

# Validating MEDIQUAL Constructs: Reliability, Empathy, Assurance, Tangibles, and Responsiveness

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**Abstract** In this paper, we validate MEDIQUAL constructs through different media users in help desk. In a previous paper only two end-users' constructs were used: assurance and responsiveness. In this paper we extended MEDIQUAL constructs to include reliability, empathy, assurance, tangibles, and responsiveness, which are based on the SERVQUAL theory.

The results suggested that: 1) five MEDIQUAL constructs were validated through the factor analysis. That is, importance of the constructs have relatively high correlations between measures of the same construct using different methods and low correlations between measures of construct that are expected to differ (Cronbach, 1971; Campbell and Fiske, 1959) 2) five MEDIQUAL constructs are statistically significant on media users' satisfaction in help desk service by regression analysis.

## Introduction

Recently, IT support for end-users emerged as one of the leading concerns in organizations (Whiting, 1997). Continuous adapting and updating of communication technologies have driven most organizations to develop more effective help desk or customer service centers. Organizations are always looking for new ways to provide better help desk service in order to satisfy customers growing demands and expectations (Dabolkar et al., 2000).

In recent help desk research, following the growing demands of new technology support, a number of commercial products introduced using advanced techniques, such as self-service

customer-center problem resolution, the instant help function, and desk automation. Remote on-line troubleshooting and Internet-based products are examples of more advanced technologies that are currently being used to support customer centers (Oxford, 1998).

The objectives of this study are twofold. First we extend previous research (Lee et al., 2001) in MEDIQUAL constructs such as reliability, empathy, assurance, tangibles, and responsiveness, based on the SERVQUAL theory. Second, we validate MEDIQUAL constructs as new belief criteria on media users' satisfaction.

## LITERATURE REVIEW

Most early studies on media choice have paid attention to social presence and media richness theories. Researchers define social presence as "the degree to which a medium permits communicators to experience others as being psychologically

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present" (Short et al., 1976; Fulk et al., 1987), or "the degree to which a medium is perceived to convey the actual presence of the communicating participants" (Short et al., 1976). According to the social presence theory, communication media are perceived as rating in social presence. Social presence, then, is determined by the degree to which one medium transmits information about facial expression, direction of looking, posture, dress and nonverbal, vocal cues. For example, conventional media such as face-to-face and group meetings are perceived as ranked high in social presence. By contrast, electronic media such as early e-mail and computer based written documents are poorly perceived in terms of social presence. Therefore, social presence theorists argued that conventional media are more appropriate for tasks requiring high social presence, whereas electric media and written letters are more appropriate for tasks with low social presence requirements.

Similar to the social presence theory, the media richness theory focuses on the nature of media characteristics, and on their match with task complexity (Hiltz and Turoff, 1981; Rice, 1984, 1992; Daft and Lengel, 1984, 1986, Lengel and Daft, 1988). This theory is based on task variety and task analyzability: Task variety is "the frequency of unexpected and novel events that occur in the conversation process (Daft & Lengel, 1986, p. 554)" and task analyzability refers to "the degree to which tasks involve the application of objective, well-understood procedures that do not require a novel solution." Media richness theorists suggested that rich media, such as face-to-face and telephone, facilitate the immediate exchange of a wide range of communication cues, while lean media such as e-mail, written rules and regulations, letters, and written notes allow exchange of a restricted range of such cues over a longer period (Daft and Lengel, 1986). Then, the media richness theorists posed that richer media are more appropriate for unanalyzable tasks such as resolving disagreements, making important decisions, generating ideas and

exchanging confidential/sensitive information, whereas leaner media are more appropriate for analyzable tasks such as exchanging routine information, clarifying confusing viewpoints, and exchanging urgent/timely information. They suggest that when equivocality is high, organizations allow for rapid information cycles among managers, typically face-to-face and telephone, and prescribe fewer rules for interpretation (Weick, 1979; Daft and Lengel, 1984).

Although these two theories tried to explain end users' media choice, several authors of empirical studies have suggested that media choice cannot be logically explained or predicted by considering only the inherent richness or social presence of a medium and its characteristics of the task (Markus, 1988; Rice and Shook, 1990; Zmud et al., 1990; Yates and Orlikowski, 1992; Trevino and Webster, 1992; King and Xia, 1997). For instance, Ngwenyama and Lee (1997) found that electronic media are increasing their richness through messenger service such as call and pager.

Since media richness theory is only partially supported by empirical tests, it is likely that other factors or dimensions affect end-users' media choice. In order to overcome criticisms of media richness theory, we adopted the service quality (SERVQUAL), created by Parasuraman et al. (1985), as new model that is associated with medium. Parasuraman et al. (1988) presented a 22-item scale consisting of five service quality dimensions. They theorized that regardless of type of service, customers use basically similar criteria in evaluating service quality and that these criteria span virtually all aspects of service. Those dimensions are:

- Tangible : physical facilities, equipment, and appearance of personnel.
- Reliability : ability to perform the promised service dependably and accurately.
- Responsiveness : willingness to help customers and provide prompt service.
- Assurance : knowledge of employees and their ability to inspire trust and confidence.

