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# **Using LibQUAL+<sup>®</sup> to Identify Commonalities in Customer Satisfaction: The Secret to Success?**

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## **Abstract**

### **Purpose**

What is the key to library user satisfaction? Can LibQUAL+<sup>®</sup> help in the quest for delivering a quality library service? This paper presents international research into library customer satisfaction as measured by the LibQUAL+<sup>®</sup> survey methodology. Commonalities of satisfaction and dissatisfaction have been identified which influence the customers overall view of the library. This knowledge can be used to further increase customer satisfaction through targeting these areas for service improvement.

### **Methodology**

LibQUAL+<sup>®</sup> is a library service quality survey instrument developed by the Association of Research Libraries (ARL) in association with Texas A&M University. The survey comprises of 22 questions categorised by three dimensions of service; Affect of Service, Information Control and Library as Place. LibQUAL+<sup>®</sup> uses gap theory to evaluate customer expectations as well as perceptions. For each of the 22 questions respondents are asked their minimum and desired expectations along with their current perceived level of service on a nine point scoring scale. From these ratings two score measures are calculated; service adequacy, and service superiority. The adequacy score is calculated by subtracting the minimum rating from the perceived score, with a negative score indicating that minimum expectations are not being met. Similarly, the superiority score is calculated by subtracting the desired score from the perceived rating, with a positive score indicating that desired expectations are being exceeded.

This paper builds on research conducted at Utrecht University in 2012. The LibQUAL+<sup>®</sup> results from Utrecht University were analysed to explore the differences between customers who were very satisfied, and those who were very dissatisfied, with the service. This research has now been extended to an international level using the UK and Ireland's Society of College, National and University Libraries (SCONUL) LibQUAL+<sup>®</sup> consortium results and the results from Leiden University in the Netherlands.

Results from each of the three dimensions of service quality were reviewed separately. The survey results from respondents who had given a high satisfaction mean score to one of the three dimensions were analysed separately to assess if they had also given high satisfaction mean scores overall. This process was then repeated for those who had given low satisfaction mean scores. High satisfaction was defined as a mean superiority gap score of larger than zero, indicating that their desired expectations were exceeded, together with a mean adequacy gap score of more than one, indicating the minimum expectations were clearly exceeded. Low satisfaction was defined as a mean adequacy gap score of less than zero, indicating minimum expectations were not being met, together with a superiority gap score of less than minus one, indicating the desired expectations were clearly not met.

Initially all responses meeting the research criteria were reviewed, except for those from library staff who traditionally have different expectations than the other customer groups. The analysis was then replicated with the results from the different customer groups separately; undergraduates, postgraduates, staff and academic staff.

### **Findings**

For all customer groups the findings showed a pattern to satisfaction levels with regards to the Information Control dimension of the LibQUAL+<sup>®</sup> survey and a similar pattern with the Affect of Service dissatisfaction levels. Respondents with high satisfaction mean scores (as defined above) in the Information Control dimension were discovered to have the largest positive scores for the overall average perceived scores, indicating they are the most satisfied customers. When reviewing the surveys with low satisfaction mean scores in the Affect of Service dimension it was discovered that these respondents also had the largest negative scores for the overall average perceived scores, indicating they are the most dissatisfied customers. The findings show that both information resources and customer service affects the overall opinion of the library service for all customer groups.

### **Research Limitations and Implications**

The implication from the research is that good information resources could have a positive effect on customers' opinions of the library just as much as poor service from library staff could have a detrimental effect. Nevertheless, any conclusions drawn from these findings should recognise that the research is limited to measuring service quality within the confines of the LibQUAL+<sup>®</sup> survey methodology. The research has not investigated the reasons for the commonality, nor do these averages say anything about the motivation for each individual respondent to give these scores in the survey. Therefore, these averages can, with respect to ideas for improvements, only be used as indicators for what should be emphasized. Even within both groups, the satisfied and the dissatisfied customers, there remain considerable differences in what causes the (dis)satisfaction.

### **Preliminary Conclusions**

Statistical analyses confirm that these findings hold for every user group. Therefore, for the library manager seeking to deliver a quality library service it will be important to take both of these factors into account and deliver information not only in a professional, but also in a helpful manner.

### **Originality and value of the proposal**

Although based on previous research, the extension of the analysis from an institutional level to an international consortia level strengthens the initial research conclusions. The findings, implications and conclusions are valuable to library managers seeking to improve the customer perceptions of their library service, providing evidence of factors that influence customers' opinions.

