

reality bytes

**an in-depth analysis of
attitudes about technology
and career skills**

February 2001



foreword

The Victorian Government has set an ambitious goal for Victoria to be the knowledge capital of the knowledge nation.

Fundamental to this goal are the State's skilled and creative people, who underpin a diverse range of industry sectors.

The pervasiveness of information technology in today's society means that every industry – not just the high-tech industry – needs people with technology skills.

For that to occur we have to ensure that our young people recognise that technology skills are an essential part of any career. But before we can do that, we need to understand what young people think of technology. Reality Bytes is the result of a major research project that informs on exactly that issue.

Reality Bytes is the most in-depth study of young people's attitudes to technology and career choices conducted in Australia to date. The findings contained in this report will help shape government policy in this area, and have implications for private industry which needs to understand young people if they are to recruit and retain them.

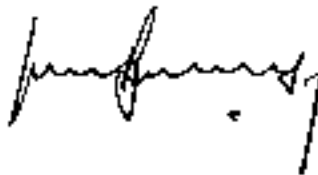
One of the key research findings in the Reality Bytes report is that young people see the study of technology as limiting future career options.

Reality Bytes also indicates that young people don't have a clear understanding of today's workplace, or the extent to which technology is used in almost all jobs today.

The Victorian Government is spending \$1 million on a technology skills awareness campaign to address these perceptions. Part of our Skills x Knowledge = Growth statement, the campaign aims to convince young people that technology skills increase your career options.

Increasing the uptake of technology skills is vital if Victoria and Australia are to succeed in the knowledge economy.

I hope that Reality Bytes provides intelligence for governments and industry with an interest in helping young people understand the opportunities that technology skills can offer.



John Brumby MP
Minister for State and Regional Development



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Introduction

In common with most nations, Australia is experiencing rapid growth in the information and communication technology sector as the use of these technologies becomes pervasive in the economy and society.

The developed world is experiencing substantial industrial, economic and social change through rapid advances in computing and communications technologies.

The world of work in particular is changing faster than ever before. It took more than 200 years for the forces unleashed by the industrial revolution to comprehensively reshape traditional patterns of work and commerce in most of the developed world. The information revolution has substantially achieved this in less than two decades.

Almost all jobs today use some form of information technology for business processes and management, creative output or communication. Over the next three years, 100,000 new jobs will be created in the IT sector – and without action as many as half of these could go unfilled. Moreover, many times this number of traditional jobs will come to require the use of technology skills.

Professions such as medicine, law and architecture are rapidly embracing information technology and network capabilities. Trades as diverse as mechanical engineering, fashion design and landscape gardening are increasingly using technology for diagnostic services, design and production management, modelling and customer services.

While many jobs in traditional intermediary roles are disappearing as businesses develop the capacity to talk directly to

customers and electronic services replace paper transactions, whole new industries are emerging based entirely on these new technologies – for example, web publishing, digital "broadcasting", interactive games and online marketing.

Technology is being used to push the boundaries of innovation and build new ways of working and communicating. Today we are all part of a media-rich, 'wired' community. Distance, time zones, planning horizons, research and development timeframes and product lifecycles have been dramatically compressed.

Information management – and knowledge management – have become major strategic functions in organisations, and a primary source of national and global productivity and economic growth.

A paradox – especially in advanced nations – is that the IT sector that builds, maintains, empowers and enhances the infrastructure and applications is finding it hard to fill the jobs it creates.

There are simply not enough qualified people to fill many of the jobs available in IT – despite the offer of stratospheric salary packages, the certainty of gaining employment, the fact that IT skills let people work anywhere in the world, and provide the opportunity to play a major role in shaping the future.



Introduction

This is the background to a major research project commissioned in 2000 by Multimedia Victoria to better understand the factors that were inhibiting uptake of IT skills and inform the development of a strategy to address that failure in the marketplace.

The research was designed and undertaken by Hill and Knowlton with Nexus Research.

There were both short and longer-term interests in this research.

In the short-term Victoria and Australia face a shortage of qualified people to meet the projected growth in IT employment.

In the longer-term economic growth depends on fostering highly skilled and qualified people who are able to use and apply technology skills across all industries, and social equity will crucially depend on the capacity of all individuals to participate in activities which require a foundation level of confidence in using technology.

The research, and the strategies that will flow from it, illustrates the seriousness with which the Victorian Government is treating the issue of skills needs and consolidates its leadership among state governments with regard to technology matters.

In addition to informing government action, the research provides valuable insights to industry on policies the sector can adopt to encourage young people into technology-based careers.

More than 350 people participated in aspects of the research, which involved semi-structured in-depth interviews, focus groups and quantitative surveys in addition to extensive desktop research and literature reviews.

The research focused on young people who were nearing and entering the years of post-compulsory education and training and sought to identify how they formed career aspirations and selected subjects and courses, and to understand their relationship with and perceptions of technology. Also examined were the views of groups that are known to influence young people – parents, media, career teachers and subject teachers.

Since skills development is a lifelong process, we considered that the attitudes and expectations of mature age people would also produce interesting insights relevant to IT careers. Groups of mature age "job switchers" – those who were actively considering a career change or re-entering the labour market – participated in focus groups and completed survey questionnaires.

Finally, a large range of IT industry stakeholders were interviewed to gain their perspectives on the industry, the skills development process and the benefits that IT employment offered to people. These stakeholders included employers, academics and training providers.

a guide to this report

The majority of this report focuses on the attitudes of young people and how they contrast with the views of other influencers and stakeholders. Where possible we have drawn relevant comparisons with the mature age job switchers. Most chapters begin with a brief statement of the assumptions held by the researchers at the outset of this project, and a summary of the key findings. The outlined assumptions constitute hypotheses which were tested by the research, with either their confirmation or rejection pointing directions for targeted action.



Introduction

The **Executive Summary** (p.4) provides an overview of the key themes and findings from the research.

Chapter 1 **Young people today** (p.8) looks at their life aspirations and expectations, their relationship with technology and their media habits.

Chapter 2 **What do I want to be?** (p.21) looks at the process by which young people attempt to define their career aspirations, and the factors that appear to consciously or unconsciously influence these decisions. It also examines both positive and negative job features and attributes.

Chapter 3 **IT as a field of study** (p.35) examines how students select subjects for later secondary study, and the factors that impede participation in IT study. It also canvasses the views of teachers, lecturers and industry stakeholders on the current performance of the education system.

Chapter 4 **IT and Careers** (p.47) discusses perceptions of jobs in the IT sector, awareness of the role of technology skills across industry and steps that might increase interest in IT jobs, and media perceptions of IT.

a note on the limitations of research

It was not intended, when the research was undertaken, to produce and publish a report based on the findings. The intention was to uncover broad themes relevant to people's interactions with technology and their perceptions of IT careers that would be used to inform a communications strategy.

By far the most important element of the research project was the qualitative research, which could explore in depth the complexity of the subject matter and provide insights into why particular views were held.

The majority of the conclusions drawn in this

report are based on the focus group research and the in-depth interviews conducted with teachers, university and TAFE lecturers, key media and industry leaders.

The quantitative surveys of students and mature-age job seekers were intended to complement the qualitative findings and provide some validation for conclusions drawn from the focus groups.

It is important to note that students studying IT are over-represented in the student survey, and that the mature age findings are based on a relatively small sample that is nonetheless statistically significant. This means that the numerical findings need to be treated with a degree of caution.

- A more detailed explanation of the research process can be found in the Methodology.

Further details about the Victorian Government's IT achievements and policies including:

- the Connecting Victoria Ministerial Statement;
- the report of the IT Skills Taskforce Skills x Knowledge = Growth; and
- the Skilling Victoria for the Information Age strategy for post-compulsory IT education, training and employment

can be found at the Multimedia Victoria website - www.mmv.vic.gov.au

executive summary

Reality Bytes summarises the findings of a research project commissioned in mid-2000 by Multimedia Victoria to understand barriers to the uptake of IT skills

key findings at a glance

- Most students have a very limited view of IT as the computer, keyboard and peripherals such as cabling rather than the 'social' and 'entertainment' technologies they enjoy.
- Students are aware of the opportunities and money in IT but by and large don't care. They are more motivated by a desire to pursue careers that link with their personal interests.
- Mature age job seekers are more likely to be positively disposed towards IT.
- Students see jobs involving technology as technical, not creative; solitary not team-oriented.
- IT can be seen as limiting their future options – a direct route to spending work time glued to a monitor and keyboard.
- IT as undertaken at secondary school level is criticised by most students and contributes to their view that IT is "boring".
- Students are aware that technology skills are important across all industry sectors – but not how or why. This in fact reflects a more general lack of awareness concerning the world of work.

The research examined the dynamics that influence career choice and identified perceptual barriers that might be inhibiting the uptake of IT skills. Where possible, the research also explored measures to address these barriers.

At the outset of this research project there was a working assumption that demand signals were being poorly transmitted, resulting in a lack of awareness of the employment opportunities in IT and the generous salaries on offer. This assumption was quickly dismissed.

There is a near universal awareness that the IT sector has an abundance of well-paid jobs on offer and that these jobs are generally secure. This information excites and attracts many mature age people, but is of little interest to the bulk of the student population.

key findings

The research uncovered some attitudes and barriers that are of concern. However, on the positive side, mature-age job seekers are highly attracted to IT employment and the acquisition of technology skills through formal training and/or retraining. One in four young people are highly motivated to continue studying IT and want to work in the IT sector, predominantly in 'new economy' occupations.

There seems to be a genuine recognition by most young people that technology skills will be used in almost any job – but this belief is shallow, rarely acknowledged without prompting, and not usually expressed with an understanding of how and why technology skills will be used.

Indeed, the research found a general lack of awareness of the modern workplace and little understanding of the way that



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technology is reshaping work practices in most occupations. Young people have little exposure to the workplace and much career literature tends to describe jobs in terms of the qualifications required and their outcomes or mission – not what is actually ‘done’. Popular culture representations, descriptions provided by family and peers and brief stints of work experience are as close as many young people come to experiencing jobs in action. Consequently, young people lack detailed understandings of even traditional jobs but particularly new economy jobs and those traditional jobs that have been reshaped in recent times due to technology.

This was not restricted to young people. Most parents and many career teachers indicated a lack of confidence in providing guidance and advice outside of their immediate experience to young people about their options – the pace of change has been so rapid that nobody seemed to have a clear picture of the world beyond their personal experience.

Most students have a very limited view of IT as the computer, keyboard and peripherals such as cabling. This is the IT they see in the classroom, which also tends to be associated in their minds with data processing and programming. Yet they are immersed in an electronic world of technologies that they enjoy – mobile phones, email, the internet, digital music and interactive games – but these technologies are seen as "entertainment" rather than as IT. There is some sense that these forms of social enjoyment would lose their appeal if linked to formal study or work.

The research found that most young people have an overwhelmingly negative perception of IT jobs as male-dominated, boring, solitary

and low-level tasks that involve little more than sitting at a screen all day entering code or data. They believe that IT employees interact only with a computer, not with people.

This impacts significantly on their attitude towards IT as a subject, which is seen as not challenging and technical. Those who are not studying IT tend to view many IT students as obsessive and totally absorbed in technology.

These attitudes are reinforced by media and popular culture's tendency to portray IT jobs using outdated, 'nerdy' stereotypes – and, very importantly, by the 'invisibility' of the IT industry and the lack of positive, balancing role models.

At the stage in schooling when IT becomes an elective subject, most young people have only a vague idea of the type of career they ultimately want to pursue. Some admit to having no particular career in mind. For these students, the next step in the learning process becomes an end in itself and they are inclined to choose subjects that they like or that allow them to keep their options open.

Young people see value in to keeping their options open. Notions of job security and 'a job for life' have been significantly, and visibly, undermined in recent years. Young people seek to ensure choice by developing skills that will then allow them, as far as possible, to transfer from one employment sector to another.

However, IT is not seen as an 'options provider' that would add to their stock of necessary skills, but as a vocational subject that is only important for students who want to work in IT.



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Most stakeholders believe that many schools face impediments in presenting IT study in a way that is engaging and creative. However, there is considerable praise and commendation for universities and TAFE institutes that have worked closely with industry to develop innovative and leading-edge courses. In addition, many universities and TAFE institutes, with industry support and cooperation, are actively attempting to combat gender issues in an integrated (albeit remedial) manner.

steps to broaden the appeal of IT

So what can be done to broaden the appeal of technology-related careers and encourage more young people to develop technology skills as part of their own stock of life skills?

Part of the answer is provided by young people themselves: they nominated more information and work placement opportunities as the most desired way of increasing their interest in IT careers.

better information

Information they would find useful included information about the types of jobs, the skills required and remuneration. Around one third of young people indicated that more information about the future – or about growth industries – would be useful.

There appears to be a need to recast the manner in which this information is delivered. Young people are particularly interested in knowing what is actually involved in different jobs – what people actually do in their average day. They are interested in material that helps them ‘visualise’ what a job would be like.

Use of case studies and ‘living examples’ of jobs – showing real people that challenge the stereotypes – will help them reach more

informed judgements, as will the ability to hear first-hand from people through school visits. The research indicated that young people’s career decisions are influenced by personal discussions with relatives or ‘neighbours’ involved in their chosen career. A significant proportion of young people believed that employers are an attractive source of advice about careers – especially those intending to work in IT.

For the IT industries, there are several implications.

The challenge is to develop more accurate awareness of the importance of IT skills in almost all jobs today – and the diversity of jobs in the IT sector – and to develop linkages with the personal interests and aspirations of the target audiences.

It is apparent that perceptions around the utility of technology in the workplace must be broadened. Technology skills must be positioned as an ‘options provider’ that has relevance in almost any career.

Aspects that need to be better explained include the social interaction and teamwork, opportunities to travel (a key aspiration for young females), job security, opportunities for further education and training – as well as the fact that the skills developed in IT careers are portable to almost any other industry. While the availability of jobs and the salaries offered are important, they are not key factors in determining career choice.

It is also important to not overstate the fast-paced environment. Concerns about stress and lifestyle are very strong among young people in general and especially among those considering an IT career.

In addition to school visits to talk to students about the types of jobs available in IT, there



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may also be a need for personalised mentoring and 'buddy' initiatives, although care is needed in matching students with appropriate IT representatives. This would be vital in identifying possible mentors for female students.

work placement

Both young people and mature age respondents expressed a strong desire and preference for opportunities that allowed them to observe different jobs and help them assess whether they would be 'right' for them.

Asked to identify measures that would be helpful to people 'in transition' between study and the world of work (or between careers), 50% of young people and almost six-in-ten mature age people favoured options that combined work and study.

45% of young people believed that more work experience opportunities – and formal programs such as apprenticeships and traineeships – would be positive steps.

Mature age people also nominated more childcare places and assistance, as well as incentives for retraining.

There is considerable scope for the IT sector to improve the availability of work placement opportunities for students.

However, these need to be carefully structured to avoid reinforcing any negative stereotypes and perceptions. Quite a number of the focus group participants indicated that a poor work placement had turned them away from jobs they had previously considered attractive. This appeared to be a common experience for young females who had been considering IT careers.



young people today

There is a tendency for market research to amplify the differences between each generation based on their social trends and behaviours, and to mask or mute those attitudes or aspirations that are constant. Since the transistor radio helped create the first "teen" market in the 1950s – setting the stage for the rise of distinctive youth cultures – researchers have paid significant (perhaps too much) attention to each generation's "own" technology.

The current generation of teenagers is the first to have grown up with the internet as a widely accessible technology. Some have labelled this the 'internet generation' – a label rejected by young people themselves. Indeed, they reject or defy any attempt to apply a caricature to their age group. They demand respect as individuals while fiercely defending and projecting the identity of the social "tribe" they belong to. [See Tribal Passions, on page 9]

The research sought to understand how teenagers in the Year 2000 saw themselves and their relationship with technology. Were they positive about the future? Had the proliferation of new technologies, careers and ways of working affected their life goals or worldview? Was their social tribalisation reflected in other ways, such as their interaction with mainstream media? Are there any role models that have broad appeal to most young people? In essence, are they different to previous generations?

Teenagers today do share characteristics with previous generations (while distinguishing themselves with other social tastes and behaviours). They have a strong work ethic (occasionally defined on their own terms), see further education or training as essential, and would like to travel and experience other cultures. **They are optimists.** They are pragmatic and practical, but also believe that career choice is harder than it was for their parents.

While their social attitudes may be progressive, they are wary of making decisions now that could lock them in to a limited or unhappy future, and consciously pursue options that allow them to 'leave their options open' for as long as possible. At the same time, they welcome any opportunities to personally explore each option – and to hear first-hand from people who have experience in that field – before ruling it 'in' or 'out'.

Social researcher and commentator Hugh Mackay has previously described Australian young people as 'the options generation'. The research commissioned for this project both validates and extends this concept.

Based on our research, we would extend this concept and describe today's teenagers as the 'show me' generation. They are willing to consider any options that are potentially interesting, but need to be convinced that any claims are true. They express a strong desire to 'test drive' different careers to see if the promises live up to the reality; they are quick to detect and discard marketing 'hype' about careers.

