




Careers in

Information & Communications
Technology (ICT)

Contents

Foreword	1
Introduction	2
Snapshot of the ICT Sector in Australia	2
Graduate Employment and Salary Information	2
ICT Career Pathways and Training	3
Vocational Education & Training (VET)	3
University Programs	4
Vendor/Signature Training	4
Occupations in the ICT Industry	4
Key Occupation Descriptors	6
1. Analysts	6
2. Developers	6
3. Managers	7
4. Quality Specialists	7
5. Technical/Engineering Roles	8
6. Other Specialist Roles	8
7. End-User and Technical Support Roles	9
8. Sales and Marketing Roles	10
Skills in Demand	10
Career Progression in the ICT industry	12
Graduate Profiles.....	13-17
Job Search Strategies.....	18
What Employers Want: Personal and Work Attributes in Demand	18
Graduate Employers Say...	19
Career Planning Strategies.....	19
1. Getting experience in your current workplace	19
2. Networking	20
3. Targeted cold calling	20
4. Contacting recruiters	20
Job Search Traps to Avoid	20
Preparing Yourself for Work	21
Further Information About Careers in ICT	21
Acknowledgments.....	22

NOTE:

Wherever you see this icon  please go to www.graduatecareers.com.au>>What Job For You>>Career Profiles>>ICT>>More Information for continued discussion and/or useful websites on that subject.

Foreword



Congratulations on your decision to consider a career in the Information and Communications Technology (ICT) sector.

More than any other industry today, ICT offers a diverse range of opportunities and challenges that allows you to explore your own areas of interest and expertise through your professional endeavours.

Because ICT is so pervasive and provides the enabling infrastructure for every other industry, ICT professionals can choose to work in industries as diverse as finance, retail, manufacturing, telecommunications, mining, fashion, multimedia, government, entertainment and more. The possibilities are only limited by your interest, drive and imagination.

Of course, ICT is also an important sector in its own right, contributing around six per cent of Australia's GDP and generating revenues of \$85 billion per annum.

You can work with a multinational corporation, operate as an independent contractor or consultant, or join one of the thousands of thriving Australian Small to Medium Enterprises (SMEs) engaged in delivering innovative technologies and services to business, government and the wider community.

ICT is also a global industry sector, with international standards and methodologies that allow ICT professionals to travel and work almost anywhere in the world. The current global shortage of ICT professionals means even more opportunities for those wishing to experience other cultures and lifestyles. Australian ICT professionals are highly regarded overseas for their strong work ethic, high quality education and 'can do' attitude.

The Australian Computer Society (ACS) is currently working with other leading ICT professional associations around the world to develop an international accreditation for ICT professionals that will allow wider recognition of their knowledge and skills, opening up even more doors for Australians wanting to work abroad.

ICT is a highly paid profession that demands continuous education and professional development to stay up to date with emerging trends and developments, and rewards those who commit to this high standard.

Many ICT roles increasingly require highly developed business communications and problem solving skills to effectively negotiate with clients, management and technical staff in order to design and implement solutions that support business needs. A strong dose of vision and possibility thinking are also important when it comes to seeing the potential for new technologies to shape our future.

ICT offers the potential to solve many of our nation's greatest challenges, from global warming, water shortages and other environmental issues through to driving increased productivity and opening up access to new markets and opportunities through improved communications.

When it comes to a rewarding and challenging career that keeps you engaged, offers the chance to make a significant contribution and ensures an outstanding quality of life, it's hard to beat ICT.

Anthony Wong MACS

- ACS National President

Introduction

While the ICT industry does exist in its own right, many of the people in the field are employed across a range of other industries, perhaps presenting an impression that the industry is much smaller than its actual size. This has led to the mistaken belief that ICT jobs are in short supply and could be one reason for the recent downturn in people wanting to enrol in courses. Another could relate to the large number of job titles, many of which are specific to just one industry, making it difficult to identify the full range of roles on offer.

The *Year 2000* frenzy may have well and truly passed, but the technology era is far from over. With constant demands for innovative software solutions, upgrades of systems and speedier and more efficient processes, there are still fantastic opportunities available and the field will certainly support new entrants well into the future. The ICT industry today is one characterised by ever-increasing sophistication, globalisation, virtualisation and specialisation which means graduates can and often do create their own niches rather than simply responding to traditional job advertisements.

Businesses, governments, manufacturers, service providers and even private individuals continue to need people with a range of specialist ICT skills. This includes staff members, contract workers, service providers and product sellers. ICT qualifications are therefore highly regarded and provide an excellent career foundation, whether they are undertaken on their own or in combination with one or more other disciplines (such as Business, Accounting, Commerce, Engineering etc.), thus enabling graduates to enter the labour market in a wide range of industries.

Read the graduate profiles to discover just some of the possible exciting career journeys you might want to consider. You will also learn useful information about the sector as a whole, the opportunities within it and the best ways to access these along with job search methods and tips. I hope you will find the information useful in developing your own fantastic career in ICT.

Julie Farthing

Author, *FCDA*, *MCareerDev* and *Career Consultant*

The ICT industry today is one characterised by ever-increasing sophistication, globalisation, virtualisation and specialisation. Graduates can create their own niches...

Snapshot of the ICT Sector in Australia

ICT encompasses a range of terms that are used to describe the sector. These provide an historical perspective on how technology is used to manage information, and help to create more efficient processes. Some of these names are:

- Information Technology (IT)
- Information Technology and Telecommunications (IT & T)
- Computing
- Computer Science.

These terms are largely interchangeable today. ICT workers include blue and white collar workers, technical and trades people, professionals and executives. The relatively recent arrival on the scene of the Chief Information Officer (CIO) indicates that the leaders in large corporations now recognise the important role that technology plays in an organisation's ongoing success.

ICT is in part an industry in its own right, although there are ICT specialists in just about every workplace, either physically or virtually, who might develop software, install hardware or provide support. Most large organisations have their own ICT departments.

Graduate Employment and Salary Information

With ICT skills, the likelihood of being employed is high. At the time of writing, many ICT-related job vacancies remain unfilled because there are not enough applicants. This trend is expected to continue over the next five years as fewer people will graduate while the demand will remain high. Salary rates can change, so for current information about the starting salaries and destinations of ICT graduates visit the GradsOnline website (www.gradsonline.com.au) produced by Graduate Careers Australia (GCA). GradsOnline provides state-by-state and gender breakdowns of ICT-related industry activity, trends in graduate salaries and activities and salary comparisons with other fields of education. For salary and labour market information for TAFE graduates, visit the National Centre for Vocational Education Research (NCVER) website (www.ncver.edu.au).

A snapshot of the statistical data on the Australian ICT sector, ICT higher and vocational education, ICT trade, ICT employment and skills and ICT migration is also available through the Australian Computer Society (ACS) website (www.acs.org.au/2009compendium).



