

# The Contribution Of Employment Satisfaction Factors To Recruiting, Retaining And Career Development Of Information Systems And Technology Professionals

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## ABSTRACT

*Attracting and motivating people to work is a time-honoured subject that presents an ongoing challenge for employers who desire to attract and retain high quality information systems and technology (IS&T) professionals in the face of a sustained global shortage of talented staff.*

*This paper explores issues surrounding the retention of IS&T staff by employers. The findings demonstrate that the three groups have different perspectives and priorities regarding what workplace factors are important to attracting and retaining them as employees of a given organisation. The paper reports research that examined work motivators from the perspectives of information systems and technology IS&T students, practitioners, and employers. The findings and discussion presented are based on a survey of 253 students, 136 practitioners, and 137 employers. Factor analysis identified three "Employment Factors". They are Factor 1 – Work Environment, Factor 2 – Internal Relations, and Factor 3 – Tangible Rewards.*

*The findings indicate that students and practitioners rank the importance of the three employment factors in reverse order, with students ranking Work Environment as most important, while practitioners ranked it as least important. Both groups rank Internal Relations as second in importance. Practitioners rank Tangible Rewards, as most important, while students rank this factor as least important. Clearly, the priorities and needs of students and new graduates are quite different from those of experienced practitioners. These results are consistent with earlier findings by the authors (Turner and Lowry, 1999; 2000; 2001a) that identified the divergence of interests between new graduates and practitioners / employers.*

*Employers sit somewhere in the middle, ranking Factor 1 – Internal Relations, as most important, followed by Factors 2 and 3, respectively. This may indicate a career maturation process in which an individual has one set of needs and priorities during the early period of career entry and development that, once achieved and the person feels that s/he is established, shift toward tangible rewards in a second, practitioner career stage, followed by another shift in perspective as the individual achieves senior management or owner status.*

*The results of this study indicate that fringe economic rewards are of relatively less importance than working conditions to IS&T professionals. Simply paying more to retain entry level IS&T employees may create more problems than it solves. Instead, a proactive consciousness and integration of Work Environment, Internal Relations, and Tangible Rewards characteristics as conditions of employment may ultimately provide a greater incentive for staff to accept and remain in employment with a given organization rather than economic, or hygiene factors.*

*The findings suggest that organisations that wish to retain new graduates might be wise to pay particular attention to the work environment and internal relations within the firm during the first years of post-graduation professional employment. In contrast, organisations must realise that tangible rewards are of more importance to experienced practitioners. Enlightened organisations that take note of and provide for changing individual priorities as careers develop and mature are likely to be the most successful in retaining the loyalty and services of the best practitioners.*

## INTRODUCTION

Attracting and motivating people to work is a time-honoured subject that presents an ongoing challenge for employers who desire to attract and retain high quality information systems and technology IS&T professionals in the face of a sustained global shortage of talented staff. In a classic article entitled "One More Time, How Do You Motivate Employees", Herzberg (1968) distinguished "hygiene factors" such as salary and fringe benefits, without which job satisfaction will not occur, but which are not sufficient in themselves to produce job satisfaction, and "motivators" such as professional recognition and other relatively intangible perquisites such as a personalized reserved parking space, a corner office, or a sonorous title, which, when combined with appropriate "hygiene factors", create a climate in which job satisfaction, productivity, and stability can develop. Herzberg characterized two styles of management, "KITA" (unflatteringly known as "kick in the rear") and "nurturing." *KITA* managers assume that they own staff members and that staff are motivated and loyal because of the economic (hygiene) rewards they receive. The *KITA* rationale assumes that simply increasing economic rewards (and threats of their removal) will be sufficient to retain employee loyalty. *Nurturing* managers have a different approach focused more on a supportive working environment and atmosphere. Yet the *KITA* manager and style are very much alive and multiplying in the IS&T world.

Discerning and reconciling the aspirations of university students preparing for careers in information technology industry with the skills, competencies, personal characteristics and qualities desired by employers is, at best, the art of finding an acceptable, if not optimal balance between graduate aspirations and employer expectations. This is an important gap to fill. This paper explores some issues surrounding the retention of information systems and technology IS&T staff in an Australian context. The paper adds weight to the argument that relying on *KITA* to motivate and retain scarce IS&T professional staff is not the answer. While Higher Education institutions provide the theory and skills for students to become IT&T professionals they do not generally skill students for the workplace.

## EDUCATION OF IS&T PROFESSIONALS

Students are first and foremost concerned with future employability. They classically desire to develop sufficient skills and base of knowledge to secure their first position following graduation, to survive in that position, and to feel that their education has prepared them for advancement in the medium term of five or more years (Knapp, 1993; Waterman and Waterman, 1994).

Employers, on the other hand, often indicate that they want new graduates who can be immediately productive in their environment, who are teachable, loyal team players who work to deadlines, who possess the ability to make an intelligible presentation, who can write understandable business letters, memoranda, and reports (Knapp, 1993). Employers are seeking entry-level professionals who possess well-developed "soft" skills in addition to sound technical skills (Cutler, Fleming *et al.*, 2000; Turner and Lowry, 2001b, 2002, 2003; Kee, 2001; Snoke and Underwood, 2002; Lowry and Turner, 2004).

