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GENDER DIFFERENCES IN STUDENTS' PERCEPTIONS OF IS PROFESSIONALS AND THE ROLE OF THE INTRODUCTORY IS COURSE

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Abstract:

Declining enrollments has been a major concern for the Information Systems (IS) community over the last decade. While there are many issues to consider, one possible explanation for this decline is the negative stereotypical image students hold about IS professionals. Moreover, the underrepresentation of women in the IS field, has also been linked to the negative stereotypical image of IS professionals. There is a lack of empirical research that investigates the image of IS professionals in general and women's perceptions in particular. To address this research gap, this study investigated students' stereotypes of IS professionals and whether female and male students differed in terms of their perceptions of IS professionals. The study also examined the influence of the introductory IS course in shaping female and male students' perceptions. The findings revealed that female and male students attribute some similar and some different characteristics to IS professionals. The study confirmed that the introductory IS course plays an important role on how students view the IS field.

Keywords: *Education, gender, information systems, introductory IS course, IS careers, IS enrolments, stereotypes, underrepresentation, women.*

I. INTRODUCTION

Over the last decade, declining enrollments in Information Systems (IS) and related disciplines has been a major concern for academic institutions offering IS degrees and companies that are in need of hiring qualified information technology (IT) professionals. Student enrollment in IS/IT programs in general has fallen by as much as 70 percent since late 1990s [Dick et al., 2007; Street et al., 2008] in the United States. Many universities in Europe have also reported similar sharp drops in enrollments. Paradoxically, career opportunities in the IS profession continue to abound [Panko, 2008]. For example, in the United States, IT field is expected to add about 1.4 million new jobs by 2020 [NCWIT, 2013; Laudon, 2011]. Even though anecdotal evidence suggests that IS enrollments have started to slowly increase; estimations are that in the near future, there will not be enough graduates to fulfill the increasing demand [NCWIT, 2013; Lynch, 2007].

To make matters worse, despite the shortage of IT professionals, women are largely underrepresented in the IT field. In 2011, women earned only 18 percent of undergraduate IS degrees [NCWIT, 2013] and, alarmingly, the proportion of women pursuing IS degrees has been declining [NCWIT, 2013; Ahuja et al., 2006]. These statistics mirror industry, as women comprise 57 percent of the labor force, but only a mere 26 percent of the IS workforce [NCWIT, 2013]. Given the inevitable benefits of having a diverse workforce in today's global economy; failure to tap half of all qualified individuals presents a major hurdle for the long-term viability of the IS discipline, as well as industry and economy [Ahuja and Thatcher, 2005]. Therefore, attracting more women to the field of IS represents an extremely important issue to consider.

One of the main reasons cited for declining enrollments in IS involves the negative stereotypes students hold about IS professionals. Negative stereotypes have also been repeatedly reported as a major contributor to the underrepresentation of women in IS [Ahuja, 2002; Lee, 2005;

Rettenmayer et al., 2007]. However, there is a lack of empirical research that investigates the image of IS professionals as well as the role gender plays in shaping students' perceptions. To date, most of the studies that investigate stereotypes and women's underrepresentation have been conducted in the Computer Science (CS) domain. Given the distinction between CS and IS disciplines, there might be differences between the stereotypical images of CS and IS professionals as well as the reasons for the underrepresentation of women in these two disciplines. Yet, there is very limited academic research that focuses on understanding the image of IS professionals and the factors that facilitate or inhibit women's decisions to pursue IS degrees [Beyer, 2008]. Therefore, the purpose of this study is to address this research gap. More specifically this study will (a) investigate the stereotypes of IS professionals as perceived by students; and (b) examine whether female and male students differ in terms of their perceptions of IS professionals. The study will also (c) examine the influence of the introductory IS course in shaping female and male students' perceptions as this course plays a significant role in busting prevailing myths about the IS profession and in attracting larger pools of students to the discipline.

