



EMPIRICAL RESEARCH

A Cultural Comparison of Trust in eLearning Artifacts

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ABSTRACT

A significant body of literature focuses on learning mediated by technology (eLearning). We conceptually develop and empirically test a model of trust antecedents with online undergraduate students. Contributing to the student eLearning success literature, we posit that eLearning students require the support of technologies and trust in those technologies to feel satisfied with their learning and perceive that they will have a positive learning outcome. This study considers the effect of culture by comparing the trust and satisfaction of American and Latin American students in eLearning technologies. By conducting this study in two countries that differ in terms of national culture power distance and individualism, we learned that culture directly and significantly impacts trust in learning technologies. Culture also significantly changes the strength of the relation between trust and satisfaction. Future research directions and implications for researchers and higher education instructors are discussed.

Subject Areas: Culture, eLearning, IT artifacts, Technology Mediated Learning, Trust.

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INTRODUCTION

The popularity of the Internet and the rise of information and communication technologies (Ahmed, 2010) have fueled the rampant growth of online learning (eLearning) in organizations and academic institutions. The eLearning market was expected to grow from an estimated \$17.5 billion market to \$52 billion in just three years (between 2007 and 2010) (Kopf, 2009). The eLearning market has a reported growth rate of 35.6% (Sun, Tsai, Finger, Chen, & Yeh, 2008). While this explosive growth may have primarily been due to eLearning growth in developed countries, eLearning has also gained popularity and diffusion in emerging economies such as in Sub-Sahara Africa (e.g., the case of the African Virtual University) (Mbarika, 2003; Simmons et al., 2011).

While the term 'eLearning' has experienced different conceptualizations in the extant literature, in this study, we use the term to refer to learning mediated through Web-based technology systems that enable universities to offer media rich courses and degree programs to students (e.g., Carlson & Zmud, 1999). Some systems used in eLearning include, but are not limited to, course management systems such as Blackboard (Blackboard.net), live class software such as Elluminate (Elluminate.com), and a host of online library databases.

There have been empirical studies on how culture affects trust (e.g., Doney, Cannon, & Mullen, 1998; Fukuyama, 1995; Hofstede, 1980) and how culture affects learning satisfaction (Gunawardena, Nolla, Wilson, Lopez-Islas, Ramirez-Angel, & Megchun-Alpizar, 2001; Zhu, 2011). However, a gap exists in terms of how specific dimensions of culture affect the relation between trust and learning satisfaction. To our knowledge, studies of the effect of eLearning satisfaction integrating trust as an antecedent have been limited. Much of the trust research has been conducted using the Technology Acceptance Model (TAM); however, the current study addresses (1) the effect of trusting beliefs in a course management software and its impact on learning satisfaction and (2) how culture may affect the relation between the trust and learning satisfaction and culture's direct effect on trust. A user's trust in an IT artifact (hardware or software that enable tasks) is an important component in the relationship between technology and the user, and could impact task performance and satisfaction (Benbasat & Zmud, 2003; Hai-Jew, 2006). This research asks two questions: (1) What factors lead to trust in IT artifacts that may impact a student's perceived learning outcome (i.e., grade) and learning satisfaction, and (2) what role does culture play?

Studies have tested the application of the TAM in diverse cultural contexts in an effort to analyze national culture effects. The TAM is one of the most widely used behavioral models in the information systems (IS) field and has been used to predict behavioral outcomes and the adoption and use of an IS. However, to the best of our knowledge, it has not been used to measure satisfaction.

This research contributes to the extant eLearning literature in two ways: First, this research theoretically explains and empirically tests trust as an explanatory construct of student satisfaction and perceived learning outcome. Second, this research is unique in that it tests the proposed relationships in a Latin American context where salient cultural factors may influence the trust-satisfaction relationship.

This paper is organized as follows. We first review the literature on eLearning, trust, and culture and then develop research hypotheses based on a synthesis of the literature. Next, our measurement and structural model are tested and data are presented. We conclude with limitations and assumptions of the research.

LITERATURE REVIEW

History of Distance and eLearning

Distance learning emerged over one hundred years ago in the United States when mail-based materials were used to allow students to take courses in a location outside of the host college or university. Distance learning through the mailing of materials has been virtually replaced by online learning, also referred to as eLearning. eLearning has significantly enhanced the distance learning experience by applying a social technology strategy that includes various augmentations along with the blending of new technologies and pedagogical information (Hiltz & Turoff, 2005).

eLearning delivers instructional education to individuals and groups through Internet-based communication in industry and educational settings (Webster & Hackley, 1997). In education, eLearning enhances the experience through the use of online material (e.g., course syllabus), discussion boards, self-paced courses, and online courses that are presented online via audio and video conferencing (Webster & Hackley, 1997).

Trust

Mayer, Davis, and Schoorman (1995, p. 712) defined trust as “the willingness of a party to be vulnerable to the actions of another party irrespective of the ability to monitor or control that other party.” Trusting beliefs are a secure conviction that the other party has favorable attributes (such as benevolence, integrity, and competence), strong enough to create trusting intentions (Vance, Elie-Dit-Cosaque, & Straub, 2008). The perception of benevolence takes place when a trustor is perceived as willing to do well by others. Perceptions of integrity develop when a trustor is perceived to have an unwavering commitment to a set of principles. Competence or ability is perceived to be the group of skills, competencies, and/or expertise of a trustor. Contemporary research suggests that trust is more complex than originally thought, involving not only people, but also IT artifacts. Studies show that trustees pay attention to the attributes of a trustor’s ability (Moorman, Deshpande, & Zaltman, 1993), benevolence (Ganesan, 1994), and integrity (Hart & Saunders, 1998; Morgan & Hunt, 1994).

Chow and O’s (2006) e-shopping study results showed that integrity had a positive and significant effect on the factor of trust in e-shopping before first-hand experience was gained, and ability and integrity after first-hand experience was gained. Wang and Benbasat (2008) identified six reasons (knowledge-based, interactive, dispositional, calculative, heuristic, and institutional) why users trust, or refuse to trust, a technology. Hai-Jew (2006) found that trust in the relationship between learners and courseware technology can lead to beneficial and cooperative behaviors. Manochchri and Young (2006) found that the instructor-led method

was more satisfying and there was a significant difference in student satisfaction between learning on the Web and instructor-based learning. We propose that the lack of satisfaction can be remedied if trust in the learning management system is first obtained.