ICT Career Pathways and Training

Generally speaking, there are five education and training options related to the ICT industry:

- **On-the-job Training:** this includes inductions and in-house training programs.
- **VET Programs:** including certificates I-IV, diplomas and vocational graduate certificates offered by organisations such as TAFEs and private training colleges.
- **University Programs:** including undergraduate degrees, degrees with honours, graduate diplomas and masters qualifications.
- **Vendor/Signature Training:** related to specific products delivered by a range of organisations including private training colleges and vendors themselves.
- **Ongoing Professional Development:** this is usually run by professional associations or industry groups; some of these have prerequisite qualifications or experience.

ICT workers must engage in ongoing learning throughout their careers in order to keep abreast of technology and changing user requirements. This means that, depending on their needs at any given time, one or more of the above options will be included in an individual's learning program. For example, a young person may commence working for a large organisation on leaving school, perhaps undertaking a traineeship. He or she then goes on to study at TAFE, obtaining a diploma which is then converted to a year or more of a degree program. Once the student completes the degree, he or she works in one or more ICT areas for four or five years, perhaps participating in a vendor training program, then returns to undertake a masters program in an area of key interest.

Other ICT workers begin their studies at postgraduate level, having obtained an undergraduate qualification in another field such as Accounting, Engineering or Commerce, usually after several years of on-the-job experience.

People intending to learn and/or study should read the course content carefully, as titles may be misleading and may change from institution to institution or from one year to the next.

Vocational Education & Training (VET)

A wide range of public and private organisations deliver training that leads to nationally recognised qualifications. VET courses often provide entry with advanced standing to university study. VET courses are in most cases shorter and more practically-based than university programs, and depending on the delivery and assessment approaches of the training organisation can be achieved through a mixture of on- and off-the-job training. Recognition of prior learning (RPL) via formal study or on-the-job experience may reduce the time taken to obtain these qualifications.

There are four main types of VET courses:

1. **Certificate courses** range from Certificate I to Certificate IV in Information Technology, Technology or Multimedia. At the Certificate IV level these courses usually become more specialised, e.g. client support, multimedia, networking.
2. **Diploma and Advanced Diploma courses** may begin with a certificate course; these usually take around two years to complete.
3. **Graduate Programs** offer people with on-the-job experience and/or an undergraduate degree the opportunity to obtain a vocational graduate certificate (or higher).
4. **Statement courses** include vendor programs and also non-vendor-specific specialisations, e.g. creating databases; developing macros; and learning to build, upgrade and repair PCs etc. These courses are often useful for small business operators and those with special interests.

VET programs are run by a range of providers: secondary schools, TAFEs, adult education centres and private registered training organisations (RTOs). Depending on the qualification, graduates may work in one of these occupations:

- Client support
- Database administration
- Games development
- Helpdesk operation
- Multimedia development (e.g. DVD, CD-ROM, Film, TV)
- Network administration
- Network engineering
- Software development
- Systems analysis and design
- Technical support
- Troubleshooting
- Web development.

University Programs

Most universities offer ICT-related courses. These may be within an ICT or IT faculty, or else found in Business, Engineering or Arts faculties. Samples of the programs currently available from Australia's 39 universities include:

- Bachelor of Computer Science
- Bachelor of Business Informatics
- Bachelor of Engineering in Microelectronic Engineering
- Bachelor of Information and Communications Technology
- Bachelor of Information Technology/ICT
- Bachelor of Multimedia/Multimedia & Digital Arts
- Bachelor of Science (Games Software Design and Production)
- Bachelor of Internet Science and Technology
- Bachelor of Science (Software Engineering)
- Bachelor of Science (Information Systems)
- Bachelor of Science (Internet Computing)
- Graduate Certificate in Information Systems
- Graduate Diploma in Information Technology
- Graduate Diploma in Internetworking
- Master of Science (Network Engineering)
- Master of Computer Science
- Master of Computing
- Master of Information Technology
- Master of Software Engineering
- PhDs in a range of specialisations
- ICT graduates may also go on to study the Graduate Diploma in Education.

Many institutions offer broadly-titled courses such as a Bachelor of Computer Science that allow you to major or specialise in one or more areas as you progress through the course. Other institutions offer a variety of niche degrees, each one targeting a special area of the market such as the Bachelor of Engineering (Microelectronic Engineering).

ICT courses are often offered in combination with another discipline. Dual-sector institutions, and others...offer pathways to university programs via a TAFE diploma or advanced diploma.

ICT courses are often offered in combination with another discipline. Dual-sector institutions, and others through special articulation arrangements, offer pathways to university (higher education) programs via a TAFE diploma or advanced diploma.

If you have a base qualification in another field you may choose to take a graduate certificate or graduate diploma program to gain specialist IT skills. When deciding whether or not to undertake a fourth year of study, determine the market standard in the area in which you wish to work before enrolling. For example, research institutions may regard an honours year as a base qualification, while commercial enterprises usually place greater value on a combination of work and study experiences.

Vendor/Signature Training

Much of this training is related to specific products and is often delivered by private training colleges and the vendors themselves. Many vendors offer certification which becomes a transferable qualification within the industry.

Vendor training is often undertaken by those already employed as a way of maintaining and extending their skills. These programs can be expensive and are often subsidised or paid for by the employer, however, taking these courses is also a way of demonstrating to an employer your motivation and enthusiasm for working in a particular area. Due to high costs it is important to select courses wisely, especially if you are self-funding them.

A number of training organisations deliver both VET programs and vendor/signature courses.

Occupations in the ICT Industry

The following occupational groupings provide a guide to the kinds of roles ICT workers undertake. Often job roles will overlap and/or individuals might work in two or more functional areas. Do not rely on a job title only to determine what duties you will be undertaking in a particular setting. Many industries and organisations have job titles that are specific; research may be required in order to locate the job roles that best match your range of skills.

This table should not to be taken as an indication of positions available at a particular time or geographical location. Consult our online resources for up-to-date information.



