Assessing a Spanish Translation of the End-User Computing Satisfaction Instrument Targeting Mexican Internet Users

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The End-User Computing Satisfaction (EUCS) instrument is intended to assess the relative level of satisfaction that an end-user has with some specific computing technology. This study validates a Spanish translation of the EUCS administered to Mexican Internet users. The study finds that the Spanish translation of the EUCS is a valid and reliable measure of end-user satisfaction with the Internet among Spanish speaking populations.
Introduction


Computer usage in Mexico has also been an investigative area of interest. Examples include the Torkzadeh and Gemoets (1998-1999) investigation of the impacts of the application of information technology on end-users in Mexico, the Lunce and Smith (2000) examination of information technology in maquiladora facilities located in northern Mexico, and the Heilman and Brusa. (2005, 2006) study of computing satisfaction in Mexico. The work of Heilman and Brusa (2005, 2006) and Heilman et al. (2004) has focused especially on trying to extend the use of Spanish translations of standard MIS survey instruments into Mexico.

The purpose of this study is to validate a Spanish translation of the End User Computing Satisfaction (EUCS) instrument used specifically in the context of Internet satisfaction in Mexico.

The Survey Instrument

The End-User Computing Satisfaction (EUCS) instrument merges “ease of use and product items to measure satisfaction of users who directly interact with the computer for a specific application” (Doll & Torkzadeh 1988). The instrument is intended to provide a “potentially measurable surrogate for utility in decision making” and “a surrogate measure for system success” across a “variety of applications.” A large body of prior research has established the instrument’s validity and reliability in a variety of settings and technological environments (Collins et al. 1993; Doll et al. 1994; Glorfeld & Cronan 1993; Harrison & Rainer 1996; Hendrickson et al. 1994; Kim & McHaney 2000). From a cross-cultural perspective, Chinese (Igbaria 1992; Igbaria & Zviran 1996) and Hebrew (Igbaria & Zviran 1996) translations of the EUCS instrument have been tested, as well as a Spanish version (Heilman & Brusa 2006; Heilman et al. 2004).
The instrument consists of a single second-order factor (End-User Computing Satisfaction) composed of 5 subscales (Content, Accuracy, Format, Ease of Use, Timeliness) measured by 12 questions. The Spanish translation of the survey questions used in this study is the same used by Heilman et al. (2004). The items were presented in a section of a questionnaire in which respondents were asked about their satisfaction with the Internet. Responses to the questions were measured by a five point Likert-type scale where 1 = “almost never,” 2 = “some of the time,” 3 = “about half the time,” 4 = “most of the time,” and 5 = “almost always.” In the Spanish version of the survey, 1 = “casi nunca,” 2 = “algunas veces,” 3 = “la mitad de las veces,” 4 = “muchas veces,” and 5 = “casi siempre.” Figure 1 shows the structural model of the EUCS measure used in this study.

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Figure 1: Structural Model of the End-User Computing Satisfaction Measure

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The Sample

Copies of the translated survey were distributed among workers in Mexico by students who attend college classes in the U.S. but live and work in Mexico. A total of 243 usable surveys were returned. 131 respondents (53.9%) were male and 112 (46.1%) were female. In terms of the organizations with which the respondents were affiliated, 132 (54.3%) worked in private companies, 16 (6.6%) worked in public companies, 2 (0.8%) worked in local government, 88 (36.2%) worked in universities, 2 (0.8%) worked in high schools and 3 (1.3%) did not specify. 147 respondents (60.5%) were between the ages of 20 and 30, 75 (30.9%) were between 31 and 40, 19 (7.8%) were between 41 and 50, and 2 (0.8%) were over the age of 50.

Lisrel 8 was used to test the fit of the model (see Figure 1) to the collected data. For purposes of scaling and statistical identification, the factor loading of one indicator in each subscale is set to 1 and the variance of the second-order End-User Computing Satisfaction factor is set to 1 (Byrne 1998 p.172). Figure 2 presents the results of this analysis. Factor loadings are shown with t-values in parentheses. The next section describes the validation process.
Construct Validation

Validity refers to the extent to which an instrument measures what it is intended to measure. Construct validation establishes that a measure appropriately operationalizes its underlying construct. In this case, confirmatory factor analysis was used to determine if the data collected using the Spanish version of the EUCS instrument supports the hypothesized factor structure of the End-User Computing Satisfaction construct. Doll and Torkzadeh (1988) originally proposed that the EUCS instrument represented a five factor structure (Content, Accuracy, Format, Ease of Use, Timeliness). However, subsequent research indicates these are actually five subscales under a single second-order factor (End User Computing Satisfaction) as shown in Figure 1. (Chin & Newstead 1995, Doll et al. 1994). The second-order model is validated here.
Reliability

Reliability refers to the degree to which scores are free from measurement errors. It is a necessary but not sufficient condition for instrument validity. One method commonly used to assess internal-consistency reliability is coefficient alpha, which is based on the notion of splitting a measure into as many parts as the number of items. Alpha, then, is the average of all possible split-half reliability coefficients for the measure (Pedhazur & Schmelkin 1991). Coefficient alphas greater than .70 indicate reliable constructs (Fornell & Larker 1981). The alphas for the EUCS subscales are: Content = .89, Accuracy = .88, Format = .82, Timeliness = .85, and Ease of Use = .83. These values indicate that all the subfactors are reliable. In addition the coefficient alpha for the overall instrument is .95, which is well above the recommended threshold and compares favorably with the .92 that Doll and Torkzadeh (1988) reported in their initial study.

