the users' perceptions of library e-SQ. The scale items were based on the 22 criteria of e-service quality, built on the basis of the focus group research and previous studies. Respondents were asked to rate the level of importance attributed to each e-quality criterion on the scale from 1 – 'not important' through to 5 – 'very important'. In addition, respondents were asked to rate their perception of the UT library performance on a specially designed scale which included the Zone of Tolerance (see Figure 1). The online questionnaire was distributed among the library users by e-mail. Research was based on 416 fully answered questionnaires.

SPSS was used for processing the data of quantitative study. Data processing included factor analysis and regression analysis. Factor analysis (principal component analysis, using Varimax rotation with Kaiser normalisation) was used as the method of structural classification in order to group and reduce the criteria of quality. The factor analysis was made for 3, 4 and 5 factors. During the factor analysis, one indicator with low communality (factor value 0.381) was removed from the analysis. After that, the factor analysis was run again. The sorted rotated values of factor loading with minimum value of 0,4 or more were considered. Factor analysis enabled to identify factors affecting e-SQ, as a result of factor analysis, four dimensions with their associated 22 scale items were derived.

**Table 1. Factor analysis of individual dimensions of academic library e-SQ, the given factor values > 0,4**

| Variable | Factor 1 Communi-cation | Factor 2 Content | Factor 3 Access | Factor 4 Design |
|---|---|---|---|---|
| Support | .720 | | | |
| Feedback | .716 | | | |
| Courtesy | .673 | | | |
| Dialogue | .695 | | | |
| Competence | .694 | | | |
| Responsiveness | .578 | | | |
| Accuracy | | .672 | | |
| Clarity | | .661 | | |
| Relevance | | .653 | | |
| Credibility | | .649 | | |
| Sufficiency | | .564 | | |
| Completeness | | .537 | | |
| Speed | | | .768 | |
| User-friendliness | | | .677 | |
| Easy access | | | .667 | |
| Reliability | | | .662 | |
| Assurance | | | .640 | |
| Navigation | | | .535 | |
| Security | | | .533 | |
| Entertainment | | | | .759 |
| Aesthetics | | | | .753 |
| Personalisation/ customisation | | | | .501 |

The first factor, **communication,** is concerned with aspects of the human-to-human (librarian-to-user) communication. The second factor, **content**, is related to the information provided or mediated by the library. The third factor, **access**, is concerned with aspects of the user-information system interaction. The fourth

factor, **web design**, is focused on the aspects of e-environment and website design options.

## 7. Data analyses and practical applications

The collected answers were analyzed by the following:

- location of e-SQ/library performance evaluations on the scale of The Zone of Tolerance,
- comparison of the answers from different groups based on the academic status, faculties, demografic profile of respondent,
- mapping the positive and negative evaluations by target groups and by faculties,
- identifying the importance of evaluated SQ criteria for different groups.

The library should turn its attention first and foremost to those evaluations that fall below the Zone of Tolerance (below the acceptance level). It is useful to map out all such answers, analysing them by user groups. For optimal service development and efficient resource planning, the real needs of the library user should be identified through which e-service criteria are essential for users and which are not. For this analyses is useful to construct an importance-performance matrixes for every library's target group and each university faculty. The matrixes include the following indicators (see Table 2):

- e-services idicators which the library renders the best, and which are the most important/not important for users,
- e-services indicators which quality is unsatisfactory, and which are very important/not important to users.

**Table 2. Importance-performance matrix for e-service quality indicators and service development (by the author)**

| | | **Performance of service** | |
|---|---|---|---|
| | | *Below the bottom of the ZoT* | *Remains within the ZoT* |
| **Importance for user** | *High* | e-services criteria which quality is unsatisfactory, and which are very important to users | e-services criteria which the library renders the best, and which are the most important |
| | *Low* | e-services criteria which quality is unsatisfactory, and which are not important to users | e-services criteria which the library renders the best, and which are not important |

Survey results can be taken as a basis to development the library service strategy. It is considered vital to set priorities on those quality factors and criteria that are of high importance for users but where the quality estimation falls lower than ZoT. The elements of key importance in evolving library service development plans include analysing these factors, performing additional user enquiries as necessary, and starting special quality programs and projects. Additional human and financial resources should be directed into these areas.

Those service indicators that are estimated highly but are of low importance for users should also be of serious concern. A great economy of resources may be achieved here, as even lowering SQ to the bottom of the ZoT should not affect the overall satisfaction of users. Specific quality programs and projects were drawn for each strategic focus, concentrating on those services where importance was high, but evaluations did not stay within ZoT. The eUTLib Qual survey has set library benchmarks for developing services and making managerial decisions on which e-service areas should be addressed first. It helped to focus resources on satisfying the academic community's needs instead of wasting them on less important fields.

## 8. Conclusions and practical applications

This study demonstrates how academic libraries can use the instrument of e-service quality evaluating, based on the Zone of Tolerance concept and an importance-performance mapping method. The proposed approach to quality research allows gathering necessary information to focus strategic planning on services important for users and to efficiently allocate the library's resources. The research presents an alternative framework and measurement scale for monitoring academic library e-service quality.

Although published research on academic library e-service quality has increased, it mostly focuses on users' expectation. This study is one of a few that examine library e-service quality on the basis of users' perceptions as well as search for criteria that users identify as important for the quality evaluation. The principal difference of eUTLib Qual instrument from generally accepted SERVQUAL and LibQUAL+TM methods is that respondents do not have to evaluate their expectations (the width of Zone of Tolerance) on an absolute scale, instead concentrating on much simpler direct evaluation of their perception of service relative to adequate expectations. This allows a combination of the practical values of ZoT concept, improving the questionnaire and increasing the validity of the data.

This study makes a contribution to an area of interest of librarians-practitioners. Academic libraries put much effort into the development of their services. They must be able to show whether their service quality satisfies their users and whether their services are developed in the right direction and in a cost-effective

way. It is not very difficult today for library specialists to plan and carry out a users' survey. However, it is more difficult to apply survey results in library management processes. While such surveys give library managers information about user satisfaction, they provide too limited insights into developing services and focusing on real user needs. It is useful and interesting for library managers to know how users evaluate e-services, however, that alone does not provide enough value to move forward. This is a frequent question at professional meetings, how to incorporate the survey data in managerial decision-making practices, and how to use it to improve library e-services.

To conclude, the e-service quality of academic libraries is a multidimensional concept, whose total extent has not yet been fully grasped. It is essential to continue with research to enhance this concept. The instrument eUTLib Qual could provide inspiration for library practitioners looking for ways of evaluating e-SQ. As systematic (e-)SQ monitoring is still not standard practice for many academic libraries, the author hopes the methodology and the instrument offered will give academic library managers useful guidelines for measuring and maintaining appropriate (e-)SQ level, setting adequate tasks, providing necessary services, allocating resources optimally and eventually achieving more efficient operation.

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