An Empirical Study about the Critical Factors Affecting MIS Students' Job Opportunities

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Executive Summary

For the first time in many years, Management Information Systems (MIS) students and faculty are seeking ways to improve full-time job placement for program graduates. Due to sharp IT budget cuts, the slowing economy, and outsourcing, job opportunities for MIS graduates have become scarcer than ever before. In addition to achieving good academic performance, MIS students have adopted aggressive approaches to securing employment, such as building MIS-related internship experiences, adding additional majors, and taking more technical course work. Research on the critical factors affecting MIS full-time job opportunities has not received enough attention, and little empirical research is currently available. There are several factors generally known to affect full-time job opportunities for graduates. These factors include the intern-like work experience, nature of work experience, multiple majors, the timing of major declaration, grade point average, and gender difference. An urgently needed empirical study has been completed and the results are reported in this paper.

Keywords: MIS major, MIS full-time job offers, internship, double majors, gender, grade point average, empirical analysis

Introduction and Literature Review

Students and faculty in higher education are attempting to improve student job placement in the current economy climate. In the MIS area students and faculty have faced an even more difficult situation because of the information technology (IT) offshore outsourcing in recent years and the downward trend in the economy. A survey by the National Association of College and Employers found that 42.4 percent of employers indicated that they expect to cut college hiring (Lee, 2003). According to the Bureau of Labor Statistics, the number of unemployed workers between the age of 20 and 24 is 1.4 million, up 60 percent from four years ago. The U.S. Bureau of Labor Statistics estimates that there are now 212,000 unemployed computer and mathematics professionals (Keefe, 2003). Today's graduating seniors are no longer under any delusion. A survey by job-search website Monster.com found that 61 percent of college graduating seniors expected to move in with their parents (Chen, 2003). Since the end of the dot-com boom, unemployment among IT professionals has soared, reaching 6.5% in March 2003 (Chabrow, 2003). Most observers believe that offshore outsourcing, immigration, and continued pressure to lower costs denote that white-collar workers will continue to struggle to find new

employers. These factors generally hit the software field harder than other technical fields (Costlow, 2003).

Internship experiences and multiple majors have surfaced as important factors that may positively improve the job placement of MIS students (Fang, Lee, Huang, & Lee, 2004). Internships offer a mutually beneficial experience for companies and students (Pianko, 1996). Academicians, practitioners, and students themselves have widely extolled the benefits of internships, defined as structured and career relevant work experiences obtained by students prior to graduation from academic programs (Taylor, 1988). Knouse (1999) and Schambach and Kephart (1997) suggest that internships during college offer a variety of benefits to students, such as increasing opportunities for finding jobs upon graduation, reinforcing the skills learned from courses, and gaining better understanding of organizations and solidifying career focus. However, empirical support for the benefits of internships is not extensive. Though several studies have reported that internships yield high job satisfaction and favorable employment opportunities for participants, they have rarely controlled for potential confounds, such as the nature of the internship and whether internships provide additional full-time job offers, and other important factors, such as single versus double majors, timing of MIS major declaration, gender difference, grade point average, etc. Also, the evidence for the employment value of supplementary experience has been found only in research with limited samples (Fuller & Schoenberger, 1991), and with limited controls on factors such as ability (Sagen, 2000) and major. Further research is needed to examine how these factors translate into job opportunities, specifically in the field of MIS.

Hypotheses Development

This research project is designed to investigate the relationship between full-time MIS job opportunities and other factors, such as internships, double majors, grade point average, etc. A survey instrument (see Appendix) has been designed to investigate the following hypotheses:

> H 1: Students who have had an MIS internship have the same number of MIS full-time job offers as students who have had no MIS internship.

