1-2009

More than a Bumper Sticker: The Factors Influencing Information Systems Career Choices

Christopher Scott
Washington State University, clscott@wsu.edu

Mark A. Fuller
Washington State University

Kimberly M. MacIndoe
KPMG Seattle

K.D. Joshi
Washington State University

Follow this and additional works at: https://aisel.aisnet.org/cais

Communications of the Association for Information Systems

CAIS

More than a Bumper Sticker: The Factors Influencing Information Systems Career Choices

Christopher "Kit" Scott

Department of Information Systems
Washington State University
clscott@wsu.edu

Mark A. Fuller

Washington State University

Kimberly M. MacIndoe

KPMG Seattle

K.D. Joshi

Washington State University

Abstract:

Considering the ongoing concerns regarding enrollments in MIS programs, it is necessary for MIS educators to understand the underlying motivations that influence student choices of major, as well as how students view the field of MIS related to these factors. To address this problem, a series of focus group sessions were conducted on three distinct samples of students which examined the following questions: (1) What factors influence a business student's selection of a field of study and/or career? (2) What factors encourage or deter a business student's choice to enter the field of MIS? and (3) What strategies can an MIS department employ to increase awareness about MIS-related careers among business students? Results from these focus groups suggest that most students rated *job scope* as an important issue in their deciding on a major; however, students with little or no knowledge of MIS perceived this career path as narrowly focused (e.g., sitting at a computer and coding all day). Results also suggest that non-MIS majors held more negative perceptions of the characteristics associated with MIS professionals, whereas freshman and sophomore students declaring MIS as their future major held more positive perceptions than non-MIS majors, and junior and senior MIS majors held even more positive perceptions.

Keywords: IS discipline, enrollment crisis, education, exploratory, interviews

I. INTRODUCTION

From the mid-1990s into 2001, we witnessed the rapid growth and adoption of new technologies (such as advances in Internet technology, enterprise systems, etc.) that resulted in a skyrocketing demand for information technology (IT) professionals. Computer science and information systems degrees were viewed as valuable assets to have for a college graduate, and jobs in the IT field were booming. However, world events such as the attack on 9/11, the bursting of the so-called "tech bubble" in 2001, renewed interest in global outsourcing, and diminished Y2K repairs halted the expansion of the IT industry resulting in reduced employment opportunities within all disciplines, but particularly the field of information technology [Akbulut and Looney 2007]. Perceptions grew that the field was in trouble, and not surprisingly, enrollments in computer and technology-related majors dropped [Street, et al. 2008].

Today, IT industry employment is robust, with the U.S. Bureau of Labor reporting projections of employment in this market segment reaching nearly 3.5 million by the end of last year, exceeding its peak of the dot.com boom in 2000. Further, IT careers are predicted to be among the fastest growing and highest paying careers over the next decade, with growth forecasted to surpass 30 percent by 2012 [Horrigan 2004 ; Akbulut and Looney 2007]. The problem the business community is now facing is in finding the talented workforce to fill the open IT positions. While employment opportunities are increasing, the supply of qualified candidates for these jobs is lagging. Enrollment in IT-related programs at colleges and universities has declined by as much as 75 percent over the last five years [Street, et al. 2008], with some university programs closing down entirely. Such enrollment declines have precipitated discussions within the academic community on possible solutions to the problem, perhaps most famously articulated in the discussion that occurred on AIS World in October 2006, where over 120 suggestions were made for bumper sticker slogans that would describe MIS, and convey the opportunities in the field [Watson 2006].

Considering the changes that have occurred in the IT industry over the last 10 years, and the resultant changes with respect to enrollments in college and university programs, we believe we need more than a marketing campaign. Specifically, we need to understand why students are not attracted to MIS programs. There has been relatively little empirical research specifically on attraction to MIS career choices [Joshi and Schmidt 2006].   This work provides some empirically driven guidance to the MIS community based on the exploration of the factors that are instrumental in shaping a business student's career choice. Hence, our research examines:

1. What factors influence a business student's selection of a field of study and/or career?
2. What factors encourage, or deter, a business student's choice to enter the field of MIS?
3. What strategies can an MIS department employ to increase awareness about MIS-related careers among business students?

The remainder of the paper is organized as follows. We first discuss the MIS enrollment problem, and examine research on this topic. We then present our focus group methodology and describe the data collection and analysis procedures. Our analysis is presented next, followed by our discussion and recommendations. We conclude by discussing the limitations of this research.

II. THE MIS ENROLLMENT PROBLEM

The mismatch between the demand for new graduates and the number of students entering the information systems discipline is speculated to be due to a variety of factors. Some believe the cause of decreased interest is due to a misunderstanding regarding the nature of the discipline and the types of career options possible—for example, confusing MIS[1] careers with those of computer science (careers that may attract different types of people). Others believe there may be an incomplete understanding of the effects of outsourcing and off-shoring, resulting in students (and parents) beliefs that an MIS education is not a good long-term career investment.

Whatever the reason for the decline in applicants, employers are again seeking out IT professionals, and looking for those with modernized skill-sets, more appropriate to today's technology careers. While base-level technology related skills are still crucial for success, employers are also emphasizing the importance of management and business skills as well. Lou Sostillo of Surrex Solutions, a placement agency for IT professionals, states that

---

[1] In this paper, we use the abbreviation "MIS," but we recognize that different information systems programs in business schools use a variety of abbreviations (e.g. IS, MIS, BIS, CIS).

candidates need to be well-rounded with a "…strong business sense and good presentation skills. It isn't like the dot.com craze where someone could simply bang out code for a Web site in the back room" ["Job Search 2005].

There have been a number of studies regarding perceptions of computer science and closely related fields; however, similar studies about the information systems major are scarce. The two fields are often thought to be overlapping by individuals unfamiliar with these majors, however information systems is unique in that it is a technology focused curriculum coupled with a business core. Since this business-technical skill set is increasingly in demand, it is vital that we conduct research that helps us better understand student decision making related to career choices—and if appropriate, foster strategies to address misconceptions about information systems careers that may help match the supply of students with market demand. Without enough qualified graduates, employers will begin to look elsewhere, perhaps overseas, potentially further harming perceptions of opportunities in the field and continuing to drive down enrollments, resulting in a vicious cycle that could significantly weaken the discipline, and ultimately diminish the supply of a much-needed technology-enabled workforce.

One study that recognized the issue of the growing IT field and decline in enrollment was conducted by Akbulut and Looney [2007] entitled "Their Aspirations Are Our Possibilities: Inspiring Students to Pursue Computing Degrees." The authors' goal was to identify mechanisms that shape a student's career choice in the field of computing and then formulate recommendations on how to motivate students to pursue a computing major. Unlike Akbulut and Looney, who restricted their surveys to business students who had not yet crystallized their career choice, the current research captures the perceptions of students at all levels of the decision-making process (lower division committed and uncommitted students as well as current majors) using a focus-group approach. We believe surveying both lower and upper division students provides some unique opportunities to examine attitudes among different student populations. In addition, we believe examining the perceptions of both committed and uncommitted lower division students can also provide useful information that may help us diagnose why potential students are opting out of technology careers.

Other past research has also examined students' IT related perceptions, but was focused on specific subgroups of students, e.g. women [Ballard, Scales, and Edwards 2006]. Our current research builds upon Joshi and Schmidt [2006]—which explored the traits and tasks related stereotypes associated with the MIS profession—by investigating the factors that influence business students' (both males and females) perceptions about MIS in general, as well as the factors that influence their decision-making related to choice of major.

For this research we collected data, through focus groups, at a large Northwestern U.S. university to capture business students' perceptions (both lower division and upper division, and those committed and not committed to MIS). By analyzing this data we then pinpoint possible causes for the continual decline in MIS enrollment and generate new ideas as to how information systems departments can better promote their programs to potential students.

III. METHODOLOGY

This section covers the procedures used to gather a sample population and collect data, describes the classification scheme used to code responses, and reviews the techniques used to analyze the coded data.

Data Collection

The sample for this study was composed of undergraduate business students. Participants were selected from high-performing students enrolled in lower and upper division MIS courses—with students representing both those that were committed to MIS and those that were not. High-performing students were selected because we believed that these students were likely to be more thoughtful related to their career choices, and this is certainly the group of students that most MIS departments would like to attract into their major. A major portion of our sample intentionally consisted of freshmen and sophomores since these students were more likely to still be in the process of evaluating and formally choosing a major.

Non-MIS or undecided students were selected from a large (around 500 students per semester) lower division MIS course that was required of all college of business students regardless of their choice of major (typically only about 10 percent of the students in this course indicate in interest in MIS as a career). Undeclared (lower division) students with an interest in MIS were selected from a lower division MIS course which was open to all majors, but required for MIS majors. Declared (junior and senior) MIS majors were selected from MIS upper-division courses required for the major.

Six focus group sessions were conducted, each consisting of no more than six students. A total of 31 students participated in the study. The sessions were held in a conference room (with food and drink provided) and lasted

between 30 minutes and one hour, depending upon the number of participants and their willingness to contribute to the discussion. Each session was tape recorded and subsequently transcribed.

The focus groups were divided into the following categories:

1. Freshman and sophomores intending to major in MIS (2 sessions)
2. Freshman and sophomores undecided or non-MIS (3 sessions)
3. Juniors and seniors majoring in MIS (1 session)

Each group was presented with a series of open-ended questions which can be viewed in the Appendix. The first set of questions aimed at uncovering their reasoning behind selecting a major. They were then asked about their attitudes and perceptions toward MIS professionals. Students were then informed of the goals behind the study, and asked direct questions about their choice to major, or not major, in MIS. They were also encouraged to offer any suggestions as to how to better inform students of the available opportunities within the field.

