

CHAPTER 2

DEMOGRAPHICS OF AUSTRALIA'S STEM-QUALIFIED POPULATION

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KEY FACTS

- 1 In 2011, there were 2.3 million people with STEM qualifications in Australia, and 5.7 million people with Non-STEM qualifications.
- 2 Of the STEM-qualified population, approximately two thirds held Vocational Education and Training (VET) qualifications, while one third were higher education graduates with bachelor degrees or higher.
- 3 Of the 1 117 011 people with certificate III and IV qualifications, just over one million had Engineering qualifications.
- 4 The gender distribution of people with STEM qualifications was highly skewed, with males making up 84 per cent of the total.
- 5 Thirty-five per cent of people with STEM and 31 per cent of people with Non-STEM qualifications living in Australia were born elsewhere, but there are differences across the different STEM disciplines.
- 6 Between 2006 and 2011, the number of STEM-qualified individuals in Australia grew by 15 per cent, while the number of Non-STEM-qualified individuals grew by 26 per cent.
- 7 The age of the STEM-qualified population varied across the disciplines; for example, almost half (49 per cent) of the Information Technology qualified population was under the age of 34, compared to one third (33 per cent) of the Non-STEM, and 29 per cent of the STEM-qualified population.

HOW MANY STEM-QUALIFIED PEOPLE ARE THERE IN AUSTRALIA?

In 2011, there were approximately 8 million people in Australia aged 15 years or over with a post-secondary qualification at the certificate III level or above. Amongst those where the field of qualification was identifiable, 2.3 million qualifications (28 per cent) were in STEM fields (Table 2.1). The majority of post-secondary qualifications (5.7 million, 72 per cent) were from Non-STEM fields. 7.6 million people aged 15 years and over did not have a post-secondary qualification in 2011.

Of the 2.3 million people with STEM qualifications in Australia, 8 per cent had a postgraduate degree (doctorate or masters) as their highest level of education, 25 per cent a bachelor degree or graduate diploma, 12 per cent a diploma or advanced diploma, and 55 per cent a certificate III or IV (Table 2.1).

The number of people and level of qualification varies significantly across the different STEM fields (Table 2.1, Figure 2.1 and Figure 2.2). Two thirds of the total STEM-qualified population had a qualification in Engineering, the majority (82 per cent) of whom held vocational level qualifications.

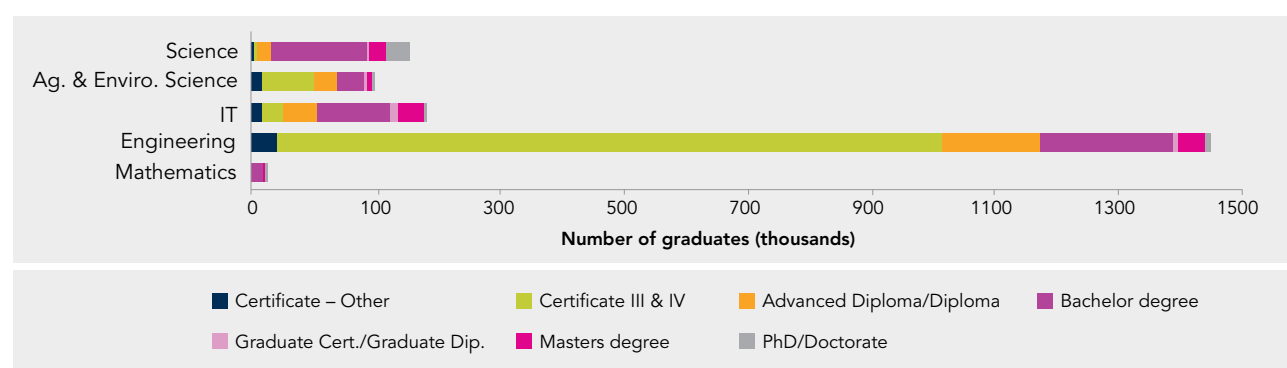
Mathematics was the STEM field with the fewest qualified people (just over 27 000). It was the field with the lowest percentage of people with VET qualifications and the highest proportion of people with qualifications at the bachelor level and above, at 95 per cent.

