A Gender based Investigation of Stereotypical Barriers in Management Information Systems Profession

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Abstract

Negative stereotypes are assumed to be one of the major barriers preventing students from pursuing Information Technology (IT) degrees and careers. An important worldwide problem, the underrepresentation of women in IT, has also been linked to negative stereotypes. In today's information age, overcoming these stereotypes to attract more students to the IT field is extremely important for the advancement of our economy and society.

Previous research has focused on students' stereotypes in the technical IT fields. There is a lack of research that investigates students' stereotypes in the newer, more business focused IT subfields such as the Management Information Systems (MIS) field. In this respect, this study investigated students' stereotypical image of MIS professionals and compared male and female students' perceptions. It also examined whether the introductory level course played a role in altering female and male students' stereotypical image of MIS professionals. The findings carry several important implications for MIS programs and educators.

Keywords: Barriers, Gender, Introductory MIS Course, Management Information Systems, Management Education, Stereotypes, Underrepresentation, Women.

Introduction

Underrepresentation of women in Science, Technology, Engineering and Math (STEM) careers is a well-known global problem. Although, research indicates some strides have been made in certain STEM fields such as health, life sciences and math; the number of women pursuing information technology (IT) related occupations has been on a steady decline[13,20,24].

While the role of IT in our everyday lives and the operations of companies continues to increase rapidly, creating many attractive job opportunities in every industry; there continues to be a major IT talent shortage[20,26]. Women's underrepresentation in the field, not only amplifies this talent shortage in the short-term; but also creates many detrimental problems in the long-term. Therefore, it is necessary to reduce the entry barriers and attract more students in general and more female students in particular to pursue degrees in various IT fields.

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One of the key barriers preventing students from pursuing IT degrees has been the negative stereotypical image of IT professionals. Even in today's information age, the IT industry is still dogged by the image of geeky and socially inadequate and isolated IT employees, putting off young people, especially women, from pursuing IT degrees and careers[15,19].

Prior research on stereotypes and women's underrepresentation in IT has mainly focused on the technical Computer Science (CS) domain. However, more recent research has indicated that there might be major differences among the various IT subfields and certain newer subfields of IT, such as Management Information Systems (MIS) may be more attractive to women than CS. Compared to the technical CS field, MIS is a business function like human resources and marketing. MIS focuses on moving information about people, processes and products across the organization to facilitate decision making and problem solving.

Therefore, MIS has a greater applied business emphasis along with a social component, which is more associated with the more female-friendly professional cultures that women are generally more interested in[1,16]. Regardless, even though MIS is considered as a more attractive option for women, female students still tend to shy away from pursuing degrees and consequently careers in the MIS field.

There is very limited academic research that focuses on understanding the barriers preventing students from pursuing MIS degrees. Furthermore, students' stereotypical image of MIS professionals and the role gender plays in shaping these perceptions are yet to be investigated. Therefore, the purpose of this study is to address this research gap. More specifically this study will examine the following: (a) the stereotypes of MIS professionals as perceived by students and whether there are differences between female and male students in terms of these stereotypes and (b) the influence of the introductory MIS course in shaping female and male students' stereotypes.

Review of Literature

Stereotypes are beliefs and generalized assumptions about the attributes of a particular group of people[22]. Even though there may be some validity to certain stereotypes; usually, stereotypes are over-generalized and/or exaggerated assumptions and are not accurate reflections of reality. When negative, stereotypes about a group typically lead to prejudice about the group as well as the individual members of that group[9]. In this respect, prevailing stereotypes about

the MIS profession may deter students from pursuing an MIS career path.

Previous research on IT stereotypes focused on the stereotypical image of computer scientists[5,7, 18, 23]. These studies found that computer scientists are assumed to be male, heavily technology oriented, intensely focused on computers and socially awkward personalities lacking interpersonal skills. Other similar stereotypes also include that being a computer scientist requires inborn brilliance and that CS is a socially isolating profession that does not involve working with others[19]. These stereotypes conflict with women's interpersonal orientations and the qualities valued in women by the society and make it difficult for women to identify themselves with the CS domain and pursue a career in this field[6,19].