Some job titles under the functional headings include:

Analysts	Developers	Managers	Quality Specialists	Engineers	Other Specialist Roles	End-User and Technical Support Roles	Sales and Marketing
Business Analyst	Analyst/ Programmer	Development Manager	Auditor	Computer Service Engineer	Communications Specialist	Computer Operator	Account Manager
Business Systems Analyst	Application Programmer	e-Commerce Project Manager	EDP Auditor	Computer Systems Engineer	Data Modeller	Computer Systems Officer	After-Sales Consultant
Business Systems Planner	Computer Animator	Information Systems Manager	QA Test Analyst	Customer Engineer	Design Specialist	Customer Engineer	Computer Sales and Marketing Manager
Database Analyst	Data Warehouse Developer	Network Manager	Quality Lead	Electronics Engineer	Design Technician/ Specialist – research and development (R&D)	Database Administrator	Contracts Administration Manager
Systems Administration Analyst	Database Developer	Operations Manager	Quality Specialist	Hardware Design Engineer	Desktop Publisher	Hardware Technician	Customer Contact Centre Operator
Test Analyst	Developer/ Applications Programmer	Service Manager	Tester	Integration Engineer	e-Commerce Architect	Helpdesk Operator	Customer Training Officer
	e-Commerce Programmer	Team Leader		Network Engineer	e-Learning Coordinator	ICT Trainer/ Educator	Pre-Sales Consultant
	Games Designer and Developer	Technical Development Manager		Software Engineer	Geographic Information Specialist	Repair/Service Engineer	
	Multimedia Developer	Test Manager		Systems Engineer	Instructional Designer		
	Network Analyst			Technical Support Engineer	Internet/Intranet Administrator		
	Senior Programmer			Telecommunications Engineer	Knowledge Management Specialist		
	Software Programmer				Network Administrator		
	Systems Programmer				Network Designer		
	Web Programmer				Security Specialist		
					Software Architect		
					Solutions Architect		
					Systems Administrator		
					Technical Implementer		
					Technical Installer		
					Technical Writer/ Documenter		
					Web Administrator		
					Web Architect		
					Web Designer		

Key Occupation Descriptors

1. Analysts

ICT professionals may become analysts after spending two to three years in the field, during which time they gain broad industry knowledge and a range of technical skills related to their area of specialisation. They require excellent skills in communication, problem solving, analysis, leadership, time and project management, business acumen, methodical work habits, teamwork, strategic thinking, self-motivation and an ability to conceptualise and use intuition.

Business Analysts review, analyse and evaluate the overall business and information needs of an organisation to develop solutions to business and related technology problems. The role also encompasses strategic business research and analysis in developing business plans and market research to support an organisation's future directions.

Database Analysts develop and maintain databases, ensuring optimum performance and problem resolution. They analyse and design code for database access, modification and construction and are also responsible for the tables, data dictionaries and monitoring of standards and procedures.

Network Analysts research and recommend policies and strategies for an organisation's network infrastructure. They design, install, analyse and implement computer systems/networks, and ensure that the network is effective and meets emerging requirements of the organisation. The role can also include operational tasks such as monitoring system performance, software and hardware upgrades, backups, network maintenance and support.

Systems Analysts match business and system requirements, including developing data and system process flow diagrams, charts and specifications to suit different needs. They must specialise in one or more programming languages. Systems analysts plan and coordinate system feasibility studies, and analyse and

make recommendations for the strategic direction of an organisation's systems architecture across a variety of operating platforms, environments and levels.

Test Analysts examine requirements documentation, develop system test cases, execute these test cases against requirements, examine results, and issue and manage defect reports using bug-tracking systems. They work closely with developers throughout the development phase and possess an understanding of the data-and-traffic characteristics of an optimal system and quality standards. They may also give opinions on software quality issues.

2. Developers

Generic skills that developers require include broad industry knowledge and an ability to conceptualise. The roles demand a creative approach, innovative thinking and excellent client consulting skills. Developers must be able to work autonomously, handle pressure, meet deadlines and be self-motivated. Essential skills needed include presentation, time management, interpersonal, problem solving and analytical capacity, and a methodical approach to work. Developers must be process- and team-oriented, be able to work to a plan and have an excellent eye for detail.

Multimedia Developers use a range of creative software to create and manipulate graphic images, animations, sound, text and video into programs with instructional and graphic strategies. These programs are used to produce CD-ROMs, information kiosks, multimedia presentations, websites and entertainment/education products. Multimedia developers may specialise as computer-based graphic designers, instructional designers, multimedia programmers, author-based programmers, project managers, digital video/sound editors, animators or a combination of these. They may also consult with clients to develop specifications; determine the best platform and software required for a particular project; prepare code, instructional design and screen design concepts; design, create and maintain web pages; and manage the image and copyrights of the company.

Software Developers/Programmers create, maintain and modify computer and software programs such as operating systems, communications software, utility programs and compilers. They analyse and interpret technical designs and flow charts to construct specifications using a business functional model; test programs; and write technical documentation.

ICT professionals may become analysts after spending two to three years in the field, during which time they gain broad industry knowledge and a range of technical skills related to their... specialisation.

Web Developers create software solutions specifically for internet and intranet websites. Responsibilities include the design, implementation and support of web applications, and website content changes and upgrades. In addition to applying technical skills, web developers consult with clients and may need to consider budgetary and resource constraints.

3. Managers

Managers require leadership and interpersonal abilities, and proficiency in problem solving and financial management. They must be self-motivated, highly organised, able to motivate others, and prioritise, delegate and coordinate projects. The role requires strategic thinking, a result-oriented attitude, and exceptional skills in time management, negotiation and client consulting. Management roles usually require three to five years industry experience.

Project Managers are involved in scheduling, controlling and directing human and capital resources. They also help manage funding and facilities for particular ICT projects. Their duties include project scoping and costing; resourcing, development and implementation; and ensuring projects are delivered on time and within budget. Often the role only requires a broad understanding of the ICT industry, relying on resources and staff to perform the operational development of a project. These positions require strong project planning methodology, interpersonal and leadership attributes and documenting skills.

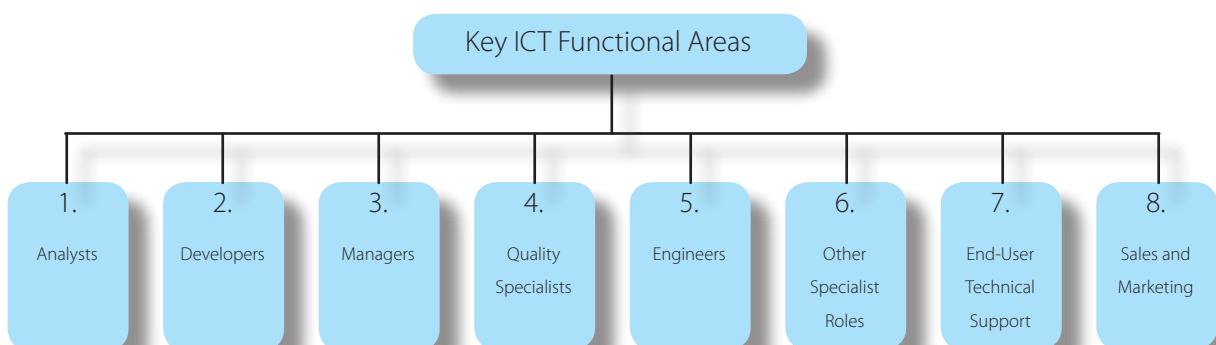
Technical Development Managers manage the full life cycle of a development project, including providing technical support and integrating technologies. This includes being responsible for the end-to-end management of the project in the areas of budgeting, costing, planning, resourcing, designing and coordinating; providing technical expertise to the project team with analysis, programming, testing and quality control; and implementation and post-implementation review.