As the study by Gault, Redington, and Schlager (2000) indicated, three terms are commonly used to delineate higher-education programs that involve learning through employment in industry: cooperative extension, cooperative education, and internship. Cooperative extension programs denote state-sponsored agricultural work experiences; therefore, these programs are not included in this study. Cooperative education originated to enable students in professional programs to finance their education (Thiel & Harley, 1997). Normally, cooperative education programs (co-ops) are heavily concentrated in engineering and manufacturing disciplines. Internships generally refer to part-time or full-time experience and cover a wide variety of academic fields and organizational settings. Students may or may not get paid. In some internship programs, student participants receive course credits and grades. Other internship programs do not give course credits and grades because it is hard to measure students' learning across different organizational settings and the various experiences of the internships. According to the study by Gault et al. (2000), the distinction between co-op and internship is more a matter of degree than of kind. While co-op students tend to work full-time, interns can work part time or full-time. Compensation is normally required for co-op students, although it may be optional for some internship programs. Based on the subtle differences between co-op and internship programs, it is not surprising that universities sometimes use the terms interchangeably. Thus, while this study does not include co-op experience, the research results are relevant for the co-op experience as well.

When asked to identify the single-most influential college preparation for the job market, job placement directors, recent graduates, and current students resoundingly agree that internships are best (Scott, 1992). In this research, we focus on MIS internships instead of general internships

across all disciplines. Most studies of internships have covered specialized areas such as engineering and nursing (Sagen, 2000) and business college internships (Knouse, 1999), or internships in general (Peak & O'Hara, 1999; Taylor, 1988). These studies report that internships have a positive relationship with students' full-time job offers. However, internships from different disciplines may affect the type of full-time job offers a student receives. For example, some internships are very technically oriented, where MIS interns carry out debugging routines and determine working solutions to complex problems (Fleming, 1999). Potential employers may require students to use certain software or hardware that are not available in a university, in order to assess students' technical background and expertise. Other internships might be much less technically oriented, such as a liberal arts internship, but more people oriented. Students' capability in those kinds of areas might be evaluated based on their performances in student organizations and possibly on their own writings. The diverse nature of internships can exert different influences on full-time job offers.

> H 2: Students with an MIS single major have the same number of MIS full-time job offers as the students who have double majors with MIS as their primary major.

Rumberger (1981) estimated that approximately 40% of all U.S. college graduates in 1976 had more education than their jobs required. For employers, a higher level of education has been correlated with positive work-related attitudes and behaviors, such as the increased importance of challenges and other higher-order needs in one's work (Quinn & Mandilovitch, 1977), the desire for intrinsic job rewards (Witney, 1972), tolerance of change (Mandilovitch, 1977), and the capacity to benefit from on-the-job training and experience (Bowen, 1977).

MIS students sometimes have a second major for a variety of reasons. Some would like to increase their marketability by having a double major, especially one that currently has good job placement. Other students are very interested in both disciplines they study. Also, students may not want to drop their first major when they choose a second major because their first major may be very interesting and/or marketable, and they have already invested time and effort in finishing first-major requirements. In some business programs, students have double majors because they haven't yet been admitted to the business program. Because of the large amount of effort and time needed for double majors, it is important to understand double majors' impact on MIS full-time job offers. Also, a student could have lots of extra credit hours but not a double major. The study by Fang et al. (2004) did not find significant differences, in terms of full-time job offers, between the students with MIS single major and the students who have double majors with MIS as their primary major. Except for the aforementioned study, the researchers in this study could not find other empirical studies which address how a double major affects MIS full-time job offers.

> H 3: Students who declare their MIS major in the first two years (freshman and sophomore year) have the same number of MIS full-time job offers as students who declare their MIS major later in college.

During their college years, students declare majors at different time periods. Some students declare their MIS majors relatively early, such as in their freshman or sophomore years, while others do so comparatively late, in their junior or even senior years. The time at which students declare their MIS major could be a factor influencing MIS full-time job offers. Compared to students who declare MIS majors late, students who declare their MIS majors early may have more explicit and clearer goals and objectives. Therefore, they may tend to focus on the courses and activities directly related to the MIS discipline. On the other hand, the students with late MIS major declarations could have diverse courses and activities that may not directly relate to their MIS discipline. If a student declares MIS as his/her major in the first two years, that student would have a greater opportunity to have an MIS internship, which may eventually help him/her get job

offers. How does the MIS major declaration time affect MIS full-time job offers? It appears that there is no information available from the existing literature in this regard.

> H 4: Female students who had MIS internships receive the same number of MIS full-time job offers as male students who had MIS internships.