Vance and colleagues (Vance et al., 2008) suggested that institution-based trust in a system, system quality, navigational structure, and culture significantly affect trust in IT artifacts, specifically in mobile-commerce portals. Institution-based trust refers to an individual's trust levels with respect to monitoring, security, control, policies, and regulations which ensure safety. Institution-based trust is the trustor's belief that effective third-party guarantees are in place to assure the trustee's behavior will be consistent with the trustor's favorable expectations (Pavlou & Gefen, 2004). Institution-based trust also applies to the decision of whether to use an IT artifact in the context of open source software (Stewart, 2003) because users want to feel assured that some third party is watching out for their best interest before they use open systems or open software.

Trust in eLearning

Factors such as academic ability, motivation, degree of effort, and maturity correlate positively with learning outcomes in IT-mediated learning (Hiltz & Turoff, 2005). Surprisingly, much of the literature on trust in eLearning has taken place within the organizational context and not in academic settings. Organization eLearning teams thrive in an atmosphere of trust when the input of every team member is valued without fear of reprisal (Hoegl & Gemuenden, 2001). Through openness and confidence engendered by interpersonal trust, effective collaboration can occur in e-learning projects (Mason & Lefrere, 2003). But how does trust in the IT artifact correlate with learning outcomes?

Extant literature on trust in technology suggests that a users' acceptance and the affective responses toward a particular system are important factors influencing participation and engagement with a system (Davis & Wong, 2007). But how does it impede learning satisfaction or the way a student's achievement is perceived in terms of their learning outcome from the online class? Simmons and Simmons (2010) found that trust mediated the relationship between computer self-efficacy and task-technology fit antecedents and student learning satisfaction and perceived learning outcome dependent variables in the United States.

Culture and Technology

Differences between national cultures have been found to explain various aspects of information technologies (e.g., Straub, 1994; Tan, Watson, & Wee, 1995). In 2006, Leidner and Kayworth published work on their review of the ISs literature on culture and found six groups of studies: (1) culture and IS development; (2) culture, IT adoption, and diffusion; (3) culture, IT use, and outcomes; (4) culture, IT management, and strategy; (5) IT's influence on culture; and (6) IT culture. Furthermore, a 2008 literature review (Kappos & Rivard, 2008) proposed (1) culture influences the development process of an IS; (2) culture moderates the relationship between the development process and the characteristics of the IS; (3) culture moderates the relationship between the characteristics of the IS

and acceptance and resistance; (4) culture moderates the relationship between the characteristics of the IS and use process; and (5) IS use influences culture (e.g., Bandyopadhyay & Fraccastoro, 2007).

National Culture

Several researchers have identified national culture dimensions such as low/high context communications, monochronic/polychronic time, and universalism/particularism, but none are as well applied as Hofstede's culture dimensions (Clark, 1990). Hofstede (1984) defined culture as a collective programming of the mind that distinguishes one group from another. While working at IBM, Hofstede conducted a large-scale study on culture between 1967 and 1973 (1984). Hofstede collected data from over 116,000 respondents in 66 countries which resulted in empirical evidence from 50 countries of the four dimensions of culture (ITIM, 2009). Hofstede first presented the four dimensions of national culture to assist those working in international business and affairs (1980; 1991). The original four dimensions are: (1) Power Distance, (2) Uncertainty Avoidance (UA), (3) Individualism, and (4) Masculinity. The Chinese Cultural Connection (1987) subsequently identified a fifth dimension—the short- versus long-term orientation (STO/LTO) of a society.

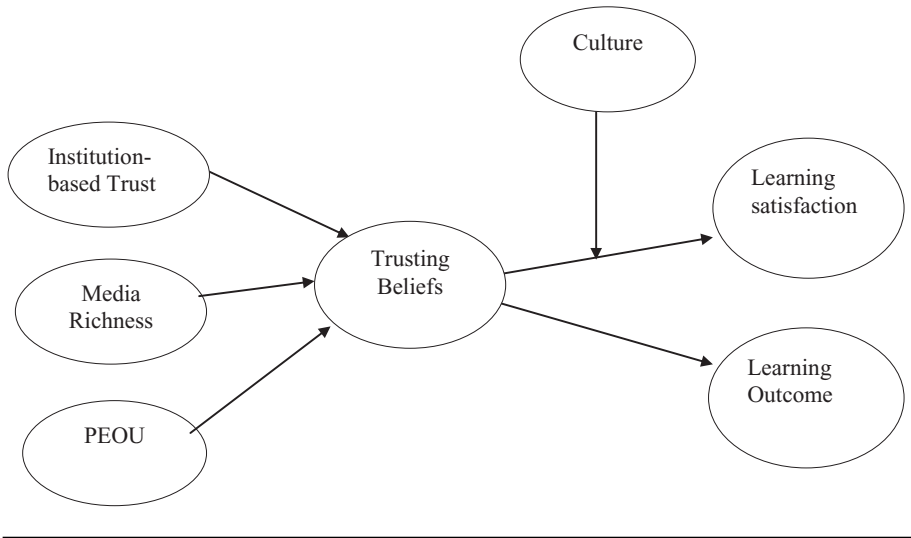
Power Distance (PDI) is the acceptance of the degree of unequal power distributions from those on the below side of the distribution; it is the attitude towards inequality between a superior and a subordinate (Hofstede, 1991). A higher PDI rank is indicative of acceptance of inequality of power in a society, for example, to respect those more powerful, accept wide income gaps, and for subordinates to complete tasks by superiors even if unsure of the ethical value (Hofstede, 1980, 1991)

UA is outlined as tolerance for uncertainty (Hofstede, 1984). UA is the degree to which individuals try to avoid ambiguous or risky situations and the tolerance for people with different ideas. Countries such as Greece, Portugal, Guatemala, Uruguay, and Belgium score high on UA and seek ways to reduce uncertainty (Hofstede, 1980). Countries such as Jamaica, Denmark, Sweden, and Hong Kong have a low score on UA and tend to tolerate more risk and people from other countries.

