2010 ITWeb-JCSE Skills Survey

Summary of Main Findings

JOBURG CENTRE FOR SOFTWARE ENGINEERING

2010

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Summary of Main Findings

Introduction

This is the third Annual Skills Survey report, compiled by the Joburg Centre for Software Engineering (JCSE), using data collected through the ITWeb on-line survey and from other sources. This year, we have been joined in this partnership by the ISETT SETA and the Meraka e-Skills Institute. These new partners bring additional credibility to our survey and we have benefitted from the additional insights available from the ISETT SETA's own data gathering processes.

We had hoped that there would be a significant increase in corporate responses, following the extended partnership, which provided reach into new constituencies. At first glance, it appeared we had succeeded in this objective, as we saw greater response numbers. However, it seems that almost half of the corporate respondents failed to complete the survey, after posting their demographic details, in spite of a follow-up process. This has not happened before and we will be examining the causes in detail and looking to overcome this challenge in 2011. We emphasise that we do have enough data to draw valid conclusions and we experienced no problems with the personal responses.

ICT Skills – the Changing Environment

In spite of the global economic recession that has now extended into its third year, reports are regularly published that suggest the ICT sector will continue to experience a shortage of key skills in the short to medium term. The following example, published by CRImobile in March 2010[1], highlights Europe's challenge: "In a press conference held at CeBIT, high-level representatives from three IT-related groups [which were DigitalEurope, a European information and communications technology (ICT) industry association, and BITKOM, the German ICT industry association, as well as a Bonn-based consulting firm "empirica"] presented facts and figures about Europe's digital future.

"The European labour market may face a great shortfall of 384,000 ICT practitioners by 2015, while only 10 per cent of the economic sector would not require e-skills at that time, the three groups said, according to a foresight study. "Europe could lose an important competitive advantage if we do not fully capitalise on the ability of the digital industry," Bridget Cosgrave, Director-general of DigitalEurope, said. "The burning issue for Europe is to build an adequately e-skilled workforce."

"The digital industry has the capacity to create 400,000 new jobs in Europe in the next five years, with the increasing application of ICT solutions, such as e-health, e-government, e-learning, and e-business, the survey predicted."

The article goes on to bemoan the decline in the number of young people entering the ICT-related fields of study, due at least in part to perceived poor quality of teaching of IT classes at schools. It is hardly surprising, then, that South Africa is not immune from this global situation. As recently as October 2010, Career Junction's "Information Technology Job Report"[2] cites poor skills availability as a major reason for South Africa's IT industry struggling to compete globally.

[1] http://english.cri.cn/6966/2010/03/03/2001s553671.htm

[2] As reported by My Broadband, 10 October 2010 – http://mybroadband.co.za

In their comprehensive report published in 2008, Roodt and Paterson (p.58)[3] suggest that South Africa's shortage of computer professionals and associate professionals (CPAPs) by 2015 will be between 9 700 and 29 000, depending on whether ICT managers are included in the model. In their model, CPAPs make up 40% of the job roles in the broader ICT sector, indicating that the total shortage will be much higher.

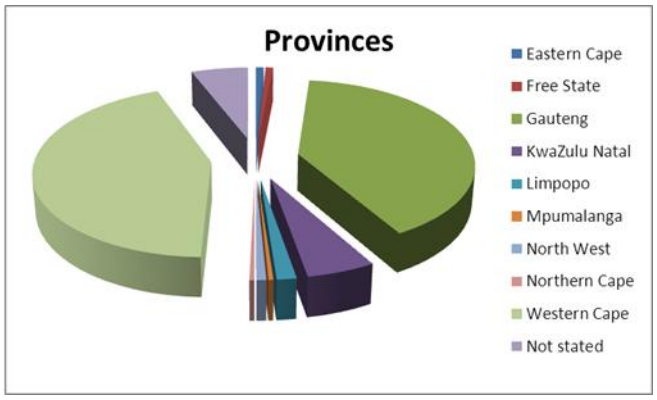
According to the ISETT SETA's Sector Skills Plan (p.6) for 2011-2016[4], they anticipate an under-supply of 500 ICT graduates from Universities and an **over-supply** of 5 000 graduates from Universities of Technology over the three years ending 2012. The detailed tables (pp.6-7) of scarce and critical skills required up to March 2013 list 20 scarce and 40 critical occupations, totalling 2 667 and 3 784 opportunities for skills investment, respectively. This data does not enable us to reach any conclusions about vacancy rates, though.

In looking at the South African ICT environment, we have attempted to arrive at a total number of employees engaged in skilled occupations, i.e. not including end-users and not including non-ICT roles, such as clerks, drivers and other non-technical jobs. Roodt and Paterson (op.cit.) suggested this was approximately 150 000 in 2005. ISETT SETA reports 143 000 in their Skills Plan (op.cit.), from which we would need to deduct the non-ICT roles and add back the ICT practitioners employed in other sectors, such as financial and government institutions and the major employers across the commercial, industrial and academic spectrum. We estimate the current total to be in the region of 175 000 employees, although we admit that this is open to debate, without some more firm evidence being available. This suggests that the South African ICT skills shortage is much lower than previously thought, perhaps between 7% and 15%.

Survey Process

As with the 2008 and 2009 Skills Surveys, the objectives were to identify the most pressing skills needs from the corporate perspective and to balance that with a view of the current skills capacity of the practitioners and their intentions for future skills development. The process was the same – using an almost identical questionnaire, devised by the JCSE, and published as an on-line survey by ITWeb. Additional participation was solicited with the support of the ISETT SETA, the Cape IT Initiative, the Information Technology Association and Computer Society South Africa.

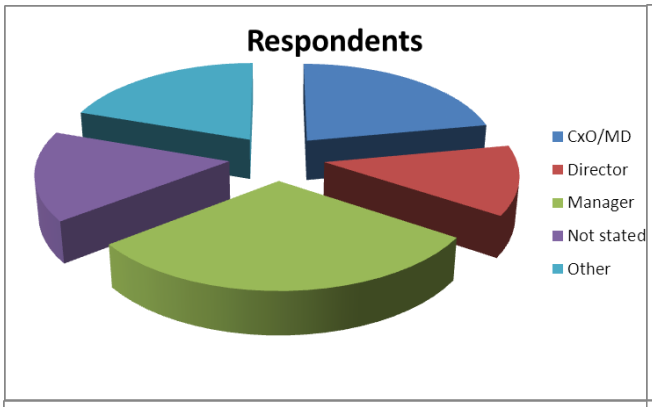
Following analysis of the data by JCSE, this summary and other reports are compiled. The findings are shared with the partners and will be reported through the ITWeb stable of publications in 2011.