We found that their relationship with technology was strong as consumers, troubled as users in classroom setting, and problematic as 'developers'. Most young people are immersed in technology but see most of this as entertainment or social communication – and only a minority associate these technologies with the world of work beyond the IT sector.



young people today

Tribal Passions

It must be appreciated that socially young people tend to have less in common with each other today than those in generations past. This phenomenon is frequently characterised as a 'tribalisation' of youth. Unlike baby boomers who were "shaped by homogenising TV, under 30s are influenced by a diverse medium, the Internet."¹ The virtue of breadth of opportunity is the trade-off against the curse of having to face a dizzying array of choices and an increasing absence of models by which one can navigate through life.²

The desire to balance expression of individuality with some degree of peer solidarity (frequently through the consumerism allowed by greater disposable income than was available to past generations) gives rise to a subdivision of youth into skaters, surfies, punks, homeboys, goths, petrolheads, Westies, riot grrrls, slackers and many other groups and sub-groups. This situation is lent even greater complexity by the flexible boundaries between groups. There is nothing to say a punk can't surf.

Segmentation of youth culture is of course by no means a new phenomenon – think of mods, rockers, hippies etc. What is more unique is the opportunity to sub-segment to an unprecedented degree – an opportunity afforded by technology such as the internet, providing access to information and

its existence couldn't be sustained through traditional media.

The phenomenon of significantly segmented youth tribes, combined with a significant degree of cynicism and media savvy, sometimes makes young people today a difficult audience to reach.

To be able to communicate across the broad spectrum of youth, it is important to identify those characteristics that unite (as far as possible, noting that universal characteristics will be a rarity) rather than divide young people.

the future is bright – "blue sky" aspirations

Both the student and mature age survey respondents were questioned about their general outlook – and 'blue sky' (ideal world) aspirations – over the next five years.

When the surveys were conducted in August and September 2000, there was a sense of overwhelming optimism among young people and the mature age respondents.

- 84% of students, and 83% of the mature age respondents, believed that life would generally get better in the next five years. Only 4% of young people believed that life would get worse. This high level of optimism reflects confidence in the economy (or perhaps more accurately,

¹ Ellingsen P, 'Don't Call Us a Generation' in The Age Saturday Extra, 6 May 2000, Pages 1, 4-5

² Sources of Influence: Youth Monitor (internal Hill and Knowlton document)

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simply an absence of anxiety about the economy – ‘confidence’ tends to imply a more considered response than may be warranted) and their ability to reach their goals.

To assess the medium-term aspirations of both young people and the mature age group, we adapted a series of questions developed by ANOP Research Services Pty Ltd (ANOP) for a series of biennial surveys of young Australians commissioned by the Commonwealth Government between 1984 and 1988.

These questions attempt to establish and rank in importance broad ambitions for the next five years (blue skies aspirations). In addition, they tackle specific activities relating to employment, education, training

and lifestyle (here we added further options to those included in the earlier ANOP series to assess ‘work and family balance’).

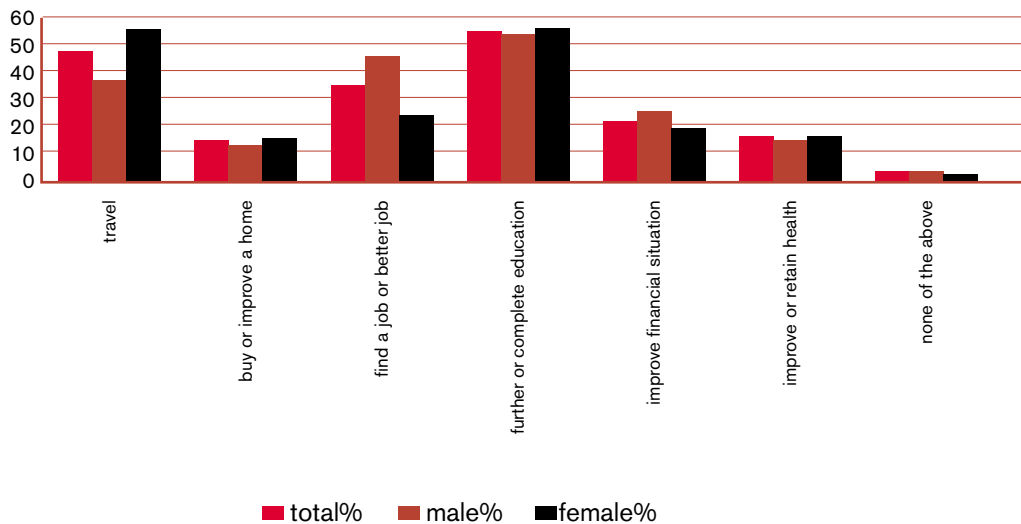
For the specific activity options, respondents were asked to nominate:

- what they were interested in doing in the next five years (aspirations), and
- what they expected to be doing in five years’ time (expectations).

The difference between recorded ‘interests’ and ‘expectations’ is the ‘expectation gap’. A significant difference can indicate a lack of confidence in being able to actually achieve one’s goals.

Students’ main aspirations (that is, their first preference) are to further or complete their education (55%), travel (47%) and

"blue skies" aspirations - young people



young people today

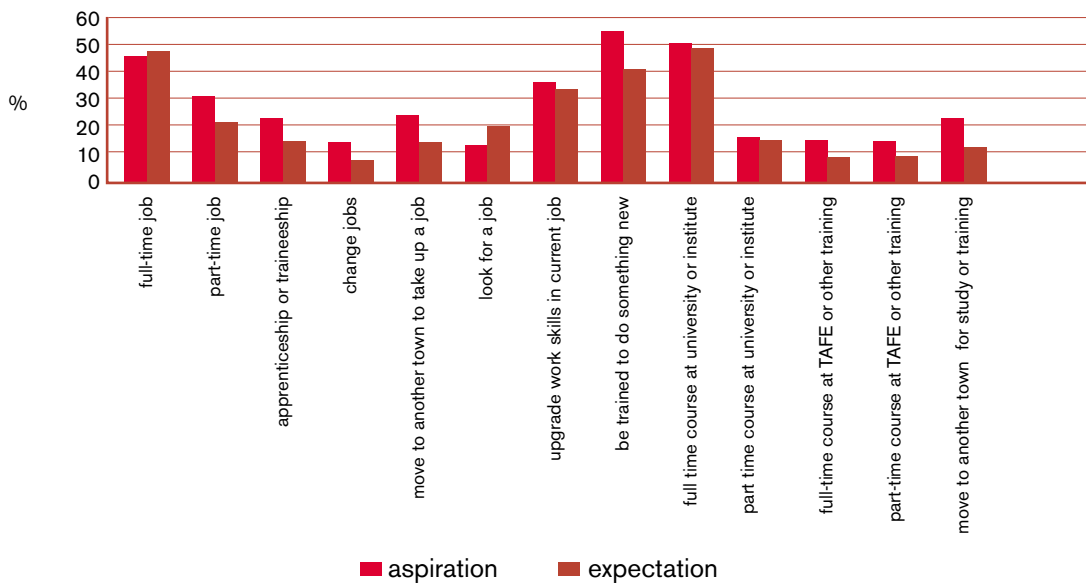
employment (35%). Around one in five nominated a better financial situation, buying or improving a home, or improving/retaining their health. That travel ranks ahead of employment provides some indication of the importance placed on pursuit of interests.

Females equally ranked travel and further education (56%) while males were more motivated towards employment.

'Further or complete education' was more highly rated by students attending government and metropolitan schools.

- 77% express an interest and 64% expect to be involved in training or retraining, either within their current job or being trained to do something new.
- 78% express an interest and 75% expect to be involved in post-compulsory education at a university, institute or TAFE campus.

activities (next 5 years) - students



With regard to specific **activity areas**:

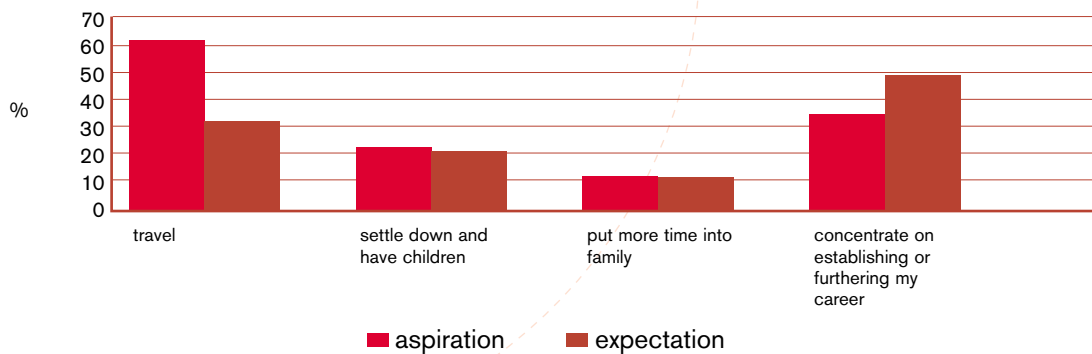
- The overwhelming majority of students (88%) nominated at least one labour force option as an aspiration and a similar proportion (80%) expect to be in the labour force in five years' time. The remaining 20% expect to still be in full-time education and training or looking for work.

- There are some signs of accepting mobility: 24% would be interested in moving to another town for work (and 14% expect to do this), while 23% are interested in moving for study or training (expected by 12%).

(Further detail around students' employment, training and education aspirations and expectations is provided in the next chapter.)

young people today

lifestyle activities (next 5 years) - students

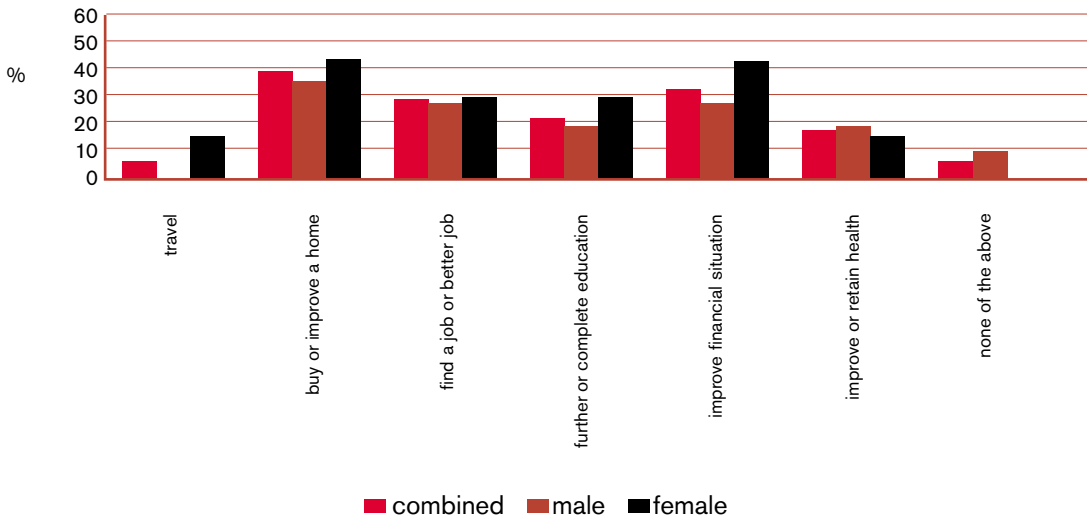


With regard to **lifestyle** options:

- 62% of young people are interested in travel in the next five years (male 54% and female 70%) but only 33% expect to do so (male 30%, female 35%). Interest is strongest among Year 12 students and those attending non-government schools.
- 23% of students expressed an interest and a similar proportion expected to settle down and have children in the next five years. Interest is marginally higher among Year 10-11 students, those at government or regional schools, and those intending to work in IT (28%).
- 12% are both interested in and expect to put more time into their family, with stronger levels of interest from males, those attending government schools, those living in metropolitan areas and those intending to work in IT (22%).
- While only one in three (33%) expressed a desire to be "concentrating on career" in five years time, half (50%) expected to be doing so. Expectation was stronger among females, Year 9-10 students, those at non-government schools, those living in metropolitan areas, and those intending further study or a career in IT (41%).

young people today

mature age aspirations



mature age aspirations

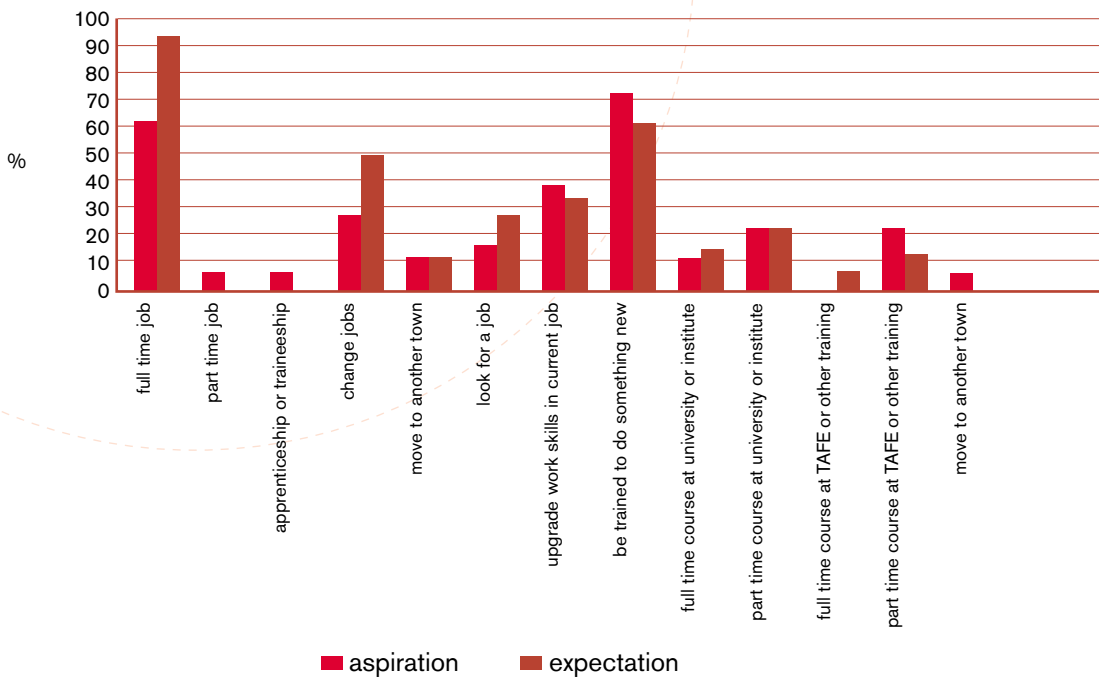
Mature-age respondents' main aspirations were to buy/improve a home (39%), improve their financial situation (33%), followed by improved employment (28%), further education (22%) improving/retaining their health (17%) and travel (6% overall but 14% for mature-age females).

Certainly, the mature audience places less emphasis upon leisure options and pursuit of personal interests, and is more conscious in seeking financial gain. Industry should be mindful of this crucial difference between young and older people when attempting to promote itself to younger people.

Successful attractors for the mature age group will not necessarily find similar success with a younger target audience.

young people today

activities (next 5 years) - mature age

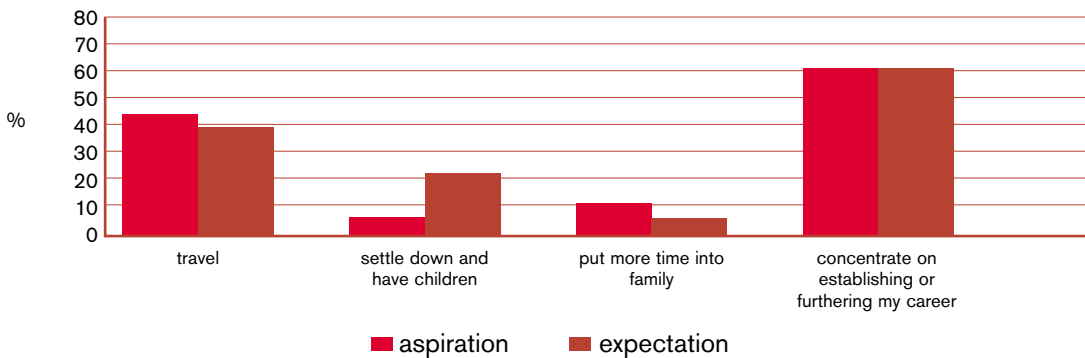


With regard to specific **activity areas**:

- 94% of mature age respondents (and 100% of females) expect to be in the workforce in five years' time and most expect to be in a full-time job. 36% of males and 71% of females expected to change jobs.
- 78% are both interested in training or retraining and expect to do so. This interest/expectation is twice as likely to be in developing new skills than upgrading skills in their current job.
- 50% are interested in and expect to undertake some further education in the next five years. There was a mixed spread of interest between full and part-time courses, and between universities /institutes and TAFE colleges.

young people today

lifestyle activities (next 5 years) - mature age



With regard to the mature age group's **lifestyle** options:

- 44% are interested in and 39% expect to travel in the next five years, although there are intriguing gender differences.

More men expect to travel than are interested in travel, which may suggest dissatisfaction with the level of (involuntary) work-related travel. On the other hand, only half of the women interested in travel expect to achieve this goal.

