

# **Research Training Programs at Australian Universities Warrant Review: Overseas Research Students Completion Performances are Superior to Domestic Students.**

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**Summary:** *Australian Universities funding from government for research training programs is performance-based with timely completions a very important determinant as to the amount of money received. Overseas research students have proven to be a better investment for universities in terms of financial returns from government because their completion rates are superior to those for domestic students. Growth in the recruitment of overseas research students has far exceeded the growth in domestic students. One outcome of the research training program is that Australian universities are now graduating more overseas information technologists, engineers, agricultural and environmental scientists with research training than Australian students. An adverse outcome of concern is that there were fewer Australian male research graduates in information technology, architecture and building and agriculture and the environment in 2017 than a decade earlier. These imbalances may have longer term consequences for Australia's economic competitiveness in a technologically-oriented digital world. Female research students also do have superior completion performances to their male counterparts. A review of research training recruitment practices in our universities, including the countries of origin for students, is warranted to establish if the national interest is being adequately served.*

## **Introduction**

The Australian Government has since 2017 provided funding to universities for research training programs (RTP) based on simplified performance-based metrics related to research income (50%) and research student completions (50%) following the recommendations of the Watt Review of 2015 (1). The funding allocations are managed by the Department of Education and Training (2). An amount of \$1.027 billion was provided to universities for research training in 2019 based upon 2016 and 2017 performance data. Over two years universities received near \$70,500 for each high-cost doctorate completion and \$35,250 for each low-cost doctorate completion. Lesser sums were received for Masters by Research completions. It is therefore in the financial interest of universities to maximise the number of research student completions in the shortest possible time. The completion performance outcomes for research students is the principal focus of this article.

The scholarship funds provided by government may be used to support both domestic and international students with stipend and tuition fees up to two years for Master's and four years for Doctoral candidates. It is not surprising therefore that universities have developed policies that represent the best investment to gain maximum funding from the RTP scheme, since research students are vital to research programs in all universities. In some high cost Fields of Education overseas research students are being preferred to domestic research students because of their superior completion records. How well does this approach serve the national interest? This aspect of research policy is explored in this article.

In an earlier article in 2012 the domestic and overseas research student profiles for the period 2000 to 2010 were examined (3). In 2010 almost one in four postgraduate research student enrolments and completions were from overseas an increase from less than one in six a decade earlier. The benefits and risks associated with that trend were discussed.

In a more recent article the enrolment data for domestic and overseas doctoral students over the decade from 2008 to 2017 was examined (4). The research contribution from overseas students continues to increase to one in 2.5 (40%) doctoral students in 2017. Domestic students are predominantly part-time slowing the completion rate. In 2017 the number of full-time domestic and overseas candidates were almost equal. Nearly all Australian Universities are reporting growth in overseas research students to far exceed domestic student growth with overseas students accounting for seven in ten additional enrolments in 2017 compared with a decade earlier in 2008. Why is this so when Australia needs to place high priority on national high-level skills development and the retention of new knowledge in Australia?

When reviewing the research contribution of postgraduate students to university performance, data on enrolments and completions by field of education are important variables in addition to the overall trends previously examined. The Commonwealth Department of Education and Training database provides the time series data for both higher education completions (5) and enrolments (6) from 2001 to 2017 by Field of Study and Field of Education. Government sponsored reports on completion rates (7,8,9) with the primary emphasis either on all students, bachelor degrees or all postgraduate students are available.

Our analysis in this article concentrates on the same 10-year period 2008 to 2017 as in the previous study (4) with the primary focus on completions in the context of the known enrolments. The work considers the sub-set of all postgraduate research students by field of education<sup>1</sup>, not just doctorates by research, as well as gender issues. This is the aggregation level reported in the data sets publicly available.