Table 2.1: Australian population with post-secondary qualifications, by field and level

	Science	Ag. & Enviro. Science	Information Technology	Engineering	Mathematics	Total STEM	Total Non-STEM
Doctorate	34 050	2 911	2 914	10 634	2 762	53 271	62 825
Masters degree (a)	23 997	8 444	38 662	39 686	3 873	114 662	390 200
Graduate Certificate/ Diploma	5 127	3 285	11 567	6 708	1 074	27 761	266 743
Bachelor degree	143 644	38 440	107 768	200 356	17 960	508 168	1 769 902
Higher education subtotal	206 818	53 080	160 911	257 384	25 669	703 862	2 489 670
Advanced Diploma/ Diploma	20 898	36 829	55 745	149 327	784	263 583	1 102 289
Certificate III & IV	6 350	77 126	27 396	1 006 009	130	1 117 011	1 409 918
Certificate–Other	5 804	20 580	20 881	41 347	195	88 807	379 011
VET subtotal	33 052	134 535	104 022	1 196 683	1 109	1 469 401	2 891 218
TOTAL (b)	239 870	187 615	264 933	1 454 067	26 778	2 173 263	5 380 888
Level inadequately described	3 942	4 044	9 602	30 130	200	47 918	188 964
Level not stated	2 000	4 587	3 389	25 743	171	35 890	133 091
TOTAL	245 812	196 246	277 924	1 509 940	27 149	2 257 071	5 702 943

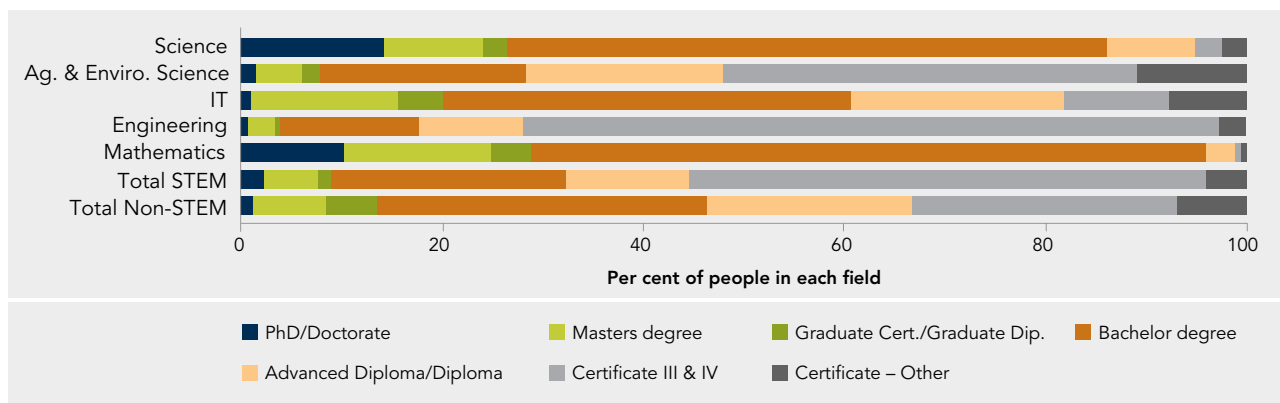
Note: (a) Includes 'Postgraduate level not further defined'. (b) This total includes only those whose level of highest post-secondary qualification was both stated and adequately described. The number of respondents whose response was inadequately described or not stated is significant, and is displayed in the following rows as well as included in the total. As there are some people with qualifications in more than one STEM field, some people will be included in more than one row.

Figure 2.1: Australian STEM-qualified population, by field and level



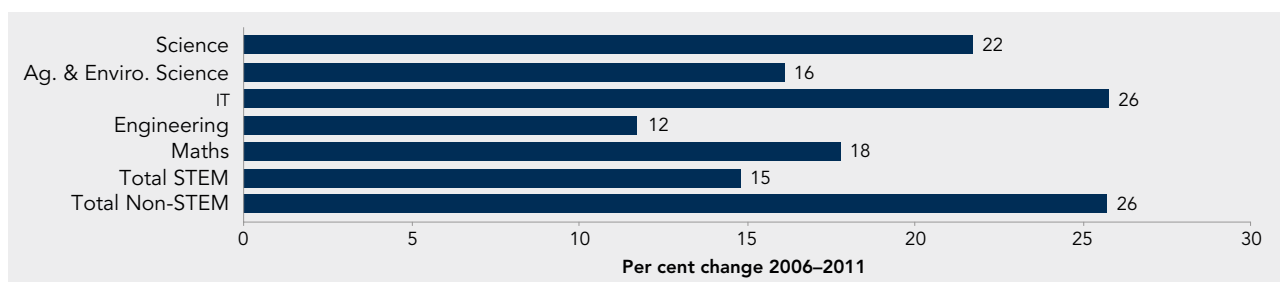
Note: The values in the above graph do not include respondents with inadequately described or not stated level of education and thus the numbers in this graph are different from those in Table 2.1. Respondents with qualifications in more than one STEM field will be included in more than one data point.

