Can library users distinguish between minimum, perceived, and desired levels of service quality? Validating LibQUAL+® using multitrait multimethod analysis

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ABSTRACT

LibQUAL+® is a widely used measure of library service quality. Based on SERVQUAL's gap theory, LibQUAL+® measures items on three levels of service quality: minimum, perceived, and desired levels. Differences between user evaluations of service quality on these levels indicate the types of gaps in service quality. Gap theory has been criticized due to the possible inability of users to distinguish between different levels. However no study has investigated this claim using statistical analysis. A multitrait multimethod (MTMM) framework was used to evaluate the validity of using three levels of measurement to measure customer satisfaction in LibQUAL+®. Measurement errors across levels of measurement are correlated, indicating that simple score differences are inaccurate estimates of gaps. Users are able to distinguish between the three levels of measurement indicating support for validity of using gap theory in measuring library service quality.

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1. Introduction

LibQUAL+® is one of the most widely used instruments that purports to measure library service quality (Garthwait & Richardson, 2008). To date, the instrument has been administered to more than a million participants from over 1164 institutions worldwide (Wei, Thompson, & Cook, 2005). Its breadth of use places increasing responsibility on the designers of the instrument to evaluate its validity. Based on SERVQUAL (Parasuraman, Zeithaml, & Berry, 1985) that uses gap theory, LibQUAL+® measures each of its items on 3 levels of service quality: minimum, perceived, and desired levels. Differences between customers' evaluation of service quality of an organization's levels of service indicate different types of gap in service quality. For LibQUAL+® these gaps are the adequacy gap (perceived minus minimum) and superiority gap (desired minus perceived).

2. Problem statement

A comprehensive validation that includes all three levels of measurement has not been conducted so far in order to address any of the validity issues raised. Construct validation in most studies has been restricted to a single method at a time (e.g., Cook, Heath, Thompson, & Webster, 2003), perhaps because of the increase in model complexity. For instance, evaluating construct validity of 22 items that are indicators of three factors (traits) is not too complex, but when each of these items

is measured on three levels, the design becomes complicated with 66 items that are indicators of three traits and three levels (fully crossed). That is, each item is an indicator of a trait and a level.

Two questions underscore the need for evaluating the validity of measuring responses on three different levels.

1. Do respondents distinguish between the different levels sufficiently well that measuring gaps is meaningful?

2. How are responses and their measurement errors on different levels correlated and how can these correlations be systematically included in the model?

The first question is important because it directly addresses the question of whether there is a need for gap theory to measure library users' evaluation of service quality. Computing gaps makes sense only when the respondents distinguish between the different levels of measurement for what they are. The second question is important because responses on minimum, perceived, and expected levels for an item and their measurement errors may be correlated with each other. Therefore, gaps cannot be computed as simply differences between two uncorrelated variables, but rather, must take into account these systematic correlations.

3. Literature review

Although several studies have addressed some types of validity of LibQUAL+® (structural, longitudinal, and measurement invariance, e.g., Cook et al., 2003; Kieftenbeld & Natesan, 2013; Lane, Anderson,

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Ponce, & Natesan, 2012), these focused on the perceived level of library service quality. Limited validation of instruments based on gap theory has led some researchers to question the validity of using gap theory to measure gaps in service quality (e.g., Van Dyke, Kappelman, & Prybutok, 1997). For instance, measuring traits at different levels indicates that the researchers assume that respondents can understand the difference between minimum, perceived, and expected levels (Van Dyke et al., 1997) and express them clearly in the ordinal scale of measurement (Yu, Hong, Gu, & Wang, 2008). Yu et al. (2008) contend that the perceived and expected LibQUAL scores are interrelated, which may confound a user to rate each of these levels in relation to each other. On the other hand, one may argue that it is logical to expect correlations between customers' responses on different levels. Roszkowski, Baky, and Jones (2005) argue that perceived score is a better predictor of satisfaction than the gap between perceived and expected scores, thereby questioning the need to measure constructs on different levels.

Besides library service quality, instruments based on gap theory have been used to measure service quality in a variety of industries, including healthcare (Carman, 1990; Headley & Miller, 1993; Hu, 2011), banking (Lam, 2002; Mels, Boshoff, & Nel, 1997; Zhou, Zhang, & Xu, 2002), fast food (Lee & Ulgado, 1997), telecommunications (van der Wal, Pampallis, & Bond, 2002), retail chains (Parasuraman, Zeithaml, & Berry, 1994), and information systems (Jiang, Klein, & Crampton, 2000). Therefore, the procedures presented in this study can be applied in other disciplines to evaluate the validity of using different levels of measurement for gap theory.

4. Multitrait multimethod models

The present study uses a multitrait multimethod (MTMM) framework to evaluate the validity of using three levels of measurement to measure customer satisfaction in LibQUAL+®. This extension helps present a systematic procedure researchers can use to comprehensively evaluate the validity of other instruments that are based on gap theory. MTMM models can be used to simultaneously evaluate the construct validity of traits measured on different levels while also measuring level effects. These models include the correlated uniqueness (CU) model, the correlated method (CM) model, the correlated trait correlated method (CTCM) model, and correlated trait correlated (methods − 1) model (CTC(M − 1)). In order to avoid confusion between the term method factors in MTMMs and the levels of measurement in LibQUAL+®, the different levels of measurement will be referred to as methods of measurement. Fig. 1 shows the fully crossed method and trait structure for LibQUAL+®.

