Why IS: Understanding Undergraduate Students' Intentions to Choose an Information Systems Major

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ABSTRACT

The continuing losses in Information Systems (IS) enrollments over the last few years have generated a widespread concern in the IS community. Despite many speculations about what led to the downturn and what should be done to reverse it, there has been surprisingly little research that systematically investigates this issue. This paper reports a study that applied the theory of reasoned action (TRA) to understanding undergraduate students' intentions to choose an IS major. Factors that could influence students' choices are identified from previous research and categorized according to the TRA theoretical framework. In addition, the study explored how gender affected students' intentions. Survey data were collected to test the research model. The results identified *genuine interests in the IS field, job availability, the difficulty of the IS curriculum*, and *opinions from family* and *professors* as important factors that affect students' intentions to choose an IS major. They also suggested that female students were discouraged socially from majoring in IS. On the basis of the findings, this paper offers several recommendations on how to improve recruiting efforts to increase IS enrollments.

Keywords: IS enrollments, major selection, theory of reasoned action, gender

1. INTRODUCTION

Throughout their short history, majors related to the Information Systems (IS) field have seen some dramatic swings in undergraduate enrollments. According to a 1997 Department of Commerce report, the number of bachelor's degrees awarded to computer science students in 1986 more than quadrupled that in 1980. The number then dropped 40% by 1990 (Department of Commerce, 1997). Since the mid-1990s, coincident with the emergence of the Internet, e-commerce and the subsequent dot-com heat wave, IS became the most coveted major among undergraduate students, and enrollments exploded. Some business schools had to take extraordinary measures to curb enrollments so that they could be maintained at a manageable level (Goff, 2000). When the dot-com bubble burst in the early 2000s, however, enrollments once again plummeted. While accurate numbers on the overall enrollment reductions are not available, a recent inquiry conducted through the *ISWorld* mailing list – the most popular mailing list among IS professors – suggested a rather dismal situation (Panko, 2005): Among the 17 U.S. schools responding, only 1 experienced growth, but more than half (9) reported decreased enrollments. The decreases were substantial in about one third of the schools, with 2 schools reporting 50% and 3 schools reporting 20 to 30% enrollment declines. These responses corroborated the "horror" stories regarding the significant drop in undergraduate IS enrollments in American business schools over the last few years.

Much is at stake should this trend continue. Policy makers are concerned that the United States might eventually lose its leading position in the Information Technology (IT) industry because other countries are graduating more students in IS-related majors. Industry leaders have begun to complain about the immediate difficulties in hiring qualified talents and are worried about future recruitments to replace retiring baby-boom workers (Murphy, 2005). The downswings in IS enrollments also have reduced the institutional needs for IS departments and IS professors, evidenced by the difficult academic job market faced by new doctoral graduates in recent years.

Given the significant impacts of declining IS enrollments, it is imperative that efforts be made to address this issue. A natural first step would be to understand the underlying factors and processes that influence undergraduate students' decisions to choose an IS major. Many studies have examined the factors affecting students' choice of the business major in general or certain business majors, such as accounting (e.g. Adams et al., 1994; Barnowe et al., 1979; Cohen and Hanno, 1993; Coleman et al., 2004; Lowe and Simons, 1997). Yet surprisingly little research has investigated what leads students to major in IS (for an exception, see Lee and Lee, 2006). In addition, many of these studies were limited to analyzing factors identified in an *ad hoc* manner. Few involved a theoretical framework, which made it difficult to compare and contrast results from different studies, to synthesize findings across different

studies, and to accumulate knowledge on this important issue (Taylor and Todd, 1995).

The study reported in this paper utilized the theory of reasoned action (TRA, Ajzen and Fishbein, 1980) as its theoretical base. The TRA and its successor, the theory of planned behavior (TPB), are widely accepted social psychological theories that explain human behavior from a cognitive perspective (Ajzen, 1991). Both theories have been used extensively by IS researchers, especially in IT acceptance research (e.g. Davis et al., 1989; Mathieson, 1991; Taylor and Todd, 1995). The TPB extends the TRA in that the TPB includes the construct of perceived behavioral control to "deal with situations in which people may lack complete volitional control over the behavior of interest" (Ajzen, 2002, p2). The behavior of interest in this study is students' decision to choose an IS major. Because the actual performance of the behavior (i.e., declaring the major) is within the students' control and thus completely volitional, it is reasonable to assume that perceived behavioral control does not affect the intentions to choose an IS major. Hence, the TRA was chosen over the TPB for this study.

This study also explored the role that gender played in undergraduate students' choice of an IS major. Researchers have long noticed a gender gap in major selection (Turner and Bowen, 1999). In 2003-04 in the United States, male students who earned a bachelor's degree in computer and information sciences outnumbered their female counterparts by nearly 3 to 1 (Department of Education, 2005). Within business schools, research showed that male students were much more likely to embrace the IS major than female students (e.g. Kim et al., 2002; Malgwi et al., 2005). However, more women are completing their college educations. In 2003-04, more than 800,000 female students, compared with less than 600,000 male students, received a bachelor's degree. About equal numbers of male and female students were awarded a bachelor's degree in business (Department of Education, 2005). To boost IS enrollments, it is important to attract more female students, which can be helped by a better understanding of the roles that gender plays in selecting the IS major. This study explored the issue within the TRA theoretical framework.

2. THEORETICAL DEVELOPMENT

2.1 Applying the Theory of Reasoned Action

The Theory of Reasoned Action (Ajzen, 1991; Ajzen and Fishbein, 1980) holds that human behavior is directly motivated by the intention to perform the behavior: The stronger the intention, the more likely the behavior will be performed. Two factors lead to the formation of the behavioral intention: attitudes toward the behavior and subjective norms. The former refers to a person's overall evaluation of the outcome of performing a behavior, and the latter represents the social pressures the person perceives when deciding whether to perform a behavior. Attitudes and subjective norms are each, in turn, influenced by a set of beliefs – behavioral beliefs and normative beliefs, respectively. Behavioral beliefs are evaluations of the outcome generated and/or the cost incurred from engaging in certain behaviors. Normative beliefs reflect salient referents' opinions on whether the person should perform a behavior. Thus according to the TRA, students' intentions to choose an IS major are affected by their attitudes toward choosing the major and the social pressures exerted on them to choose the major. The attitudes are based on their evaluations of all possible outcomes resulting from choosing an IS major, and the social pressures result from the salient referents' opinions on whether they should major in IS.

The canonical way of applying the TRA involves eliciting behavioral beliefs and normative beliefs and their salience from a representative sample of the research population (Ajzen, 1991). An alternative to this method is to derive salient beliefs from previous research, which saves time and effort. Moreover, this alternative allows researchers to use a similar set of salient beliefs across studies, making it possible to detect the relative importance of the beliefs across different situations (Taylor and Todd, 1995). This is especially important if we would like to influence the behavioral intention by affecting the students' beliefs (e.g. Strader and Katz, 1990). One potential obstacle to using the alternative is that there have been only a few efforts to understand undergraduate students' decisions to choose an IS major (e.g. Ketler and Moncada, 1992; Lee and Lee, 2006; Myers and Beise, 2001). Studies that have examined the choice of majors in a broader context had to be relied on to identify the salient beliefs for this study. Fortunately, research that has compared students' choices of majors has suggested that students preferring different majors were affected by the same set of factors (Kim et al., 2002; Lee and Lee, 2006; Lowe and Simons, 1997; Malgwi et al., 2005).

