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The Influence of Gender-Ethnic Intersectionality on Gender Stereotypes about IT Skills and Knowledge

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Abstract

One line of investigation in attempting to better understand the gender imbalance in the information technology (IT) field is to examine gender stereotypes about the skills and knowledge in the IT profession. A survey of 4046 university students in the United States was conducted to examine gender stereotypes held by contemporary university students (White, Black and Latino men and women) about the skills and knowledge in the IT profession. The Individual Differences Theory of Gender and IT was used as the motivating theory for this study because it enabled the incorporation of gender-ethnic intersectionality in the research design. The results revealed that while gender stereotypes about the skills and knowledge involved in the IT profession do exist, they are not uniform across all members of a gender group. The men tended to rate all of the skills as more masculine than did the women respondents. Technical skills were more consistently stereotyped by both men and women in each of the gender-ethnic groups than were nontechnical skills. However, gender stereotypes about nontechnical skills were more contested and revealed both within-gender and within-ethnicity variation. The women students' rating of nontechnical skills as less masculine than the men suggests that these nontechnical skills are being incorporated into the women's sense of gender identity. These results show that gender-ethnic intersectionality provides one important explanation for within-gender variation in gender stereotypes that are held by contemporary university students. These findings suggest promising avenues for interventions to address not only the masculine gender stereotyping of skills in the IT profession, but also differential gender stereotyping of technical vs. nontechnical skills and variation in gender stereotyping by the intersectionality of gender-ethnic groups.

Categories and Subject Descriptors

K. Computing Milieu, K.3.2 Computer and Information Science Education, K.7 The Computing Profession, K.7.1 Occupations

Keywords

Careers, ethnicity, gender, gender hegemony, gender stereotypes, individual differences theory of gender and IT, intersectionality, information technology, IT skills, IT workforce, race, stereotypes

Introduction

One line of investigation in attempting to better understand the gender imbalance in the information technology (IT) field is to examine gender stereotypes about the skills and knowledge in the IT profession. As Risman and Davis (2013) point out, the study of sex and gender has undergone a considerable evolution. In the early 20th century sex and gender were conflated while the explanation for sex-based (or gender-based) differences in behavior was biological: sex hormones. By mid-20th century the psychological study of sex and gender was underway. Bem (1981) offered a new conceptualization: sex is biological; gender is psychological. Hence, sex and gender, while closely coupled, were seen as separate. Sex was about biology; gender was about personality dimensions. Therefore, an individual could be rated high on both masculinity and femininity. An agentic woman could be low on femininity and high on masculinity. A man could be high on femininity. By the late 20th and early 21st centuries, the understanding of sex and gender evolved further as the notion of performativity was added to the understanding of gender (Butler, 1990; West and Zimmerman, 1987). That is, individuals, regardless of biological sex, *perform* a gender; they do not *possess* a gender as a fixed and inherent personality trait that is inextricably linked to one's biological sex. But throughout this evolution in our understanding of gender what has remained constant is the association of gender *roles* with one's gender.

Gender Stereotyping in the IT Profession

It is commonly assumed that the skills associated with work in the IT profession, consistent with the dominance of men in the profession, are viewed as masculine. For example, a questionnaire sent to 108 managers and 325 of their direct reports in four U.S. organizations, measured social and emotional skills. The authors found that women were stereotyped as more likely to exhibit sensitivity to the social and cultural environment in their organizations, such as recognition of constraints (Ginger et al., 2010). Similarly, Atwater, et al. (2004) found problem solving to be perceived as masculine and communicating to be perceived as feminine. Creativity was perceived to be feminine in Cejka and Eagly's (1999) study.

However, some studies have found certain skills to be gender neutral. A study employing Torkzadeh and Koufteros' Computer Self-Efficacy Scale (CSES) to assess self-perception of computer skills and knowledge of 310 undergraduate students at a large Midwest university revealed no substantial differences between men and women regarding their perceived advanced and mainframe computer skills (Smith, 2005; Torkzadeh and Koufteros, 1994). Atwater et al. (2004) also found that one-fourth to one-third of the participants could not categorize some management sub-roles as either masculine or feminine, thereby casting doubt on the continued prevalence of masculine stereotypes about managers.

As this literature shows, there is considerable interest in understanding gender norms and stereotypes as they apply to specific behaviors. And, despite contrary findings such as those described above, unilateral perceptions of gender differences continue to be asserted (Eagly and Wood, 1991). Women are stereotypically perceived to be more expressive: building relationships, nurturing, and concerned with emotions. Men, on the other hand, are thought to be more instrumental: assertive and focused on getting a job done or a problem solved (Bem, 1981). Cognitive abilities such as being analytical and quantitatively skilled are perceived as more masculine, whereas verbal skills and creativity are typed as feminine (Cejka and Eagly, 1999). Woodfield's (2002) interviewees revealed that skills such as building credible relationships with clients are often viewed as feminine-typed attributes whereas an attribute such as technical competency is associated with men.

Although there is some evidence of change over time in these stereotypes, with traditionally masculine traits being seen as more acceptable in women, the basic pattern is still observable (Atwater et al., 2004; Cejka and Eagly, 1999; Greening, 1999; Hull and Umansky, 1997; Joshi and Kuhn, 2007; Joshi and Schmidt, 2006; Willemsen, 2002). Overall, the research literature indicates that business students are more likely to rate masculine traits as more applicable to successful managers than feminine traits (Atwater et al., 2004; Willemsen, 2002). Cejka and Eagly (1999) found that students rated feminine attributes as more important to success in women-dominated occupations, and masculine attributes as more important to success in men-dominated occupations. However, higher prestige and higher earnings were associated with occupations thought to require masculine attributes. Greening (1999) examined gender stereotyping among computing students, and Hull and Umansky (1997) found that men accountants tended to devalue women accountants who displayed "masculine" leadership traits. Personality measures based on self-reports also reflect these gender stereotypes. The ascription of different traits to men and women has pervasive, although often subtle, effects on how people perceive both their and others' capabilities. This, in turn, exerts an influence on occupational choice.

Considerable research has been conducted on gender role expectations in the workplace. Glick (1991) investigated the relationship between occupational stereotypes and gender discrimination as expressed in prestige and salaries for "men's" and "women's" jobs and in hiring decisions. While the masculinity of a job was found to be a strong predictor of occupational salary and prestige, that was not the case for feminine jobs. A subsequent study (Glick, Wilk and Perreault, 1995) explored a multidimensional approach to occupational gender stereotyping. Participants rated a random sample of 100 occupational titles. Important gender-related occupational attributes such as masculine personality trait requirements and analytical skills did not load on the gender-stereotype factor but did load highly on the prestige factor. Hence, specific gender-related attributes were related to perceived occupational prestige. The results supported Gottfredson's

(1981) theory of vocational choice. That is, a person tends not to consider an occupation if its prestige and gender do not match one's socio-economic class and gender.

Beyond gender role expectations related to a particular job are the effects of gender role expectations related to workplace behaviors. Rudman's research examines backlash experienced by agentic women whose workplace behaviors deviate from gender stereotyped expectations. That is, women in leadership positions who enact masculine behaviors are not liked when they deviate from those associated with gender stereotypes (i.e. that women should be kind, thoughtful, and sensitive to others' feelings). Rudman and Glick (2001) found that agentic women experienced discrimination in the hiring process because they were viewed as not nice, unlike men applicants with the same skills and presentation. Further, they found that it is a particular aspect of agentic presentation that elicits the backlash. It was not the traits associated with competence, but rather those associated with social dominance, such as competitiveness and aggressiveness, that triggered backlash. In later research (Rudman, Moss-Racusin, Phelan and Nauts, 2012) a series of five studies supported the status incongruity hypothesis that "agentic women are penalized for status violations because doing so defends the gender hierarchy (p. 165)." The authors' conclusion is that backlash is a mechanism whose role is to preserve the dominance of men. These issues that arise with gender role expectations, in turn, lead to gender role conflicts.

Because the IT field dominated by men and requires many skills perceived to be masculine, Social Role Theory (Eagly et al., 2000) suggests that women with certain internalized gender roles would consider a career in IT to be undesirable. However, the fact that *some women* enter and remain in the IT field suggests that this is not the complete explanation. Further, the existence of some women in the IT field indicates that theorizing the gender imbalance at the gender group level, alone, without taking into account other factors, is problematic. Theories about the gender imbalance that assume all women to be a homogenous group do not take into account the fact that not all women are exposed to or internalize the same gender roles or experience the same constraints as a result of these gender roles (Trauth and Quesenberry, 2006). *What remains critically unexamined is a deeper level of analysis about perceived masculine and feminine traits that also takes into account the influence of other factors influencing women and men*.

There is a need for more research and theorizing that explores gender stereotypes about IT skills and knowledge from a vantage point that would help us to better understand factors that can account for within-gender group variation in both the projection (by men) and the internalization (by women) of gender stereotypes about the skills and knowledge required of IT professionals.

In response to this need we undertook a research project[1] to investigate factors influencing within-gender differences in gender stereotypes about skills and knowledge in the IT field. Guided by The Individual Differences Theory of Gender and IT (Trauth

[1] Earlier insights that were published while data were still being collected appear in (Trauth et al., 2012a, 2012b).