The narrowing definition of information technology tends to exclude and devaluate the contribution of women (Cukier, Shortt, & Devine, 2002). It was found that males benefited from relevant work experience over females (Sagen, 2000). The explanation for male successes is unclear, except that success might be linked to a predominantly male profession such as computer science. It seems that there is no clear and consistent description in the literature (Pedro, 1984; Shaffer & Johnson, 1980; Vecchiotti & Korn, 1980), regarding gender influence on job offers. When studying MIS internships' impact on full-time job offers, we take the gender issue into consideration because it might affect students' MIS full-time job offers.

> H 5: Students who have had MIS internships receive the same number of MIS full-time job offers regardless of the nature of their MIS internships.

Academic skills can be defined as thinking and reasoning skills that have been found to be important across a range of disciplines (Floyd & Gordon, 1998), with the degree of importance varying by industry. Academic skills were identified to be of paramount importance for entry-level hires in technical fields such as the computer industry. Academic skills incorporate analytical skills, using computer applications, creative thinking, information search, and problem solving. The various natures of MIS internships might influence students' academic skills, especially computer skills and problem-solving skills, in different ways ("Top dollars", 2000).

What students learn from their internships can be related to the nature of those internships. Some internships may emphasize programming; others could require problem solving. Students can build a broad range of work experience during their internship periods, such as: database development and maintenance, system analysis and design, and Web site development. The different nature of MIS internships may influence MIS full-time job offers differently. In the literature, we could not find any substantial research regarding the effect of the type of MIS internship nature on MIS full-time job offers.

> H 6: Students with an MIS major share the same number of MIS full-time job offers regardless of their grade point averages.

Grade point average (GPA) has been used as an important indicator for students' academic performance. Recruiters sometimes explicitly specify the requirements for a job applicant's GPA. Recruiters almost always require job applicants to report their GPA either directly or indirectly. It seems recruiters deem that students' GPAs offer some evidence of how well students are prepared for careers, other things being constant.

In the study by Albrecht, Carpenter, and Sivo (1994), 80.5 percent of all recruiters representing 664 employers reported a preferred minimum grade point average. In particular, business recruiters held true to their emphasis on grades; 77.2 percent reported a preference for at least 3.0. The results of the study indicate that although employers value both high grades and high involvement, such as participation in student organization and pre-professional activities, the value placed on grades is somewhat higher. However, MIS or IT recruiters' opinions were not separated out in the study. In the study by Rosson, Schoemer, and Nash (1973), however, the results based on 478 responses indicate no significant differences between the GPA's of employed and unemployed graduates. In other words, based on this evidence, the assumption that students with high grades have a better chance of obtaining employment is not valid. The aforementioned study included responses from various fields, not just MIS. To avoid potential confounding effects caused

by various majors, the current study focuses on the students having MIS as their majors. Some of these students may have a none-MIS major as their second major.

Methodology

During a recent academic year, MIS Seniors from an AACSB-accredited business school were participants in this empirical study. Demographic background, the nature of MIS internships, and information about full-time job offers were solicited on the survey instruments. Six students participated in the pilot test. Based on the feedback from the pilot test, the authors refined the questionnaire. Refined questionnaires (See Appendix) were sent to 220 senior students taking a 400 level course required for the MIS major. Students' participation was optional and anonymous. There was no attempt at follow up for non-respondents because of the anonymous nature of the survey. Requiring participants to provide personal identification information, while asking for GPA and number of job offers, might result in biased responses.

The students who participated in the survey were not required to take internships, though they were encouraged to do so. Most MIS internships are paid-internships. These students receive no course credit hours, though grades are assigned for their internships. A student's transcript shows the Internship record. Students work at least 120 hours for their internship. The employers offer documentation about students' performance and the nature of the internships. The grade is based on the performance of the student and assigned by an MIS faculty in charge of MIS internships.

Data Analysis

161 (73 percent of the potential subjects) students participated in the survey. The demographic information about those subjects is summarized in Tables 1 through 6, which provide the detailed information about the distributions of major, gender, MIS major deceleration time, and internship.

Table 1: Major Distribution

MIS Major	Other Business Major	Non Business Major
78	9	2

Table 2: Gender Distribution

Male	Female
64	36

Table 3: Number of Majors Distribution

Single Major	Double Major
61	38

Table 4: Other Business Major Distribution for Double Major Students

Marketing	Finance	Accounting	Decision Science	Management	Economics	Organizational Behavior
35	28	21	11	2	1	1

Table 5: Major Declaration Time Distribution for MIS Students

First Two Years	Last Two Years
75	22

Table 6: Number of Internship Distribution

No Internship	One Internship	More then One Internship
40	39	18

Descriptive statistics for the data used in the analysis are shown in Table 7.

