

Salient Beliefs in Majoring in Management Information Systems: An Elicitation Study

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Abstract

Research utilizing the Theory of Planned Behavior to understand behavior should first elicit beliefs about the phenomenon from the target population. In order to understand the reasons why students choose to major or not major in Management Information Systems (MIS), we elicited beliefs from 136 students attending university in the United States and in Zambia. We employed a questionnaire with open-ended questions to elicit beliefs about majoring in MIS. The gender split of study participants was 52%-48% with a female majority and their ages ranged from 19 to 35. Using content analysis of the generated qualitative data, we identified 11, 5 and 9 categories of behavioral, normative and control beliefs respectively. The results of our study indicate that student beliefs about the MIS major and profession have changed over the past decade; students now favorably perceive the MIS job market and attach importance to the opinions of industry professionals when making the decision to major in MIS. Analysis of the ranked elicited beliefs shows that most students believe that the MIS degree grants them competitive advantage in the employment marketplace.

Keywords: enrollment, management information systems, elicitation study, theory of planned behavior, information systems major, career

1. INTRODUCTION

Declines in enrollment into Management Information Systems (MIS) programs in the United States and elsewhere are well documented (Becerra-Fernandez, Elam & Clemmons 2010; Calitz, Greyling & Cullen, 2011; Huang, Greene & Day, 2008; Zhang, 2007). The implications of declining enrollments are many and varied: first, since Information Technology (IT) is a driving

force for growth in advanced countries, if the decline continues, then the US risks falling behind other countries in technological development, to the detriment of the whole economy. Indeed, labor surveys show a dire shortage of skilled technology professionals worldwide (Manpower Group, 2012). Second, enrollment declines have a negative effect on business schools' tuition revenue, a situation that significantly impacts university operations since tuition is the primary

revenue source for most universities (InsideHigherEd, 2013). Certainly, sharp declines in enrollment at some business schools have led to closure of their MIS departments (Aken & Michalisin, 2007). Last, declines in MIS enrollment affect graduates of MIS doctoral programs by shrinking their employment opportunities. Because declines in MIS enrollment have such dire consequences, it is important to understand the factors that influence a student's decision on whether to major in MIS.

Although various studies have been conducted to investigate the underlying causes of declining MIS enrollment, few studies have elicited input from prospective enrollees. By relying exclusively on influences garnered from the existing literature, studies that aim to understand why MIS enrollment rates are in decline may fail to capture newly emerging explanations for the phenomenon. In addition, certain influences that were major driving factors behind students' decisions in the past might have lost their potency with time. As such, a major thrust of our research study has been to learn from prospective MIS enrollees concerning the possible factors that lead them to make the decision whether to major in MIS. We employed the elicitation survey instrument that serves as input for the Theory of Planned Behavior (TPB) (Ajzen, 1985) in order to collect the most salient beliefs about MIS from students. This way, we can detect new beliefs that have gained salience in more recent years and might not be found in the existing literature. Moreover, utilizing an elicitation survey allows us to rank the beliefs and hence gain an understanding as to which beliefs are more instrumental in influencing the student's decision to major in MIS. Finally, our approach allows us to identify the most prominent social referents that influence the decision to major in MIS.

Our study is unique in that it is not limited to the United States; we also elicited beliefs about MIS from students in the Southern African country of Zambia. Since the Zambian government recognizes the role of IT in the transformation of its economy (ZICTA, 2009), the country will require educated MIS professionals to fuel the transformation process. Gathering beliefs about majoring in MIS from Zambian students should provide clues on which beliefs are likely to influence student enrollment in MIS in a developing country.

Our findings indicate that the most frequently cited beliefs about MIS are positive. However, and perhaps paradoxically, students report more barriers that make majoring in MIS a more difficult decision than the pull factors that make it an easier decision.

In the following sections, we present the theoretical foundation for our study followed by a discussion of the method of data collection, analysis, and results of the analysis. We conclude by discussing the research contributions and limitations.