Individualism (IDV) pertains to a society that is centered on collectivism or individualism. If a culture is centered on the collective, it exhibits low individualism which infers that family and groups are important, and people generally do not rely on or trust strangers (Fukuyama, 1995). If the culture is centered on the individual, people are expected to look out for themselves and immediate family and may be more willing to depend on individuals or strangers (ITIM, 2009).

The Masculinity dimension which is often confused with gender, deals with opportunities for high earnings, recognition, and advancement (Newman & Nollen, 1996). Although Hofstede (1980, 1984, 1991) offered examples related to men and women, men can possess qualities or preferences high on femininity, and females can possess qualities or preferences high on masculinity. Cultures that rank high on masculinity (e.g., Japan, Austria, Venezuela, Italy, and Switzerland) are associated with work goals, such as earnings, promotions, and assertiveness. Cultures that

Figure 1: Structural model of IT artifact trust antecedents and outcomes.



rank low on masculinity (e.g., Sweden, Norway, Denmark, and Costa Rica) stress nurturance, quality of life, friendliness and congenial environments.

FRAMEWORK AND HYPOTHESES BUILDING

Our conceptual framework explains how a user’s trust in an IT artifact impacts perceived learning satisfaction and perceived learning outcomes and how culture moderates the relation between trust and satisfaction (Figure 1). We propose that institution-based reasons previously found to impact trusting beliefs in IT artifacts, along with media richness and perceived ease of use (PEOU) influence trusting beliefs and thus impact the perceived learning satisfaction and the perceived outcomes. Building on IT artifact literature and prior research we propose the conceptual model in Figure 1.

Institution-based trust is associated with societal structures (e.g., legislation, rules, guarantees, and third-party assurances) that people believe will make an environment trustworthy (McKnight, Choudhury, & Kacmar, 2002). It refers to one’s sense of security from guarantees, safety nets, or other impersonal structures inherent in a specific context. Institution-based trust’s situational normality is an assessment that the transaction will be a success, based on how normal or customary the situation appears to be. Furthermore, structural assurances refer to an assessment of success due to safety nets such as legal recourse, guarantees, and regulations that exist in a specific context. Structural assurances can be built into the Web site, for example the Better Business Bureau’s Online Reliability seal. In a learning environment, an IT artifact such as a learning management system may contain institution-based trust features such as a university seal, privacy statement, or some other form of assurance on the homepage (Benbasat & Zmud, 2003). A seal such as VeriSign or a secure login disclaimer also expresses institution-based

trust. Empirical research supports the notion that institution-based trust positively relates to artifact trust (Vance et al., 2008). Thus, we hypothesize:

H1: Institution-based trust will positively affect a student's trusting beliefs in the IT artifact.

The theory of media richness describes the potential information-carrying capacity of a communication medium. Thus, a medium is rich if its information provides a greater understanding to the user. The greater the medium ranks in availability of feedback, the ability to transmit multiple cues, the use of natural language, and the personal focus of the medium all apply to richness (Daft & Lengel, 1984). Steuer (1992) perceived this media characteristic by the way in which an environment presents information to the senses. The premise of media richness lies in the assumption that messages appealing to multiple perceptual systems are better perceived than those that call on single or fewer perceptual systems (Li, Daugherty, & Biocca, 2003). Thus, more perceptual messages are more effective than messages using less perceptual systems. Media differ in social presence or "the degree to which a medium permits a user to experience others as being psychologically present" (Fulk, Steinfield, Schmitz, & Power, 1987, p. 532). In an eLearning environment, social presence is very important for the communication among students and between the student and the instructor. Students need assurance that their discussion posts and messages are clearly and accurately relayed across the technology, thus richness of a medium depends upon the ability to express linguistic innuendos and social presence. If a student feels their ideas and thoughts are not getting across appropriately, they may not trust the IT artifact.

Social presence also influences eLearning (Gunawardena & Zittle, 1997). Researchers conducted a series of four experiments during 1972–1974 to measure the social impact of telecommunications media (Short, Williams, & Christie, 1976). Many researchers have postulated that the learner's comprehension or retention of knowledge (cognitive learning) as well as their feelings, attitudes, behavior, and satisfaction (affective learning) with the course may be affected by their perception of social presence (Jolivet-Jones, 2007). Shepherd and Martz (2006) found that the richer the distance education environment, the higher the reported satisfaction with a distance course, and the higher the valuation of the course delivery platform by the users. Media richness has been shown to enhance trust, quality, and motivation in online communities (Pollach, 2008). Hence, past research indicates that media richness impacts learning satisfaction and trust in online communities. Thus, we offer the following hypothesis:

H2: Media richness will positively affect trusting beliefs in the IT artifact.

As part of the TAM, Davis (1989) initially identified PEOU, which is a person's belief that a system is free from error, as fundamental to a user's acceptance of an IT artifact. In e-commerce, a customer's perception of a company's Web site (service environment) is a micro level factor impacting trust (Kim & Tadisina, 2007). For example, the process of a customer browsing a Web site provides an opportunity to recognize a company's competence and benevolence. Furthermore, the experience may lead to a customer confirming his or her trusting beliefs. In the e-commerce context, some researchers propose Web site quality as one of the

predictors of trust. PEOU is a form of Web site quality assessment by a user before any experience with the artifact.

Further research determined that an individual's perception of a particular system's ease of use, controlling for external factors, is anchored to his or her general computer self-efficacy, as an individual's judgment of computer-related skills in various situations (Venkatesh & Davis, 1996). Studies have also found that the availability of training and support for the use of an IT artifact had no impact on perceptions of ease of use (Karahanna & Straub, 1999). Thus, we hypothesize that greater PEOU will correspond to higher levels of trusting beliefs. This hypothesis is consistent with the integrated trust-TAM relation advanced by Gefen, Karahanna, and Straub (2003b), who found strong evidence that ease of use leads to higher levels of trust. More recently, Wang and Benbasat (2008) also found strong support for this relationship and therefore we posit:

H3: Perceived ease of use will positively affect trusting beliefs in the IT artifact.