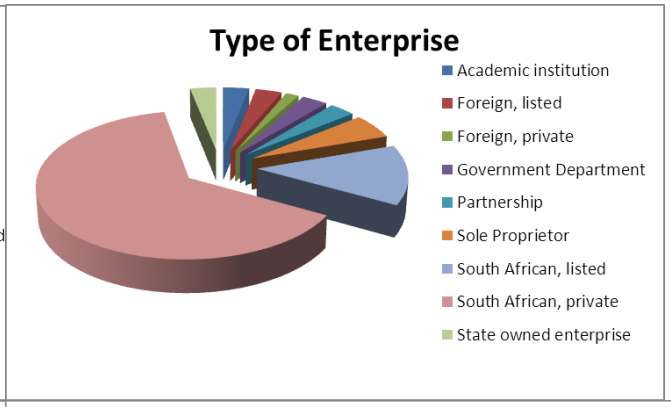


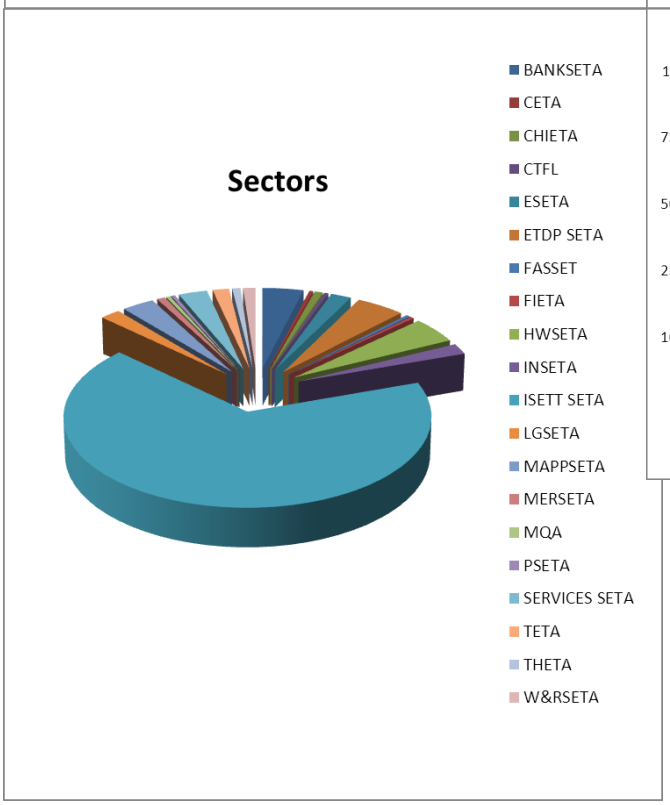
Corporate Responses

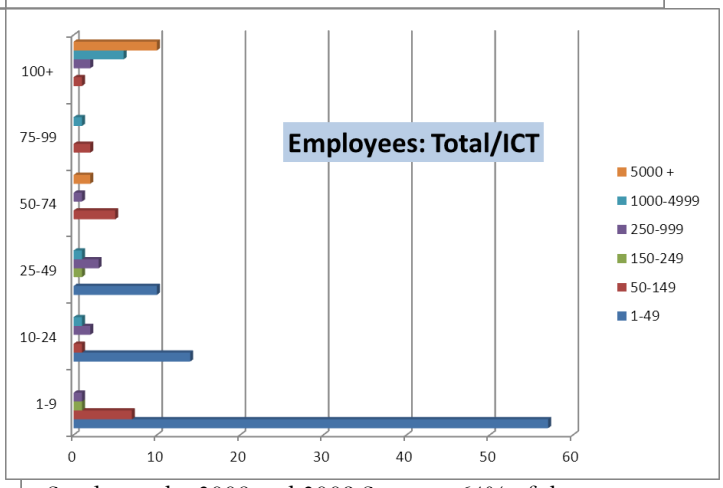
Although 254 identifiable responses were recorded, only 127 valid responses (i.e. all fields completed) were received from corporate executives, returning us to the 2008 level (2009 = 157). All nine Provinces were represented (2009 – 9; 2008 – 5) and 40% of the respondents were located in Gauteng, 44% in Western Cape (thanks to our colleagues at CITI). 34% of the respondents were C-level executives or Directors (2009 – 45%) and 30% were Managers (2009 – 25%).

[3] ICT Skills in the Labour Market: An Occupational Level Analysis Focusing on Computer Professionals and Associate Professionals, 1996-2005: Joan Roodt and Andrew Paterson: January 2008
[4] ISETT SETA Sector Skills Plan 2011-2016: September 2010: Version 1.1









Similar to the 2008 and 2009 Surveys, 64% of the enterprises were South African privately-owned (non-listed) companies and 13% were listed companies. 67% were operating in the ICT sector (2009 – 57%) and the remaining enterprises were drawn from the Banking, Construction, Chemical, Clothing, Energy, Education & Training, Financial Services, Forestry, Health & Welfare, Insurance, Government, Manufacturing/Engineering, Media/Advertising/Printing/Publishing, Mining, Retail/Wholesale, Tourism, Transport and other Services sectors – again, a very similar pattern to the 2008 and 2009 results.

62% of the enterprises have less than 50 employees (2009 – 50%; 2008 – 40%) and 25% have between 50 and 250 staff members (2008/9 - 20%). 45% of all respondents employ less than 10 people internally to supply ICT functions (2009 – 40%).

The ISETT SETA Sector Skills Plan 2011-2016 (SSP) reports that there are 2 672 companies (2009- 2 428) that it classifies as within its sector (i.e. they are paying the Skills Development Levy and have a payroll exceeding R500 000 per year) and that they employ 143 076 people (2009 - 141 929). Of these companies, 85% have 1-49 employees, 10% have 50 to 149 employees and 5% have 150 or more (largely unchanged from 2009). Approximately one-third of these companies submit a Workplace Skills Plan. This table from the SSP (op.cit.) shows the change in employment numbers since 2004:

