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The Net Promoter Score (NPS) as a Tool for Evaluation of the User Experience at Culture and Library Services

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Abstract: We studied the applications of Net Promoter Score (NPS) to service quality evaluation in cultural and library organizations in Finland. The survey for measuring the NPS was conducted in two different environments (physical and web) and in different modes (combined with other questions). The physical environment consisted of regional libraries, the Oodi Library, and two museums of the City of Helsinki, and feedback terminals were used for collecting user opinions. In the web environment, an electronic survey was conducted among the users of end-user interface for the National Digital Library of Finland. Through the feedback terminals, two questions were asked: (i) "How did we do today" and (ii) the NPS score, and the order of these questions was changed weekly during the study period. Our analysis shows that while there is some correlation between the responses to the two questions, each of them appeared to bring a noticeable amount of extra information on the top of the other. Also, the order of the questions affected the results to an extent. The results indicate potential usefulness of NPS for the studied purpose.

Keywords: Net Promoter Score (NPS), Public libraries, Libraries of higher education, Museums, User satisfaction

1. Introduction

The operational environment of libraries today is still more challenging in comparison with past days due to the rapid development of the information and operational environment of the libraries. This casts a challenge for the development of library services and thus challenges the libraries to update the methods of evaluation and reporting their services.

The need to show the positive impact of the library services and the value added for the clientele are the carrying power in developing the new indicators that

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would give more information than mere numerical ones. The target is to recognize the strengths as well as the points of development of the services and to support the management of the library. Also, in the situation of limited resources, non-laborious and easy to use and understand indicators would be of great value.

In 2003, Reichheld (2003) introduced the Net Promoter Score (NPS) as a simple method for measuring the customers' loyalty by inquiring their willingness to recommend on a scale from 0 to 10 a brand (product, service or enterprise as a whole) to their friends or colleagues (
Figure **1**). In the scale used 0 indicates "not at all likely" and 10 indicates "extremely likely".

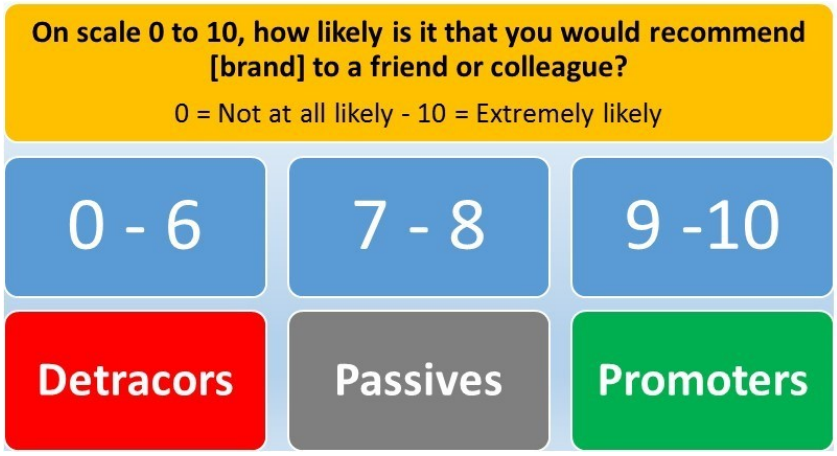

Figure 1. Illustration of the idea of Net Promoter Score (NPS) as described by Reichheld (2003). The respondents are grouped to "Promoters", "Passively satisfied", and "Detractors".

Following the method of Reichheld (2003), the respondents were grouped into "promoters", "passively satisfied", and "detractors" as shown in
Figure **1**. The NPS is then calculated by the following formula: NPS = P – D, where P = Percentage of promoters, D = Percentage of detractors, ranging from –100 to +100.

The "detractors" are considered as potential spreaders of a negative word of mouth, whereas the "promoters" are considered as potential spreaders of a positive word of mouth, putting their reputation on the line by recommending the service they received (Reichheld 2003).

The inducement to the new type of indicator, according to Reichheld (2003), was that the "traditional-style" indicators are considered complex and laborious

to count, and thus practically useless, whereas the NPS consists of only one question which gives the organizations timely data.

In spite of criticism presented e.g. by Keiningham et al. (2008) and Kristensen and Eskildsen (2011), the NPS was quickly adopted and it seems to have established itself in the business. It seems to challenge the traditional but more laborious indicators still generally used. Laitinen (2018) demonstrates a review of different indicators and of the debate and use of the NPS.