Data Coding

Based upon past literature [See Joshi and Schmidt 2006], a data classification scheme was formed by including a set of categories for coding decision-choice influencers, and for classifying traits and tasks associated with the MIS profession. As the transcriptions were reviewed and coded, new concepts and categories emerged while others were found to be insignificant. The initial classification scheme was then adjusted to better represent the collection of responses. The final version used to code the responses is listed in Table 1.

Table 1: Data Classification Scheme		
Category Codes	*Category Labels*	*Category Description and Sample Examples*
1	Sits in Front of Computer	Phrases are mapped to this category when the responses contain phrases indicating the attribute of sitting in front of a computer. Examples of answers categorized under this attribute include: "sitting in front of a computer screen eight hours a day" and "sitting at a desk and working on a computer system."
2	Nerdy/Geeky Image	Phrases are mapped to this category when the responses contain phrases regarding image or the attribute of being nerdy or geeky. Examples include: "being nerdy," "pocket protectors and glasses," "people who use computers are computer nerds," "seemed so creepy," and "people lurking around playing with computers."
3	Interpersonal and Communication Skills	Phrases are mapped to this category when the responses contain phrases hinting at the need for, or lack of, interpersonal skills, or the word communication is mentioned in responses. Examples include: "people skills," "personal skills," "deal with a very wide variety of people," "being a people person," "interact with people," "meet people," "the social side," "communication skills," "good at presenting their ideas," "communicate with whoever you're working with," and "tell people what's going on,"
4	Technical Skills	Phrases are mapped to this category when the responses contain phrases indicating any type of attribute related to technology including hardware and software skills, general computer or technical knowledge, or systems development skills. Examples include: "technological background," "IT knowledge," "computer skills," "tech support," "basic knowledge of hardware, software," "programming skills," "really technical," and "jobs in the systems development life cycle."
5	Managerial Skills	Phrases are mapped to this category when the responses contain phrases indicating managerial attributes like leadership skills, organization skills, project management, business acumen, planning, training, budgetary, supervisory, or general management skills. Examples include: "business skills," "project management skills," "time management and organizational skills," "decision-making," and "leadership."
6	Problem Solving Skills	Phrases are mapped to this category when the responses contain phrases indicating problem solving skills attributes like critical thinking or creativity. Examples include: "analytical skills," "solve business-related problems," "think critically and creatively," "thinking outside of the box to solve problems," and "analyze and solve a wide range of problems

7	Likes Computers and Technology	Phrases are mapped to this category when the responses indicate the attribute of liking or disliking computers and/or technology. Examples include: "wanted to work with computers," "really liked computers growing up," "didn't want to have to deal with computers," "the computer aspect throws me off," "like technology," "all the technology you get to work with," and "learning about technologies."
8	Willing to Keep up With New Technology	Phrases are mapped to this category when the responses contain phrases indicating the attribute of the willingness to keep up with technology. Examples include: "adapt technology and adjust with it," "skills to adapt and further everything," "the cutting edge of technology," "technology is always changing," and "adapt to a fast paced environment."
9	Hard/Difficult	Phrases are mapped to this category when the response mention how hard or difficult material or tasks seem to be. Examples of this include: "intimidating," "doesn't come as natural," "hard to understand," "something that challenges me," and difficulty of the curriculum."
10	Fun /Interesting or Boring	Phrases are mapped to this category when the responses indicate factors or tasks that related to the field are either fun or boring in nature. Examples include: "so much fun," "really enjoyed it," "way more interesting," "really repetitive," "didn't enjoy it," and "it looked boring."
11	Job Scope	Phrases are mapped to this category when the responses indicate that a variety of skills, tasks or jobs are performed. Examples include: "more versatile and open to a lot more variety of jobs," "how flexible and how much variation there is," "the field is really broad," "dynamic in skills," "broad range of skills," "it just depends," and "well-rounded."
12	Profession Self-Efficacy	Phrases are mapped to this category when the responses indicate the level of one's judgment in their capability to succeed at a certain task or profession. Examples include, "what comes natural," "fits my capabilities," "personal aptitude," "how my strengths would help me," and "comfort level."
13	Income/Pay	Phrases are mapped to this category when the responses indicate income level as an influencing factor toward choosing a career. Examples include: "looked at salary," "salaries make it really attractive," "pays well," and "money is pretty important," and "how much money I would be making after college."
14	Encouraged by Others	Phrases are mapped to this category when the responses indicate they were encouraged, or discouraged, by other individuals toward a certain field of study or career. Examples include: "listen to others in the major," "told me about the major," "talked to professors," and "my advisor suggested it."
15	Career Opportunities	Phrases are mapped to this category when the responses indicate a high level or a lack of career opportunities within a certain major or profession. Examples include: "availability of jobs in that field," "career opportunities after college," "job growth," "get a good job," "it's in high demand," and "jobs are going overseas."
16	Desire to Travel	Phrases are mapped to this category when the responses indicate one's level of interest in travel opportunities within a career. Examples include: "traveling possibilities," "an interest in travel," "want to work international," and "working in other cities."
17	Interests in Profession	Phrases are mapped to this category when the responses indicate an emotion that piques a curiosity or concern with a major or profession. Examples include: "in line with my personal interests," "it combined all my interests," and "your interests are very important."
18	Knowledge about IS	Phrases are mapped to this category when the responses indicate that one was previously or currently unaware of the field of Information Systems or its related professions. Examples include: "had no clue," "don't feel very informed about the major," "didn't know what MIS was," and "had never heard of MIS before."

Responses to the open-ended questions were often multidimensional containing numerous factors. For that reason, significant phrases in each of the responses were parsed out and subsequently mapped to a category in the classification scheme. For example, a participant's response regarding characteristics, "Analytical skills, being a people person, and also being able to adapt to a fast-paced environment" was divided into: 1. Analytical skills, 2. being a people person, and 3. being able to adapt to a fast-paced environment. Similarly, a response pertaining to

factors, "I like to mix it up and be working with people but at the same time be able to work with programs and technology," was broken down into 1. I like to mix it up, 2. be working with people, and 3. able to work with programs and technology. These fragments were then coded accordingly.

All transcriptions were reviewed and coded to ensure a consistent analysis and consistent category placement of responses. If there was any uncertainty about the assignment of a phrase to a certain category, it was discussed amongst two co-authors until an agreement was reached for the appropriate interpretation and placement of the response. As each phrase was parsed out, a subject's gender, degree level, and career intentions were recorded.

Additionally, participant responses were assigned either a negative or positive tone in relation to the relative attitude that the phrase revealed toward the field of MIS. For example, a participant's response, "It gives you a broad background in both business and computers which really seems to open options in the future" was coded as a positive response. Conversely, another individual's response, "I would think it would be much more technical, like coding and being a nerd honestly" was classified as negative.

Data Analysis

Phrases were initially coded and analyzed within each of the three categories previously discussed:

1. MIS freshmen and sophomores
2. Non-MIS/Undecided freshmen and sophomores
3. MIS seniors.

Through the process of coding we further separated phrases within each focus group type into two smaller sets of data, termed "Factor" and "Characteristic" data. This provided for a more meaningful and better representation of the phrases and their contexts.

The first set, Factor Data, contained responses pertaining to *factors influencing the subjects' selection of a field of study and/or career* (factors influencing field of study, or FIFS). The second set, Characteristic Data, included responses received when participants were questioned about *perceptions or characteristics associated with the field of Management Information Systems and MIS professionals* (perceptions of MIS, or PMIS). Both the FIFS and the PMIS were measured by recording the frequency of each type of response, and then showing those frequencies as a percentage of the total number of phrases within the focus group category (e.g., MIS freshmen and sophomores). Percentages were also computed by gender and by positive or negative tone of the response.

IV. RESULTS

The findings are presented and compared in a bar chart format using the classification scheme listed in Table 1. The following results are presented in response to the first two questions listed under the research questions (RQ) section.

RQ1: What factors influence business students' selection of field of study and/or career?

The results are presented in three different ways. First, the overall frequencies across all responses of influencing factors are presented, and then the data is broken down and reported by group type (e.g. declared, undeclared, etc.) and by gender. Figure 1 depicts the overall frequency distribution of factors that were considered by a business student while selecting a field of study and/or a career. The source data shows responses for all sub-groups combined. Taken as a whole, *job scope* (30 total comments) is shown to be the most frequent FIFS taken into consideration. Students responded with statements such as, "I did think about what kind of job I could get with a major that I could go anywhere with and was pretty broad," "Flexibility of the major to allow me to change career paths later on if I decided to," and "I like to mix it up."