- 14% of females but none of the males were interested in settling down and having children – although 18% of the men expected to do so (and 29% of the females).
- While 9% of males and 14% of females were interested in putting more time into their families, none of the males expected to be able to do so – probably reflecting a concern about their hours of work in the future.
- 45% of males and 86% of females both express an interest in and expect to concentrate on their career in the next five years.



young people today

relationship with, and understanding of, technology

To young people technology in its broadest sense is 'wallpaper'. Like culture, it is not only all around them but an essential part of their lives, their self-identity and their tribal affiliations. They relish the new opportunities for mobile communication, SMS 'zapping', email, chatrooms, online music, e-zines, computer games and other, 'fun' applications.

Yet young people define their technology in a very different way than the industry, policy-makers and mature age people do. They classify their 'fun' technologies as entertainment or infotainment – but not as information technology.

This can be clearly seen in three important findings.

- Most young people (58%) have a restricted view of IT as hardware ("computers and the chips, semi-conductors, keyboard and cabling used to build a communications network"). Only 38% see IT as embracing the software applications, entertainment and the online world ("web sites, the internet, computer games and other entertainment as well as the computer").
- The 'old technology' view is slightly more common among male students, Year 9 and Year 12 students, and students living in the metropolitan area.
- The 'new technology' view is more common among mature age respondents, female students, Year 11 respondents, and those intending further study or training or a career in IT.
- By way of contrast, only 39% of the mature age respondents had an "old

technology" view, which largely reflects their broader exposure to the reality of the modern workplace (recognising that four in ten is a significant minority).

We believe this 'old technology' view reflects a number of interrelated factors.

First, many of the new mobile and online functions have evolved from, been developed by, or become an alternative to other (non-computer) technologies. Mobile phones are seen as an extension of the 'plain old telephone'. Computer games are seen as an extension of video games. Email and chatrooms are seen as an alternative to both post ('snail mail') and the telephone. DVD is seen as an extension (and enhancement) of video. Online music and MP3 are alternatives to broadcasting and (possibly) purchasing.

"Convergence" across the digital platform does not appear to be part of their understanding of the world of technology. They still see and perceive products (and services) emerging from different silos.

Secondly, their exposure to the study of IT at school does not appear to have generated broad enthusiasm among the student population. Although it has become a passion (even obsession) for some, many students see it as boring or simply unengaging. They regard their social use of the computers, the internet and mobile phones in a different category to the formal, structured study of IT. (More on IT as a subject in chapter 3).

However, many students are exposed to engaging use of IT in other areas of the curriculum. Yet students are not making the link between this activity and IT.



young people today

Thirdly, there is the personality factor. There is an 'us and them' mentality when young people look at IT. Most young people see IT as an unattractive field partly because it is 'owned' by the stereotypical 'geek' or 'nerd'. Their own observations in the school computer lab tend to confirm this (although 'geek' and 'nerd' are not terms that we found commonly used by young people themselves). For most young people, it would be unthinkable to associate anything positive with those students they mock, envy, taunt, ridicule or find intimidating in the school environment. (Attitudes towards outstanding IT students are discussed in chapter 3).

- Young people differentiate between their role as consumers of technology as opposed to 'users' (of advanced computer-based applications) or 'developers' (ie. building the applications or enabling technologies).

It is cool to be a consumer of entertainment technology – and this extends (for example) to being expert in customising and programming the functions to enhance the 'uniqueness' of a mobile phone. To draw an analogy, every young person wants to learn to drive a car as well as they can. Only a minority want to tinker with cars as a leisure pursuit and only a very small minority ever think about gaining skills in automotive engineering as a career. Young people do not yet seem to consciously appreciate that the skills they develop as consumers of technology are just as relevant to their future careers as the traditional '3Rs'.

- The pervasive spread of information and communication technology is not universally welcomed without qualification.

Indeed, a minority of people – including young people – have reservations about its impact.

In focus groups there were a number of specific reservations expressed about technology from all demographic groups. These were not systematically quantified or ranked but fell into four areas:

- integrity (fraud, privacy, personal control and system or network reliability),
- employment (people being replaced by machines),
- loss of personal service and social interaction (cited especially in financial services and utilities), and
- choice (IT being 'forced' onto people before they are ready, especially affecting older people)

personal access to, and interaction with, technology

The relative disinterest shown by students in careers based around technology cannot be attributed to a lack of familiarity with technology in their own lives.

There is high penetration of technologies in student homes in the sample including computers with a CD-ROM (91%), VCRs (90%), internet access (66%) and Pay-TV (23%).

- Computer and internet access at home was lowest for students attending government schools and regional schools, while internet access was highest for those attending non-government schools and schools in the metropolitan area.
- Almost one in five females had computers without a CD-ROM. These can be inferred to be older computers (286 or 386). It is

young people today

uncertain whether these households have older computers due to lower socio-economic status or other factors.

- The majority of students had used a mobile phone at least once in the previous week. More females than males had used a mobile phone, with usage higher for students attending a non-government school and those living in the metropolitan area.

- Among the mature-age survey respondents, 45% of the men had not used a mobile in the previous week but 27% had used one more than 10 times (our arbitrary level set as a benchmark of heavy usage).

Focus groups indicated that most students were comfortable using computers. There was an absence of the 'fear' noted in many of their parents. (A notable exception was a female student who had a "compulsory" laptop for a couple of years which "had never been to school"!).

However, some interviewed teachers voiced concerns about gender imbalances:

"It is really only a few students who take IT on as part of their life – these students seem to live for IT ... Boys are more inclined to embrace IT as part of their lives whereas girls seem to use IT as a means to an end."

It is our observation that young males are heavier consumers of internet services. Young females demonstrated a more balanced interaction with the online world (although their own use of the internet is primarily for communication with other people).

81% of students spent less than 10 hours on a **computer** in the preceding week (and

58% spent less than five hours). High users were predominantly male and attending metropolitan schools. Not surprisingly, students intending to study IT or work in IT were very high users. Mature age respondents spent considerably more time on computers, reflecting occupational needs.

Students mainly used computers for schoolwork and homework (87%), games and entertainment (57%) and other 'fun' activities (40%). A significant number used the computer for drawing or design (14%) and learning how to program (16%). Females were less likely to use computers for games or 'fun', while mature age respondents were significantly more likely to use them to learn how to program.

A significant proportion of students (54%) usually access the **internet** from home (school access was 49%).

Students mainly used the internet for email (68%), research for school projects (58%), personal research (52%) and music (48%). More than one in three also use the internet for games and entertainment (35%) and chatrooms (33%), while just under one in five used it to access online magazines (17%). Significantly more females (81%) than males (53%) used email, while males were more likely to access games and entertainment and music.

Mature age respondents mainly used it for email and for personal research, although there is also a significant proportion who access online magazines and music.

Other findings:

- 44% of students, predominantly males, had downloaded music in MP3 format, which we believe is a reasonable indicator

young people today

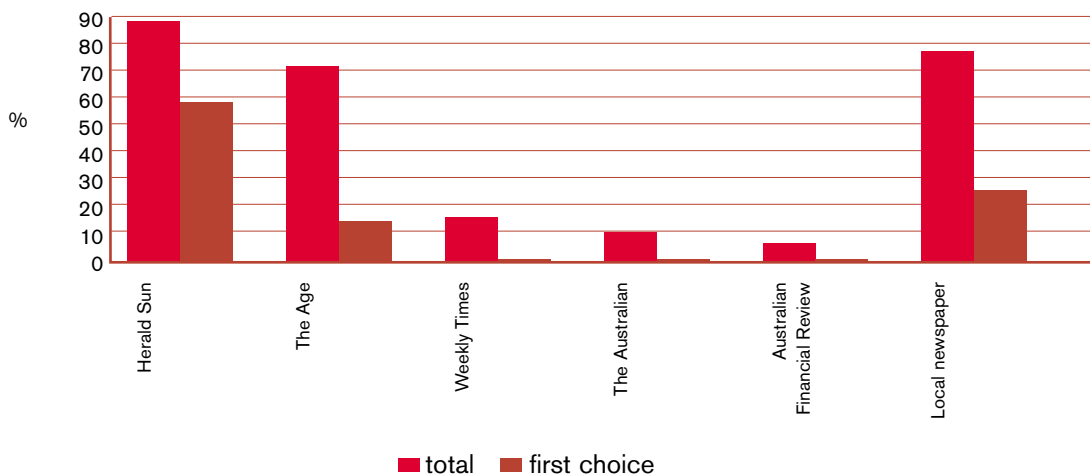
of an 'early adopter'.

- 86% of students and 89% of mature-age respondents have their own email address. Significantly more young females (92%) than males (79%) have an email address reinforcing the greater appreciation by women and girls of the communication aspects of technology.

newspapers generally than males.

The relative popularity of newspapers with broad youth audiences over more specialised youth-oriented publications corroborates our categorisation of youth culture as 'tribalised'. That is, publications targeting particular areas of interest are only of interest to particular youth segments. This is particularly so among males, with females having relatively more homogenous

newspaper readership (students)



media usage and behaviour

Investigation of youth media habits provides practical insights into how to communicate with young people on a wide scale. Importantly, it was revealed by survey that mainstream newspapers such as The Herald-Sun, community newspapers and The Age are read more widely among students than any particular youth-oriented publication.

The Herald-Sun is regularly read by 88% of students, followed by their local suburban or regional newspaper (77%) and *The Age* (72%). Only around one in ten read *The Australian* or the *Financial Review*. Females were slightly lower consumers of

magazine consumption patterns. Young females can be effectively reached through four key publications: *Dolly*, *Girlfriend*, *Cleo* and *Cosmopolitan*.

The popularity of newspapers is a positive finding as it provides an opportunity for industry to reach a young target audience while simultaneously communicating with this group's influencers: parents, teachers and older siblings.

In terms of reaching young people of both genders through magazines, *Smash Hits* and television related publications *TV Week* and *TV Hits* were among the most highly ranked magazines (in terms of total readership) to record significant readership among both



young people today

males and females. *Smash Hits* recorded a female readership of 15% and a male readership of 24% among youth, while *TV Week/TV Hits* recorded 23% and 26% respectively.

Young males' readership habits are more diverse (with a bias towards sporting and recreational interests eg. football, cricket, surfing). One in four young males read computer or games magazines, and a similar proportion read the 'new lad' magazines *Ralph* and *FHM*.

Young people's radio habits reveal some interesting patterns. While broadly confirming that FM stations are their dominant choice, there are significant shifts within the age cohort.

While FOX FM and TTFM decline in popularity with age, the popularity of Triple M, RRR and Triple J increase with age (indeed, Triple J is the most popular station for year 12 students and for regional students). Not surprisingly, regional students also listen to regional ABC and AM stations.

potential role models from the world of entertainment

We stress that these findings and rankings arise from research conducted prior to the Olympic Games.

In terms of personalities presented through various media, a lack of universally popular 'role models' provides further evidence of the tribalisation of youth. TV presenters/actors and sporting identities had widest appeal.

Among young females the highest rankings were recorded for Heath Ledger (28%), Ian Thorpe (15%) and Susie O'Neill (14%). The only others to record 10% or better were Mark Phillipoussis, "an AFL captain", Paul

McDermott, Brooke Satchwell, Pat Rafter and Rebecca Cartwright.

Among young males the highest rankings were recorded for "an AFL captain" (22%), Ernie Dingo (17%), Pat Rafter and Ian Thorpe (both 16%). The only others to record 10% and higher were Glen Robbins, Rob Sitch and surfer Mark Occilupo.

Interestingly, Glen Robbins and Rob Sitch (both 21%) were the most popular choices for year 12 students.

Conspicuous by their absence are personalities from the music industry (particularly given the finding that among magazines, *Smash Hits* ranked well among both males and females). However, this may be explained, speculatively, by reference to young people's avid interest in music. Music among young people can be one of the critical characteristics by which they seek to define (or perhaps confirm an existing definition) of themselves. As such, young people will tend to focus on particular genres of music rather than profess an interest in 'music' as a whole. Consequently, across the spectrum of youth, music can be as divisive as it is unifying, resulting in few widely held role models.

There is a corollary between the relative popularity of non-'youth culture' specific personalities as listed above over more youth oriented musicians, and the popularity of newspapers over youth publications.

These findings provide a caution against engaging 'personalities' as advocates for technology on the basis of a youth culture affiliation. The appeal of such an advocate can be very limited.



what do I want to be?

"I think the hard thing is in choosing subjects in Year 10 for 11 and 12 that's kind of like for the rest of your life. You - you're meant to know in Year 10 what you wanna do."

– Student³

Deciding what occupation to pursue is among the most difficult and important decisions in anyone's life. For most people, it is seen as a lifelong decision, and a poor choice can be costly and painful to change.

For some young people the choice of career is clear, but for the majority it is not. In focus groups, even those who believe they have a reasonable idea of the type of job or career they want had reservations. This is mainly due to a lack of detailed knowledge about career options.

For most teenagers the world of work will be reached in their own time. Their focus is on the immediate next step in their transition, rather than the destination. They accumulate skills that might be useful later on and turn down opportunities that are uninteresting or not seen as having broad relevance.

Most students have very shallow knowledge of the reality of most jobs in the modern workplace, and accordingly have little appreciation of the extent to which technology skills are fundamental. At the same time, most parents and many career teachers indicated a lack of confidence in guiding students – the pace of change has

been so rapid that very few respondents seemed to have a clear picture of the world of work beyond their personal experience.

Yet young people know that the start of their working lives is nearing. 80 per cent expect to be involved in some form of labour market participation in the next five years, with the remainder expecting to still be in education or training systems.

But what type of participation is desired and on what basis do students select a career? How do students select the courses that point them in the direction of employment? Which modes of education and training are preferred to take them there? What can be done to ease the transition into a career? These questions are addressed in this chapter.

selecting a career

Career selection is a daunting challenge today, due to the changing workforce and rich choice of occupations. Indeed many young people believe that this decision is more difficult than ever before – 51% agree that "It is harder for young people to choose careers than it was for our parents".

³ Whitely S and Porter J 'Student Perceptions of Subject Selection' in *Australian Journal of Career Development* Volume 8 Number 1, Autumn 1999, Page 45

what do I want to be?

However, 63% believe they know the type of job or career they want after completing their secondary education, especially those attending schools in metropolitan areas (probed more deeply however, many of those beliefs are highly tentative).

How have students arrived at these career preferences? As we found in the focus groups, there are a number of influences.

Students who have a preferred career are very much driven in that career choice by "what I like doing".

*"My Dad says, if you work at what you like you never have to go to work".
- a Shepparton student.*

How do students know what they will like doing? Simply put, they are influenced by their experience of and **capabilities** in school subjects,

science	→	scientist, doctor
art, technical drawing etc	→	graphic designer, architect
economics	→	business
english	→	journalist

and/or **longtime leisure/social interest,**

liking, caring for animals	→	vet
tinkering with, working on cars	→	mechanic
liking, enjoying cooking	→	chef
doing friends, family members hair	→	hairdresser

and/or **personal traits or talents,**

liking, caring for children	→	teacher, child care
helping people with problems	→	psychologist, social worker
good communicator, speaker	→	lawyer, public relations, real estate

What the students thought they would like doing overwhelmingly outweighed other considerations such as job opportunities, remuneration levels or lifestyle aspects such as travel opportunities and being able to work from home.

However, while remuneration and job opportunities were not sufficient to select a career, they were often cited as reasons to discount particular careers of interest.

While this held true for the majority of students participating in the focus groups, there were exceptions.

- Some students who wanted to be actors or musicians or sports people indicated they had chosen other careers because of the decided lack of job opportunities and/or low remuneration except at the elite level.
- Those young people with an interest in becoming dentists or lawyers appeared to be financially motivated, but they were very much a minority.

Unlike metropolitan students, many young people from rural and regional areas are likely to be faced with leaving family and friends to pursue higher education and careers. Relocation issues are strongly linked to their decisions about careers and further study.



what do I want to be?

course selection

Students' choice of school subjects and post-compulsory education or training generally reflects their interests and desire to keep their options open for as long as possible.

A majority of students (52%) believe it is most important to choose subjects at school that provide them with "broad skills, not tied to any particular career" while 42% would choose "subjects that specifically prepare me for the job or career I want".

- Those more likely to prefer "broad skills" subjects are females (57%), Year 12 (68%), non-government school (59%), and living in a regional area (61%).
- Conversely, those more likely to prefer "job specific" subjects are males (55%), year 9 (64%), government school (52%), living in a metropolitan area (58%), and those who intend to study or train in IT.

In terms of **further education and training**, the most important factor in young people's course decisions is "subjects I like and interest me" (44%) followed by "subjects that will keep my options open" (33%) and "subjects that will help me get a job" (17%).

Most students were preoccupied with the next step in the career chain rather than the end goal. Accordingly, most decisions about subject selection and post-secondary school education or training were made in the absence of a firm view of a desired career.

Given that pursuing options on the basis of 'what I like' equally applies to course and career selection, desirable careers will logically be accessed by desirable courses of study. Of course, this assertion contains a major qualifier – that is, it will not hold true if courses fail to adequately represent the desired career. It then becomes easy for students to dismiss potentially desirable careers on the basis that the relevant courses are unappealing. This is a particular danger for the IT sector where the courses of study that purport to lead to these careers often meet with student dissatisfaction. Students' general lack of awareness concerning workplace realities, and specifically the technology sector, will lead them to conclude the undesirable course of study will lead to an equally unappealing career.