Figure 2.2: Australian population with post-secondary qualifications, by field and level as a percentage of the total in each field



Note: The numbers in this graph are different those in Table 2.1 due to inadequately described or not stated level of education. As there are some people with qualifications in more than one STEM field, some people will be included in more than one column.

Figure 2.3: Percentage change in the number of people living in Australia with post-secondary qualifications, by field, 2006 to 2011



From 2006 to 2011, the number of STEM-qualified people grew by 15 per cent, while the number of people with Non-STEM qualifications grew by 26 per cent (Figure 2.3). Among the STEM fields, the highest growth was in IT at 26 per cent, while the lowest growth was in Engineering at 12 per cent.

WHAT ARE THE PROPORTIONS OF MALE AND FEMALE STEM-QUALIFIED PEOPLE IN AUSTRALIA?

In 2011, 84 per cent of people with a STEM qualification were male. Females made up the majority of people with Non-STEM qualifications, at 61 per cent. The gender distribution varied across the different STEM fields and levels of qualification (Figure 2.4). The gender distribution in Science was approximately equal with 51 per cent males and 48 per cent females. The field with the most uneven gender distribution was Engineering, at 93 per cent males; which is

reduced slightly to 88 per cent when considering only those with university level qualifications.

Between 2006 and 2011, the number of females with STEM qualifications increased by 23 per cent, which exceeded the growth for males at 14 per cent (Figure 2.5). The largest difference was in the number of females who had qualifications at the bachelor level and above (35 per cent growth for females, 29 per cent growth for males). The rate of growth at the certificate to advanced diploma level was significantly higher for Non-STEM compared to STEM qualifications for both males and females.

Notwithstanding the changes in the number of graduates, the proportion of females with VET level STEM qualifications was the same in 2006 and 2011 at 9 per cent (91 per cent males in VET). Amongst the population with university level STEM qualifications, the proportion of females increased slightly from 2006 to 2011 from 28 to 29 per cent, thus resulting in the male population decreasing from 72 to 71 per cent.

Figure 2.4: Gender distribution of post-secondary qualifications, by field and level

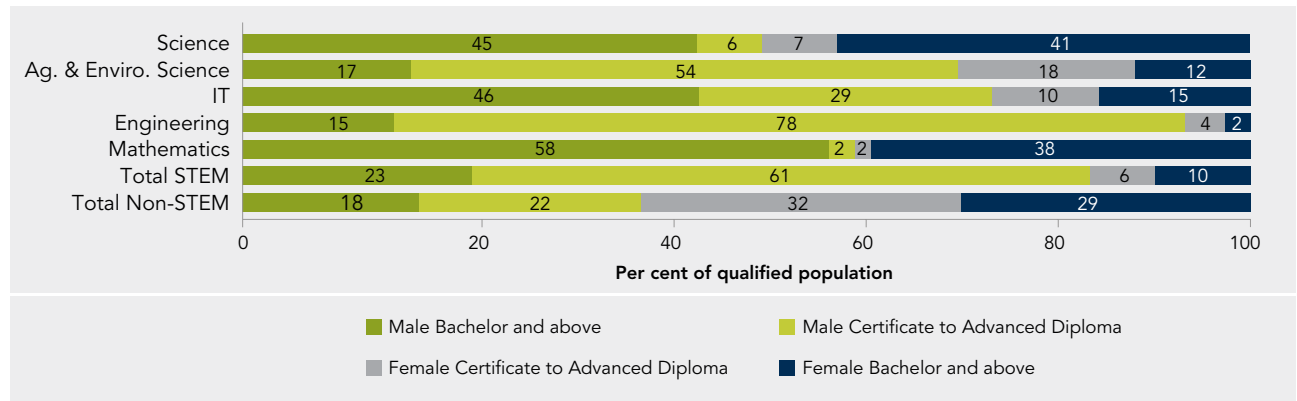


Figure 2.5: Percentage change in the number of people living in Australia with post-secondary qualifications, by gender, field and level, 2006 to 2011