Though the description of systematic use of NPS in libraries seems to be sparse, individual cases of its use exist. Niemi-Grundström (2014) described the use of NPS as an agile method integrated into user satisfaction surveys, reaching the NPS value of 18 in Tampere University of Technology in 2013.

Another example of using the NPS in the library field was demonstrated by Lafrance and Kealey (2017). They used the NPS in Personal Librarian (PL) program for transfer students at four-year private university. They measured the NPS value of 60 for the transfer students.

In a common survey of three merging Finnish universities, the Tampere University of Applied Sciences, the University of Tampere and Tampere University of Technology, conducted in 2018, the overall NPS value of 60.7 and 58.8 among students was measured (Niemi-Grundström, personal communication 6th June 2019).

A more systematic use of the NPS was reported by Välbe (2015, 2016), showing the development of the NPS of all assessed services of the National Library of Estonia in six successive surveys from 59 in 2014 to 76.5 in 2015.

Since that, the National Library of Finland and the AMKIT Consortium, which coordinates cooperation among the Universities of Applied Sciences (UAS) libraries in Finland, have applied the NPS in their user surveys (AMKIT user survey 2017; Laitinen 2018).

In the AMKIT user survey (2017), the overall NPS value for the UAS libraries of 62.7 was measured, the scale of results varying from 35.6 to 87.1. Laitinen (2018) reported the NPS value of 29.9 for the National Finna search service of materials of libraries, museums and archives.

On the basis of experiences received from two national libraries and 23 UAS libraries, the concept of NPS was adopted in the new International Standard ISO 21248 (2019) which instructs the quality assessment in national libraries.

The Culture and Leisure Sector of Helsinki City in Finland has been utilizing NPS in its feedback surveys since 2018, collecting NPS data from the visitors via Feedbackly™ terminals (

Figure **2**). The terminals enable collecting of 'barometer' information on the satisfaction with services or products. When placed on a service path, and when the feedback is treated anonymously, the customers usually feel comfortable about sharing their opinions via the terminals. Large amounts of feedback data make it possible to track variations and trends over time, which enables accurate targeting of service development and improvement measures.

Figure 2. The Feedbackly terminal.

In the City of Helsinki Survey conducted by the Culture and Leisure Sector of Helsinki City, the customers' general sentiment data was collected in addition to NPS ratings. This was done by starting the survey with the "How did we do today?" question, illustrated in the terminals with smileys and referred to as the "smiley question" in this text. The idea was to let the customers express their on-the-spot feeling first, and after that to give it extra consideration to answer the NPS question.

We also note that the feedback terminals used in the Culture and Leisure Sector of Helsinki City surveys accept written feedback to let the customers verbally justify their NPS ratings, which can bring potentially valuable information for further analysis.

The user survey carried out by the Culture and Leisure Sector of Helsinki City demonstrates the application of a feedback survey in physical environment, whereas the user survey carried out by the National Library of Finland is an example of a user survey in network environment.

For the latter, the results from the national Finna user survey were used. Finna is the end-user interface for the National Digital Library of Finland and it is gradually replacing the user interfaces of all Finnish libraries, archives and museums (https://finna.fi).

2. Method

2.1 Setting the Research Questions and Description of the Method

The target for this study was to demonstrate the applicability of measuring the NPS in different types of environments (physical and network).

The following questions were posed:

1. How high is the dependence between customer's answers to the smiley and the NPS questions? In particular, would asking just one of the two questions be sufficient?
2. Does the order of the questions influence the value of Net Promoter Score?
3. Does the order of the questions influence the number of responses?

The data for these questions were collected from two variations of the City of Helsinki Survey (the Basic and the Parallel surveys).

For addressing the question 1, we considered the correlation of the responses for those customers who answered both the smiley and the NPS questions. The collected data seem to indicate that while there is, predictably, a dependence between the responses, there are also noticeable discrepancies. Using three methods, we tried to clarify how strong the dependence was.

The NPS values for both the City of Helsinki Survey and the Finna Survey were calculated following the formula introduced by Reichheld (2003).

2.2 The City of Helsinki Survey

The City of Helsinki Survey was conducted from the 16th September to the 1st November 2019. The material was collected at 13 regional libraries, Oodi Library (three terminals), Helsinki Art Museum (HAM) and Helsinki City Museum. Testing included 18 points of measuring in 16 locations.