Aside from keeping options open and pursuing subjects on the basis of interest, course selection is largely a function of what the student is good at. Aptitude for particular subjects and rankings for tertiary entrance also serve to inform subject selection. If early ability is taken to be prerequisite for continued interest, there are implications for participation in IT by rural communities and indigenous populations who are less likely to have acquired basic skills.⁴

A further influence, suggested by one IT teacher, may be how subjects are rated in terms of Tertiary Entrance Rank (TER) score.

⁴ Department of Education, Training and Youth Affairs report cited in 'Internet students out-savvy teachers' (*The Sunday Telegraph*, 18 June 2000)

what do I want to be?

"A lot of students are choosing subjects that do not interest them, rather they choose subjects in which they can gain a higher TER score."

- IT teacher

advisors, role models and information sources

How do young people make the link between what they like and potential careers?

First and foremost, there are students' own observations, both personally and from the popular culture and mass media. They 'see' jobs in action as it were. Work placement (usually in Year 10) allows for more than observation, it allows for some interactive involvement. This experience may be confirming, or, in many cases, it may be in conflict with previous observations (or advice). Many students taking part in the focus groups had decided against a prior career choice because of work experience.

Also establishing the link between 'likes' and careers are those people who we may refer to as 'advisors'. Parents are influential. In some cases their influence was very strong and very direct. In others it was more indirect and subtle. Older siblings or school contacts who had recently left school or started work were also important.

It is an interesting aside that in the focus groups students did not nominate parents as an influence, and that the parents did not

believe they played a role in the decisions. Yet, the student surveys clearly indicated that parents remain the most important influence, and by a significant margin. This most likely represents the existence, by no means new, of a 'cringe' factor associated with any admission in front of peers of parental influence. This is understandable, given that adolescence and early adulthood represent the period during which young people seek to assert their independence.

This instance represented the greatest discrepancy between the focus group findings and the quantitative research. Aside from the question of parental influence, quantitative research corroborated the focus group findings indicating that focus group participants were less squeamish discussing other issues in front of their peers.

Nonetheless, parental influence is strong. Dellar (1994) has found that with regard to obtaining relevant information, parents and siblings ranked higher than career education or counselling resources available within the school.⁵ Teachers and career advisers at school appear to be another main advisory group.

However, in focus group sessions reservations were expressed by both parents and teachers that they often felt uncomfortable or lacked confidence to offer career advice to young people. Many acknowledged that the pace of change

⁵ Dellar G, 'The School Selection Process: A Case Study' in *Journal of Career Development*, 2 (3), 185-204, 1994 Cited in Whitely S and Porter J, 'Student Perceptions of Subject Selection' in *Australian Journal of Career Development*, Volume 8 Number 1, Autumn 1999, pages 44-48

what do I want to be?

meant their own understanding of different jobs (other than their own) could be outdated. Many said they did not have access to accurate information. Some indicated their own lack of knowledge or experience with computers meant they had no basis for advising their children in this area.

Parents are in a critical position to teach their children how to make career decisions, but to use their influence constructively they need materials and programs with which to work.⁶

While relied upon as sources of advice and guidance, many parents are still suspicious of the online world, and these suspicions are fuelled by tabloid media promulgating an image of the Internet as a tool for copyright infringement, anarchy and all manner of sexual deviance.

On a less sensational level, there is a concern that children are "losing their appreciation of print-based technologies and ... the preparedness to put in the effort that the older technologies demanded."⁷

young people's ranking: who do you listen to for advice about...

school subject choice		higher education & training choices		job or career choices	
	%		%		%
primary influences					
parents	77	parents	73	parents	76
teachers	62	teachers	56	career teachers	54
career teachers	43	career teachers	52	teachers	43
friends	45	friends	31	friends	39
secondary influences					
uni/TAFE	25	VTAC guide	27	employers	23
VTAC guide	23	uni/TAFE	26		
other influences					
employers	12	employers	14	uni/TAFE	17
media	10	media	14	job centres	16
job centres	10	job centres	14	media	14
govt info/web	8	govt info/web	6	parents	11
other/myself	10	unions	4	unions	7
unions	6	other/myself	5	unions	6
				other/myself	6

⁶ Otto L, 'Parents as Career Advisors for Their Children; a Program Description and Evaluation' in *Australian Journal of Career Development* Volume 6 Number 2, Winter 1997, pages 16-20.

⁷ Associate Professor Toni Downes quoted in Bagnall D, 'Born to be Wired' in *The Bulletin*, (15 August 2000) Pages 25-29.

what do I want to be?

Further, recent demonstrations of the vulnerability of the 'dot coms' will also have given parents further pause for thought before advocating technology-oriented career directions.

Extended family and friends are influential, often as role models rather than advisers (which we will discuss further shortly).

The personnel at university and TAFE college open days (often attended in Year 11, but mainly Year 12) are also influential to those students who attend. So too are the speakers at careers sessions run by schools.

A common understanding of University and TAFE lecturers, is that careers teachers are pivotal in disseminating information to students about career choices. However, there is also a strong belief that students prefer to have personal contact with, or hear directly from the industry when making choices about their career path.

"Students prefer to hear from people they can relate to- like fellow students who work in the industry and have had a taste of the 'outside world'."

- University Careers Counsellor

This is particularly true of students intending to work in IT, who are more likely to listen to employers for career advice.

Of course, these groups of "advisers" do more than help students to decide where "what they like" might lead them. They also advise on further education/training, job opportunities, remuneration, lifestyle etc.

Even though these latter aspects are generally secondary to "what I like doing" in determining career choice (as discussed in the last section), they cannot be ignored.

Parents' influence, as perceived by students, tends to decline with the age of the student. The influence of parents in course and career decisions is substantially lower (but still above 60%) for Year 12 students while the role of teachers and career teachers rises in importance – indeed, career teachers are perceived as more important than parents for jobs and careers.

Other notable survey findings in terms of influencers include:

- Year 9 students give particular importance to the media as a source of information about subjects and further education/training leading to careers.
- Males, more than females, value career teachers, the VTAC Guide, universities and TAFE colleges, employers, unions, job centres and government publications or websites.
- There is no significant difference based on school attended or where students live, except that the VTAC Guide and university or TAFE colleges appear to be of less importance for students at government schools and those living in regional areas.

role models

In the context of remuneration and lifestyle, the influence of 'role models' is significant. These may be family members or friends who have 'done well'. They may be personalities in the community or even in the media who are not personally known (and in the case of the media, may be characters from TV shows), to whom students aspire.

It can be readily seen that some of the above inputs are likely to be lacking as far as an IT career is concerned. Parents, in general, are less likely to know about or



what do I want to be?

understand IT compared to traditional careers. Similarly, there is likely to be a lack of family or friends knowledgeable about or involved in IT given its relative 'newness' as an industry and thus limited opportunity to have had significant sections of the community participate in it at some stage of their career.

Finally, there is a lack of IT role models – both real and within fictional media. Where these do exist, role models tend to reinforce negative stereotypes, ie the 'nerd'.

Bill Gates is cited as a visible 'embodiment' of IT, however his desirability as a role model is far from universally agreed.

Interestingly, hackers were noted by one interviewed stakeholder as being appealing to young people.

"Hackers are also respected a lot. They are seen as the Robin Hoods of the internet, attacking the big multinationals."

- Education Sector Stakeholder

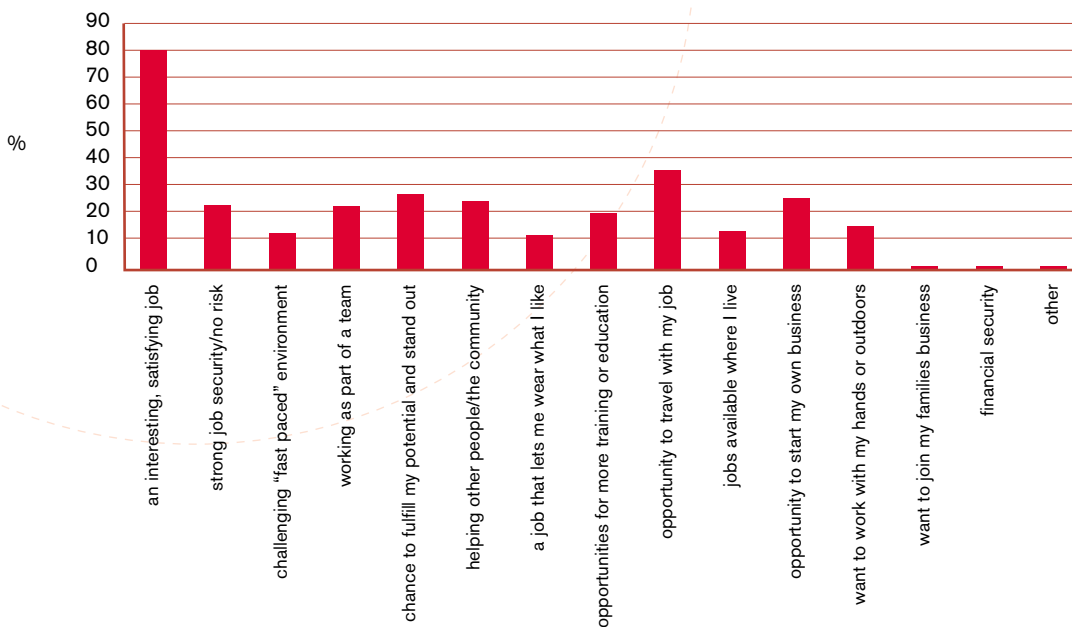
Students' ranking of potential Australian role models are discussed in the previous chapter.

influence of popular culture

The media is usually understated by research participants as a source of information or influence, but it has a powerful role in shaping perceptions of different careers. This is particularly important for young people, who have not yet had 'real world' experience in the workforce. They tend to have highly favourable, even romanticised, views of careers that are glamourised in TV programs and films – for example, law (Ally McBeal), medicine (ER), veterinary science (Harry's Practice). They equally hold negative views of occupations portrayed in an unfavourable or unflattering way in popular culture – especially jobs in the technology sector. Almost without exception, people working in IT are portrayed as socially inept, isolated, working in sterile environments or as obsessive and sometimes sinister personalities.

what do I want to be?

desirable job characteristics (students)



attractive job attributes

Beyond personal 'likes' and the views of their influencers, what specific job attributes do young people find appealing and/or repellent?

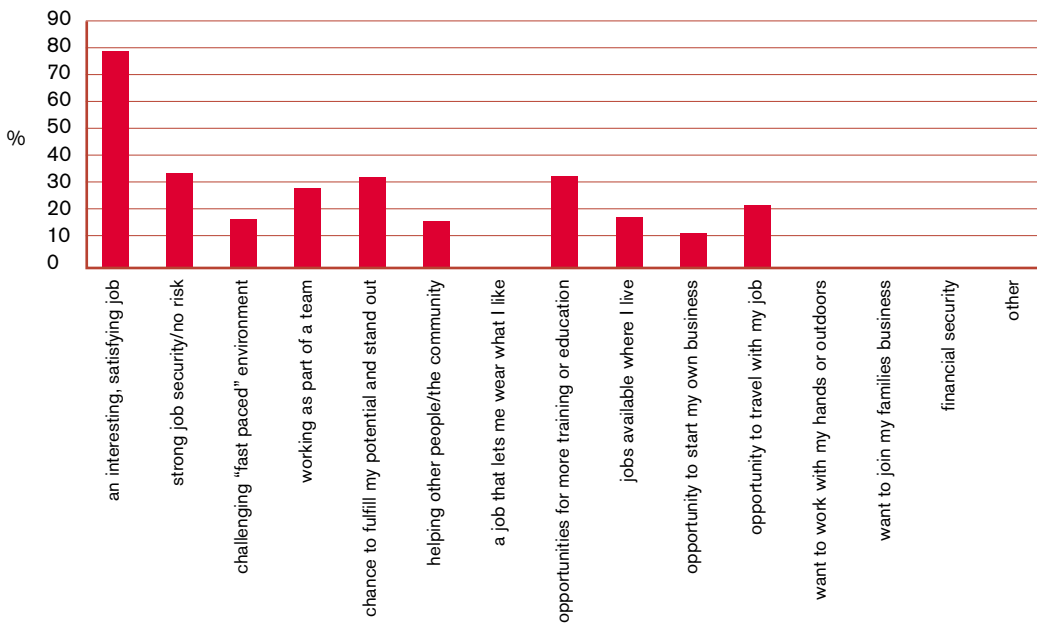
The attributes young people considered most desirable in a job are that it be "interesting" and "satisfying" (80%), followed by "opportunity to travel" (35%). The ability to "fulfil my potential and stand out" followed next (27%), closely trailed by an opportunity to start their own business (27%), helping other people (24%), teamwork (23%), job security (23%) and opportunities for more education and training (20%).

- Young males are more attracted than young females by job security, teamwork, fulfilling potential, working outdoors or with their hands, and opportunities both for more education or training and to start their own business.
- Conversely, young females placed more emphasis upon "opportunity to travel with the job" which was the second most attractive feature for them (40%). They were also more attracted to helping other people, and wearing what they like.

The relative importance of job security, teamwork and jobs in the local area increases with young people's age while the attraction of a fast-paced environment declines with age.

what do I want to be?

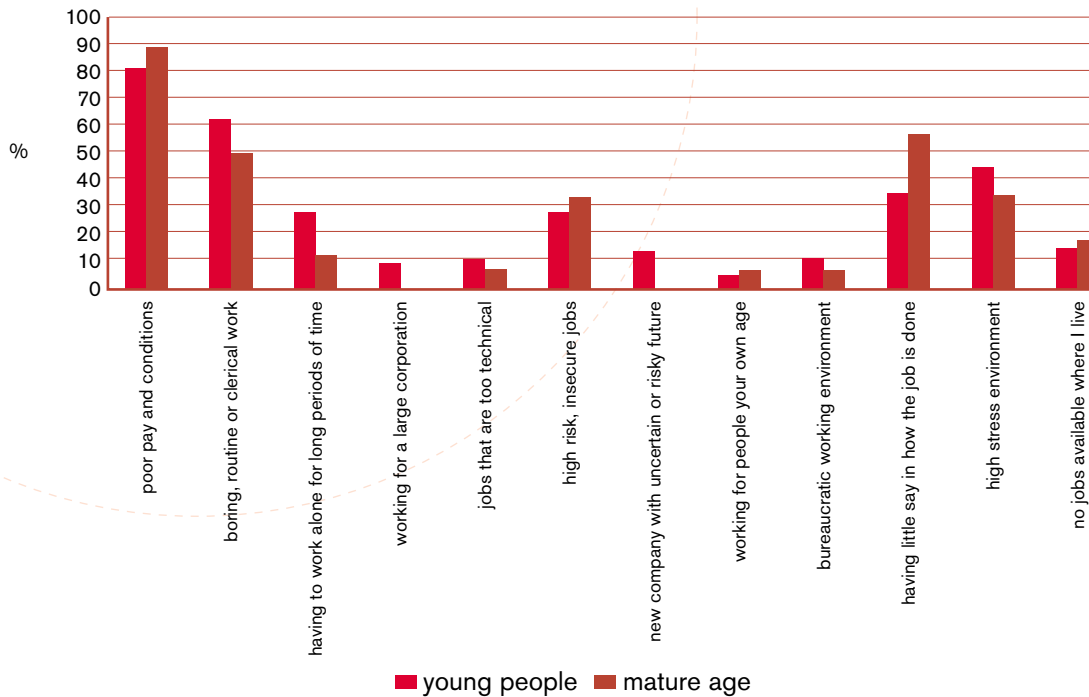
desirable job characteristics (mature age)



The attributes desired by mature-age people differ in only two respects from those desired by young people. The older age group were substantially more attracted to opportunities for further education or training, and an opportunity to fulfil their potential and stand out.

what do I want to be?

undesirable job attributes



Not surprisingly, poor pay and conditions was found to be the most undesired job characteristic (81%) among young people followed by boring routine or clerical work (62%) and high stress (44%).

A further three undesirable characteristics received equal weighting (30%) - working alone for long periods, risk and lack of security, and having little say in how the job is done.

There were only two significant gender differences in terms of undesirable attributes:

- 34% of males but only 22% of females indicated an aversion to high risk, insecure jobs, and
- females are three times as likely as males (14% to 5%) to negatively regard jobs that

are too technical. This finding has obvious implications in terms of how technology careers are marketed to young women.

Year 12 students are most likely to be concerned about job insecurity, lack of local jobs and joining a "new company with an uncertain or risky future". In contrast, concern about having little say in the job declines with age for the student population.

Interestingly, concern about stress and insecurity is very strong among students intending further education or a career in IT. This may represent a considerable challenge to be addressed by the IT industry, and certainly, further investigation is warranted. However, there is an alternative explanation. It is possible that those people intending a career in IT are not any more concerned about stress and job security than their

what do I want to be?