2. THEORETICAL FOUNDATION

An extension to the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), the TPB aims to explain the link between the intention to perform a stated action and the actual behavior that proceeds from the intention. Like the TRA, the TPB asserts that an individual's attitude towards a behavior and perceived subjective norms (external pressures to perform a behavior) both influence the intention to perform a certain behavior. Unlike the TRA however, TPB contains an additional construct, the perceived behavioral control (PBC) of the individual. PBC is the individual's belief that she is able to perform a certain behavior. PBC is important because certain behaviors are not under an individual's complete volitional control; such behaviors might require additional resources that are beyond the reach of the individual.

Students' intentions to enroll in MIS have been investigated under the lens of the TRA, most notably in a study by Zhang (2007). As Zhang (2007) explains, a student with a favorable attitude towards MIS is more likely to enroll in MIS than one who does not have a favorable attitude. Moreover, if a student's social influences are supportive of the student's decision to enroll in MIS, then the likelihood that the student will do so increases. However, Zhang (2007) discounts the possibility that students might not have full control of the decision to enroll, as he asserts that the decision to major in MIS is one that students can make of their own volition. That assertion might not hold under all circumstances, however, because a student might want to enroll in MIS and might not be able to afford it. In developing countries such as Zambia, lack of access to computers might prevent a student from majoring in MIS. Furthermore, a student might feel that the MIS major is difficult relative to other

majors. Indeed, previous studies have shown that the perceived difficulty of a major is a barrier to its enrollment (Noble Calkins & Welki, 2006; Saemann & Crooker, 1999) and that this is especially true of MIS (Locher, 2007). These barriers indicate that enrolling in MIS is a decision that might not be completely under the control of a student. Therefore, we feel that PBC is a valid construct that can explain additional variance for the intention to enroll in MIS.

To examine behavior using the TPB an elicitation survey completed by a subset of participants prior to creating the final survey instrument is recommended (Ajzen, Nichols & Driver, 1995; Sutton, French, Hennings, Mitchell, Wareham, Griffin, Hardeman, & Kinmonth, 2003). However despite the prevalence of studies that utilize the TPB/TRA theoretical framework, few of them actually conduct an elicitation survey (Sutton et al., 2003). This elicitation stage is important because it allows for the identification of cognitive and affective salient beliefs resident in the phenomenon under investigation, hence forming a foundational stage of TPB research (Ajzen et al., 1995). Specifically, respondents are surveyed on three aspects of their beliefs: behavioral, normative, and control beliefs. Behavioral beliefs indicate whether an individual holds a favorable view of the behavior under investigation. Normative beliefs measure the social pressure that an individual feels to perform that behavior. Control beliefs assess how much control the individual feels she has over the decision to perform the stated behavior. Therefore, in the context of understanding students' decision to major in MIS, our study aims to uncover students' attitudes towards the MIS major, their perceptions of sources of social pressure and the amount of control they feel they have over the decision to major or not to major in MIS.

3. METHOD

We elicited beliefs from the general population of students enrolled in business classes at two private universities in the US and Zambia. We solicited responses by enlisting the help of professors who offered extra credit to their students as incentive for completing the survey by a specified date. The approximately 90% response rate was satisfactory and as such, we did not send reminders to potential respondents. Participants entered their student IDs on the survey. These IDs were sent to professors to assign extra credit points; however the IDs were not used in our analyses nor were responses sent

to professors, all in order to maintain anonymity. Our questionnaire employed questions formulated by Ajzen and Fishbein (1980) and Ajzen and Driver (1991), but modified to suit the context of our study. The questions evaluated students' behavioral, normative and control beliefs concerning the decision to major in MIS. For the behavioral beliefs, we did not restrict our study to cognitive beliefs, but we also elicited affective beliefs from our respondents. For example, for eliciting the positive cognitive beliefs about majoring in MIS we asked: "What are the advantages of majoring in MIS?" For the positive affective question we asked: "What do you like about majoring in MIS?" We include the complete set of elicitation survey questions in Appendix A.