2002, 2006; Trauth et al., 2004), we considered the extent to which *ethnicity* could explain within-gender variation in gender stereotypes about the IT field. Survey data about contemporary university undergraduates' perceptions of the IT field were analyzed to test our research question: *Does the intersectionality of gender and ethnicity affect gender stereotypes about the skills and knowledge in the IT profession?*

Literature Review

Gender and Ethnic Underrepresentation in Science, Technology, Engineering and Mathematics (STEM) Fields

While the gender composition of the computer science field remains dominated by men, the ethnic composition of the students planning to major in other STEM fields has become more diverse over time. On the one hand, the proportion of White students planning to major in STEM declined from 77 percent in 1995 to 71 percent in 2010. On the other hand, the proportion of Asian American / Asian students increased from seven percent to 12 percent and the proportion of Latino students increased from five percent to 13 percent. In 2006, underrepresented minorities (Blacks, Latinos, and American Indians/Alaska Natives), as a group, earned 17 percent of bachelor's degrees in STEM, 12 percent of master's degrees, and ten percent of doctorates (NSF, 2008). In both 1995 and 2010, American Indian/Alaska Native and Black students have consistently accounted for two percent and 11 percent, respectively, of freshmen intending to major in STEM (NSF 2012). However, the NSF (2012) also reports that Blacks, Latinos, and American Indian/Alaska Natives generally have lower high school completion rates, college enrollment rates, and college persistence and attainment rates than Whites and Asians / Pacific Islanders. However, members of these ethnic groups who do enroll in college are about as likely as Whites to choose STEM fields.

According to the National Center for Education Statistics (2011), those who identify as Black constitute 12 percent of the U.S. population, 11 percent of all students enrolled in college, and 13 percent of the total workforce. While their overall participation in college and the workforce largely mirrors their representation in the population, only three percent of the technology workforce is Black. In 2009, Blacks received seven percent of all STEM bachelor's degrees, four percent of STEM master's degrees, and two percent of STEM PhDs (National Center for Education Statistics, 2011).

With respect to IT careers, in particular, a survey of first year college students revealed that Black men expressed a greater intention than did Black women to pursue a computer science degree. Among Black first year college students, 1.1 percent of women expressed an intention to major in computer science while 3.8 percent of their men peers expressed such an intention (Higher Education Research Institute, 2007). However, this study shows more Black women (1.1 percent) expressing the intention to pursue computer science than their White (.3 percent), Asian (.5 percent), Native American (.4 percent) and Latina (.1 percent) peers. For men in this study, Black (3.8 percent) and Latino (5.1 percent) respondents planned to pursue computer science degrees at a slightly higher rate than White (3 percent), Asian (2.8 percent), and Native American (3.3 percent) respondents.

Several reasons for the underrepresentation of ethnic minority students in IT degree programs are posited in the practitioner and scholarly literature. According to one study (Bayer Corporation, 2010) the top three causes of underrepresentation in STEM include low quality science and math education programs in poor school districts (75 percent), persistent stereotypes that STEM isn't for women or minorities (66 percent), and financial issues related to the cost of education (53 percent). These findings are corroborated in other research showing that Black and Latino students have less access to advanced courses in math and science in high school, which negatively affects their ability to enter STEM majors in college (Frizell and Nave, 2008; May and Chubin, 2003; Perna et al., 2009; Tyson et al., 2007). Margolis et al. (2008) discuss a cruel irony that even when schools in disadvantaged areas provide computer equipment, they often lack curricula to sufficiently prepare students with the necessary technical skills for success in college. Women of color, in particular, face persistent stereotypes in which computing is constructed as a profession that is both White and masculine (Badagliacco, 1990; Margolis et al., 2008; Taylor, 2002). Hence, as a "White man's profession" computing is at odds with both their ethnic and gender identities.

Further, underrepresentation does not end with the completion of a college degree. Black Americans represent less than two percent of those working in IT occupations (U.S. Bureau of Labor Statistics, 2011). Few Black men are graduating and pursing a degree in IT. According to the National Science Foundation (2011), Black men received 8.5 percent of all computer and information science degrees awarded in 2008. In comparison White men received over 54 percent of all computer and information science degrees awarded in 2008. Furthermore, less than a third of Black Americans who receive a degree in STEM stay in their chosen field; the vast majority leave STEM occupations (NSF, 2008).

Current population statistics show 47.8 million Latinos in 2010 with a projected Latino population of 102.6 million in 2050 (US Census, 2010). The underrepresentation of Latinos within the IT workforce is especially problematic given these demographic trends in the United States. While in 2005 Latinos comprised 14 percent of the population, they are the most rapidly growing ethnic group in the country. By 2050, it is estimated that Latinos will account for a quarter of the U.S. population (US Census Bureau, 2005). However, this trend is not reflected in statistics about participation in STEM fields. Invoking statistics from the National Science Foundation, the Tomas Rivera Policy Institute (2008) points out that in the 2002-2003 academic year Latino students earned only six percent of undergraduate STEM degrees, one percent of master's degrees and two percent of doctoral degrees.

The literature attributes this underrepresentation to systemic barriers within the education system and the work environment itself. These barriers contribute to a lack of participation and representation of Latinos, as well as other racial and ethnic minorities. Much of the pre-existing work examines the policies that contribute to educational success, as well as the social barriers that prevent Latino students from being recruited into and succeeding in STEM programs. Much of the literature that examines the reasons behind the severe underrepresentation of Latinos within the IT workforce looks at the education system, particularly grades K-12, which first introduces science, technology, and math skills. Mathematics and fundamental science skills are often considered positive indicators for performance in college STEM majors (Tomas Rivera Policy Institute, 2008). Latino students, however, are at a severe disadvantage in terms of high school exposure and preparation. According to a literature review on the challenges and opportunities Latinos experience in STEM fields, math is taught at lower levels in predominantly minority-serving schools. In addition, there is less access to rigorous course work such as Advanced Placement (AP) classes, suggesting that racial and ethnic minority students are not as prepared for college-level math courses as students in predominantly White schools. Another factor is that Latino students are often referred to tracks that are less academically rigorous than their White counterparts (Gandara, 2006).

Flores' (2011) review of Latino underrepresentation in STEM suggests that directing Latino and other minority students into lower-level or remedial classes may result from assumptions about their English speaking abilities or their preference for a vocational track. Such assumptions prevent upward mobility as well as crucial math and science skill development. This is particularly problematic because math courses are often an indicator of persistence and success in STEM. The Tomas Rivera Policy Institute (2008, p.3) indicates that Latino K-12 students "tend to have poor study habits, critical thinking ability, and communication skills," and that "inadequate high school preparation, family and cultural dynamics, shortcomings in institutional policies and practices, or any combination of these" can contribute to this lack of skill development. This inequity in college preparation for the pursuit of STEM majors is compounded by the dropout rate of Latino high school students. It was 24 percent in 2004 in contrast with 12 percent for African Americans and seven percent for non-Latino White students (Tomas Rivera Policy Institute, 2008; Child Trends Databank, 2004).

In addition to the inequity of education and skill preparation Latino students experience in grades K-12, there is also evidence of a lack of encouragement for these students to pursue STEM and IT fields. Flores (2011) suggests that these students do not have teachers or guidance counselors encouraging them to pursue STEM careers or degrees. She argues that this lack of encouragement is compounded by an absence of Latino science and math teachers who could serve as role models. Gilroy (2010), citing Bayer Corporation (2010) notes that 77 percent of underrepresented minority women attribute their underrepresentation as both women and racial / ethnic minorities to the lack of encouragement to pursue these fields. The Tomas Rivera Policy Institute (2008) echoes these sentiments, stating that while effective teachers are crucial for success in STEM, Latino students are more likely to be assigned to less effective teachers, thereby further limiting their skill development and their chances for positive influences and encouragement.

While there are extensive barriers that prevent Latino students from exposure to and preparation for STEM undergraduate courses, or higher education in general, there also continue to be barriers at the college level that challenge these individuals and their access and opportunities to pursue STEM and IT. One of the primary barriers Latino college students face is stereotype threat. This phenomenon refers to the fear that one will perform in ways that are consistent with the often negative stereotypes about a group with which they identify or belong. This threat often affects students' abilities to succeed on tests, out of fear that they will do poorly and affirm the stereotype that informs the fear. This often becomes a self-fulfilling prophecy, embodying fear of not belonging rather than actual ability (Tomas Rivera Policy Institute, 2008). Gonzales, Blanton, and Williams (2002) conducted a study of stereotype threat in which Latino college students demonstrated that their awareness of their ethnicity negatively impacted their performance. The Tomas Rivera Policy Institute (2008) offers further elaboration, explaining that many minority students who exhibit academic excellence in high school and who go on to STEM majors in college experience an initial excess of confidence followed by anxiety. They were often excellent among their often "disadvantaged peers" in high school, something that gave them confidence that they could succeed in STEM majors. Once they begin taking classes, however, they sometimes find they are not equipped with skills equal to those of their classmates. This inequity in an arena in which they have previously excelled may help to explain lower retention among Latino students. Threats to a student's confidence, caused by awareness of stereotypes or lack of skill development and preparation, are often unarticulated yet salient barriers to Latino students pursuing and succeeding in STEM and IT majors.

While the extant literature investigates educational, economic, and domestic barriers that challenge Latino access in STEM and IT, there is also evidence of barriers in the workforce. For example, while minority full-time faculty increased from 65,000 in 1993 to 97,000 in 2003, Latino faculty only accounted for 3.2 percent of this increase (American Council on Education, 2006; Rochin and Mello, 2007). Many of the aforementioned issues are exacerbated once an individual is beyond the role of a student. Some interviewees in Tomas Rivera Policy Institute's (2008) study indicated that not only were role models and mentors difficult to come by, but it was also difficult to maintain constant mentorship throughout one's career.