It has been assumed that similar stereotypes also exist in the MIS field and serving as gatekeepers, they deter women from the MIS discipline[16]. However, we do not know much about students' stereotypes of MIS professionals. Most of the information we have about the image of MIS professionals and women's perceptions are anecdotal because so far only a limited number of studies have been conducted in this area. Moreover, since initially sound instruments to measure MIS stereotypes did not exist; these studies have been exploratory in nature[9].

Thomas and Allen[25] conducted a study to understand male and female students' perceptions of IT professionals. The study did not focus specifically on MIS professionals, but the study sample consisted of undergraduate business and IS students. The authors found significant differences between male and female students in terms of their perceptions of IT as a career and women in IT industry. They discovered that both groups had some misconceptions about IT careers with the female students attributing more negative stereotypes to IT work/workers[25].

Joshi and Schmidt[16] conducted the first study that specifically focused on students' stereotypes of MIS professionals. The authors investigated the perspectives of undergraduate business students to find out whether their images of MIS professionals were identical to the image of computer scientists. Using open-ended questions, they examined whether male and female students' perceptions were similar and whether their image of MIS professionals changed throughout the semester. The authors found that at the beginning of the semester, students attributed similar stereotypes to MIS and CS professionals.

By the end of the semester, students had developed a better understanding of the MIS profession and they acknowledged the significance of social, systems related and managerial skills. The authors also found differences between female and male students' stereotypes of MIS professionals, particularly at the beginning of the semester. As noted by the authors themselves, the major limitation of this study was

that students' perceptions were captured using qualitative methods. The authors encouraged researchers to use their study as a foundation and take advantage of quantitative research methods (particularly surveys) to confirm and validate their findings[16].

In order to address the need for empirical studies using quantitative methods, Akbulut[3] created and validated the first sound survey instrument to measure MIS stereotypes. The author generated a list of stereotypes from the CS and relevant literature as well as Joshi and Schmidt's study and then conducted a set of empirical analysis. The author's findings revealed a psychometrically sound instrument that measured MIS stereotypes in terms of five dimensions including: geeks, gender, intelligence, managerial and technical dimensions[3].

Utilizing this instrument, the author examined students' stereotypical image of MIS professionals and found that students' perceptions about MIS professionals were not as negatively as previously thought. Students disagreed that MIS professionals were geeks, that the MIS profession was typically dominated by men and that MIS professionals were too technically oriented. They agreed that MIS professionals possessed good managerial skills and were intelligent[3].

However, the major limitation of this study was that it captured students' stereotypes at the end of the semester after they had been exposed to the field of MIS. Students might have had negative stereotypes of MIS professionals when the course began and these perceptions might have shifted during the course as students gained more information about the MIS field. Moreover, this study did not investigate whether there were any differences between male and female students' stereotypes of MIS professionals. In order to address these limitations, this current study will capture students' stereotypes both at the beginning and at end of the semester and examine the differences between male and female students' perceptions at both points in time.

Methodology

Sample and Procedure: The survey methodology was used to collect the data. The sample consisted of students enrolled in an introductory level MIS course at the business school of a large, public university located in the United States. The survey was administered during the first and last week of classes. Participation in the study was voluntary and anonymous. A total of 200 usable responses were obtained. Forty two percent of the respondents were female and respondents averaged 21.1 years of age ($SD = 2.92$).

Construct Operationalization: In order to measure the five dimensions (geeks, gender, intelligence, managerial and technical) of the stereotypes construct, we used the multidimensional scale developed by Akbulut[3]. Each dimension consisted of three items and were measured by using a seven-point Likert-type scale, with a range from one (strongly disagree) to seven (strongly agree). This scale has

exhibited excellent levels of reliability and validity results in previous studies using different samples[3]. Regardless, as discussed below, the psychometric properties of the measures were reassessed and reconfirmed before the data was analyzed.

