NCVER

Understanding and resolving the skills shortage in the Australian printing industry

Victor J Callan
The University of Queensland

A National Vocational Education and Training **Research** and **Evaluation** Program **Report**

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Publisher' s note

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Foreword

This research was undertaken under the National Vocational Education and Training Research and Evaluation program, a national research program managed by the National Centre for Vocational Education Research (NCVER) and funded by the Department of Education, Science and Training on behalf of the Australian Government and state and territory governments.

Skill shortages are a highly topical issue at present. This project is one of several commissioned with the aim of raising awareness and increasing understanding of the nature and causes of skill shortages and of what might be done to remedy them at an industry level. The focus on specific industries is intentional, as the nature of the shortage, its consequences and remedies, are likely to vary from one industry to another.

In this report Victor Callan examines the printing industry. He situates the skill shortages in the wider context of technological change in the industry, which is altering the type of skills demanded by employers. He finds that, while employers will invest in new technology, they do not complement this with a matching investment in workforce training. He also points to a range of factors other than the provision of training that would improve the relative attractiveness of the printing industry to young people looking for a career.

The report is directed at policy-makers, employers, industry bodies and training providers interested in skill shortages who may be able to draw some lessons of more general applicability on how the printing industry has responded. Readers might also wish to read *Responding to health skill shortages: Innovative directions from vocational education and training* by Sue Kilpatrick and colleagues, soon to be published by NCVER, which examines how the community services and health industry is responding to shortages of health care workers.

Tom Karmel
Managing Director, NCVER

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Contents

Key messages

This report uses the Australian printing industry as a case study to see how a major manufacturing industry has responded to the issue of skill shortages. It also looks at possible future strategies for dealing with this problem.

- Finding a solution to skill shortages requires a strategic, coordinated response from three main groups: industry, the enterprise itself, and training organisations. Industry needs to provide a strategic, long-term action plan; enterprises must promote solutions within the workplace; and training providers must broaden their approaches to traditional training.
- Employers in the printing industry are actively addressing skill shortages by strategies that include introducing new technology to reduce the need for highly qualified staff and putting pressure on training providers to update the content and delivery of their training.
- Currently, there is a tendency for the industry to invest money in technology rather than to examine the more complex issue which is at the heart of the skill shortage problem: that industry lacks both a far-reaching vision and a long-term strategy for dealing with the future workforce requirements of the printing industry.
- For the printing industry to attract skilled staff, it needs to present a new image: one that is innovative, tolerant of change, well-paying, and prepared to invest in the skills and career paths of its employees.
- The industry is one of the first in Australia to design and trial an accelerated apprenticeship as one strategy for dealing with its skills shortages. However, low wages and current industrial arrangements are a strong constraint against attracting and retaining high-calibre apprentices.

Executive summary

A skill shortage occurs when the demand for employees in specific occupations is greater than the supply of those who are qualified, available and willing to work under existing industry conditions. The aim of this project was to examine the Australian printing industry as a case study of the:

- sets of factors at work in shaping current and future skills needs and shortages
- areas of skills shortages now and in the near future
- impact of current shortages upon an industry
- range of industry, employer and training provider strategies that can be applied to respond to skills shortages.

The Australian printing industry is one of Australia's largest manufacturing sectors. Small-to-medium businesses are the dominant employer type in Australia and worldwide. Like many industry sectors, the industry is operating in a rapidly changing global economy where businesses survive or thrive according to their ability to respond to change more successfully than their competitors. Many argue that the Australian printing industry has a long history of successful adjustment to change, including evidence of continued high levels of innovation, competition and technological change. Others, on the other hand, describe the industry as too traditional and unable to pursue the deeper levels of change required to operate in the new services economy.

Two methodologies were used in this project addressing skills shortages in the Australian printing industry. The first method involved a review of commissioned reports, commentaries, journal articles and statistical reports relating to the industry, its skills profile, and areas of skill shortage. The second method involved 31 interviews with teachers, directors of training organisations, employers, union representatives, members of skills councils and professional associations. This component of the research also involved shorter interviews and focus groups with 21 current apprentices and tradesmen.

Interviewees identified the primary skills shortages as in the areas of printing machinist and finishing. They also identified problems finding less skilled staff to work as table hands, trades assistants, printing and binding assistants, and in various manual labour roles. According to interviewees, the printing industry has traditionally placed great importance on the apprenticeship system. However, while the apprenticeship system will continue to be an important supplier of skilled labour for the industry for many years to come, other avenues will need to be explored to meet the skilled labour needs of the industry.

A complex set of interrelated factors was seen to shape the existing skills requirements and shortages. Interviewees highlighted:

- a lack of vision by the industry about its future
- too great a focus on new technology and equipment, rather than on investment in people and their training, to resolve the skills shortages

- ✧ the low profile and poor image of the industry, with the printing industry being perceived as dirty, smelly and noisy
- ✧ the negative attitudes of parents, teachers and school counsellors in relation to career prospects in the trades generally, and in the printing industry specifically.

At the same time, there was no evidence of an anti-training attitude in the industry; rather, it was believed that the industry needed to reposition itself to attack the skills shortages through multiple strategies instead of relying predominantly on an investment splurge to protect continued profits and growth.

The report offers three responses to assist the Australian printing industry—and related industries—to address the current skills shortages. These responses were derived from the data that emerged for this project, but have their roots in strategic management, human resource management and the training literatures. The position taken in responding to skills shortages is that we need to focus our attention on big-picture issues (*strategic responses*), actions by employers (*workplace-based solutions*) and a rethinking and broadening of approaches to training (*training solutions*).

Based upon the issues raised by industry members in the interviews, and employers in particular, the *strategic responses* to the skills shortage in the printing industry include:

- ✧ continued investment in technology, but tempered by a renewed investment in other areas, such as staff training, waste reduction, and improved customer processes for customer management; new technology requires less skilled labour and so contributes to the easing of skill shortages
- ✧ continued diversification, which will cement the future of the industry in the services and communication industries and thus lead to the provision of more attractive and skilled positions for staff
- ✧ improvement in the image and profile of the industry to attract a pool of more motivated and qualified students into traineeship and apprenticeship positions
- ✧ improved relationships with schools, including 'adopt a school' programs, more personal contact with school counsellors, teachers and parents, and more innovative promotions that better match the interests of technologically literate young people
- ✧ expansion of the role of Australian Apprenticeship Centres to provide more support for marketing and promotion of apprenticeships in the printing industry, including building relationships with key players in the school-to-work transition
- ✧ promotion and rewarding of efforts to build upon initiatives for improved collaboration between printing companies in the training of employees, including the sharing of high-technology equipment to train apprentices and more collaborative marketing efforts to reposition the image of the industry.

The second set of approaches for responding to the skills shortages emphasises the continued and accelerated application of *workplace-based* strategies. These strategies recognise the need to support and encourage the growth of the capabilities of existing employees, as well as attract employees from other industries. Other strategies currently being used by employers to compensate for shortages included the use of overtime, accessing staff through labour hire firms and adjusting shifts (for example, using overlapping or split shifts).

In addition, upskilling is being used by employers to deal with the skills shortage. Companies are selecting individuals from their pools of semi- or unskilled employees whom they consider have the appropriate levels of interest, motivation and attitude to take 'a risk with' and engage them in an apprenticeship or traineeship. In some cases, these workers have also completed an intensive up-front skills program. The majority of current apprentices interviewed had come into the industry as casual or unskilled labour, working as off-siders or table hands until taking up an apprenticeship.

The third set of strategies suggested as solutions to the skills shortage in the printing industry can be described broadly as *training-based*. Many of these strategies are applicable to other industries in Australia. These training solutions include:

- a rethink of existing training models, including changes to the traditional methods of training. A key challenge is to determine the nature and extent of the training required, given the rapid rate of technological change and the likelihood that current students, once employees, will enter an industry quite different from the current one. A rethinking of the training model needs to review where training occurs (for example, on or off the job, block, day release and other), how it occurs (for example, hands-on, flexible learning, computer-based) and the nature of the trainer (for example, the role of the student as learner, and the roles of supervisors, employers, teachers and other students)
- the use of accelerated apprenticeships facilitated by better use of off-the-job training, training plans, credit transfers and recognition of current competencies
- a review of apprenticeship pay, which is currently perceived to be too low to encourage apprentices into, and to finish, their training
- the greater use of workplace assessors to meet the needs of an industry where the dominant employer is a small-to-medium business, whose productivity can be seriously affected by the absence of apprentices at colleges
- the growth in the use of VET in Schools and school-based apprenticeships, an initiative also dependent upon increased attention to other issues, such as the image of the industry, improved industry–school partnerships and improved apprenticeship pay
- exploration of opportunities that may emerge through further developments in technology cadetships, the new technical colleges and the Institute of Trade Skills Excellence
- an increase in the use of prevocational training and its improved integration into the training models, especially to assist the transition of youth in less skilled printing roles into apprenticeships
- the successful rollout and implementation of the new industry training package
- the development of pathways that allow more access to higher-level qualifications and continuing professional education for existing employees in a wide range of operational and more professional roles in the industry.

In summary, this case study of the Australian printing industry reveals the complexity of issues that shape a skills shortage and the requirement for any industry to seek a coordinated response that draws upon the efforts of employers as well as training providers. The solutions demand a mix of shorter-term strategies concerned with improving the image and marketing of the industry but, more significantly, the adoption of longer-term strategies concerned with clarifying the vision and direction for this industry in order to maintain continued momentum for change.

Introduction

The nature of the skills shortage in the Australian printing industry

A skill is an ability to perform a productive task at a certain level of competence (Shah & Burke 2003). A skills shortage is:

> … when the demand for workers for a particular occupation is greater than the supply of workers who are qualified, available and willing to work under existing market conditions, and if the supply is greater than demand, then there is a surplus. (Shah & Burke 2003, p.v)

The printing industry in Australia is experiencing what one typology of skills shortages classifies as a Level 1 shortage (Richardson 2007). That is, there are few people who have the essential technical skills who are not already using them, and there is a long training time required to develop the skills. This type of skill shortage is identified as the most severe obstacle to the expansion of an industry and its firms and the type that requires longer-term planning by the training system. Skill imbalances require attention because they lead to sub-optimal production. They can substantially inhibit production, making an industry less competitive. While skills shortages are a feature of competitive markets, and skills imbalances often resolve themselves over time, industry and government intervention is often warranted when there is strong evidence that such shortages are impacting upon the competitiveness of a nation (Richardson 2007).

Shah and Burke (2003) conclude that:

- Skill shortages exist at most stages of the business cycle.
- They can co-exist with low or declining employment growth in an occupation or industry.
- Although apprentices are a major source of supply in the traditional trade areas, there is increasing evidence of alternative pathways into these jobs, including traineeships.
- Upskilling of the existing workforce is as important an issue as the training of new entrants into an industry.
- Solutions for tackling the problems of skills shortages must be tailored to the needs of the particular industry, although some generic solutions do possibly exist across industries.
- Rapid changes in technology mean that training programs need to have continual improvement mechanisms built into their development.

Significantly for the printing industry, the nature of skills and the pace of technological and marketplace change means that, increasingly, the shelf life of many skills is short. In some cases there will be skills obsolescence. There is little doubt that further advances in technology will continue to streamline the printing production process and it is very likely that these advances will reduce further the traditional separation between the pre-press, print and finishing stages of production, thus continuing to make various roles obsolete and necessitating the retraining of existing staff. In addition, this uncertainty about the future of the industry is being felt by its apprentices and trainees. Surveys of students being trained for roles in the industry (for example, Callan & Johnston 2002) reveal that only about half expect a longer-term future in the printing industry.