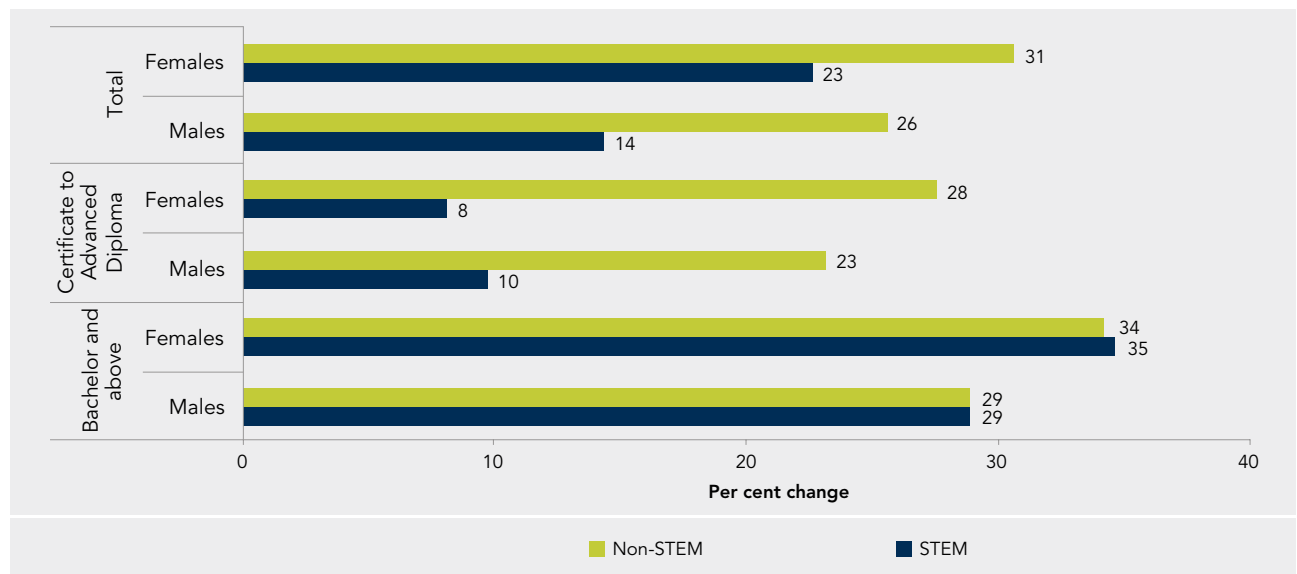
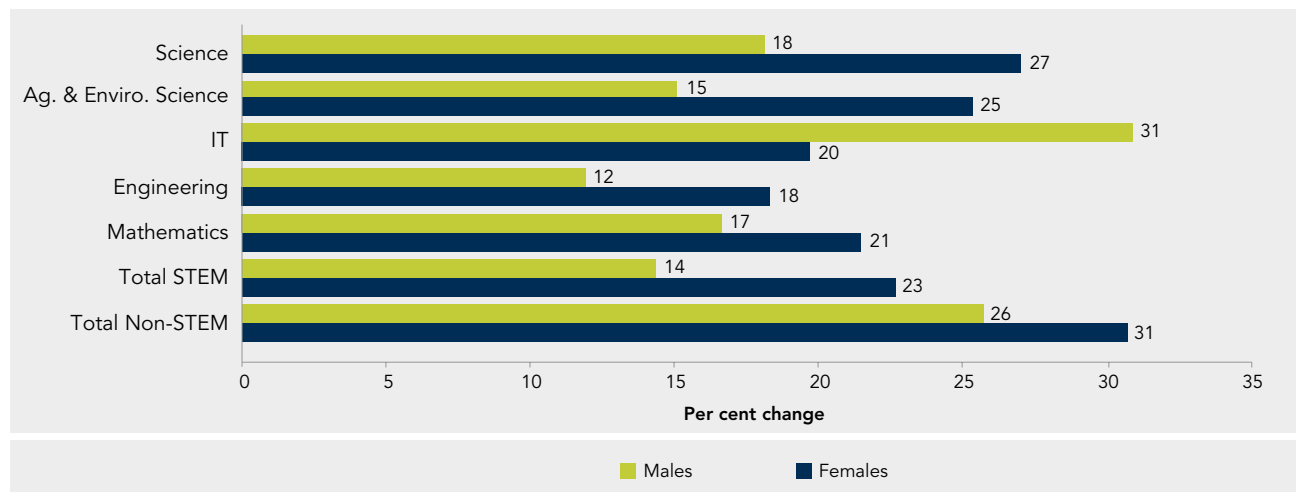


