Investigating a 21st Century Paradox: As the Demand for Technology Jobs Increases Why Are Fewer Students Majoring in Information Systems?

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Abstract

This paper reports the results of a survey administered to 322 undergraduate business students enrolled in an introductory Information Systems course at a public liberal arts college located in the northeast US. The goal of this research was to learn, given the increased demand for technology oriented jobs, why fewer students are choosing the Information Systems (IS) major. The survey results indicate that lack of interest in IS or greater interest in another major are the primary reasons why students do not select IS as their major. Furthermore, even though students are knowledgeable about the career opportunities in the IS field, they simply do not find the IS field interesting enough to major in it.

Keywords: IS Education, IS Enrollment, IS/IT Major, IS/IT Career

1. INTRODUCTION

Each year there are several studies and news reports that list the "best jobs." The best jobs on these lists are usually selected based on a multitude of variables including employment opportunity, salary, work-life balance, and job security (US News and World Report 2013). This year, as well as for the last several years, technology oriented jobs such as Systems Analyst, Database Administrator, Software Developer, and Web Developer have consistently and routinely appeared near the top of these lists (CareerCast 2013, Forbes 2013, US News and World Report 2013). Projections from the U.S. Bureau of Labor Statistics (BLS) support these claims. For instance, the BLS projects a 22.1 percent employment growth for Systems Analysts jobs between 2010 and 2020 (BLS

2013). This is higher than the average of all other occupations.

Paradoxically, while there has been some improvement in recent years, in the 21st century, enrollment in the college majors that would prepare students for careers in technology oriented jobs is significantly less than it was at the turn of the century (National Science Board 2012, Zweben 2013). This phenomenon has not gone unnoticed. Information Systems (IS) and other technology oriented educators have been struggling to find the reasons why. Over the last several years there have been numerous studies and research papers reporting on this situation (Walstrom, Schambach, Jones, & Crampton 2008, Lenox, Jesse, & Woratscheck 2011).

Ramapo College, a public liberal arts college in northern New Jersey, has not been immune from this problem. Enrollment in the IS program (which is housed in the school of business) has shrunk over the last ten years. At the same time, enrollments in other business programs at the college, such as Accounting and Management, have expanded. This is especially surprising given the school's proximity to the high tech demand area of New York City.

This paper reports the results of a survey administered to 322 undergraduate business students enrolled in an introductory Information Systems course at Ramapo College. Participants were queried about their knowledge of career opportunities associated with each business discipline, their preferred job characteristics, job-related concerns, the most influential factors in selecting a major and a career, and their impression of the IT profession, among others. The goal of this research was to learn, given the increased demand for technology oriented jobs, why fewer students are choosing the Information Systems major.

2. LITERATURE REVIEW

Ever since enrollments in Information Systems (IS) and related majors began to decline in the early 21st Century, educators have sought to understand why and to reverse the decline. The well publicized growing need for IS professionals has fueled this effort rather than a self-serving desire by academics to maintain the status quo (Hecker 2005). Nevertheless, so far, research has not revealed a plan, which has been successfully applied to alter the enrollment trend (Saunders & Lockridge 2011). Walstrom and Schambach (2012) find that having students read an article about the job of a system requirements analyst improved students' perception of the IS field, which is evidence that a reversal may be possible. Accordingly, this literature review seeks to identify patterns in student preferences that will provide a blueprint for remediation. We will first review studies that identify the factors that influence student choice of major. Then we will focus on studies that explain why students do not choose IS.

At the time of the PC revolution of the early 1980s (Greene 2011), scholars were already seeking to identify the factors that influence choice of major field in the study of business. Hafer and Schank (1982) surveyed 942 business students and found, unsurprisingly, that career-related factors such as job security and financial reward were the primary influence. This has not changed much as a more recent study by Roach, McGaughey, and Downey (2009) found job availability and security to be paramount, which may reflect the current economic recession. After surveying students by major regarding 37 influences on choice of major (internal, external, and interpersonal), they found that although interest in the subject of the major was important, it played a secondary role. They also suggested that the impact of interpersonal influence may have been underestimated.

A related issue, which has yet to be explored thoroughly, is what is meant by "interest in the major." According to Rouibah (2012), Ferratt, Hall, Prasad, and Wynn (2009) surveyed 50 undergraduate students and found that job/career prospects, personal interest and ability (self-efficacy), and practical application of course work were the primary components. Roubiah notes that "practical application" is a broad descriptor and would include attributes such as problem solving, creativity, social interaction, helping others, utility to business, reputation, etc.

