

# Filling the Pipeline for IS Professionals: What Can IS Faculty Do?

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## ABSTRACT

The large increases in the number of IS majors about ten years ago have been matched by equally large decreases in IS enrollments over the last few years. The authors used a survey of over 200 students to answer the question “what can faculty do to attract more IS majors?” This paper reports our results and provides several specific suggestions for directed efforts.

**Keywords:** IS recruitment, IS majors, University Curricula, Information Systems, Declining Enrollments

## 1. INTRODUCTION

There are many reasons why declining enrollments are important to the various disciplines of most universities. At both public and private institutions, for example, enrollments affect the number and timing of course offerings, the staffing requirements of the departments that offer them, and of course the recruitment efforts of the colleges who staff them (Goff, 2000; Clark, 2008)). Then, too, at formula-funded universities where funding is calculated based on student counts, enrollment translates into real dollars in the budgets of institutional administrators, and thus influences resource-allocation decisions within the university as a whole (Brookshire, 2006). Finally, the lack of enrollments in some areas or the over-subscription of courses in others presents problems to those administrators seeking to match the supply of course offerings to student demand for them.

Declining enrollments are also of special importance to industry and government employers, who depend upon IS programs to help train new hires or educate returning students seeking graduate-level education (Kastrul, 2008). Here, the laws of supply and demand for qualified graduates are very much in evidence, with (for example) past shortfalls of technically-qualified individuals requiring both businesses and state agencies to pay unexpectedly high salaries or signing bonuses to attract hires for newly-created positions or to replace retiring baby boomers (Murphy, 2005). Then too, many scholars believe that IT personnel are one of an organization’s most important resources, and that managing, retaining, recruiting, and replacing such workers are critical challenges to corporate executives (Ferratt, Agarwal et al.,

2005). Finally, industry leaders express concern that U.S. and European companies have the potential to lose their competitive edge as more technically-competent hires graduate from institutions in developing countries and begin working for competitors abroad, or are better able to execute the strategic corporate IT initiatives of the future (Pournelle, 2004; Armstrong, Nelson et al., 2008).

A review of the literature suggests that the field of information systems is but one of several fields that have experienced large swings in student enrollments over the years. Similar trends have been observed in such disciplines as agriculture (Smith, 2005), art appreciation (Kimweli and Richards, 1999), chemistry (Wolke, 2006), civil engineering (NewsBriefs, 1998), economics (Fournier and Sass, 2000), and science and mathematics (Brookshire, 2006). The issue of variable enrollments has been particularly characteristic of, and problematic to, the areas of computer studies, where the large increases in enrollments in the 80s and 90s were matched by equally large decreases in the period 2001-2008. In the period from 1980 to 1986, for example, the number of bachelor’s degrees awarded to computer science majors more than quadrupled (Zhang, 2007). This increase was followed by an equally dramatic drop in student IS majors in subsequent years, with institutions reporting losses as high as 50 percent (Zhang, 2007; Panko, 2008). Granger, et al. (2007) predicts future world-wide decreases “as much as 70 to 80 percent.”

Decrease in enrollment may affect the genders unequally. Camp (1997) described the low number of graduates in computer science awarded to women and the “incredible shrinking pipeline”. Strategies related to

attracting and retaining women in information systems and computer science continue to be “filling the pipeline” issues (Horwitz and Rodger, 2009). Shrinkage in female enrollment have also compounded the “gender gap” perpetuating inequalities in IS workforce development (Trauth, 2006). It would seem that since 1997, there have been islands of improvement (Singh, Allen et al., 2007); however, there remains a need to “fill the pipeline.”

Overall, the decrease in computer science and IS majors at U.S., European, and Australasian institutions has been as consistent as it has been dismaying (Camp and Gurer, 1999; Martin, Liff et al., 2004; Neumann, 2004). U.S. enrollment losses in the period 2004 to 2007, for example, fell from 57,739 to 33,437—a 42-percent drop in this three-year period—in contrast to a 2-percent total *increase* of enrollees in universities as a whole during the same multi-year period (Vegso, 2007). These enrollment losses are all the more curious, given that the U.S. Bureau of Labor Statistics has consistently listed IS jobs among those likely to increase the most in the next decade and the fact that many domestic businesses continue to seek technically-competent hires. Student enrollments in European institutions of higher learning have not fared much better. In the United Kingdom, for example, McCue (2007) reports that the number of computer science degrees awarded in 2005 fell to half their peak number in 2000. Even more drastic enrollment declines have been reported for Ireland (Panko, 2008).