## **Overview of Completions**

### **Total Completions 2008 to 2017**

In the ten years 2008 to 2017 there were 88,170 postgraduate research degrees awarded by Australian Universities. The totals for the 10 fields of education are shown in table 1 by gender for domestic and overseas students. The outcomes are also shown graphically in figure 1. Domestic students accounted for 68.5% of all the research completions in the ten-year period. There were more domestic female graduates 36.8% (32,403 women) than domestic males graduates 31.7% (27,928 men). The reverse is the case for overseas students with more males, 18.4% (16,238 men) than females 13.1% (11,601). Domestic male students had the most completions in five of the fields of education, while domestic female students had the most completions in the other five fields of education. (See table 1, columns 2 and 3). Overall, the most completions during the decade were for Natural and Physical Sciences (21.9%), Society

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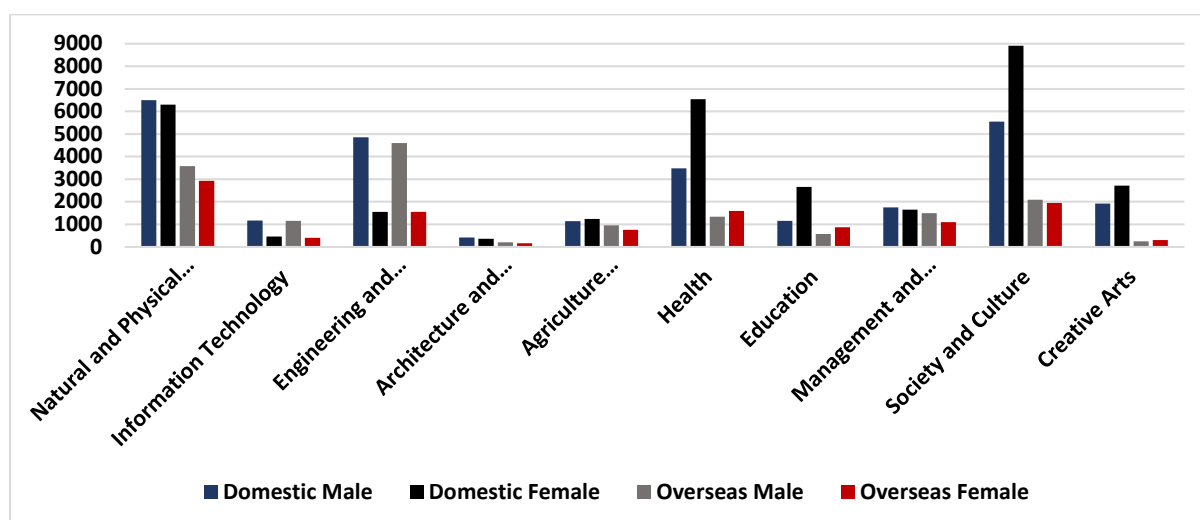
<sup>1</sup> Postgraduate Research Completions is the sum of Higher Doctorate, Doctorate by Research and Masters by Research Awards.

and Culture (21.0%), Health (14.7%) and Engineering and Related Technologies (14.2%). This distribution has changed in recent years.

**Table 1 Total Postgraduate Research Completions by Field of Education from 2008 to 2017 and by Gender for Domestic and Overseas Students.**

All Completions 2008 to 2017	Domestic Male	Domestic Female	Overseas Male	Overseas Female	Total Completions	Proportion of Completions
Natural and Physical sciences	6502	6306	3584	2924	19316	21.9%
Information Technology	1172	460	1155	400	3187	3.6%
Engineering and Related Technologies	4848	1552	4596	1553	12549	14.2%
Architecture and Building	423	366	206	167	1162	1.3%
Agriculture, Environmental and related Studies	1145	1236	960	757	4098	4.6%
Health	3480	6547	1335	1587	12949	14.7%
Education	1151	2663	567	867	5248	6.0%
Management and Commerce	1746	1649	1496	1093	5984	6.8%
Society and Culture	5544	8915	2088	1949	18496	21.0%
Creative Arts	1917	2709	251	304	5181	5.9%
<b>Total</b>	<b>27928</b>	<b>32403</b>	<b>16238</b>	<b>11601</b>	<b>88170</b>	<b>100%</b>
% of All Research Completions	31.7%	36.8%	18.4%	13.1%	100%	

**Figure 1. Total Postgraduate Research Completions<sup>2</sup> by Field of Education from 2008 to 2017 and by Gender for Domestic and Overseas Students.**

