

**Submission to House of Representative Standing Committee on Industry,
Science and Innovation: *Inquiry into Research Training and Research Workforce
Issues in Australian Universities***

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Introduction

I have been involved with the field of research training for approximately 10 years in a number of capacities including developing a national database of research scholarships with the co-operation of over 30 universities and completing in 2007 a PhD entitled 'Reconceptualising the Australian doctoral experience: work, creativity and part-time study'. I am now the project manager for the FIRST consortium, (which provides online research supervision training resources for the higher education sector in Australia and New Zealand) and an Australian Learning and Teaching Council funded study entitled 'Building research supervision and training across Australian universities', both of these projects are based at the University of Technology, Sydney. I also provide support for various studies related to research education at Deakin University and RMIT in collaboration with Professor Terry Evans and Dr Peter Macauley.

Purpose of submission

The purpose of this submission is to provide an analysis of the trends in the doctoral population between 1998 and 2006, which may help the committee in its considerations.

Source and limitations of the data

The data presented in this submission were obtained from DEEWR¹ aggregate datasets, which are published yearly on its website. The data for the datasets are provided by higher education institutions and therefore can be taken as a reasonable reflection of the student populations within the limitation of the accuracy of institutional reporting processes. This data were initially analysed as part of my PhD and a number of problems were identified in the underlying data and suitable changes were made where appropriate. The data presented here are only for doctorate by research students and does not include doctoral by coursework or masters by research students. It therefore, should not be confused with data on higher degree by research students as has been the case in some other submissions. The data also represents numbers of students not load. The datasets were first made available on the DETYA website in 1998 and the latest dataset that is available on the DEEWR website is for 2006, so these years form the timescale of the analysis.

Overall trends in the doctoral student population

The enrolled doctoral student population between 1998 and 2006 grew by 62%, (25,004 to 40,511). The domestic student population also grew during this time,

¹http://www.dest.gov.au/sectors/higher_education/publications_resources/statistics/selected_higher_education_statistics/previous_years.htm

although at a lower pace, of 50% (21,879 in 1998 to 32,853 in 2006) and the international student population grew by 145%. Thus, the percentage of domestic students in the overall enrolled population fell from 86% in 1998 to 78% in 2006.

The commencing doctoral student population showed a growth of 32% over the period 1998 to 2006. However, there was a drop from 2004 to 2005 from 8,363 to 8,066 but this was followed by an increase in 2006 to 8,407 (the highest it has ever been). It is therefore difficult to determine a trend in the later years of this analysis but there is a little evidence to say there has been a consistent decline in doctoral commencements between 1998 and 2006. An even more complex picture emerges when examining the trends in domestic and international commencements. The domestic doctoral population shows a more erratic pattern and although it grew by 18% between 1998 and 2006, there have been periods of decline, e.g. between 2000 and 2001 and between 2004 and 2005. However, there was again a small growth between 2005 and 2006 and therefore it is difficult to determine an overall trend. Therefore, there is little evidence of a consistent decline between 1998 and 2006 in domestic doctoral student commencements as claimed by some submissions to the committee.

In contrast to the domestic students, international doctoral commencements increased year on year between 1998 and 2006 with a growth of 115%. Thus, the proportion of commencing domestic doctoral students to the total commencing doctoral population declined from 86% in 1998 to 76% in 2006.

The data for completing doctoral students shows a growth for both domestics and international students between 1998 and 2006 of 56% and 102% respectively. However, there are signs that the growth rate in domestic graduations may decline in the near future. The effects of changes in the doctoral commencing body appear to take between 4 – 5 years to emerge in the doctoral completions student body. Therefore, it may be said that the growth in completions between 1998 and 2006 is a reflection of the growth in commencements between 1994 and 2002. It could be concluded, if completion rates remain constant and using the growth of the domestic doctoral commencing population between 1998 and 2006 as a predictor, there may be a drop in the growth of the completing domestic doctoral population in the next 5 years by perhaps as much as 38%.

Sex

The balance in the domestic doctoral population between the sexes from 1998 to 2006 continued the gradual change in favour of women that can almost be traced back to when doctoral education first commenced in Australia. In 1998, 46% of enrolled domestic doctoral students were women and this increased to 52% in 2006. As indicated before changes in the doctoral completion population appear to lag behind the commencing population by approximately five years, therefore if the trends identified between 1998 and 2006 continue, it can be expected in 2008, for the first time, there will be more domestic women doctoral students graduating than men.