II. BACKGROUND LITERATURE

Gender

Women are theorized to differ psychologically from men. At an early age, children learn behaviors and information specific to gender. Beyond absorbing gender-related content, children process new information through an ever evolving gender schema, developed through continued interactions with their environment. Children also adapt by developing schematic selectivity during the development, shaping an individual-level gender schema. The self-concept that emerges as a result is used as a lens through which a person determines his or her self-worth, resulting in a self-fulfilling prophecy known as sex-typing [Bern, 1981].

The concept of gender schema is consistent with theories developed to predict the role of women in the information technology profession. Individual Differences Theory (IDT) suggests that a range of socio-cultural influences shape a person's inclination to participate in a specific profession. For instance, a woman bases her inclination to participate in the IT profession on socio-cultural experiences [Trauth 2002]. In this respect, gender schemas are naturally related to occupational choices and learning activities. Because men and women perceive themselves differently in relation to their work, career choices are often shaped by gender perceptions [Ahuja et al. 2006]. In educational settings, attitudes towards certain subjects are partially determined by gender schemas. For instance, a multitude of studies have established gender's relationship to technology related self-efficacy, a key predictor of IT related career choices and technology usage.

Stereotypes

Stereotypes are defined as cognitive structures containing the perceiver's generalized assumptions about the members of a social group [Hamilton and Troiler, 1986; Wittenbrink et al., 1997]. Stereotypes may be positive (e.g., IS professionals are smart people) or negative (e.g., IS professionals are nerds) [Dasgupta and Asgari, 2004]. They may be accurate or inaccurate regarding the average characteristics of a group [Leyens et al., 1994].

Stereotypes about a particular domain may influence students' identification with the domain in question [Smith et al., 2005; Steele, 1997]. Students tacitly assess their prospects in a particular domain, and broadly speaking, their identification increases when the prospects of the domain are favorable, and decreases when the prospects are unfavorable [Steele 1997]. In this respect, negative stereotypes about the IS profession may make it more difficult for students to identify themselves with the domain, and can cause them to shy away from the discipline.

A review of the literature suggests that a myriad of studies have been conducted to capture the occupational stereotypes of computer scientists and the CS profession. Due to the under representation of women in the discipline; most of these studies have either investigated the

perceptions of females only or compared the female and male students' views of computer professionals [Carter, 2006; Craig et al., 2002; Margolis and Fisher, 2003; Teague, 2002; Tjaden and Tjaden, 2000]. These studies have found that the CS profession is burdened by heavy negative stereotypes about the nature of the work these individuals do and the traits they possess and these negative stereotypes makes it harder for women to enter the CS profession. It has been assumed that similar stereotypes also exist in the IS field and that women tend to shy away from the IS discipline due to gender related negative stereotypes. However, most of the information we have about the image of IS professionals and women's perceptions is anecdotal as to date only a limited number of studies have been conducted in this area.

Recently, Joshi and Schmidt (2006) conducted a study to understand students' stereotypes of IS professionals and compared the perspectives of male and female students. The major limitation of this study was that these perceptions were captured using qualitative methods (i.e. open ended questions).

Until recently sounds instruments to measure IS stereotypes did not exist. Akbulut [2009] created a survey instrument that measures stereotypes of IS professionals. Utilizing this instrument the author later examined students' perceptions of IS professionals. The author observed that students' perceptions about IS professionals were not as negatively as previously thought, and their perceptions shifted towards the more positive end of the spectrum during the semester [Akbulut, 2013].

III. RESEARCH METHOD

Given the objectives of the study, the survey methodology was utilized to collect the data. The sample consisted of students enrolled in different sections of an introductory level Management Information Systems (MIS) course at the business school of a large state university located in the United States. Participation in the study was voluntary and participating students received extra credit as an incentive. A web-based survey was administered during the first and last week of classes. A total of 318 usable responses were obtained. Forty five percent of the respondents were female and respondents averaged 21.4 years of age ($SD = 2.14$).

The multidimensional scale developed by Akbulut-Bailey [2009] was used to measure the different dimensions of the stereotypes construct. The construct included 5 dimensions: *geeks*, *gender*, *intelligence*, *managerial* and *technical*. Each dimension consisted of 3 items that were measured by using a seven-point Likert-type scale, with a range from 1 (Strongly Disagree) to 7 (Strongly Agree).