Collectively, previous research has identified a rather rich and stable set of instrumental and experiential beliefs regarding the outcome of choosing a major. The instrumental beliefs consider the benefits and cost incurred by choosing the major, while the experiential beliefs relate to speculations about the pleasure and satisfaction stemming from this choice. There appear to be three major groups of instrumental beliefs: job-related beliefs, image-related beliefs, and cost-related beliefs.

Both common knowledge (Murphy, 2005) and previous research (Fiorito and Robert, 1982) have recognized the job market's influences on students' choice of majors. Numerous studies have either identified or confirmed job-related beliefs as important factors influencing students' choices (e.g. Adams et al., 1994; Cohen and Hanno, 1993; Gul et al., 1989; Lee and Lee, 2006; Lowe and Simons, 1997; Malgwi et al., 2005). These include concerns about job availability, monetary compensation, and job security. High job availability and satisfying initial salary appear to have drawn undergraduate students to the accounting major (Adams et al., 1994; Cohen and Hanno, 1993). Poor job availability, not surprisingly, has discouraged undergraduate students from majoring in IS recently (Lee and Lee, 2006). Students also have identified job security as an important belief that affects their attitudes toward an accounting career (Felton et al., 1995). With the memory of the massive layoffs during the dot-com bubble burst still fresh, job security could be an important concern for students who are considering an IS major.

Compared with job-related beliefs, image-related beliefs – the students' perceptions of the effects of choosing an IS major on how they appear to others – have been less

discussed in the existing literature. Findings from previous research have implied that certain stereotypes are associated with particular majors. For example, the accounting major was associated with working with numbers, and students generally considered it more boring than other majors (Cohen and Hanno, 1993). Such stereotypes are not totally unwarranted because researchers did find a relationship between personal traits and major selection (Leppel et al., 2001; Noel et al., 2003). Other research has suggested conflicting images regarding IT jobs and IT workers (Myers and Beise, 2001). While IT jobs are described as exciting, youthful, and enjoyable, IT professionals are often perceived to be "geeks" or "nerds" that are better at working with computers than with people. The geeky image of IT professionals could negatively affect students' attitudes toward choosing an IS major. In addition to personal image, the social image of a profession may affect students' choice of an IS major. For example, researchers have wondered about the influence of accounting scandals on students' choice of the accounting major (Coleman et al., 2004). A positive social image of the IS profession should encourage students to choose an IS major.

Because choosing an IS major generally does not incur more financial cost to students than choosing other majors, cost-related beliefs are more about the expected academic difficulties than financial difficulties. They include factors such as the amount of course work required (Cohen and Hanno, 1993), aptitude in the subject (Lowe and Simons, 1997; Malgwi et al., 2005), and perceived ease or difficulties in studying and earning a degree (Adams et al., 1994). Students who believe that IS courses are difficult, who doubt that they have the capacity to learn about IS/IT, who suspect that they will have a difficult time pursuing an IS major, and who think pursuing an IS major will take too much work probably will have a more negative attitude toward choosing an IS major.

For this study, experiential beliefs are defined as the expectation of the psychological reward that will result from performing a behavior. Such beliefs help explain why having a genuine interest in a field consistently has been found to be one of the most important, if not the most important factor affecting students' choice of majors (e.g. Adams et al., 1994; Cohen and Hanno, 1993; Malgwi et al., 2005): Students who are more interested in a field will enjoy studying the field more; and students value the inherent joy and satisfaction experienced when studying their chosen majors. Thus students who are interested in the IS field believe they will enjoy studying IS, which leads them to conclude that their choice is psychologically worthwhile. In this way, experiential beliefs influence students' attitudes toward choosing an IS major, in addition to instrumental beliefs discussed above. All else equal, students who are more interested in the IS field should have a more positive attitude toward pursuing an IS major.

Within the TRA framework, normative beliefs refer to salient referents' opinions about whether a person should perform a behavior. To discover normative beliefs is to identify the salient referents. These salient referents may be even more influential in the context of this study because undergraduate students are typically young adults with limited life experience. Given the magnitude of the decision about which major to choose and to pursue, students are likely to value others' inputs. Previous studies have identified a set of salient referents that affect undergraduate business students' choice of majors (Adams et al., 1994; Cohen and Hanno, 1993; Malgwi et al., 2005). This study considered the influences of students' family, friends, fellow students, advisors, and professors.

Figure 1 presents the TRA framework used in this study. Given the strong theoretical link between the intention to perform a behavior and the actual behavior within the TRA framework and the practical difficulties in measuring students' actual behavior for this study, the reported study focused on intentions to choose an IS major rather than the actual behavior of choosing an IS major.

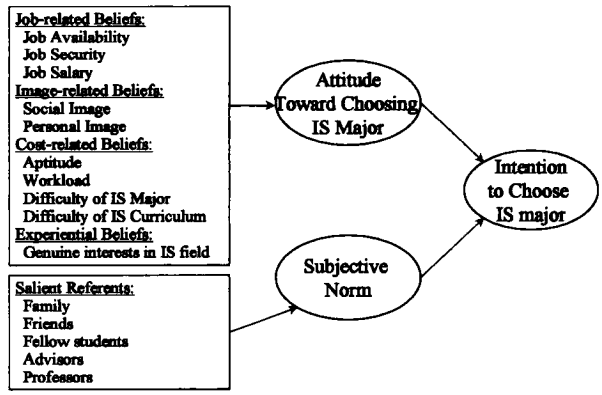


Figure 5: The TRA Framework

2.2 The Role of Gender

Many studies have examined the relationship between gender and the choice of college majors and have explored why gender makes a difference. Lapan et al. (1996) argued that gender works by affecting self-efficacy beliefs and vocational interests, as their study indicated that female students were less academically prepared for and did not believe in their ability to succeed in a math major, which made them less interested in math and prevented them from choosing that major. This view was contradicted by Correll (2001), who showed that female students having the same grades and test scores in math as male students still perceived themselves as less mathematically competent than their male counterparts. Turner and Bowen (1999) extended gender differences from just self-efficacy beliefs to include other issues, such as labor market expectations and expected college experiences. Furthermore, Lackland and Lisi (2001) suggested that gender made a difference not because of efficacies or expectations for success, but because female students had different value systems than those of male students: They generally had more humanitarian concerns than male students and consequently, were drawn to majors related to the helping professions, such as nursing and special education.