Studies of the interaction of ethnicity and gender in STEM education suggest that gender differentiated self-confidence in STEM learning varies across ethnicity. For example, Black women were found to be independent and assertive and, in some cases, expressed greater confidence than women in other ethnic groups with regard to STEM education and education in general. While universities acknowledge these unique challenges faced by minorities and women, they often fall short in their institutional response to redress these disparities. For example, the Bayer Facts of Science Education XV survey (2011) polled 413 STEM department chairs at the country's leading research universities. These survey respondents were mostly men (87 percent) and White (88 percent). While 84 percent agreed that the recruitment and retention of women and minority STEM undergraduates is important to their institution's chancellor/president, only 33 percent reported that their colleges have a comprehensive STEM diversity plan with recruitment and retention goals in place.

In a study of underrepresented minority women in technical positions in leading high-technology companies in Silicon Valley, Simard (2009) reports that:

> "… 77% of underrepresented respondents working in these high tech companies have a bachelor's degree or higher, while only 12.5% of Latinos and 17.3% of African Americans earn a bachelor's degree or higher in the US, compared to 29% of Whites and 50% of Asians. Similarly, over 30% of underrepresented respondents in our sample have a graduate degree, compared to only 3.9% of Latinos and 5.9% of African Americans in the general US population." (Simard, 2009, p. 8).

There was no statistically significant gender difference in degree attainment among study participants. However, minority women (48.9 percent) are more likely than minority men (27.5 percent) to come to technology careers from disciplines outside of computer science and engineering. Thus, if companies require technical degrees or graduate degrees for advancement, minority women are at a distinct disadvantage.

Gaps in the Literature

While the literature addressing Blacks and Latinos is increasing, much of the research is framed in a way that hinders thorough and nuanced understandings of these population's unique experiences. Empirical data concerning Blacks or Latinos, particularly when discussing STEM and IT, often categorizes them as one part of a minority group being examined. That is to say many studies are conducted to understand "women and minorities", which winds up aggregating and universalizing the experiences unique to each "minority" group. Latinos are rarely looked at exclusively; most often their survey responses are combined with those submitted by Blacks and compared to the dominant White culture or women as a minority group. When Blacks or Latinos are examined as singular groups, there is little intersectionality that examines how identity characteristics such as gender, class, or sexuality interact and influence one another. Similarly, although some literature does acknowledge the differences in lifestyles, values, histories, cultures, and experiences of different nations all clustered under the "Latino" or "Hispanic" category, much of the extant literature fails to recognize these differences. Overall, while the research seeking to understand these two minority populations is advancing, much of it is universalizing both "African American" and "Latino" experiences.

The main focus of workforce diversity efforts in the information technology (IT) field has been on gender and ethnic diversity. Diversity reports coming from high tech companies underscore the need for continued efforts to produce greater gender and ethnic balance in the IT field (Pepitone, 2011). In recent years the literature on recruitment and retention of personnel in the IT field has included research on underrepresented groups. This work has appeared in both journal articles (e.g. Gallivan, 2004; Joshi and Schmidt, 2006; Katz et al., 2006; Kuhn and Joshi, 2009; Kvasny, 2006; Riemenschneider et al., 2006; Tapia, 2006; Trauth et al., 2008a; Windeler and Riemenschneider, 2014) and in conferences and conference tracks that focus on IT personnel.[2] But the vast majority of this research on underrepresented groups in the IT field focuses on one category alone: women, African Americans, Latinos or Native Americans (e.g. Armstrong and Riemenschneider, 2014; Outlay et al., 2014). For example, only 14 papers have been presented at the ACM SIGMIS Computer Personnel Research Conference that have considered the topic of multiple identity characteristics. Eight of them looked at gender and nationality or culture (Adya, 2008; Guzman et al., 2007; Kvasny, 2006; Nielsen et al., 1997, 1998, 2000; Trauth et al., 2006; Von Hellens et al., 2001) while six papers dealt with gender and ethnicity (Cain, 2012; Cain and Trauth, 2013; Gallivan et al., 2006; Kvasny, 2003; Trauth et al., 2012a; Windeler and Riemenschneider, 2013).

However, the demographic shift taking place in the USA calls into question the practice of viewing men and women as homogeneous groups that do not take into account other identity characteristic such as ethnicity. It suggests that focusing on gender or ethnicity, in isolation, might be insufficient to explain the underrepresentation of either women or minorities in the IT field. Instead, a more nuanced stratification of the population – by gender within ethnic group – is needed in order to provide richer insights into the phenomenon of under representation (Collins, 1998). What is needed is more research that considers the *intersectionality* of gender and ethnicity. The research study reported here responds to this need to examine, in greater detail, gender stereotypes about technical fields such as IT that also take into account the changing gender/ethnic landscape in the USA and in higher education.

[2] Since 1962 the ACM Computer Personnel Research Conference has presented research about factors affecting the supply of information technology professionals. Since the late 1990s analyses of the gender imbalance in the IT field have consistently appeared at this conference.

Theorizing Gender and Ethnic Underrepresentation through Intersectionality

To date, the social constructionist theory of gender has been the dominant means of explaining the gender imbalance in the IT field. In this view gender is perceived as a socially constructed script that prescribes different values, attributes, and activities for men and women (Eagly et al., 2000; Konrad et al., 2000; Smith, 1997; Wilson, 2004). According to the social constructionist perspective, the perception that feminine attributes are women-owned traits and masculine attributes are men-owned traits is socially constructed, accepted and internalized. In other words, men will be socially perceived as well-suited to perform stereotypically masculine roles whereas women will be viewed as fitting well in stereotypically feminine roles. These social prescriptions of gender-based roles, in turn, exert pressure on men and women to conform to prescribed gender normative roles. While conformance to the gendering process may be resisted by certain individuals, the constructivist view holds that the cultural and social roles and norms ascribed to a particular gender nevertheless shape the majority of individuals' world views (Wilson, 2004). Hence, masculine gender stereotypes about the skills and knowledge required to succeed in IT careers present a barrier to the participation of women.

But the nacent, alternative theoretical perspective of intersectionality is also in evidence in gender research in the IT field. As Trauth (2013) explains:

> This gender theorizing acknowledges the variety of factors influencing gender relations. This type of gender theorizing is expressed in gender intersectionality and minority gender theories. In contrast with the underlying principle of fixed group membership . . . gender intersectionality and gender minority theories introduce nuance and within-gender group variability found by considering biological sex in conjunction with other salient identity characteristics such as : gender identity, sexual orientation, race or ethnicity. . . Hence, gender and IS research employing a theory of gender intersectionality or a gender minority theory might focus on better understanding black women or gay men or transgendered individuals in relation to IT use or the IS professions (p. 284).

Trauth cites as an example Adya and Kaiser's (2005) IT career choice model that considers structural factors, social settings and ethnic culture.

A fundamental question examined in our research is whether all women and all men hold the same gender stereotypes about skills in the IT field. For this reason, we sought a theory that accounts for *both* gender group-level influences *and* within-gender variation due to ethnic identity. Hence, the theory chosen for this research is the

Individual Differences Theory of Gender and IT (Trauth 2002, 2006; Trauth et al., 2004). This theory originated out of the effort to: 1) identify factors that could explain the underrepresentation of women in the IT field; and 2) account for those women who overcame barriers and entered the IT field. Hence, this theory enables the examination of both societal and individual factors that can explain within-gender group variation in participation in the IT field (Trauth et al., 2008a, 2008b). As shown in Table 1, this theory is composed of three constructs. The individual identity construct consists of two sub-constructs: personal demographics (e.g. age, ethnicity, nationality, socio-economic class, and parenthood status); and career items (e.g. the type of IT work in which one engages). The second construct, individual influences, consists of the personal characteristics sub-construct (e.g. educational background, personality traits and abilities); and the personal influences sub-construct (e.g. mentors, role models, and significant life experiences). Finally, the environmental influences construct consists of four sub-constructs: cultural influences (e.g. national, regional or organizational attitudes about women or about women and IT); economic influences (e.g. cost of living, availability of IT employment); policy influences (e.g. laws about gender discrimination and maternity leave); and infrastructure influences (e.g. existence of childcare facilities). According to the Individual Differences Theory of Gender and IT these constructs, taken together, can explain within-gender variation in participation in the IT profession. This theory does so by identifying differences among women in the ways they relate to the IT field, experience gendered discourses about IT, and respond to them (Trauth and Quesenberry, 2006; Trauth et al., 2009).

Construct	**Sub-construct**	**Examples**
Individual Identity	Personal demographics	age, ethnicity, socio-economic class
	Type of IT work	software development, IS design
Individual Influences	Personal characteristics	educational background, personality traits, abilities
	Personal influences	mentors, role models, significant life experiences
Environmental Influences	Cultural influences	attitudes about women & IT
	Economic influences	cost of living
	Societal infrastructure influences	availability of childcare
	Policy influences	laws about gender discrimination

Table 1. Constructs of Individual Differences Theory of Gender and IT

Two of the three constructs of this theory were employed in our research: individual identity (i.e. gender and ethnicity) and environmental influences (i.e. cultural gender norms related to the IT field). The environmental influences construct accounts for gender group-level influences while the individual identity construct accounts for within-gender variation due to the influence of gender-ethnic intersectionality. This theory has been used elsewhere to explore within-gender variation (Cain, 2012; Cain and Trauth, 2015, 2013; Kvasny et al., 2009; Morgan et al., 2015).

