

Reasoned Action Analysis Theory as a Vehicle to Explore Female Students' Intention to Major in Information Systems

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ABSTRACT The low number of female enrolees in computer-related fields such as information systems, information technology and computing sciences does not match the increasing IT related jobs – thus creating a gender imbalanced workforce in a field that has become ubiquitous. This paper examines the factors why female students do not major in information systems and suggests possible solutions. The researchers used a behavioural model based on the theory of reasoned action and a survey of the students enrolled in a bachelor of commerce degree to help them answer the fundamental question “what factors influence female students to major, or not, in information systems?” Multiple regression analysis was used to predict the intention to major in IS. The study found that a “genuine interest in IS” and the “perceived self-efficacy” most account for a woman’s decision to major in information systems. Equally important are those reasons that students gave why they did not pursue IS, including such matters as “unfamiliarity with the field prior to university” or “the perceived difficulty of the subject”. Implications for practice are explained.

INTRODUCTION

It is widely recognised that despite the pervasive nature of computing and the growing need for Information Technology (IT) and Information Systems (IS) professionals in the work place, women are still not well represented. In a number of other professions and disciplines there has been an influx of woman in the workplace as well as at higher education institutions (Willyard 2011; Elmer 2013; Ratcliffe 2013). It has been found that women outnumber men on most courses offered at universities (Ratcliffe 2013). At this institution in which the study was carried out, female and male students made up 58% and 42% respectively of the total student population – a situation that is not too dissimilar to most institutions globally. More specifically, the Business degree programmes have recently attracted more female students. However, female students are still underrepresented in the field of computing, including Information Technology, Information systems and Comput-

er Science. Not only is there generally significantly less demand for Computer related courses for both genders but there has also been a further decline in female student enrolment compared to male students (Glass 2012). Ratcliffe (2013) affirmed that there is a large gap in the enrolments for Information Systems majors between male and female students. This gap poses a serious threat to the future of the discipline in terms of gender equality in the work place and human resource needs (Stockdale and Stoney 2007). The purpose of this study is to investigate the factors causing this phenomenon in the present context and an attempt to reverse the situation.

Literature Review

A number of computer related courses exist that may be classified into three main categories, namely, Computer Science, Information Technology (IT) and Information systems (IS). Computer Science is mainly concerned with computer algorithms and programming. IT is concerned with computer networking and hardware, and Information Systems is mainly concerned with the enablement of using technology to enhance business decisions (Henwood 1999). Most studies have used the concept of IT interchangeably when referring to all computer related disciplines. In this study, the focus is on information systems as a discipline of concern as it links both technology and computers

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to humans. Information Systems (IS) embodies more interpersonal skills than other related computing fields – a characteristic that is posited to be more female oriented.

The change from secondary school to university or college is a substantial adjustment for a large number of students, which may account for why a significant number of students choose their majors after they have gained first-hand experience with the subjects done in their first year (Stockdale and Stoney 2007). In this context, Ahuja et al. (2006), assert that a choice to follow an IT/IS career normally takes place well before one enters the workforce – possibly years prior to working – a choice that maybe influenced during their high school tenure (Downes and Looker 2011). While one can be optimistic in believing that one could influence students towards a certain major at the tertiary institution – it might be too late if they have made up their minds to pursue something that is familiar to them.

Comparative Review of Male and Female Interest in Information Systems

A study undertaken by Henwood (1999) highlighted a possible reason for the low interest of Information Systems by female students, suggesting that historically males have always had a stronger association with technology than females. In a separate study, Cassidy and Eachus (2002) found that in general males' computer self-efficacy was higher than that of females – a key predictor of male students' intention to study computer-related courses. More recently, it was further emphasised that several of the best developers of mobile software for mobile operating system platforms such as Android, Windows Phone and iOS are predominantly male (Chang 2011). It would appear that this affinity of males towards technology persists in present times. However, Ambujam and Venkalakshmi (2009) state that empowerment of women can be considered as a function of information and technology and thereby enable women to "compete in a global knowledge-based world". To this end it can be inferred that females' computer self-efficacy can increase. Galpin's et al. (2003) "computer self-efficacy" theory holds that computer self-efficacy influences students' intentions to study computer-related courses at tertiary level, confirming