This scale is a theoretically and psychometrically sound instrument that has exhibited excellent levels of reliability and validity in previous studies with different samples [Akbulut-Bailey, 2009]. Regardless, the psychometric properties of the measures were assessed and reconfirmed before the data was analyzed. Due to space limitations, the detailed test results are not reported here, but can be obtained from the authors.

IV. RESULTS

The sample was first divided into two groups according to gender. Then each group was further divided into two groups according to time; representing the beginning and end of the semester.

T-tests were employed to investigate the research questions. First; for each group, one-sample t-tests were employed to detect the presence of stereotypes along each item. Second, independent sample t-tests were employed to identify whether there was a statistically significant difference between the male and female students in terms their perceptions of IS professionals at the beginning and then at the end of the semester. Similarly, independent sample t-tests were again conducted to identify whether there was a statistically significant difference within each gender group between the beginning of the semester and end of the semester. The results are provided below.

Table I. Stereotypes at the Beginning of the Semester – Females vs. Males

Stereotypes	Time 0 Females				Time 0 Males				Comparison	
	Mean	SD	t-value	sig (df=65)	Mean	SD	t-value	sig (df=93)	t- value	sig (df=158)
Geeks	3.81	1.34	-1.163	NS	4.00	1.28	.000	NS	-0.916	NS
Gender	4.37	1.09	2.786	**	4.07	1.10	.689	NS	1.682	*
Intelligence	5.86	0.77	19.394	***	5.70	1.04	15.871	***	1.067	NS
Managerial	4.59	1.18	4.020	***	4.59	1.15	5.021	***	-0.53	NS
Technical	5.17	0.63	14.972	***	4.52	1.10	4.585	***	4.267	***

*p<.05, **p<.01, ***p<.001

For the geeks dimension, the t-tests revealed a non-significant negative value for female students and a non-significant positive value for male students, meaning that the item scores were not significantly different than the scale midpoint for both groups. This indicates that both female and males students were neutral about the geeky or nerdy features of IS professionals at the beginning of the semester. A comparison of the mean scores also showed that, even though the mean score for male students was slightly higher than the mean score for female students; the difference between the two groups was not statistically significant.

For the gender dimension, the t-tests revealed a significant positive value for female students meaning that the item scores were significantly higher than the scale midpoint. For the male students, the item score was slightly higher than the scale midpoint and the t-test revealed a non-significant positive value. These findings state that female students believed that the IS profession was dominated by men and men, not women, pursued careers in the IS field. However, male students were neutral about the gendered view of the profession. Moreover, a comparison of the mean scores showed that, there was a significant difference between the two groups.

For the intelligence dimension, the t-tests revealed significant positive values for both female and male students, meaning that the item scores were significantly higher than the scale midpoint for both groups. This indicates that both groups of respondents agree that IS professionals tend to be intelligent. A comparison of the mean scores showed that, the mean score for female students was slightly higher than the mean score for male students; however, the difference between the two groups was not statistically significant.

For the managerial dimension, the t-tests revealed significant positive values for both female and male students were significantly higher than the scale midpoint for both groups. This indicates that both groups of respondents agree that IS professionals possess managerial skills. A comparison of the mean scores showed that, the mean score for female students and the mean score for male students were the same and hence the difference between the two groups was not statistically significant.

For the technical dimension, the t-tests revealed significant positive values for both female and male students, meaning that the item scores were significantly higher than the scale midpoint for both groups. This indicates that both groups of respondents agree that IS I professionals tend to have a strong technical background. A comparison of the mean scores showed that the mean score for female students was considerably higher than the mean score for male students. The difference between the two groups was statistically significant.