Within the TRA framework (Figure 1), gender can influence students' intentions in four ways: by affecting the strength of behavioral beliefs (e.g., self-efficacies or expected experiences) and normative beliefs; by directly affecting the strength of attitudes and subjective norms; by affecting students' intentions directly, as well as attitudes

and subjective norms; and by affecting the path coefficients (i.e., moderating the effects of the beliefs, attitudes, and subjective norms). One possible reason that gender can directly affect student intentions is because of the sex differences in sex-role socialization (Eccles and Hoffman, 1984): The social and cultural biases regarding what women should and can do may be so entrenched – even in the mindsets of female students – that female students may subconsciously avoid an IS major. Similarly, gender can directly affect attitudes and subjective norms. Finally, research has shown that female and male students might be affected by the same factors, but they put different weights on different factors (Lee and Lee, 2006; Weinberger, 2004). Hence the TRA offers a theoretical framework that can potentially integrate findings from previous studies. It is worthwhile to explore all four possible ways in which gender can make a difference.

3. RESEARCH METHOD

The survey method was used to test the theoretical framework presented in Figure 1. Data were collected by surveying students who enrolled in an introductory IS course in the college of management at a public urban university in the northeastern United States during the Fall 2006 semester. The course was required for all business students and was usually one of the first courses taken by incoming students. Many of students who were taking this course had not declared their major yet. Practically, they were an important population to target for recruiting new IS students (George et al., 2004); thus it is important to understand their opinions on choosing an IS major.

Wherever possible, measures used in previous research were adapted to be used in this study. For example, items that measured attitudes were adapted from (Taylor and Todd, 1995). Most items adopted phrases found in previous studies from which the behavioral beliefs and normative beliefs were identified. The items then were tested with a pilot survey of students taking the same introductory IS course in the Spring 2006 semester. Based on feedback from the pilot survey, several minor wording changes were made and a few unreliable items were dropped. Appendix A enumerates the measures that were used in the final study.

4. RESULTS

4.1 Response Analyses

In total, 114 responses were collected from students who had not declared their majors by the time the survey was administered. Among the respondents, 49 were female and 65 were male. The mean age of the respondents was 22 years old, with a standard deviation of 4.9 (N = 110). Among the 112 respondents who indicated their status, more than 70% were either freshmen or sophomores (N = 36 and N = 44, respectively). Twenty-nine respondents identified as juniors and 2 were seniors. These latter two groups of respondents probably were transfer students who had spent two or three years in local community colleges or other local universities and who had not declared their major in the college of management by the time of the survey.

Nearly 60% of the respondents are minorities (N = 65), with the largest minority group being Asian or Pacific Islander (N = 29). Even though more than 80% of all the respondents reported themselves as full-time students (N = 95), almost all students also worked either part-time (N = 62) or full-time (N = 44). Overall, the respondents represented well the diversified, working student body in the college of management, which, however, may differ from student bodies in many other business schools.

4.2 Measurement Properties

A structural equation modeling technique, Partial Least Squares (PLS), was used for the data analysis. Structural equation modeling techniques allow testing measurement models and the structural model simultaneously, thus making the calculation of the variable scores transparent to the researchers. Compared with other structural equation modeling techniques, PLS has minimal demands for sample data distribution, residual distributions, and sample size and can accommodate the use of both reflective and formative indicators (Chin, 1998). It has been used widely in MIS research. The software used was PLS-Graph Version 03.00 Build 1126 (Chin, 2001).

In this study, all behavioral beliefs were measured with reflective indicators, but the normative beliefs were modeled with formative indicators because salient referents were believed to be relatively independent of each other (Chin, 1998). To determine the reflective measures' psychometric properties, the variables' composite reliabilities, the average variances extracted by the variables from their reflective indicators, the correlations among variables, and the indicator-factor (cross-)loadings (Chin, 1998) were examined. The composite reliabilities, the square root of the average variances extracted, and the correlations between constructs were readily generated by PLS-Graph. They are presented in Table 1, together with means and standard deviations of the constructs and normative beliefs. The factor loadings and cross-loadings were obtained through simple manipulations of the original data set and the PLS-Graph output with SPSS (Gefen and Straub, 2005) and are presented in Table 2.

The reliabilities of individual items of the reflective measures were examined by checking the standardized loadings of items. Items with loadings greater than 0.7 were deemed as demonstrating good individual item reliability (Chin, 1998). As shown in Table 2, the minimal indicator-construct loading in this study was 0.70, with most loadings greater than 0.85. Composite reliability was examined next. Although there is no statistical way to calculate the minimally acceptable composite reliabilities, the generally accepted rule is that composite reliabilities of 0.70 or higher are adequate (e.g. Yi and Davis, 2003). In this study, the lowest composite reliability was 0.84 for perceived difficulty of an IS major and perceived difficulty of the IS curriculum. All other composite reliabilities were no less than 0.85. Hence the measures used in this study demonstrated sufficient reliabilities.

For indicators of a latent construct to demonstrate acceptable convergent validity and discriminant validity, the loadings onto their own latent constructs must be significant and higher than the cross-loadings onto other latent constructs, and the square root of a latent construct's AVE must be at least 0.7 and substantially higher than its corral-

	Mean	S.D.	Mean		ρ_c	I	A	SN	JA	JSE	JSA	SI	PI	INT	DIFC	APT	W	DIFM	G
												Male							
(N=49)									(N=65)		Female								
I	3.43	1.37	3.72	3.05*	0.91	**0.91**													
A	3.97	1.34	4.11	3.80	0.92	0.77	**0.92**												
SN[1]	3.26	1.23	3.44	3.02+	N/A	0.70	0.71	N/A											
JA	4.74	1.16	4.53	5.01*	0.92	0.28	0.48	0.31	**0.92**										
JSE	4.65	1.16	4.56	4.77	0.84	0.28	0.43	0.25	0.63	**0.85**									
JSA	4.58	1.10	4.49	4.69	0.85	0.29	0.39	0.31	0.63	0.68	**0.87**								
SI	4.27	1.07	4.16	4.41	0.89	0.25	0.40	0.28	0.51	0.62	0.54	**0.86**							
PI	3.47	1.33	3.60	3.30	0.90	0.19	0.13	0.36	0.07	0.06	-0.03	0.09	**0.91**						
INT	4.47	1.36	4.72	4.16*	0.90	0.63	0.69	0.60	0.37	0.34	0.34	0.35	-0.01	**0.86**					
DIFC	4.83	1.10	4.69	5.02	0.88	0.11	0.21	0.10	0.40	0.42	0.36	0.57	0.05	0.24	**0.84**				
APT	4.30	1.27	4.46	4.10	0.84	0.36	0.42	0.38	0.36	0.37	0.34	0.37	0.10	0.54	-0.04	**0.85**			
W	4.62	1.19	4.53	4.73	0.84	0.31	0.42	0.36	0.43	0.29	0.25	0.42	0.12	0.35	0.45	0.24	**0.85**		
DIFM	4.10	1.21	3.94	4.31	0.83	0.17	0.25	0.32	0.09	0.14	0.10	0.15	0.26	0.15	0.43	-0.04	0.31	**0.84**	
G			1	0	1.00	0.25	0.12	0.20	-0.21	-0.09	-0.09	-0.19	-0.02	0.22	-0.15	0.13	-0.09	-0.13	**1.00**
REF1	3.11	1.60	3.23	2.96															
REF2	3.26	1.47	3.43	3.04															
REF3	3.33	1.48	3.58	3.00+															
REF4	3.50	1.46	3.77	3.15*															
REF5	3.56	1.46	3.82	3.21*															

Note N = 114. ρ_c = Composite Reliability; I = Intention to choose an IS major; A = Attitude toward choosing an IS major; SN = Subjective Norm; JA = Job Availability; JSE = Job Security; JSA = Job Salary; SI = Social Image; PI = Personal Image; INT = genuine INTerest in IS field; DIFC = DIFficulty of IS Major; APT = APTtitude; W = Workload; DIFM = DIFficulty of IS Curriculum. Diagonal elements (bold) are the square roots of average variance extracted by variables from their indicators. REF1 = family; REF2 = friends; REF3 = fellow students; REF4 = advisors; REF5 = professors. Correlations > 0.25 significant at 0.01 level; Correlations > 0.19 significant at 0.05 level.