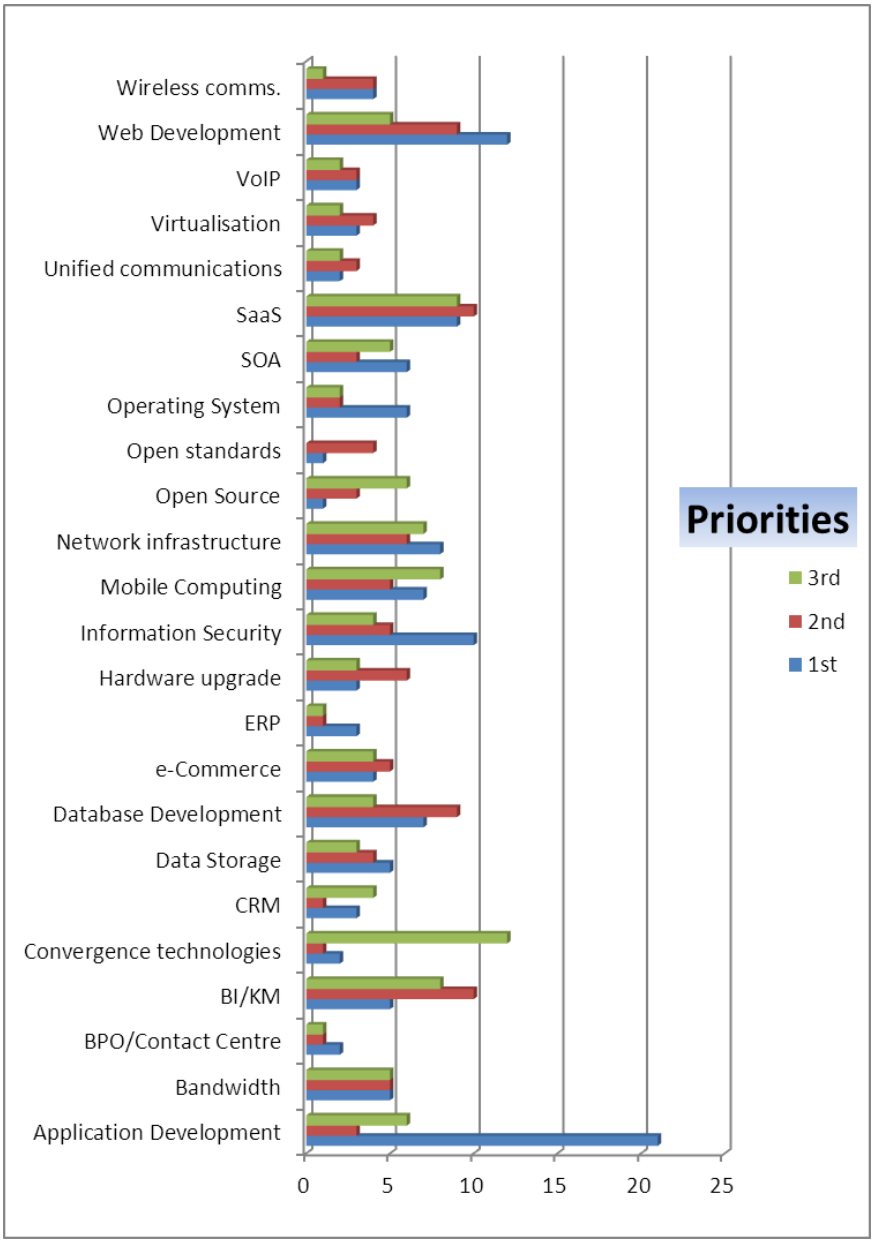
Company Size	2004	2004-2005 Growth	2005	2005-2006 Growth	2006	2006-2007 Growth	2007	2007-2008 Growth	2008	2008-2009 Growth	2009	2009-2010 Growth	2010
Large	86,828	-5.3%	82,234	5.4%	86,661	0.9%	87,465	-0.5%	87,000	6.9%	92,967	3.3%	96,015
Medium	16,440	9.4%	17,982	2.6%	18,446	9.8%	20,257	1.3%	20,513	-10.9%	18,270	-3.0%	17,719
Small	39,344	-15.6%	33,193	-6.4%	31,062	5.3%	32,710	12.1%	36,672	-16.3%	30,692	-4.4%	29,342
Total	**142,612**	**-6.5%**	**133,409**	**2.1%**	**136,169**	**3.1%**	**140,432**	**2.7%**	**144,185**	**-1.6%**	**141,929**	**0.8%**	**143,076**

TABLE 1: ICT SECTOR EMPLOYMENT GROWTH

As the SSP points out and our research shows, there are companies which have defined themselves as being in other sectors (e.g. Dimension Data in Services) and there are organisations (such as the banks) with a large ICT skills component which belong in other sectors. This means that the ISETT SETA data represents a sub-set of the ICT sector and the results of our Survey are seen as complementary to their data. The low rate of employment growth reflected in the ISETT SETA reports may be as much a reflection of the shortage of supply as the effect of the recession. We will examine this further in the succeeding sections of this report.

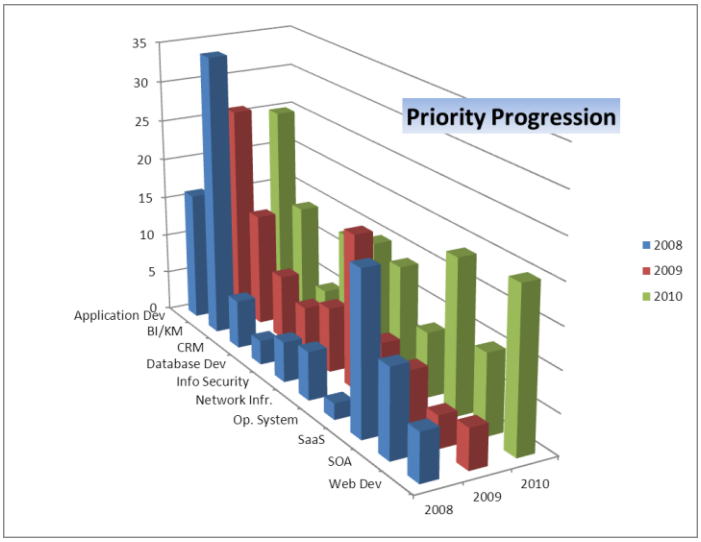
ICT Priorities

The 2008 Survey identified the top 6 priorities, based on the selection of their own top 3 by each respondent. That analysis showed that **Business Intelligence/Knowledge Management** was the top-ranked priority, followed by **Application Development** and **Software as a Service**. These were supported by Service Oriented Architecture, Web Development and Mobile Computing.



Our 2009 data was revised to include all identified priorities, and the chart showed that **Application Development** was last year's top priority, with **Business Intelligence/Knowledge Management** being pushed into third place by the (perhaps) surprise entry of **Network Infrastructure** in second place. CRM, Information Security and the Operating System were the supporting cast, although there was little difference between many of these "other" priorities.

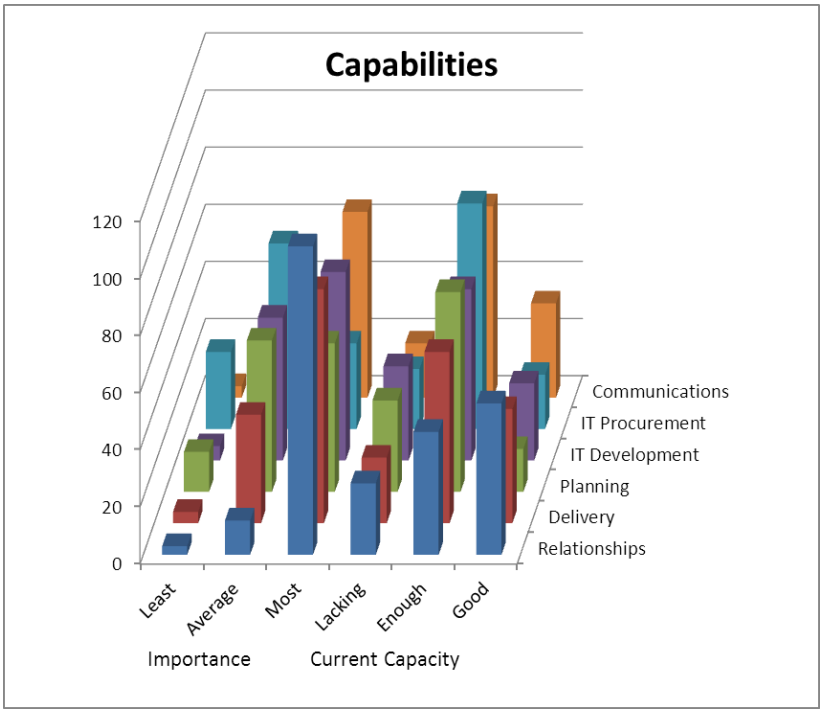
We thought that the emphasis on Network Infrastructure in 2009 reflected the growing realisation that effective broadband access is essential if the benefits of many of the other areas of development are to be felt.