Table II. Stereotypes at the End of the Semester – Females vs. Males

Stereotypes	Time 1 Females				Time 1 Males				Comparison	
	Mean	SD	t-value	sig (df=63)	Mean	SD	t-value	sig (df=93)	t-value	SIG (df=156)
Geeks	3.34	1.47	-3.576	**	3.35	1.18	-5.284	***	-0.051	NS
Gender	3.92	1.16	-.573	NS	3.81	1.09	-1.699	NS	0.595	NS
Intelligence	6.16	0.52	33.528	***	5.97	0.93	20.563	***	1.501	NS
Managerial	4.86	0.86	8.004	***	4.94	1.00	9.122	***	-0.512	NS
Technical	4.92	0.83	8.820	***	4.03	0.92	.373	NS	6.129	***

*p<.05, **p<.01, ***p<.001

For the geeks dimension, the t-tests revealed significant negative values for both female and male students, meaning that the item scores were significantly lower than the scale midpoint for both groups. This indicates that at the end of the semester, both female and males students disagreed with the statements about IS professionals being nerds. A comparison of the mean scores also showed that, even though the mean score for male students was slightly higher than the mean score for female students; the difference between the two groups was not statistically significant.

For the gender dimension, the t-tests revealed non-significant negative values for both female and students meaning that the item scores were not significantly different than the scale midpoint. These findings state that at the end of the semester, neither female nor male students believed that the IS profession was dominated by men and men, not women pursued careers in the IS field. Both groups of students were neutral about the gendered view of the profession. Accordingly, a comparison of the mean scores showed that, there was no significant difference between the two groups.

For the intelligence and managerial dimensions, the t-tests revealed significant positive values for both female and male students meaning that the item scores were significantly higher than the scale midpoint for both groups. This indicates that at the end of the semester, both groups of respondents agree that IS professionals tend to be intelligent and possess managerial skills. A comparison of the mean scores showed that, the mean score for female students was slightly higher than the mean score for male students for the intelligence dimension and slightly lower for the managerial dimension. However, the difference between the two groups was not statistically significant.

For the technical dimension, the t-tests revealed significant positive values for both female and male students meaning that the item scores were significantly higher than the scale midpoint for both groups. This indicates that both groups of respondents agree that IS professionals tend to do a lot of programming. A comparison of the mean scores showed that the mean score for female students was considerably higher than the mean score for male students. The difference between the two groups was statistically significant.

The effects of the introductory IS course on stereotypes according to gender

It was observed that students' perceptions shifted during the course as they gained more information about the IS field in general, and the nature of IS careers in particular. The results are provided below:

Table III. Stereotypes of Female Students

Stereotypes	Time 0 Females				Time 1 Females				Comparison	
	Mean	SD	t-value	sig (df=65)	Mean	SD	t-value	sig (df=93)	t-value	sig (df=128)
Geeks	3.81	1.34	-1.163	NS	3.34	1.47	-3.576	**	1.984	*
Gender	4.37	1.09	2.786	**	3.92	1.16	-.573	NS	2.312	*
Intelligence	5.86	0.77	19.394	***	6.16	0.52	33.528	***	-2.581	*
Managerial	4.59	1.18	4.020	***	4.86	0.86	8.004	***	-1.529	NS
Technical	5.17	0.63	14.972	***	4.92	0.83	8.820	***	1.998	*

*p<.05, **p<.01, ***p<.001

For the geeks dimension, the t-test revealed a non-significant negative value at the beginning of the semester. However, at the end of the semester, the t-test revealed a significant negative value. This indicates that at the beginning of the semester female students neither agreed nor disagreed with the statements about the geeky or nerdy features of IS professionals. However, at the end of the semester, the respondents disagreed with such statements. As such, there was a positive shift in female students' perceptions during the semester. A comparison of the beginning and end of the semester mean scores also showed that there was a statistically significant decrease in the mean scores at the end of the semester.

For the gender dimension, the t-tests revealed a significant positive value for female students at the beginning of the semester and a non-significant negative value at the end of the semester. These findings state that female students initially believed that the IS profession was dominated by men, but their perceptions changed throughout the semester and they were neutral about the gendered view of the profession at the end of the semester. Moreover, a comparison of the mean scores showed that, there was a significant decrease in the mean scores at the end of the semester.

For the intelligence dimension, the t-test revealed significant positive values both at the beginning and end of the semester, meaning that the item scores were significantly higher than the scale midpoint. This indicates that female students agreed that IS professionals tend to be intelligent. A comparison of the beginning and end of the semester mean scores showed that there was a significant increase in the mean scores at the end of the semester. These findings together indicate that female students' perceptions have strengthened throughout the semester.