Trusting beliefs are a secure conviction that the other party has favorable attributes (such as benevolence, integrity, and competence) strong enough to create trusting intentions (Vance et al., 2008). We operationalize perceived learning satisfaction as the learner's satisfaction with how much he or she has learned in the online course. Trust has been well identified as a predictor of technology usage, adoption, and understanding a user's perception in technology (Li, Nan, Rajiv, & Zhilin, 2008). However, very little is known about how trust predicts a user's satisfaction in an IT artifact. The implications could be tremendous considering e-commerce, mobile devices, and eLearning adoption and diffusion. In educational settings, it has been shown that cognitive style impacts satisfaction and interpersonal trust. A learner's cognitive style has predictive power over the students' satisfaction and trust with their team members and teamwork experience (Liu, Magjuka, & Lee, 2008). Distrust can negatively impact an individual's satisfaction. In teams, a lack of trust negatively affects team members' satisfaction and their willingness to continue being involved with their team (Golembiewski & McConkie, 1975). Thus, we hypothesize the following:

H4: Trusting beliefs will positively affect perceived learning satisfaction.

Identifying and assessing learning outcomes is very important (Duke, 2002; Pridmore, Bradley, & Mehta, 2010). Learning outcomes has been measured through theoretical models such as TAM (Landry, Griffeth, & Hartman, 2006) and E-Learning success model (DeLone and McLean, 2003). Hai-Jew (2006) examined the constructs of trust and technology using the proxies of student retention/persistence, course grades, and student perceptions to measure the relationship between high-trust and the effectiveness of student online learning. For this study, a learner's perceived outcome of learning in the course is operationalized as how well the student thinks he or she will do in terms of course grade (Neuhauser, 2002). Prior research suggests that trust impacts learning outcomes, perceptions (Simmons & Simmons, 2010), and facilitates a better understanding and evaluation of the online course (Hai-Jew, 2006). When distrust occurs in online learning "students' questions become more pointed, often go after minor points, show less

tolerance/patience; work becomes inconsistent and/or late, participation markedly decreases” (Hai-Jew, 2006, p. 22). Distrust can negatively impact student perceived learning outcomes. Trust in online technology can, therefore, be adjudged to provide positive perceptions towards learning outcomes. Accordingly, when students trust the IT artifact, they are more likely to perceive a better outcome as a result of its use. In light of these arguments we hypothesize the following:

H5: Trusting beliefs will positively affect perceived learning outcomes.

Theory has proposed that national culture and trust are closely related (Doney et al., 1998; Fukuyama, 1995; Hofstede, 1980). Prior literature suggests that the meaning, antecedents, and effects of trust are determined by culture (Doney et al., 1998; Fukuyama, 1995) and that trust is also a central aspect of culture because it is correlated closely with cultural differences across nations (Hofstede, Neuijen, Ohayv, & Sanders, 1990). Specifically, how and whether trust is established can depend on the cultural norms and values that guide a person’s behavior and beliefs (Hofstede, 1980). Doney et al.’s (1998) conceptual work on interpersonal trust and culture identified five cognitive trust-building processes that help explain how trust develops in business contexts. Their research propositions posited that societal norms and values influence application of the trust-building processes. In terms of channel relationships, trust has also been examined as a source of added value in managing channel functions (Nevins & Money, 2008). Vance et al. (2008) found positive evidence that individuals from high UA cultures would tend to place less trust in an IT artifact which provided further support for previous research on culture and trust. Gefen, Rose, & Warkentin (2005) investigated the role of trust in IT adoption in electronic voting across two cultures where dissimilar concepts of socially acceptable behavior existed and found that trust is culture dependent. Trust and trust beliefs are key components in e-commerce adoption (Gefen, Karahanna, & Straub, 2003a) and we further explore trust beliefs in technology mediated learning across two different national cultures and expect that:

H6: Culture will positively affect trusting beliefs in the IT artifact.

Many factors, such as instructional technique coupled with the learning environment, can impact learning satisfaction, perceived learning, and actual learning in eLearning environments (Collis, 1995; Gunawardena et al., 2001). Jung, Choi, Lim, and Leem (2002) suggested that students who participated in online collaborative tasks expressed higher levels of satisfaction with their learning processes compared to students who did not participate in online collaborative learning. Zhu (2011) conducted an online cross-cultural study with Chinese and Flemish students to examine student satisfaction and performance and found significant differences putting forth that culture is an important variable to be considered in eLearning.

Conceptual work conducted by Waheed (2011) suggested that in high power distance cultures students involved in online education are less likely to ask questions or speak freely. Typically in online environments, students are required to respond, discuss, and share their opinion on various topics by posting messages where all students and the instructor can view. In high power distance cultures,

students tend to be more passive and may be reluctant to communicate, because they are not used to speaking in front of their superiors (Ryan, 2000).

Hornik and Tupchiy (2006) investigated individualism-collectivism at the individual level and found that in a technology mediated learning environment, these dimensions had differing effects on the use of online communication capabilities, perceived learning, and satisfaction with the online experience. Online students from collectivistic cultures, like Asia, rely on groups, have strong associations with their roots, and thus prefer more traditional classroom educational methods (Vatrapu & Suthers, 2007; Waheed, 2011).

In the current study, we propose that students from different cultures perceive learning technologies according to their cultural influence. Considering that cultures high in power distance and low in individualism are reluctant to speak in front of superiors and prefer face-to-face learning, we hypothesize the following:

H7: High power distance/collectivist cultures will have less trust and lower satisfaction in WebCT.

RESEARCH METHODS

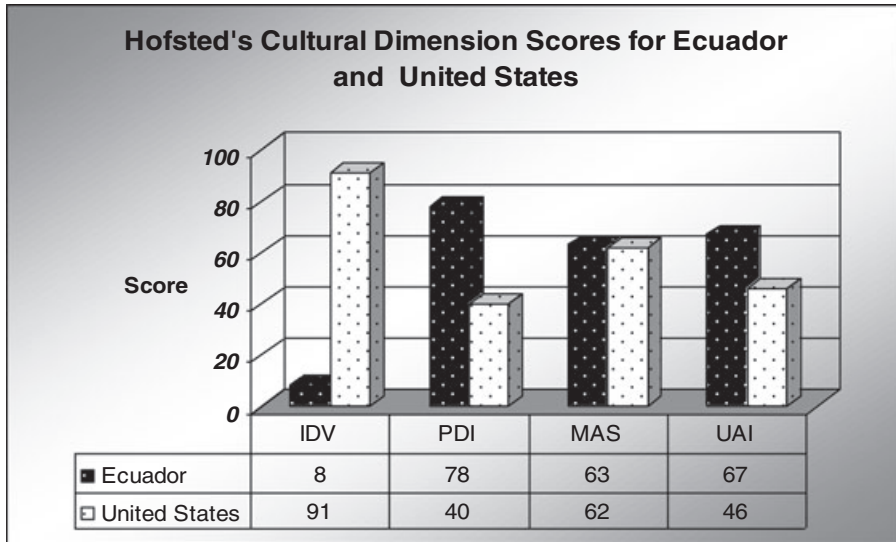
In the following section we explain the framework of the study, the procedures used to develop the survey items, and the instrument used for data collection. The purpose of the survey is to examine how trusting beliefs in IT artifacts impact learning satisfaction and perceived learning outcomes. We explore the trust relationships of students at traditional learning institutions in Quito, Ecuador, and United States that offer online classes.