4. Quality Specialists

Working in the quality area may require any or all of the following skills: project management, problem solving, interpersonal, client interaction, organisational, analytical and time management. Quality specialists must be process-oriented, be able to meet deadlines, work under pressure and work autonomously in an environment in which a methodical approach and hands-on attitude are integral.

Quality Assurance Specialists ensure quality software development and delivery. They write and revise quality standards and specifications, and monitor the system development life cycle of a project to ensure all processes and procedures are followed stringently. Quality specialists conduct internal audits to ensure development quality is achieved. They may also create, review and audit industry accreditation standards (e.g. ISO accreditation); analyse projects; create test plans; review, audit, write and interpret specifications; and oversee external auditing processes.

Testers evaluate new and modified software applications to ensure these operate as specified. The role involves discovering and reporting errors; re-testing and revision with the highest attention to detail; and following stringent quality procedures and standards. Testers create and implement test plans, create and process test scripts and ensure testing is performed in accordance with quality assurance guidelines. Testers also document testing and error diagnosis results and write and interpret technical specifications. A tester needs to liaise with users and work closely with system developers to articulate faults, offer advice and provide possible solutions.



5. Technical/Engineering Roles

Engineering roles require skills in analysis, problem solving and attention to detail. Staff need to have a hands-on attitude and a methodical, results-oriented approach along with the ability to work autonomously, under pressure and to deadlines. Ideally they will also have business acumen and the capacity to think innovatively and strategically.

Hardware Engineers are responsible for the architecture, design, implementation, development and support of a computer's hardware infrastructure. They require a detailed knowledge of protocols operating across different environments, as well as a high level of competence in both the electronic and telecommunications industry.

Technical Engineers design, build, manufacture, implement and support computer systems. The role includes both hardware and software and the interaction between the two. Technical engineers have an excellent knowledge of the components of computer hardware and related peripheral devices as well as of networks, software applications, electronics and operating systems. Industry certification is often required.

Telecommunications Engineers design, implement and support data communication systems including optical, frame relay, multicast, cable, wireless, ISP and other technologies. They create, update and follow protocols and maintain telecommunications equipment (e.g. satellite) using voice, radio, network, two-way, microwave and digital data.

6. Other Specialist Roles

Depending on the role, specialists may require analysis, problem solving, project management, presentation and negotiation skills to supplement their knowledge of the business or sector.

Data Modellers write and interpret specifications, manage data integrity and understand database

technology. They also design, develop, review, document and implement data models for enterprise-wide relational and/or object database applications with an emphasis on assuring data integrity and access between applications. There are three levels of data modelling: conceptual, logical and physical. These involve the specialisation of data analysis, standardisation, naming and normalisation.

Network Administrators install, configure, maintain and support an organisation's network environment. This includes inventory documentation, resolution of network faults, security and the allocation of server resources ensuring optimum network performance. The role may also include the design and support of server systems and software, system back-ups and the planning and implementation of software and hardware. Network administrators use operating systems (e.g. Windows NT, UNIX, Windows 2000), Local Area Networks (LAN), Wide Area Networks (WAN), network protocols (e.g. TCP/IP) and server software (e.g. MS Exchange). They require industry certification (e.g. Microsoft Certified Systems Engineer).

Security Specialists manage the security of an organisation's system infrastructure, investigate and resolve incidents, monitor for intrusions, provide virus protection defences, enforce bandwidth policy, monitor data transactions in and out of a network environment and secure all servers from unauthorised use.

Software Architects design, develop, modify, document, test, implement, install and support software applications. They require knowledge of diverse software programming languages and apply the best methodology to suit a specific environment.

Technical Writers create and develop materials to support new or modified ICT installations or software. Products may include instruction manuals using print, online or other media. Technical writers assist with developing standards and specifications and must understand source code and interface. The role may also include the creation and revision of technical documentation in accordance with corporate policies, procedures and guidelines, as well as the development of press releases and technical articles.

Developers must be able to work autonomously, handle pressure, meet deadlines and be self-motivated. Developers must be process- and team-oriented, be able to work to a plan and have an excellent eye for detail.

7. End-User and Technical Support Roles

Support roles require presentation, consulting, group facilitation, problem solving, teamwork and time management skills, along with a creative and intuitive approach, flexible attitude and the ability to work autonomously under minimal supervision to meet deadlines consistently. Staff in these positions must make decisions, initiate processes and procedures, and prioritise workloads. They need to be team-, customer- and process-oriented.

Computer Operators provide ICT support and maintain computer infrastructure; manage, maintain and support an organisation's mainframe and midrange computer network and software; load and run batch programs; diagnose errors; and resolve faults.

Database Administrators facilitate the management, access, retrieval, sharing and configuration of large amounts of data through the design, implementation and maintenance of computerised databases. They also monitor and improve database performance and capacity, and plan for future expansion requirements.

Helpdesk Operators provide first level technical assistance for computer users who are having problems with computer and peripheral technology. They receive, diagnose and solve most user queries and may travel to

client sites to rectify more complex issues. Other activities may include: responding to requests received by email or phone; prioritising and allocating work; troubleshooting problems; logging clients into a computer network; logging higher-level problems and communicating these to other technical support workers; and maintaining records of problems and how they were resolved.

Support Technicians install and configure software and hardware. They also troubleshoot and resolve technical issues related to desktop hardware, network administration, software applications and upgrades, databases and other end-user products.

Trainers provide instruction about computer hardware and software to individuals or groups. They facilitate meetings, workshops and conferences, and develop training documentation and procedures, graphical presentations, multimedia and visual aids. The role can also encompass training needs analysis, organisational skills, and gap analysis in the assessment and design of course content. Trainers may review or adapt current training procedures, conduct training for project or technology rollout and evaluate training outcomes.



8. Sales and Marketing Roles

Sales and marketing professionals require technical product knowledge as well as the ability to communicate this to clients. They must keep their knowledge up-to-date and maintain strong relationships with clients and customers throughout the sales process, from initial contact through to post-delivery. High-level negotiation and problem solving skills are required, along with organisational and self-management expertise.

Account Managers sell computer hardware, software, telecommunications and IT services. They can also manage the sourcing and delivery of products to customers. An account manager may consult with current and potential clients to determine their technology requirements; prepare sales proposals and tender responses (including costings); deliver professional presentations; negotiate major deals; identify sales prospects; maintain key customer contacts; and keep customers informed of new product developments.

Pre-Sales Consultants require broad understanding of the ICT industry to assist with the technical aspects of the sales cycle in which knowledge of specific software or technology is usually required. Pre-sales consultants are responsible for the interpretation of functional and technical specifications, problem solving and the resolution of request for proposals (RFP) and tenders. The ability to technically interpret and customise applications to suit prospective customer requirements is essential, together with high-level communication skills to confidently present and sell appropriate solutions.