Reliability and Validity: The reliability of each stereotypes dimension (construct) was examined to ensure the items collectively measured their intended dimension consistently[14]. Both Cronbach's α and composite reliability scores were calculated to examine internal consistency (table 1). In all cases, the generally agreed upon lower limit of 0.70 for both types of reliability was achieved, confirming reliability of the scales[12,21].

Convergent validity was assessed at the individual item and construct levels by examining individual item loadings and the average variance extracted (AVE), respectively[12]. As shown in table 2, at the item level, all individual item loadings exceeded the 0.707 recommended level, indicating that the items converged adequately on their intended dimensions and no undesirable cross-loadings emerged[12,14]. Additionally, average variance extracted (AVE) values for each dimension exceeded the recommended threshold value of 0.50, confirming that the items collectively demonstrated convergent validity at the construct level (table 1).

Discriminant validity was examined by comparing the AVE associated with each dimension to the correlations among the dimensions[4]. In table 1, Diagonal elements (in bold) represent the square root of the AVE and the off-diagonal elements represent the correlations among dimensions. For each construct, the AVE exceeded the correlations between different constructs, confirming discriminant validity (table 1). Given the strong reliability and validity estimates, the psychometric properties of measures were reconfirmed.

Data Analysis and Results

We first divided the sample into two groups according to gender. Then we divided each group into two sub-groups according to time; representing the beginning and end of the semester.

In order to answer our research questions, we employed a set of T-tests. First; for each gender group, one-sample t-tests were conducted to detect the presence of stereotypes along each dimension. For each dimension, a mean score that is significantly different than the scale midpoint (4) would indicate the presence of a strong stereotype. The t-statistic could be used to detect the directionality of the stereotype. Second, we employed independent sample t-tests to identify whether there was a statistically significant difference between the male and female students in terms their stereotypes of MIS professionals both at the beginning and 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 discussed below.

Stereotypes of MIS Professionals: Female vs Male Students: We first investigated whether students held strong stereotypes along the five dimensions and compared the perceptions of female and male students.

Table 1
Construct Reliability, Correlations and Discriminant Validity

Constructs	α	CR	AVE	Constructs				
				Geeks	**Gender**	**Intelligence**	**Managerial**	**Technical**
Geeks	.868	.894	.778	**.882**				
Gender	.864	.892	.764	.356	**.874**			
Intelligence	.784	.871	.676	.064	.062	**.822**		
Managerial	.796	.865	.690	.378	.344	.318	**.831**	
Technical	.768	.792	.598	.272	.174	.012	.216	**.773**

Note: α: Cronbach's α. CR: Composite reliability. AVE: Average variance extracted

Table 2
Items and Loadings

Geeks1	.842	Gender 1	.874	Intelligence 1	.844
Geeks2	.868	Gender 2	.830	Intelligence 2	.798
Geeks3	.815	Gender 3	.889	Intelligence 3	.810
Managerial 1	.782	Technical 1	.806		
Managerial 2	.878	Technical 2	.732		
Managerial 3	.845	Technical 3	.740		

Beginning of the semester:
Geeks: At the beginning of the semester, both female and males students were neutral about the geeky and nerdy features of MIS professionals. 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.

Gender: At the beginning of the semester, female students believed that the MIS profession was dominated by men and MIS was a career pursued by men, not women. However, male students were neutral about the gendered view of the profession. Moreover, a comparison of the mean scores showed that the difference in perceptions between the two groups was statistically significant.

Intelligence and Managerial: For the intelligence and managerial dimensions, both groups of respondents agreed that MIS professionals tend to be intelligent with good problem-solving skills and possess managerial skills including people and communications skills. The difference between the two groups was not statistically significant for either dimension at the beginning of the semester.

Technical: Both female and male students agreed that MIS professionals tend to have a strong technical emphasis similar to that of a computer scientist including a need for a robust math and science background along with programming skills. The difference between the two groups

was statistically significant; with the mean score for female students being considerably higher than the mean score for male students. This indicates that female students placed greater emphasis on the need for high level of technical skills.

