

Demographic impact on higher education enrolments

October 2008

Key points

Australia's population is projected to grow substantially. There will be changes in the demographic structure of the population. There will need to be investment in, and substantial expansion of, Australia's tertiary education institutions over the next 30–50 years to accommodate population growth, assuming present rates of participation.

Additional investment and changes will be needed, to respond to opportunities and accommodate needs for mid career education and other impacts of economic and demographic change.

Ageing of the population will pose policy challenges, including some which will impact on the education system.

Replenishing and expanding the academic labour force will be a challenge.

An increase in resources will be required, to avoid the reduction in quality which will accompany the increase in numbers of students.

Introduction

There are many factors affecting demand for higher education in Australia. These include admission requirements, availability of alternative education pathways, population, costs at the time of study and repayment of deferred costs, perceptions about quality and value relative to price and opportunities foregone, the general economic situation and level of demand for graduates, and policy settings related to overseas student places. Each of these factors has an impact on overall student enrolments.

This Backgrounder examines the expected changing domestic demand for university places as a result of demographic growth. In assuming most of the other factors remain as they are, the analysis is limited—but provides a partial quantification of the scenarios for which government and higher education institutions will have to plan.

Population projections

The Australian Bureau of Statistics (ABS) has recently released population projections for Australia to 2101, based on revised assumptions about fertility, migration and life expectancy.

<http://www.abs.gov.au/ausstats/abs@.nsf/ProductsbyCatalogue/5A9C0859C5F50C30CA25718C0015182F?OpenDocument>

There are three main series of projections.

Series B assumes parameters similar to the present fertility rate, net overseas migration and life expectancy, and is the basis for this analysis. Under the assumptions used in Series B, Australia's population would grow to 35.5 million in 2056, and 44.7 million by 2101.

Series A assumes higher demographic parameter values, which would result in a population of 42.5 million in 2056 and 62.2 million in 2101.

Population growth consistent with Series C would produce an Australian population of 30.9 million in 2056 and 33.7 million in 2101.

The demographic parameter assumptions made by the ABS for these three main series are summarised in **Table 1**.

Table 1. ABS population projections 2006–2101: assumptions

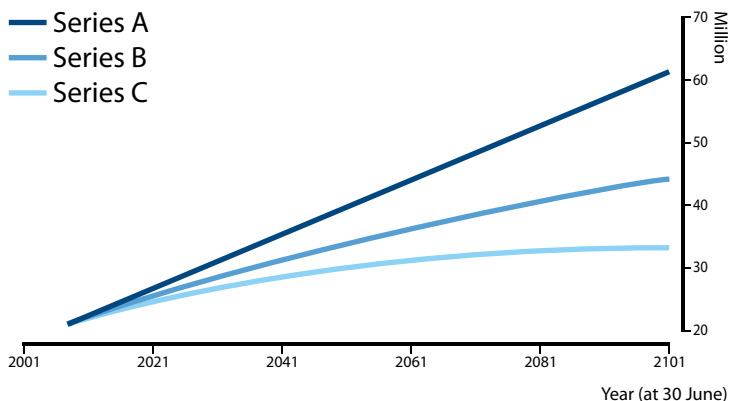
	Total fertility rate(b)	Net overseas migration(c)	Life expectancy at birth(a) Males	Life expectancy at birth(a) Females
	Babies per woman	Persons	Years	Years
Series A	2.0	220,000	93.9	96.1
Series B	1.8	180,000	85.0	88.0
Series C	1.6	140,000	85.0	88.0

(a) From 2056

(b) From 2021

(c) From 2010–11 in Series A and C
From 2007–08 in Series B

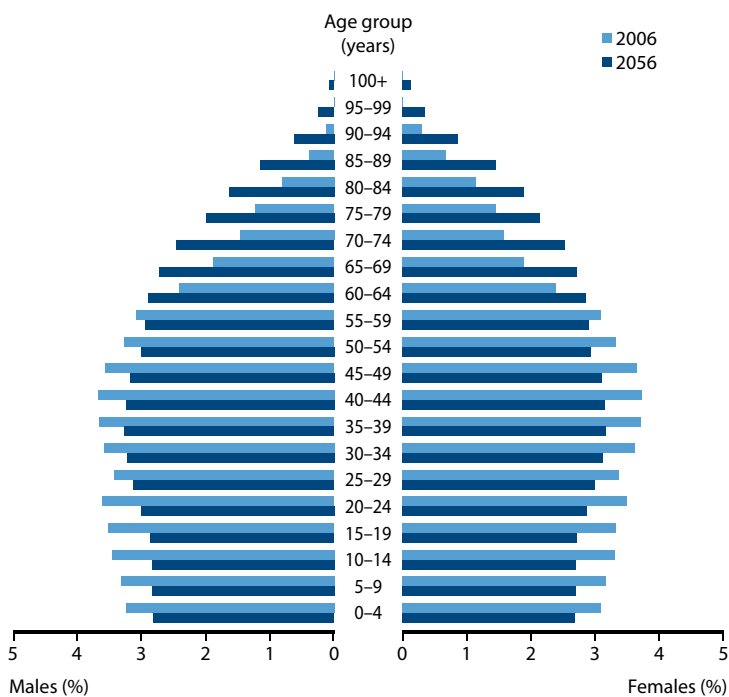
Figure 1. Projected population, Australia, 2006–2101



Source: Population Projections, Australia, 2006 to 2101, ABS (cat. no. 3222.0).