Figure 2.6: Percentage change in post-secondary qualifications, by gender and field, 2006 to 2011



The percentage growth in the number of females who had post-secondary qualifications was higher than males across all fields except IT (Figure 2.6).

WHERE DO STEM-QUALIFIED PEOPLE LIVE IN AUSTRALIA?

In 2011, ten per cent of the total population of Australia had STEM qualifications, while 27 per cent had Non-STEM qualifications. Just under one third of STEM-qualified people lived in New South Wales, a further quarter lived in Victoria and one fifth in Queensland (Figure 2.7). The distribution of STEM and Non-STEM-qualified people was similar across Australia.

The number of STEM-qualified people as a percentage of population in each state or territory varied from 12 per cent in the Australian Capital Territory and Western Australia to 9 per cent in the Northern Territory (Table 2.2). The Australian Capital Territory had the equal highest percentage of STEM-qualified people and the highest percentage of Non-STEM-qualified people; however it had the lowest ratio of STEM to Non-STEM-qualified people in Australia at 0.37.

The rate of change in the number of people with qualifications in Non-STEM fields exceeded that of STEM fields across all states and territories from 2006 to 2011 (Figure 2.8). The highest increase in STEM qualifications was in Western Australia at 25 per cent, while the lowest was in New South Wales and South Australia, both at 10 per cent.

Figure 2.7: Distribution of people with post-secondary qualifications across Australia, by field and state or territory of usual residence