After-Sales Consultants provide support during a product's warranty period and may assist with the bedding-in of new systems, hardware or software by acting as a link between technical staff and the customer. They may also provide information about upgrades, peripherals and further enhancements to the product or service. After-sales consultants often work for vendors and have detailed knowledge of the product range available.

Skills in Demand

The Department of Education, Employment and Workplace Relations (DEEWR) provides information on skills in demand. This information is updated twice a year.



The following list is advisory only, as the ICT sector constantly changes to meet new demands and technologies such as languages, software, operating systems, networking systems and hardware. The need for workers differs around Australia and the world, however, as an increasing number of ICT personnel work remotely, geography is becoming less important.

It is expected that in one's working life three separate careers might be typical, and in ICT one need not leave the sector at all in order to change careers!

(Source: Australian Computer Society)

Database	General Application Development/ Software	Internet, Networking/ LAN/WAN	ERM/CRM applications	Process & Systems Management	Security	Geographical Information Systems	Other Specialisations
.Net technologies	COBOL (legacy systems)	Advanced Web Design	SAP	Broad Commercial Business Understanding	CISSP (Certified Information Systems Security Professional)	GIS (e.g. Mapinfo)	Test Analysis – VAT, SIT
C++/C#/C	Java	ASP	PeopleSoft	Project Management	e-Commerce Security (non-programming)		CISCO
Data Warehousing	Java Script	CORBA	Siebel	Systems Analysis	Network Security/Firewall/Internet Security		Ingress (database)
DB2	Lotus Notes	IPX	Oracle E-Business Suite		PKI		
Delphi	Microsoft SQL Server	J2EE	VMS		Risk Management		
	Oracle	SNA	Windows				
	PowerBuilder	SOAP					
	Powerhouse	XML					
	Progress						
	Sybase SQL Server						



Career Progression in the ICT industry

"The range of tasks and streams within an ICT career is huge. It is expected that in one's working life three separate careers might be typical, and in ICT one need not leave the sector at all in order to change careers!"

(Source: Australian Computer Society)

There are three main forms of career progression within the ICT industry:

- 1. Following a traditional career path:** this often begins with an entry level role such as working as a helpdesk operator as a student or recent graduate before undertaking further training in a specialist area to become a network or database administrator. An operations manager position might follow, or even becoming the CIO of a large corporation. Each progression has a higher level of responsibility usually accompanied by an increase in income and/or benefits.
- 2. Undertaking a range of roles within one organisation or industry:** for example, a person who works in a support or programming role might spend time as a trainer, researcher, technical writer or project manager. This career path suits people who prefer a varied career to moving into management roles. It also enables people who enjoy working for a particular organisation, field or industry (e.g. banking and finance, environmental engineering) to maintain their interest and keep learning. Sometimes this career progression takes people out of the ICT area altogether as they find other activities that incite their passion.
- 3. Developing a specialisation:** becoming an expert in a particular system, process, database, programming language etc. assists a person in transferring between organisations. They become highly valued (and often highly rewarded) for their knowledge and expertise and might even find themselves travelling around the world. The down side of this is that they might become expert in an area that is superseded, so it is important to keep abreast of change and develop new expertise if necessary in order to maintain employability.

Research by the Information Technology Contract and Recruitment Association (ITCRA) has identified some of the top ICT skills in demand as:

1. Helpdesk
2. Project management
3. SQL
4. Windows XP
5. Windows
6. Java
7. Business Analysis
8. MS Office
9. C#
10. Windows 2000
11. Windows 2003
12. Oracle
13. Active Directory

Reprinted with permission: www.itcra.com

...I didn't consider working in research, much less science. However [I've]...since had papers published in scientific journals detailing software I have helped develop.

Steve Androulakis – Bachelor of Computing (Software Development)

Graduate Profiles



Steve Androulakis

- Bachelor of Computing (Software Development)

"The 'real world' experience helped me grasp the concepts I had learned in my studies and helped me to be better equipped to take on work of increased complexity."

I entered a Bachelor of Computing (Software Development) degree at Swinburne University using one-and-a-half years of credit from an Advanced Diploma in Computer Science at Swinburne TAFE. This allowed me to complete university in one-and-a-half years instead of three.

Throughout my studies I saw it as important to be as involved in the ICT field as possible. I undertook on-site residential tech support roles and basic programming jobs on weekends and eventually made the decision to scale university back to part-time in order to take more programming work. The 'real world' experience helped me grasp the concepts I had learned in my studies and helped me to be better equipped to take on work of increased complexity.

At Swinburne University it is mandatory for students in the last semester of their degree to take a placement in the real world as part of a student team. I was lucky enough to be chosen as a team leader, so I was able to select the organisation and project my team would work on. I chose a project in bioinformatics through the Faculty of Medicine at Monash University. The project involved working with cutting-edge information technology, which excited me despite having no university-level science behind me and no real idea of what 'Bioinformatics' entailed.

As a team, we delivered a quality product and soon after I completed my placement I received a call from the project's owner offering me full-time work as a software developer in the Bioinformatics lab on graduation. A week after my final exam I started work there.

When I first enrolled in the course I didn't consider working in research, much less science. However I fit right in with the researchers and have since had papers published in scientific journals detailing software I have helped develop. Many don't consider exactly how wide-ranging the ICT field is these days – how it affects most aspects of society, and how valued and in demand we're becoming. I found my final semester student project was absolutely critical to attaining 'real world' experience and for access to opportunities in industry.

Graduate Profiles



Christine Hsiao

– Bachelor of Tech (Hons), Master of IT

“...the ICT industry is full of possibilities and changes, and the primary responsibility to keep abreast of these opportunities ultimately lies in one’s own hands.”

My journey in the ICT field started with my first animation program in Year 11, written in Quick Basic. I was fascinated by how equations are translated to moving clouds and how simple algorithms can be used to solve complex problems. I set my mind to become a world-class software developer.

Whilst completing my Bachelor of Technology degree in Auckland I took up a software development role writing marina management programs. Having received first class honours in my specialisation I knew I was technically competent; however, after working on real industry projects I realised that ICT is not only about programming.

After two months working as a developer I decided to take the plunge in Australia in order to develop more business skills and understand more about the ICT industry. I completed a Master of IT degree at

Queensland University of Technology (QUT), focusing on project management and software architecture. Both have proved to be invaluable in my current role managing several surveying and mapping projects for the Queensland Government. In this multidisciplinary role I work as a project/release manager, business analyst, software developer, configuration practitioner and sometimes in production operation recovery.