For the managerial dimension, the t-test revealed significant positive values both at the beginning and end of the semester meaning that the item scores were significantly higher than the scale midpoint. This indicates that female students agree that IS professionals tend to possess good managerial skills. A comparison of the beginning and end of the semester mean scores showed that there was not a significant change in the mean scores at the end of the semester.

For the technical dimension, the t-test revealed significant positive values both at the beginning and end of the semester, meaning that the item scores were significantly higher than the scale midpoint. This indicates that female students agree that IS professionals tend to have a strong technical background. A comparison of the beginning and end of the semester mean scores showed that there was a significant decrease in the mean scores at the end of the semester. These findings together indicate that females recognize the technical skills that IS professionals have, but their perceptions about the need for strong technical skills have weakened throughout the semester.

Table IV. Stereotypes of Male Students

Stereotypes	Time 0 Males				Time 1 Males				Comparison	
	Mean	SD	t-value	sig (df=65)	Mean	SD	t-value	sig (df=93)	t- value	sig (df=158)
Geeks	4.00	1.28	.000	NS	3.35	1.18	-5.284	***	3.591	***
Gender	4.07	1.10	.689	NS	3.81	1.09	-1.699	NS	1.687	NS
Intelligence	5.70	1.04	15.871	***	5.97	0.93	20.563	***	-1.873	NS
Managerial	4.59	1.15	5.021	***	4.94	1.00	9.122	***	-2.208	*
Technical	4.52	1.10	4.585	***	4.03	0.92	.373	NS	3.287	**

*p<.05, **p<.01, ***p<.001

For the geeks dimension, the t-test revealed a non-significant negative value at the beginning of the semester for the male students. However, at the end of the semester, the t-test revealed a significant negative value. This indicates that at the beginning of the semester male students neither agreed nor disagreed with the statements about the geeky or nerdy features of IS professionals. However, at the end of the semester, they disagreed with such statements. This indicates that there was a positive shift in male students' perceptions during the semester. A comparison of the beginning and end of the semester mean scores also showed that there was a statistically significant decrease in the mean scores at the end of the semester.

For the gender dimension, the t-test revealed non-significant positive values both at the beginning and end of the semester, meaning that the item scores were not significantly different than the scale midpoint. This indicates that male students neither agreed nor disagreed that the IS profession was dominated by men and their perceptions did not change during the semester.

For the intelligence, the t-test revealed significant positive values both at the beginning and end of the semester, meaning that the item scores were significantly higher than the scale midpoint. This indicates that male students agree that IS professionals tend to be intelligent. A comparison of the beginning and end of the semester mean scores showed that there was no significant increase in the mean scores at the end of the semester.

For the managerial dimension, the t-test revealed significant positive values both at the beginning and end of the semester, meaning that the item scores were significantly higher than the scale midpoint. This indicates that respondents agree that IS professionals tend to be intelligent. A comparison of the beginning and end of the semester mean scores showed that there was a significant increase in the mean scores at the end of the semester.

For the technical dimension, the t-test revealed a significant positive value at the beginning of the semester. However, at the end of the semester, the t-test showed a non-significant positive value. This indicates that at the beginning of the semester, male respondents agreed that IS professionals tend to have a strong technical background. However, at the end of the semester, male students neither agreed nor disagreed about the need for a strong technical background. A comparison of the beginning and end of the semester mean scores showed that there was a significant decrease in the mean scores at the end of the semester.

V. CONCLUSION

The findings of this study provides important insights into a) understanding students' stereotypical image of IS professionals b) whether female and male students differ in terms of their perceptions

of IS professionals, and c) the impact of the introductory MIS course in shaping female and male students' stereotypical image of IS professionals.