The education sector provides core skills for industry to develop and to maintain competitive advantage but the onus is on the IS&T industry to obtain skilled workers and to train existing staff and provide opportunities for the new entrants (NOIE, 1999b). However in both the USA and Australia IS&T education often is seen as concentrating too much on a narrow set of technical skills (Ross and Ruhleder, 1993). There are numerous publications both within academia and industry suggest that IS&T curricula should concentrate on developing technical and business skills, working in a collaborative setting, instilling sensitivity to social and organizational impacts and inculcating the ability

to self-learn in a rapidly changing technological environment. (Ashley and Padgett, 1997; Turner and Lowry, 2001b) have shown that despite the call from IS&T employers for more business-oriented skills in IS&T students, core business subjects do not rate highly.

Technical skills are not the total answer in preparing IS&T professionals however. Ross and Ruhleder (1993) claim that many system shortcomings arise from the fact that they do not address business objectives and neither are they sensitive to user needs or concerns. Further, Ross and Ruhleder suggest that programs aimed at developing IS&T professionals of the future must cover a wide range of skills and assist the integration of these skills in complex environments. It is not sufficient for IS&T graduates to just have technical capabilities but they should also be aware of the need for professionals to take responsibility for their work and understand the importance of appropriate ethical behaviours (Little, Granger *et al*, 1999). Little and Granger *et al* further suggest a need to include these aspects in the curriculum of current IS&T programmes. They discuss an “industry-academic gap” that leads to dissatisfaction amongst employer groups with IS&T graduates. They suggest that the ways in which professionalism and workplace issues are currently addressed in IS&T curricula is a reason for this gap.

Kee (2001) alludes to the changes in skills that IS&T professionals in the growing area of e-commerce are likely to need. These include additional skills in marketing, customer relations, and visualisation/graphic design skills as well as the traditional technical skills in programming. Stein and Hawking (2001) report on a survey of e-commerce managers where they found that teamwork and deadlines dominated business skills requirements and that knowledge of e-business and e-commerce models were the more important technical skills.

Rada (1999) calls for verifiable standards for IS&T graduates but recognizes that the field of IS&T education is changing too quickly for standards to be implemented. He suggests that current and potential IS&T workers strive for assessed, certifiable educational achievements that are meaningful to employers.

Richards, *et al.*, (1998) using a panel of 20 experienced IS&T professionals, developed a list of candidate characteristics that are important when seeking to employ IS&T professionals. They found there were three distinct categories, namely: people/business skills, new technology skills and mainframe skills. They also found that people skills had a higher rating than did computer based or technical skills. Lu and Wang (1998-1999) investigated the skills and knowledge needs of IS&T graduates. Respondents were mainly middle level managers, with a smaller proportion of IS&T professionals. They noted a lag between the arrival of new technologies such as Windows 95 and integration into the IS&T curricula and the devotion of too much effort to teaching traditional programming languages that were falling in demand.

Misic and Russo (1999) investigated the stress academics and practitioners placed on various aspects of systems analysis tasks and what is taught. They found substantial differences in some aspects and activities considered important by practitioners that were not considered or taught by academics for example conducting interviews, evaluating new systems, and end-user training.

Martz and Landoff (1999-2000) compared the expectations of students and recruiters with regard to general soft skills and IS&T hard skills. They gathered views from senior students and employers about what was important for recruitment, in three years and for career advancement. They found that teamwork skills rated highly but written communication skills rated quite low by both groups. For technical or hard skills, employers rated business processes analysis as highly important early on but this lessened in importance over time.

Myers and Beise (2001) report a study on features of the IS&T sector that attract or deter students from entering the field. Their study hoped to uncover reasons why students are attracted to IS&T courses and why many drop out prior to completion.

Crook and Crepeau (1997) investigated the career orientation of IS&T students and practitioners to ascertain if there were differences. Looking at 292 IS&T professionals and 63 junior and senior year IS&T students, they found that there were significant differences in a range of career anchors with students rating autonomy, technical competence and managerial competence amongst others as significantly more important than did IS&T practitioners.

## EMPLOYMENT AND RETENTION OF IS&T STAFF

According to the Centre for International Economics (2001, p. 22) some of the primary reasons for skills shortages in IS&T include:

- Limited student places at universities and TAFE colleges;
- Insufficient numbers of teaching staff;
- Inadequate and falling funding levels for public education;
- Higher salaries in relative terms and more opportunities overseas for those with advanced research skills;
- Increased activities in IS&T functions through technologies such as the Internet, multi-media and e-commerce;
- Increased use of computers and telecommunications, increasing demand for IS&T professionals;
- A mobile IS&T workforce makes companies reluctant to provide internal training because they believe they are unable to recover the benefits of that training;
- Restrictions on migration into Australia;
- Lack of appeal to young women in particular to enter the profession;
- The rapid technological changes in IS&T;
- The cyclic nature of skill demands.

Ongoing shortages of qualified IS&T staff in Australia (IT&T Skills Taskforce, 1998) and internationally (NOIE, 1999a) underline the importance of optimising the outcomes of IS&T education and ensuring that new IS&T graduates are quickly absorbed into the work force. Yet it is not easy for new graduates to gain experience and to get their first job (Yelland, 2000). Indeed (Maglitta, 1996) has reported that some companies prefer to hire IS&T professionals without degrees over IS&T graduates, preferring to put them through training programmes (Khan and Kukalis, 1990). It has been observed that many businesses have lost money because of mistakes caused by inadequately prepared graduates (Ashley and Padgett, 1997). Mackenzie (2002) suggests that the problem lies in the inadequate up-to-date skills that fresh graduates in IS&T possess at the time of graduation. It can therefore be concluded from some of the literature relating to IS&T education that graduates will leave tertiary institutions with good technical skills but little else. There is little in many IS&T graduates' education that prepares them for the workforce and it is little wonder that there is a gap between student employment expectations and those of employers (Turner and Lowry, 1999).