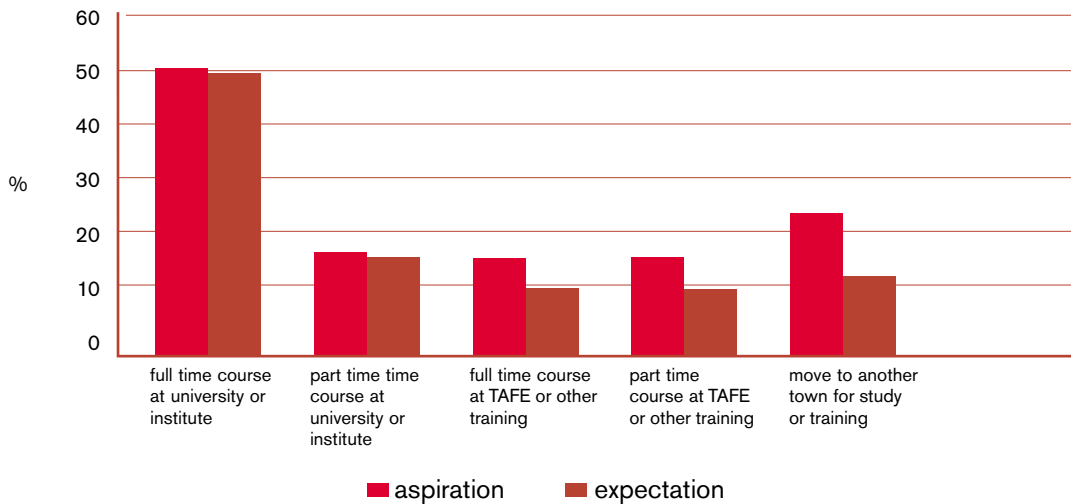
peers, but may be more sensitive to these issues given the reputation that the industry has.

Mature-age respondents – probably reflecting their workplace experience to date – were significantly less concerned about boring/routine work or a high-stress environment, but more concerned about having a say in how the job is done.

learning new skills is higher among females, middle secondary, and those living in regional areas. However, there are significant gaps between these aspirations and actual expectations.

Mature-age respondents were similarly (78%) interested in training or retraining but, in contrast to students, there is an equal expectation that they will pursue this aspiration. Overwhelmingly this was in new skills for new jobs.

further education and training options



further education and training aspirations in next five years

Further education and training preferences also provide useful insights for the promotion of technology skills.

Three-quarters (77%) of students express an interest in updating current work skills (36%), being trained to do something new (55%) or both, and a similar proportion expect to become engaged in some training (64%). Interest in upgrading skills in the current job is higher among males, Year 10 and non-government students. Interest in

This desire for new skills for new jobs is closely linked with mature-age respondents' more positive disposition towards technology careers.

More than three-quarters (78%) of students express an interest in pursuing further education at a university, institute or TAFE college. There is near parity between interest and expectation in general. It is interesting, however, that both interest and expectation for most modes of further education appear to decline as students approach and enter VCE year, which may reflect either stress or



what do I want to be?

a self-perception of 'study fatigue'. (There may also be some highly seasonal impact since the surveys were conducted shortly after a holiday period between school year semesters).

Full-time university or institute study (51%) still remains the most desirable pathway, most strongly for non-government students. Again, expectation is stronger at Year 9 but still more than 40% at Year 12, and is highest among non-government students, those living in the metropolitan area, and those intending to either continue study in or to work in IT.

Part-time university or institute study (16%) appears to grow in attractiveness as students near and enter the VCE year, and is slightly more attractive for females, students living in the metropolitan area, and students intending to work in IT. More Year 9 than Year 12 students expect to be in part-time study, while this is not a high expectation of those intending a career in IT.

One in seven students (15%) are interested in a full-time TAFE course, especially males, Year 10 students at a government school and those living in regional areas – as well as those intending further study or a career in IT. With the exception of regional students (only half those interested actually expect to pursue a full-time TAFE course), there are similar expectation trends.

Part-time study at a TAFE college is equally attractive (15%) but more highly valued by students at government schools, those in homes where a language other than English is spoken, and among those intending study or careers in IT.

While one in four students (23%) express an interest in moving to another town for study, just on half (12%) expect to do so. Interest is strongest among females, Years 10 and 11, and students at government schools or living in regional areas. Indeed, the high probability that further study will require rural and regional students to relocate appears to have influenced these students to be more concerned about and more involved in their post-school study and career choices than their city counterparts. Certainly, the impact of their choices seem greater given that they are likely to be faced with leaving family and friends.

Half of the mature-age respondents are interested in education options, mostly in part-time university/institute or TAFE courses.

These results concerning preferred modes of study carry some important implications in terms of designing appealing pathways leading to technology related careers. Given the earlier finding that many students are focused on the next 'learning platform' more than the end career result, pathway design will be a crucial element in delivering people into technology careers.

what do I want to be?

labour market aspirations in the next five years

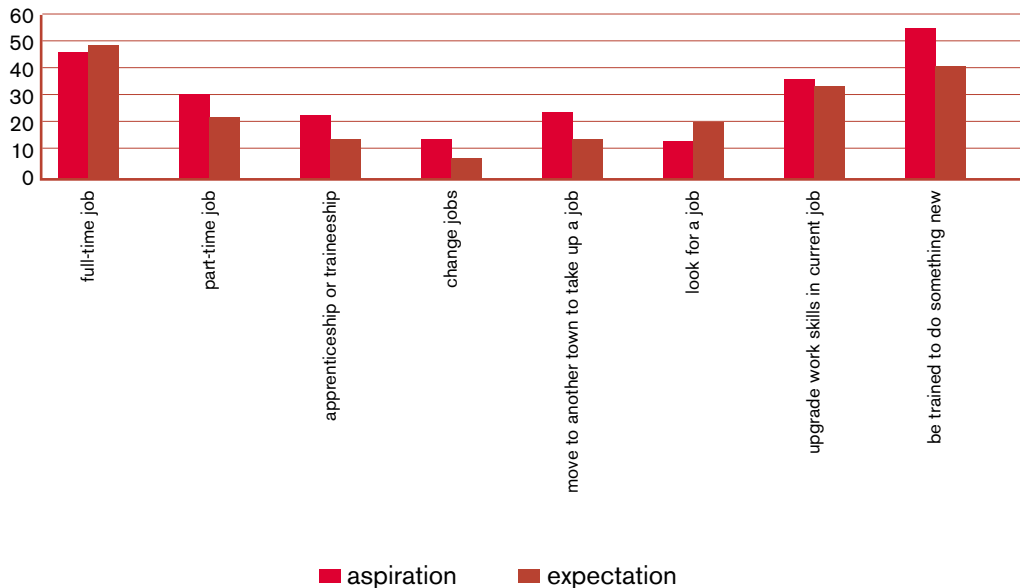
Full-time work is the most desired and expected employment option (46% interest and 48% expectation) and is highest among later secondary students, those in regional areas.

Almost one third (31%) of students are interested in part-time work, especially those at government schools and living in metropolitan areas – but for each of these groups there is a significant "expectation" gap.

Interest in an apprenticeship or traineeship is consistent across most of the demographics except that it is higher in the middle secondary than later secondary years (perhaps explained by the fact that some students do leave school at the end of year 10 to enter an apprenticeship). The other significant point is that while more female than male students (29% to 16%) express an interest, fewer females (12% to 17%) expect to gain an apprenticeship or traineeship.

However, 20% of students expect to be looking for work in five years time, especially Year 12 and those living in metropolitan areas or attending government schools.

labour market options (next 5 years)



what do I want to be?

making the transition

There is a broad consistency of view among students about the best ways to help people manage the transition into the workplace, although there are some differences between the middle and later secondary students and the mature-age respondents. In particular:

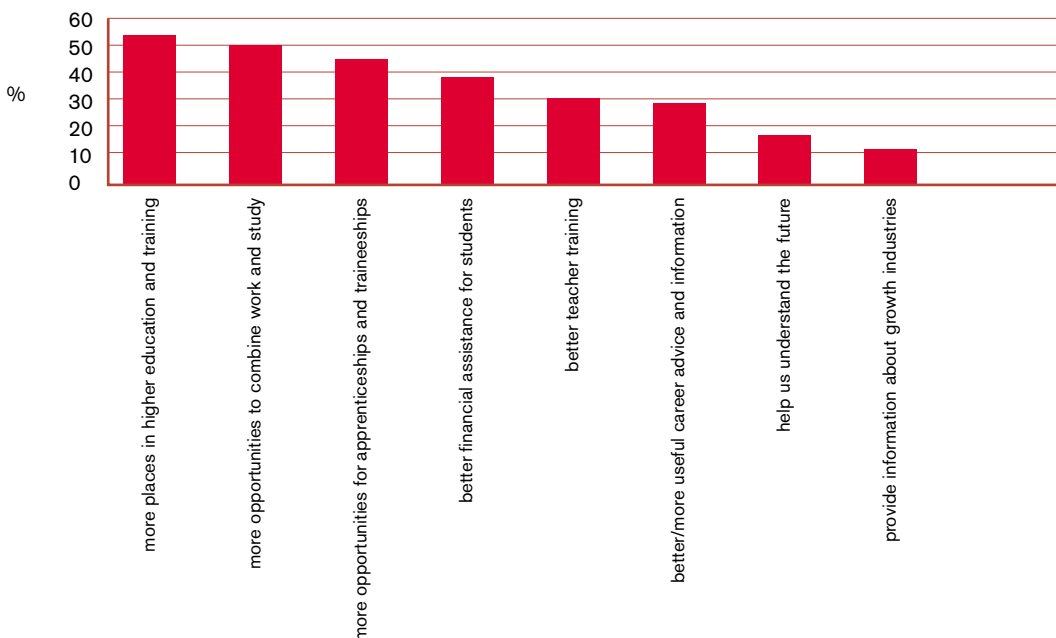
- Year 11 and 12 students are relatively more concerned about adequacy of places in higher education and training, while mature-age respondents did not see this as a major priority
- Concern about financial assistance was higher among Year 11 and 12 students
- There is strong support for flexible models that allow the combination of work and study, among both the student and mature-age respondents, either as work placement or as a structured

apprenticeship or traineeship. This desire is strongest among students in regional areas.

- Better teacher training is more strongly supported by students living in the metropolitan area and those intending further study or training in IT
- Mature-age respondents and students from a non-government school, those living in metropolitan areas and those who speak English at home are more inclined to desire more useful career advice
- Students living in metropolitan areas and those intending further study or training in IT are more inclined to desire help in understanding the future.
- Improved childcare was important for mature-age females.

Industry support for initiatives that would address these concerns may prove to be an important means of attracting recruits.

student recommended measures to manage transition into the workplace





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"As the technology changes so rapidly, courses – and in fact companies – can struggle to keep up with the changes. Maybe all that we can add to our courses is to teach students to be adaptable and that learning doesn't end at the end of a course. Teaching students how to learn and teach themselves is what is critical."

- Industry Stakeholder

The education system – particularly secondary schools – faces steep expectations from the community to provide high quality education that equips students to participate fully in society and the world of work. The growing importance of information technology as a core life skill has led to substantial investment by government and non-government education bodies.

Victoria has been the national leader in IT infrastructure provision through a range of initiatives, including computers in schools, notebook computers for teachers, a wide area network connecting all schools, and a systemic approach to curriculum content and support materials.

The Victorian Government is committed to encouraging skills development in and building on the State's leadership in IT education and training.

Recent reports and initiatives centred around this issue include:

- Connecting Victoria,
- Skills x Knowledge = Growth,
- Public Education: The Next Generation report,
- Ministerial Review of Post-Compulsory Education and Training Pathways in Victoria, and
- Skilling Victoria for the Information Age

These initiatives emphasise the importance of ensuring that all students are provided

with the foundation skills in information and communication technology needed in the modern workplace.

There has been sustained growth in student participation in computer studies and IT in secondary school and post-compulsory settings over the last decade. Around one-quarter of students undertake IT study in Year 12, with males accounting for 65% of enrolments. This gender imbalance is even more acute in higher education, where 81% of IT enrolments are males.

The Australian Council for Educational Research recently published a demographic analysis of Year 12 student participation in subject areas. It found that IT students were most likely to be from families of low and low-middle socio-economic status; that government school students were more likely to participate in computer studies than students from Catholic or independent schools; and that rural students were more likely to enrol in computer studies than metropolitan students.

The research undertaken for Multimedia Victoria found widely differing views amongst stakeholders and students about the role, resourcing, direction and performance of the education system.

There was a unanimous and very strong view among industry, academic and media stakeholders that the delivery of IT education can improve. There were concerns that the curriculum is failing to engage students and

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that considerable efforts are needed to support IT teachers through professional development (the Victorian Government has already announced initiatives to address some of these issues).

On the other hand, there was considerable praise and commendation for universities and TAFE institutes that have worked closely with industry to develop innovative courses.

There was an equally strong view among non-IT students that the subject is 'boring'. There is also acknowledgment that the best IT students are more knowledgeable than the teachers, obsessive about technology, and 'live' IT. This is not seen in any other area of the curriculum and can be a deterrent to many students.

Nonetheless, the classroom experience is satisfactory for a great many students. Some broad issues to be considered are what can be done to enhance the attractiveness of IT study and – more importantly – ensure that all students have an accurate understanding of the importance of technology skills and are encouraged to develop them further.

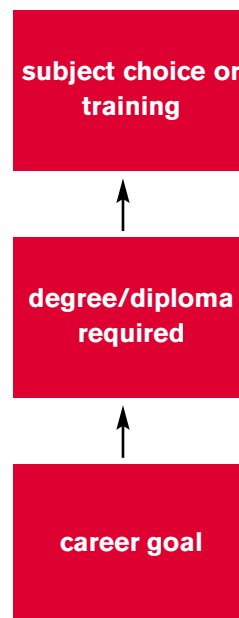
choosing a pathway through year 12 and later years

It is important to note that subject choice through the middle and later secondary years is a mix of compulsory subjects and electives, with students expected to have some exposure to each of the eight 'Key Learning Areas' (KLA) until the middle secondary years. All students should have some preliminary exposure to IT as part of the Technology KLA, but the IT subjects are electives in the later secondary years.

There are several different approaches to navigate paths through school, post-

compulsory education and training and into the workforce.

A minority of students with clear career goals tend to 'plan in reverse'. They work back from their desired career to determine degree or diploma requirements, then consider the required TER and any pre-requisites for entry to these courses, and then chart their subject choice accordingly. This is career-driven navigation.

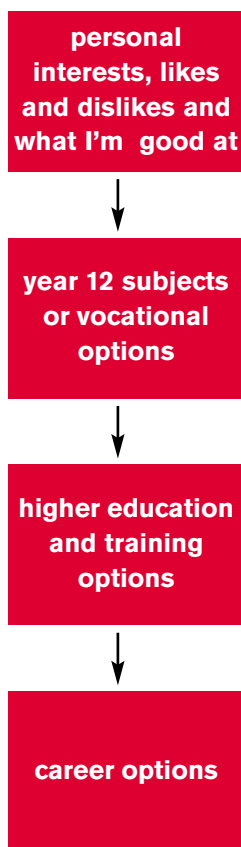


There is some evidence to suggest that the vast majority of IT students adopt career-driven navigation.

However, as discussed in the last chapter, most students' immediate focus is with the next step in the pathway, rather than the 'distant land' of work. Indeed, there are many students – the research suggests 40%, even in Year 12 – who have no or little idea of what career to follow. For these students, the next step in the pathway really becomes an end in itself – and there is a clear

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preference for subjects that match their interests and 'likes', and allow them to keep their options open.



Importantly, students are likely to avoid subjects that do not add to their options or are seen as closing off particular options. This is one of the problems facing IT as a field of study: most students do not see IT subjects as enhancing their menu of choice in later years. There is a perception that there is no need to study IT unless they intend to work in IT later on – the fact that technology skills will be important in almost any job is not yet part of their consciousness. Moreover, because their

perception of careers in IT is overwhelming negative, this impedes consideration of IT as a subject.

how does IT rate as a subject?

Of participants in the student survey, mathematics was being studied by 88% of students followed by science (69%), 'technology' (67%) and LOTE (35%). This question was designed to measure participation by KLA, so it captured students who may be doing another subject in the Technology KLA rather than IT. **54% of the Year 12 students were studying technology, as were 82% of regional students (compared with 45% in metropolitan schools).**

Students were then asked (unaided) to nominate their 'favourite' and 'best' subject. (See chart on next page)

Interestingly, maths topped the student list of favourite subjects (17%). However, this may be because maths has a larger pool of students from which to be nominated as a favourite subject.

IT was ranked equal third at 10%, with males more positive (13%) than females (8%). It was most highly rated by those intending future study or a career in IT (23%), and by Year 12 students (18%).

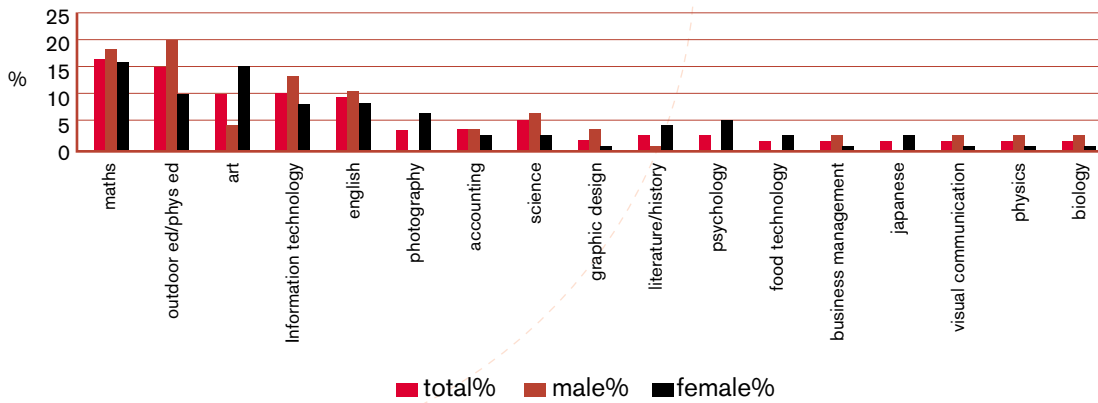
The popularity of IT among those students enrolled in IT was noted by many stakeholders.