Our **2010 data** has been revised again, to indicate what each respondent thought was their 1st, 2nd and 3rd priority for the coming year. **Application Development** retains its top spot for the second year, with **Web Development, Software as a Service** and **Business Intelligence/ Knowledge Management** just surfacing above several other contenders for the next most significant issues. The spread of interest among the second and third tiers of "priorities" indicates the wide range of challenges facing enterprise decision-makers who need to keep their information systems capable of delivering services that support the changing business needs.

If we compare the changes over the three year period, we can see a significant drop in the importance of **Business Intelligence/Knowledge Management** and a significant increase in the interest in **Web Development.** The lowered interest in Software as a Service (SaaS) in 2009 seems to have been an anomaly.

Business Capabilities



In spite of our concerns that ICT practitioners are expected to perform too many concurrent roles (see our 2008 and 2009 reports), it is important that technical skills are supported by a range of business capabilities.

Success is not just about the technical solution – good customer relationships, efficient delivery, effective planning, managed development, proper procurement and good communications are essential ingredients for excellent performance.

Our chart shows that knowledge of IT procurement is seen as the least important business capability, as is reflected in the highest rating of current capacity. The areas of most concern are Managing IT Development and Planning of Architecture & Infrastructure, each reflecting the highest "lacking" rating in current capacity. The overall indication that enterprises will be lacking around 15% of these attributes supports the overall level of the indicated skills shortage in the ICT sector.

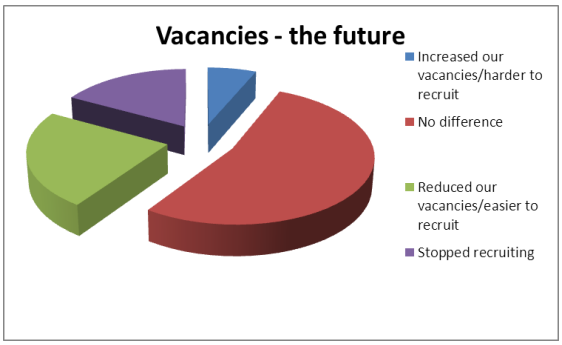
Staff Dynamics

Last year, we said that this is the section of the Survey where we would expect to see the immediate effect of the economic downturn. In 2008, one-third of corporate respondents said that there had been/would be no change in staff numbers in the previous/next year. The majority of enterprises expected to increase staff numbers by between 10% and 50% and almost nobody anticipated lower numbers in 2009. It was these results that led us to extrapolate the forecast demand to suggest that as many as 70 000 new practitioners would be required.

In 2009, there was an appreciable shift towards the reporting of lower staff numbers in the year to mid/late 2009 and into 2010.

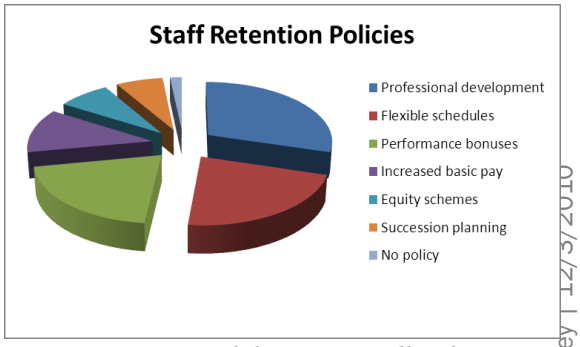
Although many small companies were still anticipating growth in employment, the numbers were offset by the much clearer evidence of some companies reducing staff numbers. Those who reported having lowered the complement in 2009 indicated that reductions were in the order of 20%, improving slightly to 14% in 2010.

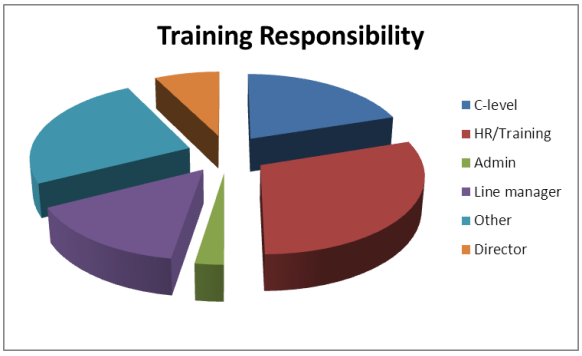
All of this, combined with the data from the ISETT SETA SSP and reports from some of the larger employers in South Africa, reinforces the picture that the actual growth rate in ICT employment is a lot lower than previously.



The Vacancies chart shows that 40% of enterprises report a lower number of vacancies or a cessation of hiring, following the recession. Although 53% say it has made no difference, this is not, in fact, an indication of continued hiring. In spite of the Skills Needs data (see below) showing that a high percentage of respondents continue to lack skills in many key areas, we do not see this translating into increased employment until the economy recovers. We are suggesting that the current demand will be limited to 7-15%, i.e. 12 000 – 25 000 job opportunities. This is considerably higher than the ISETT SETA numbers would suggest but we have to take into account the economic growth in the other major sectors of the South African (and global) economy.

There has been a minor change in the pattern of staff retention policies reported in the last year. Support for professional development remains the most popular and performance bonuses have slipped to third place, with flexible scheduling being particularly used in small companies. These three policies account for almost three-quarters of the reported retention policies.





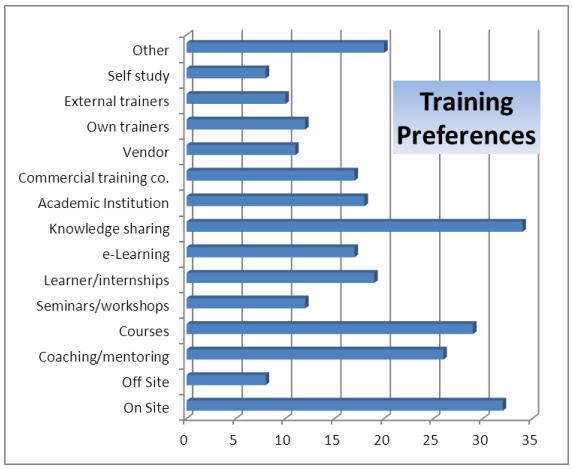
In our 2008 report, we commented that many small and medium size companies do not have a specific training function within their structure. The pattern remained the same in 2009, with C-level executives or owners in small businesses carrying this responsibility (as would be expected) but with a high proportion of line managers shouldering the burden in medium and large enterprises. There has been a slight shift from Line Managers to Human Resources and Training departments in 2010, perhaps beginning to address

the concern that line managers are faced with the dilemma of needing to satisfy the pressure of deadlines and delivery schedules against the need to grant time for training and career development to key employees.