The Oodi Library, three regional libraries and both museums are located at the downtown area of Helsinki, while ten libraries are located at the suburban area. In
Figure 3, the sizes of bubbles indicate the volume of responses at the location.

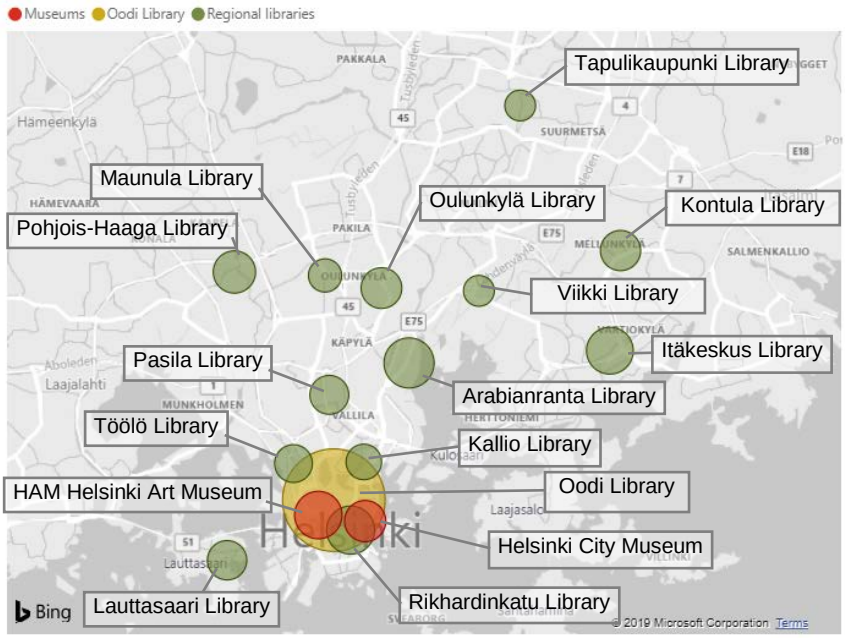

Figure 3. Locations of the cultural organizations.

The questions of the City of Helsinki Survey are shown in Table 1. The experimental arrangement included the Basic Inquiry and the Parallel Inquiry with reverse sequence of the questions 1 and 2. The order of the questions was changed weekly as shown in Table 1. The Finnish primary schools had their autumn holidays on the week 42, which was excluded from the survey period.

Table 1. The order of the questions in the Basic and Parallel inquiries.

	BASIC INQUIRY WEEKS 38, 40 AND 43		**PARALLEL INQUIRY WEEKS 39, 41 AND 44**
1	How did we do today? (Smiley icons)	1	How likely would you recommend us to others? (Score 0-10)
2	How likely would you recommend us to others?	2	How did we do today (Smiley icons)
3	Open feedback	3	Open feedback

In the smiley question (
Figure 4), the smileys get a five-step-gradient with the numeric values of 0, 25, 50, 75 and 100 by which scale the averages were calculated.

Figure 4. The smiley question

The question for the NPS rating (
Figure 5) followed the principle of Reichheld (2003) as well as calculating of the NPS.

Figure 5. The NPS question.

After the structured questions, the respondents were allowed to give additional comments in an open field. In both inquiries, the first question was followed by alternatives to justify their ratings of smileys (Basic Inquiry) or NPS (Parallel inquiry). This material will be analysed in a separate survey.

2.3 The National Finna User Survey

The Finna User Survey was carried out as an Internet survey within four weeks period in January-February 2019 and the link to the survey was given to the users as a pop-up window.

The results from Finna User Survey were grouped according to the sectors of cultural heritage organizations and the groups were named as following:

- "National" for the common group for all users;

- "Institutes of Higher Education" for the universities and universities of applied sciences;
- "Museum" for the museum sector;
- "Public libraries" for the libraries of the municipalities;
- "Others" for rest of the respondents (using the Finna interfaces of the National Library, archives or libraries of research institutes).

The NPS values were counted for each group and as a total of all interfaces.