This is followed by *career opportunities* (17 comments) and *encouragement by others* (17 comments) supported by phrases such as, "I look at the opportunities that the major will provide after graduation," and "My [computer science] advisor had suggested it to me." *Interests in profession* (13 comments) and *interpersonal and communication skills* (14 comments) were also frequently mentioned. Students made statements including, "It had to be something I was interested in," and "I like working with people."
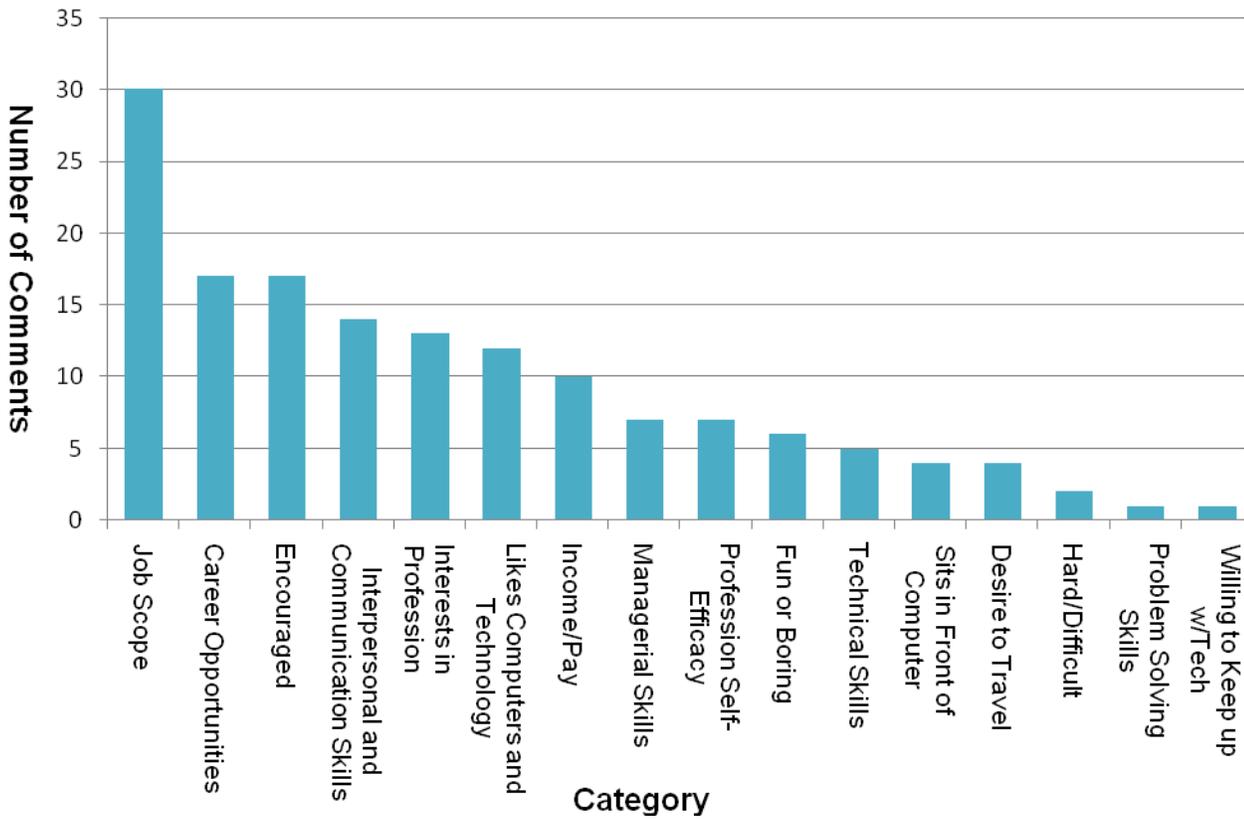
Figure 1: Frequency of Factors Influencing Field of Study and/or Career Choice

Figure 2 illustrates the comparison of the frequency distributions of FIFS by each group type. The top five FIFS discussed by MIS freshmen and sophomores included: *job scope* (20 percent)*, interpersonal and communication skills* (17 percent)*, encouragement by others* (12 percent)*, likes computers* (9 percent)*, career opportunities* (9 percent)*.* Top five factors for MIS juniors and seniors were: *job scope* (24 percent)*, career opportunities* (13 percent)*, encouragement by others* (9 percent)*, interests in profession* (9 percent)*, and not wanting to sit in front of a computer*[2] (7 percent). Finally, we can see that the top five factors for Non-MIS freshmen and sophomores are *job scope* (14 percent)*, profession self-efficacy* (14 percent)*, encouragement by others* (14 percent)*, career opportunities* (14 percent)*, and income* (11 percent). *Job scope* proved to be the most prevalent factor among all three groups. *Career opportunities* and *encouragement by others* also demonstrated to be common top factors.

Figure 3 illustrates the percentage of comments of FIFS mentioned by each gender across all focus groups. A larger proportion of female responses (8 percent) mentioned *profession self-efficacy* versus only 3 percent of male responses. Interestingly, females mentioned *want to travel* (8 percent) more frequently than males (0%) and males mentioned interpersonal and communication skills (13 percent) more frequently than females (2 percent).

### RQ2: What factors encourage, or deter, a business student's choice to enter the field of MIS?

To begin to answer this question, we performed a two step analysis technique. First, we reviewed the overall frequencies of the characteristics that the study participants associated with MIS professionals. Second, we separated and compared responses by group and by gender. While groups may have mentioned similar characteristics, it is important to understand the context or tone in which the phrases were used. For instance, two students may have mentioned the same characteristic but carried contrasting attitudes or tones behind their responses. For this reason, we further break down the data to depict the frequencies of positive versus negative responses within each group type (allowing us to determine, for example, whether a mention of *career opportunities* was an attractant or deterrent to entering the field of MIS). This further allows us to pinpoint any variation that may be present between the groups, particularly MIS versus Non-MIS students, in terms of attitudes or perceptions toward the MIS field.

---

[2] While this particular comment would seem to be a response to question about perception of MIS, it was in fact made in response to the factors influencing field of study question.
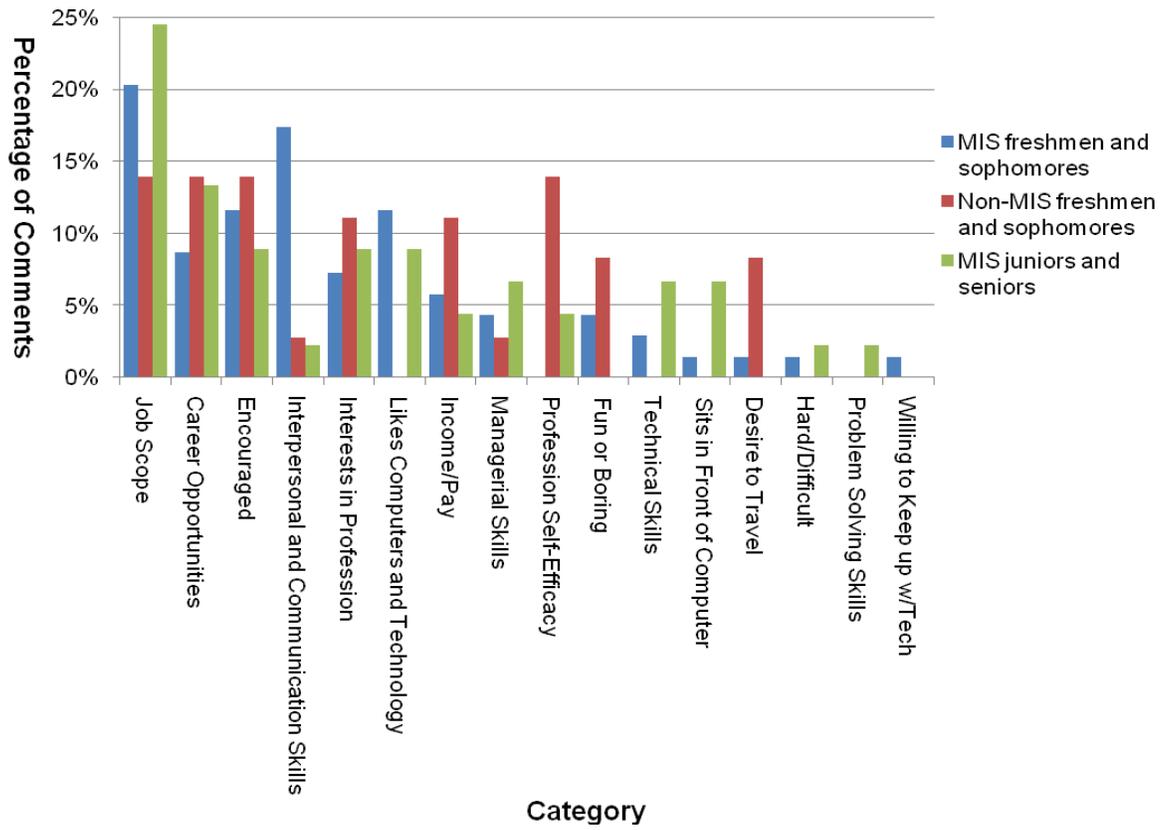
Figure 2: Frequency of Factors Influencing Field of Study and/or Career Choice by Group

Note: The Y axis represents the percentage of comments on each category given by each group. For example, for the MIS freshmen and sophomore group, 21 percent of their comments were categorized as Job Scope.
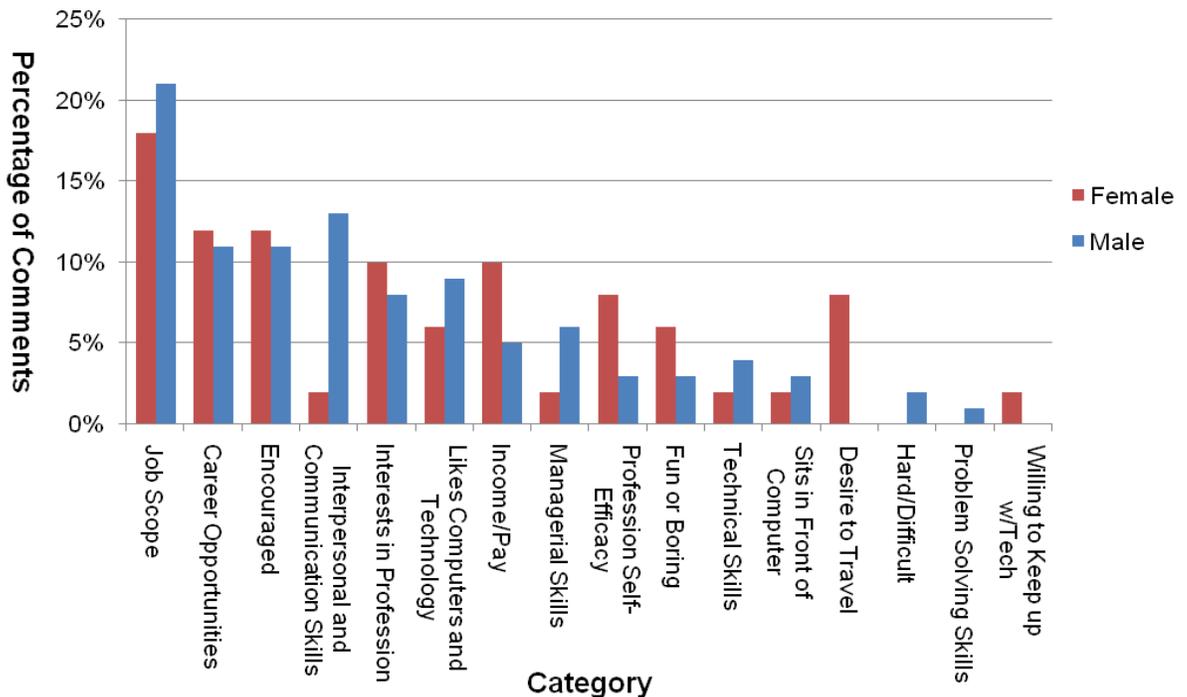
Figure 3: Frequency of Factors Influencing Field of Study and/or Career Choice by Gender