+ Difference significant at 0.1 level; *Difference significant at 0.05 level.

1. Subjective norm was modeled using formative indicators, thus ρ_c and average variance extracted do not apply.

Table 1: Descriptive Statistics, Composite Reliabilities, Square Root of AVE Values, and Correlations among Latent Variables

Indicator	I	A	JA	JSE	JSA	SI	PI	INT	DIFC	APT	W	DIFM
I1	**0.92**	0.68	0.17	0.22	0.19	0.21	0.25	0.59	0.14	0.33	0.26	0.22
I2	**0.91**	0.73	0.34	0.28	0.34	0.26	0.09	0.56	0.06	0.34	0.30	0.09
A2	0.72	**0.93**	0.46	0.47	0.36	0.46	0.10	0.69	0.22	0.41	0.41	0.22
A2	0.72	**0.92**	0.43	0.32	0.36	0.28	0.15	0.60	0.16	0.37	0.37	0.24
JA1	0.28	0.46	**0.93**	0.60	0.62	0.49	0.07	0.35	0.35	0.38	0.41	0.10
JA2	0.23	0.43	**0.92**	0.56	0.55	0.45	0.06	0.33	0.40	0.28	0.38	0.07
JSE1	0.22	0.39	0.49	**0.88**	0.52	0.56	0.02	0.29	0.38	0.29	0.22	0.10
JSE2	0.26	0.35	0.61	**0.84**	0.68	0.50	0.08	0.29	0.35	0.36	0.30	0.15
JSA1	0.17	0.32	0.54	0.60	**0.85**	0.43	-0.12	0.24	0.28	0.21	0.29	0.04
JSA2	0.33	0.36	0.56	0.59	**0.89**	0.51	0.05	0.35	0.34	0.37	0.16	0.13
SI1	0.26	0.36	0.32	0.45	0.37	**0.88**	0.16	0.34	0.45	0.36	0.36	0.13
SI2	0.23	0.35	0.50	0.53	0.47	**0.83**	0.11	0.27	0.54	0.23	0.36	0.21
SI3	0.17	0.33	0.54	0.62	0.56	**0.88**	-0.04	0.31	0.50	0.39	0.38	0.04
PI1	0.18	0.12	0.11	0.05	-0.03	0.07	**0.90**	0.04	0.07	0.17	0.13	0.22
PI2	0.16	0.12	0.02	0.05	-0.02	0.09	**0.91**	-0.06	0.02	0.02	0.10	0.25
INT1	0.58	0.63	0.29	0.24	0.33	0.27	0.00	**0.90**	0.14	0.47	0.32	0.17
INT2	0.34	0.43	0.34	0.39	0.37	0.38	-0.17	**0.79**	0.30	0.35	0.23	0.04
INT3	0.67	0.69	0.34	0.28	0.23	0.30	0.07	**0.91**	0.21	0.57	0.35	0.16
DIFC1	0.15	0.23	0.39	0.43	0.38	0.56	0.05	0.27	**0.91**	0.03	0.35	0.40
DIFC2	0.04	0.14	0.25	0.31	0.21	0.45	0.05	0.18	**0.81**	-0.07	0.47	0.31
DIFC3	0.05	0.13	0.37	0.29	0.27	0.43	0.01	0.11	**0.81**	-0.12	0.36	0.39
APT1	0.27	0.33	0.29	0.25	0.29	0.33	0.12	0.52	-0.03	**0.84**	0.19	-0.06
APT2	0.35	0.40	0.34	0.39	0.30	0.32	0.07	0.43	-0.04	**0.89**	0.23	-0.01
W1	0.26	0.35	0.40	0.32	0.22	0.42	0.07	0.38	0.42	0.32	**0.85**	0.23
W2	0.26	0.36	0.33	0.17	0.21	0.30	0.14	0.22	0.34	0.09	**0.86**	0.29
DIFM1	0.19	0.27	0.08	0.09	0.04	0.12	0.23	0.14	0.37	-0.02	0.33	**0.97**
DIFM2	0.06	0.09	0.09	0.22	0.25	0.19	0.23	0.14	0.44	-0.08	0.13	**0.70**

Note N = 114. I = Intention to choose IS major; A = Attitude toward choosing IS major; SN = Subjective Norm; JA = Job Availability; JSE = Job Security; JSA = Job Salary; SI = Social Image; PI = Personal Image; INT = genuine INTerest in IS major; DIFC = DIFficulty of Major; APT = APTtitude; W = Workload; DIFM = DIFficulty of Curriculum.

Table 6: Loadings and cross-loadings for the measurement model (Reflective indicators only)

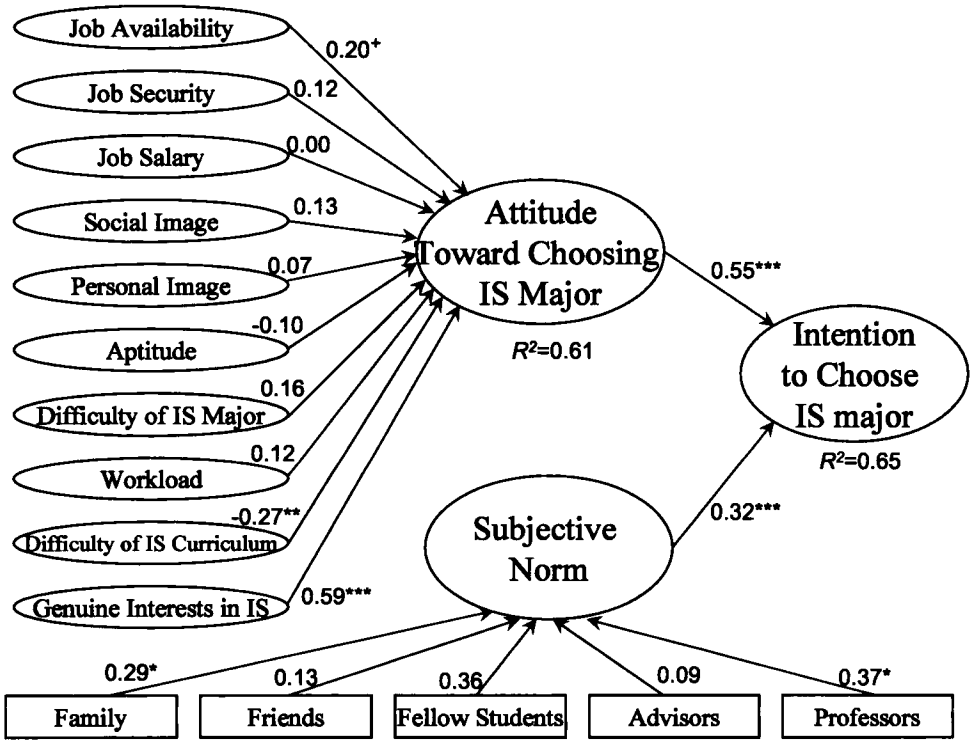
tions with other latent constructs (Chin, 1998; Gefenand Straub, 2005). As shown in Table 2, all loadings of the indicators onto their own latent constructs were significant at the $p < 0.001$ level except one loading of an indicator of the perceived difficulty of an IS major that is significant at the $p < 0.05$ level (Table 2). The square roots of the AVEs of all latent constructs are greater than or equal to 0.84 (Table 1). For all examined constructs, the indicator loadings are at least one order of magnitude higher than the indicators' cross-loadings with other latent constructs. The square roots of all AVEs were also quite a bit higher than their correlations with other latent constructs.