**Keywords:** LibQUAL+<sup>®</sup>, Academic Library Performance, Customer Satisfaction.

**Category:** General Review.

## **Using LibQUAL+<sup>®</sup> to Identify Commonalities in Customer Satisfaction: The Secret to Success?**

This paper presents international research into library customer satisfaction as measured by the LibQUAL+<sup>®</sup> survey methodology. Building on research initially conducted at Utrecht University in 2012 the research has sought to identify commonalities in customer satisfaction and dissatisfaction.

LibQUAL+<sup>®</sup> is a library service quality survey instrument developed by the Association of Research Libraries (ARL) in association with Texas A&M University (Association of Research Libraries, 2011). The survey consists of 22 standardised questions on library services which are used internationally, allowing libraries to benchmark their performance against one another.

One of the key strengths of LibQUAL+<sup>®</sup> is its use of gap theory to evaluate customer expectations as well as perceptions. For each of the 22 questions respondents are asked their minimum and desired expectations along with their current perceived level of service on a nine point scoring scale. Alongside the minimum, desired and perceived scores two further scores are calculated to aid the evaluation of the library; the service adequacy and the service superiority. The service adequacy score is calculated by subtracting the minimum score from the perceived score. A positive adequacy score indicates that the customers' minimum expectations are being exceeded, whereas a negative adequacy score indicates that the library is failing to meet minimum expectations. Similarly, the service superiority score is calculated by subtracting the desired from the perceived score. A positive superiority score indicates the library is exceeding customers' desired expectations, whereas a negative score indicates that desired expectations are not being met.

The 22 questions are split into three dimensions of library service, Affect of Service (AS), Information Control (IC) and Library as Place (LP). The Affect of Service dimension contains nine questions relating to the library staff, including their knowledge to answer customer questions and the level of customer service received. The Information Control dimension consists of eight questions covering the library resources and how easy it is to access information. The Library as Place dimension consists of five questions assessing the physical environment. For each dimension the scores are averaged providing a dimension mean score for each of the five question scores; minimum, desired, perceived, adequacy and superiority. The survey is administered in two formats, LibQUAL+<sup>®</sup> Long which asks all 22 core questions, and LibQUAL+<sup>®</sup> Lite which presents 8 of the core questions to each respondent. LibQUAL+<sup>®</sup> Lite deploys a random sampling methodology resulting in all 22 core questions being assessed at the participating library, but each individual respondent only answers a sub-set of the core questions.

The research sought to identify if there were any common factors for the scores received from satisfied and dissatisfied customers. The analysis used all of the scores received from individual respondents from the sample group. The dimension adequacy and superiority mean scores were used to identify respondents who were satisfied or dissatisfied with one of the dimensions. The scores from these sub-sets of respondents were then analysed to see if there were any commonalities in their scores for the other two dimensions. For example, if a customer was satisfied with the Affect of Service dimension, were they satisfied or dissatisfied with the other two dimensions? This research was repeated for respondents who were satisfied with the Information Control dimension, and finally those who were satisfied with the Library as Place dimension. Correspondingly, the same analysis was conducted for customers who were dissatisfied with one of the dimensions, with each dimension reviewed separately.

## Methodology

This research used a sample of 33,820 surveys, of which 28,208 were from the SCONUL consortium, 3,761 from Leiden University (LU), and 1,851 from Utrecht University (UU). The UU surveys were in the long version, the LU in the lite version, and the SCONUL surveys in mixed form.

Firstly, the Library Staff surveys,  $n_{\text{libst}} = 371$ , were removed since, as stated before, they traditionally have different expectations than the other customer groups.

Secondly, all surveys were removed which had inconsistent responses,  $n_{\text{inc}} = 5,346$ . Inconsistent responses are defined as when a respondent has rated their minimum service level higher than their desired service level (i.e. score inversions), which is illogical. Ordinarily LibQUAL+<sup>®</sup> automatically filters out excessive inconsistent responses as part of their data screening. As the research was using the raw survey data and specifically focussing on gap scores, using them to define (dis)satisfaction, it was necessary to remove all inconsistent responses.

Thirdly, incomplete data sets were removed for respondents who had selected “not applicable” to all questions within one dimension,  $n_{\text{empty}} = 1,057$ . Since this research compares scores given by respondents for the three dimensions, it is important that all dimensions had at least one rating, otherwise it is not known what the respondent might have said in connection to the other two sections. Following this data screening the final number of surveys used for this research was 27,046, which represents 80% of the total sample.