Overall Perceived Characteristics of MIS and/or MIS Professionals

The overall frequency distribution of responses examining *perceptions or characteristics associated with the field of Management Information Systems and MIS professionals* (PMIS) are represented below in Figure 4. The source data for this chart includes the coded responses from the Characteristic Data of all the participants across all group types combined. Across the total collection of extracted phrases for this research question, *technical skills* and *job scope* were mentioned most often (48 times each). These characteristics are followed by *interpersonal and communication skills* (40 times), *did not know about MIS* (33 times), *career opportunities* (32 times), *managerial skills* (29 times), and *sitting in front of a computer* (23 times).
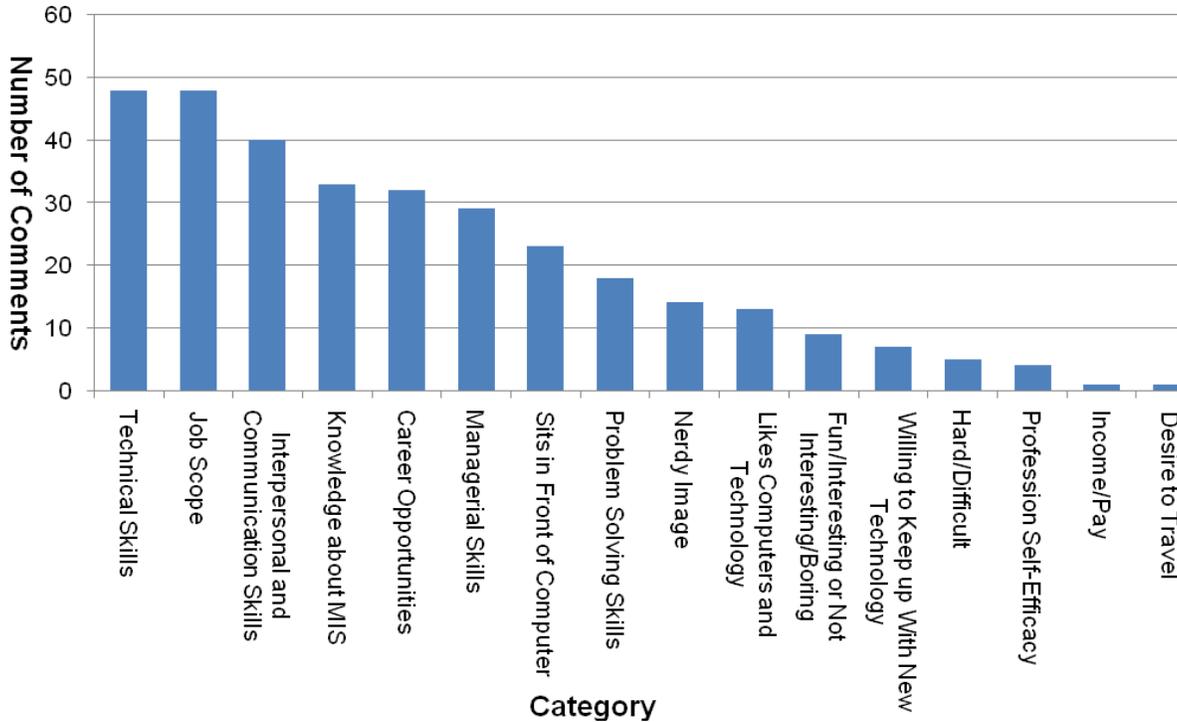
Figure 4: Overall Frequency Distribution of Perceived MIS Characteristics

Figure 5 shows the comparison of the frequency distribution of perceived characteristics across three group types (uncertified MIS freshman and sophomores, Non-MIS freshman and sophomores, and MIS juniors and seniors). As can be seen from Figure 5, MIS freshmen and sophomores as well as MIS juniors and seniors were reasonably consistent in their perceptions related to almost all of the characteristics they perceived to be associated with the field of MIS. However, Non-MIS freshmen and sophomores clearly reveal some distinct perceptions of MIS professionals and careers. For example, perceptions of MIS *job scope*, *interpersonal and communication skills* needed, *knowledge about MIS*, *career opportunities* in the field, *managerial skills* needed, and affinity *for computers and technology* all showed a high degree of variance between MIS and non-MIS students.

Figure 6 illustrates the percentage of comments of perceived characteristics mentioned by each gender across all focus groups. Perhaps the most striking difference between genders is in the category of *knowledge about MIS*, where 15 percent of female responses fell into this group while only 7 percent of the male responses.

Comparing Response Directionality among Groups

The prior figures have illustrated the frequency that characteristics were mentioned by various groups related to their perceptions of the MIS field or career. However, in most cases a characteristic mentioned also had a positive or negative directionality (e.g., high degree of *job scope* versus limited *job scope*). As another example, while responses from each group appeared in the category of *sitting at a computer all day*, the directionality of those responses varied significantly across the three groups (see Figures 7, 8, and 9). For Non-MIS freshmen and sophomores, the directionality was clearly negative, with phrases such as "I thought it would just be sitting at a desk and working on a computer system." For MIS freshmen and sophomores, the directionality was mixed, and for MIS juniors and seniors, comments focused on this attribute indicated that this was not perceived to be a characteristic of the profession. Responses from Non-MIS students illustrated how pervasive this negative perception may be, but also how it could be modified through information. For example, one student (who participated in a focus group after having seen a guest speaker who spoke about the nature of MIS) made the comment that having such speakers

15
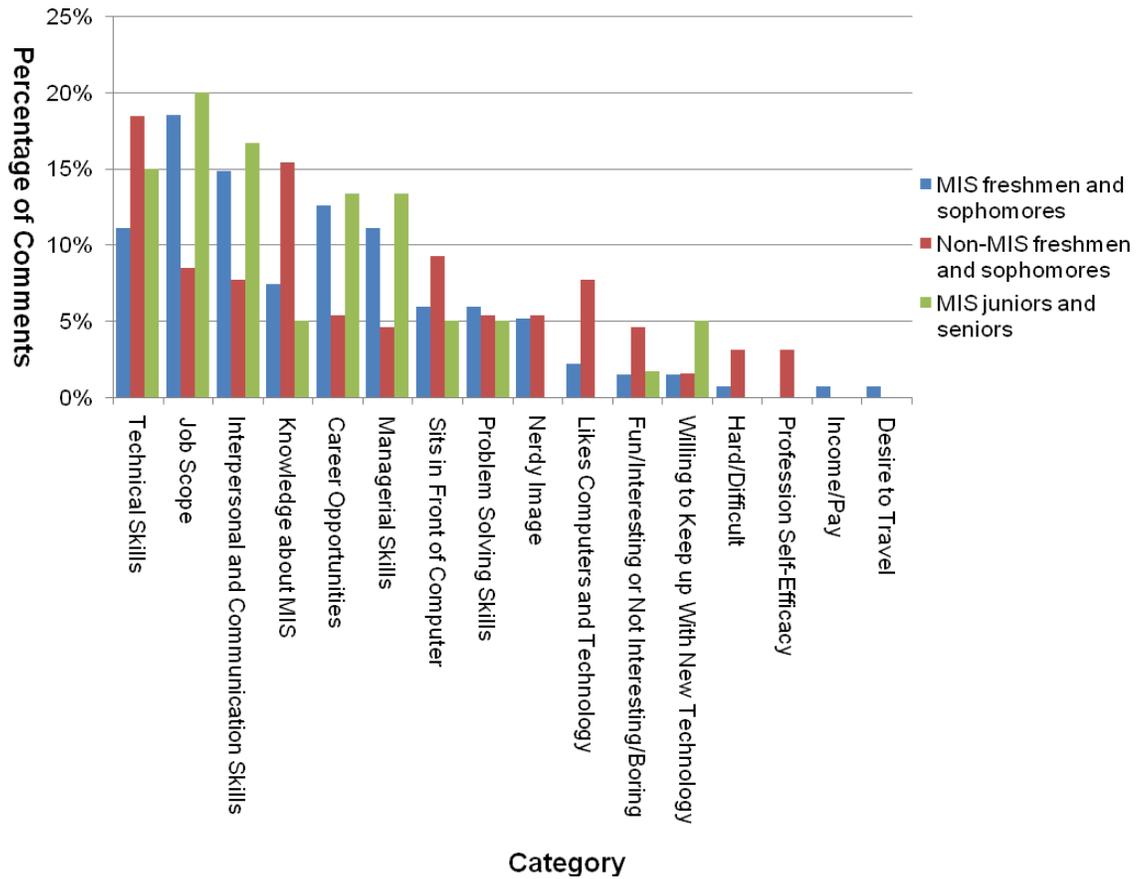
Figure 5: Overall Frequency Distribution of Perceived MIS Characteristics by Group