Table 7: Mean, Standard Deviation, and Sample Size for the Data Used in the Statistical Analysis

Question Number in the Survey	Mean	Standard Deviation	Sample Size
Q1a	0.79	0.41	161
Q1b	0.18	0.39	161
Q2	0.36	0.48	161
Q3	1.4	0.51	161
Q5*	0.22	0.43	161
Q10	0.82	0.84	161
Q12a	0.57	0.5	161
Q12b	0.02	0.16	161
Q12c	0.12	0.31	161
Q12d	0.06	0.24	161
Q12e	0.03	0.18	161
Q12f	0.09	0.29	161
Q14	0.25	0.46	161
Q23a	0.27	0.45	161
Q23b	0.44	0.5	161
Q23c	0.29	0.45	161

Notes: Q1, Q12, and Q23 are categorical variables. They are transformed into dummy variables. For example, Q1a refers to MIS major. Value 1 denotes MIS major. Value 0 means any other major but not MIS. The alphabetic sub-notation in a dummy variable refers to the corresponding optional answer in the original survey question.

Q5* is transformed from question 5 in the survey. Value 0 means that a student declared MIS major in the first two years of his or her college study. Value 1 means the opposite.

The hypothesis testing and regression analysis was conducted using the SAS System (Windows Version 8) and MS Excel 2000. The analysis is discussed below.

The literature review suggested that there might be relationships between MIS full-time job offers and the aforementioned independent variables. The authors employed a predictable model to study the relationships. As a matter of fact, the nature and the value of the variables offer some justification for using ANOVA and linear regression models. For example, the average MIS full-time job offers for students with a networking-related internship is 0.4, whereas the average value of the same variable is 0.27 for those who did not have network-related internships. In other words, as the nature of the internship changes, the corresponding MIS full-time job offers can differ largely. For those who did not have MIS internships, for instance, the average MIS full-time job offers is 0.10, while the average value of the same variable is 0.33 for those who had one MIS internship. As the value of the independent variable increases, the average dependent variable value goes up. The approximate linear pattern is also noticeable in the corresponding data plot shown in Figure 1.

In addition to hypothesis testing, multiple linear regression analysis was also used in this study. In the multiple linear regression model, the dependent variable is the number of full-time MIS job offers. Independent variables include gender, number of majors, number of MIS internships, MIS major declaration time (first two years versus after the second year), the nature of MIS internships, and GPAs. The nature of MIS internships is categorical, and is broken up into six dummy variables. The value of each dummy variable can only be zero or one, based on the optional answers in question 12 (See Appendix). One means that the corresponding internship is taken, while zero refers to the fact that the internship is not taken. GPA is also categorical, and thus further

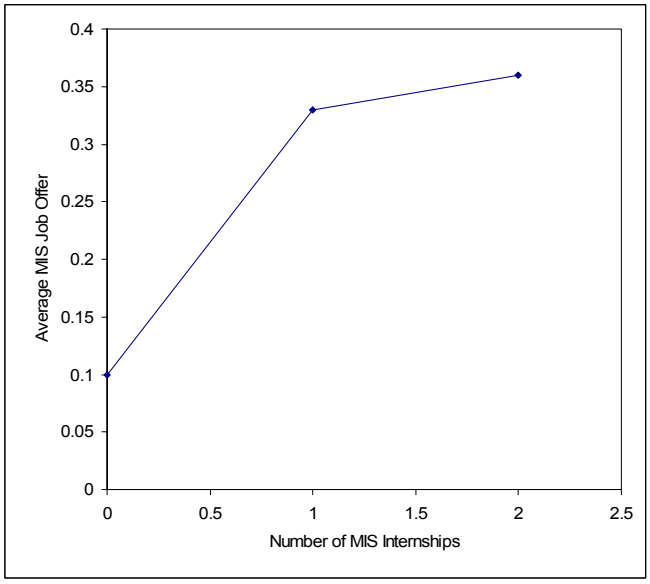

Figure 1: Data Plot (Average MIS Full-Time Job Offers versus Number of MIS Internships)

described by three dummy variables corresponding to each possible GPA category offered in question 23 in the survey. Without conducting the aforementioned transformation, the data analysis could be misleading. For example, using 2.5 as the value of the MIS internship nature variable in the regression model means nothing. Moreover, assigning 1 to system analysis & design-related internship and 5 to network-related internship may result in the impression that the difference between those two internships is 4, which is very confusing and deceptive.