The broad fields of study in 2006 with the largest number of women domestic doctoral students were Education, (65%) and Health (65%), they were least represented in Engineering and Related Technology (21%) and Information

Technology (28%). In the Natural and Physical Science in 2006 there were almost an equal number of men as women studying at the doctoral level.

Fields of study

The broad fields of study in 2006 with the largest number of domestic doctoral students were Society and Culture (8,736), and Natural and Physical Sciences (6,820). However, the broad fields of study that showed the highest growth of domestic doctoral students between 1998 and 2006 were Information Technology (108%), and Management and Commerce (80%). The broad fields of study which showed the least level of growth were Education (27%) and Agriculture, Environmental and Related Studies (38%). These trends contrast quite strongly with the international student body, which shows that the Creative Arts had the highest growth of 329% followed by Education (218%), where as the lowest levels of growth were Agriculture, Environmental and Related Studies (37%) and Natural and Physical Sciences (104%).

The broad fields of study with the highest level of growth between 1998 and 2006 in domestic doctoral completions were Management and Commerce (201%) and Creative Arts (147%). The broad fields of study with the least growth were Architecture and Building (0%) and Natural and Physical Sciences (25%).

Full-time and part-time

In 2005, 43% of domestic doctoral students were in part-time enrolment yet on average between 1998 and 2005 only 31% commenced their studies as part-time students. This suggests that a significant proportion of domestic doctoral students who commence full-time convert to part-time during their candidature.

Full-time domestic doctoral students in 2005 were most strongly represented in Natural and Physical Sciences (77%) and Agriculture, Environmental and Related Studies (71%) whereas part-time domestic doctoral students were most represented in Education (74%) and Management and Commerce (51%).

Age

In 2006, 52% of commencing doctoral students were over 30, which suggests that the majority of doctoral students may not come direct from an honours year of study. Also in 2006, 63% of the enrolled doctoral student population was over 30. Between 1998 and 2006 enrolled doctoral students aged over of 60 showed the highest level of growth (211%) of any age group, the lowest growth were those students aged between 30 and 39 (47%).

Aboriginal or Torres Strait Islander students

In 2006, 248 doctoral students identified themselves as from Aboriginal or Torres Strait Islander origins, this represents 0.75% of the 2006 domestic student population. This figure of 248 students represented a growth of 169% on the 1998 population. In 2006, Aboriginal and Torres Strait Islander doctoral students were most strongly represented in the broad fields of study of Society and Culture (108) and Education (44) and were least represented in Architecture and Building (1) and Engineering and Related Technologies (2). Aboriginal or Torres Strait Islander students represented

0.95% of the commencing doctoral population in 2006 and 0.44% of the domestic completions population. This suggests the completion rates for Aboriginal and Torres Strait Islander doctoral students are significantly less than for non-Aboriginal and Torres Strait Islander students.

This review of the doctoral by research student population between 1998 and 2006 represents a brief overview of some of the main trends that can be identified within the limitations of the published data. If the committee wishes for further analysis of the data to be undertaken, I would be available to do so within the constraints of the data available.

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Appendix

Commencing doctoral students by fees status 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Domestic	5458	5998	5912	5553	6179	6506	6581	6322	6422
International	924	1148	1298	1366	1609	1690	1792	1744	1985
Total	6382	7146	7210	6919	7788	8196	8373	8066	8407

Enrolled doctoral students by fee status 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Domestic	21879	23590	24387	25133	28679	30019	31249	32021	32853
International	3125	3372	3564	4126	5361	5856	6436	6932	7658
Total	25004	26962	27951	29259	34040	35875	37685	38953	40511

Doctoral Completions by fee status 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Domestic	2880	3056	3354	3299	3692	4079	4123	4414	4484
International	603	651	623	643	673	807	973	1016	1217
Total	3483	3707	3977	3942	4365	4886	5096	5430	5701

Percentage of commencing doctoral students by fee status 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Domestic	86%	84%	82%	80%	79%	79%	79%	78%	76%
International	14%	16%	18%	20%	21%	21%	21%	22%	24%