Hypotheses

The research question addressed in this paper is the following: *Does the intersectionality of gender and ethnicity affect gender stereotypes about the skills and knowledge in the IT profession?* Intersectionality is explored in this study through examination of differences among contemporary White, Black and Latino men and women college students with respect to gender stereotypes they hold about the IT field. In order to address the research question we developed the following hypotheses.

To test for *overall differences* within gender and ethnicity, we compare the perceptions of six groups (White Men, White Women, Black Men, Black Women, Latino Men, Latina Women).

> **Hypothesis 1**: Women and men of different ethnicities (White, Black, Latino) will significantly differ in their perceptions of the masculinity-femininity of IT skills.

To test for *within gender differences* based on ethnicity, we compare perceptions of the three ethnicity groups for each gender.

> **Hypothesis 2**: Women of different ethnicities (White, Black, Latino) will significantly differ in their perceptions of the masculinity-femininity of IT skills.

> **Hypothesis 3**: Men of different ethnicities (White, Black, Latino) will significantly differ in their perceptions of the masculinity-femininity of IT skills.

To test for *within ethnicity differences* based on gender, we compare perceptions of the two gender groups for each ethnicity.

> **Hypothesis 4**: White students of different genders (women, men) will significantly differ in their perceptions of the masculinity-femininity of IT skills.

Hypothesis 5: Black students of different genders (women, men) will significantly differ in their perceptions of the masculinity-femininity of IT skills.

Hypothesis 6: Latinos students of different genders (women, men) will significantly differ in their perceptions of the masculinity-femininity of IT skills.

Methodology

Intersectionality is explored in this paper through examination of gender differences among contemporary White, Black and Latino men and women college students with respect to gender stereotypes they hold about the IT field. More specifically, the six posited hypotheses were tested using a sample of 4,046 college students to explore our intersectionality thesis. In this section, we describe our sample, data collection procedure, and analysis.

Data Collection

Undergraduate students enrolled in IT courses at 12 universities were surveyed between 2010 and 2012 to explore gender stereotypes about the skills and knowledge of the IT field. Three of these institutions are classified as predominantly White institutions (PWI), four are classified as Hispanic serving institutions (HSI) and five are classified as historically Black colleges and universities (HBCU). Students participated in this study on a volunteer basis; in some cases, instructors offered extra credit for participation in the survey. Using a five-point Likert scale (1 = feminine, 3 = gender neutral, 5 = masculine) students were asked to assign gender stereotypes to a list of 39 skills that prior research identified as part of the IT professional toolkit (Huang et al., 2009; Trauth et al., 1993; Trauth et al., 2010). To avoid sequencing bias these skills were presented to each participant in a randomized fashion. Out of a total number of 4,046 survey participants the distribution of participants by ethnicity and gender category is shown in Table 2.

Table 2. Respondent Numbers by Gender - Ethnicity Category

Gender - Ethnicity Category	Sample Size (N)	Percentage
White Men	1,917	47%
White Women	854	21%
Black Men	380	9%
Black Women	430	11%
Latino Men	272	7%
Latina Women	193	5%

Total Respondents	4,046	100%

Data Analysis

Data were analyzed using analysis of variance (ANOVA) to test the six posited hypotheses. An ANOVA was used to determine whether there were any significant differences between the means of gender and/or ethnic groups of college students. Our analyses consisted of a series of ANOVA analyses to test the mean differences between groups for each of the 39 skills. IBM SPSS was used to perform ANOVA testing. The independent variables (IV) determining the groups were ethnicity and gender (see Table 3) and the dependent variables (DV) were each of the 39 skills (See Table 4).

Table 3. Independent Variables (IV) by Hypothesis	
H 1:	White Women, White Men, Black Women, Black Men, Latino Women and Latino Men
H 2:	White Women, Black Women and Latino Women
H 3:	White Men, Black Men and Latino Men
H 4:	White Women and White Men
H 5:	Black Women and Black Men
H 6:	Latino Women and Latino Men

Table 4. Dependent Variables (DV)
Communication skills (e.g., verbal, written, presentation skills)
Ability to work in teams
Negotiation skills
Leadership skills
Customer relationship skills
Workplace relationship skills
Initiative
Dependability
Adaptability
Ability to work under pressure
Openness to new experiences
Creativity

Critical thinking
Ability to engage in independent learning
Ability to train end-users and peers
Analytical ability
Problem solving skills
Business knowledge (knowledge about business functions)
Domain knowledge (e.g., health care industry; telecommunications industry)
Sensitivity to organizational culture & politics
Professionalism
Project management skills (e.g., project budgeting; project planning; project risk management)
Ability to learn & employ new technologies
Ethics
Web development skills
Ability to handle ambiguity
Global awareness
Ability to understand technological trends
Networking skills (e.g., LAN/WAN; setting up networks; wireless networks)
System implementation skills
Programming skills (e.g., C#, XML, VB, Java)
Business analytics skills (e.g., data mining, online analytics processing systems)
Integrating enterprise applications
System auditing & information assurance
Process analysis (e.g., gathering systems requirements; systems analysis)
IT architecture/infrastructure
Database management skills (e.g., manage SQL server, ORACLE DB)
Design skills (e.g., systems design; ER modeling; dimensional modeling; data modeling)
IT security

Results

The results of the hypothesis testing are shown in the Appendices. The first hypothesis was an all-encompassing test. This test was done to explore differences in perceptions of the masculinity-femininity of IT skills among women and men respondents of different ethnicities. The sample means, standard deviations, F statistic and the respective level of significance for each of the IT skills are displayed in Appendix A. We found significant differences across 38 of the 39 IT skills. This provides evidence that the intersectionality of gender and ethnicity differentially affects the gender stereotyping of IT skills. Hence, we proceeded with additional tests to examine the nature of these within-gender differences based on ethnicity, and within-ethnicity differences based on gender.

The next two hypotheses explored within-gender differences based on ethnicity. The second hypothesis was tested to examine within-gender differences among women respondents, based on their ethnicity (White, Blacks, Latino), in perceptions about the masculinity-femininity of IT skills. The sample means, standard deviations, F statistic and the respective level of significance for each of the IT skills are displayed in Appendix B. We found that the women did differ significantly across 18 of the 39 IT skills. The third hypothesis was tested to examine within-gender differences among men respondents, based on their ethnicity (White, Black, Latino), in perceptions about the masculinity-femininity of IT skills. The sample means, standard deviations, F statistic and the respective level of significance for each of the IT skills are displayed in Appendix C. We found that men differ significantly across 15 of the 39 IT skills.

The remaining three hypotheses examined within-ethnicity differences based on gender. The fourth hypothesis explored differences between White women and men in perceptions of the masculinity-femininity of IT skills. The sample means, standard deviations, F statistic and the respective level of significance for each of the IT skills are displayed in Appendix D. We found significant differences across 30 of the 39 IT skills. The fifth hypothesis explored differences between Black women and men in perceptions of the masculinity-femininity of IT skills. The sample means, standard deviations, F statistic and the respective level of significance for each of the IT skills are displayed in Appendix E. We found significant differences across 31 of the 39 IT skills. The sixth hypothesis explored differences between Latino women and men in perceptions of the masculinity-femininity of IT skills. The sample means, standard deviations, F statistic and the respective level of significance for each of the IT skills are displayed in Appendix F. We found significant differences across 27 of the 39 IT skills.

Discussion

In this research we sought to better understand university students' perceptions about the skills and knowledge of the IT profession. First, we wanted to know whether gender stereotypes are being applied to the skills and knowledge in the IT profession. As our data show, the answer to this question is yes. Given that this was the case, we then wanted to determine whether these gender stereotypes were unilaterally held by all members of a gender group or whether there was some within-gender variation. To do this, we undertook to examine within-gender variation based on ethnicity and within-ethnicity variation based on gender. The first hypothesis determined that significant differences among the gender-ethnic groups in their gender stereotyping did exist – for 38 of the 39 skills. Hence finer grained analyses of these variations were warranted.

Post hoc analysis using Scheffé's method was used to identify pair wise differences. We found that there were significant differences among women respondents for 18 of 39 skills. Most of this within-gender variation in gender stereotyping (11 skills) related to nontechnical skills.[3] It is also noted that this variation occurs for those skills that the students also classified as being more feminine (i.e. < 3.0). Finally, we note that of the three ethnic groups Black women accounted for the most significant variation. These observations are shown in Table 5.

Skill (T- technical, NT-nontechnical)	**Most Masculine to Most Feminine Stereotyping**
Significant differences across all three groups of women	**(W-White women, B-Black women, L-Latina women)**
Business analytics (T)	W B L
Database management (T)	W B L
Web development (T)	W B L
Teams (NT)	B L W
Customer relationships (NT)	B L W
Workplace relationships (NT)	B L W
Creativity (NT)	B L W
Black & Latina women significantly different from White women	
Programming (T)	W L B
Networking (T)	W L B
Design skills (T)	B L W
Communication skills (NT)	B L W
Sensitivity to organizational culture & politics (NT)	L B W
Ethics (NT)	B L W
Black women significantly different from White & Latina	

[3] The early work on skills and knowledge in the IT profession classified skills into three categories: technical skills, human interaction skills and domain understanding (Huang, et al., 2009; Trauth et al., 1993). However, in this work we collapsed human interaction skills and domain understanding into a single category: nontechnical skills (Joshi et al., 2010; Trauth et al., 2010).

women	
IT architecture & infrastructure (T)	B L W
Adaptability (NT)	B W L
Ambiguity (NT)	B W L
Domain knowledge (NT)	L&W B
Black women significantly different from Latina women	
Dependability (NT)	B L W

Table 5. Within-Gender Variation (Women) in Gender Stereotyping of IT Skills

Once again post hoc analysis using Scheffé's method was used to identify pair wise differences. We found significant differences among men for 15 of 39 skills. Nearly all of this within-gender variation (14) related to nontechnical skills. It is noteworthy that more of the nontechnical skills showed within-gender variation for men than for women in this study. Likewise, these results show that there is very little variation across the men in this study about the gender stereotyping of technical skills. Also, the general pattern of gender stereotyping along a masculine-feminine continuum (i.e. 1=feminine, 5=masculine) shows Black men ranking the skills as trending toward more masculine with White men ranking them as trending towards the least masculine. Finally, we note that when significant differences exist, Black men were always part of the group that accounted for those differences. These observations are shown in Table 6.