## Satisfaction and dissatisfaction

Satisfaction and dissatisfaction are defined by the average adequacy and superiority gaps for the three dimensions, Information Control (IC), Affect of Service (AS) and Library as Place (LP). Searching for definitions several criteria were tested. Owing to the large sample group the research had the freedom to apply a strict definition to satisfied and dissatisfied customers.

Satisfaction can be defined as an average perceived score exceeding the average desired score; the level of service is higher than desired expectations. In cases where the desired and minimum scores were close together the respondents were not deemed to be highly satisfied customers. For example, an average minimum score of 6.7, an average desired score of 6.8, and an average perceived score of 6.9, receives a positive superiority score (indicating desired expectations are being exceeded), but the minimum expectations are only just being met. Therefore, a second criteria was chosen, the perceived level of service should not only exceed the desired levels, but also clearly be larger than minimum. As shown in figure 1, the definition for satisfied respondents was selected as where the dimension average adequacy gap score is larger than one, and the average superiority gap score is larger than zero. Using the same arguments, dissatisfied customers were defined as respondents giving a dimension average adequacy gap score of smaller than zero and an average superiority gap score of smaller than minus one. This definition indicated that the respondent's average perceived score was below minimum expectations and more than one point lower than the desired levels.

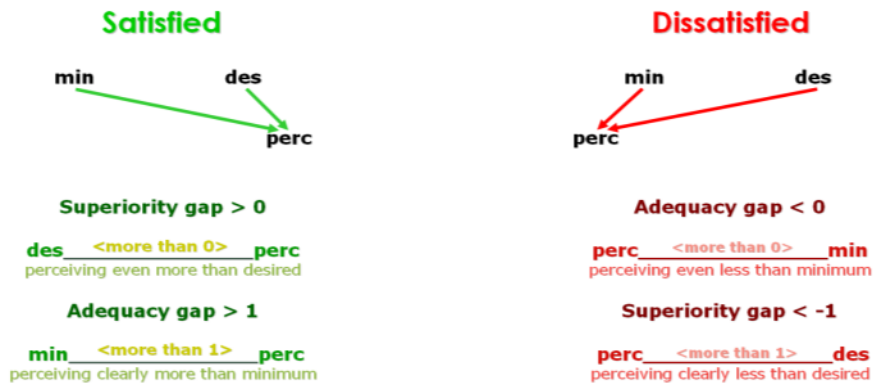


Figure 1: Conditions for satisfaction and dissatisfaction

## Findings

The above definition of satisfaction was applied to the sample group for each dimension in turn, and the overall perceived score reviewed for each sub-set, as shown in table 1. It was discovered that respondents who were satisfied with the IC dimension yielded an average perceived score of 7.61. Applied to the LP dimension, the average perceived score was 7.44, and applied to the AS dimension the average perceived score was 7.34. Clearly, **the positive IC group was the most overall satisfied group**, which is shown in figure 2. This indicates that customers who are highly satisfied with the IC dimension are, on average, satisfied with all aspects of the library service.

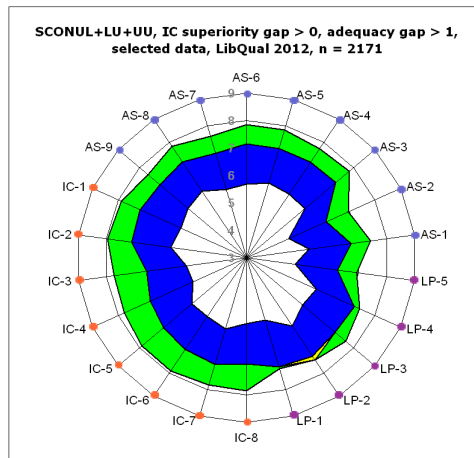


Figure 2: Responses from the sample group with high satisfaction with the Information Control domain.

Next applying the conditions for dissatisfaction, the average perceived score for the negative IC group was 6.05, the average perceived score for the negative LP group was 6.15, and the average perceived score for the negative AS group was 5.69. As shown in figure 3, **the negative AS group thus was the most overall dissatisfied group**, indicating that customers who are highly dissatisfied with the AS dimension are, on average, dissatisfied with all aspects of the library service.