The skills shortage in the Australian printing industry is recorded in a number of locations. Occupations from the industry are included in the Department of Immigration's report on the Skilled Occupation List of Printing Machinists. 'Printing trades' (that is, graphic pre-press trades, printing machinists, binder and finisher) are listed in the 2004 National Skills Shortage List on the website of the Department of Employment and Workplace Relations. In addition, as noted in the report titled *Bridging the skills divide* (Senate Employment, Workplace Relations and Education References Committee 2003), the printing industry is identified as an industry that has not been very effective in attracting new apprentices to generate sufficient numbers of skilled people. Overall, there is a widely held view that there is a lack of skilled people who can assist printing enterprises to respond to current and future market opportunities.

Research purpose

The current project focuses on the Australian printing industry as a case study of an Australian industry experiencing a skills shortage. The specific focus of this report is on the nature of these shortages, their causes and, most importantly, potential solutions. The aims of the project are to:

- provide an analysis of the set of factors that are at work in shaping current and future skills shortages
- define the specific areas of skills shortage that exist and that will be exacerbated in the future
- discuss and critically analyse the impact of these shortages upon the industry
- explore a range of feasible vocational training, industry and related strategies that can be applied in the short- and longer-term to respond to skills shortages in the printing industry in Australia.

Methodology

The discussion presented in this report on the nature of the skills shortage and strategies for its resolution is based upon two sources.

- A review of past reports into the Australian printing industry and an examination of reports from other countries has been conducted. These reports included commissioned reports, commentaries, information taken from various statistical databases on skills shortages, books and research journals.
- The second method involved 31 interviews with teachers, directors of training organisations, employers, union representatives, members of skills councils and of professional associations. Two focus groups were also held with 21 current apprentices at the Queensland School of Printing and Graphic Arts, while shorter interviews were conducted with another eight teachers.

The purpose of the face-to-face and telephone interviews was to gain the opinions of a wide cross-section of members of the printing and graphic arts industry. At the same time, it needs to be noted that this project was not funded to be a broad review of the Australian printing industry. The intention was to use the printing industry as a case study into the nature of the skills shortages, including planned and anticipated responses to the shortages, especially those concerned with training solutions.

As they were considered as representative of the broader industry, most of the interviews with employers were conducted with members of the industry in Queensland. Interviews with representatives of the industry association and training providers included participants from the industry in New South Wales, the Australian Capital Territory, Victoria, South Australia and Western Australia (see the appendix).

A structured set of questions formed the core questions in each interview (see the appendix). Questions were modified according to the nature of the respondent. In addition to being interviewed, four individuals from the industry provided a reference group. This group facilitated access to additional materials and reports in the industry, advice about persons to be interviewed, and feedback on various drafts of this report.

Research questions

- What is the set of factors behind the skills shortage in the printing industry in Australia?
- Where are those skills shortages most apparent?
- Are current skills shortages impacting similarly upon smaller and larger printing businesses and their performance?
- What are the vocational education and training interventions and related industry strategies being applied, or can be applied more often, to manage and resolve the skill shortages in this industry?

Industry trends and challenges

Overview

The printing industry is one of the largest manufacturing sectors in Australia. It employs more than 115 000 people (Printing Industries Association of Australia 2005a). Small-to-medium businesses dominate the industry, as is the case for Australian industry in general, with 85% of printing enterprises employing fewer than 20 people. This predominance of small businesses is a worldwide feature of the industry. For example, almost three-quarters of print shops in Germany employ fewer than ten staff. In Asia, about 95% of companies are classified as small businesses (Heidelberg Druckmaschinen 2005).

The number of establishments in the Australian industry total about 5000. They are spread across Australia and have a physical presence in every region (Printing Industries Association of Australia 2005a). Annual industry turnover is approximately $18 billion, and the industry's annual exports total more than $600 million and imports more than $2 billion. Average annual capital expenditure is approximately $746 million. Based on data from the 2002–03 financial year, total paper usage in newsprint, printing and writing papers and packaging was more than 3.7 billion kg. On a per capita basis, each person in Australia consumes the equivalent of 187.6 kg of newsprint, printing and writing papers and packaging papers annually. It is estimated that the printing industry uses more than 36 000 tonnes (36 million kg) of inks annually.

In terms of financial performance, during the past decade average industry growth was slightly below the average growth rate for Australian manufacturing (Printing Industries Association of Australia 2005a). The industry accounts for 11% of the total gross value of the Australian manufacturing industry. The Australian printing industry is increasingly seeing traditional print products being complemented by digital products, often CD and internet-based, creating new markets and changing traditional print business models. Other developments in these new forms in the printing industry include shorter print runs, document customisation, data and knowledge management and faster print turnaround. More specifically, activities include:

- ✧ digital file, workflow, database and knowledge management; multimedia, pre-press and desktop publishing; mailing and distribution
- ✧ commercial and job printing, including packaging (paper, cardboard, plastic, metal and other substrates)
- ✧ publishing and printing newspapers, books, magazines and periodicals, greeting cards, calendars and diaries, posters, labels, signs and displays, advertising material (catalogues, brochures and leaflets), business forms, t-shirts and other fabrics, stamps, cheques and other security products
- ✧ manufacture and publishing of audio, CDs, video and data media, and the manufacture of paper stationery items.

Drivers for change

The Australian printing industry, like other industries, is now operating in a rapidly changing global economy where the competitive advantages for businesses are no longer concerned only with price and quality. Today businesses survive or thrive on their ability to respond better than their competitors to change. A key component of sustained competitive advantage is having skilled, knowledgeable and adaptable workforces that have broad technical, but also more generic knowledge and skills sets (Callan & Ashworth 2004; Gibb 2004).

There are numerous drivers for change at work in the Australian printing industry. Restructuring of all segments of the media industry is causing a shift in the nature of competition and power within the marketplace. In addition, economic forces, such as rising costs and pricing pressures, are squeezing margins, while changing consumer preferences means that consumers demand instant access, better service and environmentally responsible production methods. Profit margins in the Australian printing industries have been squeezed for some time, and continue to be (Printing Industries Association of Australia 2005a). The industry generally talks about single-digit profit margins, with revenue growth being tough. Printing firms are operating on very slim profit margins due to price competition, increased costs and over-capacity caused by moves by publishers to print off shore (Accenture 2001).

The industry is aware of the need for the ability to respond successfully to the imperative for continued change. A Printing Industries Association of Australia (2004) report reveals evidence of cultural and structural change to promote capacity maximisation, consolidation and growth, and cost reduction. Strategies include the introduction of lean manufacturing methods, industry benchmarking, waste reduction and digital process automation. Many argue that the printing industry has a very successful history of adjusting to rapid technological change. Others, however, dispute this claim. The industry has moved from hot type to cold type to laser printing in the span of 15 years; stripping full-film imposition to direct-to-plate in ten years; colour separation by camera, to scanner, to big digital colour systems, to desktop-published colour in fewer than 20 years; and from press proofs to two major kinds of off-press proofs to digital proofs and PDF proofs in 25 years (O'Brien 2002).

In terms of technology, companies, where they can afford to, are responding to the skills shortage by purchasing more advanced technology that allows higher levels of automation and less reliance on access to skilled staff. There continues to be considerable capital expenditure investment in new plant and equipment. The main driver for new technology is not a response to the skills shortage, but rather a recognition by organisations of the need to purchase more expensive advanced equipment to remain competitive in attracting and retaining key clients.

However, new technologies are saving money and time due to shorter set-up times, reduced ink consumption, reduced paper waste and better controls for quality. For example, in 1980, setting-up a four-colour printing job took one hour at the press. Today it takes 15 minutes. Paper waste is estimated to be reduced by a factor of five, while productivity has increased by an estimate of 4120% (Heidelberg Druckmaschinen 2005). Heidelberg Press, one of the world's largest manufacturers of printing machines, is looking to a future it sees with 'electronic publishing as the heart and soul of the communication industry', 'with presses becoming more capable of learning and correcting themselves' and with 'the day of offset printing at the press of a button growing ever nearer' (Heidelberg Druckmaschinen 2005, p.35).

While the tools have changed, many question the deep ability of the industry to change. They argue that the really hard part of change is still to be achieved—adjusting management styles and mindsets to focus on the customer and the need for printers to develop a deeper understanding of the needs of their customers. It is generally accepted that, for printers to be successful in the future and in their responses to the skills shortage, the industry needs to alter existing mindsets. Printing

enterprises must invest more in their people to encourage the development of skills that will enable printers in the new services economy to have services and products available to convince their customers to continue to use the printing industry (APIS Business Services 2004; Department for Industry, Science and Resources 2001).

The future viability of the printing industry rests on the capacity of the industry to alter its mindset, such that it provides not only products that are part of the traditional printing industry (for example, books, brochures, advertising materials), but also products from the emergent ancillary industry (such as graphic design, desktop publishing, telemarketing, e-books, multimedia services). This will allow printers to provide more complete business solutions for their customers.

A critical challenge for the future of the industry is its capacity to reposition itself for a role in the value-adding business rather than remaining focused upon commodity-based competition. As Ryan and Watson (2003) argue, technological change has revolutionised the industry in the past two decades. In particular, recent technological changes in the production process have created new occupations in the pre-press and desktop publishing areas. The sense of 'the craft' of printing has disappeared and jobs have become de-skilled in many areas. However, commercial printing presses cannot be operated by unskilled people or by people with just basic computing skills. These authors conclude that print workers today need a broader set of skills and more underpinning knowledge than the print workers of the past. Printing workers, however, have been slow to learn more about the production process. This situation has led to a major shortage of skilled printing machinists and managers of printing businesses.

At the same time, there are many examples in the industry of successful efforts to move into the value-adding aspects of printing. A prime example of this is the National Archives of Australia. Armed with the task of housing potentially petabytes of government information with both public and private coverage, the National Archive is currently moving to change their and others' mindsets from paper to digital, as well as educating the public about future access to digital records stored in web-based access repositories. In 2001, the Australian Printing Industries Report, *Print21: Navigating the 21st century*, was funded and published by the Department of Industry, Science and Resources. This report provided a critical review of the current and future status of how various organisations were responding to the challenges faced by the industry. In terms of what is known now as the *Print21* projects (see Printing Industries Association of Australia 2004), evidence of the new mindsets that are emerging include:

- ✧ an industry-based cadetship created by Canberra Institute of Technology to provide industry-based training with an emphasis on book printing
- ✧ the Creator-to-Consumer Research Project (C-2-C), which has involved a partnership between RMIT University and Common Ground Publishing, exploring the implications for skills and capabilities in the light of changes in the production and publishing supply chains involving digital technology.

Other examples of mindset changes are reported in a variety of commissioned research reports. As identified in such commissioned reports (Department for Industry, Science and Resources 2001; Accenture 2001; Printing Industries Association of Australia 2004, 2005), the key challenges, however, continue to include:

- ✧ achieving true customer focus by offering total business solutions
- ✧ having and retaining the right people to allow organisations to put the best skills and cultures in place
- ✧ continuing to invest in new technology
- ✧ promoting operational flexibility
- ✧ remaining competitive with imports.

As proposed in the *Print21* report (Department for Industry, Science and Resources 2001), the prospects for the Australian printing industries will not improve without continued efforts to create a major rethinking of the nature of the printing business and its business models. Demand for traditional print products is expected to continue to fall over the next ten years. More traditional jobs will be disappearing with continued automation and the introduction of advanced technologies (APIS Business Services 2004). Moreover, central to the application of innovative strategies that exploit new opportunities in the marketplace will be the need for more skilled staff.