End of the semester
Geeks: At the end of the semester, both female and males students disagreed with the statements about MIS professionals being nerds and computer geeks. The difference between the two groups was not statistically significant.

Gender: The findings state that at the end of the semester, neither female nor male students believed that the MIS profession was dominated by men. Both groups of students were neutral about the gendered view of the profession. Accordingly, there was no significant difference between the two groups.

Intelligence and Managerial: At the end of the semester, both groups agreed that MIS professionals tend to be intelligent and possess managerial skills. 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.

Table 3
Stereotypes at the Beginning of the Semester – Females vs. Males

	Time 0 - Beginning of the semester Females				Time 0 - Beginning of the semester Males				Comparison	
Stereotypes	**Mean**	**SD**	**t-value**	**sig (df=83)**	**Mean**	**SD**	**t-value**	**sig (df=115)**	**t-value**	**sig (df=198)**
Geeks	3.83	1.30	-1.205	NS	3.95	1.27	-.390	NS	-.679	NS
Gender	4.38	1.07	3.261	**	4.05	1.07	.550	NS	2.130	*
Intelligence	6.15	.53	36.873	***	5.99	.86	25.033	***	1.440	NS
Managerial	4.61	1.11	5.002	***	4.62	1.13	5.958	***	-.102	NS
Technical	5.15	.60	17.333	***	4.48	1.09	4.821	***	4.996	***

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

Table 4
Stereotypes at the End of the Semester – Females vs. Males

	Time 1 - End of the semester Females				Time 1 - End of the semester Males				Comparison	
Stereotypes	**Mean**	**SD**	**t-value**	**sig (df=83)**	**Mean**	**SD**	**t-value**	**sig (df=115)**	**t-value**	**sig (df=198)**
Geeks	3.21	1.44	-5.007	***	3.33	1.21	-5.984	***	-.603	NS
Gender	3.90	1.15	-.791	NS	3.77	1.09	-2.295	*	.835	NS
Intelligence	5.85	.78	21.722	***	5.68	1.08	16.626	***	1.280	NS
Managerial	4.86	.88	8.896	***	4.89	1.02	9.444	***	-.264	NS
Technical	4.90	.84	9.834	***	4.00	.94	.033	NS	6.978	***

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

Technical: At the end of the semester, male students were no longer concerned about the strong technical emphasis for MIS professionals, however, female students agreed on the statements about MIS professionals' possessing strong technical backgrounds and skills. 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.

Effects of the Introductory MIS Course on Stereotypes According to Gender: It was observed that students' perceptions shifted during the course as they gained more information about the MIS field in and MIS careers. The results are provided below.

Female Students: Beginning vs. End of the Semester
Geeks: At the beginning of the semester, female students were not sure about the statements about the geeky or nerdy features of MIS professionals, but at the end of the semester, they totally 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 scores confirmed that the decrease was statistically significant.

Gender: Female students initially believed that the MIS profession was dominated by men and thought that men, not women, pursued careers in this field. However, 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.

Intelligence: For the intelligence dimension, both at the beginning and end of the semester, meaning that female students agreed that MIS professionals tend to be intelligent. However, there was a statistically significant decrease in the mean scores at the end of the semester. Even though female students still believed that MIS professionals were smart individuals, they were less concerned about their brilliance.

Managerial: For the managerial dimension, female students agreed that MIS professionals tend to possess good managerial skills both at the beginning and end of the semester. Moreover, even though there was an increase in the mean scores, the change was not statistically significant.

Technical: Both at the beginning and end of the semester, female students agreed that MIS professionals need to have a strong technical background and skills. 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 MIS professionals have, but their perceptions about the need for strong technical skills have weakened throughout the semester.

Male Students: Beginning vs. End of the Semester
Geeks: At the beginning of the semester, male students neither agreed nor disagreed with the statements about the geeky or nerdy features of MIS professionals. However, at the end of the semester, they disagreed with such statements. 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.