Note: The Y axis represents the percentage of comments on each category given by each group. For example, for the MIS freshmen and sophomore group, 21 percent of their comments were categorized as Job Scope.
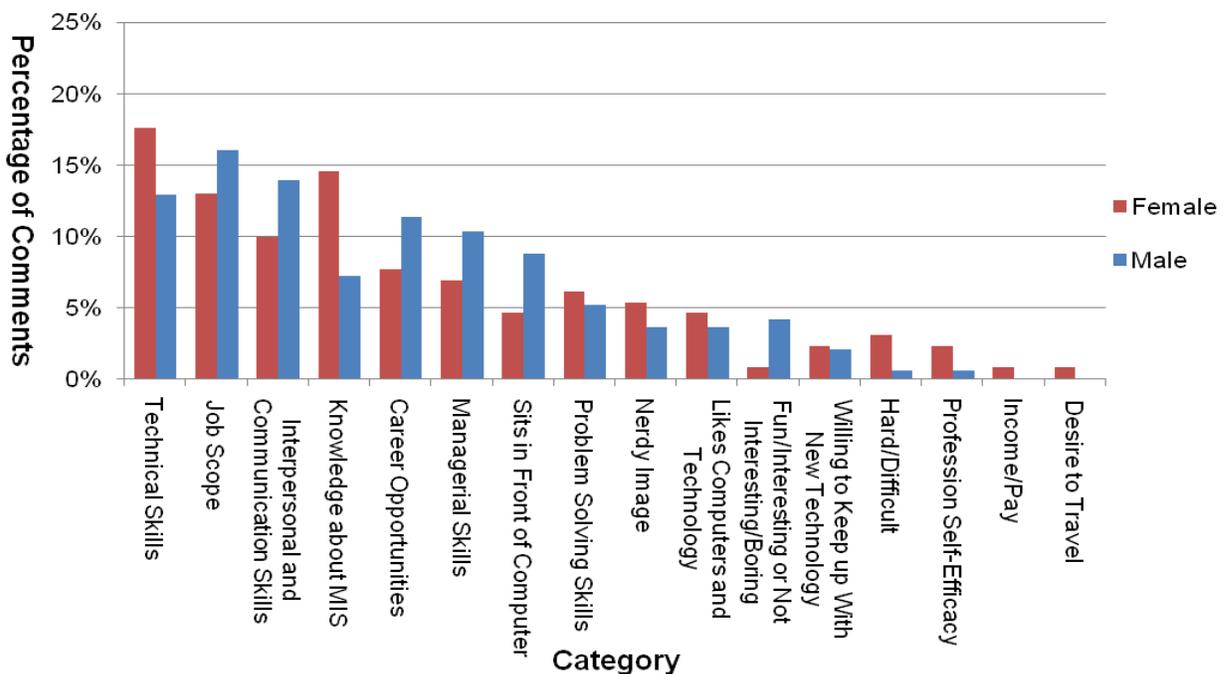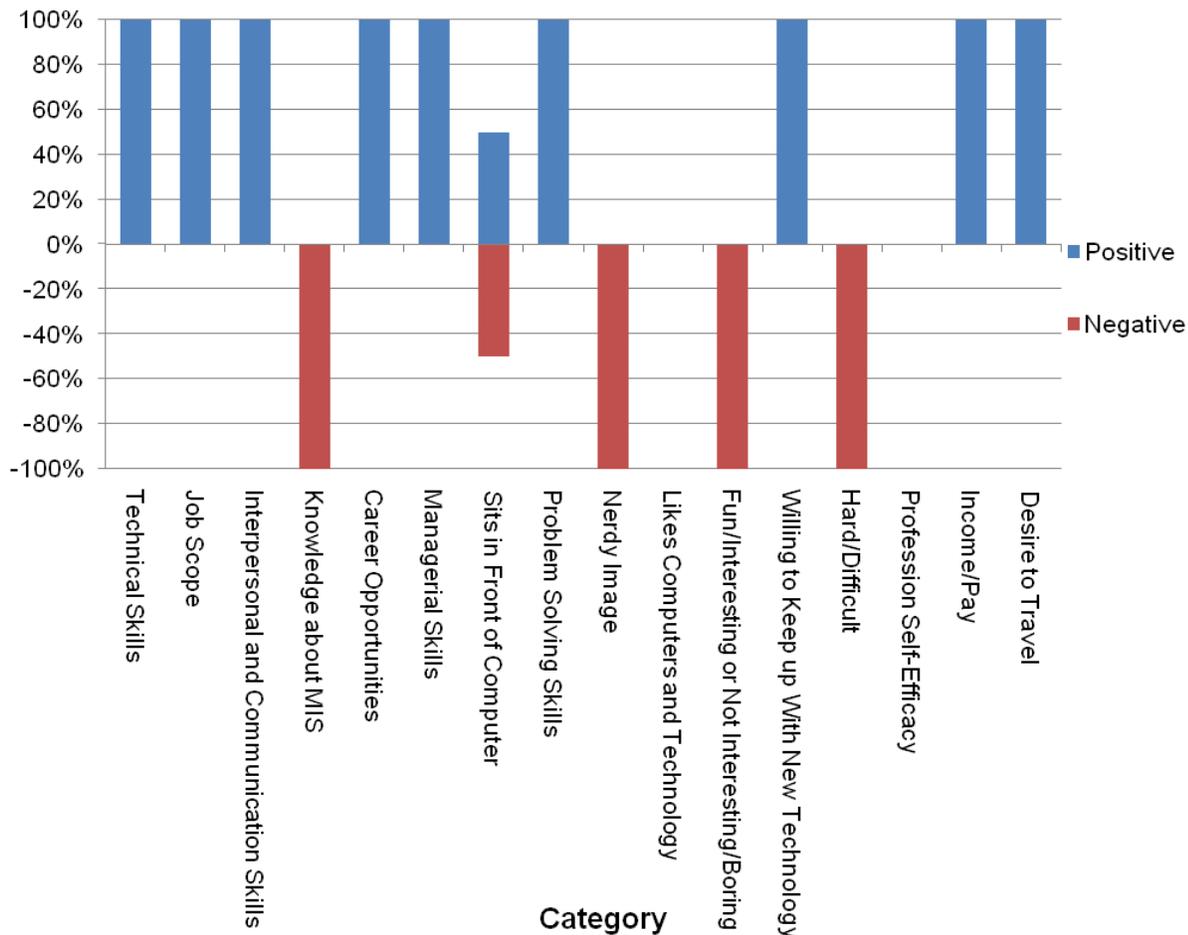

Figure 6: Overall Frequency Distribution of Perceived MIS Characteristics by Gender

was "a good idea and lets you know that you're not just going to be stuck sitting behind a computer. It goes over all the different aspects of the business like all over and it gets you involved."

To systematically explore the directionality of responses by group, we first looked at the frequency distribution of positive and negative responses within freshmen and sophomore groups intending to major in MIS (Figure 7). Measures are displayed as a percentage of the total number of phrases within each category for the group indicated. Most categories were responded to positively (10 of the 15), which is not surprising since these students are planning to major in MIS and thus should have more overall positive attitudes toward the field.

Negative responses emerged in five categories: *sits at a computer all day, nerdy/geeky image, hard/difficult, not interesting/boring,* and *lack of knowledge about MIS*. It should be noted that negative phrases mapped to these categories were from participant responses in which they were discussing how they **had** perceived or viewed MIS to be **prior** to any experience with an introductory MIS course. Phrases mapped to these categories included, "I always thought of it as being nerdy," and "I thought I'd just be sitting in front of a computer all day." These phrases were coded as negative to demonstrate common misconceptions that are found within students *before* they are actually exposed to the accurate information about the field. This also means that Figure 7 is clearly overstating the negative impressions that this group currently holds.

Figure 7: MIS Freshmen and Sophomores: Frequency Distribution of Characteristics by Positive or Negative Response

Next we review this same data for MIS juniors and seniors. This is displayed following in Figure 8. As with the MIS freshman and sophomore data, a majority of the responses were coded as positive with the exception of the category *knowledge about MIS*. Again, we point out that negative phrases observed in this category only represent participants' previous perceptions, or in this case, previous lack of knowledge and/or information about the major. Examples of statements are, "I didn't know about MIS before I made my choice" and "I had never heard of MIS before I came to college." Clearly, for upper division majors, impressions of the field were quite positive. While this might be as expected, it is nonetheless somewhat reassuring that MIS majors are not "disappointed" with their choice of career after more in-depth exposure.