Other studies have been more finely tuned and focused on the differences between computer science (CS) and IS majors. For example, Roach et al. (2009) compared IS and CS majors at four US universities and found the most important influence for both majors was interest in technology and compensation. Notably, CS majors chose their major in high school or shortly thereafter while IS majors did not. Also, IS majors were more influenced by others, including instructors, parents, and friends, in making their choice. As expected, IS majors' choice was influenced by an interest in business organizations and interpersonal interaction while

CS majors were more interested in technology itself.

Another factor affecting major choice, specific to the information technology (IT) field, is the multiplicity of names for essentially the same course of study. Some examples are: computer information systems (CIS), management information systems (MIS), and ITM (information technology management). Tabatabaei and Tehrani (2010) found that there was no consistency in the naming of the major and proposed a study to determine whether there was a relationship between department name and enrollment. To date, a cause/effect relationship has yet to be determined although anecdotal evidence of the confusion is readily available by a cursory search of the Web.

Zhang (2007) applied the theory of reasoned actions to analyze the factors that influence students' selection of the IS major. According to this theoretical construct, students' perception of the likely outcomes of selecting the major, along with social pressure to do so, culminates in an intention to select it. In surveying a public urban university with a minority enrollment of 60%, Zhang discovered that interest in the field, availability of jobs, difficulty of the curriculum and influence of family and teachers were the important factors. He also particularly noted that female students did not feel encouraged by family, friends, advisors, and professors to the same extent male students did. Perceived difficulty and lack of encouragement from faculty were the key factors that worked against selection.

Building upon studies by Walstrom et al. (2008) and Hogan and Li (2011), Li and Thomson (2011) surveyed students in the business school of a medium-sized public university in the southeastern USA to determine why they had selected IS as a major. Again, career related factors and personal interest in the subject matter ranked highest. In addition, the image of the profession and the reputation of the program played a positive role in influencing students to select the major. The research also showed that business students in general regard the IS major positively which the authors opine indicates that other business majors are a fertile ground for IS recruitment. The authors also note that they were not able to identify information sources that students relied upon in selecting a major, which makes communication with potential majors problematic.

Based on qualitative one-on-one interviews across three western Pennsylvania higher education institutions, Lenox et al. (2011) found that IS students picked their major through self-collected inputs from the Internet. Sixty-six percent reported that their high school guidance counselor was not helpful in supplying information about computer-related disciplines. Interestingly, female students mention being influenced by male role models such as a father or brother to select the major.

Turning now to why students reject IS, Wong, Fiedler, and Lu (2007) surveyed undergraduate business students at one private and one public university to identify the differences between what the students were seeking in a career and what they believed the IS major would help them achieve. Students were asked how appealing a particular career outcome (career anchor) was to them and how likely each business major would be to lead to that outcome. MANOVA results revealed that the IS major was perceived to be unlikely to lead to career outcomes which matched students' needs and was perceived to be closest to the finance major in that regard. Marketing and management were seen as most different from IS and most likely to lead to competency in general management, servicing people, challenge, achievement of life style and entrepreneurial creativity. Management was seen as most likely to lead to security and stability in a career.

On the other hand, Walstrom et al. (2008) surveyed entry level business students and discovered that they were not majoring in IS because it was "not what I want to do" and "subject not of interest." Walstrom et al. noted that it is unwise for faculty to try to divine why students do not choose a major, citing a study by Noland, Case, Francisco, and Kelly (2003), which showed that reasons for accounting students avoiding accounting did not coincide with their professors' surmises. Walstrom et al. may not have identified all the sources that guide students in selecting a major because none of the sources they asked students about were identified as above average in importance. Also, the Walstrom et al. (2008) study drew only upon Midwestern students of traditional college-age. As many non-IS majors admitted to ignorance of the major, it is not clear that non-interest in the major was actually the reason why it was not chosen.

Hogan and Lei (2011) extended and validated the Walstrom et al. (2008) study in a different

academic setting, a smaller state university with many non-traditional students. They found that career related issues were the most compelling influence upon major choice followed by student interest in the field of study. Notably, the IS majors were considerably older than the students in other majors. This prompted Hogan and Lei to suggest that recruitment focus on younger students. However, this may, in fact, indicate the need for the opposite approach because returning students are the most fertile demographic segment for recruitment.