Percentage of enrolled doctoral students by fee status 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Domestic	88%	87%	87%	86%	84%	84%	83%	82%	81%
International	12%	13%	13%	14%	16%	16%	17%	18%	19%

Doctoral commencing students as a percentage of the 1998 population 1999 - 2006

	1999	2000	2001	2002	2003	2004	2005	2006
Domestic	110%	108%	102%	113%	119%	121%	116%	118%
International	124%	140%	148%	174%	183%	194%	189%	215%
Total	112%	113%	108%	122%	128%	131%	126%	132%

Enrolled doctoral students as a percentage of the 1998 population 1999 - 2006

	1999	2000	2001	2002	2003	2004	2005	2006
Domestic	108%	111%	115%	131%	137%	143%	146%	150%
International	108%	114%	132%	172%	187%	206%	222%	245%
Total	108%	112%	117%	136%	143%	151%	156%	162%

Doctoral completions as a percentage of the 1998 population 1999 - 2006

	1999	2000	2001	2002	2003	2004	2005	2006
Domestic	106%	116%	115%	128%	142%	143%	153%	156%
International	108%	103%	107%	112%	134%	161%	168%	202%
Total	106%	114%	113%	125%	140%	146%	156%	164%

Enrolled domestic doctoral students by sex 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Women	46%	47%	49%	49%	50%	50%	51%	52%	52%
Men	54%	53%	51%	51%	50%	50%	49%	48%	48%

Percentage of doctoral completions by sex 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Women	40%	40%	42%	44%	44%	46%	47%	47%	49%
Men	60%	60%	58%	56%	56%	54%	53%	53%	51%

Enrolled domestic doctoral students by broad field of study and sex in 2006

Broad field of study	Women	Men
Agriculture, Environmental and Related Studies	48%	52%
Architecture and Building	42%	58%
Creative Arts	58%	42%
Education	65%	35%
Engineering and Related Technologies	21%	79%
Health	65%	35%
Information Technology	28%	72%
Management and Commerce	43%	57%
Natural and Physical Sciences	50%	50%
Society and Culture	61%	39%
Grand Total	52%	48%

Enrolled domestic doctoral students by broad field of study 1998 - 2006

Broad field of study	1998	1999	2000	2001	2002	2003	2004	2005	2006
Agriculture, Environmental and Related Studies	1042	1086	1111	1149	1250	1286	1308	1419	1443
Architecture and Building	228	280	276	307	329	358	359	363	398
Creative Arts	824	913	1072	862	1060	1251	1344	1331	1437
Education	2217	2486	2396	2405	2725	2771	2715	2783	2818
Engineering and Related Technologies	2026	2098	2187	2293	2620	2838	3001	2999	2935
Health	3192	3538	3695	3689	4195	4448	4637	4166	4523
Information Technology	599	616	627	610	808	912	1111	1199	1248
Management and Commerce	1389	1638	1628	1748	2130	2253	2363	2463	2495
Natural and Physical Sciences	4882	5074	5099	5128	5608	5814	6108	6761	6820
Society and Culture	5480	5861	6296	6942	7954	8088	8303	8537	8736
Total	21879	23590	24387	25133	28679	30019	31249	32021	32853

Enrolled domestic doctoral students by broad field of study as a percent of the 1998 population 1999 - 2006

Broad field of study	1999	2000	2001	2002	2003	2004	2005	2006
Agriculture, Environmental and Related Studies	104%	107%	110%	120%	123%	126%	136%	138%
Architecture and Building	123%	121%	135%	144%	157%	157%	159%	175%
Creative Arts	111%	130%	105%	129%	152%	163%	162%	174%
Education	112%	108%	108%	123%	125%	122%	126%	127%
Engineering and Related Technologies	104%	108%	113%	129%	140%	148%	148%	145%
Health	111%	116%	116%	131%	139%	145%	131%	142%
Information Technology	103%	105%	102%	135%	152%	185%	200%	208%
Management and Commerce	118%	117%	126%	153%	162%	170%	177%	180%
Natural and Physical Sciences	104%	104%	105%	115%	119%	125%	138%	140%
Society and Culture	107%	115%	127%	145%	148%	152%	156%	159%
Total	108%	111%	115%	131%	137%	143%	146%	150%

