



9th International Interdisciplinary Congress on Renewable Energies, Industrial Maintenance, Mechatronics and Informatics

Booklets



RENIECYT - LATINDEX - Research Gate - DULCINEA - CLASE - Sudoc - HISPANA - SHERPA UNIVERSIA - Google Scholar DOI - REDIB - Mendeley - DIALNET - ROAD - ORCID - V|LEX

Title: Measuring service quality of the science education workshop using the servperf model

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Editorial label ECORFAN: 607-8695
BCIERMMI Control Number: 2024-01
BCIERMMI Classification (2024): 241024-0001
RNA: 03-2010-032610115700-14
Pages: 15

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CONAHCYT classification:
Area: Social sciences
Field: Education sciences
Discipline: Education
Subdiscipline: Comparative education

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INTRODUCTION

- That is why, by carrying out this workshop, we go beyond the dissemination of scientific advances and the development of activities to understand them. The quality of the service provided by the professors of the Department of Chemistry during their intervention in this teaching-learning strategy is evaluated.
- The quality of the service is essential to identify if the attending population is satisfied with the service received in the “Educational Workshop Magic of Chemistry”, which involves a series of variables to be evaluated such as those established in the SERVPERF model, which contemplates the performance of the service in an integral way, both tangible and intangible aspects.



LITERATURE REVIEW

- Since the 1980s, achieving quality in both products and services has been paramount. However, greater emphasis has been placed on the quality of tangible goods, leaving aside the services. In addition, the perception of service quality results from comparing expectations against service performance, contemplating the entire process during service delivery (Parasuraman et al., 1985).
- Services are activities produced and organized to satisfy human needs and are influenced by when and where they are produced, and by who provides them, as well as by quality levels and also by customers' level of perception and expectations of service quality (Unuvar & Kaya, 2016).
- These have special characteristics such as intangibility, heterogeneity, customer involvement in service production, facilities, and workers for service production are seen as marketing tools. An appropriate mix of these three components determined by the intensity of staff work, the personalization of the service, and the contact and interaction between the customer and the service process, will lead to a satisfactory quality service.