The age distribution of the projected population in 2056 is shown below. Increased proportions for age groups older than 60 are balanced by reduced proportions in younger age groups.

Figure 2. Projected population, Series B, Australia, age groups and sex, at 30 June 2006 and 2056



Source: Population Projections, Australia, 2006 to 2101, ABS (cat. no. 3222.0).

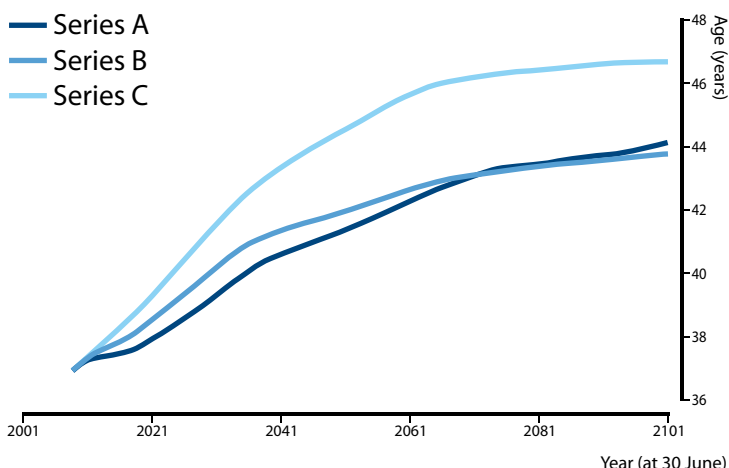
The ABS notes that "...ageing of Australia's population, already evident in the current age structure, is expected to continue. This is the result of sustained low levels of fertility combined with increasing life expectancy at birth."

In 2007, 13% of Australia's population was aged 65 and over. By 2056 this is projected to increase to 23–25%, and 25–28% in 2101. In contrast, the proportion aged under

15 years is projected to fall from 19% in 2007 to 14–18% in 2056, and to 14–17% by 2101.

These changes in the age structure of the population are illustrated in **Figure 2** showing the shift in age–sex profile from now to 2056, and **Figure 3** showing projected median age through the 21st Century.

Figure 3. Projected population, median age—Australia 2006–2101



Source: Population Projections, Australia, 2006 to 2101, ABS (cat. no. 3222.0), p. 43.

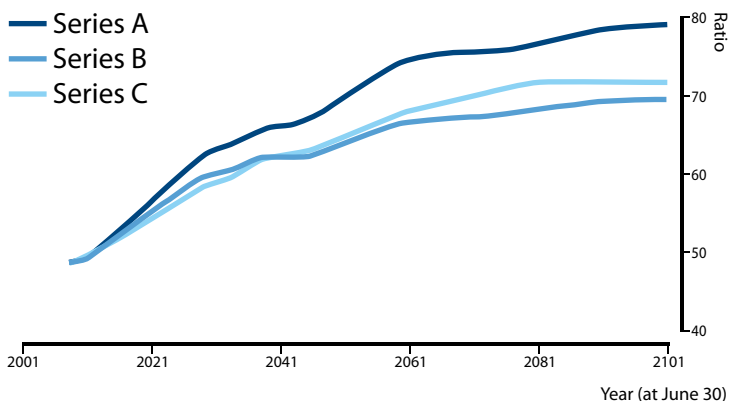
Dependency ratio

From a public policy perspective, the projected dependency ratio is an important statistical measure. The dependency ratio compares the size of the working age population (15–64 years) to the non-working age population (0–14 and 65 and over). While it is a simplistic measure, in that many aged over 15 are economically dependent, particularly during their secondary and tertiary education years, and many retire before age 65 while some remain in the workforce after age 65, it is a useful measure of population structure.

In 2007, there were 48 people in the 'non-working' age groups for every 100 in the 'working ages'. This is projected to rise rapidly, to between 65 (Series B) and 73 (Series A) by 2056 and rising further to between 69 and 79 per 100 of working age by 2101.

Expressed conversely, in 2007 there were 2.1 people in the working age groups for every person in the dependent age groups. By 2056 that will be about 1.4 or 1.5 to one, and by 2101, about 1.3 or 1.4 working for each dependent person.