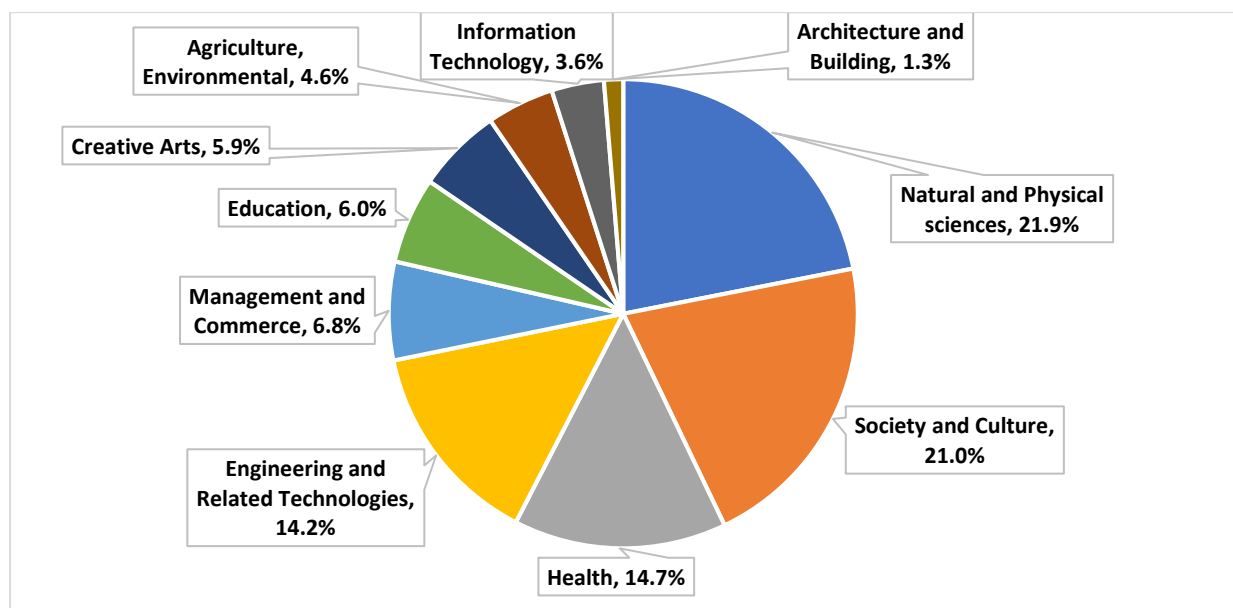


<sup>2</sup> Postgraduate Research Completions is the sum of Higher Doctorate, Doctorate by Research and Masters by Research Awards.

Overall, Society and Culture courses have the most domestic completions by a considerable margin over Natural and Physical Sciences courses with female graduates dominant in Society and Culture and Health courses (table 1, column 3, rows 7 & 9). Overseas male students have more completions than female students in seven of the ten fields of education (table 1, columns 4 and 5). Natural and Physical Sciences and Engineering and Related Technologies are the dominant awards for overseas students.

The completion distribution for all ten fields of education is shown in figure 2. Some 60% of all the completions are in science-related disciplines and 40% in humanities and social sciences disciplines. The small number of research graduates in information technology (3.6%) should be of concern in this digital age when the importance of cyber security and automation are highlighted.