In the recent past it has seemed as though some employers approach the challenge as economic rationalists, throwing ever-greater economic incentives at a seemingly ever-shrinking pool of candidates (Niederman, 1999; Jiang and Klein, 2000). This view is often accompanied by a philosophy of employee ownership - that is, that the employer *owns* the staff member because they pay them so much, and believe that they are fully justified in requiring extraordinarily long hours and neglect of family and personal interests because of the high salaries and other economic benefits offered. Moore (1998) noted the burnout of many IS&T professionals working in such an environment. Noting an unremitting IS&T staff shortage, Richens (1998) addressed a number of strategies for recruiting and retaining critical staff in the years to come that included focussing on skill building, fair compensation, and the nurturing of a sense of belonging amongst IS&T staff. A study reported by Young and Keen (1998) of initial post-graduation employment experiences found that beginning IS&T professionals in the public sector fared better in terms of career counselling, performance appraisal and training than did those in the private sector. Lee (1999) suggested that job plateau was a more important consideration for IS&T professionals for career and job satisfaction than was career plateau. Perotti and Perotti (2000) noted behaviour of recruiters of IS&T graduates in an environment of scarcity that influenced a candidate to accept a job. They found that students and graduates were favourably attracted when recruiters treated them more as persons than as prospects. Hunter (2000) and Hunter and Tan (2001) used a Narrative Inquiry method to explore the career paths of information systems in an attempt to determine what specific events influenced their careers. Stefl-Mabry (1999) reported a number of insights into the nature and importance of staff development in the recruitment and retention of professional IS&T staff.

Gill and Pidduck (2001) showed that work challenge and work environment were far more important than issues of compensation. For a number of years Gartner Group publications have consistently predicted that enterprises

relying on financial compensation alone were likely to have a high staff turnover (Morello *et al*, 1998; Gomolsky, 1999; Latimer, 2001; Keller, Rust *et al* 2002). This was supported by Goles (2001) who, reporting on student perceptions of IS&T job attributes, suggests that financial and other benefits are not used to select jobs but rather to *eliminate* them. Goles further suggests that the learning of new skills in a job is of significant interest to students.

Training is an important factor in both hiring and retention of IS&T professional staff (Gjestland, Blanton *et al* (2001) and Paré, Tremblay *et al* (2001)) who particularly noted that IS&T employees are sensitive to the importance of skill development when it comes to deciding whether to leave an organisation. They also note that training is too often regarded by employers as a prerequisite rather than as an investment in intellectual capital and staff development.

A study of new information systems professionals (King and Xia, 2001) found that socialisation of new employees was an important factor in retaining newly hired IS&T employees. They proposed that organisations make a special effort to assist new employees to adjust via socialisation processes, including mentoring schemes, to help them to become “insiders.”

**RESEARCH CONTEXT**

While much has been written in the literature of IS&T education on the skills required by industry and discussions on what should be taught to students preparing for professional work, there is relatively less that addresses the issue of the gap between the expectations of graduates in terms of their potential workplace and employers, and what employers think is important for attracting and retaining staff. This paper reports research that examined work motivators from the differing perspectives of potential IS&T employees (students), actual IS&T employees and employers. The findings demonstrate that the three groups have different perspectives in this area.

The research reported in this paper is part of a wider study investigating the “IS&T professional” from the perspective of IS&T academics, students, practitioners, and employers/decision makers in Australia (Turner and Lowry, 1999; 2000, 2001a). Although recent research has examined a number of these factors, none have looked at the area from the perspective of current students, graduates and employers in the IS&T field. Findings related to the academic preparation of IS&T professionals (hard skills), personal attributes (soft skills) and possible employment motivators are reported in this paper.

**METHOD**

This paper compares perceptions of a small number of employment motivators by IS&T students (ISSs), practitioners (ISPs) and employers and decision makers (ISEs). They are:

**Table 1: Motivating Factors In The IS&T Sector**

Label	Work Incentive Variable
JF 1	Good promotional prospects within the company
JF 2	Opportunities for travel
JF 3	A friendly work environment
JF 4	Challenging work assignments
JF 5	Provision for on-going training
JF 6	An industry competitive salary
JF 7	Flexible working conditions
JF 8	Reliable internal communications
JF 9	Supportive superiors
JF10	Opportunities to expand personal skills
JF11	Fringe benefits (eg company shares, car etc)

A combination of survey distribution methods was employed. Students were surveyed by direct distribution to second and third year students from three universities in the state of Victoria, Australia. They covered a regional university, a CBD based university with a broad demographic base, and a suburban university located in a predominantly working class feeder area. Web-based survey distribution was used for both the ISPs and ISEs.