Continuing the trend from 2008/9, overseas recruitment of skills declined again, although a small but steady stream of overseas workers are still obtaining work permits each month.

Corporate Preferences

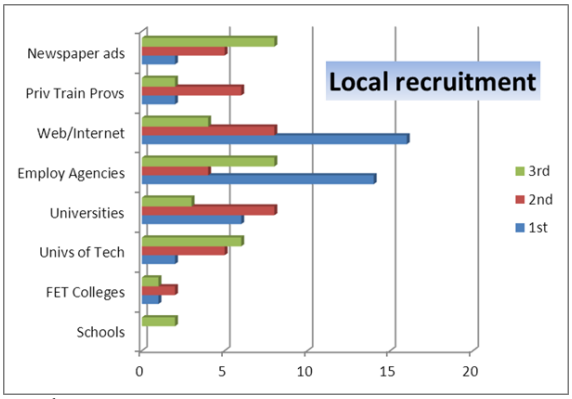
As in 2009, the responses to our question about the relative importance of pre-hiring qualifications and certifications revealed very little differentiation between the various types. A preference for graduate degrees continues to be slightly ahead of the pack, closely followed by diplomas and post-graduate qualifications, and recognition of vendor certifications brought up the rear. There continues to be general agreement that qualifications must be internationally comparable. An interesting development is the small but significant number of respondents indicating that they are "head-hunting" preferred candidates. We will track this in future surveys.



While the distinct preference for on-site training continues unabated, supporting the approaches to knowledge-sharing and coaching/mentoring processes, there has been resurgence in the use of courses at academic institutions and commercial training providers, at the expense of vendor programmes.

It is too early to identify this as a trend, as it may be only a reflection of short-term needs, rather than a strategic direction. It is clear that employers generally want the minimum off-the-job commitment to training time, even though they recognise the vital necessity for maintaining and enhancing skills levels.

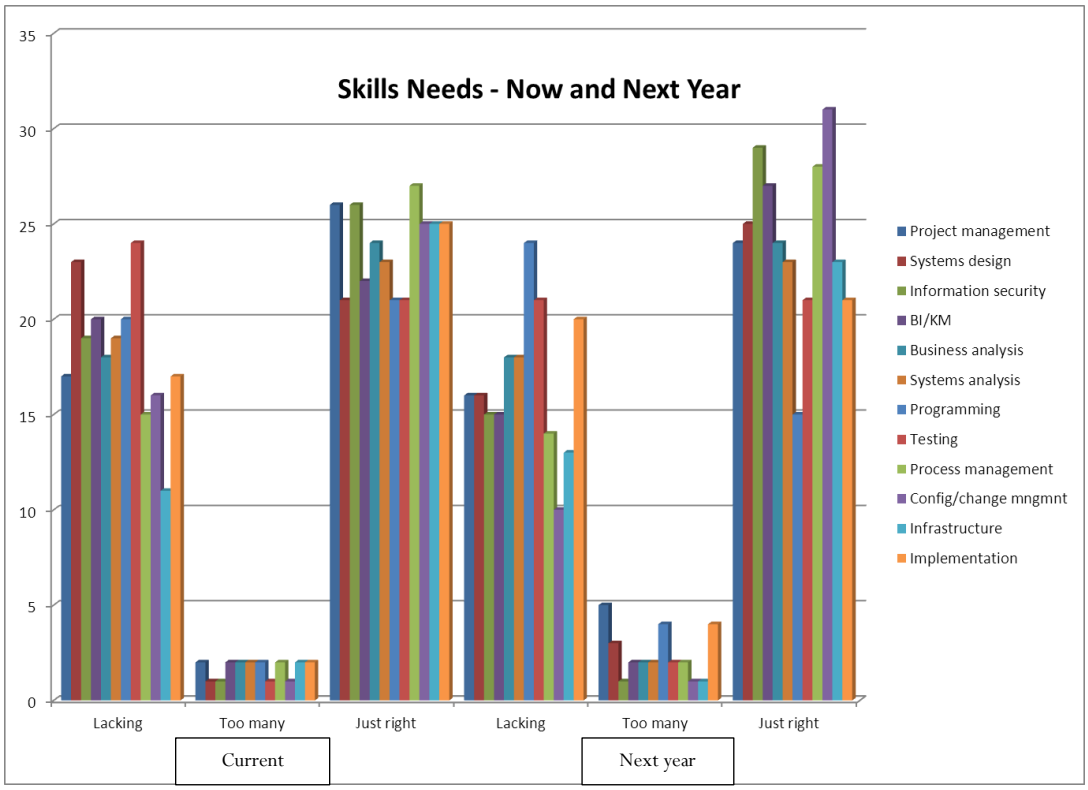
Over half of management training is achieved through coaching and mentoring, with only about one-third attending formal courses or a continuing professional development (CPD) process.

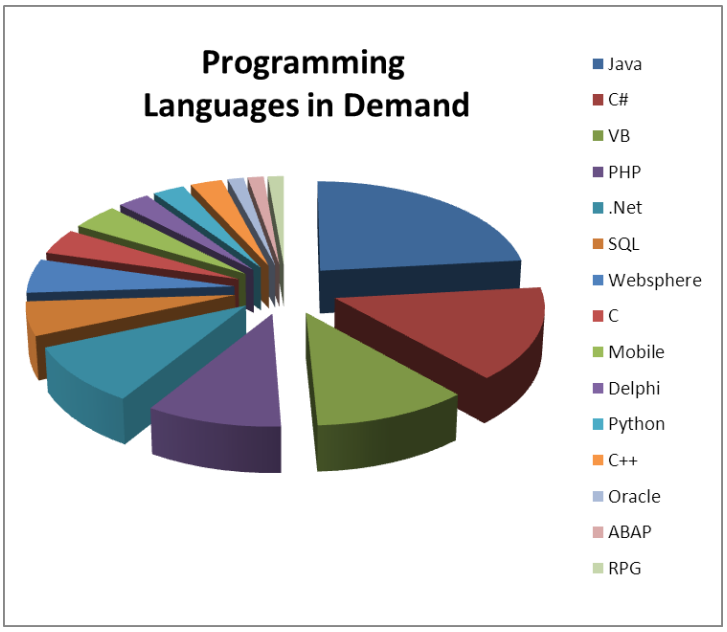


For the first time, in 2010, we asked respondents to indicate their preference for sources of local recruitment, listing them in order of 1st to 3rd choice. The chart clearly indicates that on-line recruiting is the first choice, followed by employment agencies. The other sources fall significantly behind these two, with Universities heading the choice of institutions.