"I think the students view IT courses as attractive. There are in fact a large number of students doing the higher level IT subjects. For example students in Year 10 completing Year 11 subjects and students in Year 11 completing Year 12 classes."

- Careers teacher, non-metropolitan, public school

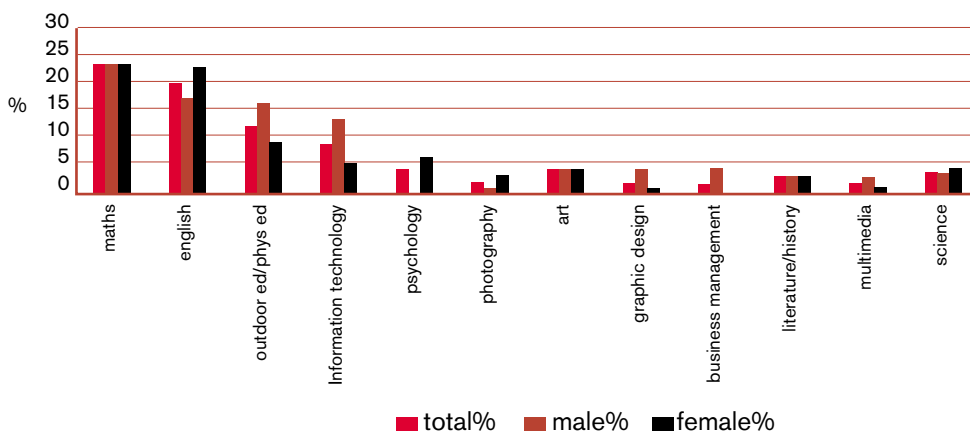
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favourite subject



Of particular interest, students intending to work in IT or to continue IT study regard maths highly, as do students at government schools and in metropolitan areas.

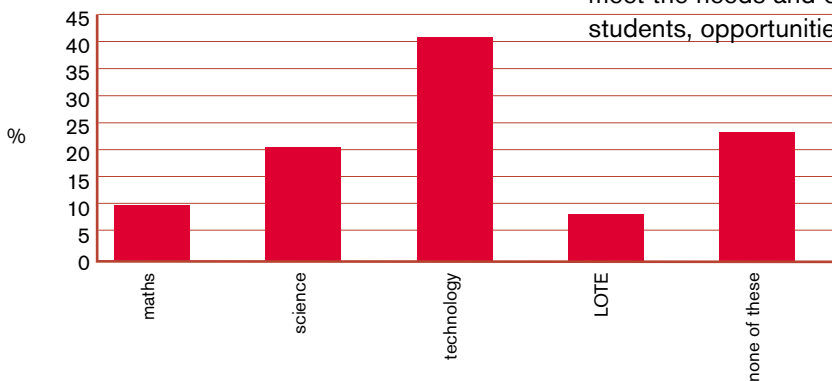
'best' subject



There were broadly similar findings for 'best' subject, with IT ranked fourth behind maths, English and outdoor education/PE. Multimedia was also the 'best' subject for 2% of students. The highest ranking for information technology was again from those in Year 12 and those intending further study or a career in IT.

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intended study in future - year 12 students



meet the needs and expectations and students, opportunities exist to lure these

Students were also asked to indicate which subjects (from the KLA list used earlier) they

the technology KLA

The Technology Key Learning Area includes the study of information technology, as well as food, automotive and other technology subjects.

The positive showing is for the entire KLA.

intended to study in future years.

Despite the popularity of maths over technology in terms of current favourites, the trend is reversed regarding study intentions. 41% of the Year 12 students intend to study technology in future years compared to only 10% who intend to study maths. A further 21% intend to continue science study.

This possibly reflects the fact that a large number of students are studying maths and science either to maximise their potential TER score, or because they are prerequisites for a range of post-compulsory courses.

Of course, study intentions do not equate to guaranteed completions in those fields of study in later years. It is a helpful indicator though that provided technology related fields of further education and training can

people towards technology careers.

what impedes student participation in IT study?

Apart from a highly negative perception of IT careers, the major impediment is the classroom experience. There are also some secondary factors that impact on students' willingness to consider IT study.

Students' comments in focus groups were particularly negative about IT as a subject. The general impression gained is that teachers have difficulty in delivering subject matter in an inspiring, challenging and insightful manner. There is general dissatisfaction with the classroom experience. As a subject it is described as "boring, a bludge".

It should be noted that a proportion of students who do enrol in IT find that it is more demanding than they had anticipated:

"A lot of kids drop out because they think it is going to be an easy subject. It is seen as a practical subject but it is actually theoretical."

- Careers Counsellor

There is some evidence that the subject

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content and delivery contributes to students' narrow and hardware-based view of information technology, and to their negative perception of IT careers.

Despite these findings there have been consistent and significant increases in the number of students enrolling in IT subjects in Victorian schools over the last decade.

Asked what might prevent them from undertaking IT related subjects, most students responded "no interest" (43%) or "don't intend to study computers at TAFE or university" (31%). Females were significantly higher than males on both responses.

Other perceived barriers to participation included:

- "rapid change means the knowledge becomes irrelevant quickly" (23%),
- "no previous experience with computers" (15%) and
- "feel disadvantaged by not having a computer at home" (10%).

Similar perceptions are uncovered through word association. Words that students most commonly associate with IT (having had some experience with the compulsory subject) are 'professional' (40%), 'computation' (35%), 'creativity' (32%), 'intellectual' (31%) and 'boring' (25%).

- Males are more inclined than females to see IT as 'creative' (45% to 21%), 'computation' (47% to 23%), 'professional' (53% to 28%) and 'university' (14% to 9%).
- Females are more inclined than males to see IT as boring (36% to 16%) or difficult (23% to 11%).

keeping leisure quarantined from study

Some of the focus group participants were

strongly of the view that it would be undesirable to confuse the 'fun' aspects of computers with the formal, structured, repetitive study of IT at school. The leisure experience is not the same as the discipline.

"We all like music, listening to music, going to concerts, but how many of us learn music or play an instrument. We all played the recorder, didn't we, in primary school, but that was that. Computers are a bit like that. There's the school subject to be avoided, but the fun bit we do at home."

Without putting too fine a point on it, it seems there is some sense among young people that hobbies and interests should be kept separate from careers, and that what is a hobby/leisure interest loses its value and relaxation function if it becomes work related.

"Model railway enthusiasts don't become train drivers."

That said, it must be acknowledged that many of the IT students **are** consciously pursuing their hobby and interest with a view to following post-compulsory education and training with a rewarding career in IT. This was noted by teachers:

"Students use the school computer system in their free time, which indicates that they truly enjoy the computers."

Another teacher pointed to the incorporation of multimedia as separate subject, and believed that this was starting to bridge the gulf between leisure and formal study:

"I think the number of children who see IT as only computing and programming is decreasing. More students are developing a good understanding that IT offers multimedia as well. It could be the development of the specific subjects in the



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schools which is helping these change perceptions."

other secondary factors

Stakeholders and students also identified a number of barriers that could be considered as 'secondary' to the main obstacles of an unfavourable perception of the industry and an unappealing classroom experience.

girls avoid IT subjects because they are male dominated

This was mostly mentioned by teachers and academics, but notably was not mentioned by young females themselves. Gender imbalance in IT participation is indisputable, with serious consequences including the lack of 'balance' in some aspects of the IT workplace. Yet male dominance of IT enrolments does not appear to be the primary barrier to female participation in IT study (or, at this age, it is not consciously identified by them as a barrier). Only 3% of female students nominated "too blokey" as a factor that would prevent them becoming interested in a job in IT.

Basically, young females are just not interested in IT. 50% say that the fact that it is "too boring" would prevent them becoming interested. They are also concerned that IT is isolating and does not involve sufficient teamwork and social interaction.

The research does not negate that male dominance is a contributing factor. It merely suggests that it is not seen by young females themselves as a primary factor.

Certainly, teachers observe that male and female students approach technology differently, and the survey data suggests that females are more 'discriminating' and

focused in their use of both computers and the internet.

"Females are generally more persistent with their work even though there are more males approaching technology."

- Careers Coordinator

"Girls are less likely to spend time improving their skills."

- IT Coordinator

"Females definitely approach IT with caution and as a result there are more males in the IT and technology subjects when they become electives."

- IT Coordinator

At least one school among those interviewed as part of the research project was actively attempting to overcome gender imbalance in participation in IT study by deliberately positioning female IT teachers as role models.

the 'best' IT students are intimidating to others

In information technology skills it is not uncommon for teacher knowledge to lag behind that of the more able students. This lag is particularly evident where students have access to a computer and associated peripherals at home.

Accordingly there is a common recognition by young people of the unique and advanced skills of the 'best' IT students:

"They know more than the teacher."

This is not necessarily a positive, and such an extraordinary level of student proficiency does not occur in any other subject (with the possible exception of LOTE).



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This is very daunting to other students who are seeking to maximise their marks. They see that they do not even approach the capabilities of the best students and therefore their own marks must be much lower – so they choose to not study IT once it becomes an ‘elective’ (and therefore avoidable).

This does, however, cut both ways. There is some evidence in both the literature (especially ACER reports) and the survey data that the withdrawal of those students who are ‘best’ in other technical or scientific subjects gives other students increased ‘hope’ that their TER scores will be improved.

Also, it should be noted that this is predominantly a metropolitan concern, due to there being fewer households online in regional and rural areas.

fear of making a mistake that crashes the computer

Network reliability does feature as a disincentive for many young people who choose to (or are inclined to) abandon their study in IT. This is closely related to these students’ own confidence and proficiency in using computers.

In the focus groups, there was some disenchantment with computers in terms of their ‘user friendliness’ and tendency to crash. Despite their undoubted usefulness, convenience and efficiency, there were concerns about reliability.

"They are not always simple to use. They crash at the worst time. The programs have so many options and functions you lose your way and worse, (you lose) what you’ve just done."

To some students, the fear of ‘crashing’ the system if they hit the wrong key was reason enough to avoid computer studies.

rural and regional areas are disadvantaged

It is also generally recognised that while rural and regional areas face particular challenges, progress is being made and there are positive examples of IT becoming entrenched in these areas. A case in point would be the IBM Centre at Ballarat.

On the whole, however, problems with the classroom experience in relation to IT experienced by metropolitan students tend to be compounded in rural schools where smaller student numbers limit opportunities for specialisation.

As an education reporter at a leading Victorian rural newspaper stated:

"Rural students mostly don't have the internet at home so they rely on teachers to tell them about it. In the city, the students lead the way and tell the teachers what is going on in with the Internet and other technologies.

"This means that if the teachers (in the country) are not any good, they are more of a barrier for rural students than for city students and there is less chance they will learn about it."

lack of awareness and understanding of IT among ‘advisers’

It was apparent that because IT is a relatively new area, the knowledge and experience of many people with respect to IT is lacking relative to other subject areas, thus IT does not receive the endorsement it otherwise might from parents, friends, relatives and the student’s own peer group. This is also linked



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to the crowded curriculum and the fact that IT is not a pre-requisite for most university and TAFE admissions:

"From point of view at looking for prerequisite subjects for university courses, there is often no room for IT subjects."

- IT Coordinator

Is anything 'wrong' with school IT education?

There was almost universal concern among all stakeholders that IT teachers were not adequately trained and resourced. There was also a high level of concern from industry that schools were not sufficiently emphasising the broad application of IT skills in the modern workplace, and the need for IT graduates to also have strong commercial knowledge, skills and instincts.

This issue is neither specific to, nor limited to, IT. It encompasses generic concerns about the education system that, in turn, reflect concerns about the capacity of school education (curriculum) to keep pace with changes in the wider community and workplace.

It should first be noted that the challenges that the school system faces in IT are daunting in many respects: financial, human resources and curriculum. In addition, the expectations that some stakeholders place on schools to prepare students to be workforce-ready are seen in few other subject areas. Unlike most subject areas, where the course content may face

fundamental revision once in a generation, IT teachers appear to be constantly struggling to 'catch up' with trends and developments.

Teachers indicate that it is difficult to keep the curriculum up to date with the rapid developments that characterise IT. Indeed, it is often difficult to keep up with what exactly these changes actually are, let alone how they may be incorporated into curricula.

"The curriculum struggles to keep pace with the developments in the IT field, especially the IT equipment which is a perfect consumer product as it is disposable after three years. Updating school equipment is extravagantly expensive."

- Principal

The majority of teachers believe that schools are not adequately resourced to keep pace with changes.

It is apparent that greater professional development for teachers is required. This is a view shared by teachers and a majority of principals, and endorsed by the major report *Public Education: The Next Generation*.

Indeed it is difficult to imagine that a satisfactory classroom experience is possible when "most teachers with information technology skills are self taught, usually learning basic skills first at work."⁸

The adequacy of the secondary school system as preparation for further study is largely seen by industry and education sector stakeholders as being dependent on

⁸ Meredyth D, Russell N, Blackwood L, Thomas J and Wires P, *Real Time; Computers, Change and Schooling*, Department of Education, Training and Youth Affairs/Australian Key Centre for Cultural and Media Policy, October 1999.

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individual schools – it is difficult to characterise the system as a whole.

According to teachers, IT is still perceived as being more technical than creative. On the other hand, the traits most desired by industry tend toward the creative. There is consensus among stakeholders that lateral thinking and a creative mind are the most desired traits. Maths ability is also recognised as a requirement but its influence is limited to a small part of courses/careers.

A further challenge for the classroom is that "specific technical skills dependent upon current technologies will become obsolete at a rapid rate ... The implication is that information technology skills should be conceptualised broadly and should emphasise learning how to learn, rather than specific technical skills that will need to be frequently unlearned."

"Recent research suggests that students now entering further education and training have a limited sense of the skills they are likely to need to adapt to a changing work and study environment which will require life-long self-directed learning, including learning through flexible delivery and on-line learning."⁹

As one interviewed industry stakeholder put it:

"The pace of change is overwhelming ... We should be emphasising and offering the

continuous learning model from an early age, so they understand the importance of being flexible, adaptable and aware that they will have continuous learning throughout their lives."

There are also legitimate concerns raised by some teachers about the expectation that schools should produce job-ready students for the IT industry rather than enable them to develop technology skills for the broader workforce:

"It would be a huge tragedy and mistake if we concentrated on turning all students interested in IT into programmers. What has to be focused on is teaching students to look at the use of IT across all industries. Tourism, farming, medicine etcetera."

- Education Sector Stakeholder

"Students ... are generally not interested in IT careers. The majority are looking for careers in medicine or law."

- Principal, metropolitan private school

perceptions of university stakeholders

While stakeholder sentiment was mixed in this area, most university stakeholders believe they 'adequately' keep up with the changes that occur in technology. However, these same stakeholders also believe that TAFE is better at keeping across developments due to closer industry links.

From the industry perspective, it is acknowledged that universities and TAFE institutes also face difficulties in maintaining pace with developments.

⁹ Ibid



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Lecturers and counsellors in Universities believe that girls perceive that IT is completely male dominated, which discourages their enthusiasm for the course.

"The IT subjects are very male dominated, which may be discouraging to girls who develop the opinion that IT is a 'blokey' course without any personal relations. Girls need interpersonal communication."

- University Careers Counsellor

"We are developing a program called 'IT girls' to address the female attitude towards IT and with the hope of encouraging girls to enrol in an IT based subject or course."

- University Careers Counsellor

So what kind of students are university IT courses attracting?

Common suggested characteristics of typical IT students are: reliability, consistency and precision. However, due to students now entering multimedia courses the typical IT student is changing with the inclusion of artistic ability, creativity and flair.

A consistent finding from interviews with university lecturers and careers counsellors was that there is a lack of definition for IT. There are no summaries of what IT courses offer, and as a result students are unaware of the diversity and meaning of IT.

"There is no umbrella definition outlining what IT offers and which areas it covers, unlike more traditional sectors such as accounting."

- University IT Lecturer

perceptions of TAFE stakeholders

The research conducted among stakeholders indicates that the TAFE sector

generally is exceeding expectations – there is high praise for TAFE's collaborative approach and capacity to rapidly adapt to incorporate new developments.

The perception held by TAFE lecturers and careers counsellors is that the most prevalent reason for undergraduates entering IT courses is that the course will ensure their skills are upgraded. Mature age students are dominating the enrolment figures. People wishing to enter the workforce again realise they need office skills, and often they will complete a certificate before trying to get a job.

The perception of IT being an industry dominated by maths and science leads to surprise when students realise that it is not. Further work can be done to develop more realistic expectations – and thus potentially attract a wider range of students.