- Empathy : the provision of caring individualized attention customer.

## Hypotheses Development

To investigate the relationship between media choice and end-user belief on help desk service, a research model was developed as shown in Figure 1.

In this model, we use five constructs from SERVQUAL (Parasuraman, Zenithal, and Berry, 1988 and 1991; Lee and Ulgado, 1997) that are thought of as closely related to end-user satisfaction with customer service: reliability, empathy, assurance, tangibles and responsiveness. This study contains, as already mentioned, adapted SERVQAUL constructs as MEDIQUAL constructs instead of the commonly used equavocality and uncertainty, or analyzability and diversity.

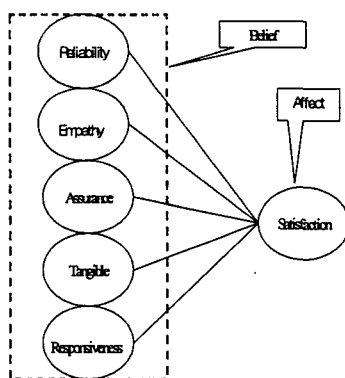


Figure 1. Research Model

To extend end-user belief criteria such as reliability, empathy, assurance, tangibles, and responsiveness, we first need to validate that the five new criteria measures. On the Basis of SERQUAL theory, we defined MEDIQUAL constructs as the following;

Reliability is defined as the degree of feeling that customer service conveys sincere interest in customer service, and that they will solve the problem correctly the first time, and in a timely fashion.

Empathy consists of the degree to which

customer service shows personal interest and politeness, and is perceived by customers as displaying personal attention.

Assurance refers to the degree of confidence customer service gives that staffs are knowledgeable about transactions, and that customers can feel safe about the privacy of transacted information.

Tangibles include modern-looking equipment, visually appealing, and aesthetic attention to materials.

Reliability is customer service's perceived ability to provide service in a timely fashion, show sincere interest, and correctly diagnose and solve the problem on the first try.

Responsiveness is customer service's perceived ability to provide prompt service, readiness to respond to requests, and to never be too busy to respond to requests.

The concept of end user satisfaction has been widely used by researchers (DeLone and McLean, 1992; Ginzberg, 1979; Klenke, 1992; Melone, 1990; Bailey and Pearson, 1983) as a surrogate of system success. DeLone and McLean (1992), introduced a comprehensive taxonomy to organize diverse research that posed six major dimensions or categories of information system success: system quality, information quality, use, user satisfaction, individual impact and organizational impact (DeLone and McLean, 1992).

Ives, et al. (1983) developed a 13-item instrument, which was later confirmed by Baroudi and Orlikowski (1988). They defined end user satisfaction as felt need, system acceptance, perceived usefulness, MIS appreciation, and feelings about a system. Bailey and Pearson (1983) evaluated overall satisfaction, which they suggested is affected by 38 items, measured by a 7-point Likert scale. Recently, Lee and Ulgado (1997) investigated the relationship between perceived SERVQUAL value and customers' overall satisfaction in the fast-food industry.

On the basis of the aforementioned research, we propose a new relationship between MEDIQUAL

constructs (Parasuraman, Zenithal, and Berry, 1991; Kettinger and Lee, 1994) and end-user satisfactions (Bailey and Pearson, 1983; Ives, et al., 1983; DeLone and McLean, 1992; Lee and Ulgado, 1997). We suggest that the assessed MEDIQUAL constructs will strongly affect end-users' overall satisfaction. The degree of overall satisfaction with the media customers will be measured within the five MEDIQUAL constructs (empathy, assurance, tangibles, reliability and responsiveness). From this general statement we propose a series of hypotheses to explore in this study.

TAM and TAM2 (Davis et al, 1989; Venkatesh and Davis, 2000) assumed perceived usefulness (as a belief) to be a direct predictor of attitude and Bhattacharjee (2001) created PAM, which adapted TAM and showed that users' perceived usefulness is positively associated with their satisfaction, which is defined as affect (evaluated attitude). Hence our hypotheses will be:

- H: End-users' satisfaction comes from reliability, empathy, assurance, tangibles, and responsiveness.
- Ha: Reliability positively affects end-users' satisfaction.
- Hb: Empathy positively affects end-users' satisfaction.
- Hc: Assurance positively affects end-users' satisfaction.
- Hd: Tangibles positively affects end-users' satisfaction.
- He: Responsiveness positively affects end-users' satisfaction.