Skill (T- technical, NT-nontechnical)	**Most Masculine to Most Feminine Stereotyping**
Significant differences across all three groups of men	**(W-White men, B-Black men, L-Latino men)**
Programming (T)	W L B
Communication skills (NT)	B L W
Teams (NT)	B L W
Leadership (NT)	W L B
Customer relationships (NT)	B L W
Workplace relationships (NT)	B L W
Adaptability (NT)	B L W
Openness to new	B L W

experiences (NT)	
Creativity (NT)	B L W
Sensitivity to organizational culture & politics (NT)	B L W
Ethics (NT)	B L W
Critical thinking (NT)	W B L
Black men significantly different from Latino &White men	
Global awareness (NT)	B L W
Independent Learning (NT)	B L W
Train end users & peers (NT)	B L W
Black men significantly different from White men	
Dependability (NT)	B W L

Table 6. Within-Gender Variation (Men) in Gender Stereotyping of IT Skills

In view of the within-gender variation, based on ethnicity, that was observed we then examined the gender stereotypes by ethnicity group. With respect to White respondents (Appendix D) we found significant differences in the gender stereotypes held by men and women for 30 out of 39 skills, 22 of which are nontechnical skills and 8 are technical skills. Interestingly, for only one technical skill, IT architecture/infrastructure, was the gender stereotype rated by women respondents more masculine than the rating given by men. For the remaining technical skills women assigned gender stereotypes that trended more toward feminine than the gender stereotype assigned by the men. And women rated all of the nontechnical skills as more feminine than did the men. Finally, all of the skills for which there was no significant difference between White women and White men are technical skills. That is, there is most agreement between White women and White men about the masculine gender stereotyping of IT skills when they are the technical skills.

With respect to Black respondents (Appendix E) we found significant differences in the gender stereotypes held by men and women for 31 of the 39 skills. As it was with White respondents, these differences were primarily with respect to the gender stereotyping of nontechnical skills (23 nontechnical skills vs. 8 technical skills). Similarly, the men rated all skills as more masculine than did the women. Finally, and once again in agreement with White respondents, all of the skills for which there was no significant difference in gender stereotyping are technical ones.

With respect to Latino respondents (Appendix F) and consistent with the other ethnicity groups, the significant differences between men and women (with respect to 27 of the 39 skills) were primarily nontechnical skills (19) not technical ones (8). Men also rated all skills as more masculine than the women did. The final observation is that Latino responses deviate from the pattern of the other two ethnicity groups. Unlike the other groups, the skills for which there are no significant differences in gender stereotyping by Latino respondents are a mix of technical (8) and nontechnical (4).

Key Findings

Overall, we find four important implications resulting from this research that can effect both future research and interventions. First, our analyses clearly show that masculine gender stereotypes exist with respect to the skills and knowledge that an IT professional should possess. Second, there is considerable consistency in the masculine stereotyping of the technical skills in the IT profession. Third, we provide concrete evidence of within-gender variation in gender stereotypes of IT skills resulting from the intersectionality of gender and ethnicity. Finally, this variation is mostly accounted for by inconsistent gender stereotypes applied to the nontechnical skills in the IT profession.

The Black participants in this study revealed the greatest number of noteworthy findings. A consistent trend among the men in the study was for Black men to rank skills as more masculine than did Latino and White men. There were no significant differences between Black men and women rating technical skills as masculine (i.e. >3.0). However, the greatest number of significant differences in skills occurred for Black respondents with the men rating both technical and nontechnical skills as more masculine than did the women. Finally, where there were significant differences among women, Black women always constituted one of the groups accounting for that difference. These findings suggest fertile ground for future research on the intersectionality of gender and ethnicity, and in particular, with respect to Black masculinity.

Within the cultural framework of America, Black men have historically needed to negotiate their masculine identities in relation to the dominant masculinity of White men (Harris, 1996). Identity development in Black mens has been studied intensely (Franklin, 1999; Cokley, 2002; Cokley, 2003; Cokley, 2005; Carter and Goodwin, 1994). Key among the concepts have been Black men's capacity and motivation for academic work. Much of the research on Black men's identity focuses on historical factors, referencing the upbringing of Black men. hooks (2004) asserts that Black men's identity in America has roots as far back as slavery, which even today, influences how Black men assimilate into modern American society.

With respect to understanding our data, we note that the tendency of Black men, compared to White and Latino men, to rate the skills as more masculine may be attributed to the issue of negotiating Black masculine identity within the IT profession. Indeed, Margolis et al. (2008) posit that Blacks' lived experiences equate to struggles with a stratified intellectual class system for which there are unintended consequences of well-intended policies at every level. One avenue of future research is to explore whether this competing mix of projected and internalized ethnic identities has produced a hyper masculine IT identity being adopted by Black men. As pointed out in (Nauert 2012), part of the construction of Black masculinity involves internalization (or resistance) to stereotypes imposed upon him (hooks, 2004). One interpretation of our findings, then, could be that stereotype and identity affiliation issues with the IT profession may cause Black men to avoid classifying their work as feminine.

The Latino and Latina respondents revealed two noteworthy findings. First, the smallest number of significant differences across all group comparisons occurred for Latinos and Latinas. Second, and perhaps most noteworthy, where significant differences between them did occur, they were both technical and nontechnical. Future research is needed to explore gender roles among Latinos and Latinas as they relate to the skills that are part of the IT profession.

The findings of this study have important implications for the use of gender theories in future research. Our finding of significant within-gender differences in gender stereotypes provides a strong argument for the use of gender theories that can take into account the variation that exists within members of a gender group with respect to gender stereotypes about the IT field. Thus, our results provide further evidence to challenge gender essentialist assumptions as they relate to the information technology field. But our results also challenge social constructivist gender theories that consider all women and all men as monolithic gender groups. Our results provide further evidence to support the Individual Differences Theory of Gender and IT because it can take into account the intersectionality of gender and ethnicity that we have shown affects gender stereotypes about the IT profession.

While this research involved a large sample, the generalizability of our findings about the intersectionality of gender and ethnicity would be strengthened by future research. One issue to be addressed in future research is gender and ethnic identity. This study included only those students who self-identified their gender as man or woman. It did not include those who did not specify one of these two genders (i.e. identified as transgender or didn't answer the question). Likewise, it did not include those who did not specify ethnicity as White, Black or Latino[4] (i.e. who left the question unanswered or responded "mixed" or "other" to the question). It would also be useful to sample working professionals to examine gender stereotypes in the workplace. Finally, this research was

[4] Since this study focused on White, Black and Latino students, those whose ethnic identity is Asian/Asian American or American Indian/Native American were not included in our analyses.

conducted in the United States; studies of gender-ethnic intersectionality in other cultures is also needed.

The ultimate goal of research into factors affecting the gender imbalance in the IT field is to develop theoretically-informed interventions that can lead to a more diverse profession. In that regard, these findings have important implications for the design and implementation of interventions to address gender stereotypes about the skills and knowledge in the IT field. The revelation of differences in stereotypes across gender-ethnic groups questions the wisdom of one-size-fits-all interventions targeted at women and minorities as one monolithic “underrepresented group”. Instead, it suggests that finer grained analyses of gender stereotypes - along the lines of those conducted in this research – should inform more targeted interventions. The IT profession needs to “drill down” to develop interventions to specifically address the gender stereotyping of technical skills as a phenomenon different from the gender stereotyping of nontechnical skills. Finally, and perhaps most importantly, the IT field needs to recognize and develop interventions that are targeted at specific gender-ethnic groups that would address the kinds of gender stereotypes identified in this paper.

Conclusion

This research documents the existence of gender stereotypes about the skills and knowledge involved in the IT profession. Further, the results prove that the stereotyping of these skills is not consistent across all members of a gender group, thereby providing theoretical support for the Individual Differences Theory of Gender and IT. Across all three ethnicity groups where significant differences occurred, the men rated the skills as more masculine than did the women respondents. Technical skills were more consistently stereotyped as masculine by both me

n and women in a gender group. However, gender stereotypes about nontechnical skills were more contested and revealed both within-gender and within-ethnicity variation. The women students’ rating of nontechnical skills as less masculine than the men suggests that these nontechnical skills are being incorporated into the women’s sense of gender identity. Overall, the results show that gender-ethnic intersectionality provides one important explanation for within-gender variation in gender stereotypes that are held by contemporary university students.