Mehta and Sivadas (1995) demonstrated that e-mail based surveys generated response rates comparable to those of postal surveys but significantly faster, at lower cost and of a higher quality. On the other hand Tse, Tse *et al* (1995) in an internal survey of Hong Kong University staff experienced a much lower return rate for e-mail surveys (6%) compared with conventional mail (27%) that they attribute to the possibility of participant identification with e-mail. Comley (1996) found comparable response rates from the two methods. Comley also indicated that electronic data collection methods are often self-selecting due to recipients irregularly checking email messages and consequently have the potential to introduce bias. He points out however that although this is a problem for representative samples, it is less of a problem for targeted groups as in the case of this research.

The web-based questionnaire was set up using Microsoft FrontPage® 2000. Data were captured using Microsoft Access® 2000. Electronic surveys have the advantage being pre-coded and free of ambiguity of response in that only one response per item can be selected. They have the disadvantage that they risk missing those who do not have access to computers and the web. This was not seen to be a problem for the two groups being surveyed because the target groups were IS&T professionals.

The three universities yielded 253 responses from 300 distributed to students during regular classes. A personally addressed email message was sent to a mailing list of practitioners and employers during 2001, inviting participation in the survey. The survey was sent to 1006 IS&T practitioners around Australia, returning 136 useable forms (13.5%). A version was also sent to 2000 IS&T decision makers in organizations around Australia using a commercial e-mailing service who supplied the list. A total of 241 responses from this list were returned as failed deliveries or as requests to opt out of future mailings. The response for this survey resulted in 153 returns with 137 being usable or 7.8 percent. Participants from both groups were asked to rate the importance of incentives offered by employers to IS&T career professionals. Participants were asked to rate the importance of eleven items on a Likert scale of 1- 7 (where was 1 irrelevant to 7 essential). The incentives were set out in Table 1 above.

This paper focuses primarily on comparing IS&T student responses with those of employers and professionals. Specifically, the research examines the gap between IS&T student motivation compared with what employers and professionals rate as important.

## **RESULTS**

The data were analysed using SPSS® for Windows, version R10. Reliability analysis was undertaken, descriptive statistics were generated, and factor analysis was undertaken as part of an initial screening. Mann-Whitney comparisons were carried out to establish the significant differences between the two groups.

### **Reliability Analysis**

The reliability of the results was confirmed by computing Cronbach  $\alpha$  scores for the two groups. The result for IS&T practitioners was  $\alpha = 0.75$ . The result for an IS&T decision makers was  $\alpha = 0.88$ . Both values exceed the benchmark value of 0.7 and are therefore considered acceptable.

### **Factor Analysis**

To establish that the factors examined in the surveys were related, a series of factor analyses were completed separately for each group. These are presented first to establish the relationships. Principal component analysis using a Varimax rotation was employed. Initially, factors that returned an eigenvalue exceeding one and factor loadings exceeding 0.5 were retained.

Three factors were identified from the student results. The analysis identified four factors for IS&T professionals (ISPs) and for IS&T decision makers. One variable, “Opportunities to expand personal skills (JF10)”, loaded onto two factors and when this was removed, three clear factors formed for ISEs but still four factors for ISPs. Three factors were then forced resulting in Table 1B for ISPs and Table 1C for ISEs. The loadings for students accounted for about 59% ISPs accounted for nearly 57% of the variance whilst for ISEs it was just over 55% of the variance. Factor loadings are shown in Table 2A below:

**Table 2A: IS&T Student (ISSs) Employment Factors**

Work Incentive	Factor		
	1	2	3
(JF9) Supportive superiors	.81		
(JF8) Reliable internal communications	.79		
(JF10) Opportunities to expand personal skills	.70		
(JF3) A friendly work environment	.60		
(JF4) Challenging work assignments		.78	
(JF5) Provision for on-going training		.76	
(JF1) Good internal promotional prospects		.64	
(JF11) Fringe benefits (eg company shares, car etc)			.76
(JF2) Opportunities for travel			.73
(JF7) Flexible working conditions			.59
Variance explained	24%	18%	17%

Table 2A suggests that there are three factors with the following emphasis for IS&T *students*:

- Factor 1: Work environment
- Factor 2: Internal relations
- Factor 3: Tangible rewards

Table 2B shows the composition of three Practitioner factors with the following emphases for IS&T *practitioners*:

- Factor 1: Tangible Rewards
- Factor 2: Internal relations
- Factor 3: Work Environment

Table 2C suggests there are three factors with the following emphases for *employers*:

- Factor 1: Internal relations
- Factor 2: Tangible Rewards
- Factor 3: Work Environment

The factors are quite similar for all three groups. While Factor 1, the Tangible Rewards factor accounted for 21% of the variance for ISPs, the same factor accounted for 19% of the variance for ISEs. Similarly, Factor 2, Internal Relations, accounted for 19% for ISPs and 20% of variance for ISEs. Factor 3, Work Environment, accounted for 16% of the variance for both groups.

There are some differences though. The composition of Factor 3 (ISPs) and Factor 1 (ISEs) are the same apart from some slightly different loadings. Although there are some differences in the composition of the other factors for each group, it is suggested that this is in part due to differing perceptions of each group.

ISPs see JF5, Provision of training, as part of the employment rewards package whereas ISEs see it more as the overall work environment or part of the job. Factor 1 for employers relates to various aspects of the work environment; Factor 2 relates to the tangible reward side of work or hygiene factors.