The multiple linear regression analysis may offer more information about the relationships between the dependent variable and the independent variables collectively. Some independent variables may be very nearly obtainable as linear combinations of the remaining independent variables. Multicollinearity may exist among the independent variables. Even if all the null hypotheses developed in this study are rejected, some of the independent variables may still not be included in the multiple linear regression model because of multicollinearity. Stepwise regression is employed in this study to identify one set of the "most important" independent variables.

Table 8: Hypothesis Testing Results

Hypothesis	Independent Variable	Dependent Variable	F Value	P Value
H1	Internship	# of MIS full-time job offer	5.08	0,0261
H2	Double Major	# of MIS full-time job offer	2.68	0.1044
H3	MIS major declaration time	# of MIS full-time job offer	3.47	0.065
H4	Gender	# of MIS full-time job offer	3.17	0.059
H5 sub1	System analysis & design related internship	# of MIS full-time job offer	0.99	0.32
H5 sub2	Clerical related internship	# of MIS full-time job offer	0.97	0.33
H5 sub 3	Database related internship	# of MIS full-time job offer	0.17	0.68
H5 sub 4	IT help desk related internship	# of MIS full-time job offer	1.26	0.27
H5 sub 5	Networking related internship	# of MIS full-time job offer	0.01	0.91
H5 sub 6	Programming related internship	# of MIS full-time job offer	0.38	0.54
H6 sub 1	GPA >=3.5	# of MIS full-time job offer	8.55	0.004
H6 sub2	3.5>GPA>=3.0	# of MIS full-time job offer	0.25	0.62
H6 sub 3	3.0>GPA >=2.5	# of MIS full-time job offer	10.3	0.002

Results for Hypothesis 1

Hypothesis one asserts that students who had MIS internships have the same numbers of MIS full-time job offers as students who had no MIS internship. The ANOVA performed on this hypothesis is significant (See Table 8). The hypothesis is rejected (F=5.08 and P=0.026). For students who had MIS internships, 32 percent obtained MIS full-time jobs. For the students who did not have MIS internships, 10 percent obtained MIS full-time jobs. Having an MIS internship can significantly help MIS students get MIS full-time jobs. There might be many reasons. For example, MIS internships give students an opportunity to apply and improve their technical skills and get first hand experience in the IT world. In addition, internships allow students to develop good communication skills and work on teams, which can increase their market value. Another reason could be a change in MIS recruiters' perspective on entry-level employee requirements. With the recent economic downturn, many recruiters have cut their training budgets for new hires and prefer those with prior work and training experience. More studies are needed to investigate MIS recruiters' perspectives on, and expectation changes for, new hires.

Results for Hypothesis 2

Hypothesis two states that students with an MIS single major have the same numbers of MIS full-time job offers as students who have MIS double majors. The ANOVA performed on this hypothesis shows insignificant results (See Table 8). We failed to reject null hypothesis (F=2.68 and P=0.104).

Results for Hypothesis 3

Hypothesis three claims that students who declare an MIS major earlier have the same number of MIS full-time job offers as students who declare an MIS major later. The ANOVA's result is not significant (See Table 8). We failed to reject null hypothesis (F=3.47 and P=0.065).

Results for Hypothesis 4

Hypothesis four states that female students who had MIS internships receive the same number of MIS full-time job offers as male students who had MIS internships. The ANOVA results are insignificant (See Table 8). The null hypothesis is not rejected (F=3.17 and P=0.059).

Results for Hypothesis 5

Hypothesis five states that students who had MIS internships receive the same number of MIS full-time job offers regardless of the nature of their MIS internships. Six dummy variables (with zero or one as possible input values) were created based on the seven categories of the MIS internship described by question 12 in the survey. For example, q12a refers to a variable that has a value of one if the internship nature is related to system analysis and design; otherwise its value is zero (See Table 7). Thus, under hypothesis five, there are six sub-hypotheses (See Table 8).