Hogan and Lei (2011) also looked at student perceptions of IS programs. Students who major in accounting, marketing, and management perceived IS as likely to make them more competitive. Students reported that they learned about IS primarily from IS classes and IS faculty with fellow students a secondary source. Potentially an interesting first class in IS might convince students from these other majors to minor in IS.

Saunders and Lockridge (2011) surveyed IS graduates of a mid-sized Midwest university and discovered that students had a desire for a more career-oriented program of study with greater input from business leaders. The results also suggested that students were less interested in how the university experience improved personal traits such as critical thinking and more interested in improving job skills. The authors cite a relatively low post-graduate employment rate (60% within three months of graduation) as a possible influence upon the results. Nevertheless, 83% responded that their college education prepared them for their career and 78% said they would recommend the IS program.

Citing a study by Moore, Schoenecker, and Yager (2009), Lenox et al. (2011) note that at least some students continue to believe some popular fallacies about the IS field. These are that: 1) the job market for IS majors is poor, 2) IS majors primarily work with MS Office, and 3) IS jobs involve sitting at a computer all day. Overcoming these popular misconceptions promoted by the media will require ingenuity.

3. RESEARCH METHODOLOGY

This research was conducted using a "grounded theory" approach. Grounded theory was developed by the sociologists Barney Glaser and Anselm Strauss in the 1960's. In the grounded theory approach, conclusions are drawn and theories are produced by analyzing a body of data. In essence, the theories that are produced are "grounded" in the data (Glaser & Strauss 1967).

For this study, the process began by analyzing the current body of literature on the diminishing enrollments in IS programs. During this process a paper by Walstrom et al. (2008) was discovered that contained a survey instrument matching the requirements of this research. After permission was obtained from the authors, the survey instrument was reviewed and slightly modified. The survey includes mostly closed end questions (which are listed in the results section below) and a few open ended questions.

The survey was administered over a two year period, from the spring 2011 semester until the spring 2013 semester, to business students enrolled in a required introductory IS course. Students were given extra credit to participate in the study but were allowed to opt out for a replacement assignment. A total of 322 students chose to participate in the study.

4. RESULTS

1. What is your major?

Major	Number of Respondents	Percent
Accounting	62	19.3
Management	60	18.6
Marketing	57	17.7
Finance	44	13.7
Information Systems	23	7.1
International Business	13	4.0
Business/Business Administration	10	3.1
Economics	9	2.8
Business Dual Major/ Concentration/Minor	7	2.2
Business Undecided /Undeclared	4	1.2
Communications	5	1.6
Music Industry/ Music Production	3	0.9
Psychology	3	0.9
Computer Science	2	0.6
Engineering Physics	1	0.3
Law and Society	1	0.3
Social Sciences	1	0.3
Sociology	1	0.3
Other	14	4.3
Undecided	2	0.6
Total	322	100.0

Table 1. Respondents by Major

In this section, the data that was collected is summarized and presented as a series of tables. The survey questions are included to provide additional clarity.

2. At what point in your academic career did you decide on your major?

Time Decided Major	Number of Respondents	Percent
High School	104	32.3
Freshman	96	29.8
Sophomore	85	26.4
Junior	18	5.6
Senior	1	0.3
Other	14	4.3
Not yet/Not sure	4	1.2

Table 2. Time of Deciding a Major

3. In each of the following areas please identify how knowledgeable you are of the career opportunities associated with each discipline.

Area	Average Knowledge Level*	Lower Third Career Awareness**	
		Number of Respondents	Percent
Marketing	3.78	58	18%
Management	3.75	61	19%
Information Systems	3.63	50	16%
Accounting	3.57	70	22%
Finance	3.30	87	27%
Economics	3.09	102	32%
International Business	2.94	126	39%

*1 = Unaware; and 6 = Very Knowledgeable
** Lower Third = awareness level at 1 or 2
Table 3-1. Career Awareness Rating

Student's t-tests were performed on mean differences in career awareness for majors and non-majors.

Table 3-2 (Appendix) suggests there is a significant difference between the awareness of majors and non-majors regarding career opportunities in each discipline.