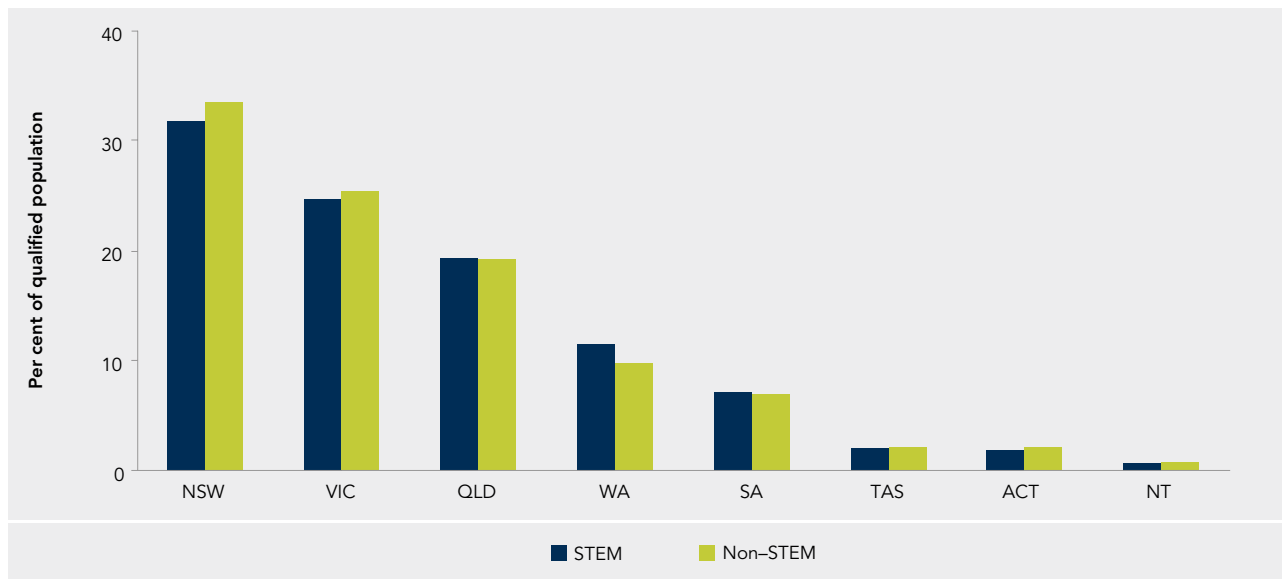
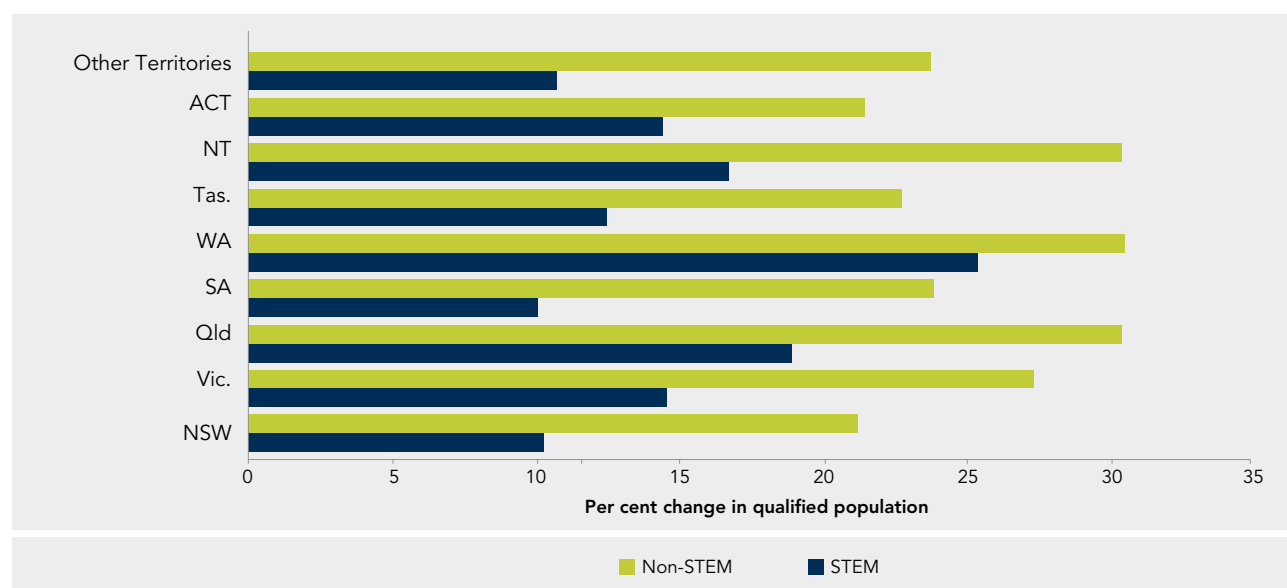


Table 2.2: Field of highest post-secondary qualification and percentage of total population, by state or territory of usual residence

	Total STEM	Total Non-STEM	Total population	Total STEM as per cent of population	Non-STEM as per cent of population	Ratio of STEM: Non-STEM
NSW	719 322	1 909 942	6 917 656	10	28	0.38
Vic.	559 126	1 453 624	5 354 040	10	27	0.38
Qld	436 819	1 090 494	4 332 737	10	25	0.40
SA	164 330	397 793	1 596 570	10	25	0.41
WA	264 755	563 503	2 239 171	12	25	0.47
Tas.	48 431	120 263	495 351	10	24	0.40
NT	19 975	46 093	211 943	9	22	0.43
ACT	44 079	120 755	357 218	12	34	0.37
Other Territories	236	473	3031	8	16	0.50
Total Australia	2 257 073	5 702 940	21 507 717	10	27	0.40

Figure 2.8: Percentage change in post-secondary qualifications, by field and state or territory of usual residence, 2006 to 2011



HOW MANY STEM-QUALIFIED PEOPLE LIVING IN AUSTRALIA ARE IMMIGRANTS?