Cassidy and Eachus's (2002) findings. According to the theory of planned behaviour (Ajzen 1991), the students' attitudes towards studying Information Systems are one of the determinants of whether they develop the intention to study Information Systems or not. Since male students generally have higher computer self-efficacy, this means that their attitudes towards studying Information Systems are also more positive. Busch's (1995) study revealed a consistent positive relation between the higher male student enrolments in computing courses and their higher computer self-efficacy. It can therefore be deduced from such research that more male students are likely to end up enrolling for computer related courses such as Information Systems (Galpin et al. 2003). In other words, males are more willing to take a risk of enrolling in a computer related discipline even though they may not be well aware of the scope of IS. Computer self-efficacy is a major contributor in this discussion; certainly there are other significant factors that contribute to the decreased female student enrolment in Information Systems that may assist in understanding why female students have lower computer self-efficacy relative to their male counterparts. In order to determine whether there was any significant relation between the students' self-efficacy and their previous exposure to computers, Galpin et al. (2003) examined factors including the students' socio-economic background and their high school exposure to computer related subjects. Students were considered to be from disadvantaged backgrounds if they had not used computers at school. Several studies (for example Cassidy and Eachus 2002; Beyer 2008) found that the more experience students gained with computers, the higher their computer self-efficacy was likely to be.

In the above context, an aspect to consider is whether equal opportunities are being presented and made available to both genders (Ilavarasan 2006). Because there are so few females in computer related positions in industry compared to men (Croasdell et al. 2011), it is cogent to assume that females are offered fewer or less stimulating opportunities, however, Ilavarasan (2006) showed that males and females are offered the same opportunities.

It can be inferred from Belanger's et al. (2007) study, on how students cope with learning computing sciences, that computer related courses

are seen as difficult and time-demanding courses. However, this claim may not be shared by both genders as Rettenmayer et al. (2007) explained that female students perceived Information Systems differently from males, including the perceived difficulty of the subject. Their findings concurred with Croasdell et al.'s (2011) study – the possible reason why some female students did not choose Information Systems as a major. A fear that is closely associated with this assumption is the resulting stress and how it would impact on their families later on in their careers (Croasdell et al. 2011). Joshi and Kuhn (2001) pointed out that female students are also largely influenced by social norms in their intentions to pursue Information Systems careers. Similarly, Zhang (2007) found that factors related to “job availability”, “interest in IS field”, “perceived difficulty of the IS field” and opinions of key individuals such as family, friends and professors influenced students' intention to choose IS as a major. These findings affirmed what Joshi and Kuhn (2001) found in their study.

Several studies (for example, Kvasny et al. 2009; Ambujam and Venkalakshmi 2009) have shown that in both developing countries, such as Kenya and India, as well as in developed countries such as the US and the UK (Ahuja et al. 2006; Ross and Thomas 2008) there is a large gap between female and male student enrolment in Information Systems. Belanger et al (2007) indicated that the enrolment in Information Systems courses further decreased to some extent at the time of their study. This implies that there would be fewer female enrollees for the course each year if the proportion of male to female were to remain the same. More recently, Croasdell et al. (2011) found that the proportion of males to females was not maintained, in that the rate of enrolment was higher for males than it was for females (Harris et al. 2009). Thus the gender gap in Information Systems continues to widen. Glass (2012) adds that if the rate at which female students' enrolments for Information Systems majors continues to decrease, there would be no female Information Systems professionals by 2032.