3. Results

3.1. City of Helsinki Survey

3.1.1 Would asking just one question be sufficient?

It appears clear that both smiley and NPS questions applied to a specific service prompt respondents to assess the service quality. On the other hand, the forms of the two questions and the response options are noticeably different. It is therefore interesting to study the level of dependence between responses to the two questions. After all, if the dependence is high, then knowing how a given person answers one of the questions would let us predict with a high confidence their answer to the other question, which would mean asking that other question is almost pointless.

To evaluate the dependence between responses to smiley and NPS, we considered them as two random variables, *X* and *Y*, on the set of the library customers, who responded both questions during the study period, and applied Pearson correlation coefficient, Mutual Information and Kendall rank correlation coefficient methods. Each of these methods has certain limitations when used for our specific problem, so we found it important to look at the problem from several standpoints.

Sample Pearson correlation coefficient reflects the linear correlation between the values of two variables on a given sample. In our case, it is a measure of the linear dependence between the smiley and NPS answers on the set of the study respondents. Given the pairs of answers { $(x_1 , y_1) , \dots , (x_n , y_n)$ }, the Pearson correlation coefficient, r_{xy} is computed as follows:

$$r_{xy} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \bar{y})^2}}$$

where:

n is the sample size

x_i, y_i are the individual sample points indexed with i

$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$ (the sample mean); and analogously for $\bar{y}$.

We obtained the following values of r_{XY} on the collected data:

Basic Inquiry: Smiley->NPS order → **0.474**
Parallel Inquiry: NPS->Smiley order → **0.559**

Since we clearly expect to see a positive correlation between our two variables, the key question is how close to 1 the Pearson correlation coefficient values are, and we can see that they are not.

While we can claim that there is no high *linear* dependence between the NPS and smiley responses, there may be other forms of dependence. Another useful test is based on so-called Mutual Information of the empirical probability distributions defined by the answers to the two questions (Rioul 2018). These distributions are just the frequencies of the answers the customers gave, and we can compute the Mutual Information via the entropies of *X*, *Y* and their joint distribution (*X*, *Y*):

$$I(X, Y) = H(X) + H(Y) - H(X, Y).$$

Our computations brought the following Mutual Information values:

Basic Inquiry (**N=3098**):
H(Smiley) = 1.594
H(NPS) = 2.393
H(Smiley, NPS) = 3.745
***I*(Smiley, NPS)** = 1.594 + 2.393 – 3.745 = **0.242**

Parallel Inquiry (**N=2952**):
H(NPS) = 2.263
H(Smiley) = 1.763
H(NPS, Smiley) = 3.665
***I*(NPS, Smiley)** = 2.263 + 1.763 – 3.665 = **0.361**

Since the Mutual Information can also be expressed as the difference between the entropy of the NPS responses and the conditional entropy of the NPS responses with respect to the smiley ones:

$$I(X, Y) = H(Y) - H(Y|X)$$

it essentially shows how much the knowledge of the smiley responses reduces our uncertainty in the NPS responses. The obtained values let us claim that even if we know what a person replied to the smiley question, our uncertainty in their answer to the NPS question is still noticeable.

One weakness of the Mutual Information test in our case is that it does not take in account that our two variables are numerical: the test treats the user responses

as categorical, disregarding the order on the sets of the response options. One more way to evaluate dependence between two random variables, which does not exhibit this weakness, is Kendall rank coefficient. This non-parametric test explicitly exploits the order on the sets of the response options and does not rely on any assumptions on the distributions of *X* or *Y*.

Any pair of observations (x_i, y_i) and (x_j, y_j), where $i < j$, are said to be *concordant* if the ranks for both elements (more precisely, the sort order by *x* and by *y*) agree: that is, if both $x_i < x_j$ and $y_i < y_j$; or if both $x_i > x_j$ and $y_i > y_j$. They are said to be *discordant*, if $x_i < x_j$ and $y_i > y_j$; or if $x_i > x_j$ and $y_i < y_j$. If $x_i = x_j$ or $y_i = y_j$, the pair is neither concordant nor discordant and called *tied*.

Since in our case we have tied pairs (the number of observations is much greater than the numbers of the response options), and the numbers of the response options are different for the two questions (5 for smiley and 11 for NPS), we chose the Kendall Tau-c variant of the test. Here, the response options for smiley are *rows* and those for NPS are *columns*; as above, *n* is the sample size.