Figure 4. Projected dependency ratio(a), Australia, 2006–2101



(a) The sum of people aged 0–14 years and 65 years and over divided by the number of people aged 15–64 years, multiplied by 100.

Source: Population Projections, Australia, 2006 to 2101, ABS (cat. no. 3222.0), p. 49.

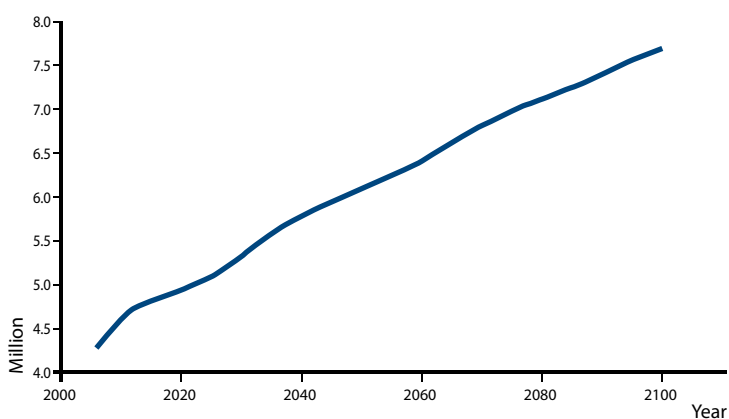
Persons aged 15–29

While tertiary education students are drawn from all age groups above about 16 years, the age groups with highest impact on university places are 15–19, 20–24 and 25–29. Projected growth in these groups is shown in **Table 2**, and **Figures 5 & 6**. (For detailed projection data for these 5-year age groups to 2101, see **Appendix Table A1**.)

Table 2. Projected population by age groups, persons aged 15–29, Australia, 2006–2101 (using Series B assumptions)

Year	Ages 15–29	Year	Ages 15–29
2006	4,290,993	2056	6,238,129
2011	4,669,570	2061	6,409,273
2016	4,841,818	2066	6,600,267
2021	4,951,358	2071	6,782,178
2026	5,111,270	2076	6,938,801
2031	5,337,146	2081	7,076,672
2036	5,596,137	2086	7,210,278
2041	5,787,796	2091	7,351,974
2046	5,953,297	2096	7,503,922
2051	6,092,970	2101	7,656,722

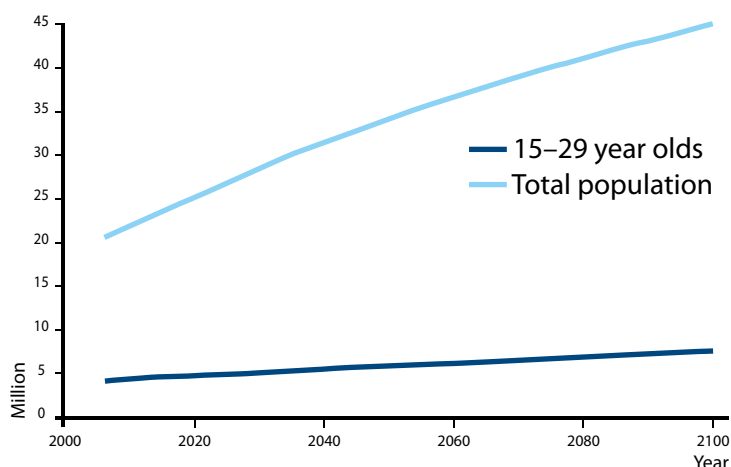
Figure 5: Projected population persons aged 15–29 Australia, 2006–2101



Source: Population Projections, Australia, 2006 to 2101, ABS (cat. no. 3222.0).

Figure 6 shows the projected population aged 15–29 in the context of the projections for total population (Series B).

Figure 6. Projected population—persons aged 15–29 and total, Australia, 2006–2101



Source: Population Projections, Australia, 2006 to 2101, ABS (cat. no. 3222.0).

State differentials

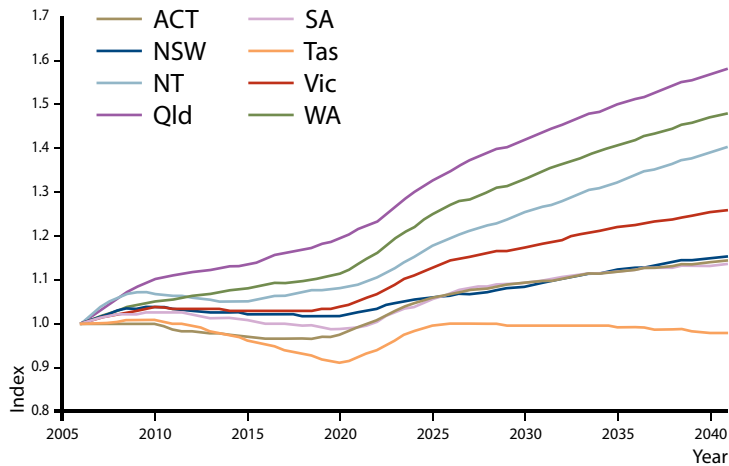
The ABS population projections note the potential impact of varying economic opportunities, overseas immigration and settlement patterns, lifestyle choices and marketing campaigns targeting interstate movers as factors influencing interstate migration. While noting that net interstate migration is the most volatile and least predictable component of population estimates, ABS assumes continuation of past trends in net interstate migration.

