

# Australia's Workforce in the Year 2001: Trends in the Occupational Structure and the Level of Qualifications

Paper presented to Economies of Education Symposium, Australian Association for Research in Education Conference, Deakin University, 23-26 November 1992

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October, 1992

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The views expressed are those of the author and do not necessarily reflect those of the Department of Employment Education and Training. The paper is based on work contained in the report Australia's Workforce in the Year 2001 (DEET, 1991). Major contributors to the relevant work were Les Andrews and Phil Aungles. Any comments welcome.

## AUSTRALIA'S WORKFORCE IN THE YEAR 2001

The report Australia's Workforce in the Year 2001 (DEET 1991) mapped out the implications of a range of economic, demographic and educational trends for Australia's workforce and student population in the year 2001. It built various scenarios based on assumptions about the economy, micro-economic reform, occupational trends, demographic trends, labour force trends and educational participation. One area of particular interest was the interaction between changes in the occupational structure of the work force and the skill base of the workforce.

This was examined in two ways. First, the issue of skill

shortages in particular occupations was analysed. Second, the skill level of the workforce, defined in a very general way, was considered against a background of increasing educational participation. This paper outlines the methodology used in the report and discusses its findings.

## SKILL SHORTAGES

Outside the regulated professions many people working in occupations do not have formal qualifications of relevance to that occupation. In some cases they have no formal qualifications at all while in other cases they possess qualifications from some other, not necessarily related, field. For example, as at the 1986 Census, 60 per cent of accountants had what could be described as a relevant qualification, 20 per cent had some other qualification while 20 per cent did not have a post-school qualification at all.

The possibility of employing persons with a variety of qualifications makes it difficult to define shortages in an absolute manner. Commonly shortages are defined in terms of not being able to attract the individuals with the desired qualifications and experience at a particular wage rate. In the long run perceived shortages can be overcome in a number of ways. Wages can adjust to both reduce the demand for persons with particular skill and increase the number of people wanting to work in that occupation. An increased number of people can be trained formally to increase the labour supply. Finally, employers can adjust their behaviour in a number of ways, by for example increasing the amount of on the job training for persons without the necessary skill levels or by reorganising work to lessen the need for people with particular skills.

If there is a reasonable amount of flexibility in relative wages, the education and training system and the behaviour of employers it could be argued that the concept of a long term skill shortage does not make a lot of sense. However, adjustment processes are not perfect, even over the longer term. Nevertheless, the multitude of methods of adjustment means that it is not possible to estimate skill shortages in the longer term in an absolute sense. Consequently, the approach taken in Australia's Workforce in the Year 2001 was to construct an index which could be used to judge whether skill shortages in particular occupations were likely to be more or less severe than at the beginning of the projection period.

This index was defined as the proportion of persons in an occupation with a relevant post-school qualifications. An increase in the proportion was taken to imply that future pressures were for a lessening of skill imbalances. Similarly, a

decrease would imply that there were pressures leading to an increase in any skill shortages. Obviously, the index does not

take into account institutional changes. For example, an upgrading of required entry level qualifications for an occupation could lead to skill shortages without any change in the index.

The calculation of the index was a fairly complicated affair. In a stylized sense it was done in four stages:

. First, projections of occupational employment were made . These projections were based on scenarios involving industry outputs, productivity changes, changes to the share of employment held by occupations within particular industries (the share effect) and changes in the importance of part-time work. It should be noted that these projections should not be thought of as employment demand projections. In particular, the share effect can be heavily influenced by supply considerations. For example, an increase in the number of people with professional qualifications will tend to lead to an increase in the share of professional occupations at the expense of para-professional or clerical occupations.

. Second, projections of the number of people with particular qualifications (by field of study) were made. These projections were based on the stock at the beginning of the period, immigration rates, the likely output of educational and training institutions, retirement rates and death rates. The central scenario assumed a continuation of trends in higher education and TAFE participation. Field of study shares were assumed to be constant. The justification for this assumption can be found in Chapter 5 of Australia's Workforce in the Year 2001.

. The third stage was to marry together the first two parts. This could not be done in a simple way because the extent of occupational mobility in the Australian workforce. The basis of the stage three projections were relationships between occupation, level of occupation, field of study, and period since qualification was obtained. In a stylized sense we assumed that new graduates entered occupations as the new graduates of 1986 had and that mobility between occupation was related to period since qualification as indicated by the 1986 Census data. In a more formal sense the technique of iterative scaling was used. A matrix (from the 1986 Census) of occupation by level of qualification by field of study by period since qualification was forced to add to a new matrix with the occupation marginals from stage one above and the level of qualification by field of study by period since qualification from stage two.

. The final stage was to multiply the matrix from stage three by a 'relevance' matrix.

The results of these projections are provided in Appendix 4 of Australia's Workforce in the Year 2001. Of the 120 occupations considered less than 20 show a decrease of more than two percentage points in their proportion of persons with relevant qualifications. Table 1 provides details of the occupations showing a decline in the proportion of persons with relevant qualifications of more than two percentage points.