Thus overall, the measurement models in this study exhibited satisfying psychometric properties.

4.3 Structural Model Testing of the TRA Framework

A structural model based on Figure 1 was built to test the TRA framework. Bootstrapping with 500 resamples was run to obtain the standard errors for the path coefficient estimates. The statistical significances of the path coefficients then were computed using *t*-tests. The results are shown in Figure 2. Overall, the model accounted for considerable variance in students' intentions to choose an IS major ($R^2 = 0.65$) and students' attitudes toward choosing an IS major ($R^2 = 0.61$).

Precisely as the TRA predicted, the analysis showed that the intentions to choose an IS major was affected by both attitudes toward choosing IS major and subjective norms. The attitude-to-intention coefficient was 0.55 ($p <$



Note: $^{+}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

Figure 6: Using TRA framework to explain student intention to choose IS Major

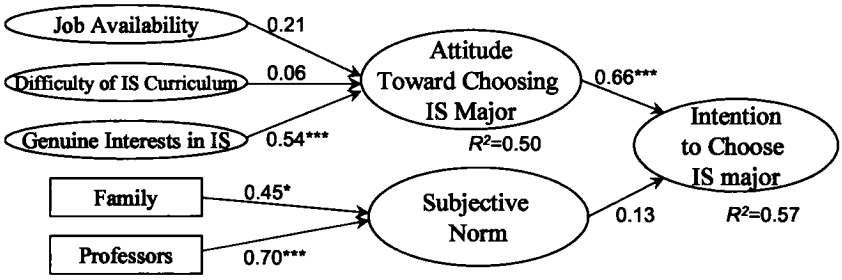
0.001), and the path coefficient from subjective norm to intention was highly significant, too (□ = 0.32, p < 0.001). Three behavioral beliefs were found significant. As far as job-related beliefs were concerned, only job availability moderately influenced the students' attitudes toward choosing an IS major ($\beta = 0.20$, $p < 0.1$); no effects from job security or job salary were detected. Neither of the image-related beliefs appeared to have influenced the students' attitudes. Among the cost-related beliefs, only the difficulty of the IS curriculum negatively affected the attitudes toward choosing an IS major ($\beta = -0.27$, $p < 0.01$). Consistent with previous research, genuine interests in IS was once again shown to be an important factor affecting students' intentions to choose an IS major. However, its influence was mediated by the attitude toward choosing IS major, as the path from it to the attitude was highly significant ($\beta = 0.59$, $p < 0.001$), but a direct link from it to the intention to choose an IS major (not shown in Figure 2) turned out not to be significant. Five salient referents were identified for this study, but only two actually appeared to have influenced the respondents: family and professors, with weights of 0.29 ($p < 0.05$) and 0.37 ($p < 0.05$), respectively.

4.4 The Role of Gender

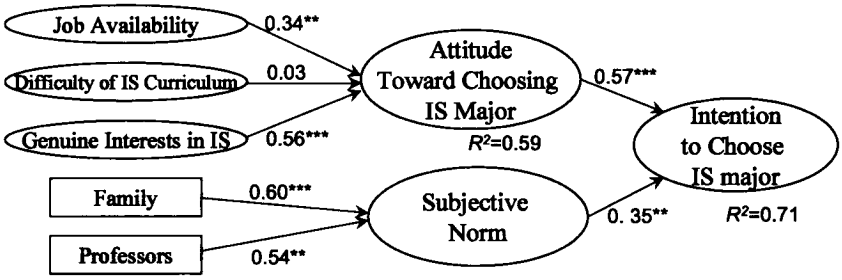
To explore how gender affects students' intentions to choose an IS major, the gender differences on behavioral beliefs, normative beliefs, attitudes toward choosing IS major, subjective norms, and intentions to choose an IS major were first examined. The mean values of these variables for male and female students were presented in Table 1, and t-tests were used to determine whether the differences between the mean values were significant.

Not surprisingly, female students were less intent on choosing an IS major than male students ($t = 2.57$, $p < 0.05$). For behavioral beliefs, female students seemed to have a more optimistic opinion of the job market, although only the difference on job availability was significant ($t = 2.22$, $p < 0.05$). There were no significant differences on the image-related beliefs between female and male students. Male students were more interested in the IS field than female students ($t = 2.08$, $p < 0.05$). Compared with their male counterparts, female students appeared to believe that IS courses were more difficult, that an IS major was more difficult to pursue, that they were not as able to study IS, and that an IS major imposed a heavier workload. However, none of these differences was statistically significant. With job availability and genuine interest in the IS field the only two beliefs differentiating male and female students, there were no significant differences between the two groups' attitudes toward choosing IS major (see the top panel of Table 1).

The data indicated that female students were socially discouraged from pursuing an IS major, as the mean subjective norm scores for female students were lower than that for male students, although the difference was only moderate ($t = 1.71$, $p < 0.1$). Individual opinions from salient referents on whether a student should become an IS major were uniformly more positive for male than for female students, although not all differences were statistically



Factors that affect male students' choice of IS major



Factors that affect Female students' choice of IS major

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Figure 7: Group analysis comparing male and female students' choice of IS major

significant at the $p < 0.05$ level (see the bottom panel of Table 2). Advisors and professors appeared not to be immune from this gender bias. In fact, this study identified them as significantly favoring male over female students for an IS major ($t = 2.13$, $p < 0.05$ for advisors and $t = 2.11$, $p < 0.05$ for professors).