The graphs in **Figure 7** show the projected increases for the States and Territories for the age groups 15–19, 20–24 and 25–29, which are most relevant to this analysis. Relatively higher rates of growth of young people in Queensland and Western Australia are consistent with strong projected total population growth, and will pose a challenge for tertiary institutions to deliver higher education in the volume likely to be demanded, at a high level of quality.

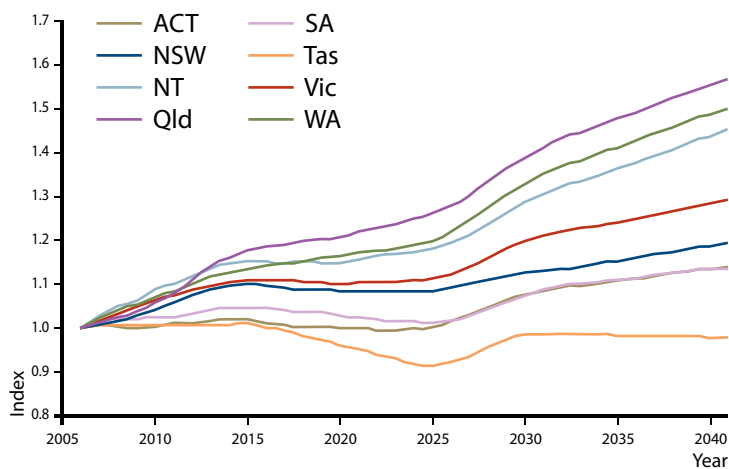
Even though projected rates of growth for Victoria and New South Wales are lower, the numbers of places likely to be required are significant, and will need careful planning for them to be available for students from about 2025–2030 onwards.

Figure 7. Population projections, indexes(a) of estimated population growth by State/Territory, selected age groups, 2006–2041

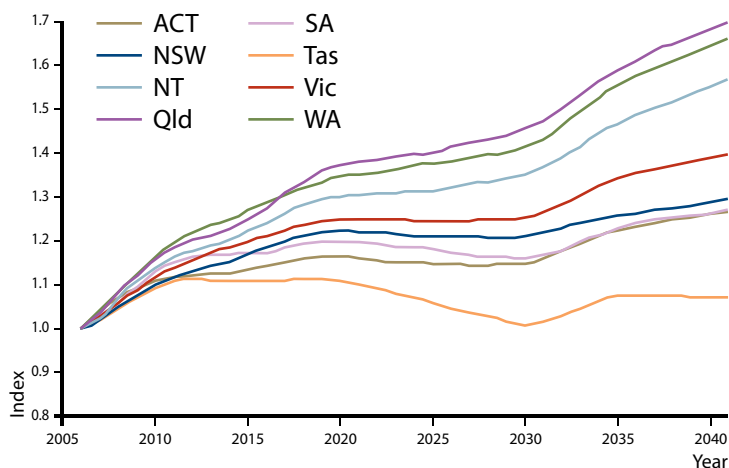
15–19 year olds



20–24 year olds



25–29 year olds



(a) 2006 = 1.0

Source: Population Projections, Australia, 2006 to 2101, ABS (cat. no. 3222.0).

Participation in higher education

Data for students in Commonwealth Government funded universities compiled by the Department of Education, Employment and Workplace Relations (DEEWR) show that the peak years of university study are ages 18–22, with a

gradually reducing but significant ‘tail’ in older age groups, with approximately one quarter of all university students aged 30 or more. Part of that ‘tail’ is postgraduate students, shown separately in *Tables 3 & 4*. *Figures 8 & 9* illustrate the age distributions for undergraduate and postgraduate students.

Table 3. Students in higher education institutions, 2007, age distributions (%)

Age group	Undergraduate %	Postgraduate %	All courses %
16 and under	–	–	–
17	6	–	4
18	13	–	9
19	14	–	10
20	14	1	10
21	12	3	9
22	9	5	8
23	6	7	6
24	4	8	5
25	3	7	4
26	2	6	3
27	2	5	3
28	1	4	2
29	1	4	2
30–39	8	28	14
40–49	4	16	7
50–59	1	6	3
60+	–	1	–
Total	100	100	100

Source: DEEWR Higher Education data 2007

Table 4. Population by age, estimated proportions attending higher education, 2007