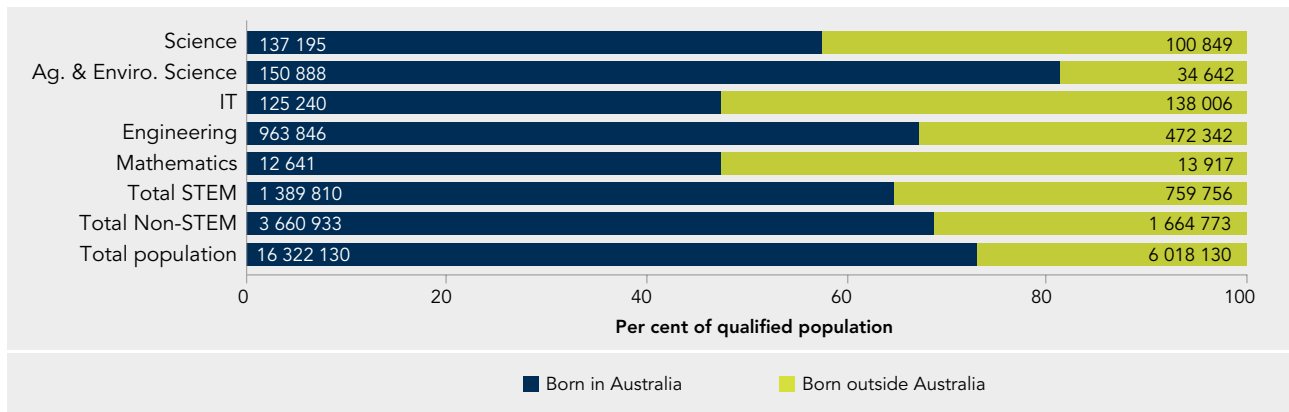
The percentage of people in Australia with post-secondary qualifications who were born outside of Australia was similar for STEM and Non-STEM fields at 35 per cent and 31 per cent respectively, and slightly higher than the percentage of people in the total population of Australia born overseas, at 27 per cent (Figure 2.9) (ABS, 2015). The proportion varied across the different STEM fields: Agriculture and Environmental Science was the only field with a lower proportion of people born overseas than the

total Australian population (19 per cent), while the majority of people with qualifications in IT and Mathematics were born overseas (both at 52 per cent).

HOW OLD ARE THE STEM-QUALIFIED PEOPLE IN AUSTRALIA?

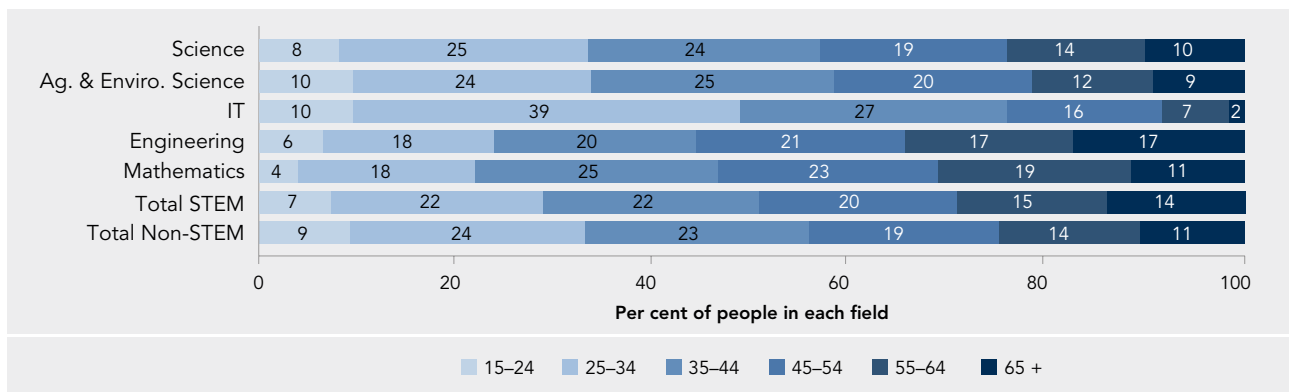
The age profile of people with STEM and Non-STEM qualifications by field is shown in Figure 2.10. Across the total STEM-qualified population, 49 per cent were aged 45 years or older. However, this varied across fields with 25 per cent of IT qualified people aged 45 years or older, while for Engineering it was 55 per cent.

Figure 2.9: Australian population with post-secondary qualifications, by field and country of birth



Note: These totals include only those where the country of birth was both stated and adequately described.