To check whether gender affects students' intentions to choose an IS major beyond the effects of attitudes and subjective norms, gender was added to the structural model shown in Figure 2, together with links from gender to intention, attitude, and subjective norm. Adding gender to the model did not change the significance pattern of the links shown in Figure 1. For the new links, the results were consistent with the t-test results: The gender-attitude link was not significant, but the gender-subjective norm and gender-intention links were both significant at the $p < 0.05$ level ($\beta = 0.21$ and $\beta = 0.13$, respectively). Apparently, gender directly and independently influenced the intention to choose an IS major.

Finally, a multigroup analysis was conducted to examine whether gender might have worked by moderating the influences of beliefs, attitudes, and subjective norms. Due to the limited sample sizes, the structural model for the multigroup analysis included only beliefs whose effects were found to be significant in the overall structural model testing. The data were split into two groups by gender, and the structural model was tested with both data sets, respectively. The models and the results are presented in Figure 3.

Both models accounted for a large amount of the variance in students' intentions to choose an IS major ($R^2 = 0.57$ for male and $R^2 = 0.71$ for female students). Gender did appear to affect some path coefficients. While attitudes toward choosing an IS major played an important role in affecting students' intention to choose an IS major for both male and female students, subjective norms played no role in affecting male students' intentions ($\beta = 0.13$, *n.s.*), but a highly significant role in affecting those of female students ($\beta = 0.35$, $p < 0.01$). For both male and female students, genuine interest in IS was an important predictor of attitudes toward choosing an IS major ($\beta = 0.54$, $p < 0.001$ for male students and $\beta = 0.56$, $p < 0.001$ for female students). Female students took job availability into consideration ($\beta = 0.34$, $p < 0.01$), but male students did not ($\beta = 0.21$, *n.s.*). No significant effects of the difficulty of the IS curriculum were detected in the simplified models. Both female and male students felt influences from both family and professors. However, there seemed to be a gender difference in the relative importance of family and professors: Family seemed to be less influential than professors for male students ($\beta = 0.45$, $p < 0.05$ for family and $\beta = 0.70$, $p < 0.001$ for professors), but more influential than professors for female students ($\beta = 0.60$, $p < 0.001$ for family and $\beta = 0.54$, $p < 0.01$ for professors).

5. DISCUSSION AND CONCLUSIONS

As much as IS scholars and professionals have been concerned about the recent decrease in IS enrollments, little research has been reported to have systematically investigated this issue. The study presented in this paper applied the TRA framework to examine the factors underlying undergraduate students' intentions to choose an IS major. It also explored how gender affected the students' intentions to choose an IS major within the TRA framework. In these efforts, the study contributed to deepening our

understanding of IS enrollments by proposing and verifying a theoretical framework, by identifying the important factors within the framework, and by probing the gender difference in students' intentions to choose an IS major.

The research model based on the TRA demonstrated considerable explanatory power, both for students overall and for male and female students separately. As the TRA predicts, students' choices of an IS major were jointly affected by their own attitudes toward choosing an IS major and the social pressures that they perceived were put upon them to select this major. The students' attitudes, in turn, were affected by their concerns about job availability, the difficulty of the IS curriculum, and perhaps most importantly, whether they thought they would enjoy studying IS. These findings were consistent with those of previous research: that students would prefer majors that have more job opportunities (e.g. Adams et al., 1994), that are easier to learn (e.g. Cohen and Hanno, 1993), and that they are genuinely interested in (e.g Adams et al., 1994; Cohen and Hanno, 1993; Malgwi et al., 2005). This study also showed that students' intentions to choose an IS major were influenced by the opinions of the persons surrounding them. In particular, families and professors were identified as two salient referent groups that exerted such influences.

Not all behavioral beliefs or salient referents in the research model were found to be significant. The research model identified behavioral beliefs and salient referents from previous studies. In total, 10 behavioral beliefs and 5 salient referents were identified, which rendered the sample size of 114 moderate. It is possible that only the most important beliefs/referents were found significant in the reported study. With a larger sample size, more beliefs and/or referents identified in this study might be found significant as well. Moreover, the three significant factors represented the beliefs of three different categories – job-related beliefs, cost-related beliefs, and experiential beliefs (Figure 1) – in support of the categorization of the behavioral beliefs in the research model. Two of five salient referents were found to be influential. Overall, the results supported the validity of the research model and verified that the TRA was an appropriate choice for the purpose of this study. They also call for more future studies, preferably with larger sample sizes and multiple research sites, so that we can paint a clearer picture of the significance of each identified belief and referent.

The TRA framework used in this study helped reveal that gender played an important yet complicated role in affecting students' intentions to choose an IS major. Although the framework was applicable to both male and female students, the two groups were concerned about different factors and were affected by these factors in different ways and/or to different degrees. Female students were less intent to choose an IS major than male students, but the two groups actually had similar attitudes toward choosing an IS major. Female students seemed to believe that they were less expected to choose an IS major than male students, and unlike male students, they weighed others' opinions when forming their intentions. However, the gender differences in the intentions to choose an IS major could be only partly attributed to how students responded to the opinions of others, as gender itself exerted a direct influence on students' intentions to choose an IS major in addition to that of subjective norms.

As far as behavioral beliefs are concerned, no significant differences were found between male and female students regarding image-related beliefs. Female students were significantly less interested in IS than male students, but the differences on cost-related beliefs – perceived difficulty of the IS curriculum or IS major, workload, and aptitude – were not statistically significant. Female students did have a more pragmatic view about choosing an IS major than male students, as their attitudes toward choosing an IS major were affected by their beliefs about job availability, but those of male students were not.

Taken together, these findings regarding gender differences pointed to sex differences in sex-role socialization (Eccles and Hoffman, 1984) over academic preparedness or efficacy (Lapan et al., 1996) as the more important factor that discouraged female students from choosing an IS major. Deeply rooted expectations about the social roles of women may have led female students to view an IS career as a less viable option and subsequently an IS major as a less preferred major. The socialization pattern was so established that even female students' more optimistic views about job availability failed to translate into more positive attitudes toward choosing an IS major. The data indicated that the opinions of students' families and professors were consistent with the dominant socialization pattern that IS is not meant for female students. Admittedly, the current study did not incorporate the issue of sex-role socialization and hence it cannot tell whether families' and professors' opinions were resultant from the dominant socialization pattern, and if so, to what degree. Still, the finding is alarming.

Methodologically, this study did not elicit salient beliefs from research participants. Instead, factors that can affect students' choice of an IS major were identified from extant literatures and organized according to the TRA framework. The high amount of variance of the dependent variables explained by the theoretical framework, and the overlap between the significant factors identified in this study and those identified in previous research, attested to the appropriateness of doing so. Most previous studies in this area have been explorative and have lacked a strong theoretical basis. Hopefully, this study can help introduce a theoretical framework that can be used to facilitate future studies on this important issue.