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Appendices

Appendix A. Investigating Within Gender & Ethnicity Differences in Gender Stereotyping of IT Skills

IT Skills	N=430 Black Women	N=193 Latino Women	N=854 White Women	N=380 Black Men	N=272 Latino Men	N= 1917 White Men	ANOVA Test - F statistics Level of Sig or NS
	Means (Standard Deviation) Men and Women of different ethnicities						
Communication skills (e.g., verbal, written, presentation skills)	2.79 (.737)	2.73 (.645)	2.55 (.726)	2.98 (.775)	2.92 (.742)	2.8 (.702)	26.223***
Ability to work in teams	2.91 (.703)	2.85 (.571)	2.73 (.659)	3.14 (.681)	3.03 (.718)	2.96 (.632)	25.838***
Negotiation skills	3.05 (.769)	3.07 (.753)	3.02 (.814)	3.24 (.715)	3.26 (.822)	3.21 (.782)	11.233***
Leadership skills	3.06 (.592)	3.06 (.551)	3.1 (.586)	3.34 (.689)	3.43 (.705)	3.51 (.719)	68.17***
Customer relationship skills	2.74 (.740)	2.64 (.730)	2.47 (.747)	2.97 (.765)	2.78 (.754)	2.68 (.740)	27.564***
Workplace relationship skills	2.79 (.744)	2.68 (.778)	2.61 (.702)	3.09 (.741)	2.92 (.747)	2.75 (.709)	26.825***
Initiative	3.01 (.620)	2.93 (.550)	2.98 (.586)	3.17 (.640)	3.17 (.632)	3.14 (.614)	13.766***
Dependability	2.9 (.660)	2.83 (.610)	2.79 (.608)	3.17 (.664)	3.06 (.719)	3.07 (.623)	33.817**
Adaptability	2.93 (.665)	2.81 (.626)	2.84 (.610)	3.21 (.634)	3.16 (.688)	3.07 (.612)	33.242**
Ability to handle ambiguity	3.02 (.618)	2.92 (.612)	2.93 (.555)	3.15 (.647)	3.08 (.663)	3.1 (.618)	12.93***
Ability to work under pressure	3.06 (.661)	3.01 (.641)	3.09 (.649)	3.38 (.710)	3.34 (.685)	3.37 (.697)	37.043***
Openness to new experiences	2.86 (.710)	2.83 (.680)	2.78 (.653)	3.16 (.759)	3.06 (.671)	2.9 (.627)	21.086***
Creativity	2.71 (.779)	2.62 (.713)	2.43 (.768)	3 (.769)	2.84 (.799)	2.71 (.750)	35.333***
Critical thinking	2.93 (.601)	2.97 (.438)	2.95 (.550)	3.16 (.651)	3.08 (.664)	3.22 (.615)	35.592***
Ability to engage in independent learning	2.99 (.607)	2.95 (.580)	2.98 (.561)	3.18 (.648)	3.12 (.614)	3.08 (.565)	10.593***
Ability to train end-users and peers	2.95 (.638)	2.87 (.594)	2.86 (.659)	3.13 (.653)	3.06 (.660)	3.04 (.650)	15.421**
Analytical ability	3.02 (.618)	3.04 (.509)	3.07 (.606)	3.19 (.604)	3.18 (.612)	3.2 (.599)	10.855***
Problem solving skills	2.95 (.565)	2.94 (.496)	2.91 (.594)	3.23 (.620)	3.2 (.582)	3.25 (.627)	51.054***
Business knowledge (knowledge about business	3.11 (.520)	3.07 (.451)	3.15 (.497)	3.26 (.620)	3.29 (.649)	3.27 (.626)	12.305***

functions)							
Domain knowledge (e.g., health care industry; telecommunications industry)	2.96 (.611)	3.04 (.607)	3.04 (.555)	3.14 (.608)	3.06 (.596)	3.07 (.596)	4.192*
Sensitivity to organizational culture and politics	2.71 (.812)	2.72 (.761)	2.53 (.735)	2.96 (.818)	2.74 (.787)	2.68 (.772)	16.872***
Ethics	2.88 (.620)	2.84 (.527)	2.76 (.606)	3.04 (.734)	2.97 (.648)	2.84 (.654)	12.281***
Professionalism	2.99 (.553)	2.94 (.556)	2.93 (.483)	3.16 (.608)	3.08 (.602)	3.1 (.570)	16.151***
Global awareness	2.99 (.581)	2.93 (.617)	2.94 (.532)	3.12 (.660)	3.03 (.689)	3 (.608)	5.057*
Integrating enterprise applications	3.14 (.544)	3.14 (.496)	3.17 (.526)	3.2 (.635)	3.18 (.544)	3.2 (.555)	1.284***
Process analysis (e.g., gathering systems requirements; systems analysis)	3.11 (.586)	3.13 (.477)	3.19 (.576)	3.16 (.640)	3.17 (.598)	3.2 (.587)	2.046***
Design skills (e.g., systems design; ER modeling; dimensional modeling; data modeling)	3.07 (.686)	3.03 (.680)	2.93 (.757)	3.16 (.739)	3.07 (.789)	3.09 (.696)	8.251*
System implementation skills	3.15 (.541)	3.23 (.540)	3.18 (.539)	3.23 (.607)	3.21 (.560)	3.25 (.585)	3.333***
System auditing and information assurance	3.12 (.589)	3.13 (.513)	3.16 (.564)	3.17 (.605)	3.14 (.622)	3.16 (.548)	0.546 (NS)
Programming skills (e.g., C#, XML, VB, Java)	3.26 (.667)	3.28 (.659)	3.49 (.701)	3.36 (.676)	3.45 (.707)	3.52 (.730)	13.958***
Business analytics skills (e.g., data mining, online analytics processing systems)	3.18 (.612)	3.07 (.604)	3.26 (.579)	3.26 (.659)	3.24 (.643)	3.24 (.615)	4.076***
Database management skills (e.g., manage SQL server, ORACLE DB)	3.22 (.607)	3.15 (.562)	3.33 (.615)	3.24 (.616)	3.29 (.644)	3.32 (.625)	5.169***
Networking skills (e.g., LAN/WAN; setting up networks; wireless networks)	3.17 (.646)	3.22 (.760)	3.32 (.684)	3.28 (.635)	3.36 (.726)	3.37 (.684)	7.594***
Project management skills (e.g., project budgeting; project planning; project risk management)	3.01 (.614)	2.97 (.581)	3.01 (.624)	3.22 (.647)	3.23 (.718)	3.27 (.673)	27.58***
Web development skills	3.14 (.536)	3.2 (.617)	3.3 (.636)	3.28 (.654)	3.31 (.671)	3.28 (.621)	4.744***
IT security	3.33 (.698)	3.34 (.651)	3.41 (.655)	3.34 (.640)	3.46 (.707)	3.42 (.688)	2.688***
IT architecture/infrastructure	3.37 (.719)	3.3 (.700)	3.43 (.662)	3.33 (.657)	3.35 (.654)	3.33 (.626)	3.369***
Ability to learn and employee new technologies	3.03 (.485)	3.09 (.547)	3.06 (.486)	3.21 (.620)	3.2 (.568)	3.2 (.559)	14.091***
Ability to understand	3.18	3.12	3.22	3.3	3.34	3.3	6.869***

technological trends	(.608)	(.569)	(.585)	(.661)	(.628)	(.618)

p<0.05 ; **p<0.01 ; ***p<0.001 ; NS: Not significant

Appendix B. Investigating Within Gender Difference among Black, Latino and White Women in Gender Stereotyping of IT Skills				
	Women Means (Standard Deviation)			ANOVA Test - F statistics Level of Sig or NS
IT Skills	Black N= 430	Latino N= 193	White N= 854	
Communication skills (e.g., verbal, written, presentation skills)	2.79 (.737)	2.73 (.645)	2.55 (.726)	17.761***
Ability to work in teams	2.91 (.703)	2.85 (.571)	2.73 (.659)	10.385***
Negotiation skills	3.05 (.769)	3.07 (.753)	3.02 (.814)	0.539 (NS)
Leadership skills	3.06 (.592)	3.06 (.551)	3.1 (.586)	0.905 (NS)
Customer relationship skills	2.74 (.740)	2.64 (.730)	2.47 (.747)	20.47***
Workplace relationship skills	2.79 (.744)	2.68 (.778)	2.61 (.702)	9.263***
Initiative	3.01 (.620)	2.93 (.550)	2.98 (.586)	1.213 (NS)
Dependability	2.9 (.660)	2.83 (.610)	2.79 (.608)	4.503*
Adaptability	2.93 (.665)	2.81 (.626)	2.84 (.610)	3.49*
Ability to handle ambiguity	3.02 (.618)	2.92 (.612)	2.93 (.555)	3.466*
Ability to work under pressure	3.06 (.661)	3.01 (.641)	3.09 (.649)	1.253 (NS)
Openness to new experiences	2.86 (.710)	2.83 (.680)	2.78 (.653)	2.146 (NS)
Creativity	2.71 (.779)	2.62 (.713)	2.43 (.768)	20.367***
Critical thinking	2.93 (.601)	2.97 (.438)	2.95 (.550)	0.51 (NS)
Ability to engage in independent learning	2.99 (.607)	2.95 (.580)	2.98 (.561)	0.215 (NS)
Ability to train end-users and peers	2.95 (.638)	2.87 (.594)	2.86 (.659)	2.951 (NS)
Analytical ability	3.02 (.618)	3.04 (.509)	3.07 (.606)	0.784 (NS)
Problem solving skills	2.95 (.565)	2.94 (.496)	2.91 (.594)	0.687 (NS)
Business knowledge (knowledge about business functions)	3.11 (.520)	3.07 (.451)	3.15 (.497)	2.068 (NS)
Domain knowledge (e.g., health care industry; telecommunications industry)	2.96 (.611)	3.04 (.607)	3.04 (.555)	3.116**
Sensitivity to organizational culture and politics	2.71 (.812)	2.72 (.761)	2.53 (.735)	9.701***
Ethics	2.88 (.620)	2.84 (.527)	2.76 (.606)	6.049**
Professionalism	2.99	2.94	2.93	2.151 (NS)