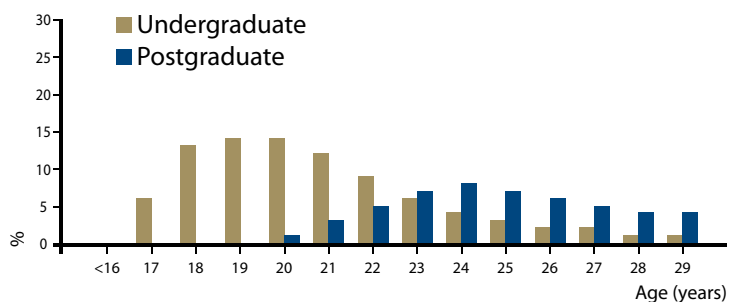
Age group	Proportion of population attending (%)	Age group	Proportion of population attending (%)
16 and under	0.73	25	13.46
17	14.14	26	10.96
18	32.33	27	9.39
19	36.36	28	8.20
20	37.00	29	7.23
21	32.61	30–39	4.66
22	26.33	40–49	2.43
23	21.13	50–59	1.03
24	16.95	60+	0.27

Sources: Derived from ABS estimated resident population by age, and DEEWR data on age of students for all courses—undergraduate, postgraduate and a relatively small number of enabling and non-award courses. International students are included in both these data sets.

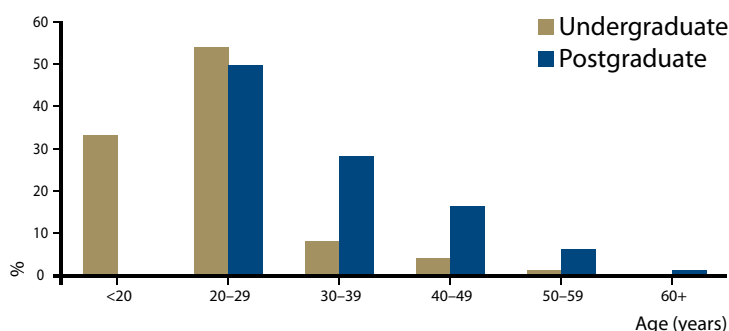
[http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/F3311A71B125E0FBCA2574740015BBA6/\\$File/32010DO001_2002200706.xls](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/F3311A71B125E0FBCA2574740015BBA6/$File/32010DO001_2002200706.xls)

<http://www.dest.gov.au/>

**Figure 8. Students in higher education 2007:
Age distribution (16–29)**



**Figure 9. Students in higher education 2007:
Age distribution (10 year groups)**



Source: DEEWR Higher Education data 2007

Projections of higher education student population

Applying the current rates of participation on higher education from DEEWR data to age-specific population projections gives the following estimates of future numbers of students. (Details by age are shown in *Appendix Table A2*.)

Table 5. Projected numbers of university students in Australia, 2006–2101

Year	Total projected university students ('000)	Year	Total projected university students ('000)
2006	1014	2056	1477
2011	1089	2061	1519
2016	1131	2066	1563
2021	1159	2071	1604
2026	1208	2076	1641
2031	1267	2081	1674
2036	1318	2086	1707
2041	1365	2091	1742
2046	1406	2096	1778
2051	1441	2101	1813

To put these projections in focus, they would mean, broadly, about 10,000 additional students per year. There would be

- 194,000 more university students by 2026
- 304,000 more university students by 2036
- 351,000 more university students by 2041
- over half a million more students (50% more than at present) by 2061.

Australia's largest university has approximately 55,000 students.

In less than twenty years, by 2026, there will need to be additional university places equal to more than three large universities.

Over the next thirty years, the supply of tertiary education places will need to expand, on average, by the equivalent of a medium-sized university, each year.

Assuming current rates of higher education attendance, an additional 460,000 places will be needed by 2041 (for 15–44 year olds, but principally for students aged about 17–29). Of these, nearly 170,000 will be needed in Queensland, over 70,000 in Western Australia, about 100,000 in Victoria and 95,000 in New South Wales.

Of course, it may not be cost-effective to accommodate the additional demand in the traditional model of the university, especially research comprehensive universities with relatively high overhead costs.

Changing technology will impact on the ways in which university education is delivered. The teaching and learning process can be expected to continue to develop and change.