Figure 2.10: Age profile by proportion of people in each age group, by field of highest post-secondary qualification



From 2006 to 2011, there was a large increase in the percentage of STEM-qualified people aged 65 years and above, with an average increase of 52 per cent across fields (Figure 2.11 and Table 2.3). This is compared to an average increase of 14 per cent for 25-34 year olds. There was a large decline in the number of people aged 15-24 years with IT qualifications (down 30 per cent, or 11 000 from 2006 to 2011). For the same age group, there was also a decline in Mathematics (2 per cent) and Agriculture and Environmental Science (7 per cent).

It is important to note that Figure 2.11 shows the percentage change in the number of qualified people in each age group from 2006 to 2011. The absolute numbers are shown in Table 2.3, and show that while IT had the largest percentage growth in people aged 65 and above, it had the smallest absolute growth at 2288 people. Conversely, Engineering had the smallest percentage growth for this age group at 25 per cent, but the largest absolute growth, at 50 598 people.

Figure 2.11: Percentage change in STEM-qualified population, by field and age group, 2006 to 2011

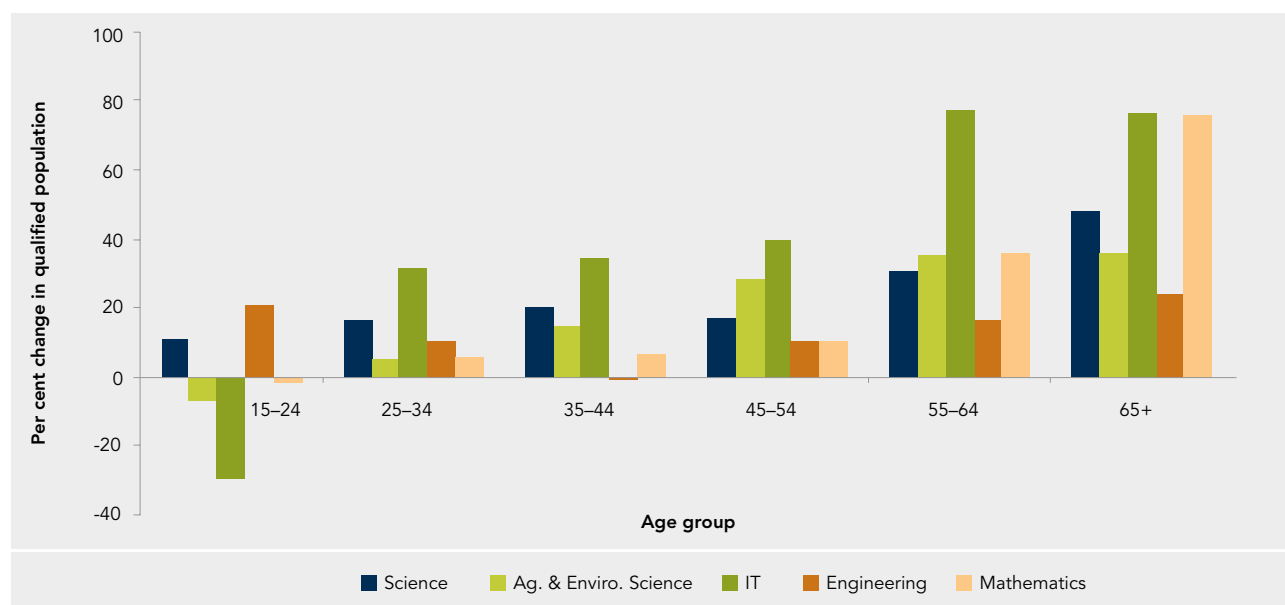


Table 2.3: Absolute change in post-secondary qualifications, by field and age group, 2006 to 2011

Age group	Science	Ag. & Enviro. Science	IT	Engineering	Mathematics	Total STEM	Total Non-STEM
15-24	1 983	-1 381	-11 267	16 372	-23	5 684	81 628
25-34	8 692	2 327	25 987	24 773	276	62 055	293 033
35-44	9 735	6 328	19 318	-338	421	35 464	251 032
45-54	6 828	8 706	12 392	30 654	582	59 162	158 966
55-64	7 983	6 280	8 226	36 761	1 399	60 649	214 365
65+	8 632	4 952	2 288	50 598	1 442	67 912	167 692
Total	43 853	27 212	56 944	158 820	4 097	290 926	1 166 716