4. To what extent do you agree with the following?

I would like a job …	Mean Agreement Score*
where creativity is encouraged	4.79
in a dynamic atmosphere	4.72
that allows independent work and autonomy	4.44
that involves a lot of verbal communication	4.41
that challenges me intellectually	4.38
that involves teamwork	4.26
that is routine and easy to master	3.84
where compensation is contingent on performance (e.g. commission)	3.73
that involves numbers and uses math based problem solving skills	3.71
that demands a heavy workload to demonstrate success	3.44

*1 = Strongly Disagree; and 6 = Strongly Agree

Table 4. Preferred Job Characteristics I
5. How important is each of the following to you?

I would like a job with …	Mean Importance Score*
advancement opportunity (promotion, career ladder)	5.40
job security (little chance of lay-offs)	5.39
high long term earnings	5.33
plentiful supply of jobs (occupational growth)	5.15
flexibility of career options (career paths)	5.11
high initial earnings (starting pay)	4.82
high social status (prestige: proud to show your business card)	4.58
self-employment opportunities (private practice, consulting)	4.46
other. Please state what in the box below:	5.05**

*1 = Not Important; and 6 = Very Important
Table 5. Preferred Job Characteristics II

**One hundred seventy-two (172) respondents filled out the "other:" section. Frequently mentioned other job aspects as important include: enjoyment and happiness, environment and coworkers, benefits and bonuses, location, opportunity to travel, vacation time, and flexible hours.

Other comments include: pensions, nice boss, flexible with maternity leave, shorter hours, very little traveling, and free lunch, among others.

6. How concerned are you about each of the following?

How concerned are you about each of the following?	Mean Concerned Score*
Jobs being outsourced overseas	4.11
Diminishing managerial levels in firms (a diminished career ladder)	4.03
Global competition	3.91
Jobs being replaced by technology	3.69
Needing to constantly learn new ways of doing business	3.49
Needing to constantly learn new technologies	3.21
Other. Please state what in the box below:	4.36**

* 1 = Not Concerned; and 6 = Very Concerned

Table 6. Job-Related Concerns

**One hundred seventy (170) respondents filled out the "other:" section. Over 60% of those expressed concern over the state of the economy and job availability.

Other individual concerns include: work requiring travel, increased demand/need for higher degrees, becoming CPA certified, competing with younger graduates, concerned about a flat tax, decay of newspapers, national debt, saving the world, etc.

7. To what extent do you agree with the following?

My impression of being an IT professional is that …	Mean Agreement Score*
IT is challenging work, especially in the first few years	4.52
IT professionals are dynamic advisors to business	4.42
IT /Computing Profession has more job growth than most other fields	4.27
IT professionals are trusted business advisors	4.23
IT is intellectually stimulating	4.20
IT requires math based problem solving skills	4.18
IT professionals have a positive image	4.16
in the IT field, Creativity is encouraged	4.14
being an IT professional requires long work hours	4.08
in the IT field, Interacting with other people is common	4.04
IT /Computing Profession has higher earnings than most other careers	4.04
IT involves a lot of verbal communication	3.84
in the IT field, Compensation is contingent on performance (e.g. bonus based)	3.73
many IT professionals become presidents or general managers of large businesses	3.29
being an IT professional is dull and boring	3.24
IT work is easy to master	2.77

*1= Strongly Disagree; and 6 = Strongly Agree

Table 7. Impression of an IT Professional

8. For each of the following, circle the importance of the item listed for why you selected your major.

Factor in Choice of Major	Mean Importance Score*
Personal Interest in Subject Matter	5.06
Ease of Subject Matter – easy for me	4.00
Family Member (s)	3.87
Performance in University Subject Matter Courses	3.75
Reputation of Degree Program at University	3.74
Performance in High School Subject Matter Courses	3.51
Difficulty of Subject Matter – difficult for most people	3.46
Friend(s)	3.25
High School Teacher(s)	2.98
University Advisor(s)	2.68
University Career Services	2.64

Program(s)	
Counseling Center Career/Interest Tests/Assessments	2.63
High School Career/Interest Tests/Assessments	2.58
University Advisement Center	2.47
High School Guidance Counselor(s)	2.39
Other. Please state what in the box below	5.00**

*1 = Not Important; and 6 = Very Important

Table 8. Items of Importance in Selecting Major

**One hundred sixty-eight (168) respondents filled out the "other:" section. One single theme of these write-ins is the job market and job/internship availability as a factor in choice of major. A few outliers include television and movies, coaches, SAT performance, trial and error, hearsay, and that "dad is a businessman."