TAFE representatives generally think that money and the expected high salary opportunities in the IT industry are presently the biggest factors influencing students to choose it as their career path. This may be related to these factors being greater attractors for mature-age groups – many of whom pursue IT through TAFE. Family background has also been mentioned as an indirect influence on students' choices concerning careers.

"Students have highly inflated ideas of the salaries which they expect to receive in the IT industry, and often they fail to see the job expectation for the level of pay. This could be a factor which could the cause for first year job placement drop-outs who don't encourage other students to work in IT."

- IT lecturer, TAFE

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TAFE institutes pride themselves as being 'hands-on' and encourage as much industry experience as possible for their students. The idea of implementing more opportunities for students to gain industry experience at secondary school level was prominent.

The perception held by TAFE representatives is that students believe IT is a separate industry - they do not view IT as a tool that can be used in all careers.

"There is a general lack of student knowledge or recognition that IT skills are in nearly all jobs."

- TAFE Careers Counsellor

combining education with practical experience

Stakeholders generally respond positively to the suggestion of combining education with practical experience to assist with overcoming the "experience gap".

However, some reservations have been expressed. For example, there are issues around whether it is the role of universities to produce industry-ready graduates. Also, any industry involvement must be balanced by recognition that IT is not only an industry sector – it is a tool for all areas.

Additionally, there is recognition that work placement – for all students, whether at school or in post-compulsory level – must be meaningful.

"Students need real world experience – however it is essential that the work experience is structured, as to ensure that the students are doing more than just standing by the photocopier. It would enable them to have a go at working on a real life project which would in turn develop enthusiasm and confidence in the IT

industry."

- Industry Stakeholder

Many students shared this concern – in focus groups, they said work experience had turned them against career options they had previously considered attractive.

Nonetheless, industry stresses that there is an experience gap and that it is not only technology skills that need to be learned, but also how to apply these in business.

Mentoring has been suggested by the industry IT&T Skills Task Force as another option to overcome the 'experience gap'. The Task Force considers that there would be benefits from linking particular individuals from an IT or technology background with particular schools, to help champion the study and to provide a 'buddy' that students can build a relationship with.

Additionally, it has been suggested that development of technology skills should be less the preserve of isolated subject areas in schools, and increasingly integrated across the entire curriculum. While the opinions of interviewed stakeholders varied as to the success of current attempts to integrate IT skills across all teaching disciplines throughout the education system, there was a consensus that the situation is improving. Familiarity with computers is starting earlier, but overall progress varies among schools.



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"For school students experience or knowledge of the jobs that are available is a general problem and quite inadequate. They have unrealistic expectations of the jobs they do know about, usually because they've got glamourised television images of what it's like working in a hospital or a law firm."

- IT&T Skills Task Force Member

The IT sector is rapidly expanding and creating new employment opportunities, not only in companies but across virtually all occupational settings. Skills that were relevant only to IT specialists a generation ago are now demanded across a range of occupations.

There is a sense of bewilderment among some stakeholders that one of the fastest growing and most rewarding sectors of the economy finds it difficult to fill jobs with qualified people – despite offering relatively high salaries for skills.

There would appear to be no simple solution to this paradox.

At the outset of the research project, there was a working assumption that demand signals were being poorly transmitted, resulting in a lack of awareness among students and other potential employees about the opportunities in IT and the generous salaries on offer. According to this assumption, better information about job opportunities and remuneration would increase the uptake of IT careers.

This assumption was quickly dismissed by the research findings. There is widespread, almost universal understanding that the IT sector has an abundance of well-paid jobs on offer. This information excites and attracts many mature age people, but is of little interest to the bulk of the student population.

Mature-age job seekers were highly

motivated towards improving their technology skills and considering a job either in the IT sector or in another industry with reliance on these skills. Their own workplace experience had shown them both the benefits of technology and its pervasive presence in most organisational and occupational settings. They were attracted by the pace of change, by the opportunities to continually learn new skills, and by the chance to be part of an industry that was shaping the future.

There was also a sense that they would be disadvantaged without technology skills and could be 'left behind'. Mature age women were also attracted by flexible work patterns and telecommuting, which they believed offered increased scope to balance work and family responsibilities. Many were actively involved in retraining.

Among most young people, however, the response is simply disinterest. This is due overwhelmingly to a negative perception of IT jobs, together with a lack of awareness about the pervasive role of technology skills in the broader workforce.

Most young people perceive IT jobs as boring, solitary and low-level tasks that involve little more than sitting at a screen all day entering code or data. They believe that IT employees interact only with a computer, not with people.

This perception is deeply held and reflects a number of contributing causes: their own



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classroom experience, portrayal of outdated and 'nerdy' stereotypes by the media, the 'invisibility' of the industry and lack of positive role models, and a judgement about the type of students that become obsessive about IT.

At the same time, most students are willing to reconsider this view if offered compelling and useful information. The door is not closed, but opening their minds to the reality of jobs involving technology will require a subtle and sensitive approach.

perceptions of IT jobs

Students tend to acknowledge the importance of technology across sectors without fully appreciating the 'how' or 'why' of technology's impact in the modern working environment. When prompted (for example, when asked to agree or disagree with a written proposition), they universally acknowledge that technology skills will be important in whatever job they have in the future. Yet this belief does not appear to have been internalised - in focus group discussions most young people believed that they would not need computer skills in their future careers.

It should be stated that there are some promising findings in terms of potential interest in the IT sector. Among students engaged in IT study there is a strong desire and intention to work in the industry. However, some stakeholders indicated that IT students themselves did not fully appreciate the diversity of IT careers.

There was some knowledge among students about the benefits in an IT career (ie. job availability, remuneration, lifestyle issues). However, such benefits are very much secondary to "liking IT" as a reason for

choosing a career in IT.

There is a very strong implication for the promotion of technology in that the attractiveness of using technology in a workplace context must be emphasised above the existence of opportunities or rewarding salaries. Promoting the true diversity of IT jobs may help ensure that those currently in study confirm IT as their chosen career, as well as making these careers more attractive to other young people.

This said, whilst there is some "generalised" knowledge that there are large numbers of IT jobs available, there is certainly little knowledge about the nature of many of these jobs - indeed, there is very poor understanding of what most jobs in the modern workforce actually involve.

The perceived characteristics of IT careers are a more pronounced turn-off for women, but are also unappealing for males that may be seeking a creative, team-oriented environment.

The attitudes of young people can be contrasted with mature age job switchers for whom job security and financial reward were drawcards for IT related careers.

Mature age job switchers exhibited greater pragmatism and realism in their consideration of careers. Lifestyle aspirations (such as the ability to work from home and work flexible hours) were also seen as strong attractions offered by IT careers.

In this context it is interesting to note that mature age people are beginning to dominate some IT related courses offered through TAFE.



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Again, among some young people there is a reluctance to consider a job in IT because they worry that they might lose their enthusiasm for technology if it became 'work'!

"I've heard of people who work on computers who just don't want to know about them when they get home. I enjoy computers, the net, the games and all that stuff but I don't want to spoil it by making it work, if you know what I mean."

The mature age group appeared to recognise and accept the 'fun', as it were, in IT more than the students. This is probably due to their seeing how computers have helped and replaced the drudgery and boredom of the previous manual systems. Neither have they had to go through the 'boring' IT subject at school.

To put it bluntly, students know that opportunities exist in IT, that there is good money in it and, by and large, they don't care.

Asked what might prevent them becoming interested in a job involving information technology, the most common response from the students was "too boring" (41% in total, 50% of females and 34% of males).

Other perceived barriers to participation included:

- "don't know what opportunities are available" (33%)
- "too difficult" (25%),
- "too solitary" (22%) and
- "don't know what training is available" (22%)

That potential boredom is such a pronounced disincentive is telling. The

attainment of basic skills is often not very engaging or exciting. It is usually when one has achieved some proficiency that the excitement or even passion comes. Most of what secondary school students learn at school with respect to IT is basic - necessary, but basic - and this colours, to a large extent, the way IT as a career is seen. IT - like writing, reading, maths - is, for most people a tool not an end (career) in itself.

Potential candidates for IT careers need to be captured early on, their interest in technology sparked and maintained in order to ensure that they go on to develop the skills that will stand them in good stead to take advantage of opportunities that may only take their interest later on.

Other factors contributing to an unflattering view of the IT industry include media portrayal of stereotypical 'computer nerds', perceptions of high-stress working environments (for example, there was a recent description of dot-com companies having a culture "fuelled by testosterone and takeaway"), and the lack of visible role models from IT companies that would help to balance perceptions.

Even the existence of opportunities to travel, which is attractive to young women in particular, can be a double-edged sword. As one interviewed stakeholder put it:

"Look at Andersen contractors bouncing around the world like ping pong balls - those people spend half their lives on planes and the rest of it trying to get over the jet lag and disorientation."

Frequent travel can be construed as representing the demanding nature of a job.

It might be noted also that TAFE students



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were inclined to believe that 'the real IT industry' existed overseas, implying that success in the industry would require relocation.

IT jobs need to be made more visible and socially attractive - and there are considerable image problems to overcome in order to achieve this.

For some, these image problems are perpetuated by the use of outmoded labels that fail to adequately represent the integration of technology across all areas of the economy and social life:

"To improve the image of the IT industry, stop calling it the IT industry. But don't find a new name. Just realise that IT is not there any more."

- IT Journalist

There are obvious consequences for any career that, by the definition of those considering their career options, does not involve fun. There are widespread perceptions that there are no interpersonal relations, no creativity involved and the image is one of sitting alone at a desk coding and fixing networks. Such stereotypes are allowed to perpetuate in the absence of alternative media images.

"There is little glamorous IT coverage in the media at the present, which suggests to the students that IT is boring and geeky."

- TAFE IT Lecturer

The characterisation of IT as 'geeky' is an interesting one. While popular among stakeholders when asked to suggest how young people may view IT, students themselves, perhaps surprisingly, only infrequently made any reference to 'geeks' or 'nerds'. Students instead, when discussing the types of people working in IT, or the attributes of these careers, focused upon listing characteristics rather than simply attaching a label.

That students prefer to identify these specific characteristics (maleness, lack of social interaction, keyboard focus, technical as opposed to creative) which would comfortably sit under the umbrella of terms such as 'geek' or 'nerd' demonstrates some sophistication on their behalf. It also demonstrates that promoting technology to students will require addressing their specific concerns, rather than simply repackaging technology as something cool. Young people will decide for themselves whether technology is cool on the basis of the provision of facts not hype.

One such specific concern is the under-representation of women in IT.

Women are under-represented in both post-secondary education and IT careers (The Australian Bureau of Statistics places the proportion of female IT professionals at 20%¹⁰). A number of reasons have been advanced to explain this, the majority of which have at their root a female perception

¹⁰ statistic reproduced in Newmarch E, Taylor Steele S and Cumpston A, 'Women in IT - What are the barriers?' (Department of Education Training and Youth Affairs, March 2000)



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of IT which does not accurately reflect the reality.

Young women seek human interaction, variety, communication and teamwork from their chosen career - qualities that they do not perceive to be present in IT related careers.

The concerns that students have about IT are not dispelled by exposure to IT through the education system. Quite the opposite, and particularly for girls, negative feelings are retained and exacerbated after a structured introduction to computers at a tertiary level.¹¹

A misconception of what IT careers are like is the reason frequently put forward by female IT professionals to explain the low level of female interest in the IT sector.

IT-related careers are perceived as 'blokey'. This acts as a self-fulfilling prophecy. Women are deterred by the overtly male image, and men in IT unconsciously tend to be more prepared to serve as mentors for other males.¹²

Male interest in IT is reflected in, and perhaps perpetuated by, the greater likelihood of parents to buy computers for boys than girls.¹³ Home ownership of a computer is perceived by students as a critical determinant of success in IT curricula.

That said, girls' computer knowledge and use is almost on a par with boys, but by the

later years of high school something is causing girls to drop out.

technology: part of all careers

The pervasiveness of technology across all sectors has blurred the distinction between IT careers per se, and traditional careers. As one interviewed industry stakeholder put it:

"Technology has been defined as a vertical issue, when it's actually horizontal."

It is this pervasiveness, the increasing dependence by all industries on technology, that makes the development of technology skills not simply desirable but an imperative. It is crucial that young people recognise this.

Although IT may not be the most desirable subject in later secondary years, or the most desired career, it is almost unanimously regarded as a basic skill that one has to learn in the same way as writing, reading, arithmetic and communication skills.

When prompted, more than nine-in-ten student and mature age respondents believed that they will use technology skills in future employment. According to one mature-age focus group participant:

"It's not the future. It's here now and we have to know how to use it."

This is a belief shared by teachers. There was widespread agreement that IT skills are important for all areas of employment.

¹¹ Watson G, 'When I Grow Up: Young people's understanding of work in a large computer company' in Australian Educational Computing Volume 12 Number 2, 1997, Pages 19-23.

¹² Ibid.

¹³ Ibid.

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"IT skills are not [so much] an asset as they are a fundamental literacy."

- Principal

"[IT skills] should become a normal asset to have, not a differentiating skill which makes one student more likely to get a job than another."

- IT Coordinator

It cannot necessarily be assumed that any failure by young people to develop technology skills can be linked to a lack of appreciation of the role of technology. However, many of those people that did state their recognition of technology skills in the focus groups did so as if by rote - as if they had been told technology is important but not why or how.

There are implications here for promoting the development of technology skills. Young people are already aware that the skills are important for jobs in general - what needs to be communicated is precisely why these skills are important and how they are applied in particular job sectors.

"Students think that IT is a part of any job, but are not aware of the specific skills needed in certain jobs"

- IT Coordinator

This is particularly important as some students to consider that against the general rule of technology use in jobs, their desired job sector may constitute an exception. This assumption is frequently incorrect. Several young focus group participants nominated occupations that they thought would not involve using computers - for example, accounting - that indicated a lack of awareness of how those jobs are performed today.

TAFE students seem to differ from the younger student population in their assessment of the use of technology in careers. The perception held by TAFE representatives is that students believe IT is a separate industry - they do not view IT as a tool that can be used in all careers.

"There is a general lack of student knowledge or recognition that IT skills are in nearly all jobs."

- TAFE Careers Counsellor

A lack of job awareness seems to be an issue that extends even beyond the concerns of technology application.

On the other hand mature age job seekers are more aware of the importance of IT as a skill. This was due to their work experience, recognition of their own limitations and need for upgrading their IT skills for new positions or re-employment. They are more conscious of the various roles of technology in the workplace.

There is a strong sense of the need to learn among mature age job seekers, and TAFE is very high on their list of providers. Private providers (eg. Interim Technology) were also mentioned, and CAE for introductory/basic courses.

Many of the mature age job seekers had achieved reasonable IT competence in their previous jobs. It seems that this has been achieved in spite of, rather than because of, the training they received. Their skills development seems to have been ad hoc, trial and error based, and undertaken in adversity.

A particular challenge for education and training providers is how to deliver the quite diverse technology skills required by contemporary careers and attempt to meet



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the dual requirements of employers generally and the IT industry more specifically.

One industry recommended approach is as follows:

"You do need one avenue in computing science for those who want to stream and want to pursue programming careers. Diversity is the challenge, and technological proficiency should be a by-product of all the other courses. The question really is how do you technologically enable the entire curriculum, because they need to learn how to use the skills and how to do this as naturally as possible."

- Industry Stakeholder

IT: who is interested?

Survey results indicated that around four in ten of the student respondents, and most mature age job seeker respondents, were interested in further study, training or a career in IT. There was strong personal interest in an apprenticeship or traineeship in IT. In all instances, interest was stronger among males.

Aside from the gender imbalance, these would appear to be quite positive results.

However, these results should be examined cautiously before being viewed too optimistically.

We have already established that young people seek to maintain their options for as long as possible. For the students who nominated an interest in IT apprenticeship and traineeship options, this may just be one of wide array of options they are currently considering.

The attitudes of young people contrast with those of their older counterparts, but there is

at least one interesting shared characteristic.

These job seekers are similar to students in that they are seeking to maintain options. The starting points are different as are the aims (maintaining job security on one hand and maintaining interest on another), but the result is both these groups are pursuing the ability to have options.

the parental influence

As was already noted in previous chapters, parents have considerable influence in the career decisions of their children. The advice they are able to provide will obviously be flavoured by their own understandings of technology and its role in the workplace.

Accordingly, examination of these understandings is important.

Except for the one or two parents who worked in the IT industry, parents were largely unknowing about IT as a career, although they did recognise:

"It's the future. It's where our children are likely to be going".

And they furthermore acknowledged that:

"Being able to work using computers will be important whatever they do. It's a fundamental skill they'll have to have."

However, they were as unknowing about IT career options and as negative in their image of an IT career as their children.

They were adamant that their children should pursue a career that involves doing "something they like and enjoy".

There was some vague view that there was substantial job availability in IT and that IT jobs paid well, but such views were impressionistic and not strongly held, and



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certainly any conception of the range of jobs was negligible.

Most parents said their influence on their children's subject and/or career choice was minimal. There were some (although not many) examples of children following in a parent's footsteps, but in such cases the parent suggested this was because of the child's own inclination and judgement rather than a parent's direct advice. Some parents suggested that their advice was more likely to be given in terms of telling their children what *not* to do than what to do.

"We've discouraged her against a couple of ideas she's had, just not appropriate, but haven't really pointed her in any direction."