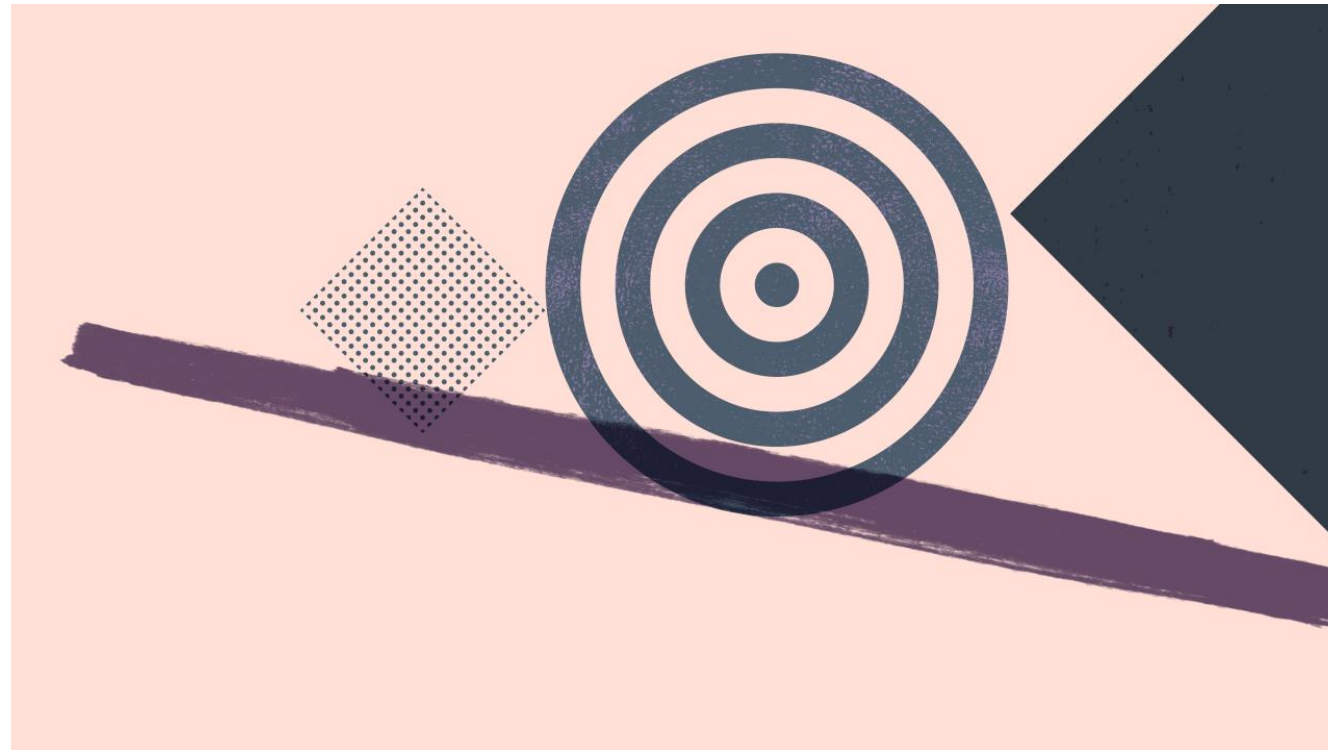
LITERATURE REVIEW

- The SERVQUAL scale is based on the gap model with the disconfirmation paradigm, i.e., it focuses on the difference between customer expectations and perceptions, where service quality is situated on a continuum ranging from ideal quality to totally unacceptable quality, with some points along the continuum representing satisfactory quality. When the discrepancy between perceptions and expectations is negative, dissatisfaction occurs, while when the result is positive, satisfaction occurs. The service quality measurement scale consists of a total of 44 items (22 for expectations and 22 for perceptions) on a 7-point Likert scale and is compared to obtain the gap scores (P-E) (Parasuraman et al., 1985; Jain & Gupta, 2004).



LITERATURE REVIEW

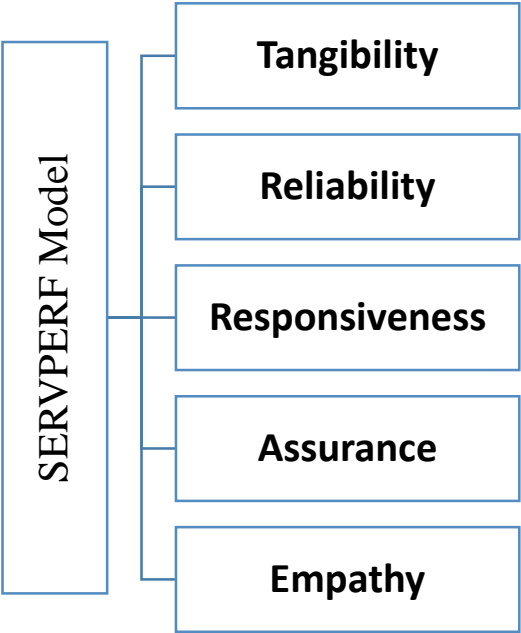
- The SERVPERF scale was developed from the gap theory of Parasuraman et al. (1985) because researchers Cronin & Taylor (1992) suggested that the gap theory was inadequate to measure service quality when contemplating the differences between the perception of the quality of service received compared to what was expected. For this reason, they proposed and developed an alternative measure based solely on performance. Being a variant scale of the SERVQUAL, since the SERVPERF contains only perceived performance, the scale consists of 22 items. Therefore, the higher the perceived performance, the higher the service quality.



METHODOLOGY

Research type

- Quantitative
- Descriptive
- Correlational
- Cross-sectional study



n =

- 110 people

Data analysis

- Descriptive statistics
- SPSS Statistics 25

Hypotheses testing

- Pearson's correlation

Measure instrument

- 22 items
- Expert judgment
- Cronbach's Alpha

HYPHOTESIS

H_0 : The five dimensions of the SERVPERF model do not present a significant correlation when evaluating the quality of service in the Educational Workshop Magic of Chemistry.

$-H_a$: The five dimensions of the SERVPERF model present a significant correlation when evaluating the quality of service in the Educational Workshop Magic of Chemistry.

- The reliability and consistency of the scale were calculated using Cronbach's Alpha Index, which presented acceptable levels according to Nunnally (1978), since the results obtained for each construct were values above 0.700, being acceptable to determine that the instrument has reliability as internal consistency. (see Table 1).

Box 1	
Table 1	
Calculation of Cronbach's alpha index.	
Variables	Cronbach's Alpha > 0.700 (Nunnally, 1978)
1-4 Tangibility (TAN)	0.712
5-9 Reliability (REL)	0.925
10-13 Responsiveness (RES)	0.796
14-17 Assurance (ASS)	0.945
18-22 Empathy (EMP)	0.906

Source: Own elaboration (2024).

A total of 110 people from the general population participated, meeting the sample selection criteria of Hair et al. (1999), who propose that for each item at least 5 questionnaires should be applied. The characteristics of the sample are detailed below (see Table 2).

Box 2	
Table 2	
Characteristics of the sample	
Sociodemographic variables	Sample profile
Age	< 18 years = 20% 18-29 years = 41% 30-59 years = 39%
Sex	Male = 55%; Female = 45 %
Scholarship	Middle school = 6% High school = 15% Bachelor = 74% Posgraduate = 5%

Source: Own elaboration (2024).