Analysis of the U.S. and Ecuador

This study was conducted in research sites in the United States and Ecuador to study the influences of culture on a student's learning satisfaction. These countries were selected because they differ substantially on Hofstede's IDV and PDI (Figure 2). According to Hofstede and Bond (1984), power distance is the extent to which the less powerful members of an institution accept that power is distributed unequally. The individualism and collectivism indicator posits that in individualistic cultures, the individual is the most important unit (Hofstede, 1991). Scores for both indices range from 0 to 100. A PDI score near zero reflects less acceptance of the unequal power distribution while scores near 100 reflect greater acceptance. Hofstede proposes that a value less than 50 represents low PDI and a value above 50 represents high PDI. An IDV score near zero is related to strong collectivist cultures while scores near 100 are related to more individualist cultures.

According to ITIM International (2009), the highest ranking dimension for the US is IDV with a score of 91 (see Figure 2). Only six other countries out of the 50 originally studied by Hofstede have individualism as their highest ranking. Individualistic attitudes, self-reliance, and loose bonds characterize societies high in Individualism. Ecuador ranks at 8 in IDV, one of the lower rankings compared to other Latin countries (average 21). The score on this dimension indicates the society is collectivist as compared to individualist, participating in a close

Figure 2: PDI = Power Distance Index, IDV = Individualism, MAS = masculinity, UAI = Uncertainty Avoidance Index. Adapted from ITIM (2009).



long-term commitment to a group, such as a family, extended family, or extended relationships.

Ecuador's highest Hofstede dimension is PDI, with a ranking of 78, indicating a high power distance culture. A high PDI is indicative of a high level of inequality of power and wealth within a society and is accepted by a society as cultural heritage. Ecuador experiences a higher degree of male gender domination in the society and power structure. In turn the female population becomes more assertive and competitive. U.S. PDI is ranked at 40 indicating a general level of equality within the U.S. society.

Measurement Development

We conducted preliminary interviews with faculty and administration to inform our survey development. Since the Ecuadorian population consisted of Spanish speaking students, the survey was translated into Spanish by the Spanish-speaking author, and then back translated to English by an instructor at the Ecuadorian university. Several iterations of translation occurred before pretesting the Spanish survey. The self-administered surveys were designed so that the questions were clear and without bias to promote full completion.

We created and adapted a number of survey items to assess the constructs in our model. To ensure content validity of the scales, we used many previously tested questions; some questions were modified for our use to measure our constructs (see Appendix A for items). We used a standard seven-point Likert-type scale ranging from strongly agree (1) to strongly disagree (7).

We operationalize the IT artifact construct with trusting belief measures with WebCT as our target IT artifact. Our study focused on student trust in WebCT as the primary IT artifact by which eLearning students “attended class.” Instructors who taught these online courses informed us that they used WebCT for administration purposes and educational interaction. Specifically, they used the course management system to post syllabi, communicate with students, post lecture notes, administer quizzes and tests, receive homework, and have discussion sessions with students (asynchronous).

Survey Administration

We chose an online survey tool to administer the survey to students in Quito, Ecuador, and the United States. An online survey tool is appropriate in our study because the respondents are frequently online (as eLearning students) and should be familiar with electronic communication and forms. The survey was administered for a period of three weeks. At the end of the period, we had received 290 responses (131 from Ecuador out of 800 emails sent and 159 from the United States out of 1000 emails sent for an approximate response rate of 16%). However, after removing incomplete responses to substantive constructs, 211 responses (Ecuador $n = 96$ and United States $n = 115$) remained for data analysis.

Our sample consisted of American and Ecuadorian online undergraduate students who were required to use WebCT as their course management tool. Approximately 66% of the respondents were male. In regards to age, 36% were between 20 and 24 years of age and 32% were between 25 and 34. About 26% were in a business-related field. The students mostly accessed the WebCT system from home, but at times accessed it from work or school. The subjects under study were in courses that cover a wide range of topics among the humanities, sciences, business and others, including ISs. WebCT was the main artifact used by the eLearning students to engage in educational interaction, maintain communication with students and the instructor, obtain instructor lecture notes, take quizzes and exams, receive homework, collaborate with other students, and to attend class.

DATA ANALYSIS AND RESULTS

In order to select the statistical technique most appropriate to analyze our data, we took the research objective, data characteristics, and model set-up into consideration (Hair, Black, Babin, & Anderson, 2010). After comparing the advantages and disadvantages of the covariance-based (CB) structural equation modeling (SEM) technique and the partial least square (PLS) SEM technique, we chose SmartPLS 2.0 (Ringle, Wende, & Will, 2005), a component-based software that uses the PLS method to test our model. We chose the PLSs method for multiple reasons. First, the purpose of this research was to contribute to theory development by better understanding the predictive ability of the IT trust artifact antecedents on IT trust and furthermore the predictive ability of trust in IT artifacts on learning satisfaction and perceived learning outcome. When “the research objective is prediction and theory development, then the appropriate method is PLS-SEM” (Hair et al.,

2011a, p. 140). Second, PLS is able to achieve greater statistical power than using CB-SEM with relatively small sample sizes (Hair et al., 2010) such as the one used in this study. However, while the Ecuador subsample size is only 96 and may be interpreted as small (total sample size of $n = 211$), the model does fulfill the PLS-SEM minimum sample size of “ten times the largest number of formative indicators used to measure one construct or ten times the largest number of structural paths directed at a particular latent construct in the structural model” (Hair et al., 2011a, p. 144). Third, since we have the same number of exogenous and endogenous variables (i.e., a balanced model), PLS-SEM is the preferred method of analysis (Hair et al., 2010; Hair et al., 2011b). In addition, PLS-based applications such as SmartPLS have been used to handle both reflective and formative constructs (Gefen, Straub, & Boudreau, 2000; Vance et al., 2008).