Sub-hypothesis one is that students who had MIS internships receive the same number of MIS full-time job offers regardless whether their internship nature is related to system analysis and design or not. The sub-hypothesis was not rejected (F=0.99 and P=0.32).

Sub-hypothesis two is that students who had MIS internships receive the same number of MIS full-time job offers regardless whether their internship nature is clerical-related or not. The clerical-related internship in this study refers to the internship related to office work such as IT data entry, project meeting scheduling, and project bookkeeping. The sub-hypothesis was not rejected (F=0.97 and P=0.33).

Sub-hypothesis three is that students who had MIS internships receive the same number of MIS full-time job offers regardless whether their internship nature is database-related or not. The sub-hypothesis was not rejected (F=0.17 and P=0.68).

Sub-hypothesis four is that students who had MIS internships receive the same number of MIS full-time job offers regardless whether their internship nature is IT help desk-related or not. The sub-hypothesis was not rejected (F=1.26 and P=0.27).

Sub-hypothesis five is that students who had MIS internships receive the same number of MIS full-time job offers regardless whether their internship nature is networking-related or not. The sub-hypothesis was not rejected (F=0.01 and P=0.91).

Sub-hypothesis six is that students who had MIS internships receive the same number of MIS full-time job offers regardless whether their internship nature is programming-related or not. The sub-hypothesis was not rejected (F=0.38 and P=0.54). For each of the above sub-hypotheses, the summarized analysis results are available in Table 8.

Results for Hypothesis 6

Hypothesis six states that MIS major students receive the same number of MIS full-time job offers regardless of their GPAs. Three dummy variables (with zero or one as possible answer) were created based on the four categories of the GPA range described by question 23 in the survey. For example, q23a refers to a variable that has value of one if the GPA is equal to or higher than 3.5; otherwise its value is zero. Thus, under hypothesis six, there are three sub-hypotheses (See Table 8).

Sub-hypothesis one is that MIS major students receive the same number of MIS full-time job offers regardless if their GPA is equal to or higher than 3.5 or not. This sub-hypothesis is rejected (F=8.55 and P=0.004).

Sub-hypothesis two is that MIS major students receive the same number of MIS full-time job offers regardless if their GPA is higher than 3.0 but below than 3.5 or not. The sub-hypothesis was not rejected (F=0.25 and P=0.62).

Sub-hypothesis three is that MIS major students receive the same number of MIS full-time job offers regardless if their GPA is between 2.5 and 3.0 or not. The sub-hypothesis was rejected (F=10.3 and P=0.002). The summarized results for aforementioned sub-hypotheses are available in Table 8.

The ANOVA results are significant for sub-hypothesis one and three, but not for sub-hypothesis two (See Table 8). For students whose GPAs are higher or equal to 3.5, 77.3 percent received MIS full-time job offers. As for students who's GPAs are between 3.0 and 3.5, 45 percent received MIS full-time job offers. Regarding the students with a GPA between 2.5 and 3.0, the survey found that only 9.7 percent had MIS full-time job offers. The statistical analysis shows that students with high GPA (equal to or higher than 3.5) have a significantly better chance to obtain full-time MIS job offers. The interpretation for this result can be that a high GPA may indicate the students have better qualifications and preparation for careers in MIS field. A high GPA might also signify students' strong dedication, commitment, and consistency in making preparations for their future vocation. Recruiters may use grade point average as one of the important criteria to make recruiting decisions.

Results for Regression Analysis

Stepwise regression analysis shows that system analysis & design-related MIS internships, networking-related MIS internships, high GPA (equal to or higher than 3.5), and lower GPA (be-

tween 2.5 and 3.0) are the four dummy variables selected in the regression model. The model F value is 9.00, while the model P value is less than 0.0001. The adjusted R-Squared value is 0. 40. The detailed statistics results are offered in Table 9 and Table 10. Interestingly, the variable representing the number of MIS internships is not selected in the regression model, while two MIS internship-nature-related variables (analysis & design-related internships and networking-related internships) are included in the model. The multicollinearity analysis shows that the value of VIF (variance inflation factor) for each variable selected in the model is between 1.12 and 1.29. Thus, multicollinearity does not appear to be a big issue in the regression analysis.