The present study is not without its own limitations. First of all, the data used for the reported study were collected from the business school of one public, urban university that had a unique student body, which casts a shadow on the generalizability of the findings. For example, the findings regarding gender differences could be due to the dominant view of women's role in the society in the particular area where the data were collected. These findings could be regionally specific and may not be the case in other parts of the U.S. or other parts of the world. To assess the generalizability of the findings, future research that collects data from multiple business schools with different characteristics (e.g. Lee and Lee, 2006) in different geographic and/or cultural areas should be conducted. Second, the application of the TRA framework in this study

was not perfect. Some compromises had to be made. For example, one might argue that having genuine interest in the IS field is more an antecedent of experiential beliefs than an experiential belief itself. However, given the importance of this construct in previous research, and to keep the questionnaire's length in control, this study chose to include items that measured genuine interests, but not those that could directly measure experiential beliefs. Third, for pragmatic reasons, this study only investigated the most popular factors identified in previous research and favored factors that could be changed through recruiting efforts for practical purposes. It excluded some other factors, such as personality (Noel et al., 2003), parental occupation, and the socioeconomic status of students' families (Leppel et al., 2001). Future studies could choose to integrate these factors. Finally, this study did not attempt to address why gender makes a difference. The data suggested sex-differences in socialization as the more plausible explanation, but we cannot confidently draw the conclusion without further studies that incorporate the socialization process and compare its effect with those of other factors.

Despite all these limitations, the findings from this study hold important implications for rethinking our efforts to boost IS enrollments. First and foremost, the significant effects of job availability supported the predominant feeling that the soft job market had discouraged many students from choosing an IS major. However, this study also suggested that the job market was just one of several factors affecting students' intention to choose an IS major. In fact, the data suggested that job-related concerns perhaps were not as significant as commonly perceived during the downturn. We cannot expect IS enrollments to self-heal as the IS job market recovers. Much more must be done.

Second, while other researchers have suggested a comprehensive strategic plan (Lee and Lee, 2006), this study suggested a few specific areas that we can focus on: We can start with cultivating more positive attitudes toward choosing an IS major by enhancing students' interest in IS; by spreading the recent good news about the improving IS job market; and by offsetting the students' perception that IS courses are too difficult. For example, students nowadays are perhaps already familiar with personal IT through their use of computers and the Internet, but few realize how important IS/IT is to today's businesses. We can make up for this by highlighting the organizational use of IS/IT in the introductory IS course, by organizing field trips to see how widely and innovatively IS/IT is used in businesses, or by inviting guest-speakers to talk about the importance of organizational IS/IT. These actions should help enhance students' interest in the IS field. We also should pitch the IS major as a viable option to the students' families because students' intention to choose IS major was influenced by their opinions. For example, IS departments should prepare promotional materials that students can pass on to their families, and encourage students to do so.

Third, while it is important to recruit female students (Lee and Lee, 2006), this study suggested that we need to adopt recruiting strategies specifically customized for female students, as they were affected by different factors in different ways. Efforts such as advertising job availability would help. However, the biggest obstacle in recruiting female students might be the deep-rooted social bias that the IS major is not for women. Realistically, IS departments cannot be expected to eliminate the bias. Nevertheless, we should try to overcome it by designing some recruiting efforts specifically targeting female students, for example, events featuring successful women in the IT industry.

Finally, this study indicated that IS professors have much to do to improve the current enrollment situation. Two observations from this study stand out regarding the influences of IS professors on students' intentions to choose an IS major: First, the perceived difficulty of the IS curriculum negatively affected attitudes toward choosing an IS major. Second, professors were identified as a salient reference group that influenced students' choice. Hence IS professors can effectively encourage students to choose an IS major in at least two ways: by teaching IS courses in a way that offsets students' preconception that the IS curriculum is difficult and by being more supportive of students choosing an IS major. The first requires IS professors to teach against the long-held belief that IS coursework is difficult (Lee and Lee, 2006), which likely will call for substantial pedagogical innovations. The second requires IS professors to build on and expand their roles as educators and researchers and advocate the IS major to students, a task that many may find uncomfortable. However, these are the challenges IS professors must take on to increase and sustain IS enrollments.

In summary, this study applied the theory of reasoned action to investigate undergraduate business students' intentions to choose an IS major during the downtime of IS enrollments and explored gender differences related to this issue. The theoretical framework was shown to be plausible and hopefully may help facilitate future studies in the same area. Practically, the findings suggested that while the recovering IS job market would help stimulate IS enrollments, much more must be done to return IS enrollments to a healthy level. In particular, we need to focus on recruiting female students and to reexamine what IS professors can do to help rebuild and maintain IS enrollments.

6. REFERENCES

Adams, S. J., Pryor, L. J., and Adams, S. L. (1994) "Attraction and Retention of High-Aptitude Students in Accounting: An Exploratory Longitudinal Study." Issues in Accounting Education, Vol. 9, No. 1, pp. 45-58

Ajzen, I. (1991) "The Theory of Planned Behavior." Organizational Behavior and Human Decision Processes, Vol. 50, No. 2, pp. 179-211

Ajzen, I. (2002) "Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior." Journal of Applied Social Psychology, Vol. 32, No. 4, pp. 665-683

Ajzen, I., and Fishbein, M. (1980) Understanding Attitudes and Predicting Social Behavior. Prentice-Hall, Englewood Cliffs, NJ

Barnowe, J. T., Frost, P. J., and Jamal, M. (1979) "When Personality Meet Situation: Exploring Influences on Choice of Business Major." Journal of Occupational Psychology, Vol. 52, No. 3, pp. 167-176

Chin, W. W. (1998) "The Partial Least Squares Approach for Structural Equation Modeling." in: Modern Methods for Business Research, G.A. Marcoulides (ed.), Lawrence Erlbaum Associates, 1998

Chin, W. W. (2001) "PLS-Graph Manual, Version 3.0." 2001

Cohen, J., and Hanno, D. (1993) "An Analysis of Underlying Constructs Affecting the Choice of Accounting as a Major." Issues in Accounting Education, Vol. 8, No. 2, pp. 219-238

Coleman, M., Kreuze, J., and Langsam, S. (2004) "The New Scarlet Letter: Student Perceptions of the Accounting Profession after Enron." Journal of Education for Business, Vol. 79, No. 3, pp. 134-141

Correll, S. J. (2001) "Gender and the Career Choice Process: The Role of Biased Self-Assessments." American Journal of Sociology, Vol. 106, No. 6, pp. 1691-1730

Davis, F. D., Bagozzi, R. P., and Warshaw, P. R. (1989) "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models." Management Science, Vol. 35, No. 8, pp. 982-1003

Eccles, J., and Hoffman, L. (1984) "Sex Differences in Preparation for Occupational Roles." in: Child Development and Social Policy, H. Stevenson and A. Siegal (eds.), University of Chicago Press, Chicago, 1984, pp. 367-420

Department of Commerce. (1997) "America's New Deficit: The Shortage of Information Technology Workers." 1997. Retrieved November 15, 2005 from http://www.technology.gov/reports/itsw/itsw.pdf

Department of Education. (2005) "Digest of Education Statistics: 2005." 2005. Retrieved Dec. 6, 2006 from http://nces.ed.gov/programs/digest/d05/tables/dt05_262.asp?referer=list

Felton, S., Dimnik, T., and Northey, M. (1995) "A Theory of Reasoned Action Model of the Chartered Accountant Career Choice." Journal of Accounting Education, Vol. 13, No. 1, pp. 1-19

Fiorito, J., and Robert, C. D. (1982) "Market and Nonmarket Influences on Curriculum Choice by College Students." Industrial and Labor Relations Review, Vol. 36, No. 1, pp. 88-101

Gefen, D., and Straub, D. (2005) "A Practical Guide to Factorial Validity Using PLS-Graph: Tutorial and Annotated Example." Communications of AIS, Vol. 16, No., pp. 91-109

George, J.F., Valacich, J.S., and Valor, J. (2004) "Does Information Systems Still Matter? Lessons for a Maturing Discipline." Twenty-Fifth International Conference on Information Systems, Washington, DC.