I see the importance of continually challenging myself to develop and explore the diversity of the ICT industry. So far I have attended conferences and seminars and used every opportunity to talk to people from all levels and backgrounds. In addition, my volunteering experience in the Young IT Board for the Australian Computer Society has helped me to demonstrate leadership and team working skills when applying for my current role job. It has also given me the opportunity to be closely involved in shaping the industry. One thing I learnt at the start of my career is that the ICT industry is full of possibilities and changes, and the primary responsibility to keep abreast of these opportunities ultimately lies in one’s own hands.

I see the importance of continually challenging myself to develop and explore the diversity of the ICT industry...I have...used every opportunity to talk to people from all levels and backgrounds.

Christine Hsiao – Bachelor of Tech (Hons), Master of IT

Graduate Profiles



Vicky Yu

- Bachelor of Engineering (Software)

"...the experience I gained was extremely helpful in preparing me for the real world in areas such as self-organisation, working proactively, developing a work ethic and taking responsibility."

I didn't start out with a set career path in mind but I have always enjoyed working with technology. I decided to study the Bachelor of Engineering (Software) degree at the University of Queensland as during the first two years, students learned the basics of programming, while the third and fourth years were more theoretical and prepared students wanting to undertake research.

I did some casual work throughout my studies for both financial and work experience reasons. Although the work was not related to my studies I later found that the experience I gained was extremely helpful in preparing me for the real world in areas such as self-organisation, working proactively, developing a work ethic and taking responsibility.

In my final year I answered a job advertisement for a volunteer position at a provider of resource planning and asset management software. Each year the company takes on university students who are close to graduating. I found this a bit daunting at first as I was 'thrown into' a COBOL (Common Business-Oriented Language) environment; this is a language I had no prior experience using, and due to scheduling issues I received no formal training. Nevertheless I found the experience valuable as it helped me to obtain my current role.

I had originally thought I would like to move into research after finishing my degree, but changed my mind as I approached the end of my course. I wanted to find a graduate position in web programming but found there was too much competition for these roles so I decided to look at other entry level roles. I found a graduate opportunity on www.seek.com.au with DST International, a provider of investment assets management solutions, and was successful.

The DSTi program included full training in COBOL as well as product training, but it also encouraged individuals to work independently. Throughout my studies I had avoided finance subjects, so it was a nice surprise to find the work very interesting. I fitted into the company in a very short time and it has been very rewarding to know that I have made a positive contribution.

Graduate Profiles



Yasas Abeywickrama

– Bachelor of Computer Science

2009 Young Professional of the Year, Yasas Abeywickrama, is a real demonstration of IT being a truly global career.

Yasas V. Abeywickrama wears many hats. He is an IT professional, was recognised in 2003 by the Chartered Institute of Management Accountants (United Kingdom) as an up-and-coming business leader and is currently the Director of the Young IT Professionals Board of the Australian Computer Society (ACS). In 2009 he was named the Young Professional of the Year and is also a published writer and a mentor. Yasas started out on this path through studying for an honours degree in Computer Science.

After three years at university, Yasas undertook an internship. During this time he realised that programming was something he no longer wished to pursue, instead deciding to ultimately work towards the area of business analysis.

After starting permanent employment as a software engineer, Yasas moved towards systems analysis to leave the area of development. Systems analysis served as a

midpoint to business analysis, and within a year Yasas transitioned into a business analysis role. In this position he enjoyed the face-to-face interaction with clients, met the challenges of managing client expectations and completed a range of general business analysis tasks. This position took Yasas out of the office and onto client sites to target the core of a range of business operations, which sometimes took him around the world.

Yasas is a real demonstration of IT being a truly global career. He has worked in the United States, United Kingdom, Sri Lanka and Australia, has been trained in the United States and Malaysia, and has worked with clients such as British Telecom, Telstra and Siemens. His professional interests are in project management, business analysis and consulting. Yasas is currently working on a consulting start-up called Docs n' Data (www.docsndata.com.au). Prior to this he worked for Accenture, a global management consulting, technology services and outsourcing company. Yasas was also exposed to the ICT sector within government during his time with the South Australian government.

Yasas is passionate about the IT industry and the ACS, and has served the ACS in many capacities over the years. Aside from his current role as Director of the Young IT Professionals Board, he is also a member of both the ACS Congress and ACS Victoria State Board. He was the Chairman – Victorian Young IT Committee-ACS in 2008, a Board Member – ACS-South Australia Branch in 2006-07 and a Board Member – ACS National Member Lifecycle Board, in 2007.

In addition to his book writing, among which is a book titled *A bit of BIT*, a book on Business Information Technology, Yasas also maintains his blog (<http://yavasva.blogspot.com>).

Business analysis took Yasas out of the office and onto client sites to target the core of a range of business operations, which sometimes took him around the world.

Yasas Abeywickrama – Bachelor of Computer Science

Graduate Profiles

Michael Stone

– Bachelor of Engineering (Software) (Hons)

“Aside from all of the great skill and knowledge development workshops NAB has put us through, the most enjoyable and rewarding part has been getting to know others involved in the graduate program.”

After taking a software design course during my HSC I decided to continue in this area. My course at the University of Newcastle provided a solid technical background and a range of useful skills. While at uni I worked in a casual programming job for a year-and-a-half with a small company near Newcastle. I also umpired AFL matches in the Newcastle league for a couple years from which I learnt many skills such as how to handle pressure in tense situations. Other than that, I focused on doing well in my degree and enjoying the student experience.

When applying for graduate roles I decided to take advantage of the development opportunities a large company could provide. After speaking to some of the graduates from the previous year’s intake at National Australia Bank (NAB) I decided this was the place for me – and luckily the good people at NAB thought so too.

On joining the workforce I quickly found that I still had a lot to learn. Over the first six months I faced a lot of challenges which have made life interesting. It has been great to be part of a group of people going through similar experiences. Aside from all of the great skill and knowledge development workshops NAB has put us through, the most enjoyable and rewarding part has been getting to know others involved in the graduate program.

My advice to students and recent graduates looking for a graduate program is to apply for as many different positions as you can and don’t be discouraged if you get knocked back a couple of times. I didn’t even make it through the online testing of some companies. Take advantage of any career and employment services your uni provides, whether it’s helping you fine-tune your résumé or practising and getting interview skills. Finally, don’t expect a great job to fall into your lap; it’s up to you to go out and get yourself the job that you want.

Daniel Howell

– Bachelor of Computer Science

“What set me apart from the other applicants who applied for jobs at Microsoft was a good mix of technical skills and the ability to stay calm and confident.”

When I graduated from secondary school I knew I wanted to do Computer Science. I had the option of attending any WA university, however, I decided on Curtin University of Technology for its worldwide reputation, the excellent course balance between theoretical and practical work, and recommendations from friends.

I worked as a technical support consultant during my studies; this experience, and the work-ready skills my teachers provided me with enabled me to achieve my dream job. On graduation I secured the enviable position of Software Design Engineer at Microsoft headquarters in Redmond, Seattle, in the United States.