Responses were elicited in an open-ended format that allowed respondents to freely articulate their beliefs concerning majoring in MIS. For each question we included five response lines for respondents to fill in as prior research has shown that few respondents supply more than five beliefs (Sutton et al., 2003).

For all questions, an initial round of coding was undertaken on a subset of the data using content analysis to uncover themes within the data, resulting in categories into which responses fell. We proceeded to code the full response set based on the identified categories. Two researchers independently coded the full set of response data; the inter-rater reliability was 90%.

4. RESULTS

Out of 136 returned surveys, 110 were usable. There was a gender split of 52%-48% with a female majority with ages ranging from 19 to 35. Up to 75% of the respondents identified their socio-economic status as upper middle class, 16% as upper class and 9% as lower middle class. The college level breakdown was as follows: 34% freshman, 23% sophomore, 30% juniors and 13% seniors. We summarize the demographic information of the respondents in Table 1 of Appendix B.

We show the descriptive statistics of the results in Appendix B, Table 2. Cohen's kappa (Cohen, 1960), which measures the rate of agreement whilst discounting the agreement due to chance between independent raters of categorical data in qualitative analysis, varied from 61% to 100% for the different questions. Using the Fleiss (1981) benchmarks, inter-rater agreement was good in

43% of the categories and excellent in the remaining 57% of categories.

We carried out an independent samples t-test in SPSS to find out if there were any gender differences in the number of responses supplied per individual. We found no significant gender differences except in the category of advantages of majoring in MIS; on average, female respondents supplied more advantages than male respondents; the difference was significant at the 10% level.

The following subsections describe the results of our analysis in detail.

Behavioral beliefs

Many of our elicited behavioral beliefs are consistent with previous IS career choice studies. Students perceive that MIS bestows competitive advantage; 84% of respondents mentioned competitive advantage as a motivator for enrolling in MIS. These students recognize that attaining a job is a competitive endeavor that requires them to acquire assets that set them apart from other job seekers. Specifically, students commented that majoring in MIS *"looks good"* on a resume and *"(helps one) stand out from other graduates."* The competitive advantage perceived by students was not limited to just the job application phase. According to one participant, enrolling in MIS would give an employee *"an advantage against other employees."* This suggests that MIS is perceived to be beneficial even beyond the job attainment milestone as it grants employees increased chances for upward mobility in the future. However, our elicited beliefs indicate that perceived competitive advantage may not extend to under-developed countries as exemplified in a comment from a Zambian study participant bemoaning the job situation in her country: *"There are few jobs for IT in Zambia."*

Furthermore, MIS is perceived as relevant for today's world. Over 80% of respondents identified technical skill acquisition as an advantage accrued from majoring in MIS. Some of the responses that fell in this category emphasized the increasingly vital role of information technology in advancing businesses in different industries. As one respondent stated: *"(an advantage of enrolling in MIS is the) ability to use information received about operations to improve the company."* Technology use was also a prominent theme in this category. Multiple responses were exemplified by this one quote

regarding an advantage of majoring in MIS: *"Ability to not worry whether I would be able to use technology in the work place."* Students therefore associated majoring in MIS with gaining a skill that is not only useful for performing work tasks, but one that also alleviates anxiety stemming from using unfamiliar technology.

Our study revealed that MIS is perceived to be a high salary industry that affords employees sufficient job security. Forty percent of respondents described the salary earned by MIS professionals as *"good"*, *"high"* or *"competitive"* and therefore an advantage of majoring in MIS. Personally-rewarding factors, such as the perception that in MIS, *"(there are) always new things to learn"* and the view of the MIS profession as *"fun (and) entertaining"*, also emerged as encouraging factors for adopting the MIS major; these personally-rewarding factors were mentioned by 34% of respondents. In addition, work environment factors, mentioned by 12% of respondents, such as *"(the ability to) work from home"* and *"(working with) smart people"* emerged as positive motivators for studying MIS.