Table 1: Analysis of Convergent Validity

<table>
<thead>
<tr>
<th>Construct</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>0.875</td>
<td>1.000</td>
<td>0.956</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>(17.95)</td>
<td>*</td>
<td>(32.23)</td>
<td>(29.22)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>1.000</td>
<td>1.000</td>
<td>*</td>
<td>(30.70)</td>
</tr>
<tr>
<td>Format</td>
<td>1.000</td>
<td>0.996</td>
<td>*</td>
<td>(26.74)</td>
</tr>
<tr>
<td>Timeliness</td>
<td>0.919</td>
<td>1.000</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(35.11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ease of Use</td>
<td>0.996</td>
<td>1.000</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(31.88)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Convergent Validity
Convergent validity refers to the convergence among different methods designed to measure the same construct (Pehazur & Schmelkin 1991). One method for evaluating convergent validity views each item in a construct as a different approach to measuring the construct. If t-tests for the loadings of all the indicators measuring a single construct are statistically significant, all indicators are effectively measuring the same construct and the construct exhibits convergent validity (Anderson & Gerbing 1988). Table 1 shows the indicator loadings for each construct along with their corresponding t-values. Indicant loadings that were fixed during model analysis have a loading of 1. T-values greater than 3.29 are significant at the .001 level. The loadings for all freed indicants are significant at the .001 level, providing evidence of the convergent validity of the constructs.

**Discriminant Validity**

Discriminant validity implies that one construct can be empirically differentiated from other constructs that may be similar (Kerlinger 1986). Discriminability may be demonstrated with a chi-square difference test among all possible pairs of constructs, in this case the five subfactors - Content, Accuracy, Format, Timeliness, Ease of Use - that make up End-User Computing Satisfaction (Ahire et al.1996).

Two confirmatory factor analyses (CFAs) are run for each selected pair of subscales. In the first CFA, correlation is allowed between the subfactors. In the second CFA the correlation between the pair is fixed to one, creating a difference of 1 degree of freedom between the models. If the chi-squares from the two tests are statistically significantly different, the constructs exhibit discriminant validity.

The chi-square critical values for 1 degree of freedom are 3.84 at the .05 significance level, 6.63 at the .01 significance level, and 7.88 at the .005 significance level. Table 2 presents the results of the difference tests, showing the differences in chi-squared values between pairs and their corresponding p-values. All differences were significant at the .01 level, demonstrating that the subscales exhibit discriminant validity.

<table>
<thead>
<tr>
<th>Table 2: Discriminant Validity Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
</tr>
<tr>
<td>Content</td>
</tr>
<tr>
<td>Accuracy</td>
</tr>
<tr>
<td>Format</td>
</tr>
<tr>
<td>Timeliness</td>
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</tbody>
</table>
Structural Analysis

Table 36 presents the goodness of fit indices for the EUCS structural model along with guidelines for evaluating the fit values (Browne & Cudek 1993; Hair et al. 1992; Pedhazur & Schmelkin 1991; Sharma 1996). Though always reported, the chi-square test is not considered to be practically meaningful and is typically discounted in favor of other methods for evaluating fit of the model to the data (Bearden et al. 1982). All the indices except chi-square indicate that the model provides a good fit for the data.

<table>
<thead>
<tr>
<th>Goodness of Fit Indicator</th>
<th>Value</th>
<th>Recommended Value</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>chi-square (49 d.f.)</td>
<td>69.35 (p &lt; .01)</td>
<td>p &gt; .05</td>
<td>poor</td>
</tr>
<tr>
<td>normed chi-square (chi-square/d.f.)</td>
<td>1.42</td>
<td>&lt; 5</td>
<td>good</td>
</tr>
<tr>
<td>GFI</td>
<td>.99</td>
<td>&gt; .90</td>
<td>good</td>
</tr>
<tr>
<td>AGFI</td>
<td>.98</td>
<td>&gt; .80</td>
<td>good</td>
</tr>
<tr>
<td>NFI</td>
<td>.98</td>
<td>&gt; .90</td>
<td>good</td>
</tr>
<tr>
<td>NNFI</td>
<td>.99</td>
<td>&gt; .90</td>
<td>good</td>
</tr>
<tr>
<td>CFI</td>
<td>.99</td>
<td>&gt; .90</td>
<td>good</td>
</tr>
<tr>
<td>RMR</td>
<td>.105</td>
<td>&lt; .20</td>
<td>good</td>
</tr>
</tbody>
</table>

Since the model fit is acceptable, the loadings of the subscales - Content, Accuracy, Format, Timeliness, Ease of Use - on the second-order factor End-User Computing Satisfaction can be evaluated. Table 4 presents the structural loadings and their corresponding t-values. All loadings are significant at the .001 level.