Enrolled international doctoral students by broad field of study as a percent of the 1998 population 1999 - 2006

Broad field of study	1999	2000	2001	2002	2003	2004	2005	2006
Agriculture, Environmental and Related Studies	96%	82%	86%	98%	108%	118%	125%	137%
Architecture and Building	114%	149%	157%	196%	224%	231%	216%	235%
Creative Arts	129%	141%	188%	251%	334%	393%	388%	429%
Education	131%	152%	193%	310%	324%	338%	335%	318%
Engineering and Related Technologies	98%	95%	116%	143%	163%	186%	210%	239%
Health	114%	118%	126%	163%	184%	202%	199%	231%
Information Technology	105%	120%	138%	164%	190%	212%	255%	317%
Management and Commerce	131%	163%	197%	274%	273%	275%	280%	301%
Natural and Physical Sciences	101%	96%	108%	122%	138%	156%	177%	204%
Society and Culture	106%	122%	138%	191%	205%	234%	262%	282%
Total	108%	114%	132%	172%	187%	206%	222%	245%

Domestic doctoral completions by broad field of study 1998 - 2006

Broad field of study	1998	1999	2000	2001	2002	2003	2004	2005	2006
Agriculture, Environmental and Related Studies	162	167	185	179	180	237	213	195	215
Architecture and Building	25	24	25	26	36	32	34	51	25
Creative Arts	68	87	97	81	111	123	149	164	168
Education	221	245	257	266	269	262	308	325	304
Engineering and Related Technologies	335	338	378	322	380	433	430	459	494
Health	441	471	563	473	604	667	659	651	655
Information Technology	79	81	98	66	75	74	89	127	144
Management and Commerce	108	145	185	194	220	230	264	271	325
Natural and Physical Sciences	835	876	849	879	891	1024	982	1075	1067
Society and Culture	606	622	717	813	926	997	995	1096	1087
Total	2880	3056	3354	3299	3692	4079	4123	4414	4484

Domestic doctoral completions by broad field of study as percent of 1998 the population 1999 - 2006

Broad field of study	1999	2000	2001	2002	2003	2004	2005	2006
Agriculture, Environmental and Related Studies	103%	114%	110%	111%	146%	131%	120%	133%
Architecture and Building	96%	100%	104%	144%	128%	136%	204%	100%
Creative Arts	128%	143%	119%	163%	181%	219%	241%	247%
Education	111%	116%	120%	122%	119%	139%	147%	138%
Engineering and Related Technologies	101%	113%	96%	113%	129%	128%	137%	147%
Health	107%	128%	107%	137%	151%	149%	148%	149%
Information Technology	103%	124%	84%	95%	94%	113%	161%	182%
Management and Commerce	134%	171%	180%	204%	213%	244%	251%	301%
Natural and Physical Sciences	105%	102%	105%	107%	123%	118%	129%	128%
Society and Culture	103%	118%	134%	153%	165%	164%	181%	179%
Total	106%	116%	115%	128%	142%	143%	153%	156%

Domestic enrolled doctoral student by type of attendance 1998 - 2005

	1998	1999	2000	2001	2002	2003	2004	2005
Full-time	12089	12940	13472	14286	16236	17126	17333	18270
Part-time	9790	10650	10915	10847	12443	12893	13916	13751
Total	21879	23590	24387	25133	28679	30019	31249	32021

Percentage of domestic enrolled doctoral students by type of attendance 1998 - 2005

	1998	1999	2000	2001	2002	2003	2004	2005
Full-time	55%	55%	55%	57%	57%	57%	55%	57%
Part-time	45%	45%	45%	43%	43%	43%	45%	43%

Percentage of domestic doctoral commencements by type of attendance 1998 - 2005

	1998	1999	2000	2001	2002	2003	2004	2005	1998 - 2005
Full-time	67%	66%	68%	70%	69%	71%	70%	70%	69%
Part-time	33%	34%	32%	30%	31%	29%	30%	30%	31%

Domestic enrolled doctoral students type of attendance by broad field of study 2005

Broad field of study	Full-time	Part-time
Agriculture, Environmental and Related Studies	71%	29%
Architecture and Building	53%	47%
Creative Arts	58%	42%
Education	26%	74%
Engineering and Related Technologies	79%	21%
Health	63%	37%
Information Technology	70%	30%
Management and Commerce	49%	51%
Natural and Physical Sciences	77%	23%
Society and Culture	55%	45%