Table 1: Occupations with Possible Skill Shortages in 2001

Employment growth

1991-2001

Percentage with relevant quals 1986

Percentage with relevant quals 2001

Change in percentage

Mining Engineers

38.6

60.3

56.3

-4.3

Dental practitioners

19.6

93.3

90.5

-2.7

Pharmacists

52.2

91.8

88.0

-3.8

Optometrists

46.9

91.2

80.8

-10.4

Physiotherapists

47.3

90.0  
79.7  
-10.3

Other Health Practitioners

46.7  
40.7  
36.9  
-3.7

Accountants

52.6  
60.4  
56.8  
-3.6

Economists

78.6  
70.3  
65.8  
-4.5

Mathematicians, Statisticians, Actuaries

66.3  
45.1  
42.8  
-2.3

Toolmakers

18.3  
71.0  
66.2  
-4.7

Carpenters and Joiners

27.9  
66.0  
60.7

-5.3

Bricklayers

40.2  
58.2  
48.4  
-9.8

Plasterers

36.6

38.3  
31.8  
-6.5

Printing Trades

15.0  
50.9  
47.0  
-3.9

Panel Beaters

26.7  
63.8  
59.6  
-4.2

Wood Machinists

28.5  
46.4  
44.1  
-2.3

Cabinet Makers

27.5  
56.6.  
53.0  
-3.6

Other Wood Trades

21.2  
28.9  
25.7  
-3.2

Hairdressers

47.9  
70.7  
68.6  
-2.1

The occupations in Table 1 are either in the professional or the trades persons groups. With only one exception all are expected to have above employment growth- the overall growth in employment

is projected to be around 16 per cent. The major factor behind the high growth of the professional occupations in Table 1 is a large share effect, based on large sustained increases over the period 1971-1986. As discussed earlier the share effects to some extent reflect supply factors. Thus one interpretation of pressures toward skill shortage would be that the supply

pressures will be less powerful than in the past. There are other ways in which possible skill shortages in professional occupations could be resolved. For example, in the optometrist and physiotherapist occupations it is quite feasible for para-professionals to take over some of the tasks currently undertaken by the professionals.

The story with the trades persons occupations in Table 1 is somewhat different. Although in most cases employment growth is above average it tends to be less than for the professionals. Again one could argue that the employment projections may be too high- one of the factors behind the growth of some of the trades persons occupations is a high investment scenario which looks a little less likely now than a couple of years ago. However, the supply side is again worth considering. Many trades occupation have suffered from high separation rates because of relatively low wages and poor career prospects. Perhaps this will change with the advent of the award restructuring initiatives. It is also possible that multiskilling will provide employers with a variety of ways of dealing with skill shortages.

The general conclusion is that these projections are not any cause to panic or assume that the training effort needs to be raised in certain occupations. However they do suggest that a small number of occupations should be closely scrutinised- particularly optometrists, physiotherapists and bricklayers.

#### A MORE QUALIFIED WORKFORCE

The main reason that there were so few occupations for which skill shortages are likely to be a problem is that the growth in persons with post-school qualifications is projected to be far above the growth in the workforce as a whole. As noted earlier overall employment growth is expected to be around 16 per cent. By contrast the number of persons with post-school qualifications is projected to grow by 33 per cent during the 1990s. Specifically the number of persons with degrees is expected to grow by about 50 per cent, the number with other post-school qualifications by about 27 per cent and the number with no qualifications by only 4 per cent.

While the proportion of the workforce with qualifications will

increase overall, the proportion with qualifications in particular occupations depends upon the relative growth rates of occupations. In fact the occupational projections in Australia's Workforce in the Year 2001 imply that, in general, the more skilled occupation will tend to grow more quickly than average. Table 2 shows the distribution of new jobs across skill/qualification deciles. The deciles are defined in terms of the proportion of persons in an occupation with various levels of qualification (Karmel and Aungles, 1990). The measure of skill/qualification level is based on the distribution of qualifications across occupations in 1986, while each decile represents 10 per cent of total 1990 employment.

Table 2: Employment Change by Skill/Qualification Decile, 1991-2001

Percentile

Share of new jobs(a)

90-100

19.1

80-90

14.7

70-80

12.3

60-70

10.5

50-60

11.7

40-50

7.9

30-40

2.5

20-30

5.7

10-20

13.1

0-10(b)

2.5

Total  
100

(a) These are 'net new jobs'; a number of occupations are expected to suffer job losses.

(b) The lowest decile contains the occupations with the lowest value of the skill index accounting for 10 per cent of employment in 1990.

All deciles with above average skill/qualification levels are projected to have above average employment growth. In fact the only low decile with above average growth is the penultimate decile which contains sales assistants. This suggests that at least part of the growth in persons with qualifications will be accounted for by the occupational mix of the new jobs.