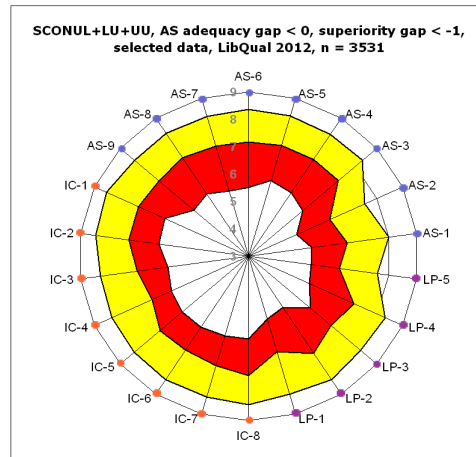


Figure 3: Responses from the sample group with high dissatisfaction with the Affect of Service domain.

Comparing the average perceived scores per dimension, the highest score was for the IC dimension in the satisfied IC group, but the lowest score was for LP dimension in the dissatisfied LP group, even when the average perceived score of this dimension was not the lowest, this being the negative AS group. Respondents who were very negative about the Library as Place, were not so negative about the IC and AS dimensions, raising the average scores of the negative LP group.

	Group Average	Information Control	Library as Place	Affect of Service
Average	6.87	6.91	6.47	7.13
Satisfied IC	<b>7.61</b>	<b>7.83</b>	7.26	7.69
Satisfied LP	7.44	7.35	7.51	7.55
Satisfied AS	7.34	7.27	6.88	7.78
Dissatisfied IC	6.05	5.78	5.64	6.61
Dissatisfied LP	6.15	6.39	<b>4.98</b>	6.68
Dissatisfied AS	<b>5.69</b>	6.02	5.43	5.47

Table 1: Perceived mean scores for each sample sub-group for each dimension.

Next, the same analysis was done for the different user groups who responded to the survey: undergraduates, postgraduates, academic staff, and staff. Surprisingly, when reviewing the results for the different roles, although the values were different for each group, the outcomes were always the same. Customers who were satisfied with IC were the most satisfied overall and those who were dissatisfied with AS were the most dissatisfied overall. The highest score was in the IC dimension for the satisfied IC group, the lowest score was in the LP dimension for the dissatisfied LP group. This held true for all user groups surveyed.

### Statistics

Using the program Statistica 7.0, the results for the average perceived scores were checked for significance, to see if, for instance, the most positive group, the positive IC group, is also significantly the most positive group.

To see if the most positive average perceived score, the 7.61 score of the IC dimension, is significantly higher than the second highest score, the 7.44 score of the LP dimension, the Student's t-test, used to determine if two sets of data differ significantly from each other by looking for the statistical probability (p) that the sets overlap.

Assuming normal distributions,  $p < 0.0001$  is found, confirming the statistical difference. For the lowest average perceived scores, the test is performed for the 5.69 score of the AS dimension and the 6.05 score of the IC dimension, again finding  $p < 0.0001$ .

Clearly, mainly due to the large numbers of surveys, the results of these significance tests were in order.

A second set of tests was performed to see if the most positive and negative average perceived scores per dimension were differing significantly, the results can be seen in figure 4. In these graphs, the means and 95% confidence intervals are shown; red lines represent the IC dimension, green lines the LP dimension, and blue lines the AS dimension.

The used codes are defined as:

Code -1: The first set of values on the left in each graph represents the excluded surveys. These values are the same for the three graphs, since they were excluded before the selections were made.

Code 1: The second set of values is, in the left graph, from the group selected for negative scores for the IC dimension, representing their given average perceived scores for both the selected IC dimension, together with their scores for the other two dimensions, and likewise for the middle and right graphs, for the LP and the AS dimension, respectively.

Code 0: The third set of values is from the groups of respondents who are, according to the criteria, neither satisfied nor dissatisfied.

Code 2: the fourth set of values is generated similarly to Code 1, but now for positive scores.

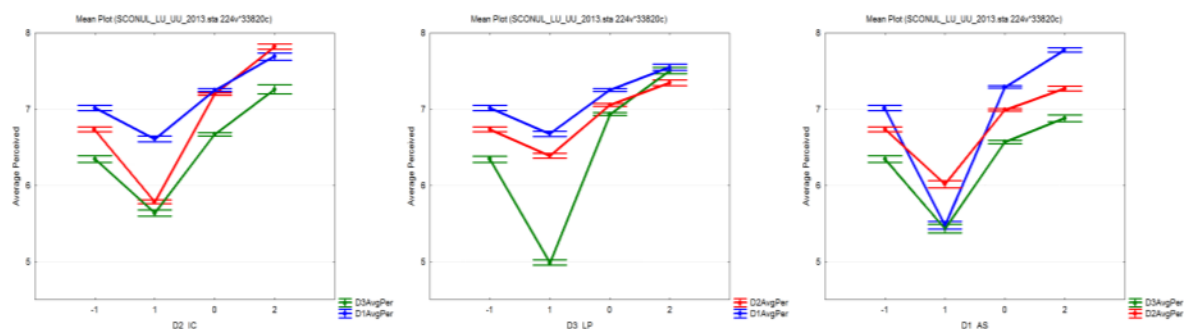


Figure 4: Graphs of the selections for positive and negative average perceived scores for the three dimensions (means and 95% confidence intervals; IC = red, LP = green, AS = blue)