RESULTS

- Measures of central tendency (see table 3)

Box 3				
Table 3				
Descriptive statistics of the five dimensions of the SERVPERF model				
	Mean	Standard deviation	Minimum	Maximum
TAN1	4.78	0.436	3	5
TAN2	4.77	0.442	3	5
TAN3	4.75	0.458	3	5
TAN4	3.77	1.405	1	5
REL1	4.45	0.934	1	5
REL2	4.69	0.520	3	5
REL3	4.67	0.490	3	5
REL4	4.47	0.832	2	5
REL5	4.70	0.460	4	5
RES1	4.57	0.627	2	5
RES2	4.11	1.120	1	5
RES3	4.71	0.456	4	5
RES4	4.71	0.456	4	5
ASS1	4.75	0.432	4	5
ASS2	4.75	0.438	4	5
ASS3	4.79	0.409	4	5
ASS4	4.77	0.421	4	5
EMP1	4.77	0.421	4	5
EMP2	4.65	0.724	2	5
EMP3	4.81	0.395	4	5
EMP4	4.80	0.402	4	5
EMP5	4.77	0.421	4	5

Source: Own elaboration (2024).

Normality test
(see table 4)

Box 4				
Table 4				
Skewness and kurtosis calculations of the five dimensions of the SERVPERF model				
Item	Asymmetry		Kurtosis	
	Statistical	Standard error	Statistical	Standard error
TAN1	-1.716	0.230	1.857	0.457
TAN2	-1.639	0.230	1.555	0.457
TAN3	-1.431	0.230	0.803	0.457
TAN4	-0.595	0.230	-1.194	0.457
REL1	-1.694	0.230	2.089	0.457
REL2	-1.421	0.230	1.104	0.457
REL3	-0.982	0.230	-0.462	0.457
REL4	-1.373	0.230	0.749	0.457
REL5	-0.885	0.230	-1.240	0.457
RES1	-1.415	0.230	1.942	0.457
RES2	-0.858	0.230	-0.468	0.457
RES3	-0.934	0.230	-1.150	0.457
RES4	-0.934	0.230	-1.150	0.457
ASS1	-1.199	0.230	-0.572	0.457
ASS2	-1.143	0.230	-0.708	0.457
ASS3	-1.451	0.230	0.106	0.457
ASS4	-1.320	0.230	-0.264	0.457
EMP1	-1.320	0.230	-0.264	0.457
EMP2	-2.295	0.230	5.014	0.457
EMP3	-1.595	0.230	0.553	0.457
EMP4	-1.521	0.230	0.318	0.457
EMP5	-1.320	0.230	-0.264	0.457

Source: Own elaboration (2024).

- Inter item correlation. It is possible to observe how they correlate with each other, thus making it possible to ensure that each element effectively contributes to the factor, given that most of the values were greater than 0.5. (see Tables 5, 6, 7, 8 and 9).

Box 5

Table 5

Correlation matrix between elements of the Tangibility dimension (TAN)

	TAN1	TAN2	TAN3	TAN4
TAN1	1.000	0.929	0.775	0.457
TAN2	0.929	1.000	0.844	0.536
TAN3	0.775	0.844	1.000	0.551
TAN4	0.457	0.536	0.551	1.000

Source: Own elaboration (2024).

Box 6

Table 6

Correlation matrix between elements of the Reliability dimension (REL)

	REL1	REL2	REL3	REL4	REL5
REL1	1.000	0.852	0.781	0.789	0.740
REL2	0.852	1.000	0.823	0.807	0.835
REL3	0.781	0.823	1.000	0.765	0.902
REL4	0.789	0.807	0.765	1.000	0.733
REL5	0.740	0.835	0.902	0.733	1.000

Source: Own elaboration (2024).

Box 7

Table 7

Correlation matrix between elements of the Responsiveness dimension (RES)

	RES1	RES2	RES3	RES4
RES1	1.000	0.485	0.587	0.555
RES2	0.485	1.000	0.673	0.655
RES3	0.587	0.673	1.000	0.868
RES4	0.555	0.655	0.868	1.000

Source: Own elaboration (2024).

Box 8

Table 8

Correlation matrix between elements of the Assurance dimension (ASS)

	ASS1	ASS2	ASS3	ASS4
ASS1	1.000	0.831	0.798	0.800
ASS2	0.831	1.000	0.777	0.828
ASS3	0.798	0.777	1.000	0.841
ASS4	0.800	0.828	0.841	1.000

Source: Own elaboration (2024).