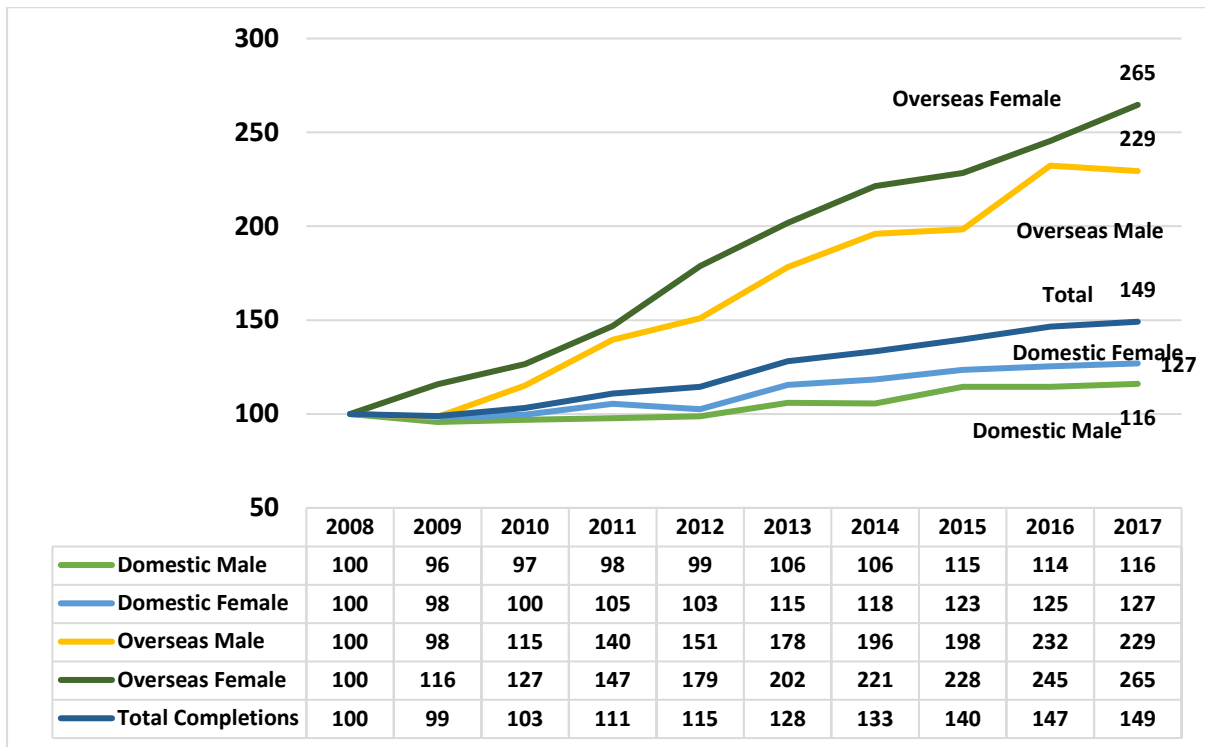
**Figure 2. Percentage Distribution of the 88,190 Completions for the Decade 2008 to 2017 by Field of Education.**



### Completion trends

Inevitably there are variations in the number of completions each year, but the trend over the ten-year period provides an instructive insight into outputs by males and females by field of education. The changes in research graduate numbers by gender and origin relative to 2008 are shown in figure 3 with the accompanying table. The largest proportional change has been for overseas females with a 165% increase relative to 2008. Overseas male graduates increased by 129%, while the domestic growth for females (27%) and for males (16%) was both very modest. In 2017 domestic students still accounted for 63.3% of the completions, but this result is proportionally less than the 77.5% of domestic graduates in 2008.

**Figure 3 Postgraduate Research Completion Trends to 2017 Relative to 2008 Numbers Normalised to 100**



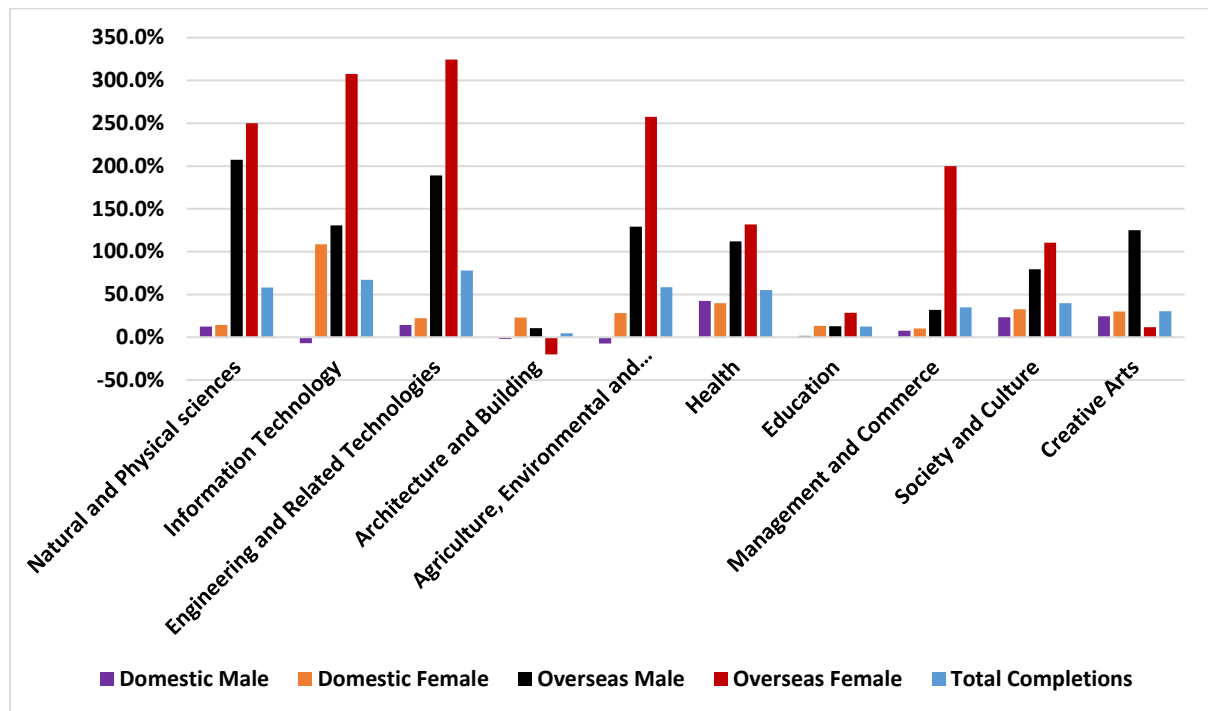
The breakdown by field of education reveals wide variations over the decade. There is too much data to profile the trend for every year but the percentage changes in completions for 2017 compared with 2008 shown in table 2.