Table 9: Regression Parameter Statistics

Dependent Variable	Independent Variable	Parameter Estimates	F Value	P Value
Number of MIS full-time job offer	System analysis & design related internship	0.42	5.42	0.02
Number of MIS full-time job offer	Networking related internship	0.65	8.04	0.01
Number of MIS full-time job offer	GPA >=3.5	0.68	10.21	<0.01
Number of MIS full-time job offer	3.0>GPA >=2.5	-0.4	4.84	0.03

Table 10: Regression Model Statistics

Model F Value	Model P Value	Adjusted R-Squared Value	Dependent Variable
9.00	<0.0001	0.40	Number of MIS full-time job offer

Conclusion

Based on the findings of the study, the authors recommend that MIS students pursue MIS internships, especially the more technically-oriented MIS internships, such as networking and system analysis & design-related MIS internships because there are significant positive relationships between those internships and the number of full-time MIS job offers. In addition, students need to improve their grade point averages for MIS full-time job offers.

Though some of the hypotheses testing results are not significant, there might be some practical differences. For example, data analysis shows that 33 percent of the male students received MIS full-time job offers, while 19 percent of the female students had MIS full-time job offers. Practically speaking, there is a difference between those two groups. The reason is unclear. Further studies are needed to identify why males have higher MIS full-time job offer percentages than females. MIS undergraduate programs may need to pay more attention to female students to see why female MIS students do not receive the same number of MIS full-time job offers as male MIS students. Although a further study is needed to investigate the causes, MIS faculty and staff need to make more effort to advise and counsel female students for their career development in the MIS field. While this study has its limitations as described below, the authors believe that their findings can aid MIS students' career development and help MIS faculty improve their advising and curriculum design.

Limitations and Future Study

Like other empirical studies, this study is not without its limitations. The study can be strengthened by increasing the sample size and including participants in other universities from different geographic areas. With an increased sample size, a more detailed empirical analysis among the independent variables and on the variables that have multiple categories, such as the nature of MIS internships, can be performed. It might be interesting to include students' MIS GPA and their last-two-year GPA in college as independent variables to examine the corresponding effects on MIS full-time job offers. MIS full-time jobs could be considered by the students with the second major in MIS. Full-time job offers in non-MIS areas may need to be considered in a future study because some students, especially those with double majors, might prefer the full-time job offers in other areas, such as accounting or finance, to those in MIS. The salary level of job offers and job satisfaction due to non-financial reasons (e.g., the company's location or job applicant's family need) could be considered as other potential dependent variables in a future study. Potential correlations between some of the independent variables (e.g. gender and internship or double major) need to be reported in a future study.

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Appendix: Survey Instrument

The objective of this survey is to investigate the impact of internship work experience on students' learning curve and the full-time job opportunities in the field of Management Information Systems (MIS).

Please fill your answer on the scanner form provided. **Please leave identity section, such as name, birth date, id number, special codes of the scanner form, blank.** Your personal information will be kept confidential. The result of this survey will be shared later. Thank you for your cooperation.

1. What is your first major?
   a. MIS
   b. Majors other than MIS in the business school
   c. Non-Business major
2. What is your gender?
   a. Male
   b. Female
3. How many majors are you currently working for?
   a. 1
   b. 2
   c. 3

   d. 4 or more
4. You can skip this question (No. 4) if you major in MIS only (MIS Single major).
   If you major in another major other than MIS, select another major:
   a. Accounting
   b. Marketing
   c. Finance
   d. Decision Science/Management Science
   e. Economics
   f. Organization Behavior
   g. Management (Production/Operation/Human Resource)
   h. None business
5. When did you decide/declare your major in MIS?
   a. Freshman
   b. Sophomore
   c. Junior
   d. Senior
6. When is your expected graduation time?
   a. Spring 2002
   b. Summer 2002
   c. Winter 2002
   d. Spring 2003
   e. Fall 2003
7. What is your opinion about the next year's job market in MIS area, compared to this year's market?
   a. Much Worse
   b. Worse
   c. Same as this year
   d. Better
   e. Much better
8. What factor is the most important factor in finding a ***full-time*** *MIS* job? (Please select only one)
   a. Communication skill
   b. High GPA
   c. Intern work experience
   d. Management Skills
   e. Recommendation from a teacher
   f. Technical skills
   g. Other (please specify:)
9. What factor is the most important factor in finding an *MIS* ***intern*** job?
   a. Communication skill
   b. High GPA
   c. Intern work experience
   d. Management Skills
   e. Recommendation from a teacher
   f. Technical skills
   g. Other (please specify:)
10. How many MIS related ***intern*** work experiences have you had before?
    a. 0
    b. 1
    c. 2
    d. 3