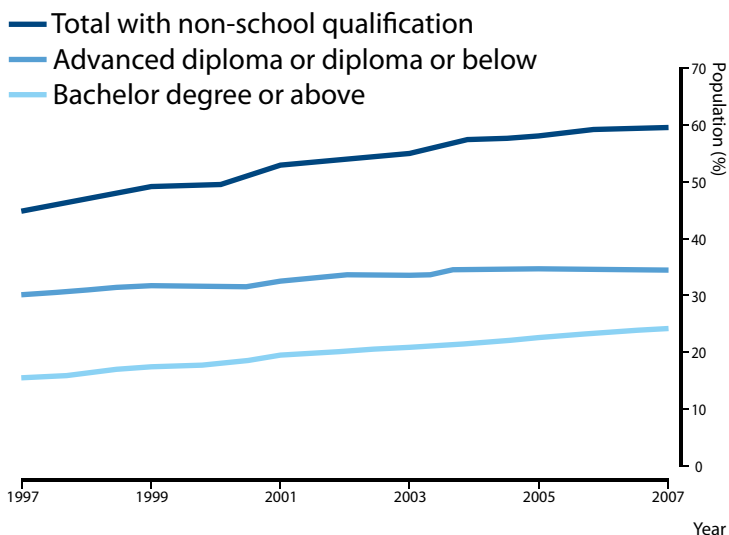
A major policy challenge facing university leaders and government is to design the most appropriate fit of supply and demand for education and training.

Changing the higher education participation rate

Over recent years, the level of participation in higher education has been rising steadily.

The ABS reported recently on summary indicators of Measures of Australia's Progress (Cat. no.1383.0.55.001). One of the indicators, on education and training, is the proportion of the adult population with a post-school qualification.

Figure 10. Education and training, highest level of non-school qualification of people aged 25–64 years



Source: Measures of Australia's Progress ABS cat. no. 1383.0.55.001 —derived from ABS Survey of Transition from Education to Work and Survey of Education and Work.

The proportion of the population aged 25–64 years with a non-school qualification (e.g. university or college education) has risen over the last decade. Between 1997 and 2007, the proportion of 25–64 year olds with a non-school qualification rose from 46% to 59%, continuing a trend seen for many decades.

The ABS commented that “The increase in the proportion of people with non-school qualifications is mainly being driven by the substantial increase in the proportion of people with a higher education qualification (e.g. a Bachelor degree or above). Between 1997 and 2007, the proportion of people aged 25–64 years with a Bachelor degree or higher level qualification increased from 16% to 24%. Over the same period, the proportion of people whose highest qualification was a vocational qualification (e.g. an advanced diploma or diploma or below) increased from 30% to 34%.”

(Measures of Australia's Progress, 2008 cat. no. 1383.0.55.001)

Assuming continuation of these past trends towards higher proportions of the population undertaking at least Bachelor studies, there will be even higher demand for places than the simple projection of population numbers indicates.

Several States and the Northern Territory have rates below the national average. ABS data show that only New South Wales (25%), Victoria (27%) and Australian Capital Territory (42%) had a higher proportion of people aged 25–64 with a Bachelor degree or higher than the overall Australian proportion (24%) in 2007. (For details, see **Appendix Table A3**.) If, as a result of population demand and government policy, all States and Territories were to move to 24% or 25%, that alone would produce a demand for many more places.

Further analysis of the impact of different higher education participation scenarios, including international comparisons, is planned and will be published in a future Backgrounder.

Older age groups

The projections of the rapidly rising Dependency Ratio will produce significant fiscal pressures. There will be pressure to increase productivity, and, for those who are able, to work longer than at present.

There will be a need for education and training to refresh and extend the skills of those who continue to work in their chosen profession or career path.

There will also be a need for education to equip people for mid-life career change, by their own choice or other imperatives.

Additionally, there is the potential for increasing study for interest, including in non-award courses, in the older years as people approach or pass retirement from full-time work.

These factors will all have an impact on demand for adult learning opportunities. At this stage, there are limited data on which to base an estimate of this impact, so it has not been included explicitly in this analysis.

A direct implication of the ageing demographic structure will be the increased demand for health care and social welfare professionals to meet the needs of people in the older age groups. While largely seen as a policy issue for the Health portfolio, it is essential that there be timely planning for education and training for this expanded demand, given the relatively long lead times for many of these professionals.

The academic workforce

The focus of this analysis is on students and the expected demand for university places. Universities need academic workforces for teaching and learning to occur. Universities also need academics and highly trained professional and technical staff to lead, undertake and support research.

Anecdotal evidence and some analysis point to a staffing challenge for Australian universities, partly attributable to the retirement of baby-boomers who became university staff in the 1960s and 1970s. Hugo (2008) estimates that “universities are likely to lose between a fifth and a third of their staff in the next decade or so”. With DEEWR data showing some 95,000 staff in 2007, this means that between 19,000 and 32,000 university staff can be expected to leave in the short to medium term. With just over 42,000 academic staff, applying the same loss rates would mean the departure of some 8,500 to 14,000 of these.

Hugo also comments on the internationalisation of the academic labour market, which means that Australia has to compete for potential academic staff from other countries, and also for “Australian graduates who are increasingly examining options in foreign countries”.