**Table 2. Percentage Change in Completions for Domestic and Overseas Students for 2017 compared with 2008.**

% Increase 2017 relative to 2008	Domestic Male	Domestic Female	Overseas Male	Overseas Female	Total Completions
Natural and Physical sciences	12.6%	14.4%	207.2%	250.0%	58.3%
Information Technology	-7.1%	108.6%	130.7%	307.7%	67.1%
Engineering and Related Technologies	14.3%	22.1%	189.0%	324.6%	77.8%
Architecture and Building	-2.0%	23.1%	10.5%	-20.0%	4.7%
Agriculture, Environmental and related Studies	-7.4%	28.1%	129.0%	257.6%	58.7%
Health	42.5%	39.8%	112.0%	131.9%	55.0%
Education	1.6%	13.1%	13.0%	28.4%	12.5%
Management and Commerce	7.8%	10.3%	31.9%	200.0%	35.1%
Society and Culture	23.2%	32.5%	79.4%	110.4%	39.9%
Creative Arts	24.5%	30.1%	125.0%	11.5%	30.5%
<b>Total</b>	<b>16.1%</b>	<b>27.0%</b>	<b>129.5%</b>	<b>164.7%</b>	<b>49.2%</b>

The outcomes are also shown graphically in figure 4. The completion numbers upon which these outcomes are based are given in appendix A for all ten fields of education. For all fields there were more completions in 2017 than in 2008 with the largest increase in absolute numbers being in Natural and Physical Sciences courses and the least in Architecture and Building courses (Appendix A). The breakdown by the origin of the students and their gender reveal wide variations.