In the three graphs of figure 4 each coloured line, consisting of three segments, represents the total amount of surveys, thus in total six different selections are made for the whole set of surveys: three times a positive selection and three times a negative one. For each of the six selections the average perceived scores are plotted in one colour, red for the IC selections, green for the LP selections, and blue for the AS selections. This figure shows the groups formed by selecting the response for a specific dimension, and the other lines represent the answers they gave for the two other dimensions. In the left graph the positive and negative responses for the IC dimension were selected, in the middle graph the responses for the LP dimension, and in the right graph the responses for the AS dimension.

In the left graph, the blue AS groups and the green LP group are plotted for the red IC group, likewise in the middle and right graph the other two dimensions are plotted for the green LP group and the blue AS group, respectively. Therefore, in the left graph the second set coincides with the Dissatisfied IC data in table 1 and the fourth set coincides with the satisfied IC data in table 1, in the middle graph the second set coincides with the dissatisfied LP data of table 1, etc.

In these graphs it can be seen that in the negative selections, the LP dimension always has the lowest scores, although not entirely significant in the right graph. These lowest scores can indeed be recognised in table 1, where for the negative selections the LP dimension each time has the lowest score.



In the same way the scores for the various roles, and the overall average perceived scores for the six selections, represented in the first column of table 1, were checked, and each time, the main conclusions hold, the positive IC groups consist of the overall most satisfied customers, and the negative AS groups consist of the overall most dissatisfied customers.

## **Conclusions**

Librarians have long been comfortable with the concept that the more information available at a library, the better the library must be. Indeed, the earliest forms of library assessment centred on the size of a library's collection. Performance measurement has moved on since those days, however this research has shown how the human element is a vital component for delivering a good quality library service.

It is found that for each role, undergraduates, postgraduates, staff and academic staff, the same conclusions hold; if respondents are satisfied with the level of service in the IC dimension, they are satisfied with the library overall. If they are dissatisfied with the level of service in the AS dimension, they are dissatisfied with the library overall.

Since these findings hold for all customer groups, the main objective of the library should be to target service improvements in the areas measured by the Information Control dimension, as a positive level of service in these areas increases satisfaction for the entire library. Alongside this, the research has identified that the interaction and support from library staff also play a significant role in the customers' perception of the library service. Should customers receive a poor level of service from the library staff it is likely to impact upon their view of the entire library service. In order to meet customer needs it is therefore vital to improve both the Information Control and Affect of Service elements of the library service.

Strikingly, although the scores for the Library as Place can be very low, these do not reflect on the overall positive or negative scores; the LP dimension has the least impact on the overall satisfaction, or dissatisfaction.

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**Autobiographical note:**

**Selena Killick** is the Library Quality Officer at Cranfield University Libraries, with responsibility for the analysis of customer feedback and library performance data. She regularly undertakes research to inform service improvements. This includes the development of models to guide planning and evaluation of library resources and services; the implementation the LibQUAL+<sup>®</sup> survey within the University and the management of the Cranfield University SCONUL Statistics submission. Selena is also retained by the Association of Research Libraries (ARL) to support European consortia and wider international participation in the LibQUAL+<sup>®</sup> survey methodology, and regularly analyses survey data, presents, publishes and advises libraries on an international basis on library assessment. Recent research has included the evaluation of electronic resources through usage metrics; a qualitative assessment of customer needs and expectations, and the development of a value and impact framework for Cranfield Libraries.

**Anne van Weerden** is information specialist Mathematics and Geosciences at the Utrecht University Library, and she is a physics student. She is also a member of the "Loket gebruikersonderzoeken" (help desk for user surveys). In the 'loket', she is responsible for performing user surveys; collecting, processing, analysis. She writes the reports, and contributes to the internal and external communication.

**Fransje van Weerden** has extensive experience with statistics having finished a masters in biology. She has worked for 15 years as informaticist and medical statistician, and is now a master student in Artificial Intelligence.