Table 4: Analysis of Structural Loadings on EUCS

<table>
<thead>
<tr>
<th></th>
<th>Content</th>
<th>Accuracy</th>
<th>Format</th>
<th>Timeliness</th>
<th>Ease of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUCS</td>
<td>.920</td>
<td>.886</td>
<td>.855</td>
<td>.938</td>
<td>.814</td>
</tr>
<tr>
<td></td>
<td>(37.27)</td>
<td>(36.95)</td>
<td>(36.62)</td>
<td>(53.22)</td>
<td>(29.05)</td>
</tr>
</tbody>
</table>
Conclusion

The purpose of this study was to assess the reliability and validity of a Spanish version of the End-User Computing Satisfaction (EUCS) instrument used to evaluate perceptions of satisfaction among Mexican Internet users. EUCS, a commonly used surrogate for measuring system success, has proven reliable and valid in a number of previous studies when applied to both information systems in general and in specialized environments.

Before considering conclusions from a survey study such as this, it is important to ensure that the survey instrument retains its psychometric properties. The testing of this study’s EUCS Spanish translation, specifically targeting Internet satisfaction and using data collected from a sample of Internet users living in Mexico, indicates that the instrument does retain its psychometric properties. The results provide evidence supporting EUCS as a second-order construct with five subscales - Content, Accuracy, Format, timeliness, and Ease of Use.
References


Feasibility Assessment System on National Research and Development (R&D) Programs in Korea

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In Korea, GERD (Gross expenditure in R&D) has increased from 14 billion US$ in 1996 to 31 billion US$ in 2008. GERD as a portion of GDP increased from 2.42% in 1996 to 3.37% in 2008 (OECD 2009). Also, the public R&D budget exceeded 10 billion US$ in 2008 and it has been more than doubled during the past decade. Rapid growth of R&D portion in a government budget inevitably accompanied with high uncertainties of plans for national R&D programs due to the complexity of Science and Technology (S&T). In order to reduce risks associated with public budget allocations, government officers try to evaluate feasibility of programs before launching them. Especially for newly proposed R&D programs which need a government budget of over 50 million US$, feasibility assessment must be done before launching the programs on the basis of the National Financial Law. Feasibility assessment is conducted with deep analysis in three viewpoints which are technology, policy, and economy and impact. The final conclusion on the feasibility for launching new national R&D program is derived from the multiple analyses of technology, policy and economy and impact using AHP (Analytic Hierarchy Process) tool. This assessment system for feasibility analysis of national R&D programs in Korea can be a good reference to other countries in emerging economies, including Latin America, and other developing countries in the Western Hemisphere.
The goal of this study was to examine the role of socialization on the attitudes and perceptions employees hold toward computer technology, and their subsequent work related attitudes of job satisfaction and organizational commitment. The examination of employee attitudes and perceptions of technology needs to be accounted for because they contribute to a person’s view of reality. Analysis of 586 full-time working adults indicated positive relationships between socialization and attitudes employees hold toward technology. Additionally, it was found through Structural Equation Modeling the value of socialization in the development of the attitudes employees hold toward technology and their work related attitudes of job satisfaction and organizational commitment.
Workplace socialization is a communication behavior that is defined as the process by which employees acquire the requisite attitudes, behaviors, and knowledge necessary to participate as an organizational member (Louis, 1980). Jablin (1987, 2001) pointed out that an important feature of socialization is behavioral and attitudinal modification, which involves the employee learning the organization’s norms for behaviors, values, and attitudes, and then aligning these with their own behaviors, values, and attitudes. As a result of the increased complexity and ambiguity found in today’s technologically equipped workplace is important to also consider the work related attitudes such as job satisfaction and organizational commitment that accompany the attitudes employees develop toward technology during the socialization process. Since computer technology has become the newest “member” to join the workplace; the way in which the organization socializes its members to this newcomer (technology) should be of interest to communication scholars and business professionals alike.

The addition of computer technologies to the workplace have changed the way in which organizations interact and coordinate activities with customers, suppliers, and its members. These changes involve the substitution of everyday business activities involving paper, telephone, and fax-based communication with electronic information exchange through the use of computer technology (Straub & Watson, 2001). With the presence of computer technology in nearly every aspect of daily life, researchers have begun to focus on the possible consequences of such use (see Murrell & Sprinkle, 1993; Smith & Caputi, 2001). For example, specific to the workplace some scholars discuss the presence of technology from a panopticon metaphor to explain the pervasive and often unobtrusive character of organizational surveillance in an employee’s working life (e.g., D’Urso, 2006). From this perspective, technology is seen as a form of power and control that subjugates workers through the use of technology (Brannan, 2005). Additional research indicates that technological advances have tethered employees to their work, thus blurring work-life
boundaries (Edley, 2001). For instance, in today’s workplace companies expect their employees to work more than 40 hours per week and are prepared to equip them with an array of technology and directly or indirectly link rewards, promotions, and other incentives for work performance that can only be delivered by the extension of the typical workday (Higgins, Duxbury, & Irving, 1992).

In contrast, other researchers highlight the positive characteristics associated with technology such as those identifying computers as cooperative partners (Clarke & Smyth, 1993) and decision makers that provide users with the best available solutions to problems (Moon, 2003). Similarly, Bocionek (1995) acknowledged the value of computer technology based on its interactivity; meaning, that computers observe users actions, develop an understanding of the user's needs, learn the user's behaviors, and then provide the user with advice. Computers and other communication technologies have also been described as the conduit that has allowed organizations to compete on a global scale (see Marcuse, 2007).