The problem of declining enrollments was of particular concern to those of us working in the IS area of a college of business. The trend began to affect class sizes and therefore attract the notice of university administrators seeking to reduce personnel costs in a period of extreme shortfalls in state funding. Our department lost one lecturer position almost immediately, and untenured faculty began fearing for their jobs.

There are many recruitment efforts that universities in general, and the faculty members of a specific discipline in particular, can do to attract students (Brookshire, 2006; Clayton, 2006). Some of the recommendations in the literature—e.g., promoting your major on your web site—are easy to do, while others—e.g., making repeated recruiting visits to local high schools—are more labor intensive. We also note that faculty time and resources are not infinite, and that most universities of which we are aware do not directly reward faculty for such efforts, even if the work itself is ultimately self-serving.

These considerations lead the authors to ask “what recruiting efforts are most likely to attract students to an IS major?” Given that gender differences have also been found in past studies of career choices, we also wondered whether the decision to major in IS might also differ between males and females (Camp and Gurer, 1999; Clayton, 2006; Alkhalifa, 2008; Johnson, Stone et al., 2008).

The next section of this paper discusses past literature on the student process for selecting a major and presents a model of how students choose one. These discussions in turn formed the basis of a survey we used to identify what factors most influence the choice of undergraduate major. We present our survey results and some practical implications in the third section of this paper. Because student comments *about* survey questions often provide the most insight into a

process itself, we also analyzed this feedback. Section 4 of our paper presents our findings for this dimension of our survey, while the last section provides a summary and some prescriptive conclusions.

## **2. HOW DO UNDERGRADUATE STUDENTS CHOOSE A MAJOR?**

A wide range of university personnel have wound up asking the same question: what can faculty do to attract students to a particular undergraduate major? The authors suggest that faculty can best decide how to attract IS majors by first identifying the factors that most influence this decision-making process.

### **2.1 Possible Influences**

Various researchers have attempted to model this process, and potential variables understandably span a wide list of possibilities (Kimweli and Richards, 1999; Noel, Michaels et al., 2003). One possible explanation for why students choose a particular major is that students gravitate towards areas in which they have a natural interest (Zhang, 2007). This might explain, for example, why students who like animals major in veterinary science, or why students who like to build things major in architectural design. This influence, which may be termed “genuine interest,” is commonly expressed by IS students in such phrases as “I have always been good with computers” or “I taught myself how to program while I was in high school.” This idea also helps explain why students sometimes choose majors in fields that promise little in subsequent career benefits. Conversely, this explanation may also help explain why students lacking such interest do *not* major in IS.

A second explanation for the choice of undergraduate major is that student preferences are career-driven—i.e., that enrollments in a given discipline thrive or decline in response to perceived hiring opportunities or employment rewards in the industry upon graduation (Malgwi, Howe et al., 2005). Related factors here include “anticipated career benefits,” “high initial compensation levels,” “job security,” “opportunities for advancement,” and “the availability of subsequent job training” (Malgwi, Howe et al., 2005; Lee and Lee, 2006). Given recent Y2K and dot-com events, with concomitant corporate expansion and contractions in IT personnel, this argument would seem to be particularly relevant to the decision to major in, or not to major in, information systems.

In contrast to tangible or anticipated job opportunities or career benefits, some experts suggest that considerations involving “self-image” and “personal preferences” also play a role in the selection of a college major (Noel, Michaels et al., 2003). For example, students may avoid majoring in accounting for fear of appearing too abstract or impersonal, or decide against majoring in IS simply because they do not perceive themselves as “nerds” or “geeks” (Zhang, 2007). (Here, it is important to differentiate between what typical IT employees actually do and what college students *perceive* they do.) Again, the claim is that congruence between self-image and job stereotype, or the lack of such congruence, plays an important role in the decision-making process.