The printing industry in Australia, moreover, is not alone in facing the demands of a changing operating environment. Globally, fierce competition within the industry has led to concerns over intense pricing pressures, cash flow pressures, tight turnaround times, inability to forecast sales, and capacity pressures. In the United States, for example, book publishers are seeking ways of making e-books work for consumers by attempting to establish a secure and economically attractive e-book marketplace and introducing industry standards for numbering, metadata and digital rights management (Accenture 2001). The effect of similar technological changes is being experienced in the Korean printing industry. The introduction of new digital technology is increasing productivity and generating demand for small-quantity printing on a just-in-time basis. This is driving the industry to consider new marketing strategies to meet this demand (see Jick-Seung 2000).

In China, the printing industry has been targeted as one of six key industries for reform in line with the government's metropolitan industries plan (see Che 2000). The printing factories have been relocated into new purpose-built factories that minimise pollution and noise. This has allowed the expansion of production capabilities, renovation of equipment and the introduction of new technologies in order to revitalise the industry and enhance its ability to compete in global markets.

The demand and supply for various types of employees

Starting with the demand and supply for apprentices, table 1 shows the trend in Year 1 technical and further education (TAFE) apprentice statistics covering the period 1994–2004. While the trend was reversed in 2004, overall there is a clear downward trend in Year 1 TAFE enrolments over the ten-year period.

Table 1 Year 1 TAFE enrolments (national)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Binding/ finishing	107	121	119	88	106	74	88	81	62	57	81
Graphic prepress	355	343	222	203	193	190	156	138	119	70	79
Printing machining	462	524	490	385	370	357	332	383	284	243	295
Screen printing, stencil printing	102	102	89	83	62	89	37	60	46	39	69
National totals	**1026**	**1090**	**920**	**759**	**731**	**710**	**613**	**662**	**511**	**409**	**524**

Source: Printing Industries Association of Australia (2005)

The 2004 outcome is 52% lower than the peak in apprenticeship enrolments of 1995. The 2005 *Industry overview* report concludes:

> The ability of any industry to be able to successfully have its future demand for labour met depends to a large extent on the training that is currently taking place. If sufficient numbers of people fail to be enrolled in apprenticeship and trainee programs then labour shortages are likely to emerge when demand for labour increases. Such a situation will in turn exert upward

> pressures on industry wages and generate a detrimental impact on costs and margins. The printing industry has traditionally placed great importance on the apprenticeship system. While the apprenticeship system will continue to be an important supplier of skilled labour for the industry for many more years to come, other avenues need to be explored to meet the skilled labour needs of the printing industry.
>
> (Printing Industries Association of Australia 2005a, pp.22–3)

The APIS Business Services (2004) report for the Printing Industries Association of Australia concludes that a core issue is a mismatch between the training currently being given and the skills actually required to compete successfully in the new printing industry environment in Australia. It is argued in this report and supported in earlier reports (Callan & Johnston 2002; Accenture 2001; Department for Industry, Science and Resources 2001), that the traditional printing industry has reached saturation in terms of volume growth. Future growth will be derived from non-traditional products and services, which will require new apprentices with different skills sets, while existing staff require considerable upskilling as managers, business owners and operatives.

The APIS Business Services (2004) report also examined the adequacy of existing educational and training delivery infrastructure for the industry. This report concluded that, although the traineeship and apprenticeship system was still important for the future growth of the printing industry, there was an urgent need to revitalise current approaches to education and training. Areas identified in an expansion or broadening of the skills base included tailored training that covered areas like production, innovation, sales and marketing, finance, management, information technology and graphic design.

Most notably, the report has modelled future demand and supply across a range of job categories using Australian Bureau of Statistics (ABS) data. It is predicted that the demand for new apprentices will continue to decline due to:

- improvements in the productivity of printing businesses brought about by equipment technology advances
- a saturation of demand for traditional print products
- the cannibalisation of traditional print products by other new media
- technological sophistication of new equipment that does not require the traditional type of apprenticeship.

This report proposes that training needs to focus upon tradespersons (that is, small offset and print machinists) as the industry continues to move away from employing tradespersons for the pre-press, post-press and screen printing aspects of the industry (see also Callan & Johnston 2002 for similar views).

Other reports such as the quarterly surveys of printing industry trends in 2005 (Printing Industries Association of Australia 2005b) show that respondents in the industry highlight three current barriers to production: lack of orders; capacity constraints; and labour constraints. These labour shortages throughout 2004 and 2005 feature, in particular, shortages in skilled printers, machinists, bindery and finishing staff, as well as experienced sales staff. Others (for example, Deloitte 2005) also note skills shortages in the areas of printing machinists and binding and finishing. Reports indicate that printing companies in most states are predicting that labour will become more difficult to obtain in the next year. In turn, the labour shortages across the industry have placed upward pressure on wages.

In this new era, the APIS Business Services (2004) report argues that, to remain viable in traditional printing, companies require staff with different sets of skills in the areas of working with and operating digital equipment, customer service, relationship management, cost and quality control and awareness of environmental management. In addition, growth will come from what is termed 'ancillary services', which are emerging in this new marketplace. As we have seen, these services

include digital printing, graphic design, mailing services, desktop publishing, telemarketing, e-books, electronic file management, multimedia services, full logistics services, webpage production, marketing services, and systems management and integration.

The *Print21* report emphasised how critical to the future viability of the printing industry was the need to overcome the shortage of people who have broader knowledge and skills. In the Australian printing industry, the skill levels of employees need to reflect more appropriately the reality that success is gained by not only operating a printing process, but also by being skilled in financial management, sales and marketing, organisational change and innovation, as well as information and technology management, and in the management of intellectual property. In summary, as *Print21* concluded, printing companies require a sustainable resource of educated and trained employees who:

- ✧ understand printing technologies and processes
- ✧ have an excellent appreciation of value chain management
- ✧ have an excellent appreciation of the developing technologies that are driving the new direction for the industry, such as digital file management, data warehousing, digital asset management, content management and print on demand
- ✧ are trained in sales and marketing, particularly solution selling
- ✧ are innovative and flexible
- ✧ have strong team and leadership skills
- ✧ have project management skills
- ✧ are customer-focused.

Callan and Johnston (2002) in their report into the printing and graphic arts industry in Queensland found evidence that providers and employers are rethinking the current approach to training in order to respond to the industry shortage of more broadly skilled employees at various levels. In brief, there was a trend towards building more flexible and innovative training solutions. As a result of feedback through surveys of students and meetings with employers, teaching staff were attempting to introduce more workplace assessment, flexible delivery and recognition of prior learning. However, they argued that even more focused training was needed, for example, adopting practices such as day release options for firms, especially smaller businesses. Moreover, more opportunities for workplace assessment that served to reduce the demands of block release were required. Teachers also noted the need for training organisations to better customise the training around the immediate and longer-term needs of the employers, including a better mix of technical and generic skills, as well as a broader understanding of production issues.

Strategic responses to the skills shortage

Investment in the new technologies and diversification

A major response by the industry has been to invest in the equipment required for the digital future. Capital expenditure is currently soaring in the Australian industry, with as much as $730 million forecast for 2005–06. Despite deterioration in production and sales figures and boosted by cheap finance, the industry continues to invest in new technologies for equipment, plant and machinery (Printing Industries Association of Australia 2005a). Proponents of the investment in new technology see few alternatives, as companies respond to increased competition, reduced margins and labour shortages. They view capital investment in new plant and machinery as allowing them to use increased automation to grow and survive. Automation allows them to manage the skills shortages and allows them to stay on the 'technology curve'.

This new technology shapes a variety of opinions about the future positioning of the industry. One image that is often talked about for the industry is the 'graphics enterprise', where there is a continuous uninterrupted flow of data beginning with a project file being placed into a digital funnel at one end of the workflow and emerging bound and finished at the other end in the client' s hands (Deloitte 2005). However, *Print21* and related reports warn of an investment splurge into new technology that by itself will not achieve sustained profits and competitive advantage. The industry needs to regain a sense of balance, including renewed investment in other areas such as staff training, waste reduction, cost-reduction programs, and improved customer management processes and strategies.

The challenge is a delicate balancing act of diversifying into those new services that clients value, while still continuing to strengthen core ink-on-paper services. Deloitte (2005) reported that successful printing companies are not of a particular size, but are those companies that do not think and act like traditional printers. They are businesses that view themselves as being in the communications industry, not in the ink-on-paper business.

The related challenge of such diversification, however, is having staff with knowledge and skills to allow companies to move into these non-traditional products and services. In Australia, this challenge has yet to be fully embraced. As noted in two reviews, *Training and the printing industry in Western Australia*, and the printing industries action agenda contained in the *Print21* report, despite access to more efficient technology, improvements in quality, and growing demand for products, the industry remains at the crossroads, with margins, profits and investment all falling steadily in recent years (Western Australian Information, Electrotechnology and Utilities Industry Training Council 2002; Department for Industry, Science and Resources 2001).

Working on the image of the industry and training

One of the problems identified by domestic printing industries in a number of countries is the relative invisibility of the industry, despite its contribution to their economies. For example, although a bigger employer than the automotive industry in the United States, the printing industry in that country has a low profile. It is the largest employer in terms of economic output and yet, because it is comprised mainly of diverse, dispersed small businesses, there is a lack of recognition of its contribution to the economy of the United States. In order to raise the profile of print media and to compete with alternative electronic media, the United States Printing Industry Association developed a marketing campaign repositioning print under the slogan: 'Print: The original information technology'. This campaign, however, met with a mixed response from the industry (see McIlroy 2002).

The Australian printing industry is estimated as the fourth largest major industry in Australia (APIS Business Services 2004; Printing Industries Association of Australia 2005a). Like its counterpart in the United States, it has been grappling with a similar level of invisibility, especially to potential new employees, and it has considered a variety of promotional strategies for some years. The reality of the industry is that the majority of operators are small businesses that are fighting hard to survive, where many smaller through to larger printing firms operate around the clock, and many on weekends.

A case study by Ryan and Watson (2003) of National Capital Printing highlights a typical situation. Printers work 12-hour shifts, while management is on call to assist in problem-solving through any 24-hour period. The seasonal nature of the business means lay-offs of staff in January, with re-employment in February. To remain competitive, businesses must invest in the latest technology, but to recoup their capital outlays, the companies need to work 24 hours per day. Customer demand is increasingly for shorter print runs and shorter turnarounds (see also Deloitte 2005). Customers assume high quality and they expect to be able to bargain on cost, flexibility, delivery time and a range of value-adding options.

Printing industries in many overseas countries have adopted a strong focus on promotion and marketing to schools, including visits and videos on career opportunities (APIS Business Services 2004). A number of reports call for a greater focus on promotion and marketing of career opportunities in the Australian printing industry (Callan & Johnston 2002; APIS Business Services 2004). While many industry figures and providers in the industry acknowledge the need for improved marketing of the industry to potential students, across the board there is confusion about the nature of future jobs and opportunities, as the industry continues to respond to rapid technological and cultural change. As Saunders (2001) concluded in a review of existing research into the nature of apprenticeships and traineeships in Australia, a large number of reports call for the need to reposition the trades in the training marketplace. In addition, in some industries like printing, there is the dual challenge of repositioning not only the trade, but also altering perceptions of the industry.

Workplace strategies for responding to the skills shortage

Enterprise-based solutions: Upskilling, displaced workers and pay

Levels of supply in the printing industry are related to the success achieved in creating a pool of potential apprentices by attracting applicants at the point of the school-to-work transition, if not before. Another factor relates to the need to have the right people available from trades levels through to more managerial positions with the broad range of skills required to operate competitively in this rapidly changing industry, where the technological advances continue to challenge the industry about what skills it actually requires of its staff. In terms of demand, key issues include: the rates of pay for recently qualified apprentices and for more senior printing machinists; working conditions in what is still seen as a dirty industry; and the terms of employment offered.