e. 4

11. From which source did you find an MIS related ***internship***?
    a. School's career planning office
    b. Internship fair
    c. Internet search
    d. MIS department office
    e. Relatives/Friends
    f. Instructors' recommendation

    Other media (please specify:)
12. What is the nature of your most recent MIS related ***intern*** work?
    a. Analysis and Design
    b. Clerical
    c. Database related
    d. IT help desk
    e. Networking related
    f. Programming
    g. Non-MIS related work

    Other (please specify:)
13. From which type of firms/industry did you work for your MIS related ***internship***?
    a. IT Consulting firms (Big 4: Accenture, Cap Gemini, Deloitte Touche, and PWC)
    b. IT Consulting firms (other than Big 4 firms)
    c. Computer technology vendors (e.g., Microsoft, Oracle, Cisco, Dell, etc.)
    d. Manufacturing firms (e.g., General Electric, Proctor & Gamble)
    e. Retail firms (e.g., Groceries, department/discount stores, etc.)
    f. Financial firms (e.g., banks, investment, insurance, etc.)

    Other (please specify:)
14. How many ***full-time MIS*** jobs offers do you currently have?
    a. 0
    b. 1
    c. 2
    d. 3
    e. 4
15. What is the nature of the ***full-time MIS*** job you are offered (if more than one job offer, please describe the one you will take)?
    a. Analysts
    b. Database
    c. Help desk
    d. Programming
    e. Networking
    f. Web Design/Development

    Other (please specify:)
16. To what extent, do you feel that your MIS related ***internship*** helps you do better job in MIS courses?
    a. No help at all
    b. A little help
    c. Some help
    d. A great amount of help
17. To what extent, do you feel that your MIS course work helps you do better job in MIS related ***internship***?
    a. No help at all
    b. A little help

c. Some help
d. A great amount of help

18. If you have a ***full-time MIS*** job offer now, does the job offer come from a company where you had MIS related **internship**?
    a. Yes
    b. No
19. If you have a ***full-time*** job offer now, is the job MIS-related?
    a. Yes
    b. No
20. If you have a ***full-time MIS*** job offer now, then from what type of companies do you receive your job offer(s) ?
    a. IT Consulting firms (Big 4: Accenture, Cap Gemini, Deloitte Touche, and PWC)
    b. IT Consulting firms (other than Big 4 consulting firms)
    c. Computer technology vendors (e.g., Microsoft, Oracle, Cisco, Dell, etc.)
    d. Manufacturing firms (e.g., General Electric, Proctor & Gamble, International Paper)
    e. Retail firms (e.g., Groceries, department/discount stores, etc.)
    f. Financial firms (e.g., banks, investment, insurance, etc.)
    g. Health Care related firms
    h. Delivery service related firms

    Other (please specify:)
21. Please select the salary range for the ***full-time MIS*** job offer you take.
    a. Below 30, 000
    b. 30, 000-34,999
    c. $35,000-39,999
    d. $40,000-44,999
    e. $45,000-49,999
    f. $50,000-$54,999
    g. Over $55,000
    h. Undecided yet;

    (Salary offered is above $55,000, then specify: $)
22. How much did you receive for your MIS ***intern work*** per hour?
    (Please approximate hourly wage if paid a lump sum)
    a. $10 per hour or below
    b. $11-13 per hour
    c. 14-16 per hour
    d. $17-19 per hour
    e. $20-22 per hour
    f. 23 dollars per hour or more

    Others (please specify:)
23. What is your current GPA range?
    a. Equal to or higher than 3.5
    b. Higher than 3.0 but lower than 3.5
    c. Between 2.5 and 3.0 (including 2.5 and 3.0)
    d. Lower than 2.5

END. Thank you very much for your participation!

Biographies

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