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An Assessment of Unidimensionality of the Servqual Scale in the Higher Education Context of Tanzania

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Abstract

Unidimensionality is a highly mandatory condition for construct validity and reliability checking of multi-item measure. It is referred to as the existence of a single construct/trait underlying a set of measures. The assessment of unidimensionality is necessary in the gathering of evidence to support the validity of interpretations based on a total score. This paper tests the unidimensionality of the SERVQUAL scale, as modified to fit the higher education setting. Data were collected from 500 students in two public universities in Tanzania. The study concludes that, the SERVQUAL scale is unidimensional, suggesting that all items of the scale measure the same construct (perceived service quality).

Keywords: Higher education, higher education institutions, service quality, SERVQUAL, Unidimensionality

1. Introduction

SERVQUAL is the most widely used instrument to measure service quality across various service sectors. This instrument exhibits a factor structure that varies across industries and contexts (Cronin and Taylor, 1992). Due to this, researchers assess service quality as a composite of the scale items (total score) rather than factor-based scales (e.g. Cronin and Taylor, 1992). However, the validity of interpretations based on a total score is questionable (Yu et al., 2007). This is due to the fact that, a composite which represents a latent factor is meaningful if the observable measures which are posited as indicators of the latent construct are acceptably unidimensional (Joreskog and Sorbom, 2006). In other words, construct validity, an important aspect of latent variable models, is achieved when the items comprising a construct are unidimensional (Kang and James, 2004). Therefore, the assessment of unidimensionality is a necessary stage in the gathering of evidence to support the validity of interpretations based on a total score (Yu et al., 2007). Thus, the objective of this paper was to assess the unidimensionality of the SERVQUAL scale, particularly in the higher education context of Tanzania.

2. Theoretical Base

2.1. Fit Indices for Unidimensionality

Confirmatory factor analysis (CFA) uses various fit indices for testing unidimensionality (Joreskog and Sorbon, 2006). The fit indices assist in detecting well-fitting from badly-fitting models (Kline, 2005). According to Hooper et al. (2008), there are three main categories of fit indices: absolute, incremental and parsimony. Absolute fit indices determine how well an a priori model fits the sample data, and demonstrates which proposed model has the most superior fit (McDonald and Ho, 2002). These measures provide the most fundamental indication of how well the proposed theory fits the data (Kline, 2005). Absolute fit indices include: The Chi-squared test, Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Root Mean Square Residual (RMR) and Standardised Root Mean Square Residual (SRMR) (McDonald and Ho, 2002). Incremental fit indices are a group of indices that do not use the Chi-square in its raw form, but compare the Chi-square value to a baseline model (Hooper et al., 2008). For these models, the null hypothesis is that, all variables are uncorrelated (McDonald and Ho, 2002). They include the Normed-Fit Index (NFI) and Comparative Fit Index (CFI) (McDonald and Ho, 2002). The parsimony fit indices include the Parsimony Goodness-of-Fit Index (PGFI) and the Parsimonious Normed Fit Index (PNFI) (Hooper et al., 2008). The parsimony indices seriously penalise for the model complexity, which results in parsimony fit index values that are considerably lower than other goodness of fit indices (McDonald and Ho, 2002). Each index is scaled to lie on an interval in which the end points are defined for a perfect model fit and for no model fit (Kline, 2005).

Despite the usage of the above-mentioned fit indices, most of them are sensitive to sample size, model misspecification, and parameter estimates (Boomsma, 2000). This situation leads to a wide disparity in agreement on which indices to report. In this vein, some

scholars argue that, reporting a variety of indices is necessary because different indices reflect a different aspect of model fit (Kline 2005; Boomsma, 2000). Other scholars suggest a two-index presentation format (Agus, 2001; Athanassopoulos, et al., 2001). This always includes the SRMR with the NFI, RMSEA or the CFI.

Based on the above discussion, and the fact that no one index has been able to meet all the required criteria: to have a finite range (e.g., 0 to 1), to reward models that are “far” from the independence model, to reward parsimonious models (models with many degrees of freedom), to be independent of sample size (in contrast to the chi-square), and to have a clear and well-established cut-off value (such as 0.90 or so) (Hu and Bentler, 1999); multiple fit indices should be examined and reported when evaluating practical fit of a model (Hooper et al., 2008). Accordingly, this study reports a variety of indices such as the Chi-square statistic, its degrees of freedom and p-value, a relative likelihood ratio (RLR), the RMSEA, the SRMR, the CFI and the PNFI (Hooper et al., 2008). Many researchers have utilised a variety of fit indices to assess unidimensionality (e.g., Ame, 2005, 2009; Wattanakamolchai, 2008).

3. Methods

3.1. The Modification of SERVQUAL Scale

The 22 service quality items in the original SERVQUAL scale were modified to fit the higher educational process. For example, that item of the SERVQUAL instrument that states “XYZ has modern looking equipment” was modified for the item on the modified SERVQUAL instrument to read as “Classrooms at XYZ have up-to-date teaching support equipment”. This was consistent with authors’ guidelines for using SERVQUAL (Parasuraman et al., 1991).

In addition, Parasuraman et al. (1993) propose that, the 22-SERVQUAL items be supplemented with context specific items when necessary. This is due to the fact that, there might be sector specific dimensions that are closely related to the nature of the service sector. In view of this, 23 new items to measure important aspects of service quality in higher education were incorporated into SERVQUAL. The 23 new items were generated from the literature review and various qualitative research inputs, namely: focus groups, pilot test and expert validation. Literature review and qualitative research have been used to develop new SERVQUAL items (Cavana et al., 2007; Tsoukatos, 2007).