Following the seminal work of Campbell and Fiske (1959), MTMM and their variants have often been used to establish construct validity (Widaman, 2010). MTMMs measure different traits at different times or using different methods such as raters or modalities. For instance, Byrne (1998) demonstrated the use of MTMM to measure several types of competence such as social, academic, mathematics, and English (i.e., different traits) for a given individual using multiple raters such as self, parent, teacher, and peer (i.e., different methods). MTMM decomposes the method effects and evaluates both convergent and
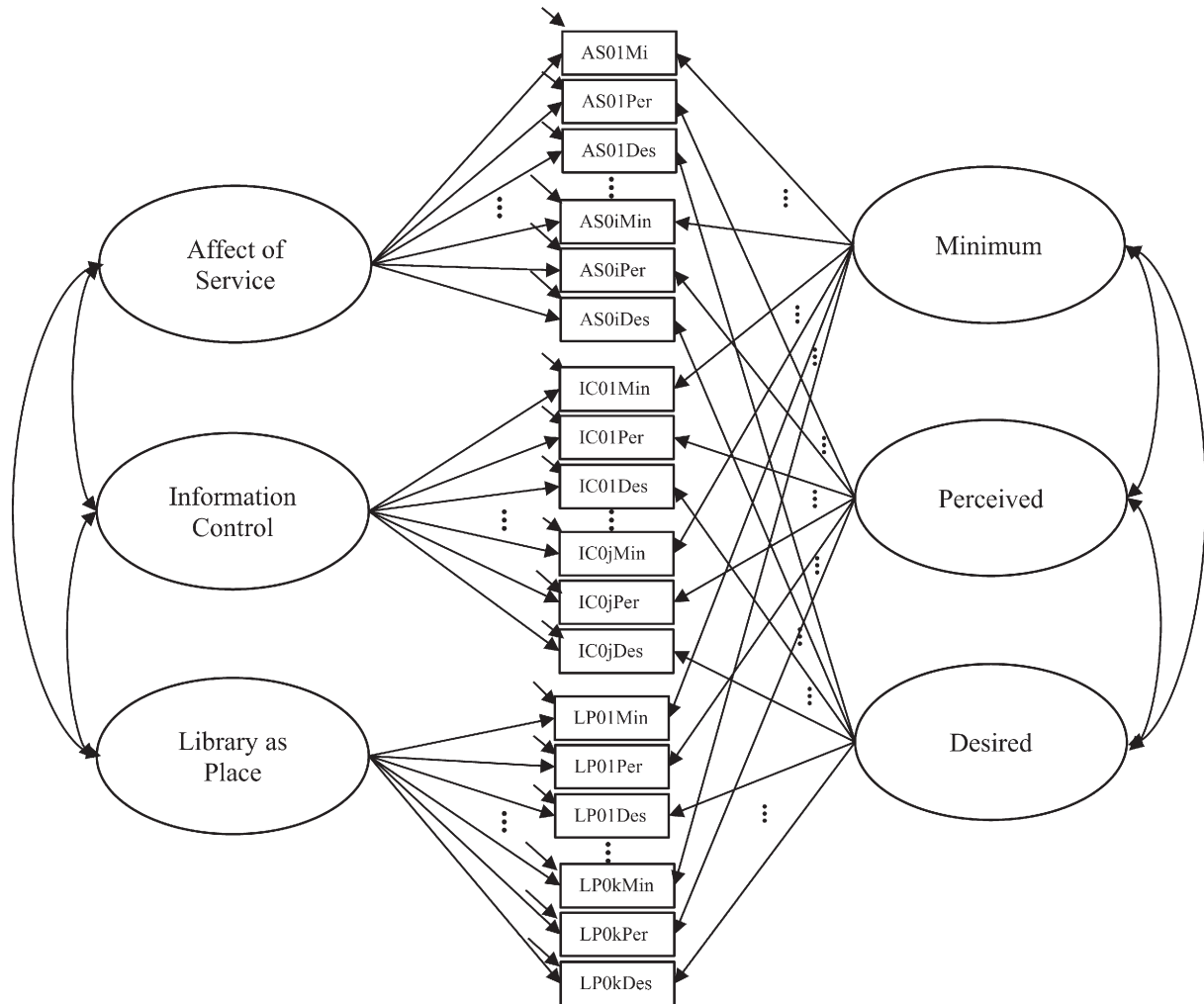

Fig. 1. Schematic diagram of the correlated trait correlated method (CTCM) MTMM model (For LibQUAL+®: $T = 3$ factors (latent traits), $M = 3$ methods of measurement, and $I = 22$ items; $i = 1,...,9$; $j = 1,...,8$; $k = 1,...,5$).