Skills Needs

In this chart, we present a revised illustration of the technology roles where skills are most lacking. In 2008, we reported that the skills in highest demand were Process Management, Business Intelligence & Knowledge Management, Business Analysis and System(s) Analysis. It was anticipated that Programming/ Development and Systems Design/ Architecture would be in short supply in 2009. Infrastructure design/management and Implementation/Support were the areas of least concern.

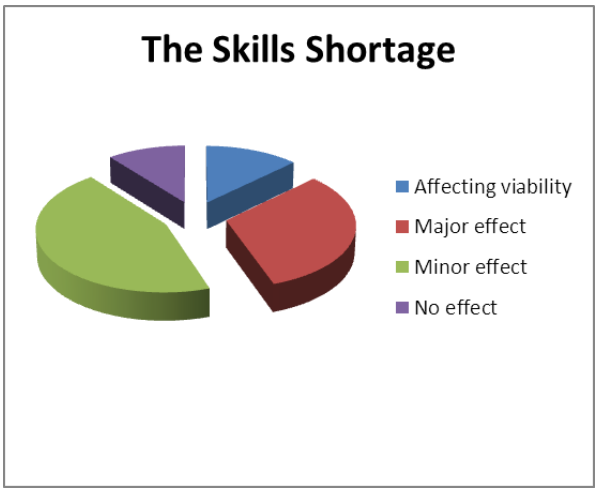




It is likely that the effects of the recession are as important a factor as any investment in training during the last year or so in creating the pronounced shift from "lacking" skills to the "just right or too many" columns on the right of the chart. It is clear that Programming/Development and Testing skills are the areas of strongest demand and it is interesting that Implementation/Support has moved back into the limelight after being of least concern in 2009.

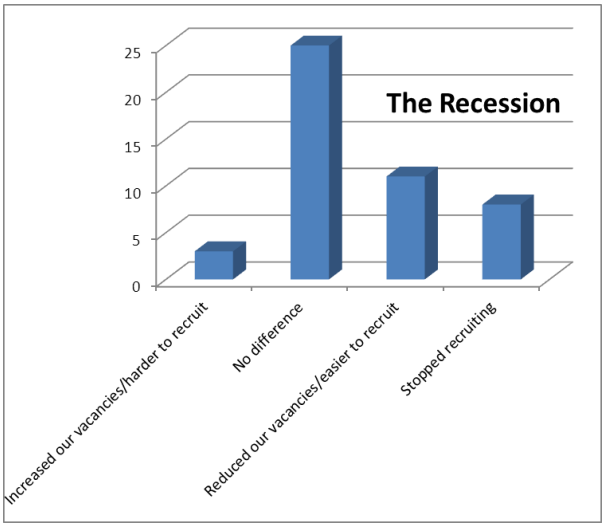
Java, C# and VB topped the list of programming languages in demand again this year (very similar to 2008 and 2009). **PHP** and **.Net** came close behind VB.

Impact of the Skills Shortage and the Economic Downturn



In 2008, all respondents indicated that the skills shortage was having at least a major effect on their business, with a few indicating that it was affecting the viability of their operations. In 2009, 75% still said that the skills shortage is having a major effect on their business and a few are still concerned about their viability for this reason. This suggests that the recessionary influences had not yet filtered through to the IT departments or to the plans to procure IT solutions that were already in place last year.

In 2010, the 75% has shrunk to 45%, suggesting that the demand for critical skills is lessening significantly, perhaps because more suitable candidates are available.



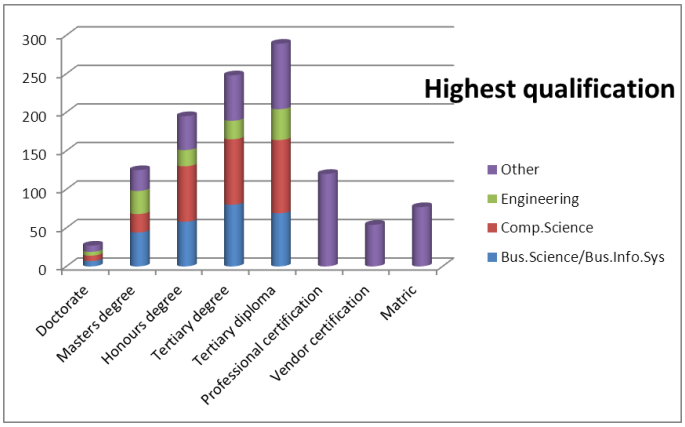
As mentioned earlier, only a tiny percentage of respondents are still indicating that it is hard to recruit their skills needs. About half say it has not affected their hiring policy and the remainder are either not recruiting or are having little difficulty in finding the skills they are seeking.

Corporate Summary

There is no doubt that the economic downturn that has shrunk the global markets has had a serious effect on the South African economy. While it remains true that our ICT sector continues to suffer a shortage of skills in a number of key disciplines, we are getting some mixed signals about how seriously this is inhibiting the ability of the ICT providers to deliver the products and services expected of them. Large institutions (including government) will be committed to some long-term projects that cannot be curtailed or cancelled before completion. The demands of changing technology and the benefits of upgrading or replacing obsolete systems require that, in many cases, the investment in technology continues, even if other business activities are being reduced. Small and medium enterprises can react more quickly to changing conditions and will have to seek new business more aggressively if they are to maintain their sustainability.

We can expect that the growth in the country's economy will remain at relatively low levels for the foreseeable future, but this creates an opportunity for us to close the "skills gap" by improving the performance of our education institutions and honing the skills of the current employee base. It is essential that South Africa addresses these skills issues to improve its competitiveness in what promises to be a tough global market.

Practitioner Responses

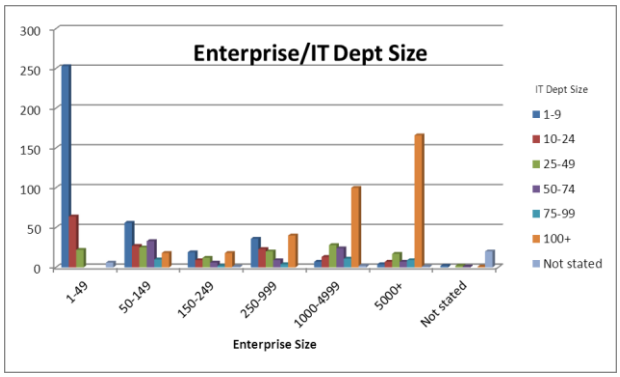


1135 valid Practitioner responses were received, 23% down on 2009's 1471 but still 18% up on 2008's 965. It is disappointing that we could not maintain the momentum but we are satisfied that the sample is large enough from which to draw valid conclusions. In this section of the report, figures in (brackets) are the 2009 results.