One area of interest to the current study involves the relationship between the attitudes employees hold toward computer technology and their work-related attitudes. For example, Rafaeli (1986) examined the impact of positive versus negative attitudes toward computers on general employee attitudes within the manufacturing industry. Rafaeli found that job involvement significantly moderated the relationship between computer use and computer attitudes. Rafaeli’s research also indicated that employees who were involved with their jobs and committed to their organization reported lower levels of computer anxiety than did their counterparts. However, the relationship between the attitudes employees hold toward computer technology their work-related attitudes of job satisfaction and organizational commitment have yet to be fully examined.

In addition to the value of examining the relationship between computer related attitudes and work related attitudes it is also important to examine organizational factors such as socialization that may contribute to these attitudes. However, little research to date has focused on the
organization’s responsibility in the development of such attitudes. Therefore, an examination of the way in which employees are socialized to computer technology (the new member of the workforce) is relevant here because the attitudes employees hold as a result of this socialization contribute to their view of technology in the workplace. Taken as a whole, the development of workplace related attitudes are primarily the result of environmental factors (Holender & Duscherer, 2004). Thirsty, it could be extrapolated that factors associated with the workplace, such as the communication behaviors associated with socialization, contribute to the attitudes and perception employees hold toward computer technology and ultimately their job related attitudes. As a result, the goal of this study was to extend prior research by examining the role of socialization on the attitudes employees develop toward technology and the relationship between these attitudes toward technology and their job satisfaction and organizational commitment. The following section highlights the possible role of socialization (organizational, work-group, and task) in the development of computer related attitudes.

Socialization

Broadly stated, socialization involves a shared understanding between the organization and its members regarding acceptable job behaviors (e.g., the appropriate use of computer technology) propagated through dialogue. Specifically, these behaviors are promoted informally by the activities of coworkers and formally through interactions with supervisors and by organizational policies and procedures disseminated to employees during their socialization (Van Maanen & Schein, 1979). Organizational socialization has also been considered as a component of the assimilation process which is defined as the way of teaching the behavioral norms and cognitive processes needed for individuals to become integrated into the organization (Jablin, 2001). Rousseau (1990) suggests that the behavioral norms encouraging employees to follow the values of the organization are driven by an organization’s espoused values (e.g., trust, autonomy, technological innovation, and
the use of technology) communicated by supervisors, coworkers, and the organization itself. These values, according to Rousseau, are “the preferred states that are often manifested in observable behaviors” (p. 159). Important here is the component of socialization that involves the values, attitudes, and behaviors associated with the appropriate use of computer technology in the workplace.

With regard to organizational socialization and technology use, organizational members are both informally and formally introduced to the appropriate use and misuse of computer technology in the workplace. Specifically, it is reasoned here that organizational and work-group socialization regarding computer technology influences the employee's attitudes toward technology. In addition to learning the norms associated with the appropriate use of technology in the workplace, the socialization of employees to technology also involves the user mastering the task of using technology (Markus, 1994) and the symbolic nuances associated with specific forms of technology (Sitkin, Sutcliffe, & Barrios-Choplin, 1992). In following with that thought, socialization was considered here as a multidimensional process including organizational, work-group, and task socialization. According to Haueter, Hoff-Macan, and Winter (2003), task socialization involves learning about the job and understanding the tasks for which one had been hired, organizational socialization involves the employee learning the values, goals, rules, politics, customs, and language of the organization, and work-group socialization involves learning particulars about the work group and the behaviors associated with the group’s rules, goals, and values.

To ensure that employees think and behave in ways espoused by the organization, rules and norms (both formal and informal) are propagated through socialization. In turn, it is reasoned here that the attitudes and perceptions employees hold toward computer technology are developed through socialization which serves to shape that person’s view of reality in the workplace. Since the attitudes and perceptions employees hold are significant to the successful use of computer
technology and the overall success of the organization, employee attitudes and perceptions will be considered in greater detail below.

**Employee Attitudes/Perceptions of Computer Technology**

Some of the seminal research carried out in the field of attitudes’ was conducted by Ajzen and Fishbein (1980) who described attitudes as a pre-disposition to respond either favorably or unfavorably to objects in the world. Implicit in this viewpoint is the notion of evaluation, where individuals rate their feelings toward an object or procedure. In effect, this evaluation process is the foundations for the current study, which is based on individuals rating their feelings toward computer technology in the workplace. According to Brown and Duguid (1991), employees learn the appropriate uses of and develop perceptions of computer technology as a result of their interactions with supervisors and coworkers. These interactions provide guidance and influence that is thought to result in a unique shared set of norms among organizational members (Brown & Duguid, 1998). To emphasize this position, Brown and Duguid (1998) pointed out that one work-group may develop a set of norms that encourage learning and exploration of new technologies, whereas another group may evolve specific norms to avoid using computer technology, or possibly even to sabotage technology. Similarly, George, Iacono, Kling, and Leaming (1995) studied two work groups that were each expected to use computer technology. Their findings indicated that each group developed contrasting views and attitudes as to the use of the technology. Their findings suggest that the same technology, when introduced into different social settings, will be viewed in very different ways, resulting in distinct patterns of use shaped by job-specific conditions, employee attitudes and perceptions, and group norms (George et al., 1995).