What set me apart from the other applicants who applied for jobs at Microsoft was a good mix of technical skills and the ability to stay calm and confident. Throughout the course, my lecturers were passionate about making sure their students graduated with the fundamental skills required in the industry. Almost everything I was asked in the interview I had covered at some point whilst at Curtin.

The skills I developed in creative and analytical thinking allowed me to offer the right mix of technical skills, together with the ability to write code from the ground up. A huge part of every assignment was creatively thinking about a solution to a problem, and then making the solution happen with the skills learned through our coursework.

The Microsoft Redmond office has approximately 22,000 employees, including 400 Australians. My new role is all about working closely with Microsoft project managers and testers to develop a product that the customer wants.

There is a huge number of departments and you are encouraged to find one that best suits you. Microsoft wants to put you in a position where you can create your best work. The company is all about passion and the theory is that the more passionate you are about your work, the more creative, innovative and well designed your outputs will be.

Original content provided by the Office of Alumni Relations, Curtin University of Technology

Job Search Strategies

Organisations recruit by using one or more of the following means:

- graduate programs
- graduates who have worked for them while students, e.g. in vacation programs, industry-based learning (IBL) programs etc.
- graduate employment directories such as **Graduate Opportunities** (www.graduateopportunities.com)
- university job boards
- referrals by people within the organisation
- their own websites
- recruitment companies
- online job ads e.g. CareerOne, MyCareer, SEEK
- networks e.g. within industry group
- transfers from other areas within the organisation
- newspaper career sections.

What Employers Want: Personal and Work Attributes in Demand

ICT graduates compete with other graduates from around Australia and the world for the best jobs in ICT. Building one's competitive edge starts long before leaving university, for example through on-the-job experience via vacation work, industry-based learning (IBL) and work integrated learning (WIL) programs offered by universities, or even through voluntary work.

Why is this important? Experience in the workplace enables students to understand how the world of work differs from that of the education arena. Also, many of the skills and attributes required by employers are difficult to gain purely from formal study.

Most people who work in the ICT sector need to be multi-skilled in order to combine technically-oriented activities with customer service, relationship building and workload management. An understanding of business processes and the ability to explain complex technical terms in simple language are required, along with:

- problem solving ability
- excellent communication skills (written and verbal)
- attention to detail
- teamwork skills
- initiative
- the desire to engage in lifelong learning activities
- flexibility and adaptability
- a 'can do' attitude.

...apply for as many different positions as you can and don't be discouraged if you get knocked back a couple of times...it's up to you to go out and get yourself the job that you want.

Michael Stone – Bachelor of Engineering (Software) (Hons)

Career Planning Strategies

Graduate Employers Say...

"The socially inept programmer so often depicted in pop culture is a myth at ANZ, with our graduates pursuing careers in project management, business analysis and consulting. We therefore value an ability to manage ambiguity and change as we work towards becoming a super-regional business. We need graduates who are not afraid to make bold decisions, think outside the square and meet challenges head on."

"As low-contact technical roles decrease in many Australian companies, successful graduates have relationship management skills that enable them to immerse in the business, understand its technology needs, and work with design, build and testing teams to create solutions that are understood and valued by the business."

Hayley Miller, Graduate Program Manager
– Operations, Technology & Shared Services, ANZ

"Today, technology isn't just about servers and platforms. It underpins our entire economy and society, and it drives future innovation. Harnessing its constant flow of inspiration has been an essential ingredient in IBM's success."

"IT graduates who find success at any technology company today need to be inspired, have an appreciation and passion for making a positive impact around the globe, and a desire and ability to collaborate to find the best possible solution for clients, whatever the situation."

Chris Major, IBM

1. Getting experience in your current workplace

- If you currently work for an organisation that has an ICT department, see if you can obtain a transfer into that area. Talk to your supervisor or manager about your studies and your career plans – if they don't know about them they can't help you.
- If transferring is not an option, see if you can be involved in a project in some way, for example implementing or testing a new piece of technology, or even becoming the area expert on a program or system. This will get you and your skills noticed and provide valuable assistance to your organisation.
- Shadowing someone or getting a mentor who is involved in an ICT project is a way to find out more about a role without actually making a move; this may be an alternative to consider if you cannot transfer or take on extra duties.



2. Networking

- Formal networking activities are provided by universities, professional associations and industry groups. You can use these activities to get to know people in the industry as well as find out more about working life, job roles and expectations.
- Informal networking activities include talking with people who are about to graduate, or who are currently studying, about their own job seeking and work experiences; they may even know about positions available in their organisation and can put your name forward. Employers often prefer to take on people who have been recommended by their own staff.

3. Targeted cold calling

- This involves researching a range of organisations to see which ones match your career interests and personal values. Once you have obtained all the information you can via the internet and/or written material, make up a list of questions you would like to ask and get in touch with someone from the company. Then, target your résumé and address your cover letter to the right person, showing them exactly how employing you will benefit their organisation.

4. Contacting recruiters

- There are recruiters that specialise in ICT jobs, but don't limit yourself to these as general recruiters will also have positions that may be of interest.

Job Search Traps to Avoid

- **Wanting too much:** Your first role as a graduate will usually be at an entry level with a base level of pay. If you are working for a large organisation you will probably begin with a formalised induction along with other graduates. If you start work in a smaller company the induction may be informal, but in all cases as a new graduate you should be working in a way that provides learning – about the organisation and its clients, the terminology and the systems and processes involved. On completion of your program (say in about a year's time), you will most likely receive an increase in pay and the opportunity to move into a more interesting and challenging role. So, when you are applying for jobs be prepared to be flexible about the kind of role you want, the equipment you want to use, the programming language and the starting salary. You might even find yourself needing to be trained in something new, right from the start. Choose your employer based on its market presence, its fit with your values and its ability to give you a great start to your career.
- **Focusing only on what is in it for you:** When speaking to potential employers or recruiters, try not to send the message that you are only interested in what they can do for you. Obviously you will want to get the most out of your employment, however, a final year student or recent graduate who appears to be interested only in the career development, training or fringe benefits an organisation can offer will fail to impress.
- **Failing to prepare:** When going for a job interview make sure you know as much as possible about the organisation and what it does. Phone ahead to ask questions if you need to, rather than being embarrassed when asked "What do you know about our company?" It is also important to dress appropriately for the role and the organisation. It is reasonable to ask about the dress code when offered an interview, or you might just like to go to the workplace a few days ahead of your appointment to see how people present themselves for work. This includes meetings with recruiters – if you don't sell yourself to them, they won't pass on your details. If in doubt, overdress rather than underdress, and seek help from an expert if you have no idea. Your university careers department can offer advice, and may even run a program on preparing students for work.
- **Presuming to know too much:** During an interview or networking session avoid sounding like you have swallowed a text book on the organisation, its financial standing and/or its latest acquisitions or losses. Provide knowledge about the company in a general sense, and take anything you read as advisory; the situation might have changed since it was written. For example, you might say, "I know that Company Y supplies software solutions to the field of architecture and that it has offices in around seven countries", rather than, "Company Y made an overall profit of seven billion dollars and won a court case against the government last year".