On the other hand, some elicited beliefs suggest MIS suffers from an image perception problem. Three in every four respondents mentioned common negative perceptions of the major that might discourage students from enrolling. Respondents spoke of the perceived *"nerd stereotype"* and *"little human interaction"* associated with MIS professionals, or that the major is boring and *"It's hard ...to get excited about."* In addition, respondents characterized the work environment for MIS professionals as *"high stress"* and *"too sedentary."* These perceptions of MIS are likely to strongly discourage enrollment.

Moreover, there exists a pervasive perception that MIS is difficult. Multiple responses mentioned by 75% of respondents articulated how challenging the major is. Many answers in this category succinctly described the MIS major with the synonyms *"hard"*, *"tough"* and *"challenging."* A more descriptive response was the following: *"(MIS has) core classes that might be beyond my capabilities."* Other responses hinted at what is difficult about MIS: *"MIS seems like sometimes it would be difficult to understand because it deals with so much technology."* This fits with another category of disadvantages of majoring in MIS; almost 30% of respondents identified *"programming"* or *"coding"* as a reason for not

enrolling in MIS because *"learning to program can be difficult."* Indeed, it seems that MIS and programming are indistinguishable in the minds of many students.

Majoring in MIS is perceived as time consuming. Perceptions such as *"too many classes"* required for graduation and classes that entail *"spending long hours on assignments"* were prevalent. Forty-six percent of study participants felt that enrolling in MIS required more classes than the average as exemplified by this response: *"(MIS requires) more classes to take so it would be more expensive (than other majors)."* Furthermore, enrolling in MIS is perceived to limit time available for other activities because students perceive that the major requires *"lots of time outside of class working on the material."* There was also a perception articulated by 44% of respondents that the cost of learning technology would persist beyond school since keeping up with new technology developments requires significant ongoing effort. As two respondents stated, *"(in MIS) knowledge becomes outdated easily"* and *"IT is evolving, so the information may not be relevant in the future."* Students might potentially feel that investing many resources into a rapidly changing field is not worthwhile.

Lack of interest also discourages students from majoring in MIS. Over 40% of the respondents mentioned that they simply were not interested in the MIS field or that they had passion for other majors. Sample responses in this category included *"I am not very interested in technology"*, *"I don't enjoy the subject"* and *"(I) couldn't major in finance (if I majored in MIS)."* These responses suggest that for many students, MIS is a boring major that inspires little excitement and is thus not feasible as a profession. Table 3 of Appendix B summarizes the most salient behavioral beliefs about MIS.

Subjective norms

Subjective norms refer to sources of societal influence that are instrumental in the decision-making process of an individual, given a set of choices. Five broad groups of social referents emerged as influential in the decision to enroll in MIS: career counselors, educators, MIS professionals, friends, and family. Just over 70% of participants indicated that the opinions of family members are instrumental in the decision to major in MIS. Sample answers in the family category included *"parents"*, *"sister"* and *"grandpa(arent)."* For the friends' category,

responses ranged from *"friends"* and *"boyfriend"* to *"fraternity friends"* with explicit names of fraternities and sororities suggesting that the decision to major in MIS can be influenced even in the college years. Our study elicited a referent not often cited in previous studies: MIS professionals. Over 20% of participants indicated that exposure to MIS professionals have an impact on their decision to major in IS. The opinions of high school career counselors also influence the decision to major in MIS, as shown by the 15% of respondents who mentioned them as instrumental in the decision making process. We present the summary statistics for subjective norms in Table 4, Appendix B.

Perceived Behavioral Controls

Several responses to the control questions echoed the answers to the belief questions. Respondents stated that *"the average starting salary of MIS majors"* and *"more job opportunities"* in MIS make it easier for an individual to enroll in MIS.