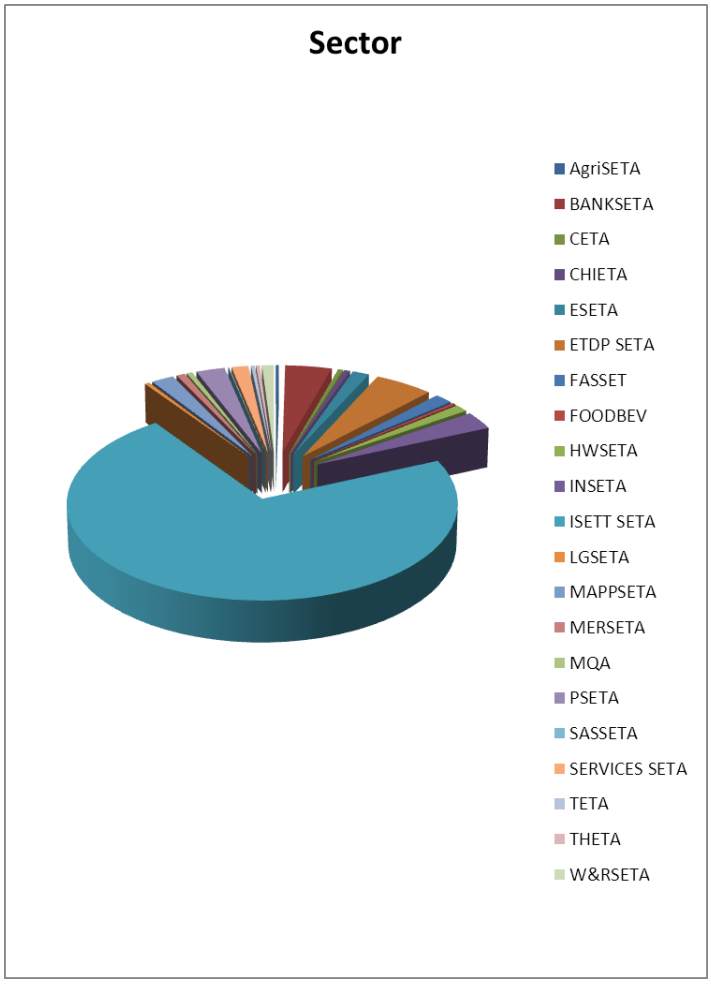
Practitioner Profile

For the past two years, we found that the "average" respondent was a 35 year old male "permanently" employed in Gauteng with more than 10 years IT experience, less than 5 years at their current employer and working as a technical manager or as a developer/programmer. In 2010, we see slightly more in the developer/programmer category and the number of Western Cape respondents has equalled the Gauteng level (thanks again, CITI).

47% (66%) have a tertiary qualification, 43% (70%) are in Gauteng, 47% (16%) in the Western Cape, 6% (7%) in KZN. All Provinces are represented in the 2010 respondents, as they were in 2009. 20% (21%) of the practitioners who responded



are female. Only 10% of respondents are under the age of 25 – an indicator of the low number of new entrants to the ICT sector in recent years.



As before, most respondents work in a small (1-9) department or a large one (100+). 14% have worked for their current employer for between 1 and 5 years and only 3% (17%) have been in the industry for less than a year. In 2008, this figure was as high as 22%, supporting the trends identified from the Corporate respondents of the drastic decline in hiring in the past year. 10% have been in the industry for 6-10 years and 15% for more than 10 years.

In 2008, 57% of respondents worked in the ICT sector. In 2009, the figure rose to 60% and in 2010 it has risen again to 72%. This is of some concern to the research project, as we are experiencing declining interest from respondents in other sectors, although this is offset to a limited degree by

the increased interest from the Western Cape ICT sector.

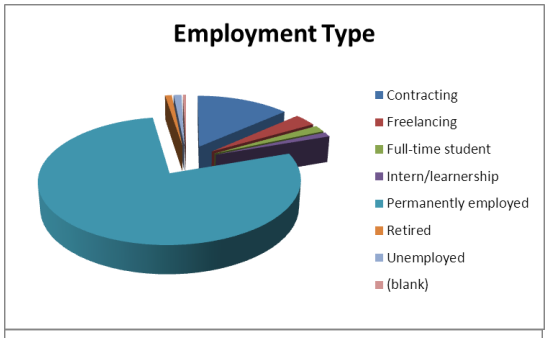
13% (14%) of responding practitioners are contractors and would be affected by the proposed banning of Labour Brokers, if the proposals were to be legislated in the form originally proposed by the Department of Labour. 78% are in permanent employment. This distribution is almost unchanged from 2009.

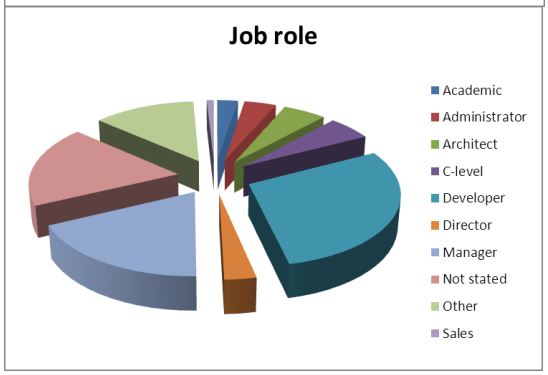
Practitioner Roles

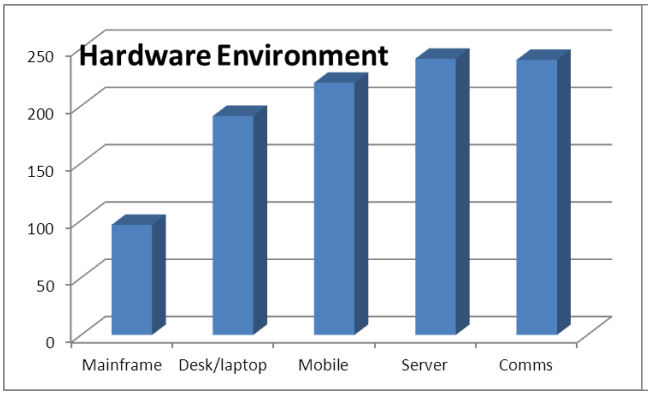
9% (5%) are working as C-Level executives or Directors, 18% (10%) are managing Operations or Development, 10% (5%) are Project Managers, 29% (15%) are in Programming or Development roles and another 17% (15%) are in Support functions.

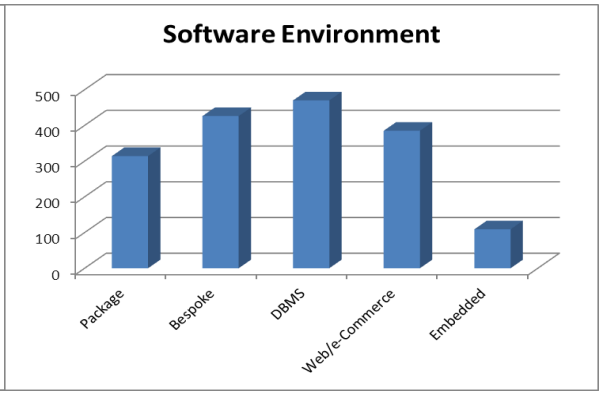
As in previous years, just over one-third of practitioners are engaged in hardware and infrastructure related activities. For the first time, we have seen a significant increase in those working in the mobile arena, with 220 respondents indicating this area of interest.