Add to these factors the additional demand flowing from projected increases in undergraduate and graduate students who will need to be taught, and researchers who will need to be trained and supervised, and it is clear that development, renewal and expansion of the academic workforce will need careful strategic attention by universities and by government. As Hugo (2008) comments “This task will have to be addressed in a context of the most competitive international labour market for the skilled academics, scientists, technologists and researchers that has ever existed. If Australian universities are to maintain their current levels of excellence, let alone enhance them, a range of innovative human resource strategies will need to be initiated.”

Policy and funding implications

Population growth alone will generate increased numbers of university students—both undergraduate and postgraduate—unless the unthinkable occurs and Australia allows its investment in knowledge, in the form of student enrolment rates, to decline.

The implications of population ageing for education policy are multi-faceted, and more complex than the scope of this Backgrounder. Economic growth and performance, labour force composition and productivity, are all relevant factors. These and other issues are explored by Taylor, Laplagne and de Laine. They note that while population ageing would reduce demand for funds for primary and secondary education if current policies and spending per capita remain unchanged, demand for relatively more expensive tertiary education may increase. Cheaper education delivery methods such as distance or correspondence education, shorter retraining courses and less personal contact with teachers may arise.

They comment that “...population ageing does not appear to justify a switch in targeting from younger people to older people” and assert “the importance in an ageing population of enhancing the quality of primary and secondary education as the basis for future investments in learning and of ensuring universal access by young people to education...”

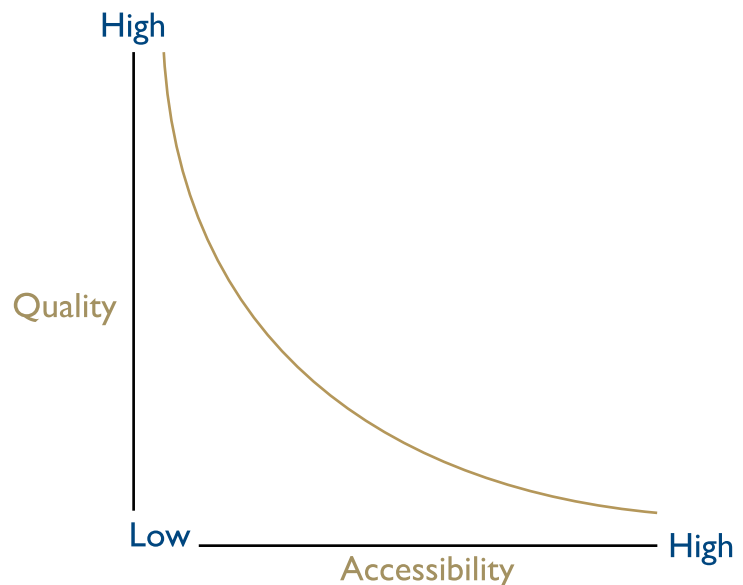
Their paper concludes that “...ageing-related underinvestments in education may occur as a result of myopia and information deficiencies” and cautions against a narrow focus on education alone, and the seeking of savings from public expenditure on education as a result of population ageing.

For any level of resource expenditure, there will be a trade-off between accessibility to higher education—numbers of students—and quality of that higher education. It will show especially in student:staff ratios. It will show also in the investment in improving the quality of research, and teaching and learning processes. It will show in deferral of maintenance of infrastructure, and in planning the facilities and staffing for the future.

With student numbers projected to increase, it will be necessary for the quality-accessibility resource curve to be shifted to a higher level, to maintain quality.

Added to that, the increasing specialisation of knowledge, the additional complexity of many disciplines, and the growing diversification on the demand side will add pressure for a greater diversity of tertiary education provision, including in the public/private sector balance.

Figure 11. Constrained resources—the quality/ accessibility trade-off in education



References

- Australian Bureau of Statistics (cat. no. 3222.0) *Population Projections, Australia, 2006 to 2101*. Released 04/09/2008.
- Australian Bureau of Statistics (cat. no. 1383.0.55.001) *Measures of Australia's Progress: Summary Indicators, 2008*. (Edition 2) Released 30/09/2008.
- Department of Education, Employment and Workplace Relations (DEEWR) Higher Education data 2007 <http://www.dest.gov.au/>
- Hugo G. (2005), *Some Emerging Demographic Issues on Australia's Teaching Academic Workforce in Higher Education Policy* 18 3, pp. 207–230.
- Hugo G. (2008), *Demographics—the need for renewal in The PhD in the Humanities, Arts and Social Sciences*. Workshop—Council for the Humanities, Arts and Social Sciences.
- Taylor P., Laplagne P., and de Laine C. (1999), *The implications of ageing for education policy in Policy Implications of the Ageing of Australia's Population*, Productivity Commission, Conference Proceedings 1999 pp. 405–434.