Conversely, the perceived time-consuming nature of the MIS major appears to be a personal cost that makes the decision to major in MIS harder. Unsurprisingly, therefore, 46% of respondents stressed that if MIS required less additional effort than other majors then perhaps students would be more willing to major. However, additional insight not emphasized in previous research was gathered from responses to the control questions. For example, 12% of respondents mentioned the presence of a support system as a pull factor to majoring in MIS. As one respondent stated *"my parents would support me (in this decision)."* Also falling in the support system category was availability of tutors and tutorials, convenient (or lack of) access to computers, and the availability of *"good MIS professors"* who would make the decision to major in MIS easier. The latter response echoes the family and educators categories of the previous section and therefore represents an overlap between the control and normative beliefs. Seven percent of respondents mentioned that MIS affords students valuable experiences such as *"getting to learn new things."* Finally, majoring in MIS seems to grant students the ability to distinguish themselves from others as evidenced by this response: *"(MIS allows me to) distinguish myself from other students."* These factors make the decision to major in MIS easier. On the other hand, low self-efficacy in the form of students feeling that they did not have the intellectual ability to succeed in the MIS major,

was mentioned by 38% of participants as a significant deterrent to majoring in MIS. Moreover, Zambian participants mentioned the lack of access to computers and reliable Internet as significant deterrents to majoring in MIS. The summary of results is shown in Table 5, Appendix B.

5. DISCUSSION: CONTRIBUTIONS AND IMPLICATIONS

This study contributes to our understanding of why students choose to major or not major in MIS. First, our study reveals several new beliefs found by eliciting beliefs from students rather than drawing from the currently documented beliefs in extant literature. Prior studies identified concerns over job availability for MIS graduates as a major contributor to declining enrollment in MIS (Foster, 2005; Lomerson & Pollacia, 2006; Mahmoud, 2005). Furthermore, a widespread perception that IT jobs are moving offshore also discouraged students from majoring in MIS (Foster 2005; Locher, 2007). However, our study shows that students currently hold a more favorable perception of the MIS job market; MIS is now viewed as a major that affords its graduates many job opportunities. In fact, 84% of respondents mentioned that the MIS major grants its graduates sufficient job security and competitive advantage in the marketplace. Clearly, students' perception of MIS jobs' availability has sharply changed over the past decade.

Second, our study reveals new beliefs concerning external influences on the decision to major in MIS. Past studies have identified the opinions of family, educators (Zhang, 2007), friends (Downey, McGaughey & Roach, 2009) and career counselors (Noble Calkins & Welki, 2006) as contributory factors in the decision to major in MIS. Our findings largely confirm these influences to be valid, but we also found an influential group that was largely unexplored in the literature. More than 20% of respondents mentioned that the opinions of MIS professionals also influence the decision to enroll in MIS; this group actually emerged as the third most influential, surpassing even the influence of educators and career counselors. The belief that the opinions of MIS professionals matter in the decision to major in MIS might reflect the fact that technology professions are gaining prominence; students might actually personally know more MIS professionals than was the case in the past. As a result, inviting MIS professionals to speak to

students in high school in class or at career fairs might create a favorable impression of the MIS profession and hence improve student enrollment into the major.

Third, eliciting beliefs regarding control in the decision to major in IS found that access to support systems is an increasingly important factor in deciding to major in MIS. Thus departments should be encouraged to develop a consistent supply of tutors and offer access to tutorials to ensure potential majors feel that ample resources are available for success.