Gender: Findings indicate that male students neither agreed nor disagreed that the MIS profession was dominated by men at the beginning of the semester, but their perceptions changed during the semester. A comparison of the beginning and end of the semester mean scores also showed that the decrease in mean scores was statistically significant.

Intelligence: Both at the beginning and end of the semester, male students agreed that MIS professionals tend to be intelligent. Moreover, there was a significant decrease in the mean scores at the end of the semester. Similar to the female students, even though male students still believed that MIS professionals were intelligent, they placed less emphasis on this dimension compared to the beginning of the semester.

Managerial: For the managerial dimension, male students agreed that MIS professionals possess good managerial and people skills at both points in time. A comparison of the beginning and end of the semester mean scores showed that even though the mean score was higher at the end of the semester, the increase was not statistically significant.

Technical: At the beginning of the semester, male respondents emphasized the strong technical background and skills required for MIS professionals. However, at the end of the semester, they neither agreed nor disagreed to the statements about the technical background. There was a significant decrease in the mean scores at the end of the semester, confirming that male students placed less emphasis to the technical dimension.

Discussion and Conclusion
In this study, we investigated students' stereotypical image of MIS professionals and compared male and female students' perceptions. We also examined whether the introductory level course played a role in altering female and male students' stereotypical image of MIS professionals.

Based on the findings in the CS domain, the literature has generally assumed that MIS professionals were viewed as geeks, mostly male, extremely intelligent, technically oriented and lacking managerial skills. Our findings showed that students' initial stereotypes of MIS professional were somewhat similar at the beginning of the semester. For example, at the beginning of the semester, both female and male students were neutral about the geeky or nerdy features MIS professionals.

Table 5
Stereotypes of Female Students

Stereotypes	Time 0 - Beginning of the semester Females				Time 1 - End of the semester Females				Comparison	
	Mean	SD	t-value	sig (df=83)	Mean	SD	t-value	sig (df=83)	t-value	sig (df=166)
Geeks	3.83	1.30	-1.205	NS	3.21	1.44	-5.007	***	2.910	**
Gender	4.38	1.07	3.261	**	3.90	1.15	-.791	NS	2.801	**
Intelligence	6.15	0.53	36.873	***	5.85	.78	21.722	***	2.843	**
Managerial	4.61	1.11	5.002	***	4.86	.88	8.896	***	-1.613	NS
Technical	5.15	.60	17.333	***	4.90	.84	9.834	***	2.136	*

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

Table 6
Stereotypes of Male Students

Stereotypes	Time 0 - Beginning of the semester Males				Time 1 - End of the semester Males				Comparison	
	Mean	SD	t-value	sig (df=115)	Mean	SD	t-value	sig (df=115)	t-value	sig (df=230)
Geeks	3.95	1.27	-.390	NS	3.33	1.21	-5.984	***	3.846	***
Gender	4.05	1.07	.550	NS	3.77	1.09	-2.295	*	2.026	*
Intelligence	5.99	.86	25.033	***	5.68	1.08	16.626	***	2.483	*
Managerial	4.62	1.13	5.958	***	4.89	1.02	9.444	***	-1.914	NS
Technical	4.48	1.09	4.821	***	4.00	0.94	.033	NS	3.627	***

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

Female students believed that the MIS 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 MIS professionals possessed good managerial skills and were very intelligent. Both female and male student groups also believed that MIS professionals were technically oriented.

Female students attributed more technical skills to MIS professionals. Therefore, we can conclude that at the beginning of the semester, both female and male students attributed some similar characteristics to MIS professionals. However, there were also some differences in the perceptions of both groups. Female students thought that MIS profession was typically for men, not women. Moreover, compared to male students, female students found MIS professionals to be more technically oriented and they placed a greater emphasis on the need for intelligence.

At the end of the semester, both groups of students disagreed that MIS professionals were geeks. Female students were neutral about the MIS field being dominated by men whereas male students disagreed that the MIS field was for men only. Both groups of students agreed that MIS professionals were intelligent and possessed managerial skills. Female students agreed that MIS 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' perceptions decreased. The only difference in terms of stereotypes was that compared to male students, female students thought MIS professionals to be more technically oriented.