Although, the forms of socialization (organizational, work-group, and task) discussed in the current study are of value; the way in which these attitudes and perceptions serve to influence work related attitudes is of equal importance. The impact of work-related attitudes has been a widely
studied phenomenon. Previous research has consistently demonstrated an association between work-related attitudes and individual performance and overall organizational productivity. Two specific groups of job related-attitudes; job satisfaction and organizational commitment, have been examined for their relationship to the attitudes employees hold about work and the organization (Miller & Mange, 1986). In order to buttress this relationship between the attitudes employees hold toward technology in the workplace and work related attitudes of job satisfaction and organizational commitment the current study was forwarded. Thinstonly, following sections will considered the work related attitudes of job satisfaction and organizational commitment in greater detail.

*Job satisfaction*

Specifically, job satisfaction denotes a group of attitudes that include individuals’ feelings (positive or negative) toward their jobs (Miller & Mange). These attitudes include cognitive, affective, and behavior evaluations and reactions toward one’s job (Miller & Mange). Various aspects of communication within the organization have also been found to influence employee job satisfaction such as: quantity and quality of information, use of technology, superior/subordinate communication, and the climate and culture of the organization (Bateman & Strasser, 1984). Employee satisfaction has been found to influence job-related behaviors such as productivity, turnover, and absenteeism (Taber, 1991; Hatcher, 1999).

In today’s work life much of the communication is mediated through computer technology, leaving fewer FtF interactions and opportunities to clarify ambiguities and misunderstandings (Yaverbaum, 1998). Further, the reliance on computer technology has also reduced instrumental and emotional social support from managers and lessened opportunities for employees to socialize at work. Subsequently, Yaverbaum (1998) found that employees who are required to utilize computer technology on a regular basis to communicate with others experience decreased satisfaction, boredom, and isolation from a lack of interpersonal contact with others in the workplace.
Additionally, Wall and Kemp (1987) argued that technology may have a positive or negative affect on employee job satisfaction depending on the perceptions employees hold toward technology.

Despite the substantial amount of prior research focusing on technology in the workplace, researchers have yet to fully examine the relationship between the attitudes and perceptions users/employees hold toward computer technology and their job satisfaction and organizational commitment. For some employees, technological advances have allowed them a greater levels of autonomy in the workplace, and for others this increased level of autonomy has served as a means to isolate them (see Wilkes, Frolick, & Urwiler, 1994). For example, technology that allows employees the autonomy of working in locations other than that of the central office or production facilities has also created conditions that isolate employees by limiting their contact with co-workers to only those mediated through technology (Martino & Wirth, 1990).

While job satisfaction deals with a person’s attitudes toward the job, organizational commitment addresses the person’s attitudes toward the organization. Employees who are strongly committed to the organization accept the goals and values of the organization and have a strong desire to maintain membership in that organization (Porter & Steers, 1973). In that job satisfaction is different from, yet related to organizational commitment; it could be extrapolated that employees’ attitudes and perceptions of computer technology are likely to influence both job satisfaction and organizational commitment. Specifically, it is reasonable to expect that employees who express favorable attitudes and perceptions of computer technology will articulate greater levels of job satisfaction and organizational commitment than employees who develop negative attitudes and perceptions of computer technology. As a result of the possible association between organizational commitment and the attitudes employees hold toward computer technology, organizational commitment was included in the current study and will be discussed in greater detail below.
Organizational Commitment. Organizational commitment indicates various aspects of how people feel about their work environment and has been conceptualized as the strength of emotional attachment to the organization and the acceptance of the organization's goals and values (Mowday, Porter, & Steers, 1982). Allen and Meyer (1990) added that organizational commitment is influenced by the employee’s attitudes, affective beliefs, and job characteristics, which in turn influences employee turnover. In order to be committed to an organization, an employee must perceive a level of compatibility with the organization to the extent that a congruency of values, attitudes, and behaviors must exists between the employee and the organization (Vandenberg & Nelson, 1999). Hence, the reduction of employee-organization friction as a result of shared attitudes and perceptions of computer technology affects how employees view the organization (Semler, 1997). That is, the agreement between organizational and personal factors, such as those regarding computer technology and its relevance to mutual goal attainment are important to the way in which employees perceive and are committed to the organization (Hacker & Steiner, 2002).

Research indicates that employees who sense that their organization cares about them and is willing and able to provide them with the tools (e.g., computer training, equipment, and service support) necessary to perform their jobs, are expected in turn to offer increased levels of commitment to the organization (Hutchison, Sowa, Eisenberger, & Huntington, 1986). However, when incongruencies in the values, attitudes, and behaviors exist between the employee and the organization, employees’ feelings of isolation and alienation increase (Madlock & Chory, 2008) while their satisfaction and commitment decrease (Fox, 1995; Warr, Cook, & Wall, 1979). Despite the increasing recognition of the powerful influence that organizational commitment may exert on a wide range of organizational outcomes and processes, knowledge of the influence that technology in the workplace has on commitment is fragmented at best (Ellemers, Kortekaas, & Ouwerkerk, 1999).
Especially relevant to the discussion here are two particular sets of determinants associated with job satisfaction and organizational commitment, which are located in the realm of attitudinal development toward computer technology and employee socialization. Insight into such determinants could not only be of considerable practical value to organizations, but also of theoretical value. For example, this increase in knowledge could serve to aid in our understanding of how attitudes and perceptions toward computer technology are influenced by workplace socialization and how these attitudes toward technology influence the work related attitudes of job satisfaction and organizational commitment. Thistly, the following hypotheses and research question were advanced.