**Table 2B: IS&T Practitioner (ISPs) Employment Factors**

Work Incentive	Factor		
	1	2	3
Fringe benefits (eg company shares, car etc) (JF11)	0.81		
An industry competitive salary (JF6)	0.68		
Provision for on-going training (JF5)	0.67		
Opportunities for travel (JF2)	0.58		
A friendly work environment (JF3)		0.76	
Good promotional prospects within the company (JF1)		0.64	
Challenging work assignments (JF4)		0.61	
Reliable internal communications (JF8)			0.76
Flexible working conditions (JF7)			0.69
Supportive superiors (JF9)			0.63
Variance explained	21%	19%	16%

Analysis of Employer factors is shown in Table 2C.

**Table 2C: Employers (ISEs) Employment Factors**

Work Incentive	Factor		
	1	2	3
Supportive superiors (JF9)	0.77		
Reliable internal communications (JF8)	0.77		
Flexible working conditions (JF7)	0.65		
Fringe benefits (e.g. company shares, car etc) (JF11)		0.73	
An industry competitive salary (JF6)		0.72	
Good promotional prospects within the company (JF1)		0.64	
Opportunities for travel (JF2)		0.55	
A friendly work environment (JF3)			0.72
Challenging work assignments (JF4)			0.70
Provision for on-going training (JF5)			0.56
Variance explained	20%	19%	16%

**KRUSKALL WALLIS ANALYSIS**

The Kruskal-Wallis test is the non-parametric equivalent of the F-test and was used in the analysis to identify any significant differences in responses for the ISSs, ISEs and ISPs. This test is applied when the assumptions of normality are not satisfied and preclude use of the F-test.

Table 3 shows the mean ranks for the three groups. They show that professional employees (ISPs) rank each of the job incentives higher than do employers (ISEs).



**Table 3: Mean Ranks of Work Incentive for Information Systems and Technology Students, Practitioners, and Employers**

Work Incentive	Mean Rank		
	Students	Professionals	Employers
(JF1) Good internal promotional prospects	266.9	296.9	226.3
(JF2) Opportunities for travel	276.4	265.6	239.6
(JF3) A friendly work environment	261.6	298.9	233.9
(JF4) Challenging work assignments	215.8	316.7	300.4
(JF5) Provision for on-going training	238.5	318.1	257.5
(JF6) An industry competitive salary	256.4	313.9	228.9
(JF7) Flexible working conditions	257.4	288.3	252.1
(JF8) Reliable internal communications	267.0	281.8	241.1
(JF9) Supportive superiors	248.4	284.6	272.3
(JF10) Opportunities to expand personal skills	271.3	288.8	226.2
(JF11) Fringe benefits	303.1	231.0	224.8

**MEAN RATINGS**

Table 4 shows the means and standard deviations of ratings of eleven work incentives by information systems and technology students, practitioners, and employers, respectively. Table 3 shows little differences between groups at the lower ratings. For example, the three groups rate opportunities for travel as the least important. Likewise, fringe benefits are rated lower by the three groups although the strength of the rating is greater for students who are, naturally, anxious to improve their economic situation following their student years.

**Table 4: Work Incentive Means and Standard Deviations for Information Systems and Technology Students, Practitioners, and Employers**

Work Incentive	Student Mean	Student $\sigma$	Practitioner Mean	Practitioner $\sigma$	Employer Mean	Employer $\sigma$
(JF3) A friendly work environment	6.13	.89	6.35	0.80	6.06	0.66
(JF10) Opportunities to expand personal skills	6.06	.92	6.16	0.86	5.84	0.81
(JF6) An industry competitive salary	5.97	.95	6.30	0.92	5.84	0.86
(JF9) Supportive superiors	5.96	1.00	6.24	0.76	6.16	0.81
(JF5) Provision for on-going training	5.80	.98	6.29	0.81	5.95	0.87
(JF8) Reliable internal communications	5.74	.92	5.79	1.04	5.54	1.02
(JF7) Flexible working conditions	5.73	.93	5.96	0.82	5.69	0.91
(JF1) Good internal promotional prospects	5.73	.93	5.88	1.03	5.46	0.97
(JF4) Challenging work assignments	5.54	.94	6.13	0.88	6.04	0.85
(JF11) Fringe benefits	5.40	1.17	4.77	1.42	4.79	1.03
(JF2) Travel opportunities	4.71	1.28	4.43	1.61	4.43	1.07

A friendly work environment (JF3) rates as the most important amongst ISPs compared with ISEs who rate it as second most important, but less strongly. Provision of on-going training (JF5) rates significantly higher for ISPs than ISEs. Salary (JF6) rated more highly for ISPs than for ISEs.

Table 5 below shows the statistical differences between them. No statistical differences exist for travel opportunities, flexible working conditions or internal communications. All other incentives show significant differences amongst the three stakeholder groups. Students rank tangible benefits such as shares and travel highest. Surprisingly, salary is ranked lower. This may reflect the aspirations of students to have material things (cars) or

lifestyle rewards (travel) early in their careers whereas ISPs are possibly facing responsibilities such as families of their own and salary then becomes important.

Table 5 shows significant differences in a number of areas. These differences may lead to a potential conflict. For example, ISPs rate promotional prospects much higher than do ISEs. Such opportunities may be interpreted as recognition for work achievement. Interestingly, there are strong differences in the importance of a friendly work environment (JF3). ISPs rate this as the most important feature. ISEs rate it highly too, but not as strongly. Training (JF5), salary (JF6) and skill development each require a tangible commitment from employers and they are likely to want to keep this under control.