Commencing doctoral students by age group 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Below 20	1	3	1	1	1	1	4	4	3
20 to 29	2687	2883	2994	2886	3358	3752	4001	3727	4038
30 to 39	1959	2174	2179	2003	2239	2216	2214	2111	2157
40 to 49	1229	1438	1391	1406	1460	1453	1418	1443	1385
50 to 59	436	561	549	536	627	636	627	655	667
Over 60	70	87	96	87	103	138	109	126	157
Total	6382	7146	7210	6919	7788	8196	8373	8066	8407

Percentage of commencing doctoral students by age group 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Below 20	0%	0%	0%	0%	0%	0%	0%	0%	0%
20 to 29	42%	40%	42%	42%	43%	46%	48%	46%	48%
30 to 39	31%	30%	30%	29%	29%	27%	26%	26%	26%
40 to 49	19%	20%	19%	20%	19%	18%	17%	18%	16%
50 to 59	7%	8%	8%	8%	8%	8%	7%	8%	8%
Over 60	1%	1%	1%	1%	1%	2%	1%	2%	2%

Enrolled doctoral students by age group 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Below 20	3	3	2	1	1	3	6	6	5
20 to 29	8661	9095	9492	10001	11570	12579	13602	14215	14951
30 to 39	8352	8742	8858	8913	10297	10522	10928	11163	11609
40 to 49	5636	6134	6364	6757	7774	7923	8075	8188	8260
50 to 59	1997	2553	2730	3036	3717	4052	4186	4376	4583
Over 60	355	435	505	551	681	796	888	1005	1103
Total	25004	26962	27951	29259	34040	35875	37685	38953	40511

Percentage of enrolled doctoral students by age group 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Below 20	0%	0%	0%	0%	0%	0%	0%	0%	0%
20 to 29	35%	34%	34%	34%	34%	35%	36%	36%	37%
30 to 39	33%	32%	32%	30%	30%	29%	29%	29%	29%
40 to 49	23%	23%	23%	23%	23%	22%	21%	21%	20%
50 to 59	8%	9%	10%	10%	11%	11%	11%	11%	11%
Over 60	1%	2%	2%	2%	2%	2%	2%	3%	3%

Enrolled doctoral students by age group as a percentage of the 1998 population 1999 - 2006

	1999	2000	2001	2002	2003	2004	2005	2006
Below 20	100%	67%	33%	33%	100%	200%	200%	167%
20 to 29	105%	110%	115%	134%	145%	157%	164%	173%
30 to 39	105%	106%	107%	123%	126%	131%	134%	139%
40 to 49	109%	113%	120%	138%	141%	143%	145%	147%
50 to 59	128%	137%	152%	186%	203%	210%	219%	229%
Over 60	123%	142%	155%	192%	224%	250%	283%	311%

Aboriginal and Torres Strait Islander doctoral students 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Commencing	34	27	29	31	33	51	47	43	62
Enrolled	92	101	97	113	144	175	203	215	248
Completed	9	8	9	7	9	15	12	16	20

Enrolled Aboriginal and Torres Strait Islander doctoral students by sex 1998 - 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Female	54	59	51	60	87	101	118	133	151
Male	38	42	46	53	57	74	85	82	97
Total	92	101	97	113	144	175	203	215	248

Enrolled Aboriginal and Torres Strait Islander doctoral students by broad field of study 1998 - 2006

Broad field of study	1998	1999	2000	2001	2002	2003	2004	2005	2006
Agriculture, Environmental and Related Studies	5	4	3	5	4	3	5	7	9
Architecture and Building					1	1		1	1
Creative Arts	4	4	8	8	8	10	13	9	11
Education	13	15	12	19	26	37	33	39	44
Engineering and Related Technologies	4	6	6	2	3	5	7	4	2
Health	12	10	7	6	10	21	24	26	33
Information Technology	2	2	2	3	3	2	1	3	7
Management and Commerce	11	14	9	6	8	11	12	11	11
Natural and Physical Sciences	14	11	13	8	12	14	15	17	22
Society and Culture	27	35	37	56	69	71	93	98	108
Grand Total	92	101	97	113	144	175	203	215	248