A fourth possible influence on the choice of major may be the anticipated difficulty in pursuing a particular program of study (Sabot and Wakeman-Linn, 1991). Here, the student considers such matters as the total number of credits required to complete the degree, the amount of mathematics required for the average course, and/or the anticipated amount of outside work in the major involved in his or her decision process. These concerns might explain, for example, why some students avoid majoring in nursing and its concomitant long, off-campus practicum. Related matters include the perceived rigor of the required courses for a given major, the grading reputation of the faculty who teach in specific disciplines, or the fear that difficult coursework and the potential for low grades will endanger a student's scholarship.

Yet a fifth set of factors that might determine the choice of undergraduate major is the influence of friends, parents, spouses, or role models on the student decision maker (Zhang, 2007). Within this framework, the idea is that students choose (or avoid) majors because some of the important people in their lives deem them desirable (or unacceptable). Although such influences can be weak, some students have explained to the authors that they were majoring in accounting simply because their fathers and grandfathers were accountants—and even though they hated accounting!

Finally, scholars suggest that a host of ancillary factors have the potential to influence the choice of college major. Related matters include the influence of faculty advisors, the availability or offering times of specific classes, the perceived strength of the faculty in a chosen area, exposure to the benefits or problems of a discipline while in high school, the amount of pre-college coursework in the area, or the lack of gender bias in a given area (Kimweli and Richards, 1999).

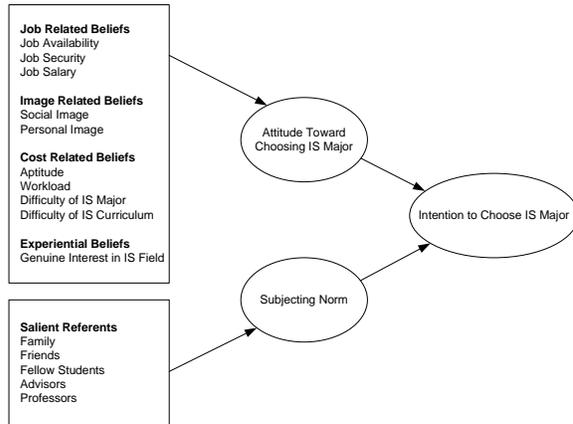


Figure 1. Theory of Reasoned Action Framework

Figure 1 summarizes the various influences that can affect the decision-making process in the choice of a major (Zhang, 2007). But not all such factors are likely to *equally* affect student actions. In particular, focusing on the most salient of them—if they can be identified—is also likely to attract the most majors when IS departments recruit them. Conversely, the reverse argument can be made for the weakest influences—i.e., that recruitment efforts

emphasizing these factors are likely to yield the smallest gains in student majors. Table 1 recapitulates the discussion above and directly indicates the published research that suggested each of our survey questions.

Question	Reference
I am [not] good with computers.	Zhang, 2007
Majoring in information systems would make me look like a geek.	Zhang, 2007; Noel, Michaels, et al., 2003
I do [do not] think there is good job security in the information systems field.	Malgwi, Howe, et al., 2005; Lee and Lee, 2006
Few of my friends whose opinions I value really understand what information systems is about.	Sabot and Wakeman-Linn, 1991.
I am not familiar with information systems or wasn't familiar with it when I chose a major.	Kimweli and Richards, 1999
Few employers really understand what information systems is about.	Lee and Lee, 2006; Malgwi, Howe, et al., 2005
I hate computers and want to do as little as possible with them.	Zhang, 2007; Noel, Michaels, et al., 2003
My friends think that alternate majors are better and I listened to them.	Noel, Michaels, et al., 2003
My parents suggested than at alternate major would be better for me.	Zhang, 2007; Noel, Michaels, et al., 2003
I do [do not] think I could get a job in information systems when I graduate.	Malgwi, Howe, et al., 2005; Lee and Lee, 2006
I do [do not] consider the information systems field to be a good career choice for me.	Zhang, 2007
I think that information systems courses are more difficult than the courses in other UNR majors.	Kimweli and Richards, 1999
Interesting subject. / I prefer to major in something else.	Zhang, 2007

Table 1. Published Research

### 3. METHODOLOGY

Our department is located in a college of business of a major western public university. The college is accredited by Association to Advance Collegiate Schools of Business (AACSB). Many of our students are first-generation college students and we have a large international student component. The typical student is the son or daughter of middle-class parents and works part time while attending classes.