The Kendall Tau-c coefficient is defined as:

$$\tau_c = \frac{2\,(n_c - n_d)}{n^2 \frac{(m-1)}{m}}$$

where

n_c = Number of concordant pairs
n_d = Number of discordant pairs
m = min (Number of rows, Number of columns)

Like the Pearson correlation coefficient, values of the Kendall Tau-c test belong to [-1, 1] interval. Here are the test values we computed:

Basic Inquiry (**N=3098**): Kendall's tau-c = **0.331**
Parallel Inquiry (**N=2952**): Kendall's tau-c = **0.396**

As the obtained values are relatively far from 1, the test does not show significant “ordering” dependence between the two variables. One should note, however, that the number of tied pairs was very large in our case, which may affect the test reliability.

Table 2. Results of the analysis of dependence between the smiley and NPS responses.

	PEARSON	MUTUAL INFORMATION	KENDALL	N

BASIC: SMILEY->NPS	0.474	0.242	0.331	3,098
PARALLEL: NPS->SMILEY	0.559	0.361	0.396	2,952
RANGE	$r \in [-1, 1]$	$I \geq 0$	$\tau \in [-1, 1]$	

While the results we obtained all show certain dependences between the responses to smiley and NPS (Table 2), it appears that those dependences are not very strong. A more careful way to express this is to state that the three natural tests that we applied – Pearson correlation coefficient, Mutual Information and Kendall rank correlation coefficient – brought no evidence of strong dependences. This, in turn, indicates that even if we know which option a library customer chooses for smiley, it is still meaningful and informative to ask them the NPS question.

3.1.2 Does the Order of the Questions Matter?

When the order of questions (smiley and NPS) was reversed (Basic to Parallel), it seemed to have some effect on the information obtained (Table 2).

The total number of responses and visitors in the cultural organizations of Helsinki City are shown in Table 3.

Table 3. Number of responses in the City of Helsinki Survey.

Group	Number of visits	Total number of responses	Share of responses
Regional libraries	363,333	5,960	1.6 %
Oodi library	396,259	2,237	0.6 %
Museums	68,072	1,188	1.7 %
Total	**827,664**	**9,385**	**1.1 %**

The response rate could not be calculated, because there were no means to evaluate the share of the customers or visitors, who faced the feedback terminal. The likelihood of facing the feedback terminal varied by the placement of it, the width of the space and other factors, which were not proportional at different locations. Instead of the response rate, the share of responses to all customer visits of the same period was calculated (Table 3).

The trend seemed to be, that locations with high volumes of visitors had the lowest shares. At the Oodi library, only few visitors faced the terminal, while at the small libraries or at museums the terminal was more visible.

The total number of responses was 9,385, with 43 % of all to the Parallel Inquiry (Table 4). The share of responses to the Parallel Inquiry compared with the total number of responses ranged at locations from 29 % to 55 %.

Table 4. Number of responses.

Group	Number of responses, Basic Inquiry	Number of responses, Parallel Inquiry	Total
Regional libraries	3,272	2,688	5,960
Oodi Library	1,433	804	2,237
Museums	671	517	1,188
Total	**5,376**	**4,009**	**9,385**

Also partially filled feedbacks were registered. The pass-through share was low: With the Basic Inquiry, 58 % of all respondents proceeded to the end of the inquiry, while of those responding the Parallel Inquiry, 74 % proceeded to the end of inquiry.

The Parallel Inquiry produced more NPS ratings, but less responses altogether (Table 5).

Table 5. The number of NPS ratings.

Group	Number of NPS ratings Basic Inquiry	Number of NPS ratings Parallel Inquiry	Number of NPS ratings total
Regional libraries	1,923	2,688	4,611
Oodi Library	812	804	1,616
Museums	363	517	880
Total	**3,098**	**4,009**	**7,107**

The average of NPS ratings with the Parallel Inquiry were four points higher (46) than the average of NPS ratings with the Basic Inquiry (42). Differences between Museums and libraries were apparent. The levels of smiley valuations were reverse. Smileys gave higher values with the Basic Inquiry (82) than with the Parallel Inquiry (77). Table 6.

Table 6. The Net Promoter Scores and Smiley averages.