**Figure 4. Percentage Increase in Completions for Domestic and Overseas Students for 2017 compared with 2008.**

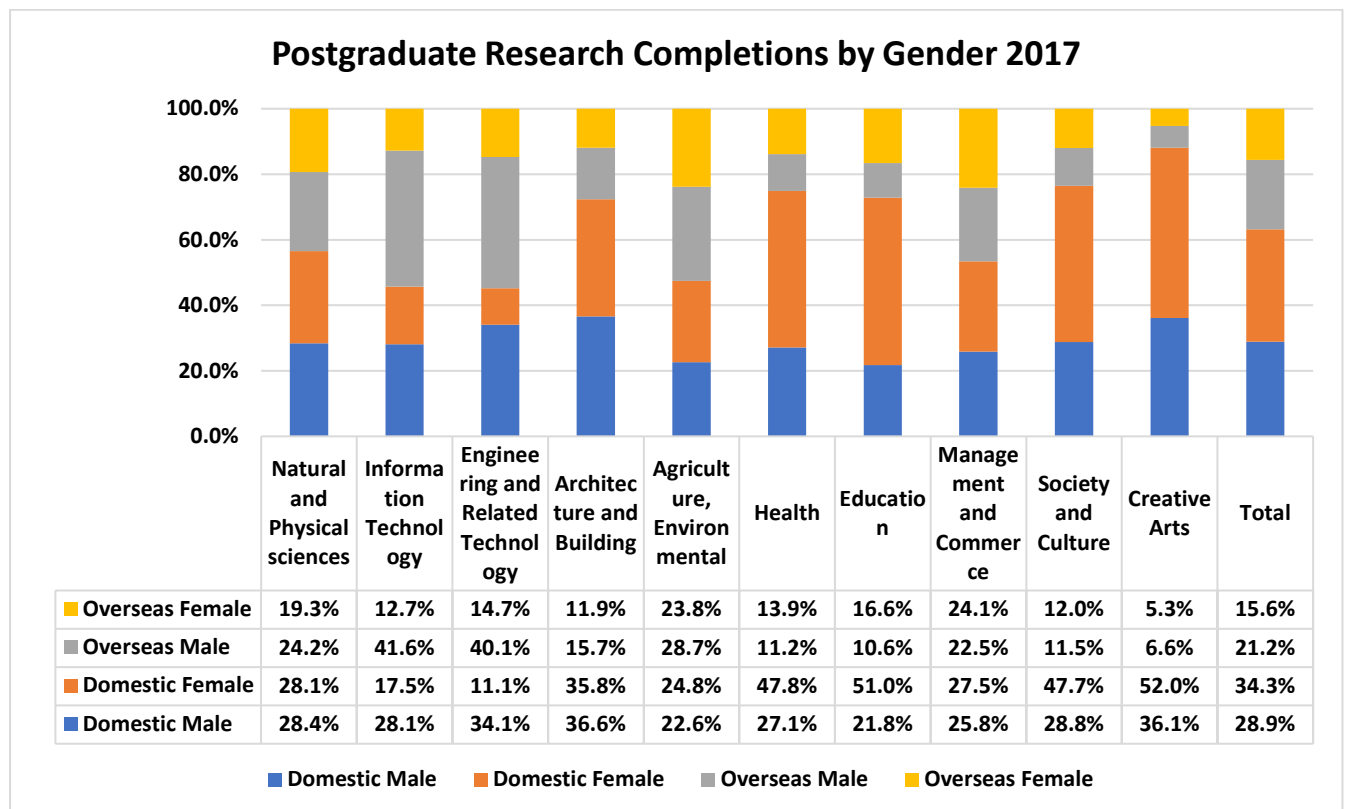


In 2017 there were fewer domestic male research graduates in three field of education than in 2008. Namely, information technology, architecture and building, agriculture, environmental and related studies. These are all high cost technology-oriented fields. There was also less than ten percent growth in education, management and commerce (table 2, column 2). By contrast, domestic female graduates increased by greater than 10 percent in all fields of education with information technology the standout with 108.6% growth (table 2, column 3). The research completion growth for overseas males is dramatically different to the domestic scene with more than 100% increases in five science-related fields (table2, column 4). They are however outperformed by their female counterparts in terms of growth in eight of the 10 fields of education. Overseas females have completion growth of more than 200% in five field, including management and commerce (table 2, column 5 and figure 4).

The percentage distribution of research completions for 2017 by student origin and gender is shown in figure 5 for each field of research. There are considerable variations by field. Domestic female completions represent the highest proportion of five field, Health to Creative Arts. Domestic males contribute most completions to only two fields, Natural and Physical Sciences and Architecture and Building. Overseas males account for the most completions in

three fields, Information Technologies, Engineering and Related Technologies and Agriculture and the Environment. More overseas male and female students graduated in these fields than their domestic counterparts. The landscape was very different in 2008 when local graduates were dominant. Domestic males contributed most graduates to the first five fields shown and domestic females to the other five fields. Overall, domestic females accounted for more completions in both 2008 and 2017 than any other group. (Appendix A, row 12, columns 3 & 8).