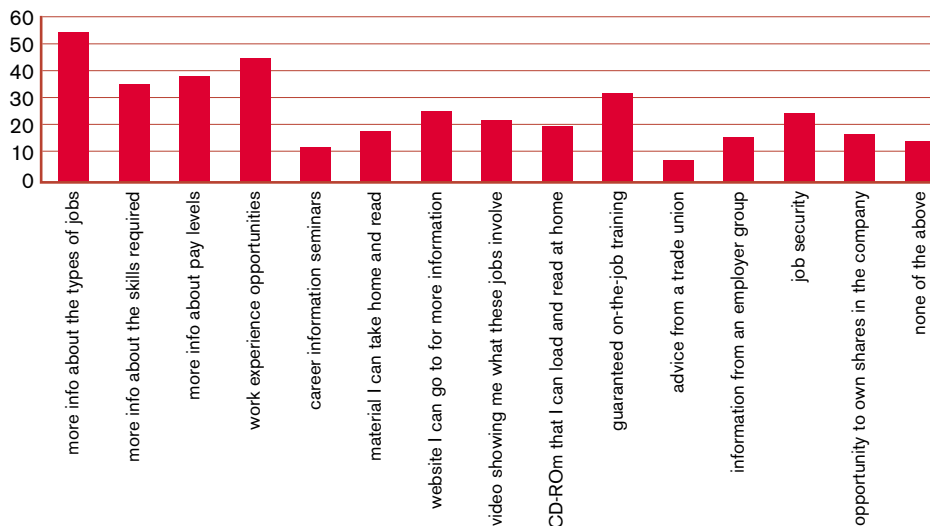
Parents', especially non-working parents, attitude to computers was somewhat reticent if not fearful, due largely to ignorance and unfamiliarity rather than bad experiences.

Some working parents indicated how poor their own IT training had been. It was on-the-job and usually undertaken on implementation (rather than prior to implementation) so they were learning as they went, which was very stressful and uncomfortable. There were also comments that the training personnel (when available) did not appear to be fully competent either, and that much trial and error was gone through.

Overall then, to take full advantage of the possibilities offered by parents as potential advocates, programs to improve parents' own understanding of technology and its role in the workplace would be well worthwhile. They are a largely untapped resource.

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what, if anything, would make you more interested in jobs in the IT field?



what would improve interest in a job in IT?

Given the range of concerns young people have about IT careers, it is telling to examine their suggestions for how to attract interest.

Overwhelmingly they would respond favourably to information (about the types of jobs, skills required and pay levels) and opportunities to 'test drive' different jobs through work placement. Job security and guaranteed on-the-job training would also be welcomed by many students.

media perceptions of IT

Given the importance of the media in constructing representations of work through real or fictional role models, it is important to understand the way in which the media itself sees technology, IT jobs and young people.

Indeed many stakeholders place an enormous amount of emphasis upon the need for popular culture role models - real or fictional:

"There are no equivalents to Ally McBeal, or ER, for the IT industry. The only role model which comes to mind is Bill Gates. Perhaps IT needs its own alluring TV show."

- University Careers Counsellor

A lack of such role models is a concern for a number of reasons. First, it perpetuates the poor understanding by students of how technology is used in the workplace.

Second, it allows for the continuance of unflattering stereotypes.

This issue of role models is but one dimension of media that is of interest in relation to the promotion of technology skills and careers.



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Interviews with journalists in the rural media, computer game media, IT media, youth and education media revealed a great variation in views and awareness about IT careers. Across the board, however, the media believe that IT skills are essential for all careers and are becoming an integral part of young peoples' lives.

rural media

The rural media feel the opportunities to pursue IT as a dedicated career are not as great in regional and rural Victoria as they are in metropolitan Victoria, although some regional centres such as Ballarat are exceptions.

Among rural journalists, there is also a perception that the industry is nerdy, unsociable and fails to offer stability for young people because of its ever-changing nature. Like others in the media, rural journalists also believe that female students at secondary level do not find IT attractive because it is "not glamorous to sit behind a computer."

In summary, the rural media feel that to change the image of IT, the industry needs to be made cool, glamorous, underground and off-beat.

computer game media

Journalists in the computer game media have a more positive view about how the industry is perceived and believe it is losing its geeky image. They perceive it as highly creative, fast moving and 'groovy.' They also believe the industry is immensely desirable because of its association with money and security.

However, one journalist from a computer game publication commented that the youth subculture who use technology all the time

do not necessarily link their career options with the technology tools they liked such as the internet and mobile phones.

youth and education media

The youth and electronic media feel that the term 'IT' is still associated with geeks but it is taking on positive connotations. Within certain youth cultures, the word 'geek' is taking on an ironic coolness.

Youth and education journalists also believe that many people feel intimidated by the whole idea of IT. Not knowing about the different types of IT jobs available, because career teachers do not know, may also be a deterrent from entering the industry. Another deterrent is considered to be the perception that the industry is about number crunching and is disorganised and stressful.

To reach mainstream youth, journalists in this category suggest the industry should appeal to young peoples' interests and advertise the advantages of becoming involved.

IT media

The IT media generally feel that money is the biggest factor in attracting young people into IT careers. This suggestion, in all likelihood, represents the close links between this section of the media and the IT industry.

In contrast to the computer game media who believe the industry is dynamic and changing, the IT media perceive it as a career path which is easy for those with a personal interest in technology and is boring, safe and secure.

Specialist IT journalists believe that the idea that IT employees just "fix networks and tell people how to delete their emails" is deterring young people from pursuing IT as a career path.



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In the future, IT journalists believe industry needs to promote itself and seek the best students rather than expect the best to be drawn to it. They also believe the term 'IT' needs to be dropped because it is considered redundant.

crunch time: encountering the workplace reality

Finally, according to industry stakeholders new entrants to the IT industry react positively to their new environment and generally the reality of the situation seems to have met their expectations, except that:

"What does surprise them is the business processes around the use and deployment of technology. One such area is that although they are taught that you should do something with steps A, B, C and D, business generally are looking for the greatest return so they will cut out parts of the process. They also not always implement the greatest and newest technologies."

- Industry Stakeholder

(This again reinforces the need to develop business acumen in parallel with technology skills.)

Strategies for retaining employees includes good pay, keeping them interested and continuing to train them.

"[To retain employees you must] acknowledge their efforts and maintain a team mentality - hardly ever is an IT job completed by one person only. There is a huge teamwork aspect to jobs in IT."

- Industry Stakeholder

When employees do leave, it is seen as stemming from the lure of money, overseas

opportunities, new challenges or dissatisfaction with long hours and a demanding workload.

The process of retaining employees and witnessing the reasons for which they leave seems to have largely informed the industry's positioning around attracting employees in the first place. This may not be the best approach given the differences, explored throughout this report, between students and people with more workforce experience.



methodology

The research methodology adopted combined a number of qualitative and quantitative approaches that, while performing discrete functions, were designed to be complementary.

The intention was to uncover broad themes relevant to people's interactions with technology and their perceptions of IT careers that would be used to inform a communications strategy.

By far the most important element of the research project was the qualitative research, which could explore in depth the complexity of the subject matter and provide insights into why particular views were held.

The majority of the conclusions drawn in this report are based on the focus group research and the in-depth interviews conducted with teachers, university and TAFE lecturers, key media and industry leaders.

The quantitative surveys of students and mature-age job seekers were intended to complement the qualitative findings and provide some validation for conclusions drawn from the focus groups.

It is important to note that students studying IT are over-represented in the student survey, and that the mature age findings are based on a relatively small sample that is nonetheless statistically significant. This means that the numerical findings need to be treated with a degree of caution.

For example, it would be incorrect to state that "41% of year 12 students intend to work in IT". However, it would be correct to state that the majority of Year 12 students enrolled in IT subjects intended to work in IT.

Research elements were:

focus groups

The purpose of these groups was to provide an understanding of the nature and extent of attitudes, opinions and perceptions which impact upon peoples' impressions of IT skills and employment/career options either in the IT industry itself or in other industry sectors utilising IT.

The focus group format allowed deeper penetration into the attitudes explored in the quantitative surveys, teasing out the relationships between attitudes, key influencers and experience with technology in the school environment, at home, or at work (in the case of mature age job switchers).

Focus Groups were conducted for a number of categories of participant. Each group comprised 8-11 people. The categories of focus group participants were:

- Year 9-10 students (Melbourne). Two groups were conducted with participants of this type. The first comprised students that were undecided about their career direction, while the second comprised those students that had a more fixed career direction in mind.
- Year 11-12 students (Melbourne). Two groups were also conducted using this class of participant with the same intention as per the Year 9-10 groups.
- Year 9-10 (Shepparton). One group was conducted to provide a regional perspective in the development of Year 9-10 results.
- Year 11-12 (Shepparton). One group, conducted according to the same rationale as per Shepparton Year 9-10 group.



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- Year 9-12 parents (Melbourne). One group.
- Year 9-12 parents (Shepparton). One group.
- Mature Age Job Seekers (Melbourne). Two groups.
- 16-22 year old TAFE students (Melbourne). One group.
- 16-22 year old TAFE students (Warrnambool). One group.

The focus groups were conducted by Nexus Research.

desktop research

Hill and Knowlton analysed and summarised all major recent and relevant reports on aspects of IT employment, education and training (Australian and select international) as well as media coverage and curriculum materials. This desktop research helped identify the scope of the challenge and provided broad validation of the quantitative and qualitative research findings.

Broadly, the areas covered by desktop research were:

- Perceptions of IT
- Career and course selection
- Youth attitudes
- Issues for women
- The classroom experience
- Career switchers

stakeholder interviews

Forty-eight stakeholder interviews were conducted. Interviews were between 30 and 60 minutes duration and took the form of semi-structured discussions (this was not a

quantitative component of research) aimed at drawing out those issues of particular interest to individual stakeholders.

quantitative survey of year 9 and 10 students

Twenty schools were approached to participate in this survey. The aim was for the survey to be completed by 20 students at each school. Five schools declined to participate and ten returned fewer than 20 completed questionnaires. This task was designed to provide statistical evidence of student attitudes towards:

- technology and its uses
- plans for the future
- careers and the influencers at work with regard to career selection
- role models and media habits

162 student questionnaires were returned and tabulated.

quantitative survey of mature age job seekers

This survey was roughly equivalent to that distributed to students (for the purposes of comparison) but adapted so as to be applicable to an older audience. This survey was distributed to 100 job seekers through job agencies. 18 mature age questionnaires were returned and tabulated.

Both questionnaires were developed by Hill and Knowlton, and tabulated by Nexus Research.

interviews with media representatives

Interviews with nine youth, IT, education and rural media representatives were undertaken to inform the development of tactics to promote IT. Broadly, media representatives



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were questioned about their views on technology (given that this would largely be reflected in the content of their respective media), readership perceptions among their respective audiences and whether they would benefit from the availability of IT role models/spokespeople.



references

- American Association of University Women, 'Tech-Savvy: Educating Girls in the New Computer Age' 2000
- Australian Council for Education Research, 'Computers: A tool for learning' Media Release, 17 March 2000
- Barker G, 'Education system the key to more women pursuing IT careers' in *The Age*, 16 July 2000, page 12
- Barker G, 'Our disappearing talent' in *The Age*, 17 July 2000
- Beatty S and Hymowitz C, 'Boss Talk: How MTV Stays Tuned In To Teens' in *The Wall Street Journal*, March 2000
- Begley S, 'Mind Expansion: Inside The Teenage Brain' in *Newsweek*, 8 May 2000, page 68
- Begley S et al, 'A World Of Their Own' in *Newsweek*, 8 May 2000, page 52
- Bougias G, 'Better understanding the Information and Communications Technologies and their Role in Victorian Society' Multimedia Victoria Information Economy Statistics Research Project, 27 January 2000
- Brumby J, Speech to launch ICT Skills Taskforce, April 2000
- Burbury, R, 'How not to be a loser try-hard' in *The Australian Financial Review*, 24-25 June 2000, Page 'the fin' 6-7
- Collett, I, 'Implications of rural location on career development' in *Career Development in Practice: A Systems Theory Perspective* (Patton W and McMahon M eds), New Hobsons Press, 1997, pages 71-82
- Dargan F, 'Cyber skill help sought for over-45s' in *The Herald Sun*, 17 July 2000, page 28
- Deloitte Touche Tohmatsu, 'Future Demand for IT&T Skills in Australia, 1999-2004' IT&T Skills Task Force
- Department of Education, Employment and Training, Ministerial Review of Post Compulsory Education and Training Pathways in Victoria (Chair: Mr Peter Kirby), August 2000
- Ellingsen P, 'Don't call us a generation' in *The Age Saturday Extra*, 6 May 2000, pages 1, 4-5
- Elsworth Shea S and Schipano D, *Career & Training Pathways in Information Technology*, May 1999, Multimedia Victoria
- Fiorini C, 'Java experience hot on job lists' in *The Age*, 13 June 2000
- Fiorini C, 'Skills shortage woes: Is it all just hype?' in *The Age*, 22 August 2000, page IT 14
- Fiorini C, 'Why the IT job agencies have a shrinking feeling' in *The Age*, 20 June 2000, page IT 16
- Han H, 'Regional Vic to go online in Govt-backed venture' in *ComputerWorld*, 26 July 2000
- Hudson S, 'Hot Careers' in *The Herald Sun*, 27 June 2000, page 27
- Illing D, 'Where are IT graduates?' in *The Australian*, 22 December 1999, page 31
- Information and Communications Technologies Taskforce Background Papers
- Jones B, 'Knowledge is power' in *The Age*, 2 August 2000, page 12
- Jonscher C, *Wired Life: Who Are We In The Digital Age?*, 1999, Anchor
- Kay, M, 'Youth lurks in the shadows' in *AdNews*, 25 February 2000, page 11



references

- Lamb S and Ball K, 'Curriculum and Careers: The education and labour market consequences of Year 12 subject choice', LSAY Research Report Number 12, Australian Council for Education Research, September 1999
- McMahon G and Baskett S, 'Hi-tech, hip and happy' in *The Herald Sun*, 17 June 2000
- McMahon M and Patton W, 'School as an influence on the career development of students: Comments by young people and considerations for career educators' in *Australian Journal of Career Development* volume 6 number 1, Autumn 1997, pages 23-26
- Meredyth D, Russell N, Blackwood L, Thomas J and Wise P, *Real Time: Computers Change and Schooling*, Department of Education Training and Youth Affairs/Australian Key Centre for Cultural and Media Policy, October 1999
- Multimedia Victoria, 'ICT Skill Shortages – The Evidence' internal MMV document
- Naidoo M, 'Locals losing IT career race' in *The Age*, 22 December 1999, page 8
- National IT Workforce Convocation – Task Force (USA), 'Changing the image of Information Technology' White Paper, January 1998
- National Office for the Information Economy, *The Current State of Play*, July 2000
- Newmarch E, Taylor Steele S and Cumpston A, 'Women in IT – What are the barriers?' (Department of Education Training and Youth Affairs) Conference Paper: Network of Women in Further Education Conference, March 2000
- Not attributed, 'Making headhunters look inwards' in *The Age*, 20 June 2000, page IT 16
- Otto L, 'Parents as career advisers for their children: A program description and evaluation' in *Australian Journal of Career Development* volume 6 number 2, Winter 1997, pages 16-20
- Parsons K, 'Internet students out-savvy teachers' in *The Sunday Telegraph*, 18 June 2000
- Porter L, 'Freedom of Choice' in *The Age* (Sunday Life!), 6 August 2000
- Reeves R, 'Girls losing the race in go-go world' in *The Age*, 22 August 2000
- Robinson P, 'Young flee Australia's skills gap' in *The Age*, 27 July 2000
- Sources of Influence; Youth Monitor (internal Hill and Knowlton document)
- Unknown, 'Why girls are still saying "no" to IT degrees', research paper
- Watson, G, 'When I grow up: Young people's understanding of work in 'a large computer company'' in *Australian Educational Computing* volume 12 number 2, 1997, pages 19-23
- Whitely, S and Porter J, 'Student perceptions of subject selection' in *Australian Journal of Career Development* volume 8, number 1, Autumn 1999, pages 44-48
- Wilson E, 'IT exams fail to prepare students for the real world' in *The Age*, 22 August 2000



references

Woolnough B E et al, 'Factors affecting student choice of career in science and engineering: Parallel studies in Australia, Canada, China, England, Japan and Portugal' in *Research in Science and Technological Education* volume 15 number 1, May 1997, pages 105-121

Wyn J and White R, *Rethinking Youth*, 1997, Allen & Unwin

Yelland P, 'Having babies just isn't high-tech enough' in *The Age*, 6 June 2000

Yelland, P, 'Security, money lure job seekers to IT careers' in *The Age*, 20 June 2000, page IT 18

Yelland P, 'Skilled workers calling the shots' in *The Age*, 18 July 2000, page IT 14

Yelland P, 'Skills shortage creates opportunities' in *The Age*, 7 December 1999, page IT 14

Yelland P, 'Where have all the IT women gone?' in *The Age*, 13 June 2000

Yelland P, 'Worldwide shortage of webwise women' in *The Age*, 30 May 2000



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Victoria

Published by the Communications
Division, Multimedia Victoria.

ISBN 0-9578667-0-4

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