When we look at the impact of the introductory MIS 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 MIS professionals.

Female students' perceptions about the gendered view of the MIS 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 MIS professionals having inborn brilliance decreased throughout the semester showing that female students placed less emphasis on the intelligence dimension. Female students' beliefs 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 MIS professionals also shifted during the semester. Similar to the female students, at the beginning of the semester, male students were neutral about MIS professionals being geeks, whereas at the end of the semester, male students no longer attributed any geeky or nerdy characteristics to MIS professionals. Initially, male students neither agreed nor disagreed that the MIS profession was male dominated and their views changed during the semester; resulting in the belief that MIS profession was not only for males.

Even though male students' still believed that MIS professionals tend to be intelligent, their emphasis on intelligence items decreased by the end of the semester. Although not statistically significant, male students' beliefs about the MIS professionals possessing managerial skills increased throughout the semester. In terms of the technical skills, male students no longer focused on the need for strong technical skills and math background to be in the MIS field, they were neutral.

These findings together indicate that students' image of MIS professionals might not be as negative as the stereotypes of CS and other technical IT professionals. Moreover, negative perceptions can be overcome with the use of appropriate mechanisms in the introductory level MIS course.

Implications
Our study has important implications in terms of the role gender plays in shaping students' perceptions of MIS professionals and how the introductory MIS course influences these perceptions.

The major differences between female and male students' perceptions were related to the MIS profession being dominated by men and requiring a robust technical background. Particularly, at the beginning of the semester, female students thought that MIS was a male oriented field. They were also concerned about the field being extremely 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 MIS professional[3].

By the end of the semester, students' perceptions of MIS professionals changed significantly in the positive direction, confirming the important role of the introductory level MIS course. The main reason for this change was that students became knowledgeable about the MIS field in general and MIS careers in particular.

Generally, the introductory course is students' first formal introduction to the MIS field. Actually, at least in our sample, it is usually the first management course they take. Moreover, majority of these students are in the early stages of deciding what major to pursue. Given this situation, introductory MIS courses can be used to dissipate any misconceptions students might have about this field[2,10,11,17].

Especially in order to attract more women to the MIS discipline, educators need to create a stereotype threat-free environment, in which students are exposed to different features of the field. Rather than just focusing on the technical concepts, they need to focus on the managerial aspects of MIS and help students understand that MIS deals with people and technology in organizational contexts[11].

In this respect, the course should reinforce that studying MIS does not necessarily prepare students to perform a set of discrete technical tasks[11] but emphasizes the use of information systems as a tool to achieve organizational objectives.

The content of the course, the materials and the technologies used in the classroom should be state-of-the-art and more importantly relevant and interesting to both genders. The assignments, projects, case studies, etc. used in the course should be selected carefully to avoid any gender bias and to incorporate material that appeals to both genders.

The introductory course should expose students to different MIS career options that would be attractive to both male and female students and instill an understanding of the positive aspects of becoming an MIS professional. Particularly connecting female students with successful female MIS professionals through awareness campaigns, guest speakers, major and career fairs and mentorship programs would prove helpful. Exposing students especially to peers and recent alumni who have reaped the rewards of the MIS field would be extremely fruitful. The instructor teaching the MIS course should have the knowledge and skills in both the business and technology fields and serve as a role model to students. Assigning successful female faculty to teach the introductory course can prove particularly helpful in inspiring and attracting female students to the discipline.

Limitations and Future Research
Our study has certain limitations. First, our study only surveyed students enrolled in introductory MIS courses at one university. Therefore, it is possible that the results are specific to that university. To increase the generalizability of the findings, students from different universities should be surveyed. Additionally, this study only focused on the perceptions of college students. Studies targeting students before they reach college years are needed to determine whether dominant negative stereotypes of MIS professionals exist among these younger students. This would allow educators to address any misconceptions in early academic years such as in primary and secondary school years[8,25].

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