There are both short- and longer-term responses that industry can apply to rectify skills shortages. In the short term, Shah and Burke (2003) identify actions that any firm can take. These typically focus upon the reallocation of resources within the enterprise to compensate for time lags involved in recruiting new staff from the external labour market. These include:

- ✧ increasing the hours of work per employee by increasing overtime or by offering to convert part-time contracts to full-time
- ✧ changing the incentive system to increase worker effort and efficiency
- ✧ retraining existing staff to meet new skills demands
- ✧ deciding that it is less expensive to use fewer or differently qualified workers in the areas of skill shortage.

In her analysis of the demand-and-supply relationship, Richardson (2007) advocates that industries like the printing industry need to become smarter in how they adjust to shortages. From the variety of available workplace-based strategies, she advocates: increasing recruitment; recruiting more widely; altering production methods to remove unattractive work; offering greater support for the education and training of new and existing workers; and improving pay and working conditions.

A number of states are currently reviewing ways of upskilling non-trade qualified employees through recognition of prior learning. Some state governments (for example, Queensland Department of Employment and Training 2005) are proposing new measures that target disadvantaged job seekers, including long-term unemployed persons with no recognised skills, aged 18 years or more. Strategies for these groups, which include Indigenous people, refugees, and carers returning to the workforce, cover skills programs with associated work placement support and mentoring to help participants secure ongoing employment. All of these developments can assist the printing industry.

In addition, it would seem that there are opportunities for the printing industry, providers and the unions to work together to assist workers who are being downsized from other manufacturing industries. A specific example is the assistance being given in South Australia to retrain skilled workers in motor vehicle manufacturing into, in particular, the binding and folding skill areas of the printing industry.

Finally, there is considerable debate nationally about the levels of apprentice pay in Australia. As concluded in at least one government report (Queensland Department of Employment and Training 2005), 'wage rates for apprentices are too low'. In the printing industry, the four-year system with its lower training wages has suited employers and it does allow compensation for the low productivity of first year apprentices. However, opponents argue that today many apprentices have Year 12 qualifications and have employment experience gained while at school. Employers must be more aware of the need to pay higher wages to keep good apprentices in their business and in the industry.

Training strategies for responding to the skills shortage

Rethinking existing training models

As the *Print21* report highlighted, the continued technological revolution in the industry is causing uncertainty over which technologies will be embraced by graphic communicators and customers, and therefore what training will be required. Rapid technological advances within the industry make it difficult for training institutions to be adequately and appropriately resourced. The challenge is to determine what training is required, given the rapid rate of technological change, and designing training paths that will be relevant in three or four years time, when students enter an industry radically different from that at present. In line with these scenarios, some predict that no single apprenticeship qualification will provide the job security it once did.

In a preliminary review of developments in vocational education and training (VET) for the printing industry in the United Kingdom and elsewhere, APIS Business Services (2004) noted a number of recent initiatives in response to skills development for the industry. These include key industry bodies assuming more responsibility for the training agenda, in some cases, including adopting the role of a registered training organisation. Training is organised around a philosophy of minimising disruption to the workplace by delivering most of the training at the workplace.

A major focus is upon upskilling trade and management staff, while the enterprise has more choice and control of the content and delivery of training. A range of flexible options include CD ROM, simulation software to model pre-press and press operation, management courses, and short-duration trade courses. In addition, considerable attention is given to promotion and marketing of the education and training programs (for example, videos on career opportunities in print distributed to schools).

As revealed in student surveys (Callan & Johnston 2002), there are generally high levels of satisfaction among learners about most aspects of training in the Australia printing industry. In particular, the overwhelming majority of students, apprentices, trainees, and graduates agree that the training staff at the colleges they attended were good trainers. About 80% of apprentices and graduates who were surveyed believed that they were learning skills relevant to their employment.

However, apprentices and graduates were less satisfied about the levels of support received from workplace supervisors and with information about what they were expected to do. They were more satisfied with the level of support from their training provider. The majority were satisfied with information given about career opportunities in the industry. The preferred style was learning away from the demands of the small business workplace using a block release arrangement. However, there was also good support for learning on the job and the use of self-paced learning materials.

Callan and Johnston (2002) found that employers were concerned about the relevance of some parts of the current training package (Printing and Graphic Arts Training Package), particularly some of the areas still covered that did not reflect major changes in the technology now being used in companies. At the same time, a related issue is that the rationale behind various aspects of the training package has not been well promoted to employers or well understood by them (APIS Business Services 2004). The training package does appear to meet industry needs for a broad pool of units covering the broad skills required to operate in the traditional and increasingly non-traditional areas of the industry. The challenge is the ability of training organisations to tailor the packages to meet more successfully the training needs of the variety of employees who are entering the industry (APIS Business Services 2004).

Other concerns raised by the Callan and Johnston (2002) report relate to the length and number of blocks being delivered; the need to introduce more flexible learning modules to cover a number of areas, especially theory (for example, occupational health and safety issues) prior to the first block release; and the impact of block release on small businesses. Again it needs to be emphasised that the printing industry is dominated by small printers who are operating in a highly competitive environment that cannot afford too much disruption or downtime.

Looking to the future, Callan and Johnston (2002) conclude that employers want:

- more focused training through day release option for all firms, especially for smaller businesses
- more use of flexible delivery before and between blocks to cover the fundamentals
- more opportunity for workplace assessment to reduce the demands of block release
- more effective customisation of the training around the immediate and longer-term needs of the employers
- more opportunities for employers to communicate with training providers about their needs and the performance of the apprentice/trainee on-the-job.

A number of industries are exploring and implementing fast-track apprenticeships, and such programs are mooted as the norm in the near future (Bowman, Stanwick & Blyth 2005). A recent example is the fast-track apprenticeship program in the metals, manufacturing and services industry, introduced in Western Australia. Applicants have proven industrial experience in a chosen area. A four-year apprenticeship agreement is entered into with the employer, and all parties (employer, training organisation, apprentice) agree to a 'reduction of term' once off-the-job competencies are achieved. The fast-tracking is facilitated by completion of a training plan, credit transfers or recognition of current competencies.

Workplace assessment

Ryan and Watson (2003) consider that the speed of technological change in the printing industry means that education and training institutions are not able to replicate work-based production processes. The practical aspects of entry-level training need to be delivered on the job. Many states and territories are introducing various forms of workplace assessment. In New South Wales, this involves teachers completing a circuit of towns and employers within the state.

Workplace assessment can be arranged around clusters of units of competency to facilitate its management. One concern about workplace assessment, however, is the financial cost in having teachers complete the assessment. When travel costs, time away, replacement for senior staff being away and hourly rates are considered, other alternatives are required to meet employers' needs for this additional element of flexibility in the training of their staff.

However, recent research from the National Centre for Vocational Education Research (NCVER) into training and workplace assessment highlights the challenges involved in assessing and using workplace assessment. Both Smith (2004) in his examination of the recognition of prior learning,

and Hyde, Clayton and Booth (2004) in their analysis of assessment practices emphasise the need to have experienced professional workplace assessors who are able to make informed judgements. They also note the challenges inherent in identifying such people.

In summary, the Australian printing industry is experiencing labour and skills shortages across a number of skilled and unskilled areas. Most Australian states in the last few years have conducted major reviews of the standing of their skills bases and the skills required across industries to make the individual states and their workforces smarter, more innovative and competitive, nationally and internationally. Many of the strategies being mentioned for potential implementation in those states will benefit industries like the printing industry. The printing industry, because of its current need to respond to skills shortages ahead of many other industries, is possibly very well positioned to benefit from future reforms to training and training organisations.

Conclusion

This section has highlighted the vital role of continued reform in training-based solutions, which will require better and stronger partnerships with training providers to offer more upskilling of existing employees, more access to workplace assessment, and further developments in the nature, length and pay associated with apprenticeships. The next section reports upon the opinions of a wide range of members of the industry and training providers on the potential strategies for assuring the skills base required for the future prosperity of the Australian printing industry.

Findings from the interviews

The purpose of the interviews was to address in more detail the four research questions noted earlier:

- What is the set of factors behind the skills shortage in the printing industry in Australia?
- Where are those skills shortages most apparent?
- Are current skills shortages impacting similarly upon smaller and larger printing businesses and their performance?
- What are the vocational education and training interventions and related industry strategies that are being applied, or can be applied more often, to manage and resolve the skills shortages in this industry?

Using the opinions gained in the interviews, the next part of this report examines the factors perceived to be shaping the skills shortages, where the shortages are at their greatest, and variations by industry size (the first three research questions).

This section of the report also offers opinions on the most effective initiatives for responding to such shortages, a topic that addresses the final research question. As noted earlier, this focus on the Australian printing industry serves as a case study of one industry's current and potential responses to the skills shortages; many of these strategies may be highly applicable to other Australian industries experiencing similar shortages.

Following the structure of the previous chapter, the findings from the interviews focus upon three broad sets of strategies for responding to the skills shortages:

- strategic responses
- workplace-based solutions
- training-based solutions.

Factors behind the skill shortages

Many factors were considered responsible for the current skills shortages in the printing industry. In brief, according to those interviewed, they include:

- *A lack of vision in the industry about its future*: many people do not recognise that 'Our future is no longer about ink on paper'. Associated with this is a lack of industry-wide attention to the skills sets required in the future for both operational and more managerial roles. Many see a failure by the industry to reconceptualise itself as part of the broader communications and information technology industry. One large employer described the challenge as 'needing to put the wow factor back into the industry'. Critics also argue that the printing industry lacks the impact imparted by having a peak body.
- *Across-state coordination*: there is little coordination across the states in presenting a national agenda and in lobbying in the areas of education and training reform, industrial relations reform and industry promotion. More radical solutions voiced included a review of the value of a state-based approach to training. Linked to this review were the development of centers of excellence

models for some trades training and the closing-down of training in some states, with the training becoming entirely in-house or interstate, with possibly only one national provider for some trades.

- *A lack of investment in training in the 1990s*: this is now being exacerbated by the ageing of printing employees, especially print machinists and estimators. But as a one managing director noted, 'this is when the smart companies invested heavily just not in technology but also in training, and we took on a number of apprentices that have stayed with us in these good times'.
- *Low barriers to entry*: this has resulted in too many small players entering the printing industry, resulting in the spreading of a relatively small pool of skilled and experienced workers across many more companies. Although mergers and acquisitions are taking place in the industry in response to technological change and over-capacity, as one manager commented: 'every time you merge two, another starts'. Many employers talked about 'commodity printing', and the marketplace being full of similarly sized printers (small-to-medium) producing similar and highly traditional printing products with little value-adding and very small margins in an overcrowded market.
- *The continued unattractiveness of the printing industry to young people*: the industry is perceived to be a 'dirty, noisy and smelly industry'. As reported by an industry representative, 'despite our best efforts, we really have little profile and awareness out there, especially among school counsellors and parents. They think printers are men with green eye shades sitting in dark rooms'. Others reported: 'They do not see us as a sexy industry. Others see us as an unskilled industry that also is not friendly to the environment. Possibly as a result, we often only attract the dregs of the labour pool and the most poorly qualified and motivated to take up apprenticeships.' At the same time, perceptions vary across the trades. Pre-press with its focus on computing and graphics is perceived more positively by school students and school leavers than printing machining ('ink-stained hands') and bindery ('boring with a lot of manual labour').
- *Attitudes among parents, teachers and school counsellors*: a university education offered a wider range of career options ('the apathy from guidance officers is appalling'). As another employer commented: 'Those out of school all want jobs sitting in front of a computer in an air-conditioned office. If you ask those who join us what they want out of the printing business, it is to own their own business as soon as possible, to be consultants or freelance, or to move as quickly as they can into the more white collar jobs of marketing, sales or as estimators.'
- *The movement of skilled printing machinists*: this also includes other staff to higher-paying industries, including in regional areas, and movements to the mining industry in Queensland and Western Australia for higher wages for unskilled work.