Measurement validation

We modeled trusting beliefs and institutional trust as a second-order construct, reflective in nature based on Jarvis, Mackenzie, & Podsakoff (2003) and Petter, Straub, & Rai (2007). As in Wang and Benbasat (2008), a follow-up formative test gave very similar coefficients and the same significance results for trusting beliefs. We adapted McKnight et al.’s (2002) conceptualization of trust with three subdimensions: competence, benevolence, and integrity. However, due to the nature of our IT artifact, the items for integrity did not hold for our study. Vance et al. (2008) used only one integrity item.

Internal consistency was assessed by composite reliability and Cronbach’s alpha. With values ranging from .91 to .97 for composite reliability and from .85 to .97 for each Cronbach’s alpha (see the Appendix for all values), we conclude that the scales were reliable since all were greater than the accepted threshold of .70 as recommended in the literature (Nunnally, 1967). Overall, these results indicate acceptable measurement properties for all reflective constructs.

Discriminant validity is demonstrated when items of one construct are highly correlated with items within its own construct. To assess discriminant and convergent validity of reflective constructs, we conducted four tests. First, the factor structure shows that the items load higher on their intended construct than on any other construct. Moreover, they load together with very high values. Next, the variance shared between measures of two different constructs should be lower than the AVE by the items measuring each construct (Chin, 1998). Table 1 displays the result matrix of latent construct correlations with the square root of AVEs in the leading diagonal. It is evident from Table 1 that non-diagonal entries were found not to exceed the diagonals of specific constructs, and thus no single violation exists of the conditions for discriminant validity (Chin, 1998, p. 327). Third, all AVEs were above .50, suggesting that the constructs capture higher construct-related variance than error variance. AVE values should be greater than .50, indicating that “half” or more of the variance of the indicators should be accounted for (Chin, 1998, p. 321). Finally, the correlations among all constructs were substantially below the .90 threshold suggesting that all constructs are distinct from each other. Therefore, we can conclude that the reflective constructs are valid in terms of discriminant and convergent validity.

Table 1: Correlation matrix of latent constructs.

Correlations between Latent Constructs; square root of AVE is leading diagonal							
	AVE	TB	IT	PEU	MR	LS	PLO
TB	Trusting beliefs	.89					
IT	Institutional trust	.874**	.84				
PEOU	Perceived ease of use	.633**	.677**	.92			
MR	Media richness	.716**	.777**	.573**	.89		
LS	Learning satisfaction	.751**	.780**	.621**	.746**	.93	
PLO	Pcvd learning outcome	.516**	.536**	.498**	.529**	.713**	.88

**Correlation is significant at the $p < .01$ level (two-tailed).

Table 2: Main effects structural model results.

Hypothesis	Casual Path	Path Coefficient	Observed t -Value	Std. Error
H1	IT \rightarrow TB	.745	10.486***	.091
H2	MR \rightarrow TB	.073	1.479	.068
H3	PEOU \rightarrow TB	.074	.914	.094
H4	TB \rightarrow LS	.731	16.613***	.050
H5	TB \rightarrow PLO	.516	10.818***	.072
H6	Culture \rightarrow TB	.088	3.649***	.024

*** $p < .001$.

In summary, all the constructs demonstrate adequate reliability and validity, indicating that the measurement model is acceptable. Overall, we are confident with respect to the measurement model assessment.

Structural Model

Main Effects

The standardized PLS path coefficients derived from the main effects testing of the structural model are shown in Table 2. As hypothesized, institution-based trust significantly impacted the learners' trusting beliefs in the WebCT IT artifact ($\beta = .745, p < .001$) and thus H1 was supported. However, media richness and perceived ease of use had a non-significant relationship with trusting beliefs therefore not supporting H2 and H3. Most notably, a learner's trusting belief in the artifact to learning satisfaction relationship was significant ($\beta = .731, p < .001$) as well as for perceived learning outcome ($\beta = .516, p < .001$), supporting hypotheses 4 and 5. Explained variance in our model was substantial with 66% of the variance in IT trust explained by institution-based trust. In addition, 44.8% of learning satisfaction and 14.7% of perceived learning outcomes explained by trust in the WebCT IT artifact.

Direct effect of culture

To analyze the influence of culture in our model, we coded culture as a binary variable. The United States subsample was coded as a "0" and the Ecuador subsample was coded as a "1." We measured culture in our study consistent with other studies

involving culture at a national level (e.g., Vance et al., 2008). The nationality of participants in the American University was mostly American citizens and the Ecuador participants were mainly Latin American citizens implying homogeneity in our sample at the national-culture level. Culture as a direct effect on trusting beliefs in our model resulted in a significant relationship ($\beta = .091, p < .05$) and H7 was supported.

Moderating effect of culture

Culture as a moderating effect was tested by first comparing a main effect model to a moderating effect model and conducting an F -test for the change in R^2 . The moderator model includes interaction terms which were calculated by multiplying culture by trusting belief variables. The R^2 for learning satisfaction in the main effect model was $R^2 = .563$. Once the interaction term was included, the R^2 changed to $R^2 = .572$. The effect size of culture was calculated by the following formula $f^2 = [R^2 (\text{interaction model}) - R^2 (\text{main effect model})] / [1 - R^2 (\text{main effect model})]$ (Cohen, 1988; Chin, Marcolin, & Newsted, 2003; Vance et al., 2008). The resulting effect size was $f^2 = .02$, small but significant (Cohen, 1988).

Consistent with Mathieson, Peacock, and Chin (2001), we conducted a pseudo F -test to measure whether the changed R^2 is statistically significant. The pseudo F -test is calculated by multiplying f^2 by $(n - k - 1)$ where n equals sample size (211) and k equals the number of independent variables (3). The resulting pseudo F -test measure was 4.14 ($p < .005$). In summary, the effect was small but indicates that the models are different in terms of explaining the variance in the dependent variable.