## Research Method and Analysis RESULTS

This survey was utilized to gather the data for this study. A 7-point Likert-type scale to measure end-users' overall beliefs of service was incorporated to rate the study variables. That is, the following set of statements (i.e., variables) relate to customers' feelings about the medium they use most. Each statement shows the extent to which the user feels the medium possesses the feature described by the statement: a "1" means users strongly disagree that the medium has that feature, and a "7" means that users strongly agree.

To improve survey design, we conducted a pilot test using a web-based The survey was distributed to 214 end-users at two organizations during the summer of 1999 and was revised. The survey was redistributed to 1,000 MBA students at five universities and six companies throughout the Republic of Korea during the spring of 2001. This study tested the aforementioned hypotheses with 222 subjects (a return rate of 22.2 percent).

Table 1. User Perceptions Questionnaire Items

		Modified	<i>Resulting Participative Perception</i>
<b>Tangibles</b> (Parasuraman, et al., 1991)	Material associated with the service (such as pamphlets or statements) will be visually appealing in excellent telephone company	Replaced by	The medium you use the most will increase visual attention using materials such as pamphlets or figures.
	The physical facilities at excellent telephone companies will be visually appealing	Replaced by	The medium you use the most makes you feel customer service is visually appealing.
	Excellent telephone companies will have modern-looking equipment	Replaced by	The medium you use the most makes you feel customer service has modern-looking equipment
	Employees of excellent telephone companies will be neat-appearing	Dropped	

<b>Responsive</b> (Parasuraman, et al., 1991)	Employees of excellent telephone companies will never be too busy to respond to customer requests	Replaced by	The medium you use the most makes you feel customer service is never too busy to respond to your requests.
	Employees of excellent telephone companies will always be willing to help customers	Replaced by	The medium you use the most makes you feel customer service is always ready to respond your request.
	Employees of excellent telephone companies will give prompt service to the customers	Replaced by	The medium you use the most makes you feel customer service provides prompt service
	Employees of excellent telephone companies will tell customers exactly when service will be performed	Dropped	
<b>Assurance</b> (Parasuraman, et al., 1991)	Customers of employees of excellent telephone companies will feel safe in their transactions	Replaced by	The medium you use the most makes you feel customer service make you feel safe with your transactions
	The behavior of employees of excellent telephone companies will instill confidence in customers	Replaced by	The medium you use the most makes you feel customer service gives you confidence about the transaction
	Employees of excellent telephone companies will have the knowledge to answer customer questions	Replaced by	The medium you use the most makes you feel customer service has a knowledge about your transaction
	Employees of excellent telephone companies will be consistently courteous with customers	Dropped	
<b>Reliability</b> (Parasuraman, et al., 1991)	When excellent telephone companies promise to do something by a certain time, they will do so	Integrated To	The medium you use the most makes you feel that customer service provides service just in time
	Excellent telephone companies will provide their services at the time they promise to do so		
	Excellent telephone companies will perform the service at the first time	Replaced by	The medium you use the most makes you feel that customer service will solve the problem right the first time
	When customer have a problem, excellent telephone companies will show a sincere interest in solving it	Replaced by	The medium you use the most makes you feel that customer service shows sincere interest in customer service
	Excellent telephone companies will insist on error-free records	Dropped	
<b>Empathy</b> (Parasuraman, et al., 1991)	Excellent telephone companies will give customers individual attention	Replaced by	The medium you use the most makes you feel that customer service shows an personal interest
	Excellent telephone companies will have employees who give customers personal attention	Replaced by	The medium you use the most makes you feel customer service tries to pay personal attention
	Excellent telephone companies will have operating hours convenient to all their customers.	Integrated to	The medium you use the most makes you feel that customer service is polite to you
	Excellent telephone companies will have The customers' best interests at heart.		
	Excellent telephone companies will understand the specific needs of their customers.		
<b>Total</b>	<b>22</b>		<b>15</b>
<b>Satisfaction</b> (Lee and Ulgado, 1997)  (Bhattacharjee, 2001)	The food and service offered by McDonald's are very good value for the money	Integrated to	Please specify the degree of overall satisfaction with the media you use most often
	The food and service offered by McDonald's are a very good bargain, considering the prices		
	How do you feel about overall experience of OBN use		
<b>Total</b>	<b>2</b>		<b>1</b>