There was little evidence that the industry presents an anti-training attitude. In fact, employers, union representatives and industry associations presented a pro-training agenda in the interviews. Overall, despite an industry that does experience 'staff poaching at all levels', 'little trust', and 'we do not share our secrets', the attitude was that the support for training at all levels was important for the current and future wellbeing of the industry.

Anecdotal evidence from the interviews is that the larger employers are leading the way in their support for training. Empirical evidence from reports like *Print21* reveals that this is often the case. Larger printing companies attract more apprentices due to their reputation (and presumably that they will get a good reputation having worked for a highly regarded employer), higher wages, better working conditions, more opportunities for pathways into higher-level positions, and more well-developed training systems and learning cultures.

Areas of skills shortage

There was considerable consensus among those interviewed over shortages in the printing machinist and bindery and finishing areas, and in some cases, pre-press. It was believed that there were also problems in accessing unskilled staff to work as table hands, trades assistants, printing

and bindery assistants and in various manual labour jobs (for example, packing and dispatching). In time, another shortage will emerge due to the ageing and retirement of skilled estimators.

Printing companies are expecting that skilled and unskilled labour will become more difficult to obtain; such labour shortages across the industry will put upward pressures on wages. At the core of the future viability of the printing industry will be the need to overcome the shortage of people who have broader knowledge and skills. As mentioned in earlier commissioned reports, employers and training organisations alike considered that the skill levels of employees need to better reflect a future where success will result from not only operating a printing process, but also being skilled in running a business. That is, more staff in printing businesses need skills in financial management, sales, marketing, and information and technology management.

Those interviewed believed that the demand for new apprentices will continue to decline due to the enhancements in new equipment and technology being taken up by the industry. The high degree of technological sophistication of such new equipment does not require the traditional type of apprenticeship; rather, successful use of new equipment requires apprentices with different skills sets. At the same time, existing staff require considerable upskilling in areas of digital equipment operation, customer service, relationship management, cost and quality control, and awareness of environmental management. They will need a better understanding of the emerging ancillary services, including digital printing, mailing services, telemarketing, e-books, multimedia services, full logistics services, webpage production and systems management and integration.

Printing companies need more educated and trained employees who understand printing technologies and processes. They need to have a deep appreciation of the new technologies that are driving the future of the industry, as well as being better skilled in sales and marketing, particularly selling of printing and communication solutions to customers. Such staff will need to be more customer-focused, innovative, and be able to work as members of diverse teams which are applying new technology to create and to sustain competitive advantage.

Differences by size of employer

It was generally believed that the shortages were being experienced more by medium and larger businesses. As one employer remarked: 'In the larger firms you have the higher levels of technology and you need skilled staff to run those machines'. Smaller businesses could rely more on family help. It was felt that the shortages were more serious in the metropolitan areas where the vast majority of printing companies were based.

Many employers believed that the shake-out that was currently occurring in the industry will continue. As one explained the situation:

> I do not see the skills shortage diminishing for some time. But a shake out is underway and the middle ground of companies with 40 to 70 employees is disappearing. We are seeing merger and take-overs and we will get many larger businesses that will eat up a lot of the skilled labour, and they will decide to train their own. The small family businesses will continue with the help of the owner working very long hours and using family labour.

The next section examines in more detail the vocational education and training interventions, and related industry strategies that are being applied or that can be applied more often to manage and resolve the skill shortages in this industry.

Strategic responses to the skills shortage

Continued investment in new technology and diversification

In terms of technology, those interviewed reported that many companies are responding to the skills shortage by purchasing more advanced technology, which allows higher levels of automation and means less reliance upon having skilled staff. Considerable capital expenditure investment in new plant and equipment is ongoing. The vast majority of employers, providers and industry representatives emphasised how continued developments in technology will continue to drive the purchase of more expensive equipment to remain competitive.

Interviewees emphasised that improved technology allowed firms to respond to customer demand for cheaper jobs and faster turnaround times. For example, digital printing is providing smaller print runs and quicker turnaround, with printing perceived as just another cheap and disposable commodity. More customers want multicolour printing. The relationship with the customer is also changing with the development of co-creation, whereby the customer now presents their print job in electronic format, so circumventing or speeding up the pre-press process.

Many employers reported that they managed to accommodate shortages by either implementing improvements in technology, by people management or a combination of both. Among those interviewed, however, there was a widely held view that capital investment in new technology has replaced investment in people, skills and training over the last five years. Unable to access trained staff, printing companies are increasingly using more automated equipment to replace both skilled and less skilled staff. Digitisation has transformed the pre-press stage. Respondents believe that the pre-press stage is fast disappearing due to customers having access to computers with networked systems, advanced software, and scanning equipment. Driving these trends are the skilled in-house staff of advertising, retail, real estate and other firms, which are traditionally among the larger users of print.

Diversification is another way in which printers are responding, and will continue to respond, to the profound changes required in the industry. Those interviewed talked about new opportunities, which include offering mailing, creative services, web/internet and database management, as well as providing digital printing, CD replication and facilities management. Smart printers are strengthening their productivity and marketing efforts, adding new communications services and embracing the internet to make the transition from printer to communications solutions provider.

A number of those interviewed who were supporters of the new Printing and Graphic Arts Training Package (ICP05) believed that the package adequately reflects the new and emerging technologies. It addresses current and future needs for formal qualifications in areas such as digital production, graphic design, process improvement, corrugating, sack and bag, mail house, and management and sales. Highlighting the diversity of the industry, they note that this new training package now contains 34 qualifications and 360 competency-based standards, with qualifications including entry-level and school-based programs (certificate II), new apprenticeship and traineeship pathways (certificates III and IV), and qualifications related to general management and specialist job roles (diploma).

However, the new training package has its critics in the industry, although they were a minority among those interviewed. In particular, they believe that aspects of the package fail to reflect fully the impact of digital technology on the skills required in future roles in the industry. They see the package as already dated and building skill sets that will not prepare the industry for its more diversified future where it actively seeks its role in the knowledge economy.

Working on the low profile and poor image of the industry

As noted earlier, the Australian printing industry is estimated as the fourth largest major industry in Australia. The majority of operators are small businesses that need to work 24 hours per day to realise the return on their investment. Customer demand is increasingly for shorter print runs and shorted turnarounds.

A number of important observations emerged from the interviews.

- The industry is perceived by potential and existing apprentices to be dirty, noisy and smelly. In addition, as one employer put it: 'We are in fact seen as not concerned about the environment or concerned about the sustainability of our planet. Yet we use a lot of plant based inks and recycled paper, and sustainability is a big part of our focus as our clients expect it of us.'
- There is an oversupply of high school leavers into the graphic arts and an under-supply into the printing and finishing trades. Young people, especially young females, prefer to sit in an air-conditioned room developing computer graphics and images, than working on a hot, noisy factory floor. Pre-press is perceived to be 'high tech and sexy'. Print and print finishing is judged to be noisy, involving 12-hour shifts, requiring some manual labour, typically completed in non-air-conditioned factories and with more pressure in terms of deadlines. Some jobs like binding are seen as 'boring, repetitive and too manual'.
- There are very low levels of awareness among current school students and school leavers about jobs and careers in the printing industry. As an employer put it: 'we are seen by young people as a nowhere or yesterday industry'. One training institute reported that: 'we had invested in a State-wide marketing campaign using newspapers and other media, only to get about 30 applications for apprenticeships'.
- There are considerable opportunities, on the other hand, to raise awareness levels among school students (see discussions on 'adopt a school'), and also among graphic arts trainees and graduates who can be attracted into the industry and retrained to meet print rather than multimedia requirements. The challenge, as one teacher described, is to 'show to the public that there is a new breed of printing businesses out there, who are all about whole communications solutions, that are exciting and innovative'.

A number of those interviewed from industry felt that many teachers in the printing industry do not have a good understanding of how to expand their courses to more appropriately reflect the training requirements emerging in the industry. In particular, some employers believed that there was little coordinated effort within training organisations and across providers nationally to understand the new training markets emerging due to changes in their industry. These markets necessitated more training in the new ancillary services of digital printing, mailing services, telemarketing, multimedia, logistics support, and systems management.

Related issues include how and what high schools can be targeted to develop special relationships that will lead to students learning about the industry through industry visits, visits to training providers and meetings with employers. At the same time, some teachers were seen to have little industry currency, and 'to be operating at a very technical level and who need a new set of skills around a more whole-of-picture approach that brings business and people skills into the training a lot more than now'.

At the same time, teachers themselves argued that they were now involved in a more focused campaign to alter public perceptions of the printing industry, although their efforts were often piecemeal and local, rather than industry-wide. A very good example of this positive spin, in terms of promoting the image of a modern printing industry is the website of the Printing Industries Association of Australia, supported by Griffith University:

> Today' s printing and graphic communications industry is a modern one with emphasis on computerised operation at all stages of production. Most businesses operate in clean, air-conditioned buildings, and skilled staff are among the highest paid in the country. The qualifications you earn in the printing and graphic communications industry are recognised

> worldwide so the choice is yours – trained industry professionals are in demand all over the world. Career growth in the printing and graphic communications industry can take many forms. You can decide to continue in the production side either as an employee or as the owner of your own business. Alternatively you can use your industry training to move into senior management, sales or production management.

Building improved relationships with schools and school counsellors

The 'adopt a school' concept is now well developed in many regions in Australia. In particular, individual employers and training providers are establishing enterprise education partnerships between local industry, schools and training providers. This strategy has various desirable outcomes when it is well implemented. They include raising the awareness and improving the attitudes of students about an industry and the careers in the industry; providing students with exposure to the workplace, which might include school-based and workplace-based learning; and building ongoing relationships between business and schools.

The printing industry has either mixed or little success in the use of this strategy as a response to the current skills shortage. It is frequently reported that one or a small group of schools is initially interested in this strategy, but either the school withdraws, or the program commences, and students' involvement in the program falls away. Training providers attributed the failure of the adopt-a-school strategy to school principals, student counsellors and parents. They report that many school principals are not interested in any relationship with a TAFE college. For those who are keen, once they get the program in place, the challenges of coordination deter them from the alliance.

It was also felt by employers in particular that the industry had attracted less motivated students, and that the schools are contributing little to keep the students motivated about undertaking these outside forms of training. Teachers noted that students are often enthusiastic to begin with, but that it is difficult to keep them convinced of the benefits of the time they are spending either at college or in the workplace. Many school counsellors were seen to be anti-trades, as were parents who wanted their children to gain university-level qualifications.

Employers and providers alike emphasised the need for the industry to develop greater awareness among current Year 10, 11 and 12 students of the career opportunities in the industry. Employers in particular saw the Year 10 student who was more interested in technical activities and entering an occupation than going to university as a key target group for the printing industry.

The 'adopt a school' strategy is one part of this effort to build stronger relationships. In addition, other strategies included:

- visits to schools from high-performing apprentices, such as taking advantage of using the Apprentice of the Year who was an apprentice from the printing industry to visit schools
- invitations to school counsellors either individually or by region to visit modern printing plants in the metropolitan area, with associated industry briefings about job and career prospects in the printing industry. A number of states have tried or continue to use this strategy, with mixed success
- the industry adopting more innovative approaches at Career Expos, moving away from traditional displays, videos and brochures, to more interactive high-tech displays that involve students preparing simple graphic designs, business cards or other tangible and memorable outcomes from their visit to the industry booth. There was support for the continued use of CD ROMS, but with some rethinking of their content to more fully capture the traditional, as well as the new or value-adding aspects emerging in the industry.

Stronger promotion of the benefits of apprenticeships

There is a widely held view in the printing industry that parents, educators and governments have gone too far in promoting university qualifications ahead of traineeships and apprenticeships. According to many employers and providers interviewed, students were being pushed into pursuing a university education when their personal interests and temperaments were really more suited to a hands-on role in a manufacturing industry.