17
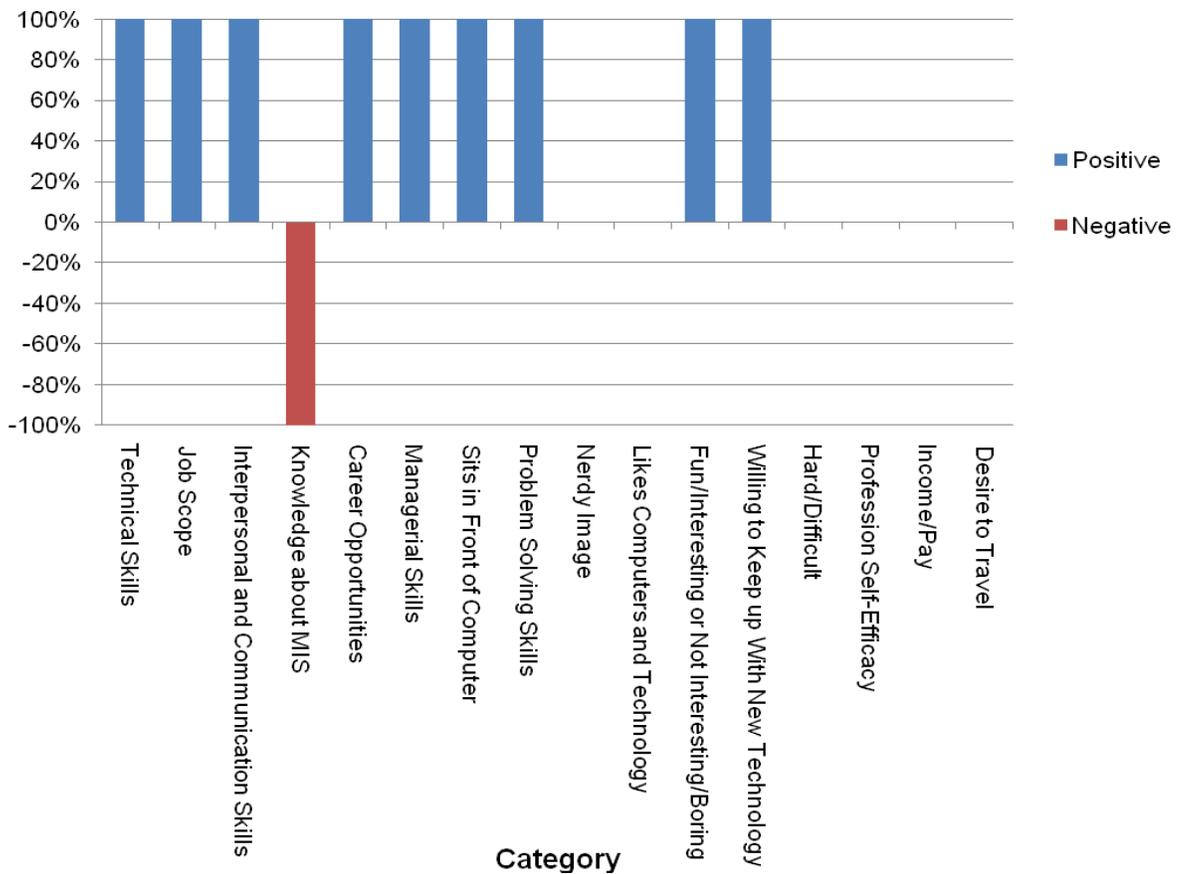
Figure 8: MIS Juniors and Seniors: Frequency Distribution of Characteristics by Positive or Negative Response

Finally, and most significantly, we assess the frequency distribution of positive and negative responses within the Non-MIS freshmen and sophomores who are either undecided or not intending to major in MIS. Results in this group, represented in Figure 9, obviously differ from Figures 7 and 8. Perceptions about the field of MIS are much more negative for this group. As an example, one student was quoted as saying "I've seen them (MIS majors) doing a lot of computer work… I'd predict that in an eight-hour job probably like five, six, seven hours of it."

To formulate recommendations for MIS programs regarding strategies for improving enrollments, we explored the factors affecting a business student's career choice. We also gathered additional input and suggestions, including many from the participants in the study themselves, particularly with regards to introductory MIS courses. We now turn our attention to a discussion of these findings, as well as recommendations based on our interpretation of the results.

V. DISCUSSION AND RECOMMENDATIONS

In examining the frequencies with which certain categories appeared in the focus group results, we focus on three areas that comprise over 50 percent of the comments given by the focus group participants: job scope and career path diversity, the technical nature of IS jobs, and exposure to information on the profession.

Job Scope and Career Path Diversity

As depicted in Figures 1 and 2, *job scope* was shown to be one of the most frequently mentioned characteristics when students were asked about those factors influencing their choice of career. When we look at Figure 5, however, it is clear that perceptions about the amount of *job scope* in the MIS careers differs markedly between MIS students and non-MIS students. MIS students at all levels mentioned job scope as a characteristic of MIS careers (19 percent and 20 percent of the time, respectively), whereas Non-MIS freshmen and sophomores mentioned it only 8 percent of the time. Furthermore, as Figure 9 illustrates, we see that 45 percent of the Non-MIS freshmen and sophomore responses within the *job scope* category were coded as negative, indicating the belief that MIS had

little *job scope*. As an example, one particular student said, "I thought that it (MIS) was going to be real specific so that you wouldn't be able to go out and do the other jobs. You wouldn't have the great backing that some of the other companies are looking for even though you may not go into that specific job that would relate to your major." Another student stated that, "More different places would want me because of (being) a finance major."
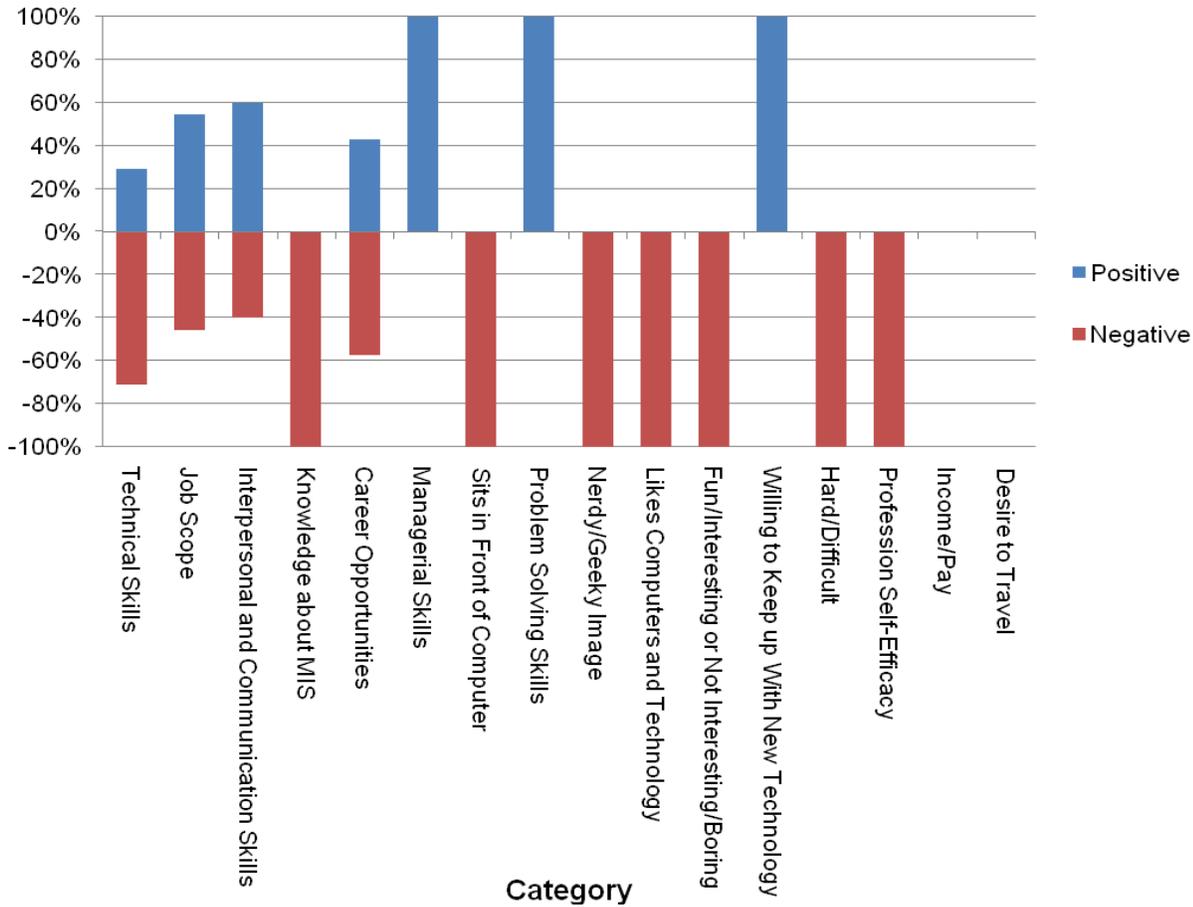
Figure 9: Non-MIS Freshmen and Sophomores: Frequency Distribution of Characteristics by Positive or Negative Response

Beyond educating students about the job functions of MIS professionals, students are concerned with what their overall career will be like after they graduate. The students that participated in this research repeatedly cited a general lack of knowledge about careers in the MIS field as an issue that influenced their decision making. There are several possible explanations for this lack of knowledge, including the relative newness of the field, parents' knowledge about the discipline (which may not have been a business major when they went through school), lack of expertise and knowledge among high school and college level advisors, limited exposure in high school, as well as others. As one student said "I don't think a lot of people give it the credit that they should seeing as how other majors like accounting and biology have centuries of history in those fields to back the credibility. I think that there are some people that go into it (MIS) thinking that there's not really a big amount of precedent for professions like this when compared to other fields. They look at that and they don't see the practical applications of the things that they're learning in class." Again, these sorts of comments illustrate that the content delivered in introductory courses is critical to building a better and more in-depth picture of what activities, and careers, IS professionals engage in—a necessary activity in career choice.

Technical Nature of IS Jobs

Also of interest is the directionality related to the perception that MIS involves sitting at a computer all day, and how that attitude changes depending on the amount of experience the students have with MIS. The Non-MIS freshmen and sophomores overwhelmingly (100 percent) viewed MIS negatively as a career that involved sitting at a computer all day. MIS freshmen and sophomores, on the other hand, were split on this belief; with 50 percent believing this was the case, and 50 percent believing it was not. Among MIS juniors and seniors, this was quite different, with 100

19

percent of the respondents feeling this not a characteristic of the MIS profession. Perceptions seem to change with additional exposure.

Exposure to Information on the Profession

One of the earliest forms of exposure to MIS related content is in the introductory MIS courses present in many universities. At our particular institution, where the course is required in the freshman or sophomore year prior to certification into any major, most students (including MIS majors) indicated an overall dissatisfaction with the course material. Some example responses on this issue include: "I just think that people don't care about the material that is given… it's not something that grabs people's attention right away"; "There is just a really bad stigma for this class. If you really want to get people interested in it you need to change the class somehow"; and "Most introductory classes are for that reason, to get people interested in the major but this one doesn't."   MIS majors, juniors and seniors especially, came to a consensus that the course does not provide an adequate representation of the major in general and made the suggestion to "reorganize the entry-level MIS course so that it gives a better view of career paths within the major and what opportunities can apply to those who may not be interested in coding all day or have a misperception already."   Another student stated, "I think that some part of [the introductory MIS course] should be structured more toward selling the MIS program itself rather than talking about the tiers of network topology… sell the program itself and educate the students about what the program has to offer and what the typical MIS graduate would be considering or capable of doing."