The literature has generally assumed that IS professionals are viewed as geeks, mostly male, intelligent, technically oriented, and lacking managerial skills. The study uncovered that some stereotypical perceptions existed along most of these dimensions, particularly at the beginning of the semester before students were formally exposed to the IS discipline. When students were surveyed at the beginning of the semester, both female and male students were neutral about the geeky or nerdy features IS professionals. Female students believed that the IS profession was typically dominated by men, whereas, male students neither agreed nor disagreed with the gendered view of the profession. Both groups of students agreed that IS professionals possessed good managerial skills and were intelligent. Both female and male student groups also believed that IS professionals were technically oriented. Female students attributed more technical skills to IS professionals. Therefore, we can conclude that at the beginning of the semester both female and male students attributed some similar characteristics to IS professionals. However, there are also some differences in the perceptions of both groups. Female students thought that IS profession was typically for men, not women. Moreover, compared to male students, female students found IS professionals to be more technically oriented.

When the students were again surveyed at the end of the semester, both groups of students disagreed that IS professionals were geeks. Both female and male students were neutral about the IS field being dominated by men. Both groups of students agreed that IS professionals were intelligent and possessed managerial skills. Female students agreed that IS professionals had good technical skills; however, male students neither agreed nor disagreed. These results indicate that, at the end of the semester, the differences between female and male students decreased. The only difference in terms of stereotypes was that compared to male students, female students thought IS professionals to be more technically oriented.

When we look at the impact of the introductory IS course on female and male students' perceptions, we can see that the course has had a positive impact on both groups of students' perceptions. For example, at the beginning of the semester, female students were neutral about IS professionals being geeks, whereas at the end of the semester, female students no longer attributed any geeky or nerdy characteristics to IS professionals. Female students' perceptions about the gendered view of the IS profession has also changed. While female students believed that the profession was dominated by men at the beginning of the semester, they neither agreed nor disagreed with this gendered view of the profession at the end of the semester. Female students' beliefs about the IS professionals being intelligent increased throughout the semester. Female students' beliefs about regarding the importance of managerial skills also increased, but the change was not statistically significant. In terms of the technical skills, female students attributed less importance to the needs for a technical background.

Male students' perceptions of IS professionals also shifted during the semester. Similar to the female students, at the beginning of the semester, male students were neutral about IS professionals being geeks, whereas at the end of the semester, male students no longer attributed any geeky or nerdy characteristics to IS professionals. Male students neither agreed nor disagreed that the profession was male dominated, and their views stayed the same during the semester. Male students' beliefs about IS professionals being intelligent also strengthened, but the change was not statistically significant. Male students' beliefs about the IS professionals possessing managerial skills significantly increased throughout the semester. In terms of the technical skills, male students no longer argued that IS professionals had strong technical skills, they were neutral.

These findings together indicate that students' image of IS professionals might not be as negative as previously thought and the negative perceptions they might have can be overcome with the use of appropriate mechanisms. First of all, we have to recognize the fact that today's college students are longtime users of technology. In other words, today's college students have grown up with technology and view it as an integral part of their everyday life [George et al., 2005; Jones, 2002]. As such, it is possible that, even though IS is much more than technology, students who are well

versed in technology have a somewhat more accurate understanding of technology related careers, including the IS profession.

The findings also have important implications in terms of the role gender plays in shaping students' perceptions of IS professionals. The main differences between female and male students were related to the IS profession being dominated by men and the need for a strong technical background. Especially at the beginning of the semester, female students were considering IS field to be a male oriented field. They were also concerned about the field being too technical. This can be attributed to the fact that female students usually exhibit low levels of computer self-efficacy in general, and low levels of self confidence in their ability to perform as an IS professional [Akbulut, 2009].

The study also confirmed the important influence of the introductory IS course on how students view the IS field. During the semester, students perceptions about IS professionals significantly shifted towards the more positive end of the spectrum as they gained more information about the IS field in general, and the nature of IS careers in particular.

In this respect, our findings confirm the importance of the introductory course. For most students the introductory course is their first formal introduction to the IS field and, moreover, the majority of these students are yet to decide what major to pursue. Therefore, with careful planning and implementation, introductory IS courses can be leveraged to dispel any misconceptions or stereotypes students might have [Firth et al., 2008] and to attract more students to the discipline [Akbulut and Looney, 2007; Dick, Granger, Jacobson, and Van Slyke, 2007; George et al., 2005; Looney and Akbulut, 2007]. Especially in order to attract more women to the IS discipline, educators need to create a stereotype threat-free environment. In order to achieve these objectives, the introductory course should emphasize the strategic role IS plays for businesses, society, and for individuals; rather than merely focusing on technical concepts [Firth et al., 2008; George et al., 2005]. The contents and the design of the current course were instrumental in achieving this objective. Emphasis was given to how information systems impact individuals, organizations, and the society we live in. The course reinforced the point that studying IS did not necessarily prepare students to perform a set of discrete technical tasks [Firth et al., 2008], but rather emphasized the use of information systems as a tool to achieve organizational objectives.