In Australia's Workforce in the Year 2001 we undertook some analysis to gauge the extent to which the occupational mix would account for the growth in persons with qualifications. The analysis focused on the proportion of persons within an occupation with a qualification; unlike in the work discussed earlier we did not confine ourselves to 'relevant occupations'. The approach was to assume that the current proportion of persons in an occupation with a particular type of qualification stayed constant. Then the occupational projections can be used to estimate the required number of persons with those qualifications. This estimate can then be compared with the projected growth in persons with qualifications. The results are given in Table 3.

Table 3: Structural Explanations for the increase in Workforce Skill Levels 1991-2001 (per cent)

Degree  
Other Post-school qualification

No qualification

Structural factors  
26.8  
18.1  
13.6

Projected increase

50.1

27.2

13.6

Difference

23.3

9.1

-9.5

Clearly, about half the projected increase in persons with degrees and two-thirds of the increase of persons with other qualifications can be accounted for by the various occupational growth rates. One of the interesting features of the table is that the structural factors are larger for degrees than other qualifications. The main reason for this is that the occupational share effect is more important for occupations with high proportions of degrees. It was argued earlier that this was, at least in part, a result of supply pressures over the period 1971-1986 (the period on which this part of the projections was based). The analysis in Table 3 suggests that these pressures are likely to continue over the 1990s, providing further justification for the projections of the high occupational share effects for many of the professional occupations.

The conclusion of this analysis is that the proportion of persons within particular occupations with qualifications is going to increase. The analysis, however is based on an historical relationship between occupations and qualification levels, not an optimal one. Thus this growth in qualification levels may represent a deepening of the skill base of the workforce. On the other hand it could represent credentialism, that is people obtaining higher levels of qualifications without improving their actual labour productivity. Unfortunately, there is no simple way of distinguishing the two hypotheses.

An increase in the proportion of the workforce with qualifications is not a new phenomenon. Between 1971 and 1986 the proportion with degrees rose from 2.8 per cent to 7.7 per cent while the proportion with any post-school qualification rose from 25.8 per cent to 36.2 per cent. Our projections suggest that the increase over the next 15 year period will be of a similar order of magnitude. By 2001 we expect the proportion of the workforce with degrees to have increased to about 13 per cent and the proportion with any qualification to about 47 per cent.

It is worth looking at the occupations where the increases have occurred or are expected to occur. Table 4 gives the distribution of qualifications across the major occupational

groups for 1971, 1986 and 2001.

Table 4: Distribution of Qualifications by Occupation, 1971, 1986 and 2001.

Degrees

Post-school qualifications

1971  
1986  
2001

1971  
1986  
2001

Managers

2.4  
8.6  
17.6

21.7  
34.3  
50.5

Professionals

27.7  
45.2  
56.0

72.3  
79.5  
88.6

Para-professionals

1.5  
4.1  
7.4

48.2

62.5

76.5

Trades persons

0.1

0.5

1.3

53.4

57.8

67.4

Clerks

0.9

3.1

6.4

8.2

20.8

31.4

Sales and service workers

0.5

2.2

4.8

12.5

19.8

28.3

Machine operators

0.1

0.4

1.1

10.2

15.6

20.5

Labourers

0.1

0.6

1.4

7.4

11.8

16.1

Total  
2.8  
7.7  
12.9  
  
25.8  
36.2  
47.1

Our projections imply a workforce that is gradually evolving in terms of qualification levels. While the distributions are changing in a fairly logical way the changes over the 30 year period are really quite dramatic. For example, in 1971 degrees were rare outside professional occupations, while in 2001 almost one fifth of managers is expected to have one. Significant proportions of para-professional, clerical and sales occupations will also have degrees. Among professionals by 2001 the majority of persons will have a degree and virtually everyone will have some sort of qualification.

Although the more skilled occupations will continue to have a much higher proportion of persons with qualifications almost a third of persons in the middle ranking clerical and sales and service worker occupations will also have a qualification. Even among labourers qualifications will not be a rarity, with our projections suggesting that about one in six will have a qualification by 2001. .PA

## CONCLUSION

In broad terms we do not expect there to be any major tendency toward increasing skill shortages during the 1990s, even discounting the current downturn. The increase in the number of skilled workers should be able to accommodate the projected changes in the structure of the economy and the workforce. There may be however some pressures in a small number of occupation

including physiotherapists, optometrists and some building trades if the trends in our scenarios come to fruition.

Of course this analysis is essentially long-term and shortages may arise from time to time if the demand for particular occupations increases dramatically as a result of, say, a sharp upturn in economic activity.

The increase in educational participation will lead to an increased proportion of the workforce with a post-school qualification. This is a continuation of a trend which has

existed for at least the last 20 years. This increase in qualification levels will be greater than can be accounted for by differential occupational growth rates and will result in the proportion of persons within particular occupations with a qualification increasing. One hopes that this will result in increasing productivity rather than just a more highly credentialed workforce. .PA

#### REFERENCES

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