	(.553)	(.556)	(.483)	
Global awareness	2.99 (.581)	2.93 (.617)	2.94 (.532)	1.249 (NS)
Integrating enterprise applications	3.14 (.544)	3.14 (.496)	3.17 (.526)	0.654 (NS)
Process analysis (e.g., gathering systems requirements; systems analysis)	3.11 (.586)	3.13 (.477)	3.19 (.576)	2.507 (NS)
Design skills (e.g., systems design; ER modeling; dimensional modeling; data modeling)	3.07 (.686)	3.03 (.680)	2.93 (.757)	5.997**
System implementation skills	3.15 (.541)	3.23 (.540)	3.18 (.539)	1.561 (NS)
System auditing and information assurance	3.12 (.589)	3.13 (.513)	3.16 (.564)	0.819 (NS)
Programming skills (e.g., C#, XML, VB, Java)	3.26 (.667)	3.28 (.659)	3.49 (.701)	18.26***
Business analytics skills (e.g., data mining, online analytics processing systems)	3.18 (.612)	3.07 (.604)	3.26 (.579)	9.6***
Database management skills (e.g., manage SQL server, ORACLE DB)	3.22 (.607)	3.15 (.562)	3.33 (.615)	9.197***
Networking skills (e.g., LAN/WAN; setting up networks; wireless networks)	3.17 (.646)	3.22 (.760)	3.32 (.684)	6.806**
Project management skills (e.g., project budgeting; project planning; project risk management)	3.01 (.614)	2.97 (.581)	3.01 (.624)	0.334 (NS)
Web development skills	3.14 (.536)	3.2 (.617)	3.3 (.636)	9.898 ***
IT security	3.33 (.698)	3.34 (.651)	3.41 (.655)	2.39 (NS)
IT architecture/infrastructure	3.37 (.719)	3.3 (.700)	3.43 (.662)	3.575*
Ability to learn and employee new technologies	3.03 (.485)	3.09 (.547)	3.06 (.486)	1.346 (NS)
Ability to understand technological trends	3.18 (.608)	3.12 (.569)	3.22 (.585)	2.502 (NS)

*p<0.05 ; **p<0.01 ; ***p<0.001 ; NS: Not significant

Appendix C. Investigating Within Gender Difference among Black, Latino and White Men in Gender Stereotyping of IT Skills				
	Means (Standard Deviation)			ANOVA Test - F statistics Level of Sig or NS
IT Skills	Black N= 380 Black Men	Latino N= 272 Latino Men	White N= 1917 White Men	
Communication skills (e.g., verbal, written, presentation skills)	2.98 (.775)	2.92 (.742)	2.8 (.702)	11.439***
Ability to work in teams	3.14 (.681)	3.03 (.718)	2.96 (.632)	12.44***
Negotiation skills	3.24 (.715)	3.26 (.822)	3.21 (.782)	0.67 (NS)
Leadership skills	3.34 (.689)	3.43 (.705)	3.51 (.719)	8.772***
Customer relationship skills	2.97 (.765)	2.78 (.754)	2.68 (.740)	26.047***
Workplace relationship skills	3.09 (.741)	2.92 (.747)	2.75 (.709)	37.224***
Initiative	3.17 (.640)	3.17 (.632)	3.14 (.614)	0.715 (NS)
Dependability	3.17 (.664)	3.06 (.719)	3.07 (.623)	3.667*
Adaptability	3.21 (.634)	3.16 (.688)	3.07 (.612)	8.496***
Ability to handle ambiguity	3.15 (.647)	3.08 (.663)	3.1 (.618)	1.176 (NS)
Ability to work under pressure	3.38 (.710)	3.34 (.685)	3.37 (.697)	0.22 (NS)
Openness to new experiences	3.16 (.759)	3.06 (.671)	2.9 (.627)	27.393***
Creativity	3 (.769)	2.84 (.799)	2.71 (.750)	24.376***
Critical thinking	3.16 (.651)	3.08 (.664)	3.22 (.615)	7.103**
Ability to engage in independent learning	3.18 (.648)	3.12 (.614)	3.08 (.565)	5.063**
Ability to train end-users and peers	3.13 (.653)	3.06 (.660)	3.04 (.650)	2.982 (NS)
Analytical ability	3.19 (.604)	3.18 (.612)	3.2 (.599)	0.127 (NS)
Problem solving skills	3.23 (.620)	3.2 (.582)	3.25 (.627)	0.785 (NS)
Business knowledge (knowledge about business functions)	3.26 (.620)	3.29 (.649)	3.27 (.626)	0.161 (NS)
Domain knowledge (e.g., health care industry; telecommunications industry)	3.14 (.608)	3.06 (.596)	3.07 (.596)	2.528 (NS)
Sensitivity to organizational culture and politics	2.96 (.818)	2.74 (.787)	2.68 (.772)	20.423***
Ethics	3.04	2.97	2.84	17.405***

	(.734)	(.648)	(.654)	
Professionalism	3.16 (.608)	3.08 (.602)	3.1 (.570)	2.405 (NS)
Global awareness	3.12 (.660)	3.03 (.689)	3 (.608)	5.877**
Integrating enterprise applications	3.2 (.635)	3.18 (.544)	3.2 (.555)	0.129 (NS)
Process analysis (e.g., gathering systems requirements; systems analysis)	3.16 (.640)	3.17 (.598)	3.2 (.587)	0.959 (NS)
Design skills (e.g., systems design; ER modeling; dimensional modeling; data modeling)	3.16 (.739)	3.07 (.789)	3.09 (.696)	1.702 (NS)
System implementation skills	3.23 (.607)	3.21 (.560)	3.25 (.585)	0.628 (NS)
System auditing and information assurance	3.17 (.605)	3.14 (.622)	3.16 (.548)	0.29 (NS)
Programming skills (e.g., C#, XML, VB, Java)	3.36 (.676)	3.45 (.707)	3.52 (.730)	8.876***
Business analytics skills (e.g., data mining, online analytics processing systems)	3.26 (.659)	3.24 (.643)	3.24 (.615)	0.086 (NS)
Database management skills (e.g., manage SQL server, ORACLE DB)	3.24 (.616)	3.29 (.644)	3.32 (.625)	2.679 (NS)
Networking skills (e.g., LAN/WAN; setting up networks; wireless networks)	3.28 (.635)	3.36 (.726)	3.37 (.684)	2.8 (NS)
Project management skills (e.g., project budgeting; project planning; project risk management)	3.22 (.647)	3.23 (.718)	3.27 (.673)	1.061 (NS)
Web development skills	3.28 (.654)	3.31 (.671)	3.28 (.621)	0.241 (NS)
IT security	3.34 (.640)	3.46 (.707)	3.42 (.688)	2.925 (NS)
IT architecture/infrastructure	3.33 (.657)	3.35 (.654)	3.33 (.626)	0.123 (NS)
Ability to learn and employee new technologies	3.21 (.620)	3.2 (.568)	3.2 (.559)	0.081 (NS)
Ability to understand technological trends	3.3 (.661)	3.34 (.628)	3.3 (.618)	0.563 (NS)

*p<0.05 ; **p<0.01 ; ***p<0.001 ; NS: Not significant

Appendix D. Investigating Between Gender Difference for White Women and Men in Gender Stereotyping of IT Skills			
	Means (Standard Deviation) White Women and Men		ANOVA Test - F statistics Level of Sig or NS
IT Skills	N= 854 White Women	N= 1917 White Men	
Communication skills (e.g., verbal, written, presentation skills)	2.55 (.726)	2.8 (.702)	76.718***
Ability to work in teams	2.73 (.659)	2.96 (.632)	73.953***
Negotiation skills	3.02 (.814)	3.21 (.782)	35.893***
Leadership skills	3.1 (.586)	3.51 (.719)	209.204***
Customer relationship skills	2.47 (.747)	2.68 (.740)	47.335***
Workplace relationship skills	2.61 (.702)	2.75 (.709)	25.665***
Initiative	2.98 (.586)	3.14 (.614)	38.742***
Dependability	2.79 (.608)	3.07 (.623)	121.229***
Adaptability	2.84 (.610)	3.07 (.612)	89.579***
Ability to handle ambiguity	2.93 (.555)	3.1 (.618)	45.755***
Ability to work under pressure	3.09 (.649)	3.37 (.697)	102.232***
Openness to new experiences	2.78 (.653)	2.9 (.627)	23.035***
Creativity	2.43 (.768)	2.71 (.750)	81.849***
Critical thinking	2.95 (.550)	3.22 (.615)	121.35***
Ability to engage in independent learning	2.98 (.561)	3.08 (.565)	19.965***
Ability to train end-users and peers	2.86 (.659)	3.04 (.650)	47.5***
Analytical ability	3.07 (.606)	3.2 (.599)	27.147***
Problem solving skills	2.91 (.594)	3.25 (.627)	174.999***
Business knowledge (knowledge about business functions)	3.15 (.497)	3.27 (.626)	26.062***
Domain knowledge (e.g., health care industry; telecommunications industry)	3.04 (.555)	3.07 (.596)	1.165 (NS)
Sensitivity to organizational culture and politics	2.53 (.735)	2.68 (.772)	23.161***
Ethics	2.76	2.84	8.935**