School-based apprenticeships and traineeships offered one way to attract and encourage students who wanted to gain practical skills into the industry. As others note (Smith & Wilson 2002; Stanwick & Saunders 2004), apprenticeships have clear advantages that need to be well promoted to Year 10 and other students.

Our focus group meetings with current apprentices reinforced these views. Apprenticeships and traineeships:

- ✧ appeal to students less likely to aspire to immediate university entrance than other students
- ✧ are seen to provide access to clearly defined and structured training that involves a part-time job, the close attention of a supervisor, working with adults rather than other teenagers, and higher levels of responsibility
- ✧ assist students to make the transition from school to work, reducing some of the uncertainties
- ✧ provide security of employment during the period of training
- ✧ share some of the responsibility for training across the student, school employer and training provider
- ✧ provide access to real career pathways with opportunities for faster training and employment.

Those interviewed supported the concept of an adult apprenticeship system for the printing industry. These apprenticeships are positively viewed by the industry, providing new pathways for industry entrants or those returning to the industry. As the printing industry continues to converge with the communications and information technology industries more generally, the concept of an adult trade system does reflect this convergence, the crossover of skills, and the movement of labour across different types of manufacturing and other industries. The adult apprenticeship model described elsewhere (Printing Industries Association of Australia 2004) reflects a better understanding of the needs of the industry, its future prospects and the need for employees with specialist as well as more generalist skills.

Expanding upon the role of the Australian Apprenticeship Centres

Employers, providers and others identified the Australian Apprenticeships Centres[1] as key partners in promoting the training experience to students. Their current roles include providing information about the industry, advice and assistance in terms of recruitment, and assistance in completing financial arrangements and documentation. A recent report on their performance (Department of Education, Science and Training 2005) proposed that the next Australian Apprenticeships Support Services contract will provide more emphasis upon the support for marketing and promotion of apprenticeships and strengthening relationships with key players in the school-to-work transition. Members of the printing industry who were interviewed would welcome this development.

Overall, those interviewed reported that Australian Apprenticeships Centres are not recognised as currently playing a major role in raising the profile of the industry to potential new recruits. Those involved in Australian Apprenticeship Centres, as well as teachers, emphasise the key concern among school-aged youth about 'what the printing trade can offer'. In particular, both employers and teachers believe that the printing trades need to develop further their promotion of the wide

[1] In 2006 the name of New Apprenticeships changed to Australian Apprenticeships.

range of pathways available upon completion of qualifications in the industry. For example, apprentices interviewed were focused on either working in white collar positions in sales, marketing or estimator roles, in moving into consulting, in running their own business, or in moving into university education in the longer term. They did not see themselves spending too long around running printing machines or being on the factory floor. Compared with how well other industries promote this wide range of pathways, the printing industry needs to promote more strongly a universal message that skills in this industry open as many and possibly more career options, if the portability of the trade overseas is also considered, than other skilled professions.

Creating and promoting skills networks

Skill ecosystems are concentrations of skills and knowledge in regions and in industries. As proposed in the National Skill Ecosystem Project (2005) supported by the former Australian National Training Authority (ANTA), following the principles of learning, action and reflection, VET providers operate in a partnership with various stakeholders (for example, industry councils, representatives, regulators, unions) to identify solutions to business challenges faced by an industry.

The exploration of solutions to the skills shortages in the printing industry fits well within the domain of a skills ecosystem model. A project could examine a range of strategies to respond to the skills shortages, including the engagement of less skilled workers, the long-term unemployed, Indigenous peoples, casual and part-time workers, people with a disability, mothers of school-aged children and related groups.

The interviews revealed that some employers are trialling ways in which to integrate some of these groups more successfully into the printing industry. Target groups include the long-term unemployed, Indigenous youth, and mothers wanting casual work around school hours. A demonstration project or trial could be established by the industry in a partnership with key stakeholders to identify a variety of training and non-training solutions to encourage skills formation and industry development.

What is clear from the interviews is that there is a lack of trust between employers in the industry. Many examples were given of efforts to poach skilled staff, fierce pricing wars and campaigns to steal customers. Few examples exist of strategic alliances or partnering, although this is altogether too bleak a picture, since there are also active partnerships between commercial businesses and joint ventures, while competitors are working very cooperatively on advisory boards set up by providers and on skills councils, and cooperating as members of the Printing Industries Association of Australia.

In Queensland, opportunities for collaboration in the printing industry in Brisbane have been explored recently in the Brisbane North Printing Industry Cluster Survey (Deborah Wilson Consulting Services 2005). This report outlined future opportunities for:

- ✧ collaboration on staff training and technology trends
- ✧ equipment utilisation, including shared access to equipment
- ✧ collaborative marketing, including the collaborative identification of target markets and clients
- ✧ collaboration in strategies to achieve cost reductions, including waste disposal.

Workplace strategies for responding to the skills shortage

Upskilling, displaced workers and pay

Employers who were interviewed were responding to the skills shortages by:

- ✧ using overtime
- ✧ accessing staff through labour hire firms

- ✧ choosing not to increase the size of the business due to staff shortages
- ✧ allocating non-trade qualified employees (that is 'minders') to machines, with trade-qualified staff supervising their work across these machines
- ✧ adjusting shifts (for example, using overlapping or split shifts) to maximise the likelihood that skilled staff were always on the floor with less skilled staff
- ✧ focusing upon building their pools of unskilled staff and providing intensive in-house training to the more motivated of these employees to 'make them more immediately useful'
- ✧ recommending that selected unskilled staff take on an apprenticeship in one of the printing trades. The majority of current apprentices interviewed had come into the industry as casual or unskilled labour, working as off-siders or table hands until they asked or were asked about taking up an apprenticeship.

Upskilling is the predominant response being used by employers to deal with the skills shortage. Many of the companies interviewed are responding to the skills shortages through an active program of recruiting from within. These individuals are employed in various roles that include job titles such as table hands, trades assistant and labourer.

The vast majority of companies are selecting individuals from this pool of employees—those they consider have the appropriate levels of interest, motivation and attitude—and engage them in an apprenticeship or traineeship. In some cases, these workers complete an intensive up-front skills program, usually with an outside provider. On some occasions an internal consultant delivers the training in house.

TAFE colleges as well as industry skills councils are also recruiting the long-term unemployed into the industry. These individuals join the pool of unskilled labour, and as described above, those judged to be more motivated and receptive to training are encouraged to complete a prevocational program at TAFE.

A group of employees who are being attracted into printing trades are older employees who now want the security of a trade qualification. Research has shown that people who commence their apprenticeship or traineeship at older ages are more likely to complete their training contract (Ball 2004), a factor making this group of people more desirable employees.

There are number of options for managing the skills shortage through access to overseas labour. A small number of printing firms have employed printing machinists and other skilled staff from the United Kingdom and Europe. Some of these staff were surprised at the dated technology being used in Australia. In some instances these overseas staff moved quite quickly to other printing companies offering them higher-paying managerial roles, or they moved to higher-paying roles in other industries. Recruitment from overseas includes a range of other potential options, such as the introduction of full-fee-paying apprenticeships for international students, with the provision of permanent citizenship upon completion of training. There is also the option of delivering training off shore, with the guarantee of work in the Australian printing industry upon completion of their qualifications.

Another group with the potential to respond to the skills shortages are recent graduates in graphic arts from both TAFE colleges and universities. Overall, there appears to be a substantial oversupply of these graduates. However, there is a widely held view among employers that many people completing certificate II qualifications in graphic design and who are entering the industry are not able to meet the specific needs for the print industry. Consequently, they require considerable re-training in how to prepare graphic arts products that will be accepted by the printing machines and how to develop these products in the much tighter timeframes that are required to meet printing production deadlines.

As one employer put it: 'It is really criminal. They are training all of these graphic arts students but very few will ever get a job, and here we are in a related industry crying out for people to join us

and to do apprenticeships that offer really good careers. I tried to recruit an apprentice printer and talked to 40 such students—none called me, and all were doing the certificate III in graphic arts'.

Turning to initiatives linked to remuneration, there is wide criticism across many trades that some employers are unwilling to sign off on competencies achieved by apprentices because they want to keep apprentices on lower rates of pay and to maximise the financial benefits of the training wage. As one employer explained the situation he faces:

> A machine I operate is costed out at $120/hour. A new apprentice does not allow me to run that machine profitably as they do not have the speed or skill, and I find that a new apprentice is non-productive for the first year. By the second and third year they are breaking even and by year four they are earning money for the company.

In response to criticisms about seeking to maintain apprentices as cheap labour, many employers in the printing industry report that they are currently paying all staff above-award wages to keep them in the industry and to stop other companies from poaching their staff. As one employer explained:

> Poaching is seen to be a major issue, and the threat of poaching makes us nervous about cooperating too much with other printing companies to share the responsibility of training staff and building their expertise across different machines that various competitor companies might be using. Once another company sees how good your staff are, they make an offer to take them away from you.

The issue of apprentice pay was raised in many of the interviews. Understandably, apprentices who were interviewed believed that wage rates are too low. There is considerable evidence that labourers and trade assistants in non-printing industries earn more than printing apprentices. Significantly, many employers now also believe the rates are too low, and as one employer suggested: 'the printing industry needs to pay its apprentices serious money'.

A few employers said that they are signing off ahead of the four years for their apprentices, while others are bringing in private consultants to complete one-on-one in-house training, in addition to training at a registered training organisation, to accelerate completion of the traineeship or apprenticeship.

The print machining accelerated apprenticeship to be trialled in Queensland involves the implementation of a new wage progression arrangement across the completion of the 24 required competencies. For these accelerated apprentices are:

- ✧ entry level: 55% of tradesperson's wage
- ✧ second point: 62% of the wage on achievement of 6 competencies
- ✧ third point: 75% of tradesperson's wage on achievement of 12 competencies
- ✧ fourth point: 90% of tradesperson's rate on achievement of 18 competencies
- ✧ tradesperson's pay rate: on the completion of all 24 competencies.

Training strategies for responding to the skills shortage

Rethinking training models

In the interviews, while they were satisfied with the levels and quality of training being provided, employers believed that the continued low numbers of apprentices required a rethinking of traditional training methods. In the interviews, employers cited the need for:

- ✧ more training into the workplace
- ✧ shorter block release parcels, especially in the third and fourth years of an apprenticeship for those from smaller businesses, which experience more disruption through the absence of employees

- more visits to the workplaces by teachers, at least to indicate continued support for the training and learning of individual students
- in the longer term, the implementation of workplace training and assessment, especially in the larger printing organisations more easily able to supply their own workplace assessors, and more opportunities for one-on-one training.

One of the better examples of progress in these areas is RMIT University's International Centre of Graphic Technology. This centre estimates that about 40% of its apprenticeships and traineeships are in the workplace. The Victorian Government has legislated that 25% of the 960 allocated hours for a certificate III needs to be completed in the workplace. The level of workplace training is negotiated on a company-by-company basis in terms of the competencies already achieved; those to be attained; the mix of workplace assessors and trained staff; and the numbers of trainees and apprentices. There is a major focus on getting the right mix, so that the arrangements are financially viable and operationally achievable. In Queensland, while block release still operates as the dominant model, in 2006 a Certificate III in Printing and Graphic Arts (Mail House) will be offered totally on the job by the Queensland School of Printing and Graphic Arts.

It is important to emphasise the impact of the existing and continued use of block release on employers. First, in some qualifications in the printing industry (for example, pre-press), block release seems mostly driven by financial constraints that operate among providers. For example, there are insufficient numbers of apprentices to justify weekly classes (that is, one day per week). Second, the current block release arrangement has a major impact, especially on smaller businesses, and, putting this in context, it is estimated that 85% of print shops in Australia have fewer than 20 people. The absence of an apprentice, especially a more skilled third or fourth year apprentice, for six to eight weeks (plus annual and other leave) has a major impact upon the production of a smaller printing company. Third, regional employers not only confront this loss of labour but also the associated costs of travel and accommodation.