Appendix: Detailed tables

Table A1: Projected population aged 15–29 (using Series B assumptions) Australia, 2006–2101

Year	15–19	20–24	25–29	15–29	Total	15–29 as proportion of total (%)
2006	1,415,205	1,471,858	1,403,930	4,290,993	20,697,900	20.7
2011	1,487,045	1,570,045	1,612,480	4,669,570	22,319,100	20.9
2016	1,490,433	1,642,019	1,709,366	4,841,818	23,967,000	20.2
2021	1,524,156	1,645,719	1,781,483	4,951,358	25,616,500	19.3
2026	1,646,259	1,679,594	1,785,417	5,111,270	27,236,700	18.8
2031	1,716,125	1,801,632	1,819,389	5,337,146	28,786,500	18.5
2036	1,783,313	1,871,491	1,941,333	5,596,137	30,238,400	18.5
2041	1,837,929	1,938,678	2,011,189	5,787,796	31,609,300	18.3
2046	1,881,601	1,993,312	2,078,384	5,953,297	32,929,100	18.1
2051	1,922,887	2,037,021	2,133,062	6,092,970	34,213,200	17.8
2056	1,982,955	2,078,353	2,176,821	6,238,129	35,470,000	17.6
2061	2,052,747	2,138,393	2,218,133	6,409,273	36,677,500	17.5
2066	2,114,095	2,208,093	2,278,079	6,600,267	37,826,900	17.4
2071	2,165,141	2,269,367	2,347,670	6,782,178	38,926,700	17.4
2076	2,209,599	2,320,355	2,408,847	6,938,801	39,976,100	17.4
2081	2,252,162	2,364,756	2,459,754	7,076,672	40,980,100	17.3
2086	2,298,925	2,407,267	2,504,086	7,210,278	41,952,500	17.2
2091	2,351,469	2,453,974	2,546,531	7,351,974	42,905,500	17.1
2096	2,404,308	2,506,451	2,593,163	7,503,922	43,838,700	17.1
2101	2,451,934	2,559,229	2,645,559	7,656,722	44,744,800	17.1

Source: Population Projections, Australia, 2006 to 2101. ABS cat. no. 3222.0

Table A2: Projected university participation in Australia, 2006–2101—number of students by age (thousands)

Year	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30–39	40–49	50–59	60+	Total
2006	2	40	90	103	108	96	78	63	50	39	31	26	23	20	140	74	27	5	1,014
2011	2	42	98	112	116	103	82	66	53	43	36	30	27	23	144	76	29	6	1,089
2016	2	42	97	112	117	106	86	71	58	46	38	32	28	25	155	79	31	7	1,131
2021	2	43	98	113	118	106	87	70	58	46	39	33	30	26	169	81	32	7	1,159
2026	2	46	108	121	124	108	88	71	58	47	39	34	29	26	177	87	33	8	1,208
2031	2	48	112	127	131	116	95	77	62	49	40	34	30	27	181	94	34	8	1,267
2036	3	50	116	132	136	121	98	80	65	52	42	37	32	28	183	98	37	9	1,318
2041	3	52	120	136	140	125	102	83	67	54	44	38	33	29	190	100	40	9	1,365
2046	3	53	123	140	144	129	105	85	69	55	45	39	34	30	199	101	42	9	1,406
2051	3	54	125	143	147	131	107	87	71	57	46	40	35	31	205	105	42	10	1,441
2056	3	56	129	147	151	134	109	89	72	58	47	41	36	32	211	109	43	11	1,477
2061	3	58	134	152	156	138	113	91	74	59	48	42	37	33	215	113	44	11	1,519
2066	3	60	138	156	161	143	116	94	76	61	50	43	38	33	219	116	46	11	1,563
2071	3	61	141	160	165	147	119	97	78	63	51	44	39	34	224	118	48	11	1,604
2076	3	62	144	164	168	150	122	99	80	64	52	45	40	35	230	120	49	12	1,641
2081	3	64	147	167	172	153	124	101	82	65	54	46	41	36	236	122	50	12	1,674
2086	3	65	150	170	175	156	127	103	83	67	55	47	41	37	241	126	51	13	1,707
2091	3	66	153	174	179	159	129	105	85	68	55	48	42	37	246	129	52	13	1,742
2096	3	68	156	178	182	162	132	107	86	69	57	49	43	38	250	131	53	13	1,778
2101	4	69	160	181	186	166	135	109	88	70	58	50	44	39	254	134	54	13	1,813

Table A3: Proportion of people aged 25–64 years with Bachelor degree or above, States and Territories, 1997 and 2007

State/Territory	1997 %	2007 %
New South Wales	16.6	24.9
Victoria	17.1	26.6
Queensland	12.6	20.7
South Australia	12.8	21.4
Western Australia	14.3	22.3
Tasmania	12.8	17.4
Northern Territory	14.0	22.5
Australian Capital Territory	31.5	41.9
Australia	15.6	24.1

Source: Measuring Australia's Progress ABS cat. no. 1383.0.55.001. Derived from ABS Surveys of Education and Work (2007), and Transition from Education to Work (1997).