**H1:** There will be a positive relationship between socialization (organizational, work-group, and task) and the attitudes employees hold toward computer technology.

**R1:** Which form of socialization (organizational, work-group, and task) will be the greatest predictor of the attitudes employees hold toward computer technology?

**H2:** There will be a positive relationship between the attitudes employees hold toward computer technology and their job satisfaction and organizational commitment.

**H3** The data will fit the following model (see Fig. 1) where socialization (organizational, work-group, and task) to technology in the workplace will influence the attitudes employees hold toward technology and their subsequent job satisfaction and organizational commitment.

----------Place Figure 1 Here----------

**Methodology**

**Participants**

The study contained the responses of 586 full time working adults from the Mid-Atlantic and Mid-Western regions of the United States (48.6% male, n = 285) and (51.4% female, n = 301),
whose overall tenure at their current job ranged from 1 to 39 years ($M = 9.95$, $SD = 7.67$).
Participants ranged in age from 23 to 61 ($M = 40.43$, $SD = 10.44$) and reported working for a variety of organizations including, education (18.8%, $n = 110$), government (8.4%, $n = 49$), service (23.4%, $n = 137$), high tech (3.6%, $n = 21$), manufacturing (7.3%, $n = 43$), civil service (2.9%, $n = 17$), healthcare (15.4%, $n = 90$), customer service (7.2%, $n = 42$), and other (13.1%, $n = 77$). Participants reported their position as top management (12.5%, $n = 73$), mid management (22.4%, $n = 131$), lower management (18.1%, $n = 106$), non-management (33.6%, $n = 197$), or other (13.5%, $n = 79$).
The percentage of their day that participants reported using computers as a part of their job functions ranged from 20% to 100% ($M = 71.60$, $SD = 20.29$). Participants also reported their computer experience ranging from 1 to 38 years ($M = 14.48$, $SD = 6.14$).

**Procedures**

A network sample was utilized for the current study consisting of employees recruited by the primary author and students enrolled in communication courses at a large Mid-Atlantic university and at a large Mid-Western university. The participants were full-time working adults who are required to use computer technology as a function of their jobs. To ensure that the participants were working adults the following procedure was utilized. The participants (working adults) were given an email address located on the cover letter in which they were asked to report the name of their organization in the subject line of the email followed by their name and telephone number in the body of the email. Participants were then instructed to return the completed questionnaire in the self addressed stamped envelope provided by the researcher in which the return name and address were to match the company name indicated in the subject line of their email. Also in the lower right hand corner of the envelope they were asked to write their name as it appeared in the body of the email. Only envelopes containing a completed questionnaire with verifiable information were used in the
study. Periodically (i.e., approximately every 30 surveys), the author called and verified that the participant who completed the questionnaire was the persons they claimed to be.

Measures

*Organizational Socialization* was measured using a modified version of the 35-item Newcomer Socialization Questionnaire (Haueter et al., 2003). The measure was designed to assess three forms of socialization (12-item organizational, 12-item work-group, and 11-item task socialization). The organizational socialization measure consists of items developed to measure newcomers’ organizational knowledge and organizational role-behavior knowledge. For the current study, the items were modified to reflect a focus on computer technology. For example, “I understand this organization’s objectives and goals” was modified to read, “I understand this organization’s objectives and goals regarding the use of computer technology.” The modified organizational socialization scale was measured on a 5-point Likert type scale ranging from (1 = Strongly Disagree to 5 = Strongly Agree) consistent with the original measure.

The work-group socialization measure consists of items developed to measure work-group knowledge and work-group role-behavior knowledge. For the current study, the items were modified to reflect a focus on computer technology. For example, “I know my work-group’s objectives” was modified to read, “I know how computer technology contributes to my work-group’s objectives.” The modified work-group socialization scale was measured on a 5-point Likert type scale ranging from (1 = Strongly Disagree to 5 = Strongly Agree) consistent with the original measure.

Lastly, the task socialization measure consists of items developed to measure job related knowledge and job role-behavior knowledge. For the current study, the items were modified to reflect a focus on computer technology. For example, “I understand how to perform the tasks that make up my job” was modified to read “I understand how to perform the computer related tasks
that make up my job” The modified task socialization scale was measured on a 5-point Likert type scale ranging from (1 = Strongly Disagree to 5 = Strongly Agree) consistent with the original measure.

According to Haueter et al. (2003), from the original 35-item version of the measure, organizational, work-group, and task socialization measures were found to have reliabilities ranging from .88 to .92. Additionally, Madlock and Horan (2009) reported similar reliabilities as did Haueter et al. (2003) with .91 for organizational socialization, .94 for work-group socialization, and .90 for task socialization. Cronbach’s alpha for the present study was .88 for organizational socialization (M = 4.30, SD = 0.72), .86 for work-group socialization (M = 4.57, SD = 0.59), and .89 (M = 4.60, SD = 4.61) for task socialization.