Inasmuch as the literature described above suggests that there are many possible factors that can influence the decision to choose a particular major, our null hypotheses is that each of them positively affects a student's selection of a particular major in general, and the IS major in particular. To answer this question empirically, the authors constructed the survey shown in Appendix A. The first part of our survey asked questions concerning demographic variables, which allowed us to gather such information as age, gender, class rank, and grade point average, while the latter questions of the instrument asked more-specific questions about our students' decision-making process. Many of the questions were suggested by the literature reviewed above, and called for binary, yes-or-no responses. Thus the survey used check boxes rather than Likert scales for responses. Because we also wanted to distinguish between those students who had already committed to a major and those who were uncommitted, we added separate questions for those distinct groups.

We administered our survey to the students taking a required, junior-level MIS class in our college of business. Students completed the survey online and told that their responses would be completely anonymous. Although participation in the study was voluntary, the promise of extra homework credit resulted in the majority of the students in all six sections of the course completing the online web survey shown in the appendix. In fact, many of the students responding to the survey had not yet declared a major, and these respondents therefore represented a recruitment opportunity for our department as well as a chance to learn their viewpoints in selecting a major. The next section of this paper reports our results.

**3.1 Survey Results**

We received a total of 217 usable student responses to our survey. Of these, 93 were females and 124 were males. The mean participant’s age was 22.9 years with a standard deviation of 4.8 years, the modal class standing was “Junior,” and the mean self reported GPA was 3.2 on a scale of 4.0. Of the 217 respondents, 170 were not declared IS majors, 36 were declared IS majors, 10 were considering an IS major, and 1 failed to respond to that question.

Table 2 reports our sample demographics by gender. In this table, we were surprised by the fact that the female respondents to our survey (1) were almost 2 years older than their male counterparts, and (2) had a (self-reported) 10-percent higher GPA. We are not sure what this means.

	Gender	Class	Mean Age	Mean GPA
Female	93	3.38	23.09	3.27
Male	124	3.26	21.00	3.00

**Table 2. Sample Demographics**

At the authors’ school, formal “advisement” is not mandatory, and many students become majors without identifying, or conferring with, a faculty advisor. Thus, we thought that “advisement” might play a role in selecting a major, and consequently asked students if they had a faculty advisor. Table 3 shows that approximately two thirds of our students had a faculty advisor—a percentage that appears to equally describe male and female respondents. But because the students at our university usually do not formally acquire a faculty advisor until *after* they have declared their major, the influence of a faculty member on a student’s choice of major is unclear.

	Advisor	None	Don't Know	Total	Advised
Female	58	20	15	93	62%
Male	80	27	17	124	65%

**Table 3. Advisor Status**

**3.2 IS Majors**

As noted above, we divided our sample into those students who had already committed to, or were considering, an IS major, and those students who had not so committed. The survey asked the IS students “If you are an information systems major or are considering becoming one, why did you

choose or think you might choose to become one? Please check all that apply.” Column 1 in Table 4 lists the possible reasons, and columns 2 and 3 show the percentage of male and female students who indicated that the factor in column 1 applied to them.

	Female	Male
Interesting Subject.	79%	65%
I am good with computers.	71%	78%
I expect to get a good job when I graduate.	57%	74%
My family members suggested the idea of majoring in information systems.	29%	13%
My friends suggested the idea of majoring in information systems.	7%	9%
I consider the field of information systems to be a good career choice for me.	79%	78%
I think there is good job security in the information systems field.	71%	61%

**Table 4. IS Majors (n = 36)**

The simplicity of our table perhaps detracts from its value. Again, the purpose of our survey was to identify those factors that are most likely to affect a student’s decision to major in a given subject. In this regard, the high percentages in selected rows of this table confirm what the literature suggests—that such factors as interest in the subject, high job expectations, congruence with a choice of careers, and the promise of good job security all appear to favorably influence the decision to major in information systems.