9. Which two of the items from question 8 were/are the most influential factors in the selection of your major?

Most Influential Factor 1	Number of Respondents	Percent
Personal Interest	158	49.1
Family Member(s)	66	20.5
Ease of Subject	21	6.5
Career Opportunities	16	5.0
Reputation of Degree Program	13	4.0
University Advisor	13	4.0
Friends	10	3.1
High School Teacher/GC	10	3.1
Performance in High School	3	0.9
Performance in University	3	0.9
Difficulty of Subject Matter	2	0.6
Others	7	2.2

Table 9-1. Most Influential Factor 1

Most Influential Factor 2	Number of Respondents	Percent
Personal Interest	55	17.1
Family Member(s)	53	16.5
Ease of Subject	39	12.1
High School Teacher/GC	26	8.1
Career Opportunities	26	8.1
Reputation of Degree Program	25	7.8
Performance in University	24	7.5
University Advisor	21	6.5
Friends	19	5.9
Performance in High School	16	5.0
Difficulty of Subject Matter	13	4.0
Others	5	1.6

Table 9-2. Most Influential Factor 2

Most influential factors 1 & 2	Number of Respondents	Percent
Personal Interest	213	33.1
Family Member(s)	119	18.5
Ease of Subject	60	9.3
Career Opportunities	42	6.5
Reputation of Degree Program	38	5.9
High School Teacher/GC	36	5.6
University Advisor	34	5.3
Friends	29	4.5
Performance in University	27	4.2
Performance in High School	19	3.0
Difficulty of Subject Matter	15	2.3
Others	12	1.9

Table 9-3. Most Influential Factors 1 and 2

10. How many times have you switched majors?

Number of Times Switched Major	Number of Respondents
0	197
1	94
2	22
3	9

Table 10. Number of Times Switched Major

Job opportunities and change of personal interest are two primary reasons students cited for changing a major.

11. To what extent were the following information sources important in choosing your major?

Information Source	Mean Importance*
Information on Internet/Web	3.86
Information on College/Department Website	3.55
Newspaper Articles	3.14
Brochures about the Major	3.09
Presentations by Faculty	3.02
Television or Movie portrayal of the occupation	2.94
Online Job Listing(s)	2.89
Presentations by Current Students	2.85
Job Listings in Classified Ads	2.83
Invited Speakers	2.82
Presentations by Alumni	2.69
Informational CDs or DVDs	2.30
Other. Please state what in the box below	3.31**

*1 = Not Important; and 6 = Very Important

Table 11. Importance of Information Source When Selecting Major

**Write-ins in the other box include family, friends, personal interest, professors, and media, etc.

12. If you are not a information systems major, what are two major reasons you are not?

The single theme which emerges for students not majoring in information systems is being uninterested in IS or liking another major better; a distant second reason is not being good with computer/IT or it seems hard/too technical.

Questions 13-15 omitted because of lack of pertinence to this paper.

16. What two things are most important to you in choosing a major?

The vast majority of the responses center around two themes: personal interest and career potential. A key-word search, which counts a response if it contains the word string but does not detect any misspelled words, shows 35.2% (227/644) of all responses contain the word interest, fun, passion, enjoy, like, love, happy or happiness, while 27.0% (174/644) of all responses contain the word career, money, job, financial, earning, pay or salary.

17. What two things are most important to you in choosing a career?

Again, the vast majority of the responses center around two themes: career potential and personal interest. A similar key-word search yields 43.9% (283/644) of responses containing the word career, money, job, financial, earning, pay or salary, while 27.5% (177/644) of responses contain the word interest, fun, passion, enjoy, like, love, happy or happiness.

The difference between responses to Questions 16 and 17 suggest students put more emphasis on career potential over personal interest when choosing a career as opposed to choosing a major.

18. For each of the majors listed below, please rate each major regarding your perceptions of the job characteristics associated with careers affiliated with that major.