While all of these comments should be viewed in the context of the student experience at our particular university, it should be noted that we have exerted a great deal of energy in course content, incorporating guest speakers, and assigning our best instructors to lead this class. While we believe these actions have had a positive effect on the size of our major within the college (our current size is close to that of the marketing and management departments at our institution, and about one half the size of accounting and finance), the fact that the content in this particular course was mentioned so consistently is causing us to reexamine this course.

Table 2: Recommendations
Introductory Course   1. **Emphasize the profession:** Incorporate class assignments or projects which better illustrate the "interesting" aspects of the profession, and provide students hands-on exposure to what professionals in our field actually do—the analysis and designing of systems.   2. **Illustrate interdependencies with other disciplines**: Show how information systems are synergistic or complementary with other disciplinary areas such as accounting, finance, marketing, as well as illustrate the effect of IS on businesses as a whole.
Instructors and Guest Speakers   1. **Choose MIS instructors strategically:** Look for instructors who provide a better "referent" for the MIS professional identity, particularly in required business courses offered by the department.   2. **Incorporate industry experience into the classroom:** Invite guest speakers who describe varied work environments, and who can address the demand for IT workers in their industry.
Promotional and Informational Opportunities   1. **Refine electronic and hardcopy promotional materials:**   Clarify descriptions on College and Departmental web sites. Include information on salaries, profiles of former students, and skills that MIS professionals utilize in their jobs in both web and hard copy materials.   2. **Utilize new technologies to promote the major:** Take advantage of social networking technologies such as Facebook.com, LinkedIn.com, Virtual Worlds (SecondLife.com), and MySpace.com.   3. **Involve students in promotional events:** Use student leaders (e.g., top students, students who have job offers, MIS student organization leadership) during events such as information sessions and career nights.
Advising, Counseling, and Engagement   1. **Ensure everyone is "on message":** Coach advisors on descriptions of the major, as well as opportunities in the field. Ensure faculty are consistent in the messages they deliver to students.   2. **Organize events to get the word out:** Host events for advising office personnel, current students, potential students, recruiters and corporate representatives, and advisory board members, with the goal of enhancing commitment to the major and improving word-of-mouth about the discipline.

Although there seems to be a negative stigma attached to the discipline, attitudes can be changed. As stated by one student, "That's the biggest point here. People can change attitudes toward something. It's just really how it's presented to them. There are so many cool things about the major that people don't really realize." Furthermore, as we saw with the differences in perceptions of MIS as a career (specifically that it involves sitting in front of a computer all day), the earlier the students receive information that debunks such misperceptions, the better.

Communications of the Association for Information Systems

Considering that MIS majors at all levels in our study had fewer misperceptions of the MIS field than the non-MIS majors, we examined the directionality of their responses to typical MIS characteristics (see Figure 9) with particular attention to those characteristics with the most negative directionality. Based upon our analysis of the data, we present a summary table of our recommendations. Each recommendation is discussed in more detail following.

Introductory Course

In examining the introductory courses in other fields (such as accounting), there exists a significant difference in terms of course content and focus. A casual survey of the content of introductory MIS books shows a buffet-style approach to information systems topics including coverage of systems analysis and design, data communications, electronic commerce, hardware, software, etc. In addition, sometimes these courses also have introductory hands-on computer skills training on office productivity software such as spreadsheets, word processing, or databases. Thus, while introductory MIS courses may expose students (at a macro level) to a variety of IS-related topics, what they frequently do not do is give the student any meaningful hands-on exposure to what professionals in our field actually do—the analysis and designing of systems.

Emphasize the Profession

The previously mentioned approach is in stark contrast to the way fields such as accounting present their introductory material. For example, in introductory courses on managerial accounting, students are exposed to techniques for the measurement of cost behavior, performing activity-based costing, budget preparation, cost allocation, etc. By the time the student leaves such a course, they can actually perform accounting tasks. By the time a student leaves many of our introductory MIS courses, all they can do is "talk" about IS, which likely does not impart (based on the feedback received from students) the same level of understanding and connection with the discipline.

Illustrate Interdependence with Other Disciplines

This difference in approaches is reaffirmed by recent research on introductory material presented in fields such as finance and accounting, which has also illustrated the movement toward "practice", and more tightly integrating their disciplinary knowledge into the business as a whole [Leauby and Wentzel 2007]. At La Salle University, for example, the accounting and finance departments developed introductory curricula to "strongly emphasize and illustrate the natural link and interdependence of accounting and finance in practice" [Leauby and Wentzel 2006, p. 19]. Considering the need for information resources for all aspects of business, such an integrated and hands-on approach to introductory MIS courses could serve to more clearly illustrate what MIS professionals do, and how the products that MIS professionals produce can influence the business as a whole.

Instructors and Guest Speakers

In addition to content changes in introductory course material, it is also critical to consider who the students are exposed to in this course. Both the selection of an appropriate course instructor, as well as appropriate guest speakers, can play a crucial role in opinion formation related to the field of MIS.

Choose MIS Instructors Strategically

Instructors and guest speakers become examples of the professional identify. Identification, as discussed in both management and psychology research, occurs when an individual comes to see some referent (for example, a guest speaker or instructor) as part of their individual self-concept [Ashforth and Mael 1989; Cheney 1983, Tajfel 1981]. Similarly, Social Identity Theory (SIT) posits that such referents provide "a system of orientation which helps to create and define the individual's place in society" [Tajfel 1981: 255]. In essence, students look for referent groups that they can picture themselves in. If we want to inform and attract potential students into the field of MIS, we need to pay attention to the characteristics modeled by instructors and guest speakers. This is particularly important for introductory courses, where departments potentially have the opportunity to reach undecided students.

Incorporate Industry Experience into the Classroom

Such "influencers" need to not only model the behaviors that recruiters are demanding (including both technical and interpersonal skills), but also need to be someone that can address potential students' work values. The choice of guest speakers is critical. It may be beneficial to incorporate a number of different types of guest speakers, including both those at higher levels of management, but also more recent graduates who are just embarking on their MIS careers (and thus can be more easily related to by those students in the class). Further, it may be useful to engage upper division MIS students (perhaps those that have already participated in MIS internship opportunities or leaders from MIS student organizations) to also visit classes with undecided students. Many of the student comments seem to support this notion, indicating that presentations were the one of the most effective ways to inform students and provide proof that there is more to MIS than computers.

Promotional and Informational Opportunities

Refine Electronic and Hardcopy Promotional Materials

Beyond the introductory course, students also commented on the need to have good presence in venues students use to gather information (e.g. the Internet, or hardcopy materials/brochures available through the college and university advising offices). MIS departments should consider whether their description of the major on departmental or college-level Web sites is adequate, often the first resource that students refer to when exploring other majors. Some sample examples of responses include: "I was looking at the MIS Web site and I don't think they did the best job at portraying what it was. When I read it I thought that it sounded like being in front of a computer all the time. They don't really explain the broad aspect of MIS" and "A question that I would have is what else is involved in an MIS degree? What are the core courses in the program? What skills are taught? What is the entire spectrum of careers?" To address such comments, the design and content of college and university level websites should be carefully considered. On the college's departmental website, content should include information on salaries, profiles of recent graduates, appropriate selection of graduates to serve as a positive referent group, descriptions of skills gained, and possible jobs. While the university-level Web site may also include summaries of the above information at a higher level of abstraction, particular care should be given to descriptions of the skills gained and highlighting of careers for which MIS graduates will become candidates. Consider incorporating audio and video materials as well.

Utilize New Technologies to Promote the Major

Web sites such as facebook.com and myspace.com have become very popular communication tools among students and organizations. Establishing a presence on these sites may provide for another method of distributing information to a wide variety of people, in addition to illustrating the department's willingness to incorporate and utilize emerging technologies that the students are already familiar with. Other sites, such as LinkedIn.com may also provide opportunities for students to start engaging in networking opportunities with past graduates.

Involve Students in Promotional Events

Departments should also take advantage of face-to-face venues for attracting students, e.g. pre-registration orientations, information sessions, or career fairs—all designed to help students in their decision making. Again, getting the appropriate people in front of potential students is critical. Rather than just faculty at such events, including MIS student leaders, students with recent job offers, etc. may be beneficial. In addition, presentation materials need to include appropriate descriptions of the field, and possibly incorporate short videos of recent graduates in the field.

Advising, Counseling, and Engagement

Additionally, MIS departments should consult and partner with any student advising that is done from outside the department. At our university, the College of Business has an advising department that students interact with to help them decide on majors and career paths.

Ensure Everyone is "On Message"

In the past, our advising office used the question, "Do you like computers?" as a means to identify potential students interested in information systems. Given the data gathered during this survey, where non-MIS students clearly indicated this as a negative of the profession, the use of such phrases is not only likely to provide a misleading impression about the profession and MIS careers, but also act to hinder student interest. Educating and coaching advisors (as well as faculty) on the appropriate messaging is critical, as is getting the appropriate promotional materials in their hands. In partnering with the advising office, our department has not only helped develop more appropriate phrases that can be used both verbally (e.g. "using technology and information to facilitate business change", "helping companies use technology to redesign their business processes", etc.), but we have mirrored such descriptions in our promotional materials.

Organize Other Events to Get the Word Out

In addition to working with the advisors on how to articulate the qualities of the MIS program and profession, the department also hosts a luncheon once a semester for the advisors to discuss our program, reinforcing our message, and gather feedback from them, with the overall goal of creating a partnership for the benefit of the program. Other events can also be organized including potential students, current students, top students, faculty and corporate representation to build commitment to the program. As an example, corporate site visits can be sponsored to engage undecided students, those considering IS as a career among other options.