Perhaps the most important information in this table is what does not appear to impact a student’s decision to major in IS—in particular, the (lack of) influence of family or friends. For example, our results suggest that asking current IS students to “spread the word” about the IS major is not likely to yield much in the way of new recruits—students do not appear to be very receptive to such messages from peers. A similar conclusion might apply to “the influence of family.” This was also particularly useful information to our department. We planned to use scarce departmental resources for a mass solicitation mailing to the parents of potential IS majors, an effort our survey suggests is also not likely to yield large recruiting gains. Based on the results of our survey we abandoned this project.

At an alpha level of .05, the percentage differences between male and female IS majors were not statistically significant with one exception—the “influence of family members.” In our sample, 29 percent of the females indicated that family members suggested the idea of majoring in IS—over double the rate for males of 13 percent. Although this might be an avenue for recruitment, the fact that the percentage itself is small is, to us, an important counter-argument.

**3.3 Non-IS Majors--Personal Reasons**

It was equally important for us to discover why students were

not choosing to major in IS. Accordingly, we asked non-IS majors to answer a different set of questions than the IS majors—mostly questions relating to their personal and professional reasons for *not* selecting IS as their major.

To ascertain information about their personal reasons for not becoming an IS major, we asked “If you are not planning to major in information systems, why not? Please check all that apply.” Column 1 of Table 4 provides a list of possible answers to this question and columns 2 and 3 of the table show the percentage of male and female students who indicated that the personal factor in the first column applied to their decision to *not* major in IS.

In Table 5, the small influence of parents or friends in a choice of major provides further evidence that a mass mailing was probably not a good idea. A surprise for us was a similar lack of strength for such motivational factors as “difficulty with computers,” “unfamiliarity with the information systems field itself,” “difficulty of the IS major,” “concerns about a geeky self image,” or “hating computers.”

	Female	Male
I am not good with computers.	21%	11%
I prefer to major in something else.	89%	84%
I am not familiar with information systems or wasn't familiar with it when I chose a major.	29%	18%
My parents suggested that an alternate major would be better for me.	1%	3%
My friends think that alternate majors are better and I listened to them.	0%	1%
I think that information systems courses are more difficult than the courses in other UNR majors.	7%	10%
Majoring in information systems would make me look like a geek.	0%	2%
I hate computers and want as little to do with them as possible.	7%	4%

**Table 5. Non-IS Major Personal Reasons (n = 170)**

Of these results, the small percentages for both males and females for the question “I am not familiar with information systems...” was the most interesting. As a department, we considered changing our name from “Information Systems” to something containing the word “computers” in it to better increase our major’s visibility. Again, our survey directed us away from such an approach for the simple reason that “lack of understanding about the major” does not appear to be a strong detractor from the discipline. Seemingly, the only important personal factor motivating the choice of an alternate major appears to be the same reason that some students become IS majors—an interest in the (alternate) subject matter itself.

We found no statistically-significant gender differences in our sample results for non-IS majors. Thus, although almost twice as many females as males (1) thought that they were not good with computers, (2) were unfamiliar with the IS major, or (3) indicated that they “hated computers and wanted as little to do with them as possible,” the t-statistics

for these items of 1.85, 1.75, and .89, respectively, were not significant at the .05 level.

**3.4 Non-IS Majors--Professional Reasons**

Finally, the literature suggests that students sometimes choose their majors based on such perceptions of the profession as the inability to get a good job in the field or the (lack of) job security once in it. The first column of Table 6 lists examples of such concerns while columns 2 and 3 of the table report the percentage of male or female students selecting such choices.

Most of the percentages in this table are notable for their small size, indicating the surprisingly slight influence such concerns are to non-IS students in choosing a major. These “non-issues” included (1) concerns about job security, (2) fears that employers don’t understand IS, (3) fears that friends don’t understand IS, (4) concerns for losing jobs offshore, or (5) a lack of employment opportunities upon graduation.

	Female	Male
I do not think there is good job security in the information systems field.	3%	5%
Few employers really understand what the information systems discipline is about.	7%	6%
Few of my friends whose opinions I value really understand what information systems is about.	3%	7%
Job security in the information systems field is a problem because so many information systems jobs are moving off shore.	8%	4%
I do not think I could get a job in information systems when I graduate.	6%	6%
I do not consider the information systems field to be a good career choice for me.	77%	57%

**Table 6. Non-IS Majors Professional Reasons (n = 170)**

Again, these results were very useful to us. In prior discussions with potential student majors, for example, we tended to emphasize such things as “job security” or “job opportunities” because we thought such things mattered. We now know that, to our non-IS majors, they don’t. This finding contrasts sharply with the perceptions of IS majors.