Major	Job Availability	Pay and Benefits	Promotion Opportunities	Job Security	Mean
Accounting	4.13	4.14	3.66	3.84	3.94
Information Systems	4.16	3.87	3.81	3.74	3.90
Finance	3.80	4.18	3.92	3.52	3.86
Business Admin	3.63	3.84	3.86	3.53	3.72
Management	3.55	3.80	3.93	3.44	3.68
Marketing	3.58	3.56	3.79	3.29	3.56
Economics	3.37	3.66	3.45	3.31	3.45
Mean	3.75	3.86	3.77	3.52	

*1 = Negative; and 5 = Positive

Table 18. Perception of Job Characteristics of Corresponding Major

19. Use the same rating scale to show your perception of each degree area:

Area	Interesting Topics	Easy to do well	Faculty generally good	Faculty generally entertaining	Mean
Marketing	3.86	3.54	3.62	3.59	3.65
Business Admin	3.59	3.31	3.58	3.27	3.49
Information Systems	3.36	3.17	3.88	3.51	3.48
Management	3.68	3.36	3.56	3.33	3.48
Economics	3.26	3.00	3.39	3.09	3.19
Finance	3.16	2.83	3.38	3.00	3.09
Accounting	2.89	2.88	3.34	2.84	2.99
Mean	3.40	3.16	3.54	3.23	

*1 = Negative; and 5 = Positive

Table 19. Perception of Characteristics of Each Major

6. ANALYSIS OF RESULTS

In this section, an analysis is presented of the tables shown in the results section. Tables 1 and 2 show some basic information about the responders to the survey. Table 1 shows the breakdown by major of the respondents. The data shows that only 7.1% of the respondents are currently majoring in IS. Over 80% of the respondents are currently majoring in another business discipline and around 10% are majoring in a non-business discipline or undecided. Table 2 shows that over 75% of the respondents are sophomores or freshmen.

Tables 3-1 and 3-2 show how knowledgeable the respondents think they are of the career opportunities available in the various business disciplines. These tables are important to our study because they can show that students, even with knowledge of the career opportunities in IS, choose another major. Tables 3-1 and 3-2 appear to bear this out. Table 3-1 shows that the majority of respondents felt somewhat knowledgeable about IS career opportunities. In fact, IS career knowledge ranked third among the business disciplines, behind only Marketing and Management. Table 3-1 also shows that only 16% of the respondents reported that they were not knowledgeable about IS careers.

Table 3-2 shows more detail of the respondents' knowledge of career opportunities in the business disciplines by breaking the results down by majors and non-majors. This table clearly shows that respondents have much more knowledge of career opportunities in the discipline in which they are majoring. It should be noted, however, that even those respondents not majoring in IS still rated their knowledge of IS career opportunities as above average.

Tables 4, 5, and 6 show what kinds of job characteristics are important to students and what job related concerns students may have. Table 4 shows that respondents want a job where creativity is encouraged, the atmosphere is dynamic, independent work and autonomy is allowed, verbal communication is involved, there is intellectual challenge, and teamwork is integral. Table 5 shows that advancement opportunities, job security, high long term earnings, plentiful supply of jobs, flexibility of career options, and high initial earnings are also important to the respondents in their preferred job characteristics. Table 6 shows that students are most concerned about jobs being outsourced and diminishing career ladders.

Table 7 shows the respondents impression of being an IT professional. This is, again, important data to the study because it can help us analyze why students are not choosing the IT profession. Overall, the respondents appear to have a favorable impression of the IT profession. The number one impression is that IT is challenging work. Given the fact that table 4 showed that respondents wanted a job that challenged them intellectually, we would assume that this is a positive impression of IT. In fact, many of the impressions of IT listed near the top of table 7, such as job growth, intellectually stimulating, creativity, and a lot of verbal communication, correspond to the preferred job characteristics listed in tables 4 and 5. Some negative impressions of the IT profession include needing math skills, working long hours, and being dull and boring are also reflected in table 7. However, those characteristics show up near the bottom of table 7 and were, therefore, chosen less by the respondents.

Tables 8, 9-1, 9-2, and 9-3 show what factors influenced the respondents in choosing their major. All four of these tables corroborate each other in that all four show that "personal interest" is the number one influencer of how a student chooses their major. Table 8 has a slight discrepancy from the other three tables in that it shows "job market" as the second most often chosen influence, while the other tables list

"family member" as the second biggest influence.