As a fourth contribution, we have presented a ranking of the most salient beliefs about MIS that students possess. Previous studies identified various factors that influence enrollment into MIS programs, but few of them explore the relative importance of each factor. If we take the percentage of respondents that expressed a particular belief as a proxy for salience of that belief, then our study shows that certain beliefs are more salient than others. By this measure, the most alluring reason for enrolling in MIS is the competitive advantage that the major grants its graduates in the employment marketplace. The second most-cited advantage was the acquisition of technology skills. This finding is important in that it supports the encouragement of MIS as a complementary second major for many business students. On the other hand, the image of MIS as a profession that involves little to no human interaction emerged as the single most salient factor that discourages enrollment into MIS; hence underscoring the caricature of the MIS profession as entailing little more than sitting behind a desk and staring at a computer screen for hours on end. Closely trailing the human interaction factor is the perceived difficulty of the MIS major, which has already been identified in prior studies as a significant deterrent to majoring in MIS (Locher, 2007). Required preparatory classes in MIS at the high school level could help remedy the perception that the MIS major is difficult.

Given the many favorable views expressed by students about the MIS major, the question then arises why MIS enrollment rates keep declining. Since our study included students from a variety of majors, we can conclude that positive views about MIS are not limited to MIS students, but persist throughout the population of college students. However, since these views are not translating into increased enrollment in MIS programs, it is possible that students only

become aware of the MIS major and its positive characteristics after starting college. At that stage, students might already have made the decision to enroll in other majors, suggesting that the high school preparation phase is influential in the decision to major in MIS. Another explanation is that the unfavorable characteristics of the major simply outweigh its favorable attributes in importance to the students, resulting in students adopting other majors. As has been shown in various studies, the existence of a negative belief towards a particular behavior may prevent its subsequent performance (Darker, Larkin, & French, 2007; Hancock, 2013). For example, a student might be attracted to MIS because of the high starting salary but at the same time be repelled by its perceived difficulty. Therefore MIS educators and career counselors should focus not only on highlighting the positive aspects of majoring in MIS, but also on transforming the negative perceptions that plague the major to positive perceptions (Sutton, 2002). If the major is perceived to be difficult, for example, educators and counselors may explain to students that difficult majors are more prestigious, have less competition for jobs and therefore award higher salaries than easier ones. Moreover, since students explained that the difficulty in MIS stems from its programming component, educators and counselors may clarify that MIS encompasses much more than just programming, and that MIS professionals are not limited to just writing code. In this manner, a previously perceived disadvantage could now be seen as an advantage.

The rapidly changing nature of MIS relative to other fields imposes a cost that discourages enrollment into the major. An often-mentioned observation by our study participants is that new programming languages emerge frequently and MIS professionals therefore need to be in a constant state of learning, a requirement that is limited to only a few majors. This stands at odds with other more traditional majors, where students go to college, graduate with a bachelor's degree and at that stage they would have fulfilled the bulk of their learning requirements. With the cost of learning persisting beyond school, it is little surprise that many students who might otherwise be willing to major in MIS would be deterred from doing so. However students can be informed that many top-tier professions such as accounting, law, medicine, etc. require ongoing learning of their professionals.

Finally, our analysis suggests differences in beliefs between study participants in the US and

Zambia. Whereas American participants highlighted job availability as an advantage of majoring in MIS, some Zambians expressed concern that the availability of IT jobs is limited. There seems to be a gap between the Zambian government's expressed vision for the role of IT in transforming its economy and students' perception of that vision. Furthermore, some Zambian respondents mentioned the lack of computers and Internet access as an inhibitor for MIS education, a concern that was not articulated by even a single American participant. A Zambian majoring in MIS therefore incurs higher cost than her American counterpart since it's more difficult for her to obtain a computer and Internet access. Consequently, Zambians may feel less control over the decision to enroll in MIS than their American counterparts. In order to encourage student enrollment in MIS in Zambia and similar countries, reliable computing and Internet infrastructure will have to be available in schools.