The one professional item that did seem to matter to non-IS students is that they did not consider IS to be a good career choice for them. This result supports the findings for “personal reasons”—i.e., that they preferred to major in something else—but gives little direction in terms of recruiting efforts. Finally, we again found no gender differences in our results for this segment of our survey.

**4. DISCUSSION AND CAVEATS**

What additional prescriptive implications do these results have for those faculty members wishing to attract more IS majors to

their departments?

A partial answer to this question can be found in a comparison of the fixed answer portions of the survey above to the free-form answers to the questions concerning a choice of major *other than IS*. Tables 7-10 present some selected comments from students.

#### 4.1 Observations

Almost all IS majors indicated that they thought the subject was interesting, that they considered themselves “good” with computers, and that they felt there were good, secure jobs awaiting them.

The answers for students who had already chosen non-IS majors or who indicated they would **not** choose IS as a major were more interesting. As noted above, one surprise to us was the fact that students *do not* seem to be rejecting IS as a major due to job insecurity or financial reasons. We explicitly probed for concern about the off-shoring of technical jobs but only 5.5% considered this an issue in their decision. The lack of explicit concern with IS job security—a little over 6%—corroborated this finding. Early in the decline of IS majors, there was speculation among academics that off-shoring and the dot-com ‘bust’ had led students to consider IS a financially risky career choice (Brookshire, 2006; Panko, 2008). But this was not true for our study, possibly due to the relatively short time horizon of students. After all, the dot-com bust was nearly 10 years ago, and has likely been offset to a great degree by the considerable press coverage over the past several years of job shortages in the IT field.

However it does appear that IT continues to have an image problem and we have identified three distinct aspects of the issue. First, although many IS educators have been aware of the perception in a large segment of the student population of IS as a synonym for “programming” that would lead to purely technical jobs in windowless basement offices and have mounted campaigns to try to offset this image, it apparently remains strong. Table 7 contains some free-form comments about this.

A second facet of the image problem is the lack of understanding of what a career in IS does entail (as opposed to misperceptions of the career.) Almost 22% of our non-IS major respondents indicated they were not familiar with information systems when they chose a career. This is unfortunate, but a number of the comments we received indicate that recruiting and other IS education efforts might have immediate positive benefits. Comments such as those shown in Table 10 indicated that a number of students would have chosen IS as a major if they had understood what a career in the field actually involved.

The third facet of a negative IS image is the perception of effort involved in IS, both as a student and on the job. Over 11 % of the students who did not choose IS as a major indicated that they felt “. . . information systems courses are more difficult than the courses in the other UNR majors.” There are several paths to countering this perception in recruiting efforts. First, it simply isn’t true by any objective measure. This is not to say that IS courses are not rigorous, but rather that Accounting, Finance, and Supply Chain Management—to name only three—often have reputations for difficulty that rival or exceed that of IS. More disturbing to some of us (as educators) is the notion implicit in these

Don't want to be stuck behind a desk all my life
I prefer artistic thinking to logical thinking
I'm hiring someone else for IS purposes.
I like to work with people, not machines.
I want to work with people not computers
I would like to work with people not computers
It does not seem fulfilling enough for me

**Table 7. Comments about Job Image**

Basically I find computer based learning very draining and dislike the idea of working solely on a computer for the rest of my life.
Have no interest in being a computer tech guy my entire life
I think sitting around and making databases all day would get repetitious quite quickly.
Don't want a 9-5 job behind a computer.

**Table 8. Comments about a Lack of IS Career Understanding**

I heard that when your job is in IT, you always have to take additional classes, because computers are always improving and changing. I don't want to be taking classes for the rest of my life.
If I am mistaken about IT people constantly having to take classes, then I would definitely want to major in IS.
Information systems seems more like a blue collar career. I know many people who work in IT who don't have college degrees. You also must constantly train yourself in new technology for the rest of your career.
IS is a good field to major in, and I could have majored in IS, but it seems the higher level courses are tricky and I don't think I would have the patience to do computer programming.