As hypothesized, the Ecuadorian culture which can be considered high power distance and low collectivistic, had a moderating effect on the relation between trusting beliefs and learning satisfaction ($\beta = .091, p < .05$). To further support which country had higher path strength, we ran a post hoc analysis. We ran the same model for both groups and noted a higher path coefficient between trusting beliefs and learning satisfaction for the U.S. subsample (U.S. $\beta = .745$; Ecuador $\beta = .713$) and thus H7 was supported. Figure 3 displays the model with path coefficients and Table 3 summarizes all hypotheses results.

DISCUSSION

The goal of this study was to identify antecedents of IT artifact trust and better understand how this trust helps explain perceived learning outcomes and student satisfaction while considering cultural impacts. Our analysis suggests that student trust or distrust in an IT artifact in eLearning will likely affect a student's learning satisfaction and perceived learning outcome. Primarily because a student from a culture considered high in power distance and low in individualism is more likely to avoid communicating to superiors (instructors) and to prefer face to face group tasks. Our results also support previous research in ISs literature that trusting beliefs in IT artifacts is possible.

The first finding provides new evidence that institution-based trust directly influences trusting beliefs in an IT artifact such as WebCT, now a relevant

Figure 3: Research model indicating significance and path coefficients.
Notes: PEOU = perceived ease of use; * $p < .05$; ** $p < .001$.

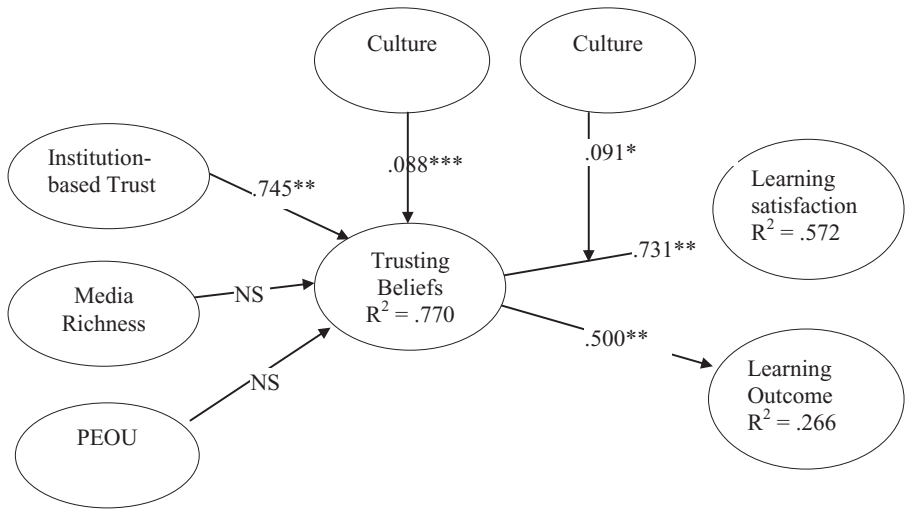


Table 3: Hypothesis testing results.

Hypothesis	Supported
H1 <i>Institution-based trust will positively affect a student's trusting beliefs in the IT artifact.</i>	Yes
H2 <i>Media richness will positively affect trusting beliefs in the IT artifact.</i>	No
H3 <i>Perceived ease of use will positively affect trusting beliefs in the IT artifact.</i>	No
H4 <i>Trusting beliefs will positively affect perceived learning satisfaction.</i>	Yes
H5 <i>Trusting beliefs will positively affect perceived learning outcomes.</i>	Yes
H6 <i>Culture will positively affect trusting beliefs in the IT artifact.</i>	Yes
H7 <i>High power distance/collectivist cultures will have less trust and lower satisfaction in WebCT.</i>	Yes

antecedent of trusting beliefs. In addition, trusting beliefs strongly impact learning satisfaction and perceived learning outcomes. This adds to research conducted in the United States in an online degree program where trusting beliefs in a course management IT artifact was a significant mediator of learning satisfaction and perceived learning outcomes (Simmons & Simmons, 2010).

The second finding was that media richness and PEOU were non-significant indicators of trusting beliefs in WebCT. This is particularly surprising given the strong findings from previous studies about the importance of media richness in enhancing trust (Pollach, 2008) and the high correlation between ease of use and trust (Gefen et al., 2003b; Wang & Benbasat, 2008). We speculate that the lack of significance may be attributed to the IT artifact itself, WebCT, or cultural elements that may alter either the meaning of trust or the relationship of trust with other constructs in the IT domain.

In summary, results from this study suggest that in an online learning context, institution-based trust (i.e., sense of security from guarantees, safety nets, or other impersonal structures) influences a user's trust in an IT artifact, such as WebCT, and consequently affects learning satisfaction. Culture directly impacts a student's trusting beliefs in learning technologies and the strength of the relation between trust and satisfaction. More precisely, we found that a high power distance/collectivist culture had less trust and lower satisfaction in WebCT.

LIMITATIONS AND FUTURE RESEARCH

Limitations

Although this study extends our understanding of student success in eLearning environments, it is not without limitations. First, our study uses one single IT artifact-WebCT to measure media richness. This limitation could explain why media richness was not found to significantly influence trusting beliefs. The majority of the subjects could rate WebCT low in media richness in their use, therefore producing a range restriction problem and hence a lack of sufficient variance in that variable for a relationship to surface. The second limitation is the absence of the integrity sub-dimension due to poor fit of the question items which is consistent with problems of the integrity sub-dimension in prior research of trusting beliefs in IT artifacts (Vance et al., 2008).

Future Research

Future research could develop and test a new scale for the trusting beliefs-integrity sub-construct scale items to more precisely measure a static IT artifact. A static IT artifact is a hardware or software that does not "recommend" or provide specific solutions to a user. A WebCT system does not recommend or help a student make decisions, and the scale used in this study makes it difficult to analyze if the WebCT itself (not its vendor) is of integrity. However, we argue that our trusting beliefs construct is still a valid measure of the student's trusting belief in WebCT.

A second future research opportunity is to further study media richness and perceived ease of use since they were non-significant indicators of trusting beliefs in WebCT. This is particularly surprising given the strong findings from previous studies about the importance of media richness in enhancing trust (Pollach, 2008) and the high correlation between ease of use and trust (Gefen et al., 2003b; Wang & Benbasat, 2008). We speculate that the lack of significance may be attributed to the IT artifact itself, WebCT, or cultural elements that may alter either the meaning of trust or the relationship of trust with other constructs in the IT domain.