In software development and implementation, database management systems have moved to occupy the largest number of practitioners, closely followed by significant numbers involved in customised/bespoke software. Web-based systems/e-Commerce have moved into third place, ahead of packaged software. 109 respondents are engaged in embedded systems work.









The emphasis on servers and DBMS shows the increasing use of business intelligence and knowledge management systems to support decision-making. Engagement in mobile systems and other communications infrastructure reflects the trend towards users requiring systems to be available where they are and no longer tied to an office or a desk.

Multi-tasking

For the last two years, we have commented on the high number of different "tasks" carried out by the average South African ICT practitioner. There has been no appreciable change in the 2010 responses. Only a minority of respondents describe what they do as involving three or less areas of activity. We can understand that it is appropriate for complementary roles to be performed over time, such as design, developing requirements,

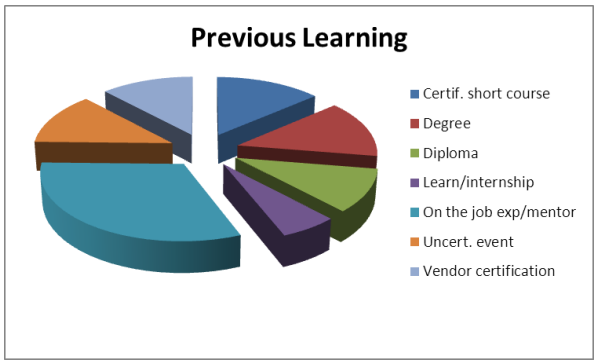
programming, testing and maintenance. We can also appreciate that in small enterprises, one has to be the "chief cook and bottle washer" and be responsible for all phases of management, administration and systems development.

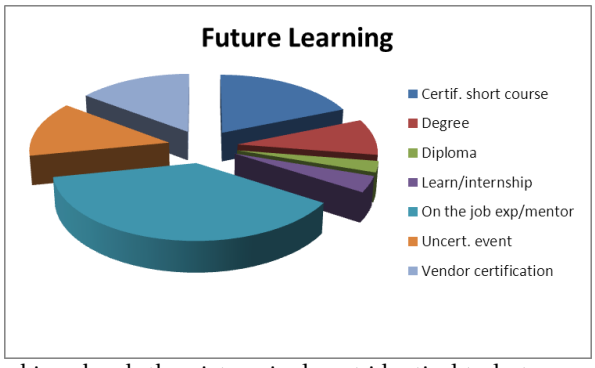
However, this does not account for the very high proportion of respondents who indicate that they carry out a very high number of technical and business activities. If a practitioner perceives that they are performing as many as a dozen different roles, from technical consulting to administration, from programming to client management, from business analysis to outsourcing arrangements, it is difficult to see how they can maintain focus on specific objectives while juggling these responsibilities. It is unlikely that they have the required strengths in all these activities or the time available to carry them all out, which would lead to a degree of underperformance in some areas.

Skills Acquisition

As in the previous two years, respondents showed how they had acquired their skills in the past, to qualify them for their current post, and how they intended to acquire skills in the future, to maintain their value in the job market.

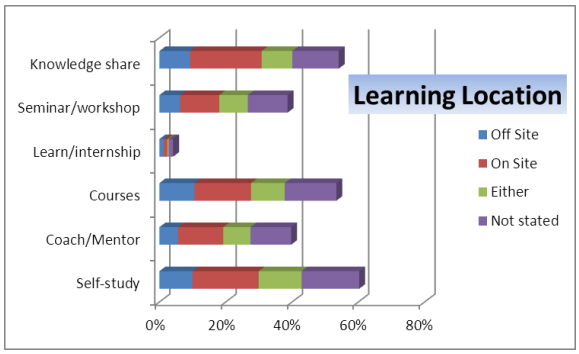
The predominance of "on the job experience or mentoring" is fairly constant, reported by 89% of respondents (2009 – 86%, 2008 - 90%) in the acquisition of skills to date. The remaining distribution was largely unchanged, but we did introduce the Learnership/Internship option in the 2010 survey and this was reported by 160 practitioners as part of their acquisition of skills in the past. We continue to note that employers are less enthusiastic about certifications than the practitioners, suggesting two factors: one is that commercial training providers "oversell" their courses to practitioners and the other is that practitioners are willing to acquire a certificate even though it may not directly influence their employment.





Looking ahead, the picture is almost identical to last year. Skills acquisition through experience, supported by short courses that lead to certification (whether vendor-specific or not) are preferred by practitioners. Those in work find less time available for continuing academic studies, even on a part-time basis, due to the pressures imposed by the challenging economic environment. In spite of the preference for on-site learning, a significant proportion of respondents indicate that the transfer of knowledge is best suited to an environment outside of the actual workplace.

As would be expected from the preference for on the job training, the use of knowledge sharing and self-study as the preferred self-paced learning sources dominate. As far as external providers are concerned, the balance between academic, commercial and vendor remains even at about one-third each, which is in line with what we reported in 2009.



Conclusions

Much has changed in 2010, in the world, in our country and in the ICT sector. South Africa spent much of the first half of the year in the thrall of the FIFA 2010 Soccer World Cup, which diverted our collective attention from the more mundane issues. Since then, the reality of the global economic recession has begun to bite, with published and unpublished retrenchment/job loss numbers rising and company financial results reflecting reduced turnovers and reduced profits. Even the final appearance of 8ta in the mobile telecommunications market will do little to expand the employment arena; rather, it will perhaps stave off the shrinkage that Telkom has experienced.

We had high hopes that this year's survey would attract a greater response, building on the momentum of 2008 and 2009 with the support of our new partners. Sadly, the valid data is at pretty much the same level as before, although we have benefitted from the closer relationship with the Sector Skills Planning unit at the ISETT SETA and we recommend perusal of the Sector Skills Plan for 2011-2016 (op.cit.) in conjunction with this report.

What we can see from the data is the growing influence of social networks on the skills required in the ICT sector, combined with the increasing use of mobile devices as business tools. Although these new technologies represent increased demand for the relevant skills, this is largely offset by the decline in other, more traditional areas. Our expectations of job growth in the ICT sector are now appreciably lower than last year.

Even so, and perhaps because of this more challenging environment, there is a greater need for the South African ICT sector to be more competitive. This can be achieved through improving the currency of the skills base, adhering to technical and business standards and encouraging professionalism for all practitioners. Core to this performance is the ongoing vital need for the country's education systems to equip all young people with the ability to embrace technology as the tools of life, and to encourage those with aptitude to pursue the study of technology so that they can become the enablers of our economic and social future.