**Table 9. Student Comments about Continuing Education**

I wish I would have considered IS sooner.
Had I been more aware earlier on about the field of I.S., I might have decided to study it. Perhaps I will major in it in the near future.
IS 301 is definitely interesting and makes me want to learn more.
I chose my major before I decided that I liked it. It is too late...

**Table 10. Comments about Regrets**

comments and counts that many students are interested only in certification and not in education per se. Several students stated that employers only want to see a business degree, and that the area of study was largely irrelevant! This might be a fertile area for future inquiry.

Also disturbing and somewhat surprising to us was the negative light in which students viewed “continuing education.” Some students singled out IS as more likely than other majors to require continuous training after graduation to stay current in the field, and considered this to be a negative factor! The comments shown in Table 9 indicate either a general confusion with respect to life in the 21<sup>st</sup> century job market (where continuous training is likely to be a fact of life), or a mistaken sense that IS demands more ongoing job training than other fields. This misapprehension could be countered by properly-designed recruiting efforts.

In reflecting on this and similar studies, there is good news and bad news about changing perceptions of IS. The good news is that with more research similar to that just described, more students with an interest in the intrinsic aspects of IS can be recruited to the field. The bad news is that since many perceptions are culturally-based, they are out of our control. Even though IT jobs are coming back, the dot-com bust took away from the profession something possibly even more valuable—its image. For a brief, shining moment during the dot-com boom, IS was cool, it was entrepreneurial, and it was where the action was. Students wanted to be a part of that, even though we now know that few of them had a realistic vision of what was involved. Unrealistic starting salaries helped nurture that vision. But no longer and there is little we can do to re-establish that pervasive image of techno-cool.

#### **4.2 Caveats**

There are many reasons why the findings and interpretations presented here should be treated carefully. Perhaps chief among them is the limitations of any survey instrument—for example, the fact that the participants in our survey were the students enrolled in only one class at one university in the US. In addition, and compared to “traditional students” at four-year programs of major universities, most of them (1) tend to be older, (2) work more hours at outside jobs during the semester, (3) take longer to graduate, and (4) may have different attitudes and aspiration levels. We also note that most of our survey participants were business majors and we recognize the possibility that the decision process for choosing a *business major* may differ from that of non-business majors. These factors make comparisons to other empirical investigations difficult.

We conducted our survey in the Spring of 2008, during a downturn in the U.S. economy. The authors feel that this may also explain why students in such conditions might prefer more “recession-proof” majors such as “accounting” or “finance” to disciplines that appear to be more vulnerable to negative economic conditions.

Finally, we recognize that our survey did not directly gather information about every possible factor that might influence a student’s choice of major. We don’t know, for example, whether TV or web-based advertising, the opinions of local or national politicians, or even a “desire to help people” had any effect because we did not directly ask

questions about such matters on our survey. We did our best to identify the most salient influences on the decision-making process of our students from prior literature. We also recognize that the choice of major may hinge on one defining factor and that we missed it for any one individual.

#### **5. SUMMARY AND CONCLUSIONS**

Filling the pipeline for IT professionals would appear to be a win-win for IS faculty and IT employers. IS faculty stand to gain new enrollments in under-subscribed classes, while IT employers are better able to train and/or recruit needed personnel from domestic university “suppliers.” But how can IS faculty best recruit the students needed to fill such pipelines?

The authors conducted a survey of over 200 students in an MIS class required of all business students to answer this question. The findings from the “fixed” portion of our survey suggest that “natural interest” in the subject matter and the importance of increasing student awareness of the field early in his or her “life” at a university are important. Conversely, the influence of family, friends, or “concerns about the profession” appear to be of negligible consequence in this choice.

We also feel that we learned as much or more from the student comments in our survey as we did from the survey itself. These comments suggest that what we can do to provide information in our recruiting efforts to directly contradict the misperceptions shown in this and other studies, including such ideas as: (1) IS is only about computers, (2) IS is only about programming, (3) IS has no opportunities for growth into high-level executive positions, (4) IS offers no opportunities for creative thought, and (5) IS requires a disproportionate amount of after-college training. Future research might include these ideas and examine intervention programs.