Accelerated apprenticeships in printing

In 2006, Southbank Institute in Queensland, in partnership with the Printing Industries Association of Australia, is offering the Accelerated Apprenticeship in Printing and Machining. Successful candidates will be able to complete their studies in two-and-a-half years. Initially 14 places were offered. The program commenced in early 2006 with an over-subscription of printing companies, although initially there was a shortage of eligible applicants, despite the fast-tracking being offered by the program and the guaranteed employment during training.

However, in the light of evidence on the nature of some of the outcomes for shorter-duration apprenticeships and traineeships, the introduction of shorter training programs needs to be monitored. While it is acknowledged that shorter-duration apprenticeships are not the same as accelerated apprenticeships being mooted at present, Bowman, Stanwick and Blyth (2005) do report some relevant information about those who undertake shorter-duration apprenticeships or traineeships (that is, duration of two years or less). They found that such apprentices or trainees:

- achieve relatively good employment outcomes
- express high levels of satisfaction with the program
- are less likely to complete their training.

Currently, in theory, apprentices in the printing industry are able to complete their qualification in fewer than four years. However, there is evidence that very few do. The traditional apprenticeship is a four-year time-based method of gaining the qualification. Where there is full agreement between the employer and the training organisation that the apprentice is competent in all required cases, according to those interviewed, the apprenticeship can be completed in as little as two-and-a-half years.

Both training providers and employers are seen to be contributing to the ongoing use of the four-year apprenticeship. As one employer put it: 'there is evidence that the teachers have been stretching their modules out for the dollars', while another reported:

> While I can accept that there is value in learning the theory on old equipment at the TAFE, I cannot accept that some of those basic skills need repeating once my apprentices have demonstrated the attainment of the required competency—it just gets plain boring for them and for us. Send them home early out of the block training rather than waste their time.

From the perspective of some training providers, however, employers see apprentices 'as a source of cheap labour, despite the skills shortage', and so will not sign off on their training under the four-year timeframe. Many employers, on the other hand, see the accelerated apprenticeship as inappropriate. As an employer explained:

> The idea that you can take a young person and give them 6–12 months at TAFE and this equates to two years on the job is absolute rubbish. What we need is a better balance of theory at college and problem-solving at work. I prefer 3–6 months at work when they first start the apprenticeship, then college for 4 weeks, and then back to work for blocks of 1 week for the rest of the apprenticeship. For me this gives me someone who can do the job for me, but I do not loose them for too long once they are trained.

A number of reports on apprenticeship non-completions supports some of these claims, while also raising other issues. The following are the major factors at work (based on the current series of interviews and past research (for example, Callan 2000, 2001; Bowman, Stanwick & Blyth 2005):

- ✧ The 'craft and skill demands' required to operate in a printing business require a full four years of on-the-job and provider-based training and experience.
- ✧ There is a lack of employer support and commitment to the trainee or apprentice. The workplace lacks a learning culture in which skilled staff are unwilling to supervise and train, and there is reluctance to allocate time to separate training away from the production process. Associated with these issues is unstructured training, a lack of training plans, and inadequate recognition of prior learning.
- ✧ Some employers see apprentices as 'cheap labour', and therefore they are unwilling to sign off ahead of the four-year term.
- ✧ Training providers are inflexible and too traditional in how they believe training needs to be delivered.

More use of workplace assessors

Printing is a diverse industry. It is made up of small, medium and large printing companies with different training needs, an issue highlighted in various reports on the industry, and in turn, in the recommendations in these reports about what needs to be done to better meet the training needs of operators (see Callan & Johnston 2002; APIS Business Services 2004).

Smaller printers who were interviewed emphasised that they have fewer staff available for training due to production demands and smaller training budgets. Furthermore, they cannot afford the lost time in having staff train off site. They want more innovative, flexible training delivery methods and greater use of workplace assessors. Overall, they are the majority of enterprises in the printing industry and they employ the majority of those who work in it. Medium-sized printers require on-the-job training that assists them to further develop their niche positions to enable them to compete more successfully with smaller and larger printers who are taking their business. Larger companies require innovative approaches to training, again at the printer' s site.

Workplace assessors from the Canberra Institute of Technology included both teachers from the institution and others from a pool of assessors trained by the institution to deliver assessment on behalf of the institute in the workplace. In another example, workplace assessors linked to RMIT University complete assessment to enable firms to provide 'statements of attainment'. These

statements have provided the firms with a qualifications framework that now links pay to skills, and in turn, the firms have now considered more planned approaches to training, such as apprenticeships.

VET in Schools, and school-based apprenticeships

The interviews revealed that the printing industry is experiencing some initial success with the VET in Schools initiative. There is strong support in the printing industry for the continued development of VET in Schools with the aim of attracting more capable individuals into the industry. However, there is evidence that providers and industry need to work more closely in terms of coordinating their efforts to target potential candidates for training in the industry.

With school-based apprenticeships, young people are employed and engaged in a contract of training, while at the same time studying full-time or possibly part-time at high school. Despite evidence of tremendous growth in the popularity of school-based apprenticeships, the printing industry overall is receiving only a trickle of requests for school-based apprenticeships, compared with industries like sales and personal services, tourism and hospitality, business, information technology and automotive.

There is no printing-industry specific research that can be interrogated to explain the reasons for the low take-up of school-based apprenticeships in the printing industry. As reported earlier, the industry has an image problem and it has not been well organised to date in managing its marketing and relationships with schools. More generally, many schools have mixed views about the role of school-based apprenticeships as a part of VET in Schools—even in the context of the more high-profile industries and employers who have established track records of providing jobs and career opportunities for students (Smith & Wilson 2002). It may be that these views are even more mixed with industries with a less high profile like that of printing.

Continue or re-introduce prevocational training

There was strong support for prevocational courses for the supply of a pool of partially trained employees for recruitment into the printing industry. Across the states, printing programs vary from 10 to 12 weeks, targeting 15 to 19-year-old school leavers with or without Year 12 completion. Some target special audiences such as long-term unemployed youth. Completion of the program provides a Certificate II in Printing and Graphic Arts (General), which is an articulated pathway into a traditional apprenticeship in the printing industry.

Training providers who were interviewed particularly believed that prevocational courses reduced the level of risk for the industry by developing greater awareness among potential recruits of the nature of the industry (that is, shift work, tight deadlines, noise, but also the attractive qualities, such as good career prospects, competitive salaries and pathways into 'white collar' employment in sales, marketing and operations). In at least one training college, prevocational programs had ceased, and teachers believed that this decision had impacted negatively upon helping to respond to the skills shortages in the industry in that state.

Employers strongly support the use of an intensive skills program that makes new employees immediately useful on the printing floor. Some companies do this in house through their own training program. However, due to production deadlines and the lack of skilled supervisory staff who could be reallocated to design and manage the training, the preference was to outsource this intensive skills program.

The new training package

Providers are actively preparing for the rollout of the qualifications supported by the new package, with changes being implemented during 2006 for the 2007 deadline. All agree that their major challenge in terms of responding to the industry skill needs and shortages is that the training package must be implemented through industry-relevant, high-quality programs.

Major challenges related to this implementation for the printing industry include:

- *Access to the latest technology*: few providers are willing to claim that they have the latest technology. While RMIT University in Victoria is seen to be better off in being able to access more advanced equipment, in other states the perceptions are that the equipment at the TAFE institutes is at least ten years old (Queensland) or even 15 years old (Western Australia)
- *Concerns about the industry currency of current teaching staff*: there is a need to upskill teaching staff in new technologies if the new package is to be successfully implemented.
- *The ageing of current staff*: there are difficulties attracting new teaching staff due to the higher salaries in the printing industry and the protracted process required in some institutions to move new appointments from the industry from short-term contracts to full-time positions.
- *Disappointment over some features of the new training package:* there is a view that some aspects of the package are 'still locked into a very traditional view of the skills required' in the industry, with some seeing 'little evidence in the new package that we are in communications solutions industry'. Both providers and employers consider that the new package provides little attention to a digital future, believing that the industry requires skilled operators with a broader view of the printing industry. The digital work flow will require staff who can rationalise all aspects of job processing, network individual stages in production, and use digital technology to give customers more access to personalised and decentralised printing. In particular, a teacher expressed his concerns as follows: 'Queensland employers and trainers are more likely to report that there is great concern in our industry about its value. We feel that other states are happier with it than we are, and having taken three years to produce, it is already seen as out-of-date from what we are trying to achieve.'

Access to higher-level qualifications and continuing professional education

In 2005, the International Centre of Graphic Technology at RMIT University launched the Bachelor of Business (Graphic Technology) program. The program (three years full-time, six years part-time) reflects the need by the printing industry to respond both to the traditional and less traditional or value-adding aspects of the industry, and provides participants with studies in business, technology, supply chains and strategic thinking. The program aims to produce graduates who will assume management and leadership roles in digital design, print production and distribution, including sales, marketing and financial management. It is aimed at middle-level or aspiring managers, and as a result, requires five years experience in supervisory or other roles for admission. Recognition of prior learning arrangements also applies for core courses. It is a full-fee-paying program. A diploma in business is also built into the degree.

In addition, the printing industry, at least anecdotally, is demonstrating its increasing willingness to employ staff at middle manager and executive levels and from other manufacturing industries. While it is still the norm that many print operations managers or managing directors have at some time been print machinists or related trade professionals, increasingly the industry is meeting its middle management needs by recruiting staff from other manufacturing industries, logistics, and the occupational health and safety areas.

Among those interviewed, there is a widely held view that there is a need for a workplace culture that is more supportive of continuing education and professional development. The printing industry needs to continue to adopt a more strategic approach to how it manages its valuable and scarce human capital. In short, the industry needs to promote the adoption of:

- strategic human resource planning at the enterprise level
- continuous learning and development programs designed and delivered for the industry, and linked both to a licensing provision as well as a qualification.

In the interviews, the industry was described as the following:

- ‘needing for players to be more business aware and strategic’
- ‘they will pay $5 million for a new machine, but not $5,000 to train someone to operate it’
- ‘this is not a very innovative industry—people are just not very forward looking’
- ‘it is seen as a yesterday industry’
- ‘this is a reactive industry, where few people are thinking ahead, and long-term planning is virtually non-existent’.

Training providers argue that the potential exists to sell small packages of enterprise-targeted training, including single and multiple competencies (for example, paper and printing processes—30-hour unit) as part of a program of continuing education for the industry. They claim that there needs to be more enterprise-level customised training, especially in larger firms, with sufficient staff and facilities (for example, training rooms and equipment) to make in-house training attractive and viable.

There is some support for creating stronger links between continuing education, training and a form of industry certification. This certification is seen by some training organisations, universities and employers who were interviewed as another way of driving cultural change, especially at the middle and senior levels of management in printing companies. The certification system would be aimed at the middle manager and higher levels to raise their professionalism and business skills in areas like finance, marketing and business strategy. Like other professional fields (for example, law and accounting) where the need to maintain accreditation exists, the professional association that represents the industry might establish and manage a defensible system for determining and recognising continuing education requirements. This is not to imply that access to a few courses and programs in strategic thinking, leadership, logistics, and corporate governance will promote an improved strategic focus in the industry.

However, as a number of reports point out (for example, *Print21*), many industry leaders are traditional, inward-looking and often too focused on day-to-day operations to attend to broader, big-picture issues relevant to their enterprises and the future of printing industry more generally. Jenkins (2005) has also proposed a similar initiative and describes how industry skills councils could value-add in managing professional development and continuing education for the industry.