**Table 5: Kruskal-Wallis Test of Significance**

<b>Work incentive</b>	<b>Chi-Square</b>	<b>df</b>	<b>As. Sig.</b>
(JF1) Good internal promotional prospects	16.6	2	.00
(JF2) Opportunities for travel	5.7	2	.06
(JF3) A friendly work environment	14.7	2	.00
(JF4) Challenging work assignments	56.6	2	.00
(JF5) Provision for on-going training	27.8	2	.00
(JF6) An industry competitive salary	25.7	2	.00
(JF7) Flexible working conditions	5.4	2	.07
(JF8) Reliable internal communications	5.7	2	.06
(JF9) Supportive superiors	6.4	2	.04
(JF10) Opportunities to expand personal skills	14.6	2	.00
(JF11) Fringe benefits	34.7	2	.00

No significant differences between the two groups were found for questions JF11, JF9, JF4 and JF2. Questions JF4 and JF9 are concerned with work activities and the work environment.

**DISCUSSION**

This study has looked at those aspects of the work environment that may be regarded as incentives for information systems and technology professionals and compared what students, practitioners and employers saw as important features of their work situation.

Factor analysis identified three similar but not identical factors of importance to IS&T students, employees and employers. These factors have been labelled “Tangible Rewards”, “Internal Relations” and “Work Environment”. The loadings on three similar factors for both employee and employer groups can be explained in terms of a similarity of perspectives shared by the two groups. While all information systems professionals (ISPs) are not information systems employer (ISEs), virtually all ISEs are also ISPs. However, each group placed different importance on the roles of the Internal Relations and Tangible Rewards factors, evidence of differing perspectives.

Both employers and employees rated other fringe benefits such as travel as relatively unimportant. IS&T employees rate four items stronger than the strongest rating by employers. The results presented here are consistent with Herzberg (1968) in suggesting that a competitive salary is important as a threshold for further consideration, but that other “hygiene“ factors are less important to IS&T employees than working conditions. Indeed provision of pleasant working conditions, on-going training and the opportunities to grow professionally are important issues for experienced IS&T employees.


**Table 6: Shows The Rankings Of The Employment Factors By Students, Practitioners, And Employers**

	Factor 1 Work Environment		Factor 2 Internal Relations		Factor 3 Tangible Rewards	
	Rank	Percentage	Rank	Percentage	Rank	Percentage
Students	1	24%	2	18%	3	17%
Practitioners	3	16%	2	19%	1	21%
Employers	3	16%	1	20%	2	19%

It is interesting that the rankings by students and practitioners are in opposition, with students ranking Factor 1 – Work Environment as most important, while practitioners rank it as least important. Both groups rank Factor 2 – Internal Relations as second in importance. Practitioners rank Factor 3 – Tangible Rewards, as most important, while student rank this factor as least important. Clearly, the priorities and needs of students and new graduates are quite different from those of “journeymen” experienced practitioners. These results are consistent with earlier findings by the authors (Turner and Lowry, 1999; 2000; 2001a) that identified the divergence of interests between new graduates and practitioners / employers.

This suggests that organisations that wish to retain new graduates might pay particular attention to the work environment and internal relations within the firm during the first years of post-graduation professional employment. In contrast, organisations must realise that tangible rewards are of more importance to experienced practitioners. Employers sit somewhere in the middle, ranking Factor 2 – Internal Relations, as most important, with Factors 2 and 3 following. This may be reflective of a career maturation process in which an individual has one set of needs and priorities during the early period of career entry and development that, once achieved and the person feels that s/he is established, shift toward tangible rewards in a second, journeyman career stage, followed by another shift in perspective as senior management or owner status is achieved.

The results of this study indicate that fringe economic rewards are of relatively less importance than working conditions to IS professionals. Simply paying more to retain entry level IS&T employees may create more problems than it solves. Instead, a proactive consciousness and integration of Work Environment, Internal Relations, and Tangible Rewards characteristics as conditions of employment may ultimately provide a greater incentive for staff to accept and remain in employment with a given organization rather than economic, or hygiene factors.

The limitations of the present study include identification of a limited number of possible incentives and a small, localized respondent group, precluding generalization. This study did not consider whether support by employers for these incentives actually acts to encourage employees to remain or if the lack of these incentives encourages them to leave. However, employers may well consider the present findings when developing strategies for recruitment and retention of information technology professionals. Given the shortage of competent technical staff and the high cost of recruiting, training, and socializing them into a professional project-oriented workplace, employers should recognize the factors and incentives that employees hope to obtain from them as conditions of continued service and loyalty. 

## REFERENCES

1. Ashley, N. W. and Padgett, T. C. (1997). Information Systems Graduates: Evaluation of Their IS Curricula. Available: <http://www.westga.edu/~bquest/1998/infosys.html> [2004, 7 January]
2. Centre for International Economics. (2001). *Breaking the Skills Barrier*. Sydney: Australian Information Industries.
3. Comley, P. (1996). The Use of the Internet as a Data Collection Method. Available: <http://www.sga.co.uk/esomar.html> [2004, 17 May]
4. Crook, C. W. and Crepeau, R. G. (1997). A study of the Career Orientations of Information Systems Students and Professionals. Special Interest Group on Computer Personnel Research Annual Conference, 138-144.
5. Cutler, T., Fleming, D., and Rosenburg, J. (2000). *Skills x Knowledge = Growth*. Melbourne, Australia: Multimedia Victoria.