Box 9

Table 9

Correlation matrix between elements of the Empathy dimension (EMP)

	EMP1	EMP2	EMP3	EMP4	EMP5
EMP1	1.000	0.726	0.840	0.759	0.793
EMP2	0.726	1.000	0.627	0.511	0.636
EMP3	0.840	0.627	1.000	0.856	0.840
EMP4	0.759	0.511	0.856	1.000	0.868
EMP5	0.793	0.636	0.840	0.868	1.000

Source: Own elaboration (2024).



RESULTS

- Correlation between constructs. The relationships between the SERVPERF model constructs were calculated with the Pearson correlation and was corroborated hypothesis test. The existence of a significant correlation between the five dimensions was detected. Pearson's correlation between the Tangibility (TAN), Reliability (REL) and Responsiveness (RES) construct with the other constructs were above 0.700 and below 0.900. The correlations between the constructs of Assurance (ASS) and Empathy (EMP) ranged above 0.700 and 0.900. Likewise, all 5 constructs showed a significant correlation with bilateral sig values of 0.0000 (see Table 10).

Box 10

Table 10

Pearson's correlation matrix between the dimensions of the SERVPERF model.

		TAN	REL	RES	ASS	EMP
TAN	Pearson's correlation	1	0.849**	0.827**	0.740**	0.730**
	Sig. (bilateral)		0.000	0.000	0.000	0.000
	N	110	110	110	110	110
REL	Pearson's correlation	0.849**	1	0.798**	0.748**	0.707**
	Sig. (bilateral)	0.000		0.000	0.000	0.000
	N	110	110	110	110	110
RES	Pearson's correlation	0.827**	0.798**	1	0.827**	0.802**
	Sig. (bilateral)	0.000	0.000		0.000	0.000
	N	110	110	110	110	110
ASS	Pearson's correlation	0.740**	0.748**	0.827**	1	0.901**
	Sig. (bilateral)	0.000	0.000	0.000		0.000
	N	110	110	110	110	110
EMP	Pearson's correlation	0.730**	0.707**	0.802**	0.901**	1
	Sig. (bilateral)	0.000	0.000	0.000	0.000	
	N	110	110	110	110	110

** The correlation is significant at the 0.01 level (bilateral).

Source: Own elaboration (2024).





ANNEXES

Below is the SERVPERF instrument adapted to the service evaluated in the context of Mexico, which was applied in this research, consisting of 22 statements on a 5-point Likert scale (see Table 11).

Box 11	
Table 11	
Items instrument	
Variable	Items
TAN1	The Magic of Chemistry Workshop at the Institute of Astronomy and Meteorology (IAM) of the University of Guadalajara is developed with modern equipment.
TAN2	The facilities of the IAM are visually adequate for the development of the workshop.
TAN3	The teacher presents a formal institutional appearance.
TAN4	The materials for conducting the workshop at the IAM are visually suitable for the purpose of the workshop.
REL1	The teacher conducts the workshop within the promised time.
REL2	The teacher shows sincere interest in solving the question or problem.
REL3	The teacher does a good job of advising on the development of the workshop from the first time.
REL4	The teacher fulfills his or her counseling within the promised time.
REL5	The teacher always tries not to make mistakes in the advice given during the workshop.

RES1	The teacher guiding the workshop tells you exactly how long each activity takes.
RES2	The teacher gives you prompt advice during the workshop.
RES3	The teacher is willing to help you during the workshop.
RES4	The teacher has time to respond to your requests during the workshop.
ASS1	The teacher's behavior during the workshop engenders confidence in you.
ASS2	You feel secure in being mentored by the teacher during the workshop.
ASS3	The teacher is courteous to you for the duration of the workshop.
ASS4	The teacher is knowledgeable enough to answer your questions in the workshop.
EMP1	The teacher gives you personalized attention in the workshop.
EMP2	The workshop at the IAM has office hours that are convenient for you.
EMP3	The workshop at the IAM has teachers who attend to you personally.
EMP4	The teacher really attends to your questions during the workshop.
EMP5	The teacher understands your specific requirements during the workshop.

Source: Own elaboration (2024) based on Cronin & Taylor (1992).



CONCLUSION

Bringing science closer to the general public, and providing a quality service to offer it, is an unavoidable task in our time. This study provided a valid and reliable instrument to measure the quality of service in the educational workshop “The Magic of Chemistry”, with which it was possible to corroborate the usefulness of the instrument with theoretical, methodological, and statistical support. It was also possible to evaluate the quality of the service provided by the teachers in charge of conducting the educational workshop. In quantitative terms, acceptable values were obtained for the validation of the scale, as well as significant levels that corroborate the significant relationship between the constructs studied.



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