	(.606)	(.654)	
Professionalism	2.93 (.483)	3.1 (.570)	53.857***
Global awareness	2.94 (.532)	3 (.608)	5.097*
Integrating enterprise applications	3.17 (.526)	3.2 (.555)	1.6 (NS)
Process analysis (e.g., gathering systems requirements; systems analysis)	3.19 (.576)	3.2 (.587)	0.525 (NS)
Design skills (e.g., systems design; ER modeling; dimensional modeling; data modeling)	2.93 (.757)	3.09 (.696)	31.49***
System implementation skills	3.18 (.539)	3.25 (.585)	8.63**
System auditing and information assurance	3.16 (.564)	3.16 (.548)	0.016 (NS)
Programming skills (e.g., C#, XML, VB, Java)	3.49 (.701)	3.52 (.730)	1.446 (NS)
Business analytics skills (e.g., data mining, online analytics processing systems)	3.26 (.579)	3.24 (.615)	0.715 (NS)
Database management skills (e.g., manage SQL server, ORACLE DB)	3.33 (.615)	3.32 (.625)	0.068 (NS)
Networking skills (e.g., LAN/WAN; setting up networks; wireless networks)	3.32 (.684)	3.37 (.684)	3.932*
Project management skills (e.g., project budgeting; project planning; project risk management)	3.01 (.624)	3.27 (.673)	87.025***
Web development skills	3.3 (.636)	3.28 (.621)	0.438 (NS)
IT security	3.41 (.655)	3.42 (.688)	0.247 (NS)
IT architecture/infrastructure	3.43 (.662)	3.33 (.626)	14.744***
Ability to learn and employee new technologies	3.06 (.486)	3.2 (.559)	38.105***
Ability to understand technological trends	3.22 (.585)	3.3 (.618)	9.306**

*p<0.05 ; **p<0.01 ; ***p<0.001 ; NS: Not significant

Appendix E. Investigating Between Gender Difference for Black Women and Men in Gender Stereotyping of IT Skills			
	Means (Standard Deviation) Black Women and Men		ANOVA Test - F statistics Level of Sig or NS
IT Skills	N= 430 Black Women	N= 380 Black Men	
Communication skills (e.g., verbal, written, presentation skills)	2.79 (.737)	2.98 (.775)	13.238***
Ability to work in teams	2.91 (.703)	3.14 (.681)	22.715***
Negotiation skills	3.05 (.769)	3.24 (.715)	12.958***
Leadership skills	3.06 (.592)	3.34 (.689)	39.882***
Customer relationship skills	2.74 (.740)	2.97 (.765)	19.573***
Workplace relationship skills	2.79 (.744)	3.09 (.741)	32.102***
Initiative	3.01 (.620)	3.17 (.640)	12.516***
Dependability	2.9 (.660)	3.17 (.664)	32.007***
Adaptability	2.93 (.665)	3.21 (.634)	37.964***
Ability to handle ambiguity	3.02 (.618)	3.15 (.647)	8.731**
Ability to work under pressure	3.06 (.661)	3.38 (.710)	43.569***
Openness to new experiences	2.86 (.710)	3.16 (.759)	33.678***
Creativity	2.71 (.779)	3 (.769)	28.42***
Critical thinking	2.93 (.601)	3.16 (.651)	27.345***
Ability to engage in independent learning	2.99 (.607)	3.18 (.648)	20.19***
Ability to train end-users and peers	2.95 (.638)	3.13 (.653)	16.186***
Analytical ability	3.02 (.618)	3.19 (.604)	14.906***
Problem solving skills	2.95 (.565)	3.23 (.620)	44.59***
Business knowledge (knowledge about business functions)	3.11 (.520)	3.26 (.620)	14.752***
Domain knowledge (e.g., health care industry; telecommunications industry)	2.96 (.611)	3.14 (.608)	17.887***
Sensitivity to organizational	2.71	2.96	19.937***

culture and politics	(.812)	(.818)	
Ethics	2.88 (.620)	3.04 (.734)	11.779**
Professionalism	2.99 (.553)	3.16 (.608)	17.419***
Global awareness	2.99 (.581)	3.12 (.660)	8.541**
Integrating enterprise applications	3.14 (.544)	3.2 (.635)	2.298 (NS)
Process analysis (e.g., gathering systems requirements; systems analysis)	3.11 (.586)	3.16 (.640)	1.168 (NS)
Design skills (e.g., systems design; ER modeling; dimensional modeling; data modeling)	3.07 (.686)	3.16 (.739)	3.282 (NS)
System implementation skills	3.15 (.541)	3.23 (.607)	4.444*
System auditing and information assurance	3.12 (.589)	3.17 (.605)	1.72 (NS)
Programming skills (e.g., C#, XML, VB, Java)	3.26 (.667)	3.36 (.676)	4.026*
Business analytics skills (e.g., data mining, online analytics processing systems)	3.18 (.612)	3.26 (.659)	2.757 (NS)
Database management skills (e.g., manage SQL server, ORACLE DB)	3.22 (.607)	3.24 (.616)	0.242 (NS)
Networking skills (e.g., LAN/WAN; setting up networks; wireless networks)	3.17 (.646)	3.28 (.635)	5.883*
Project management skills (e.g., project budgeting; project planning; project risk management)	3.01 (.614)	3.22 (.647)	22.217***
Web development skills	3.14 (.536)	3.28 (.654)	9.983**
IT security	3.33 (.698)	3.34 (.640)	0.06 (NS)
IT architecture/infrastructure	3.37 (.719)	3.33 (.657)	0.715 (NS)
Ability to learn and employee new technologies	3.03 (.485)	3.21 (.620)	23.27***
Ability to understand technological trends	3.18 (.608)	3.3 (.661)	7.634**

*p<0.05 ; **p<0.01 ; ***p<0.001 ; NS: Not significant

Appendix F. Investigating Between Gender Difference for Latino Women and Men in Gender Stereotyping of IT Skills			
	Means (Standard Deviation) Latino Women and Men		ANOVA Test - F statistics Level of Sig or NS
IT Skills	N= 193 Latino Females	N= 272 Latino Males	
Communication skills (e.g., verbal, written, presentation skills)	2.73 (.645)	2.92 (.742)	7.8**
Ability to work in teams	2.85 (.571)	3.03 (.718)	8.336**
Negotiation skills	3.07 (.753)	3.26 (.822)	6.612*
Leadership skills	3.06 (.551)	3.43 (.705)	36.99***
Customer relationship skills	2.64 (.730)	2.78 (.754)	4.028*
Workplace relationship skills	2.68 (.778)	2.92 (.747)	11.639**
Initiative	2.93 (.550)	3.17 (.632)	17.572***
Dependability	2.83 (.610)	3.06 (.719)	13.486***
Adaptability	2.81 (.626)	3.16 (.688)	30.506***
Ability to handle ambiguity	2.92 (.612)	3.08 (.663)	7.211**
Ability to work under pressure	3.01 (.641)	3.34 (.685)	28.743***
Openness to new experiences	2.83 (.680)	3.06 (.671)	12.101**
Creativity	2.62 (.713)	2.84 (.799)	9.494**
Critical thinking	2.97 (.438)	3.08 (.664)	3.557 (NS)
Ability to engage in independent learning	2.95 (.580)	3.12 (.614)	8.456**
Ability to train end-users and peers	2.87 (.594)	3.06 (.660)	9.588**
Analytical ability	3.04 (.509)	3.18 (.612)	6.302*
Problem solving skills	2.94 (.496)	3.2 (.582)	26.26***
Business knowledge (knowledge about business functions)	3.07 (.451)	3.29 (.649)	16.217***
Domain knowledge (e.g., health care industry; telecommunications industry)	3.04 (.607)	3.06 (.596)	0.112 (NS)
Sensitivity to organizational culture and politics	2.72 (.761)	2.74 (.787)	0.143 (NS)
Ethics	2.84	2.97	4.968*

	(.527)	(.648)	
Professionalism	2.94 (.556)	3.08 (.602)	6.793**
Global awareness	2.93 (.617)	3.03 (.689)	2.502 (NS)
Integrating enterprise applications	3.14 (.496)	3.18 (.544)	0.665 (NS)
Process analysis (e.g., gathering systems requirements; systems analysis)	3.13 (.477)	3.17 (.598)	0.696 (NS)
Design skills (e.g., systems design; ER modeling; dimensional modeling; data modeling)	3.03 (.680)	3.07 (.789)	0.461 (NS)
System implementation skills	3.23 (.540)	3.21 (.560)	0.126 (NS)
System auditing and information assurance	3.13 (.513)	3.14 (.622)	0.008 (NS)
Programming skills (e.g., C#, XML, VB, Java)	3.28 (.659)	3.45 (.707)	6.684*
Business analytics skills (e.g., data mining, online analytics processing systems)	3.07 (.604)	3.24 (.643)	8.819**
Database management skills (e.g., manage SQL server, ORACLE DB)	3.15 (.562)	3.29 (.644)	6.249*
Networking skills (e.g., LAN/WAN; setting up networks; wireless networks)	3.22 (.760)	3.36 (.726)	4.411*
Project management skills (e.g., project budgeting; project planning; project risk management)	2.97 (.581)	3.23 (.718)	16.451***
Web development skills	3.2 (.617)	3.31 (.671)	3.052 (NS)
IT security	3.34 (.651)	3.46 (.707)	3.127 (NS)
IT architecture/infrastructure	3.3 (.700)	3.35 (.654)	0.724 (NS)
Ability to learn and employee new technologies	3.09 (.547)	3.2 (.568)	4.404*
Ability to understand technological trends	3.12 (.569)	3.34 (.628)	14.83***

*p<0.05 ; **p<0.01 ; ***p<0.001 ; NS: Not significant