Goff, L. (2000) "MIS Big Major on Campus." Computerworld, Vol. 34, No. 28, pp. 44-45

Gul, F., Andrew, B., Leong, S., and Ismail, Z. (1989) "Factors Influencing Choice of Discipline of Study – Accountancy, Engineering, Law and Medicine." Accounting and Finance, Vol. 28, No. 2, pp. 93-102

Ketler, K., and Moncada, S. (1992) "The Relationship between Precollege Computer Experience, Strength of Knoweldge, and the Propensity to Enroll in Advanced Computer Courses." ACM SIGCPR conference on Computer personnel research (SIGCPR '92)

Kim, D., Markham, F. S., and Cangelosi, J. D. (2002) "Why Students Pursue the Business Degree: A Comparison of Business Majors across Universities." Journal of Education for Business, Vol. 78, No. 1, pp. 28-32

Lackland, A. C., and Lisi, R. D. (2001) "Students' Choices of College Majors That Are Gender Traditional and Nontraditional." Journal of College Student Development, Vol. 42, No. 1, pp. 39-48

Lapan, R. T., Shaughnessy, P., and Boggs, K. (1996) "Efficacy Expectations and Vocational Interests as Mediators between Sex and Choice of Math/Science College Majors: A Longitudinal Study." Journal of Vocational Behavior, Vol. 49, No. 3, pp. 277-291

Lee, Y., and Lee, S. J. (2006) "The Competitiveness of the Information Systems Major: An Analytic Hierarchy Process." Journal of Information Systems Education, Vol. 17, No. 2, pp. 211-221

Leppel, K., Williams, M. L., and Waldauer, C. (2001) "The Impact of Parental Occupation and Socioeconomic Status on Choice of College Major." Journal of Family and Economic Issues, Vol. 22, No. 4, pp. 373-394

Lowe, D. R., and Simons, K. (1997) "Factors Influencing Choice of Business Majors–Some Additional Evidence: A Research Note." Accounting Education, Vol. 6 No 1, pp. 39-45

Malgwi, C. A., Howe, M. A., and Burnaby, P. A. (2005) "Influences on Students' Choice of College Major." Journal of Education for Business, Vol. 80, No. 5, pp. 275-282

Mathieson, K. (1991) "Predicting User Intentions: Comparing the Technology Acceptance Model with the Theory of Planned Behavior." Information Systems Research, Vol. 2, No. 3, pp. 173-191

Murphy, C. (2005) "Speak up for the IT Career." InformationWeek, Vol. No. 1058, pp. 34-41

Myers, M. E., and Beise, C. M. (2001) "Nerd Work: Attractors and Barriers Perceived by Students Entering the IT Field." ACM SIGCPR conference on Computer personnel research (SIGCPR '01), San Diego, California, United States, pp. 201-204

Noel, M., Michael, C., and Levas, M. G. (2003) "The Relationship of Personality Traits and Self-Monitoring Behavior to Choice of Business Major." Journal of Education for Business, Vol. 78, No. 3, pp. 153-158

Panko, R. (2005) "Undergraduates IS Enrollment Trends." Retrieved Oct 28, 2005, from http://www.isworld.org/isworldarchives/Teachingmessage display.asp?message=207

Strader, M. K., and Katz, B .M. (1990) "Effects of a Persuasive Communication on Beliefs, Attitudes, and Career Choice." Journal of Social Psychology, Vol. 130, No. 2, pp. 141-150

Taylor, S., and Todd, P. A. (1995) "Understanding Information Technology Usage: A Test of Competing Models." Information Systems Research, Vol. 6, No. 2, pp. 144-176

Turner, S. E., and Bowen, W. G. (1999) "Choice of Major: The Changing (Unchanging) Gender Gap." Industrial & Labor Relations Review, Vol. 52, No. 2, pp. 289-313

Weinberger, C.J. (2004) "Just Ask! Why Surveyed Women Did Not Pursue IT Courses or Careers." IEEE Technology & Society Magazine, Vol. 23, No. 2, pp. 28-35

Yi, M. Y., and Davis, F. D. (2003) "Developing and Validating an Observational Learning Model of Computer Software Training and Skill Acquisition." Information Systems Research, Vol. 14, No. 2, pp. 146-169

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APPENDIX 1: MEASURES

Note: All items are measured with a seven-point Likert scale anchored with Strongly Disagree at 1 and Strongly Agree at 7.

Students' Intention to choose an IS major:

I1	I intend to choose IS concentration.
I2	It is likely that I will choose IS concentration.

Attitude toward choosing an IS major:

A1	Choosing IS concentration seems a good idea to me.
A2	It will be wise for me to choose IS concentration.

Salient Referents:

REF1	My family wants me to choose IS concentration.
REF2	My friends think I should choose IS concentration.
REF3	Other students recommend IS concentration to me.
REF4	My advisor recommends IS concentration to me.
REF5	My professors think that I should take IS concentrations.

Job Availability:

JA1	If I choose IS concentration, there will be jobs available for me when I graduate.
JA2	If I choose IS concentration, there will be plenty of job opportunities for me when I graduate.

Job Security:

JSE1	If I choose IS concentration, there will always be a great market demand for people like me.
JSE2	If I graduate with IS concentration, my job security will be high.

Job Salary:

JSA1	I can get a high-paying job if I graduate with IS concentration.
JSA2	My starting salary will be satisfying if I graduate with IS concentration.

Personal Image:

PI1	Choosing IS concentration would make me look like a computer geek.
PI2	IS professionals are nerds.

Social Image:

SI1	Businessmen look up to IS professionals.
SI2	If I choose IS concentration, I would have a respectable career.
SI3	The business world treat IS professionals with great respect.

Difficulty of IS Curriculum:

DIFC1	To me IS courses are intensive.
DIFC2	I think IS courses are challenging
DIFC3	I think IS courses are demanding

Difficulty of IS Major:

DIFM1	IS concentration is difficult for me.
DIFM2	If I choose IS concentration, I need to take too many courses to complete it.

Workload:

W1	If I choose IS concentration, I will have to spend a lot of time studying it.
W2	If I choose IS concentration, it will take a long time for me to complete it.

Aptitude:

APT1	I find myself good at IS courses.
APT2	I have the aptitudes required for IS concentration.

Genuine Interests in IS field:

INT1	I like IS.
INT2	I find computers and information technologies interesting.
INT3	I have a true interest in the IS subject.

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