The content of the course and the IT used in the classroom should be up to date, relevant and interesting to both genders. The current course was designed to focus on the latest information systems topics and provide insights on the current status, issues/challenges and emerging trends of information systems. Moreover, the course exposed students to different innovative and interesting software applications. The assignments, projects, case studies, etc. that were used in the course were created/selected carefully to avoid any gender bias and to incorporate material that was appealing to both genders.

The course should expose students to different career options that are available to IS professionals that would be attractive to both male and female students and instill an understanding of the positive aspects of becoming an IS professional. Inviting guest speakers or arranging company visits would also prove helpful in providing students firsthand exposure to issues facing IS professionals on a day-to-day basis. Particularly connecting female students with successful female IS professionals can be fruitful. At our current institution, we achieved these objectives by inviting guest speakers from major global and local companies. Students were encouraged to attend a speaker series program which was conducted twice a semester. The agenda included presentations by high level executives as well as by recent IS graduates and current IS majors. We found exposing students especially to peers and alumni who have reaped the rewards of the IS field was extremely fruitful.

The instructor teaching the introductory IS course is extremely important as well [Firth et al., 2008; George et al., 2005; Looney and Akbulut, 2007]. The instructor should be a business and IS savvy professional who would serve as role model to students [George et al., 2005]. Assigning female faculty to teach the introductory course can prove helpful in attracting female students to the discipline and overcoming their perceptions about the field being only for men. The teaching

assignments at our institution were mostly arranged with this understanding in mind and our most effective teachers were placed in our introductory IS course.

Limitations

The findings of the study must be interpreted in the light of its limitations. The sample used could limit the ability to generalize the study findings. Since the study only surveyed students enrolled in introductory IS courses at one particular university, the sample was relatively homogenous. As such, future studies should address the issue of generalizability through replication in different contexts using contemporary samples. Additionally, this study only focused on college students. Studies targeting high school students are needed to determine whether prevailing negative stereotypes of IS professionals exist among these younger students.

Further research is also needed to investigate the role stereotypes play in facilitating or inhibiting student interest in and pursuit of IS majors and careers. Students' having a better and more accurate picture of IS professionals might not necessarily transfer directly into an increase in the number of students pursuing IS degrees and careers.

In conclusion, these study's findings have important implication for IS programs, as the information gained in this study facilitates a deeper understanding of IS stereotypes of female and male students. University educators can use this information to design and implement specific intervention strategies to challenge the stereotypical image of IS professionals and attract larger pools of students to the IS discipline.

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APPENDIX: ITEMS

GEEKS

GEEKS1: IS professionals tend to be nerds.

GEEKS2: IS professionals tend to be technology geeks.

GEEKS3: When I think about IS professionals, I think about computer geeks.

GENDER

GENDER1: The IS profession is dominated by men.

GENDER2: Women typically avoid careers in IS.

GENDER3: Men, rather than women, typically pursue careers in IS.

INTELLIGENCE

INTELLIGENCE1: IS professionals tend to be intelligent.

INTELLIGENCE2: IS professionals tend to have good problem solving skills.

INTELLIGENCE3: IS professionals tend to be willing to keep up with technology.

MANAGERIAL

MANAGERIAL1: IS professionals tend to have good managerial skills.

MANAGERIAL2: IS professionals tend to have good communication skills.

MANAGERIAL3: IS professionals tend to have good people skills.

TECHNICAL

TECHNICAL1: IS professionals do a lot of programming.

TECHNICAL2: IS professionals tend to have a strong background in math and science.

TECHNICAL3: Computer science and IS professionals basically do the same type of work.

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