By continuing to stress, as most of us have, the people-oriented side of IS—in requirements gathering, project management, coordination with contractors and other “softer” aspects of the profession we present IS as an appealing option to those students who seek creative interaction with others as a part of their jobs. By showing the senior management levels IS has achieved with CIO and CTO positions we dispel the myths of the IS worker as a cubicle-bound low-level technician. And, simply by presenting the realities of coursework and ongoing training in virtually any career—accounting, finance and supply chain management are three that come readily to mind—we can help dispel the perception that IS requires a greater-than-average amount of effort.

Of course, we need to be careful to continue to present those aspects of the full field of IS that *do* call for concentrated analytic abilities and/or require close work with computers and other hardware. A significant number of the people who have and will continue to be attracted to the field do so precisely because it affords—as options in a very broad field—the chance to spend more time thinking and working with hardware and software than time spent in meetings or working with people in general.

When the results of this study, which point to more effective recruiting programs, are combined with the already

significant and increasing results from our existing IS recruitment programs, the future of the major looks brighter than it did only a few years ago. When speaking with colleagues at IS conferences, we see that our IS program is one of many currently on the rebound. While we may never see "IS" as the most numerous major in our college of business, we believe we have a better understanding of why the decrease in enrollments occurred, and how to keep our programs strong and viable in the future.

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APPENDIX 1 – SURVEY

## IS Student Survey

### Questions about you:

Welcome to the Information Systems major survey.

**I am willing to participate.**

- Yes  
 No

**What section of IS301 are you taking?**

- IS 301 001  
 IS 301 002  
 IS 301 003  
 IS 301 004  
 IS 301 005  
 IS 301 006

**What is your class standing?**

- Freshman (0-30 credits)  
 Sophomore (31-60 credits)  
 Junior (61-90 credits)  
 Senior (91+ credits)  
 Graduate Student (already have a degree)

**What is your gender?**

- Male  
 Female

**What is your current age in years as of today?**

**What is your overall current grade point average (GPA)?**

### Questions about your major:

## IS Student Survey

### Do you have an advisor?

- Yes  
 No  
 Don't Remember

If you answered yes, what is your Advisors Name

### Which of these best describes your choice of a major at UNR? Pick one choice below.

- I have already chosen a major in information systems.  
 I am considering majoring in information systems, but have not committed to this idea yet.  
 I have already committed to a major other than information systems.  
 I am considering other majors but have not committed to one yet.

## IS major or considering an IS major

### If you are an information systems major or are considering becoming one, why did you choose or think you might choose to become one?

#### Check all that apply.

- Interesting subject.  
 I am good with computers.  
 I expect to get a good job when I graduate.  
 My family members suggested the idea of majoring in information systems.  
 My friends suggested the idea of majoring in information systems.  
 I consider the field of information systems to be a good career choice for me.  
 I think there is good job security in the information systems field.

Other (please specify)

## Not planning to major in IS for personal reasons

## IS Student Survey

**If you are not planning to major in information systems, why not? Here are some personal reasons that might apply to you.**

**Please check all that apply.**

- I am not good with computers.
- I prefer to major in something else.
- I am not familiar with information systems or wasn't familiar with it when I chose a major.
- My parents suggested that an alternate major would be better for me.
- My friends think that alternate majors are better and I listened to them.
- I think that information systems courses are more difficult than the courses in other UNR majors.
- Majoring in information systems would make me look like a geek.
- I hate computers and want as little to do with them as possible.

Anything else? Please indicate so here.

## Not planning to major in IS for professional or career reasons

**If you are not planning to major in information systems perhaps you also have some professional or career reasons.**

**Please check as many of the following that apply to you.**

- I do not think there is good job security in the information systems field.
- Few employers really understand what information systems is about.
- Few of my friends whose opinions I value really understand what information systems is about.
- Job security in the information systems field is a problem because so many information systems jobs are moving off shore.
- I do not think I could get a job in information systems when I graduate.
- I do not consider the information systems field to be a good career choice for me.

Anything else? Please indicate so here.

## Additional comments

**Use this space for additional comments**



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All papers published in the Journal of Information Systems Education have undergone rigorous peer review. This includes an initial editor screening and double-blind refereeing by three or more expert referees.

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