According to Hart (2002), many students, most of whom are females, are unaware about information systems at school-leaving age in the South African context – suggesting that the quality of careers guidance at schools are not comprehensive. Furthermore, a small number of students pursue the specialist subject, IT, at the

high schools (Govender et al. 2013). In reality the term information systems is rarely used in schools. The more commonly used terms are: IT, computer literacy, computer science, computer studies and more recently computer applications technology (CAT). Most students at the senior years in schools have been exposed to computers at an elementary level, referred to as computer literacy. It is perhaps no surprise that many students are not familiar with what information systems are all about. Many studies have shown that prior experience with computers generally has a positive influence towards choosing computing as a study field. Female students need to have a strong inclination towards the subject before they can pursue it. This state of affairs poses a key area of concern. In order to attract and retain more female students to the Information Systems discipline, Stockdale and Stony (2007) suggest that one should create genuine interest in the subject by presenting introductory Information Systems courses such that they create high levels of interest among female students – this could stimulate students to switch to IS majors. Croasdell et al. (2011) affirms this suggestion and further emphasises the need to increase support from family members as well; these two key reasons, interest and family encouragement have been found to explain why some female students choose information systems as a major.

There is a cross-cultural and global coherency in the findings of the studies discussed above. In order to understand specifically female students' intention to choose IS or not, Ajzen and Fishbein's (1980) Theory of Reasoned Action (TRA) was used as a framework for this paper. This framework is explained in the next section. The study was guided by the following research questions:

1. What are the factors that influence female Business students' intentions to pursue IS as a major?
2. What is the relative impact of each of the factors?
3. How do these factors influence students' intentions to pursue an IS major?
4. Why do these factors influence students' intentions to pursue an IS major?

Conceptual Framework

Ajzen and Fishbein's (1980) Theory of Reasoned Action/Behaviour (TRA) considers stu-

dents' attitudes (A), subjective norms (SN) and perceived behavioural intention as independent constructs. According to their theory, a person's voluntary behaviour is predicted by his or her attitude toward that behaviour and the perceived social influence of people who are important to him/her. A person's attitude, together with subjective norms, forms his/her behavioural intention. In the context of this study, the "behavioural intention" (BI) is understood as the intention to study Information Systems as a major and "actual behaviour" as studying Information Systems as a major. Figure 1 represents the framework for this study based on the theory of reasoned action (Ajzen and Fishbein 1980), where $BI = WA + SN$ (W represents the weighted items that make up attitude).

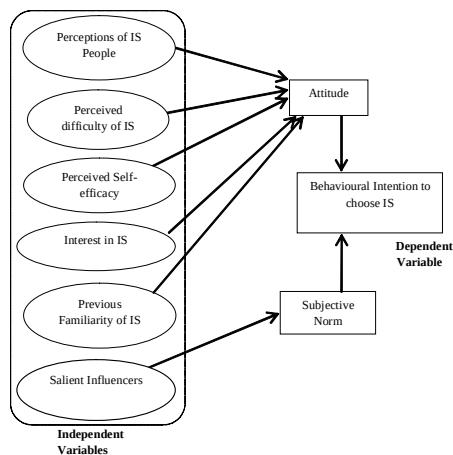


Fig. 1. Framework of study based on Theory of Reasoned Behaviour

The TRA framework has been used in diverse contexts for modelling human behaviour. It has proven effective in examining and understanding human behaviour in such diverse contexts as Internet purchasing activities (Barkhi et al. 2008) and athlete training patterns (Anderson and Lavalley 2008). More importantly, it has been used successfully in contexts that are similar to the current study (Sheppard et al. 1988; Zhang 2007). The researchers therefore considered the TRA to be appropriate to gain insight to the contributing factors that affect female students' choice of IS as a major or not.

A number of factors or items were measured and grouped according to the six categories or constructs as depicted in the Figure 1. Each category was made up as indicated in Table 1.

METHODOLOGY

Context of the Study

This study was conducted at a University with a large population of students registered for the Bachelor of Commerce qualification – a business degree. Business students generally have to register for an introductory course in information systems in conjunction with other business courses in their first year, as is the status quo at other universities. In subsequent semesters the students then begin to study different sets of courses in pursuit of a major course. In this study the researchers sought to determine the factors that influence female students towards and against Information Systems as a major. The study followed a confirmatory research design based on formerly identified factors in other studies (Brown 2006).