Table 2. Factors Analysis of Independent Variables

	<i>Tangibles</i>	<i>Responsive</i>	<i>Assurance</i>	<i>Reliability</i>	<i>Empathy</i>
The medium you use the most will increase visual attention using materials such as pamphlets or figures	.854				
The medium you use the most makes you feel customer service is visually appealing	.838				
The medium you use the most makes you feel customer service has modern-looking equipment	.780				
The medium you use the most makes you feel customer service is never too busy to respond to your requests		.906			
The medium you use the most makes you feel customer service is always ready to respond your request		.813			
The medium you use the most makes you feel customer service provides prompt service		.774			
The medium you use the most makes you feel customer service makes you feel safe with your transactions			.839		
The medium you use the most makes you feel customer service gives you confidence about the transaction			.784		
The medium you use the most makes you feel customer service has knowledge about your transactions.			.598	.420	
The medium you use the most makes you feel that customer service provides service just in time.				.834	
The medium you use the most makes you feel that customer service will solve the problem the first time.				.774	
The medium you use the most makes you feel that customer service shows sincere interest in customer service.			.447	.594	
The medium you use the most makes you feel that customer service is polite to you.			.454	.476	.420
The medium you use the most makes you feel that customer service shows a personal interest					.847
The medium you use the most makes you feel customer service tries to pay personal attention.					.771
<b>Eigenvalue</b>	2.506	2.476	2.462	2.404	1.906
<b>Percentage of Variance Explained</b>	16.708	16.504	16.416	16.028	12.705

To investigate the hypotheses, we performed a factor analysis to validate end-user service perceptions of the customer service center, even though validity and reliability of ender users' perception is widely recognized in the IT field (Kettinger and Lee, 1994; Lee and Ulgado, 1997; Jiang, et al., 2000). Factor analysis is commonly used to reduce a set of variables to underlying factors in generally linear combinations of original variables, creating a clear structure, and suggesting clear discriminant validity for these constructs. Table 2 shows the factor analysis results. As can be seen Table 2, the five factors account for more than 78.36 percent of the observed variance.

The loading of each of the 15 measures on its respective factor is well over 0.40, and the

Eigenvalues of each construct are above 1. The results of factor analysis shows the importance of the constructs, in that they have relatively high correlations between measures of the same construct using different methods and low correlations between measures of construct that are expected to differ (Cronbach, 1971; Campbell and Fiske, 1959). Based on this result, we validated the MEDIQUAL constructs.

To further investigate relationships between MEDIQUAL constructs (belief) and satisfaction (affect), we utilized multiple regression analyses. Since the primary objective of this step is to test the comparative influence of several sets of predictors for customer satisfaction, we used them as independent variables in the regression model.

The equation representing the model developed in this study can be expressed as:

$$SP = \beta_0 + \beta_1 TA + \beta_2 RP + \beta_3 AS + \beta_4 RL + \beta_5 EM, \text{ Where:}$$

- SP = Overall Satisfaction
- TA = Tangibles
- RP = Responsiveness
- AS = Assurance
- RL = Reliability
- EM = Empathy

Table 3 summarizes the results of multiple regression analysis to end-users' overall satisfaction. Based on these results, Hypotheses are supported except for empathy.

Table 3. Results of Regression

Hypotheses	Condition ( $\beta$ and p)
Hypothesis a (Tangibles)	$\beta_1=0.186$ and $0.099$
Hypothesis b (Responsiveness)	$\beta_2=0.216$ and $0.056$
Hypothesis c (Assurance)	$\beta_3=0.420$ and $0.000$
Hypothesis d (Reliability)	$\beta_4=0.337$ and $0.003$
Hypothesis e (Empathy)	$\beta_5=0.108$ and $0.337$
Model Summary	$R=0.366, R^2= 0.112$

## FINDINGS

The hypotheses test whether the MEDIQUAL constructs affect end-users' satisfaction or not. Table 3 summarizes the results from the multiple regression. The R2 scores indicate that overall the five variables constitute good predictors of end-users' satisfaction (Multiple  $R=0.366, R^2= 0.134$ ). The assurance reliability constructs appear to be the significant predictor at the level  $p < 0.005$  ( $3= 0.420, p = 0.000, 4= 0.337, p = 0.003$ ), and responsiveness and tangibles constructs are acceptable predictors at the level of .10 ( $2= 0.216, p = 0.056, 1= 0.186, p = 0.099$ ). Although the empathy construct is not

statically significant, the predictor value is positive ( $5= 0.108, p = 0.337$ ). Even though empathy is not significant, our empirical test supported the original theory of SERVQUAL. Thus, we explored that MEDIQUAL constructs are strongly related to end-users' satisfaction.

## CONCLUSION

As we hypothesized, end users' satisfaction is influenced by MEDIQUAL constructs, that is, different media users feel satisfaction from reliability, empathy, assurance, tangibles, and responsiveness

The results of this study have some important theoretical implications. First, we applied the concept of media choice to the domain of the customer service center. Second, our research incorporated SERVQUAL theory into a media selection mechanism.

The practical implication of our study is that by understanding the media choice mechanism, we may be able to provide a better help desk (customer service center), which is one of the critical success factors in the volatile business environment.

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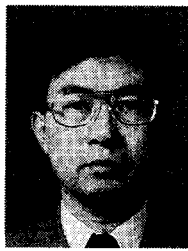
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