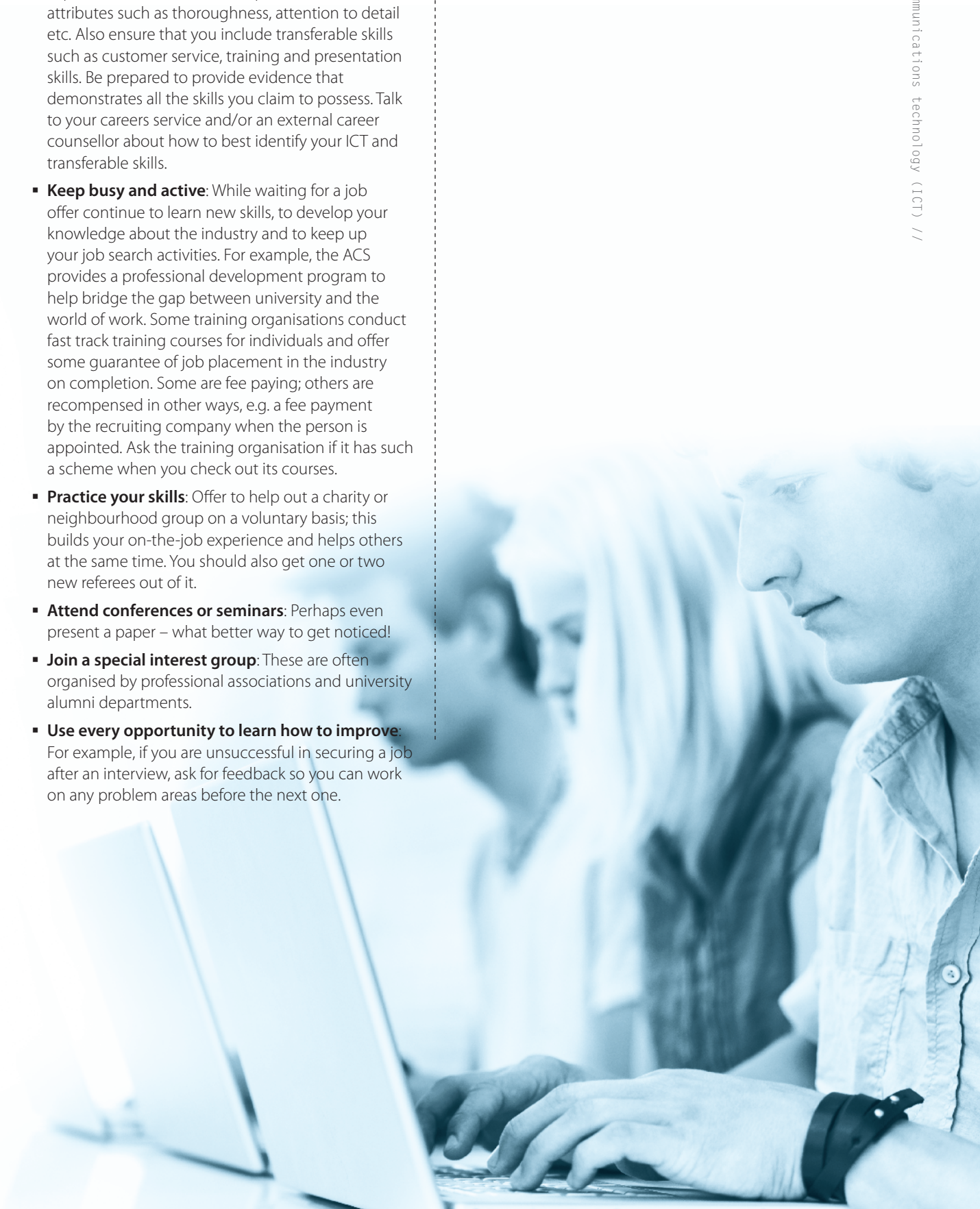
When you are applying for jobs be prepared to be flexible about the kind of role you want, the equipment you want to use, the programming language and the starting salary.

Preparing Yourself for Work

- **Be clear about what you have to offer:** List all your strengths, both 'hard' skills such as languages, software, operating and networking systems, and hardware about which you have knowledge and expertise, and the 'soft' skills – personal and work attributes such as thoroughness, attention to detail etc. Also ensure that you include transferable skills such as customer service, training and presentation skills. Be prepared to provide evidence that demonstrates all the skills you claim to possess. Talk to your careers service and/or an external career counsellor about how to best identify your ICT and transferable skills.
- **Keep busy and active:** While waiting for a job offer continue to learn new skills, to develop your knowledge about the industry and to keep up your job search activities. For example, the ACS provides a professional development program to help bridge the gap between university and the world of work. Some training organisations conduct fast track training courses for individuals and offer some guarantee of job placement in the industry on completion. Some are fee paying; others are recompensed in other ways, e.g. a fee payment by the recruiting company when the person is appointed. Ask the training organisation if it has such a scheme when you check out its courses.
- **Practice your skills:** Offer to help out a charity or neighbourhood group on a voluntary basis; this builds your on-the-job experience and helps others at the same time. You should also get one or two new referees out of it.
- **Attend conferences or seminars:** Perhaps even present a paper – what better way to get noticed!
- **Join a special interest group:** These are often organised by professional associations and university alumni departments.
- **Use every opportunity to learn how to improve:** For example, if you are unsuccessful in securing a job after an interview, ask for feedback so you can work on any problem areas before the next one.

Further Information About Careers in ICT

Further information including professional and industry associations, course providers and employment websites is available online.



Acknowledgments

GCA would like to thank the Australian Computer Society (ACS) for help in reviewing this publication.



GCA also wishes to thank all those who have contributed material and provided editorial comment for this booklet.

This booklet is one of a series intended for use by Careers Advisory Services in Higher Education in Australia. The booklets will also be of interest to tertiary and secondary students, and others considering further study.

A full list of titles is available on the GCA website – **www.graduatecareers.com.au**. Selected booklets are also available online.

© 2010 GCA

Author: Julie Farthing, *Principal Consultant, Career Dimensions*

Editor: Jesse Gerner, GCA

Graduate Careers Australia

PO Box 12103

A'Beckett Street VIC 8006

Telephone: 03 9605 3700

Facsimile: 03 9670 5752

Email: **info@graduatecareers.com.au**

Web: **www.graduatecareers.com.au**

All rights reserved by publishers.

ISBN 978-0-909592-76-9