Table 1: Items measured for the constructs

Independent variables	Items
Perceptions of IS people	Choosing IS as a major would make me look like a computer geek. IS professionals are nerds.
Perceived Difficulty	To me, IS modules are intensive. An IS major would be difficult for me.
Perceived Self-efficacy	I find myself good at IS modules. I have the aptitude required for an IS major.
Subjective Norm	Challenging My friends think that I should choose IS as a major. My lecturers think I should choose IS as a major. Business men look up to IS professionals.
Interesting	I find computers and information technologies interesting. Exciting. Prefer to major in something else
Unfamiliarity	Not aware of IS prior to university

Population and Sample

The target population was 537 female BCom students who were studying the introductory Information Systems module which is compulsory for all business students at this university. The sample was made up of 148 students, 103 of whom were first year female students. There were 148 responses in total, 30.4% male and 69.6% female. All data that has been collected from other groups other than first year female BCom students was collected only to strengthen the argument of this research by making various comparisons wherever possible.

Data Collection Instrument

This study employed the convenience sampling method whereby a questionnaire created by using *Google Docs* was sent via email to first year BCom students, including males and females. A number of the reasons that an electronic questionnaire was used were (1) the respondents can more easily retain their anonymity should they wish to, (2) this approach requires less time and funding in comparison to interviews and even paper-based questionnaires (Sekaran and Bougie 2010).

The questionnaire used in the collection of data consisted of 4 major sections. The first section focussed on the respondents' biographical information. The second elicited the reasons students chose or considered choosing IS as a major; the third captured personal and professional reasons for not choosing IS as a major and the fourth section extracted the attitudes and perceptions of students towards IS using a seven-point Likert scale where 1 represented *strongly disagree* and 7 represented *strongly agree*. The analysis was computed using SPSS version 21.

RESULTS

Table 2 contains the summaries of the demographic details of the respondents. A total of 148 questionnaires were received, of which 71.6% of the respondents were first year students and the other 28.4% were from the other years of study, including second, third and fourth years of study. First year female students made up 69.6% (103) of the respondents. Since the age groups were closely grouped and a small

number appeared to be in the "21-24" category, age was ignored in the analysis.

Table 2: Profile of respondents

Demographic variable	Classification	Frequency
Age	21-24	27
	17-20	121
Language	English	74
	Zulu	60
	other	14
Race	African	74
	Indian	72
	White	2
Gender	Female	103
	Male	45
Year of Study	First	106
	Other	42

For the sake of a deeper understanding of female students' choice of major, the responses were grouped into *Group A* (those female first year participants who were considering choosing IS as a major) and *Group B* (those female first year participants who were not likely to choose IS as a major). Only 19.5% (20) of the first year female students said they were considering pursuing an IS major. Among the respondents from *Group A*, 56.19% felt that IS was interesting, while 53.46% believed they were good with computers and 14.73% believed they would get good jobs when they graduated. A rather noteworthy finding from this group is that none of them were inspired by family or friends when considering IS as a major, contrary to Croasdell et al.'s (2011) study. 44% of them saw IS as a good career choice. Only 4.35% of the respondents in this group considered IS because of job security while 41.46% said they had access to information about the field before choosing IS as a major. These findings hint that *Group A* may have chosen to major in IS due to their genuine interest in IS, their career preferences, their perceived computer self-efficacy and access to information about the field prior to commencing with the BCom degree.

An equally important aspect of the study is to understand why so few females major in IS. The survey responses of *Group B* were examined, which is made up of first year female students who did not wish to pursue IS as a major. This group of students expressed two types of reasons for their lack of interest in IS, personal and professional. Table 3 represents – in order of descending frequency from the 83 female re-

spondents – a summary of the reasons that *Group B* selected for not pursuing IS as a major. The participants could check more than one choice for their reasons. Hence, the sum is greater than the total number of *Group B* respondents – those that had no intention to choose IS as a major.