Perceived ease of use was a non-significant indicator of trust in the WebCT IT artifact in Ecuador. Future research should consider the impact of culture as a boundary condition to this relationship since this relationship is well founded (e.g., Gefen et al., 2003b). McCoy, Galletta, and King (2007) proposed that the TAM may not hold in cultures high in PD, such as Ecuador, which may explain the lack of significance of PEOU to trust. Theory has proposed that national culture and trust are closely related (Hofstede, 1980). Specifically, how and whether trust

is established can depend on the cultural norms and values that guide a person's behavior and beliefs (Hofstede, 1980). Furthermore, our model has implications for future studies for better understanding how trust is formed in technology-mediated environments such as governments and organizations.

CONCLUSION

Contributing to the student eLearning success literature, this study presents the argument that eLearning students can develop trusting beliefs in learning technologies and that trust leads students to feel satisfied with their learning and perceive that they will have a positive learning outcome. By conducting this study in two countries that differ in terms of national culture, we have learned that culture directly and significantly impacts trust in learning technologies.

It is evident that more online college courses will be offered in the future, as it is quickly becoming the norm at many universities. This study is an attempt to investigate the mechanism of trust/relationship building between the student and the IT artifact that is the link between the learner and the course. Our findings indicate institutional-based trust is an antecedent to trusting beliefs in an IT artifact in eLearning environments such as WebCT and that a student's satisfaction is affected by their trust in such artifacts as well as power distance and individualistic cultural dimensions.

Academic institutions are best served by investing their efforts into means of increasing trust in the IT artifacts and understanding that some cultural characteristics naturally influence a student's satisfaction or dissatisfaction in different learning environments. So as institutions try to leverage the benefits of eLearning technologies, they must develop institutional safeguards around the technology to harness institutional trust. Academic institutions that cross borders and serve multinational students must recognize that different cultural characteristics may have a natural aversion to trust the system and feel less satisfied with their learning. Therefore, it will be crucial to understand how particular cultures develop trust and implement programs to engender trust for students from those cultures.

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Appendix A:
Cronbach's Alpha and Survey Instrument.

Latent Construct	Subconstruct	Item	Description	Factor Loading	Composite Reliability	Author
Institution-based trust $\alpha = .970$	Situational normality-general	I_SNB1	I feel good about how things go when I use WebCT to perform learning tasks.	.8564	.9731	(McKnight et al., 2002)
		I_SNB2	I am comfortable performing learning tasks on WebCT.	.8646		
	Situational normality-benevolence	I_SNB1	I feel that most course management tools like WebCT are designed in the best interest of students.	.8511		
		I_SNB2	If a student required help, course management tools like WebCT would have good help features available.	.7926		
Situational normality-competence		I_SNB3	Most course management tools like WebCT are designed in the interest of a student's well-being.	.8341		
		I_SNC1	In general, WebCT is competent at serving students taking online courses.	.8605		
		I_SNC2	WebCT does a good job at meeting online course management needs at my university.	.9053		
		I_SNC3	I feel that WebCT is good at what it does.	.9151		
Situational normality-integrity		I_SNI1	I am comfortable relying on WebCT to meet its obligations.			
		I_SNI2	I feel fine performing learning tasks using WebCT since vendors like WebCT generally fulfill their agreements.	.8546		
		I_SNI3	I feel confident that I can rely on WebCT to do its part when I interact with it.	.8232		

Continued.

Appendix A: Continued

Latent Construct	Subconstruct	Item	Description	Factor Loading	Composite Reliability	Author
Trusting Beliefs $\alpha = .956$	Structural assurance	I_SA1	WebCT has enough safeguards to make me feel comfortable using WebCT to perform my learning tasks online.	.8770		
		I_SA2	I feel assured that legal and technological features protect me from potential problems while using WebCT.	.7309		
		I_SA3	I feel confident that encryption and other technological features on WebCT allow me to safely perform learning tasks.	.7625		
		I_SA4	In general, WebCT is a robust and safe environment in which to perform learning tasks.	.8396		
	Benevolence	TB_B1	WebCT puts my interest as a student first.	.8534	.9638	(Wang and Benbasat, 2008)
		TB_B2	WebCT keeps in mind my interests.	.8514		
		TB_B3	WebCT understands my needs and preferences as a student.	.8874		
	Competence	TB_C1	WebCT is competent and effective in facilitating learning.	.9051		
		TB_C2	In general, WebCT is very knowledgeable about student learning needs.	.9171		
		TB_C3	WebCT performs its role of facilitating learning activities very well.	.9010		
Perceived ease of use $\alpha = .916$	Perceived ease of use	TB_C4	Overall, WebCT is a capable and proficient learning facilitator.	.9121		
		PEOU1	My interaction with WebCT is clear and understandable.	.9045	.9457	(Wang and Benbasat, 2008)

Continued.

Appendix A: Continued

Latent Construct	Subconstruct	Item	Description	Factor Loading	Composite Reliability	Author
Media richness $\alpha = .912$	Media richness perception	PEOU2	Learning to use WebCT was easy.	.9258	.9379	(Carlson and Zmud, 1999)
		PEOU3	Overall, I found that WebCT is easy to use.	.9403		
		MR1	I can give and receive timely feedback with my instructor through WebCT.	.8660		
		MR2	I can give and receive timely feedback with the other students through WebCT.	.8889		
		MR3	I can use rich and varied language in my messages to my instructor through WebCT.	.8991		
Learning satisfaction $\alpha = .927$	Learning satisfaction perception	MR4	I can use rich and varied language in my messages with other students through WebCT.	.9023	.9535	(Arbaugh, 2000)
		LS1	If I had another opportunity to take another course that used this format, I would gladly do so.	.9137		
		LS2	I was very satisfied with my learning in this course.	.9609		
		LS3	I am satisfied with the amount of information that I learned in this course.	.9271		
		PL1	I will receive a good grade in this class.	.8432		
Perceived learning Outcome $\alpha = .847$	Perceived learning outcome	PL3	I feel I will make the same grade in this class as if I would have taken the class in a traditional face-to-face format.	.8594	.9074	(Arbaugh, 2000)
		PL3	I am sure I will be satisfied with my grade in this class.	.9208		

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