6. Gill, B. and Pidduck, A. B. (2001). IT Staffing and Retention: A Success Story. Paper presented at the Association for Computing Machinery Special Interest Group on Computer Personnel Research (SIGCPR), San Diego CA.
7. Gjestland, C., Blanton, J. E., Will, R., and Collins, R. (2001). Assessing the Need for Training IT Professionals: A Research Model. Paper presented at the ACM Special Interest Group on Computer Personnel Research (SIGCPR), San Diego CA.
8. Goles, T. (2001). A View from the Entry Level: Student Perceptions of Critical Information Systems Job Attributes. Paper presented at the SIGCPR 2001, San Diego CA.
9. Gomolsky, B. (1999). *Understanding What Really Motivates IT Workers*. Stamford, CT: Gartner Group.
10. Herzberg, F. (1968). One More Time: How Do You Motivate Employees? *Harvard Business Review*, 46(1), 53-62.
11. Hunter, M. G. (2000). Factors that Influence Information Systems Professionals' Career Path: Reflective Career Biographies. Paper presented at the IT Management in the 21st Century. 2000 IRMA International Conference, Anchorage, Alaska.
12. Hunter, M. G. and Tan, F. B. (2001). Information Systems Professionals in New Zealand: Reflective Career Biographies (Preliminary Results). Paper presented at the Managing Information Technology in a Global Economy. 2001 IRMA International Conference, Toronto, Canada.
13. IT&T Skills Taskforce. (1998). *Future Demand for IT&T Skills in Australia 1999-2004*: Deloitte Touche Tohmatsu.
14. Jiang, J. J. and Klein, G. (2000). Supervisor Support and Career Anchor Impact on the Career Satisfaction of the Entry-Level Information Systems Professional. *Journal of Management Information Systems*, 16(3 (winter)), 219-240.
15. Keller, B., Rust, B., and Frey, N. (2002). *Public-Sector IT Staffing Survey: Shortages Persist for State and Local Governments*. Stamford, CT: Gartner Group.
16. Khan, M. B. and Kukalis, S. (1990). MIS Professionals: Education and Performance. *Information and Management*, 19(4), 249-255.
17. King, R. C. and Xia, W. (2001). Retaining IS Talents in the New Millennium: Effects of Socializing on IS Professionals' Role Adjustment and Organizational Attachment. Paper presented at the Association for Computing Machinery Special Interest Group on Computer Personnel Research (SIGCPR).
18. Knapp, J. (1993). Information Systems: Educational Offerings vs. Industry Needs - How Well Do They Match? Paper presented at the Special Interest Group on Computer Personnel Research Annual Conference, St Louis, MO.
19. Latimer, N. (2001). *Help Wanted: Workforce and E-Procurement Applications*. Stamford, CT: Gartner Group.
20. Lee, P. C. B. (1999). Career Strategies, Job Plateau, Career Plateau, and Job Satisfaction Among Information Technology Professionals. Paper presented at the Special Interest Group on Computer Personnel Research Annual Conference, New Orleans.
21. Little, J. C., Granger, M. J., Boyle, R., Gerhardt-Powals, J., Impagliazzo, J., Janik, C., Kubilis, N. J., Lippert, S. K., McCracken, W. M., Paliwoda, G., and Soja, P. (1999). Integrating Professionalism and Workplace Issues into the Computing and Information Technology Curriculum. *ITiCSE '99 Working Group Reports*, 33(4), 106-112.
22. Lowry, G. and Turner, R. (2004). An Overview of Education for a Technology-Based Profession: Softening the Information Systems Curriculum. In M. Khosrow-Pour (Ed.), *Encyclopedia of Information Systems and Technology* (pp. 9 pp.). Hershey: Information Science Publishing.
23. Lu, M. T. and Wang, P. (1998-1999). Knowledge and Skills of IS Graduates: A Hong Kong Perspective. *Journal of Computer Information Systems*, 39(winter), 40-46.
24. Mackenzie, K. (2002, 23 July 2002). Unis Lack on Skills, Says Cisco. *The Australian*, pp. 35.
25. Maglitta, J. (1996). IS Schools: Need Improvement. *Computerworld*, 30(8), 78-83.
26. Martz, W. B. and Landoff, G. (1999-2000). Information Systems Careers: A Comparison of Expectations. *Journal of Computer Information Systems* (winter), 41-45.
27. Mistic, M. M. and Russo, N. L. (1999). An Assessment of Systems Analysis and Design Courses. *Journal of Systems and Software*, 45(15 March), 197-202.