A large number of *Group B* seem to agree that more than having any negative feelings towards IS, the primary reason for their lack of interest in IS is the claim that they were not familiar with IS when they initially chose a major. Followed closely, the next reason for their choice is that they prefer to major in something else. It is clear that their lack of familiarity with Information Systems may account for the lack of interest in the field. The third most popular reason indicated that they considered IS not to be a good career choice for them. Clearly unfamiliarity or ignorance of the field would make participants choose such a reason. The next two reasons relates directly to students' self-efficacy. These findings suggest that computer self-efficacy has more influence on female students than it does on male students as is suggested by (Croasdel et al. 2011) in deciding whether to choose an IS major. Only 4.81% and 3.61% of the respondents in *Group B* claimed that their families and friends respectively, had an impact on their decision to take another major. Again it is apparent that family and friends have very little impact on the respondents' decisions pertaining to majors which relates directly to the fact that friends and family may be just as unfamiliar with IS as the students themselves initially.

The respondents who said they did not have an interest in pursuing IS as a major also expressed *professional* reasons for their decisions. A large number of group A respondents thought

that there was very little job security in the IS profession. Almost half of *Group B* think IS is just not a good career choice for them. These findings suggest that female students, especially *Group B*, do not base their decision of not majoring in IS on their experience as much as on preconceptions made even before enrolment into university.

Finally, the study explored the combination of factors that is likely to influence female students' intention to major in IS. Using multiple regression analysis the predictive power of a combination of variables, using the entire sample of female students (both groups A and B) was determined. The predictor variables are positively correlated with the criterion variable – the intention to choose IS as a major. The predictor variables are shown in Table 4.

The standardised Beta coefficients give a measure of the contribution of each variable to the model. A large value indicates that a unit change in this predictor variable has a large effect on the criterion variable. From the six predictor (independent) variables considered together, only *perceived self-efficacy* and *interest in IS* emerged as the significant positive predictor variables (Beta= 0.311, $p=0.002$ and Beta=0.354, $p=0.0001$ respectively) that accounts for the intention to choose IS. Both these predictors have an absolute t-test value that is greater than one (considered large) and their corresponding p-values are very small (less than 0.005). *Perceived difficulty* revealed an inverse relationship (Beta = -0.125, $p=0.114$). *Perceptions of IS people* was not a significant predictor in this model, having a small t-value (0.119<1) and a large p-value (0.906). This implies that this variable is insignificant in influencing the intention

Table 3: Personal and professional reasons why students choose not to pursue IS

<i>Reasons chosen</i>	<i>Count</i>	<i>%</i>
I am not familiar with information systems or was not familiar with it when I chose a major	61	73.49
I prefer majoring in something else	56	67.46
I do not consider the information systems field to be a good career choice for me	52	62.23
I think that information systems majors are more difficult than other BCom majors	30	36.14
I am not good at computers	25	30.12
My family advised me to take another major	4	4.81
My friends advised me to take another major and I listened	3	3.61
Majoring in information systems would make me look like a geek	3	3.61
I don't think there is good job security in the information systems field	3	3.61
IS careers are not as high-paying as other careers graduate	2	2.40
I hate computers and I want as little to do with them as possible	1	1.20

Table 4: Regression analysis- coefficientsa

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	0.692	0.874		0.792	0.431
	Subjective_Norm	0.195	0.149	0.107	1.311	0.193
	Perceptions_IS_People	0.022	0.185	0.009	0.119	0.906
	Perceived_Difficulty	-0.227	0.142	-0.125	-1.595	0.114
	Perceived_self_Efficacy	0.450	0.145	0.311	3.105	0.002
	Interest_in_IS	0.366	0.094	0.354	3.905	0.000
	Previous_familiarity	0.143	0.095	0.108	1.504	0.136

a. Dependent Variable: Behavioural_Intent_to_IS

to choose IS as a major and therefore can be removed from the analysis. *Subjective norm* and *previous familiarity* were not significant predictors in this model. Using the enter method, a significant model emerged ($F_{6, 96} = 31.257$, $p < 0.0005$) as indicated in Table 5.