Focus group interviews were conducted with third year undergraduate students, conveniently selected from different degree programmes in both universities under study. Convenience sampling was adopted because of the exploratory nature of this phase of the study. Third year students were considered to be experienced and pretty familiar with the university services, thus being likely to give more realistic expectations and perceptions of service quality. Two focus group interviews were conducted in each of the two universities under study with eight participants each, and a researcher as the moderator. This was consistent with the recommendation of Ghauri and Gronhaug (2010) that, a focus group should have between six and ten participants. Each focus group interview lasted approximately between one hour and one and a half hours in duration which was consistent with most researchers’ recommendations. Specifically, focus group interviews were conducted to identify whether the factors suggested as having an influence on perceived service quality from the literature review, can be generalized to the context of higher education, and to generate additional items to measure the service quality of higher education, that covers all aspects of the services that students are receiving. In view of this, the participants in the focus groups were asked to: (1) identify the physical and service needs of students during their studies at the university, (2) describe the meaning of service quality as it relates to students, and (3) describe the ideal service experience and expectations about the service experience at the university. This process resulted in the modified SERVQUAL instrument with 45-items under the same five dimensions of service quality: Tangibles (sixteen items), Reliability (six items), Responsiveness (six items), Assurance (eleven items) and Empathy (six items).

3.2. Data Collection

The study employed the SERVQUAL scale, with appropriate modifications for an educational setting, to collect data. The survey was conducted in two purposively selected public universities in Tanzania. Respondents (students) were systematically selected and a total of 250 students from various degree programmes in each of the two universities were selected for participation in this study. The modified SERVQUAL scale was pre-tested and had reliability coefficients (Cronbach’s alpha coefficients) greater than 0.70 recommended by Nunnally (1988). All measures were based on a 7-point Likert-type scale. The questionnaire took about 20 minutes to complete. It is important to note that, the names of the universities under study have not been mentioned in connection to the data collected because it was agreed as a condition during data collection.

3.3. Data Analysis

Data was analysed using Structural Equation Modelling (SEM) approach through AMOS 20 computer software (Arbuckle, 2010). A variety of indices such as the Chi-square statistic, its degrees of freedom and p-value, a relative likelihood ratio, the RMSEA, the SRMR, the CFI and the PNFI were reported. Accordingly, an exact fit of the model is indicated when the p-value for Chi-square is above 0.05. On the contrary, values of the RMSEA and SRMR lower than 0.05 indicate well-fitting models (Steiger, 2007). CFI is based on the non-centrality parameter and a value exceeding 0.90, is an indication of good fit (Diamantopolous and Siguaw, 2000). While no threshold levels have been recommended for PNFI, it is possible to obtain values within the 0.50 region (Kline, 2005), and a model with higher score shows better fit (Tanaka, 1993). A relative likelihood ratio of 5 or less is considered an acceptable fit, and a model with lower values shows better fit (Eisen et al., 1999). Acceptable fit indices imply sufficient evidence of unidimensionality (Hooper et al., 2008).

4. Results and Discussion

4.1. Demographic Characteristics of Respondents

Respondents were mostly in the 21 to 30 age range (89%), with the government sponsorship (85%). The demographic characteristics of respondents, overall and within samples, are summarized in Table 1.

Demographic Characteristic	University A		University B		Combined Sample	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Sample Size	250	50.0	250	50.0	500	100.0
Gender						
Male	100	40.0	135	54.0	235	47.0
Female	150	60.0	115	46.0	265	53.0
Age Bracket						
20 or less	5	2.0	5	2.0	10	2.0
21 – 30	215	86.0	230	92.0	445	89.0
31 – 40	30	12	15	6.0	45	9.0
Sponsor						
Government	235	94.0	190	76.0	425	85.0
Private	15	6.0	60	24.0	75	15.0

Table 1: Demographic Characteristics of Respondents

4.2. Unidimensionality Analysis

Table 2 presents the resulting fit statistics for the SERVQUAL scale across the three data sets (university A, B, and the combined sample).

Measures of Fit	Fit Statistics			
	University A	University B	Combined Sample	Average Values
Chi-square (χ^2)	1.67	6.03	9.99	5.90
d.f	2	6	2	3
p	0.43	0.42	0.01	0.29
RLR (χ^2/df)	0.84	1.01	5.00	2.28
PNFI	0.13	0.40	0.13	0.22
CFI	1.00	1.00	1.00	1.00
SRMR	0.01	0.02	0.06	0.03
RMSEA	0.00	0.00	0.09	0.03

Table 2: Fit Statistics

As evidenced in Table 2, all the six fit indices reported across all the three data sets are falling within recommended levels for good model fit (Hooper et al., 2008), suggesting that, the data fit the model well. The average values of fit indices: Chi-square p-value, RLR, PNFI, CFI, SRMR, and RMSEA were 0.29, 2.28, 0.22, 1.00, 0.03 and 0.03 respectively. This means that, the SERVQUAL scale possesses a good degree of unidimensionality with regard to the measurement of perceived service quality. This result is consistent with earlier empirical findings of Brochado and Marques (2009) and Seyed-Javadein et al. (2007). These scholars have reported a good model fit for the SERVQUAL measure. The implication is that, all items of the SERVQUAL scale are actually measuring the same thing (perceived service quality).

5. Conclusion

The findings indicate that, the SERVQUAL scale is unidimensional, suggesting that all items of the scale are actually measuring the same thing (perceived service quality). Therefore, the use of a composite score (index) to evaluate service quality is valid since the items making up the total score are sufficiently unidimensional. Thus, the service quality interpretations based on the total score are valid. However, it is necessary to modify the SERVQUAL scale to fit the context for the study.

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