The Attitudes and Perceptions of Computer technology were measured here by the Computer Attitudes Scale (CAS; Nickell & Pinto, 1986). The CAS was designed to measure general positive and negative attitudes toward computers. Nickell and Pinto developed the measure to include 8 items indicating positive attitudes toward computers (e.g., Computer technology is bringing us into a bright new era) and 12 items indicating negative attitudes toward computers. Sample items include: “People are becoming slaves to computer technology” and “Computer technology intimidates me because it seems so complex.” The negatively worded items were reverse coded to indicate that overall higher scores reflected greater positive attitudes towards computer technology. Participants responded to the items on a 5-point Likert scale with responses ranging from (1 = Strongly Disagree to 5 = Strongly Agree). The CAS was found to have evidence of scale reliability. For example, Nickell and Pinto (1986) reported a reliability of .81 for the positive dimension and .86 for the negative dimension of the scale. Since then a number of researchers have used the measure and found the CAS to be a reliable measure of users’ attitudes about computer technology (see Harrison
Cronbach’s alpha for the present study was .96 (\(M = 3.89, SD = 0.85\)).

Job satisfaction was measured by the eight-item Abridged Job In General Scale (Russell, Spitzmüller, Lin, Stanton, Smith, & Ironson, 2004). A 7-point semantic differential response format was used in the current study instead of the original scale formatting (0 for “no,” 1 for “?” and 3 for “yes) for clarity. The scale is comprised of short statement or single word dyads regarding an employee’s overall perception of his/her job (e.g., good-bad; undesirable-desirable). The AJIG Scale was found to have evidence of scale reliability. For example, Russell et al. (2004) reported a scale reliability of .87, where Madlock (2008a) reported a scale reliability of .92 and .88 (Madlock, 2008b). Cronbach’s coefficient alpha for the current study was .81 (\(M = 5.55, SD = 1.16\)).

Organizational commitment was measured by the 15-item Organizational Commitment Questionnaire (Mowday, Steers, & Porter, 1979). The items were measured on a 5-point Likert scale response format ranging from (1 = Strongly Disagree to 5 = Strongly Agree) consistent with its original formatting. A sample item reads: “I am proud to tell others that I am part of the organization.” According to Barge and Schlueter (1988), internal reliability coefficients for the OCQ ranged from .82 to .92, and the scale measures employee attachment to the organization. More recently, Madlock and Horan (2009) reported a reliability of .92. Cronbach’s coefficient alpha for the current study was .81 (\(M = 4.10, SD = 0.67\)).

Results

Hypothesis one predicted significant positive relationships between the variables of socialization (organizational, work-group, and task) and the attitudes employees hold toward computer technology. Results of Pearson’s correlational analysis showed that the data were consistent with the hypothesis by indicating significant positive relationships between the variables. Specifically, moderate relationships were found between organizational (\(r = .36, p < .001\), work-
Research question one sought to answer the question; which form of socialization (organizational, work-group, and task) would be the greatest predictor of the attitudes employees hold toward computer technology? A regression model containing the criterion variable of the attitudes employees hold toward computer technology and the block of predictor variables (organizational, work-group, and task socialization). The criterion variable was regressed on a linear combination of the predictor variables indicating a significant model $F(3, 582) = 41.66, p < .001, (R^2 = .177)$. The standardized regression coefficients indicated that organizational socialization $\beta = .216, p < .001$ was the greatest predictor of the attitudes employees hold toward technology followed by work-group socialization $\beta = .209, p < .001$. Task socialization was not found to be a significant predictor $\beta = .077, p = .173$.

Hypothesis two predicted that there would be a positive relationship between the attitudes employees hold toward computer technology and their job satisfaction and organizational commitment. Results of Pearson’s correlational analysis showed that the data were consistent with the hypothesis by indicating significant positive relationships between the variables. Specifically, a strong relationship was found between job satisfaction ($r = .72, p < .001$) and the attitudes employees hold toward technology, whereas a moderate relationship was indicated between organizational commitment ($r = .45, p < .001$) and the attitudes employees hold toward technology.

Hypothesis three predicted that the data would fit the model containing the three forms of socialization, the attitudes employees hold toward technology, and job satisfaction and organizational commitment. A structural equation models was developed in Amos 7.0 to test the hypothesized model. Results indicated that the data were consistent with the hypothesis for the
The results indicated that the variables fit the model: $\chi^2 (1) = 3.154, p = .076; CFI = .996, NFI = .994, GFI = .996, AGFI = .979, RMSEA = .051$. Therefore, the hypothesis was supported (see Figure 1).