Table 5: Model Summary

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.816 ^a	0.667	0.646	0.9884

a. Predictors: (Constant), Previous_familiarity, Perceptions_IS_People, Perceived_Difficulty, Subjective_Norm, Interest_in_IS, Perceived_self_Efficacy

The adjusted R Square value in the model accounts for approximately 64.6% (0.646) of vari-

ance in the behavioural intention to choose IS as a major. Only two of the variables appear to have a significant impact on female students' intention to choose IS as a major, with the strongest factor being their genuine interest in IS.

Table 6 summarises and compares the responses of groups A and B which is perhaps the most important comparison in this study. This table lists all the independent constructs and the factors that have been identified to be linked to these constructs. The scores on the right-most column are summaries per group, with group B scores on the right and group A scores on the left.

As is shown, salient referents had low impact on the decisions that both groups of respondents made in terms of choosing a major. Instead factors that had more influence for both groups were genuine interest, aptitude, per-

Table 6: Summary of groups A and B findings

	Independent variables	Items	Group		
			A	B	
Attitude towards Act or Behavioural Intention	Perceptions of IS People	Choosing IS as a major would make me look like a computer geek	[2.8]	[2.5]	
		IS professionals are nerds	[4.2]	[2.3]	
	Perceived Difficulty	To me, IS modules are intensive	[3.2]	[5.2]	
		An IS major would be difficult for me	[2.8]	[4.3]	
	Perceived Self-efficacy	I find myself good at IS modules	[5.1]	[2.6]	
		I have the aptitude required for an IS major	[5.2]	[3.5]	
	Interesting	I find computers and information technologies interesting	[5.4]	[3.1]	
		Exciting	[5.3]	[2.1]	
	Subjective Norm	Prior Familiarity with subject Salient Referents	Prefer to major in something else	[2.2]	[5.4]
			Not aware of IS prior to university	[4.4]	[2.7]
My friends think that I should choose IS as a major			[2.7]	[3.1]	
My lecturers think I should choose IS as a major			[4.2]	[2.1]	
Business men look up to IS professionals			[4.0]	[3.6]	

ceived difficulty and prior familiarity of the subject. These findings confirm the deductions made earlier in that female students base their decisions in choosing a major mostly on interest, prior knowledge of the major and aptitude. The female respondents in this study show that they need to have high computer self-efficacy for them to consider a major in IS. According to the theory of reasoned behaviour, the deductions that can be made from this study suggest subjective norms had little influence on the choice of major for female BCom students in both *groups A and B*. Attitudes towards act or behaviour had a much higher influence on the students' intention to study IS.

DISCUSSION

A noteworthy finding from both groups A and B is that few students in these groups were inspired by family or friends when deciding about whether to take IS as a major or not, contrary to other studies including that of Croasdel et al. (2011), Zhang (2007) and Joshi et al. (2001). This finding implies that the independent construct, *subjective norm* has little influence on the intentions of female students. A possible reason for this is the lack of knowledge about IS in general by family and friends since many of the female students who chose not to pursue IS as a major indicated that they were not familiar with IS prior to them entering university and simply chose a major that they were not unfamiliar with.

The commonly agreed upon factor among most studies done on this topic is that of computer self-efficacy. Male students have been found to possess higher computer self-efficacy (Galpin et al. 2003); the results of this study coincide with other research in this regard. However, findings of this study also suggest that computer self-efficacy has a greater influence on BCom female students than it does on male students in deciding whether to choose an IS major. About 17.39% of male students said they chose IS because they felt that they were competent with computers as compared to 34.78% of females from the entire sample (148) and 29.46% of female students in *Group A*. Cassidy and Eachus (2002) show how past experience with computers can help increase computer self-efficacy. The findings of this study confirm that a large portion of the female respondents relied heavily on how well they thought they were fa-

miliar with computers from their experience when deciding whether to major in IS or not.

Some of the findings suggest that female students, especially those in *Group B*, do not base their decision of not majoring in IS on their experience as much as on preconceptions made even before enrolment into university because of the lack of access to information about the major. This study indicates the degree of unfamiliarity and just how uninformed these students are about IS as a career. It can be inferred that there is a deficit in the amount of publication to inform students about the IS degree at the University. Stockdale and Stoney (2007) add that female students need to be enticed and encouraged during their introductory IS courses in their first year – a period of time that can influence wavering students to choose IS as a major as well as students who may want to change majors. The fact that subjective norms have such little influence means that first year female students perhaps need workshops and more engaging practical sessions where students are assigned mentors to inform and orient them towards IS.