Group	Net Promoter Score (NPS) Basic Inquiry ϵ[-100,100]	Net Promoter Score (NPS) Parallel Inquiry ϵ[-100,100]	Smiley average for Basic Inquiry ϵ[0,100]	Smiley average for Parallel Inquiry ϵ[0,100]

Regional libraries	39.5	47.5	80.9	77.1
Oodi Library	40.4	41.9	80.7	78.2
Museums	57.0	46.6	86.8	77.0
Total	**41.8**	**46.3**	**81.6**	**77.3**

3.2 The National Finna User Survey

Altogether 47,687 Finna users of 82,522 responded to the Finna User Survey, thus the response rate being 57.8%. The NPS values and the numbers of respondents of different groups are shown in Table 7.

Table 7. NPS values and numbers of respondents in Finna User Survey

Finna Interface Group	NPS ϵ[-100,100]	Respondents
National	47.6	3,132
Inst. of Higher Educ.	43.2	21,229
Museums	47.6	433
Public libraries	47.8	22,287
Others	36.8	606
Total	**45.6**	**47,687**

The NPS-values of the groups were close to each other, with the exception of the group "Others". The range of the NPS scale being from -100 to 100, all the values were good.

4. Discussion

The analysis of the results of the NPS and smiley questions showed that the willingness to recommend the service and the general emotional charge of the satisfaction reflect the different dimensions of the customer experience. Therefore, the measurement of the customer experience should not be left on one method only.

The same conclusion was made by Pollack and Alexandrov (2013) in their investigation of validity of the NPS to view it as an alternative to the word-of-mouth measure that is generally considered as a component of customer loyalty as noted by Morgan and Rego (2006). The NPS measures the customers' loyalty, whereas the smiley measures on-the-spot feeling of the respondent.

The colourful smiley-question at the front screen of the Basic Inquiry attracted significantly more people to respond to at least one question (5,376 responses) than the greyish Parallel Inquiry (4,009 responses). On the other hand, the numbers of people who answered both smiley and NPS questions were nearly the same: 3,098 for Basic Inquiry vs. 2,952 for Parallel Inquiry. We think this may be connected to the respondents' expectations and perceptions.

Many people are used to see only the colourful smiley question in feedback terminals, which is felt as a routine and quick exercise. So, more people are likely to stop and respond, but without noticing the second part of the inquiry. When people see a less familiar NPS question first, however, more of them prefer to skip the inquiry altogether, but those who choose to respond are more attentive and prepared to give it more thinking when answering.

It is also interesting to observe that the NPS score was higher in the Parallel Inquiry: 46.3 for the Parallel Inquiry, 41.8 for the Basic Inquiry and 45.6 for the Finna User Survey.

In the Basic Inquiry, the "feeling of the moment" was expressed to the "smiley" question. So, one could suppose that when given the NPS estimate in the second step, the customer might have used more time to consider the rating he or she gave.

As noted in Chapter 3.1.2, the order of questions had some effect on the information obtained. Whether this effect is statistically significant or rather accidental, or - in other words - to what extent the order of the questions influences the responses, their numbers and dependences may be a good question to explore in future studies.

Shankar et al. (2003) reported differences of levels of customer satisfaction and loyalty to the same service depending whether the service was received physically or online. One could expect that the motives of users of a network service like Finna to be more focused than the motives of library or museum visitors. Due to this, in our case the NPS values obtained from the different environments cannot be compared. Further, the contents and the target groups of the surveys were different.

The question for NPS was slightly different in the Internet and physical environments: In the Internet survey (Finna User Survey), the question was "How likely is it that you would recommend [the service] to a friend or colleague?". In the physical environment (the City of Helsinki Survey), it was "How likely would you recommend us to others?". We suppose that both the formulations correspondingly commit the respondents to put their reputation on the line when considering their willingness to recommend the service.

Salisbury and Peasley (2018) measured the NPS value of 25 in the La Trobe University Library in Melbourne, Australia. Yet, they criticize the borrowing of methods from the business world, noting the criticism presented by Keiningham et al. (2008) and Kristensen and Eskildsen (2011). Because of criticism, Salisbury and Peasley (2018) are not yet convinced of NPS's applicability in the libraries.

Yet, we think that new and unprejudiced methods for the evaluation of library operations need to be tested for identifying the benefits of the library to the users and society. In this spirit, the International Standard ISO 16439 (2014) encourages us to try new methods.

Because the assessment of library impact often is labor-intensive and the librarians may have lack of the knowledge of assessment, it is important to find easy and non-laborious methods of assessing the library customers' experience and the library's impact on its customers. Furthermore, the NPS is included in the International Standard ISO 21248 (2019).

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