VI. LIMITATIONS AND FUTURE RESEARCH

This exploratory study used a qualitative approach for capturing common factors affecting business student career choices and their perceptions toward the MIS field. Given limited prior research, open-ended questions were employed in this study. While analyzing data from these types of questions is more challenging (requiring the categorization of responses), such open-ended questions also allow for subject to express their views more freely, possibly surfacing factors which would have otherwise been missed in a more controlled survey.

Each focus group session was unique, as groups of students would often build off of one another's input. For example, certain topics brought up during a session seemed to suddenly fuel similar responses from other members of the group, while in other groups that same topic did not emerge in the session. As would be expected in focus groups, some participants contributed more than others. Further, in many instances nonverbal communication was not captured, e.g. a student might nod or exhibit some sort of agreement with another student's comment, but not make a statement himself most likely because the issue was already being addressed.

Focus group participants were aware that their interviewer represented the MIS Department, thus the possibility exists that Non-MIS or undecided individuals may have taken caution with their comments in order to avoid being offensive towards the department. Future research may employ means to collect data anonymously. Additionally, there is always a risk that bias on the part of those reviewing transcripts could affect response interpretation—however there were efforts to consciously avoid this throughout the process.

Finally, all focus group sessions were conducted with students from our university, which may limit the generalizability of our results and recommendations. Expanding the types of sample populations to other majors such as computer science and also to other universities could provide interesting additional contrasts. Future research could use the results of this exploratory study to conduct confirmatory studies. The factors uncovered in this study would be used to statistically test a model that examines the impact of these factors on college students' career aspirations and perceptions.

VII. CONCLUSION

This paper presents the results of a series of focus groups on the factors in MIS career choice conducted with freshman and sophomore students who were still undecided about their major, freshman and sophomore students who had decided on MIS as their major, and junior and senior students who were already majoring in information systems. The results of the study suggests that most students rate *job scope* as an important issue in their deciding on a major, however, students with little or no knowledge of MIS tend to perceive MIS as more narrowly focused than students who had some experience or knowledge of the major. Results also point to other factors that influence undergraduate students' perceptions of the MIS major and the nature of the MIS profession, including opportunities for travel, the availability of jobs after graduation, and social interaction, among others.

There were some findings that will require further research but are nonetheless compelling and somewhat unexpected. For instance, there were few instances of gender differences in perceptions of the major and perceptions of the characteristics of MIS professionals, however, some striking differences did emerge between genders on perceptions of the MIS major's fit with their abilities (profession self-efficacy), the desirability of travel, and the level of social interaction. While these gender differences were somewhat unexpected, further research needs to be conducted to ensure that these are indeed present, and if so explore the theoretical underpinnings of such differences. In addition, future research may also want to target market segments based on other demographic information. For example, younger students, and students outside of MIS, do have different impressions of what MIS is, and what a career in MIS entails, than those in the latter stages of their academic pursuits. Further research that refines what those differences are, and the rises on the downstream effects of those differences, is needed as we continue the "bumper-sticker discussion" on how we market MIS to potential students.

REFERENCES

Editor's Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the paper on the Web, can gain direct access to these linked references. Readers are warned, however, that:

1. These links existed as of the date of publication but are not guaranteed to be working thereafter.

2. The contents of Web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.

Akbulut, A. Y. and C. A. Looney. (2007). "Inspiring Students to Pursue Computing Degrees : Their Aspirations Are Our Possibilities," *Communications of the ACM* (50)10, pp. 67-71.

Ashforth, B. E. and F. A. Mael. (1989). "Social Identity Theory and the Organization," *Academy of Management Review* (14)1, pp. 20-39.

Ballard, J., K. Scales, and M. A. Edwards. (2006). "Perceptions of Information Technology Careers Among Women in Career Development Transition," *Information Technology, Learning, and Performance Journal* (24)2, pp. 1-9.

Cheney, G. (1983). "On the Various and Changing Meanings of Organizational Membership: A Field Study of Organizational Identification," *Communication Monographs* (50)4, pp. 342-362.

Hawkins, B. L., J. A. Rudy, and W. H. Wallace, Jr. (2002). *Technology Everywhere: A Campus Agenda for Educating and Managing Workers in the Digital Age.* San Francisco, CA: Jossey-Bass.

Horrigan, M. W. (2004). "Employment Projections Through 2012: Concepts and Context," *Monthly Labor Review* U.S. Bureau of Labor Statistics, 127(2), pp. 3-22.

Job Search – Hiring Environment Improves for IT Professionals (2005) Retrieved June 23, 2008, from http://www.surrex.com/changing_it_landscape/.

Joshi, K. D. and N. Schmidt. (2006). "Is the Information Systems Profession Gendered? Characterization of IS Professionals and IS Career," *Database for Advances in Information Systems* (37)4, pp. 26-41.

Leauby, B. A. and K. Wentzel. (2006). "Linking Management Accounting with Finance," *Strategic Finance* (88)3, pp. 19-24.

Leauby, B. A., and K. Wentzel. (2007). "New Linkages: Integrating Managerial Accounting and Fundamentals of Financial Management" in Schwartz, B. N. and A. Schwartz (eds.)   *Advances in Accounting Education: Teaching and Curriculum Innovations,* San Diego, CA: JAI Press, pp. 39-52.

Peterson, L. I. (2005). *Why Should I Invest in a Career in the Computer Science or Information Technology Field?* National Information Technology Education Alliance. Retrieved April 12, 2006, from http://www.nitea.org/viewpoint.cfm.

Street, C., et al. (2008). "Reversing the Downward Trend: Innovative Approaches to IS/IT Course Development and History," *Communications of the AIS* (22)28, pp. 515-524.

Tajfel, H. (1981). *Human Groups and Social Categories: Studies in Social Psychology*. Cambridge University Press. pp. 369.

Watson, R. (2006). "Bumper Stickers", Retrieved May 1, 2008, from http://docs.google.com/View?docid=ddbxn337_19srk73m.

24

APPENDIX A

Thank you very much for participating in this session. In this session, I will ask you about your career choices and your perceptions regarding IT careers.

Please fill out the demographic items listed below. In this session you will be asked to respond to a series of open-ended questions. Your responses to these questions will be kept completely PRIVATE and CONFIDENTIAL. No one other than the researchers will ever see the individual responses collected through this session.

Name_____

SID _____

Age: _____

Class Standing (eg. Freshman, Sophomore): _____

Declared Major: _____

In the Instructor's class? _____

Interview Questions

1. What factors did/are you consider when choosing a major?

    - Why did you select the major that you did?

    - If they say they are interested in _____ major that is why they choose that major, they try to find out what about that major interest them.

2. Why did/didn't you choose MIS as a field of study?

    - What attracted/deterred you from MIS?

    - If they say - I am not interested in MIS then try to probe them – what aspect of IS disinterest them?

3. Did you know about MIS before you made your choice?

    - If they say yes, then try to find the information source.

4. In your own words, what is MIS?

5. What types of jobs do you think IS professionals do, and what types of skills are necessary to do them?

6. Have any economic conditions such as outsourcing or the dot.com bust affected your decision?

7. What is your perceived outlook for IS job availability in the future?

8. For students who would be interested in this major, how can the MIS Department better communicate to students about benefits and opportunities within the field?

ABOUT THE AUTHORS

Christopher "Kit" Scott is a Post-Doctoral Fellow in Information Systems at Washington State University. Dr. Scott received his Ph.D. in Management Information Systems from Washington State University. His research focuses on media perceptions and effects on communication effectiveness, innovation and creativity, and virtual world technologies and has appeared in outlets such as *The DATABASE for Advances in Information Systems, AMCIS Proceedings,* and the *Proceedings of the Pre-ICIS SIGHCI Meeting.* Dr. Scott has taught a variety of information systems courses, including information systems project management, database management, introduction to MIS, and web technologies and innovation.

Mark A. Fuller is the Chair of the Department of Information Systems at Washington State University, and holds the Philip L. Kays Distinguished Professorship in Information Systems. Professor Fuller received his Ph.D. in Management Information Systems from the University of Arizona. His research focuses on virtual teamwork, technology supported learning, and trust and efficacy in technology-mediated environments, and has appeared in outlets such as *Information Systems Research*, *Management Information Systems Quarterly*, *Journal of Management Information Systems*, *Decision Sciences*, *Journal of the Association for Information Systems,* and *Decision Support Systems.* Professor Fuller has won multiple teaching awards, has published a textbook on Information Systems Project Management, and has taught graduate and undergraduate courses on a variety of topics, including global information systems and strategy, information systems project management, and collaborative technology.

Kimberly M. MacIndoe works as an IT Advisory Associate at KPMG LLP Seattle. She received her Bachelor's degree from the Washington State University's MIS program in 2006. At KPMG she has worked on projects in both mid-size and Fortune 500 companies in a variety of industries, including financial institutions, healthcare services, retail, timber/forestry products, transportation, and wireless telecommunications.

K. D. Joshi is an associate professor of Information Systems at Washington State University. She received her Ph.D. in Business Administration from the University of Kentucky and Master of Science in Engineering from the University of Michigan. Dr. Joshi's research interests focus on knowledge management and IT workforce issues. Her research has appeared in journals such as *Decision Support Systems, DATABASE, IEEE Transactions, Communications of the ACM, Journal of Strategic Information Systems, Information and Management, The Information Society, Journal of the American Society for Information Science and Technology,* and *Information Systems Journal.* She has received multiple research grants from the National Science Foundation to conduct her research. Dr. Joshi is currently an associate editor of the *Communications of the AIS, Journal of Organizational Computing and Electronic Commerce*, and on the editorial review board of *the International Journal of Knowledge Management*.