Discussion

The goal of this study was to advance our understanding of technology in the workplace to benefit both communication scholars and business professionals alike. As a result, the current investigation examined the role of socialization on the attitudes and perceptions employees hold toward computer technology, and their subsequent work related attitudes. It was reasoned here that the attitudes employees’ develop toward technology in the workplace mediate the relationship between socialization and the work related attitudes of job satisfaction and organizational commitment. One of the major assumptions here centered on the notion that the three forms of socialization (organizational, work-group, and task) served to shaped the attitudes employees hold toward technology. In order to test this, hypothesis one was advanced. The results supported the hypothesis indicating a positive relationship between the variables. In other words, it appears that the way in which employees are socialized to new technology in the workplace, influences their attitudes towards that technology. However, since behaviors are not enacted in a vacuum, it would be remiss to simply accept these correlational findings without further consideration of the specific influence each form of socialization has on the attitudes employees hold toward technology. In order to fully understand the impact of these correlational results additional analysis of the data were addressed in research question one.

The findings of research question one indicated that organizational and work-group socialization were significant predictors of the attitudes employees held toward technology, whereas task socialization was not. These results make several significant contributions to the current body
of knowledge in organizational communication. Specifically, it suggests that task mastery of computer technology alone has little impact on the attitudes employees hold toward technology; yet, organizations tend to spend a great deal of time and money training employees on task mastery while offering only a cursory overview of the underlying values, beliefs, and attitudes the organization and work-groups hold toward technology. However, as a result of the current findings, the socialization of employees to its newest member of the workforce (computer technology) should involve additional attention communicating the values, beliefs, and attitudes toward technology held by the organization and its work-groups. These findings suggest that traditional training programs that primarily focused on task mastery are out-of-date and need to be revised to include a greater focus on insuring value matching between the organization, work-groups, and the employee regarding technology in the workplace.

Findings of additional value associated with the current study involve the extension of socialization beyond that of newcomers to include the introduction of new technology in the workplace. It appears that any major change to the daily operation of an organization may require a period of socialization in which employees formulate attitudes and perceptions of the new policy or procedure as well as the acceptance of such a change. Thus, it could be reasoned from these findings that employee adaptation and acceptance of new technologies span beyond the task of using the technology, to include the way in which the technology dovetails into the current structure and values of the organization.

Hypothesis two examined the relationships between the attitudes employees hold toward technology and their job satisfaction and organizational commitment. The findings indicated that the attitudes employees hold toward technology were positively related to their job satisfaction and organizational commitment. In other words, as employees’ positive attitudes toward technology increased so did their job satisfaction and organizational commitment. The opposite condition is
also possible, resulting in low levels of job satisfaction and organizational commitment. In this instance, the value of technology is explained by the association between the attitudes employees hold toward technology and their subsequent work related attitudes of job satisfaction and organizational commitment. Thirsty, there appears to be value associated with technology in the workplace in the form of employee job satisfaction and organizational commitment, both of which have been found to result in monetary savings for organizations. As a result, this study provides a means to explain how to maximize the value-added component of technology through effective socialization. Based on the costs associated with recruiting, training, and socializing newcomers, organizations should take note of this finding.

Of greatest value here is found in hypothesis three because it highlights the value added component of new technology to organizations. For example, the model represents the influence of socialization (organizational, work-group, and task) on the attitudes employees hold toward technology and their subsequent work related attitudes of job satisfaction and organizational commitment. The findings indicate that it is not enough to socialize employees to new technological advances without value matching. Implicit in this viewpoint is the notion of evaluation, where individuals rate their feelings toward an object or procedure. According to Brown and Duguid (1991), employees learn the appropriate uses of and develop perceptions of computer technology as a result of their interactions with supervisors and coworkers. These interactions provide guidance and influence that is thought to reside in the unique shared set of norms among organizational members (Brown & Duguid, 1998). In other words, it is important to socialize employees to technology in ways that produces positive attitudes toward that technology in order to increase employees work related attitudes of job satisfaction and organizational commitment. With that information, organizations can realize the value added benefits of technology through increased job
satisfaction and organizational commitment of its employees by creating a communication environment that embraces technology.

*Limitations*

Although the findings of this study are of value they are not without limitations. Since people do not live in isolation there are many factors thought to contribute to the attitudes individuals hold toward technology. For example, employees who have high computer anxiety and low computer self efficacy may perceive technology differently than other employees regardless of their socialization experience. In other words, the current study is limited in its generalizability due to its limited focus. Future researchers may want to include additional factors such as those previously mentioned.

A similar limitation is centered on the lack of a qualitative component to this study. It would have been of value to understand, through the voices of the participants, specifically what it was about socialization that influenced the attitudes they held toward technology in the workplace. Although the current study had its limitations, it serves as a starting place to further investigate the influence of technology in today’s workplace.
References


Jablin, F. M. (2001). Organizational entry, assimilation, and disengagement/entry. In F. M.


### Table 1

*Correlations among Socialization, Employee Attitudes toward Technology, and Work Related Attitudes*

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Note: ** statistically significant at $p < .01$; * statistically significant at $p < .05$
Figure 1

Hypothesized Model Containing Forms of Socialization, Attitudes toward Technology, Job Satisfaction, and Organizational Commitment
Figure 2

Model Containing Forms of Socialization, Attitudes toward Technology, Job Satisfaction, and Organizational Commitment

\[ \chi^2 (10) = 3.154, p = .076; \text{CFI} = .996, \text{NFI} = .994, \text{GFI} = .996, \text{AGFI} = .979, \text{RMSEA} = .051 \]