28. Kee, J. (2001). Skill Sets for the E-commerce Professional. Paper presented at the SSECP '2001, Melbourne, Australia.
29. Morello, D. T., Zidar, E., McNee, B., and Smith, C. (1998). IT Staff Retention and Recruitment: Addressing a Critical Problem for the IS Organisation. Gartner Group. Available: <http://gartner11.gartnerweb.com/public/static/hotc/00072957.html> [2002, 16/8/2002]
30. Mehta, R. and Sivadas, E. (1995). Comparing Response Rates and Response Content in Mail vs. Email Surveys. *Journal of the Market Research Society*, 37(4), 429-439.
31. Mistic, M. M. and Russo, N. L. (1999). An Assessment of Systems Analysis and Design Courses. *Journal of Systems and Software*, 45(15 March), 197-202.
32. Moore, J. E. (1998). Job Attitudes and Perceptions of Exhausted IS/IT Professionals: Are We Burning Out Valuable Human Resources. Paper presented at the Special Interest Group on Computer Personnel Research Annual Conference., Boston
33. Myers, M. E. and Beise, C. M. (2001). Nerd Work: Attractors and Barriers Perceived by Students Entering the IT Field. Special Interest Group on Computer Personnel Research Annual Conference, 201-204.
34. Niederman, F. (1999). Global Information Management and Human Resource Management: A Research Agenda. *Journal of Global Information Management*, 7(2), 33-39
35. NOIE. (1999a, 19/6/2000). International IT&T Skills Situation and Government Responses - Background Paper. National Office for the Information Economy. Available: [http://www.dcita.gov.au/Article/0,,0\\_1-2\\_1-4\\_13787,00.html](http://www.dcita.gov.au/Article/0,,0_1-2_1-4_13787,00.html) [2004, January 7]
36. NOIE. (1999b). Providing for the Future IT&T Skill Needs of Australia. National Office for the Information Economy. Available: [http://www.noie.gov.au/projects/access/Education/paper\\_futureskills\\_99.htm](http://www.noie.gov.au/projects/access/Education/paper_futureskills_99.htm) [2003, 28 December].
37. Paré, G., Tremblay, M., and Lalonde, P. (2001). Workforce Retention: What Do IT Employees Really Want? Paper presented at the Association for Computing Machinery Special Interest Group on Computer Personnel Research (SIGCPR), San Diego.
38. Perotti, V. J. and Perotti, V. S. (2000). Recruiting the Best in These Very Tough Times: A Study of Recruiter Behaviours Preferred by MIS Graduates. Paper presented at the IT Management in the 21st Century. 2000 IRMA International Conference, Anchorage, Alaska.
39. Rada, R. (1999). IT Skills Standards. *Communications of the ACM*, 42(4), 21-26.
40. Richards, T., Yellen, R., Kappelman, L., and Guynes, S. (1998). Information Systems Manager's Perceptions of IS Job Skills. *Journal of Computer Information Systems*, spring, 53-57.
41. Richens, E. (1998). HR Strategies for IS Professionals in the 21st Century. Paper presented at the Special Interest Group on Computer Personnel Research Annual Conference, Boston.
42. Ross, J. and Ruhleder, K. (1993). Preparing IS Professionals for a Rapidly Changing World: The Challenge for IS Educators. Paper presented at the Special Interest Group on Computer Personnel Research Annual Conference, St Louis MO.
43. Stein, A. and Hawking, P. (2001). E-skill Sets: A Manager's Focus. Paper presented at the SSECP '2001, Melbourne, Australia.
44. Stefl-Mabry, O. (1999). Professional Staff Development: Lessons Learned from Current Usability Studies. *Journal of Information Technology Impact*, 1(2), 81-104.
45. Snoko, R. and Underwood, A. (2002). Generic Attributes of IS Graduates - A Comparison of Australian Industry and Academic Views. Paper presented at the Eighth Americas Conference on Information Systems.
46. Tse, A. C. B., Tse, K. C., Yin, C. H., Yi, K. W., Yee, K. P., and Hong, W. C. (1995). Comparing Two Methods of Sending Out Questionnaires: E-mail vs. Mail. *Journal of the Market Research Society*, 37(4), 441-446.
47. Turner, R. and Lowry, G. (1999). Reconciling the Needs of New Information Systems Graduates and Their Employers in Small, Developed Countries. *South African Computer Journal*, 24;(3), 136-145.
48. Turner, R. and Lowry, G. (2000). Motivating and Recruiting Intending IS Professionals: A Study of What Attracts IS Students to Prospective Employment. *South African Computer Journal*, 26(4), 132-137.
49. Turner, R. and Lowry, G. (2001a). What Attracts IS Students to Prospective Employment: A Study of Students from Three Universities. *Managing Information Technology in a Global Economy*. (pp. 448-452). Hershey, USA: IRMA.

50. Turner, R. and Lowry, G. (2001b). The Third Dimension of the IS Curriculum: The Importance of Soft Skills for IT Practitioners. Paper presented at the ACIS 2001, Coffs Harbour, NSW, Australia.
51. Turner, R. and Lowry, G. (2002). The Relative Importance of 'Hard' and 'Soft' Skills for IT Practitioners. In M. Khrosrow-Pour (Ed.), *Issues and Trends of Information Technology Management in Contemporary Organizations* (pp. 1-10). Seattle, USA: IRMA.
52. Turner, R. and Lowry, G. (2003). Education for a Technology-Based Profession: Softening the Information Systems Curriculum. In T. McGill (Ed.), *Issues in Information Systems Education* (pp. 156-175). Hershey, USA: Idea Group Publishing.
53. Waterman, R. H., Waterman, J. A. and Collard, B. A. (1994). Toward a Career Resilient Workforce. *Harvard Business Review*, 69(July-August), 87-95.
54. Yelland, P. (2000, 20/6/2000). How You Can Get a Lift Over That Work Experience Barrier. *The Age*.
55. Young, J. and Keen, C. (1998). Potential Information System Professionals: Initial Post Graduation Appointment Experiences. Paper presented at the Ninth Australasian Conference on Information Systems, Sydney NSW.

**NOTES**