Other factors that had significant influence, especially on group B's decisions, were aptitude, and interest in the field. A significant portion of group B expressed their fear of appearing to be a "nerd" and the reason for this feeling is closely associated with their difficulty related beliefs. Many students in this group think IS is only for "smart" people. There also seems to be a misconception among these students about job security and job salary for IS professionals. This misconception of IS career positions and salary packages for IS professionals in South Africa attests to the low number of enrolments in IS majors. Based on the findings and the discussion above a number of implications, which are explained in the next section, emerged.

CONCLUSION

The three streams of computer related fields, namely, computer science, information technology and information systems indicated a drastic decline of enrolment among female students. Of particular interest in this study, was the decline of female enrolments in IS. The aim of this study was to find out what were some of the most impactful factors that influenced first year BCom female students' intentions when choosing a major, specifically IS. In addition the study com-

pared the perceptions of both groups (A and B) of students in order to obtain an in depth understanding of their intentions to pursue IS as a major. The two groups' responses were analysed according to the framework based on *Theory of Reasoned Behaviour* which measures the impact or influence of two independent constructs, namely, *subjective norms* and *attitudes towards act or behaviour*. Under *subjective norms* this study examined the influence that family, friends and lecturers had on first year female students' intentions to major in IS. Under *attitudes towards act or behaviour* this study examined their perceptions of IS people, interest in the IS field, perceived difficulty, perceived self-efficacy and previous familiarity. When all factors were considered together, it was found that the two most impactful factors were interest in the IS field and perceived computer self-efficacy. At the same time the most common reason given for not choosing IS was their unfamiliarity with the IS prior to them entering university.

The outcomes of this study may be used to enhance the learning experience of first year BCom students in the IS discipline thereby possibly improving the chances of enlisting more female students in IS disciplines. Some of the most impactful factors that influence first year female students' intentions to major in IS have been identified, measured and compared. The contribution of these findings can therefore be used in conjunction with other research to inspire more female students to consider majoring in IS – reducing the imbalance of the gender gap.

RECOMMENDATIONS

The findings have important implications for enrolment and retaining female students as well as suggest some avenues for further study. The analyses suggest that there is much faculty, schools and business recruiters can do to encourage more females to major in IS disciplines. Perhaps the greatest hurdle to the recruitment process is the unfamiliarity of the field of IS. As mentioned earlier in the literature review, the concept of IS is rarely used in the school context. A small number of students offer the subject IT. In order to reach many more students, there must be an engaging computer course that creates an awareness of, and interest in computing careers including that of IS. The lack of com-

puting courses in many high schools particularly disadvantages woman—a group that have a longstanding underrepresentation in computing fields.

After the choice of IS is made, retaining their interest in IS is of utmost importance. To retain their interest in IS the content taught should be exciting and relate to real-life contexts. Workshops with other female students already completing Information Systems majors could be hosted by the university. High school female students who may not be aware of such a major could be made aware through some form of publication or through events intended to inform them of such opportunities. Another is to create more study options for women. More computer experience before tertiary education as previous studies suggest that female students need to increase their perceptions of how well they think they understand computers before they can consider Information Systems as a major.

Finally, teachers, academic institutions, and employers might find it useful to address some of the misconceptions that women might have about IS jobs—for example, that IT jobs are more suitable for males or that they are difficult and have no interest computing—and emphasise the many positive aspects.

Concerted efforts toward informing, inspiring and encouraging more female students to major in IS through salient referents like lecturers and peers who are majoring in IS in the advanced years of study – who could influence the choice of IS as a major positively. There needs to be intentionality on the university's part to actively and engagingly inform students about some of the opportunities provided by an IS degree, perhaps through testimonials from former graduates currently in the industry. An important aspect in attracting female students to IS is making sure that female role models are available in the field of IS.

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