Table 10 shows that the vast majority of respondents have never switched majors or switched once. This could be a reflection of the demographical background of the respondents as over 75% were underclassmen. Table 11 shows information gathered via the Internet and college web sites were indicated by respondents as the most important information sources in choosing their major.
Question 12 from the survey (not represented by a table in the results section) asks for two reasons why the respondents are not an IS major. The single theme which emerges for students not majoring in information systems is being uninterested in IS or liking another major better; a distant second reason is not being good with computer/IT or it seems hard/too technical.
The results from questions 13 through 15 on the survey were omitted from this paper as the results were not pertinent to this discussion. The questions pertained to the respondents perceptions of the importance of various skill and knowledge areas.
Question 16 asked the respondents to identify the two things that were most important to them in choosing a major. The vast majority of the responses centered around two themes: personal interest and career potential. These findings support the results from the earlier questions (eight and nine) and reinforce the results of question 12 (that students do not major in IS because they are uninterested).

Question 17 asked the respondents to identify the two things that were most important to them in choosing a career. While the respondents identified the same two things for question 17 as they did for question 16, here an interesting result emerged. The students reversed the priority of the two responses. For question 17 students chose career potential as the most important thing in choosing a career with personal interest being second, while in question 16, they had chosen personal interest as the most important thing in choosing a major.

Tables 18 and 19 show some interesting results. Table 18 asked respondents to rate jobs within majors for several different job characteristics. In this table, IS is rated fairly high, finishing second in the business disciplines behind Accounting. However, when asked to rank the majors in Table 19, IS dropped to third among the business disciplines. This again supports the previous results whereby respondents rated the IS profession favorably but the IS major not as much.

7. DISCUSSION AND CONCLUSION

A key aspect of the study was the demographic makeup of the subjects. In particular, it should be noted that over 75% of the respondents were sophomores or freshmen. This fact could have far reaching implications for the entire study, but it has explicit effects on certain variables. For instance, the results from question two, which asks at what point the student chose a major (the majority had chosen in high school or as a freshman), and question ten, which asks how many times the student has switched majors (the majority of students in the study had never switched), would be impacted by the student's progress toward the degree, i.e., number of credits earned.

The overwhelming majority of underclassmen in the subject group could also offer an explanation for the disconnect between how a student chooses a major and how a student chooses a career. The results show that most students choose a major based on what they are interested in (Questions 8, 9, and 16) but choose a career based on career potential factors such as salary, career earnings, financial security, advancement opportunities, and job availability (Questions 4, 5, and 17). Perhaps because the subjects are still several years away from entering the job market, they can afford the luxury of choosing an interesting major that may not directly correlate to their long range career plans.

A further review of the results shows that students feel that they are just as knowledgeable about the career opportunities in IS as they are in the other business disciplines, in fact, they are less knowledgeable about the career opportunities in Accounting (Table 3-1). Students are most concerned about the economy, job availability, and jobs being outsourced overseas (Table 6). Students' impressions of being an IT professional (Table 7) show that they think that IT is challenging work and they do not think that IT work is easy to master. The IS major scores well when the students were asked about their perception of favorable job characteristics and their perception of favorable major characteristics (Tables 18 and 19).

When students were asked the key question, (Question 12, What are two reasons you are not an IS major?) point blank, they most often gave

an answer that was consistent with why they chose their major. The number one reason that students do not choose IS as a major is because they are not interested or because they find another major more interesting. A distant second reason was that they feel IS is too hard. These results are consistent with the findings of previous studies (Walstrom et al. 2008).

The data seems to provide an answer for our research question as to why there is a paradox between the demand for high tech jobs and the lack of IS majors. Students want to major in something they perceive as interesting and, even though they are knowledgeable about the career opportunities in the IS field, they simply do not find the IS field interesting enough to major in it now.

Our future research will focus on how IS educators can get students to perceive the IS major as more interesting. Prior research (Lenox et al. 2011) has suggested that higher involvement with students while they are at the high school level may be a key factor in getting students interested in the IS field. We would like to determine if there are other factors that affect students' interest in the field.

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Appendix

Awareness of Career by Area		N	mean	d.f.	t	p
Accounting	Major	64	4.81	124	10.44	.000
	Non-major	258	3.26			
Economics	Major	9	4.33	8	2.82	.011
	Non-major	313	3.06			
Finance	Major	47	4.04	65	4.48	.000
	Non-major	275	3.17			
Information Systems	Major	25	4.80	28	5.13	.000
	Non-major	297	3.54			
International Business	Major	13	4.23	13	3.49	.002
	Non-major	309	2.89			
Management	Major	61	4.64	107	6.95	.000
	Non-major	261	3.54			
Marketing	Major	60	4.62	110	6.61	.000
	Non-major	262	3.58			

Table 3-2. Comparison of Career Awareness between Majors and Non-majors