Technology cadetships, technical colleges and the Institute of Trade Skills Excellence

Aimed at school leavers, technology cadetships are currently available at Australian Qualifications Framework Certificate levels III and IV. The initial pathway for these cadetships includes CAD/drafting, manufacturing operations, and technical officers. Few respondents who were interviewed in the printing industry perceived technology cadetships as a major answer to their skills shortages, although the term ‘cadetship’ was perceived as a favourable alternative concept to apprenticeship. The Australian Capital Territory has used the term ‘cadetship’ in repositioning its print trades, as well as for positions in the child care industry.

The planned 26 technical colleges will provide opportunities for recruiting and training young people in numerous areas of skills shortages. It is anticipated that the colleges are to be based in areas of skills shortages, strong industry bases and significant youth populations. Few respondents raised the option that the printing industry might use this vehicle as a response to its skills shortages, although the few who did believed that other industries had already gained priority well ahead of them (for example, metals and engineering trades, automotive industry, building and construction) due to their size, higher profile or more successful lobbying. On the other hand, the new Australian technical colleges appear to be a good solution for building a new pool of school-based apprentices for an industry like printing, which is at a pivotal point in its evolution.

Another development is the introduction of the Institute of Trade Skills Excellence. In the interviews, the printing industry voiced its support for this initiative. It can be argued that the size of the industry in terms of its contribution to the manufacturing sector, as well as its focus upon technology and innovation for its survival and growth, along with its experiences with skill shortages in the trade areas, should cement its place in the development of this recently announced concept. A few of the employers we interviewed listed getting access to the Institute of Trade Skills Excellence as a major priority for the industry association.

Concluding comments

A number of the strategies for addressing skills shortages in the printing industry outlined in this report have been raised in other contexts. For example, the green and subsequently, white paper of the Queensland Department of Employment and Training (2005) outlined proposals for combating industry skills shortages that focus upon:

- modernising apprenticeships
- establishing a new adult trade apprenticeship system
- establishing a specialist trade and technical skills institute
- improving recognition of prior learning
- ensuring a new look for trade careers
- reviewing the role and performance of training organisations.

Many of these options are suggested in this current report, although often using different terminologies and with different emphases.

Community consultation on the strategies (see Queensland Department of Education, Training and the Arts website) proposed by the Queensland Government revealed strong opinions, in particular about the shortening of apprenticeships. This strategy of accelerated apprenticeships has also been suggested in this review of skills shortages in the Australian printing industry. As highlighted, a shortened apprenticeship is being trialled for the printing industry in 2006. The responses to the Queensland Government strategy for modernising apprenticeships indicate general support for streamlined approaches to apprenticeships. The core concerns relate to the links between practice and experience, and that shortening apprenticeships might impact disproportionately on the time spent in the workplace.

Another major issue concerning various stakeholders—mostly in industry—relates to proposals to review and increase apprentice wages, and consequently, the ongoing attractiveness of apprenticeships to employers. At the same time, wages and current industrial arrangements are acknowledged as one of the largest constraints in attracting and retaining high-calibre apprentices. Again, this issue emerged in this current review of the printing industry.

The process of community consultation over the review of the skills and job needs for the state raised various other strategies also mentioned to varying degrees in this examination of the Australian printing industry. These proposals include:

- the role of licensing arrangements
- increased attention to continuing education and trade refresher courses
- greater focus on communicating the career opportunities offered by the trades to parents and teachers and continued efforts to counter the perception that a university education is the only pathway to rewarding jobs and careers
- the use of industry equipment and infrastructure to deliver training, including sending trainees to workplaces
- improved prevocational strategies
- reconsideration of aspects of block release.

What this discussion further highlights is that a complex set of variables needs to be recognised and acknowledged by industry and government in their consideration of appropriate strategies to deal with skills shortages. Skills are embedded in complex social and labour relations. Therefore, there are many agents at work in building pathways to skills development in our communities, including schools, families, TAFE institutes, private training organisations, universities and workplaces.

Skills shortages are not simply due to a failure by an industry to train enough people to fill available jobs. The mismatch of supply and demand is linked to numerous and difficult-to-manage macro-level factors that include:

- well-known cyclical fluctuations in labour demand
- interstate migration
- economic and demographic change that has made certain types of industries and work much less attractive compared with the alternatives on offer
- access to cheap capital that has allowed a spending spree in some industries on the latest technology.

At the enterprise level, the introduction of modern management practices is altering the nature of work, supervision, work flows and skill requirements.

Young skilled people want interesting and challenging work, excellent working conditions, supportive and skilled supervisors to train them, opportunities for advancement into challenging careers, satisfactory remuneration and working hours. Not surprisingly, it is well established that staff turnover in industry is at its highest levels among new employees, and their reasons for leaving are strongly linked to the inability of many businesses today to respond to these more aspirational factors at work in the minds of both younger and even more mature workers.

A major flaw in the industry noted in this report is that organisations will use the purchase of new technology as their major strategy for responding to skills shortages. Clearly, new technologies are being used most strategically by many firms to build sustained competitive advantage in highly competitive markets. New equipment is allowing companies to bed down a capacity that allows them to respond to customers who now accept that high quality is a given. These customers want to become a part of the design and production process as co-creators. This greater involvement of customers emerged in this review of the printing industry. At the same time, a range of issues at the enterprise level needs to be managed successfully to attract and retain the skilled workers who are required to run this new technology.

Turning again to apprenticeships, there is considerable evidence Australia-wide across many industries that the mix is still not right. As revealed in this current report, as well as by apprenticeship non-completion studies, within apprenticeships there may be poor supervision, inadequate opportunities to train and to practise new skills, and poor communication between students, teachers and employers. In addition, many apprentices feel that they are poorly paid and that they are receiving training not relevant to the demands in their current industry. Given the high rates of apprenticeship non-completions, there appears to be a need for stricter adherence by government agencies in ensuring that employers and training providers are playing their prescribed role—one that maximises the likelihood that apprentices complete their training, and therefore feel positive about staying in their chosen industry.

The level of technology available for training apprentices emerged in this review as a major concern for the providers of training. In this case study of the printing industry, the majority of providers were TAFE institutes, and with a few exceptions most reported a lack of support by their institutions for investment in new technology and infrastructure. The use of workplace learning and assessment utilising the equipment of employers is one response being pursued, but this strategy does not assist many smaller printing firms, which often do not have access to modern equipment.

The debate needs to move to the national arena of the current Commonwealth–state funding agreement and the current and future equipment and infrastructure needs of the vocational education and training system. High-technology industries like printing would benefit from reviews of this funding agreement, as well as associated policy reviews on the development and delivery of long-term training strategies to meet the current and future needs of industries, such as the one examined here.

If providers are to respond to industry needs for more customised and improved on-the-job training, then more flexible funding arrangements are required to allow the development of training products and related services that better respond to industry needs. Furthermore, this funding support needs to take account of the additional training that TAFE staff will require to implement more flexible and customised training solutions for a specific industry. Concern over access to the resources to update the skills of teachers emerged in this review of the printing industry. Teachers' abilities to access and use new learning technologies (for example, flexible delivery, workplace assessment, e-learning) will be fundamental to creating more flexible responses to meet the training needs of apprentices and the organisations that employ them.

Skills shortages negatively impact upon the ability of countries to achieve their social and economic objectives. We know that higher-performing countries have workforces with higher skill levels that allow their organisations to be more productive, innovative and competitive in an increasingly global marketplace. Skills are also a form of insurance for individuals, in that people with higher levels of skills (technical and more generic) are more likely to access jobs, and in turn, to bring economic, social and psychological benefits to themselves, their families and their communities.

This case study of one experience of the skills shortage—the Australian printing industry—reveals that the causes of skills shortages are complex. At the same time, it is fully accepted that the demand for skills and the reasons for shortages vary markedly across industries. Selecting the optimal strategies to respond to skills shortages will vary across industries and across individual enterprises in those industries. It is also important to achieve the right balance between the contributions of government, employers and individuals in meeting the costs of skills development.

Again, what is the right mix may vary across industries. At the same time, this report on the Australian printing industry identifies a range of strategies for responding to a skills shortage; these include industry-wide or big-picture responses, responses at the enterprise level and training solutions that rely on improved partnerships between employers and providers. To varying degrees, it is assumed that many of these strategies are applicable to a broad range of industry types.

As a next step, the potential applicability of many of these strategies can be explored by extending this analysis of case studies to an examination of the responses of other Australian industries to their skills shortages.

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Appendix: Method

List of respondents interviewed

Overall, 31 interviews were completed, with each interview being completed on average in 45 minutes. Those interviewed included teachers, directors of training organisations, employers, union representatives, members of the Skills Councils, and members of the Printing Industries Association of Australia (PIAA).

In more detail, interview participants were: Alison Quirke, Sunshine Coast Newspapers; Allan Wetherell, NSW TAFE; Bill Roberts, Western Australian Information Electrotechnology and Utilities Industry Training Council; Bryan Dyball, New Apprenticeships; Clem Johnson, Reid International; Collette Watson, Kwik Kopy; Dan Kelly, Watson Ferguson; Daniel Dougherty, Australian Manufacturers Workers Union (AMWU); Darren Sillis, Townsville Bulletin; David Pritchard, Canberra Institute of Technology; David Renouf, Queensland School of Printing and Graphic Arts; Garry Bender, Independent Print Media Group and Intech Australia; Gavin Kiely, Talbot Press; Greg Grace, Heidelberg Australia & New Zealand; Hans Bont, Graphic Binding; James Bennett, CPX Printing & Logistics; Jennie Trinder, PMP; Karen Simpson, Tennyson Group; Kerrie Tindell, Goprint Queensland; Mark Jackson, Spot the Printer; Neal McLary, Regional Manager Queensland, Printing Industries Association of Australia; Neville Butler, Platypus Graphics; Paul Jenkins, Creative Industries Skills Council; Peter Lane, Lane Print Group and President, Printing Industries Association of Australia; Peter Tozer, MacDonalds Printery; Rob Hohnke, IPG; Robert Black, RMIT; Susan Heaney, Heaneys Performers in Print; Tony Duncan, Victoria, Printing Industries Association of Australia; Tony Scanlan, Scanlon Printing; and Wayne Ackers, and Penfold Buscombe.

Structured questions asked in the interviews

Q1. In your view, what are the drivers for continued change in the Australian printing industry? Do you see the impact of any of these drivers diminishing in any way?

Q2. Is there a skills shortage? Where do you believe the skill shortages are most apparent currently in the printing industry (or your company)? – Are they in particular occupations, and if so, which ones? Are they being equally felt by smaller, medium and larger printing companies? If not, can you talk in more detail about how the current skills shortages that you identified are impacting upon companies of different sizes, or the types of companies you know the most about in terms of their experiences with skills shortages? In your view, are the shortages going to resolve themselves through the way markets tend to operate or will they actually get worse, and if so, in what areas?

Q3. Do you see links between these drivers, and the reasons for the existing skills shortages in the Australian printing industry?

Q4. What is the impact of these specific areas of skills shortage that you mentioned for the industry, and more specifically for your situation?

Q5. As this report is mostly about identifying feasible training solutions to the skills shortage, I want to focus on existing or potentially new strategies that use training to respond better to resolving or managing the shortages you have identified – What do you think of the current training initiatives that are in place to help manage or to resolve the skills shortage? Where is this training working well to better manage and respond to the skills shortage? Where is it failing, and why?

Q6. In terms of using training to better respond to this skill shortage, what is being done by: employers; training organizations; the industry more generally; and governments; what else can be done by: employers; training organizations; the industry more generally; and by governments.

Q7. Finally, can we talk about other issues that you would like to expand upon further, or that you thought we would talk about, but really have not.

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