6. CONCLUSION: LIMITATIONS AND FUTURE WORK

Our study has limitations: our sample of respondents is wealthier than the general population, presumably because our subjects all attend private universities in both Zambia and the US. Moreover, 43% of respondents were at the junior or senior levels of college. Wealthy and educated respondents could be more aware of MIS. To address these limitations, future work could survey a sample that is more representative of the general population by including students from public universities. Furthermore, our Zambian sample was disproportionately smaller than its American-based counterpart; this limits our ability to make generalizable comparisons between students based in these two nations. Nonetheless, we found it useful to highlight responses from the Zambian respondents so that we can acquire an understanding of which factors influencing the decision to major in MIS may differ between the two countries. Finally, future work could fulfill the purpose of eliciting salient beliefs and use the results of the elicitation stage to conduct a full study that investigates enrollment in MIS under the TPB framework.

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Appendices and Annexures

A. Survey Questions: Elicitation Survey for Identifying Reasons Why Students Choose to Major in Management Information Systems

1. a) What is your age?
b) What is your gender?
c) What is your college classification? (Freshman/First Year, Sophomore/Second Year, Junior/Third Year or Senior/Fourth Year)
d) What's your city and state of origin?
e) In what socio-economic group would you describe yourself? (Lower, Lower- Middle, Upper-Middle, Upper)
2. What do you believe would be the *advantages* of you majoring or double-majoring in MIS?
3. What do you believe would be the *disadvantages* of you majoring or double-majoring in MIS?
4. What would you *like or enjoy* about majoring or double-majoring in MIS?
5. What would you *dislike or not enjoy* about majoring or double-majoring in MIS?
6. What *thoughts* come to your mind about a major or double-major in MIS? (book)
7. Are there any individuals or groups who would think that you *should* major or double-major in MIS?
8. Are there any individuals or groups who would think that you *should not* major or double-major in MIS?
9. If any such individuals or groups come to mind if you considered majoring or not majoring in MIS, please *list them* below. (book)
10. What would make it *difficult* for you to major or double-major in MIS?
11. What would make it *easy* for you to major or double-major in MIS?

B. Tables

	Category	Frequency	Percent of Sample
Gender	Female	57	52%
	Male	53	48%
College Level	Freshman	37	34%
	Sophomore	25	23%
	Junior	33	30%
	Senior	15	13%
Socioeconomic Status	Lower Middle	10	9%
	Upper Middle	82	75%
	Upper	18	16%
University	American	106	97%
	Zambian	3	3%

Table 6: Demographic Information

Beliefs	Question	Total Beliefs	Mean (SD) beliefs per person	Percent of people who gave 3 or more beliefs	Cohen's Kappa
Behavioral (attitude towards major)	Like or enjoy	263	2.39 (1.64)	39	0.86
	Advantages	384	3.49 (1.41)	77	0.70
	Dislike or hate	206	1.87 (1.72)	29	0.61
	Disadvantages	252	2.29 (1.78)	39	0.75
Control (barriers, facilitators)	Easy	180	1.64 (1.39)	20	0.81
	Difficult	216	1.96 (1.46)	13	0.85
Normative Referents	Individuals, Groups	146	1.42(1.67)	21	1.00

Table 2. Descriptive Statistics for Elicited Beliefs

Category	Number of Respondents	Percent of Respondents
Competitive Advantage	92	84%
Acquisition of Technical Skills	90	82%
Negative Image	83	75%
Difficult classes	82	75%
Time-consuming	51	46%
Constantly-changing technology	48	44%
Lack of interest	47	43%
High salary	43	39%
Personally Rewarding	37	34%
Difficulty with programming	31	28%
Positive work environment	13	12%

Table 3: Behavioral Beliefs

Category	Number of Respondents	Percent of Respondents
Family	24	71%
Friends	14	41%
MIS/IT Professionals	7	21%
Advisors	5	15%
Educators	2	6%

Table 4: Normative Beliefs

Category	Number of Respondents	Percent of Respondents
Time-consuming	66	64%
Too much additional effort	47	46%
Lack of interest	39	38%
Lack of ability/self efficacy	39	38%
Job opportunities, placement	20	21%
Individual Support system	12	12%
Valuable experience	7	7%
Distinguish from others	6	6%
High salary	4	4%

Table 5: Control Beliefs