**Figure 5. Percentage Postgraduate Research Completions by Field of Education and Gender in 2017.**



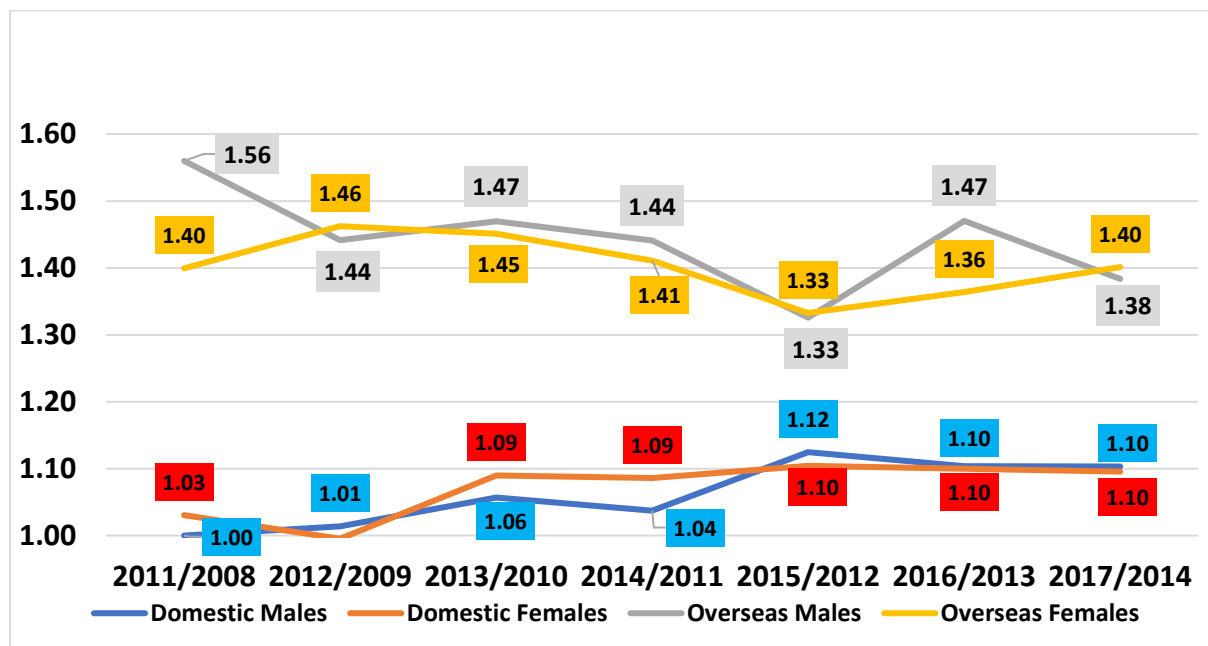
### Completions Rates

Obtaining reliable completions rate performance data is a much more complex task because so many factors affect the progression of candidates. The Commonwealth Department of Education and Training has tracked the progress of individual students using student ID and support numbers to produce data on completion rates for all postgraduate students, inclusive of both coursework and research awards, (5) using a four-, six- or nine- year enrolment period. The trends from each analysis is consistent. For example, with commencement years 2005 to 2012 after six years all postgraduate completions had increased from 72.7% to 78.0%. Domestic students had inferior completion rates, ranging from 67.2% (2005 commencement) to 73.5% (2012 commencement), compared with 81.7% to 86.5% respectively for overseas postgraduates.

Consistently, domestic and overseas females have a superior completion rate to their male counterparts with overseas females having the best completion rate record. For example, for all postgraduate students commencing in 2012 the completion rates by 2017 were overseas females 88.4% completed, overseas males 84.7%, domestic females 74.3%, domestic males 72.2%. Purely, in terms of the efficient use of resources, measured by completion times, it is very understandable why a university would prefer the recruitment of an overseas postgraduate student rather than a domestic student.

Without access to the personal enrolment records for individual students it is not possible to undertake a robust completion rate analysis for the sub-group of postgraduate research students only. Some relative insight for the different student cohorts may be obtained using a surrogate of comparing enrolment in one year with completions at a later date. The reference case chosen has been the domestic male completions in 2011 compared with the enrolments four years previously in 2008. The ratio of completions to enrolments then has been the reference point for the other research student cohorts and the different set of years. The resultant outcomes are shown in figure 6. For example, with the 2011/2008 ratio normalised to 1.0 for domestic males the performance for overseas females for the same period was 40% higher at 1.40.

**Figure 6. Research Student Cohort Completion Performances Relative to Domestic Male Completions in 2011 and Enrolments in 2008.**



The qualitative findings for research postgraduates are consistent with the more detailed analyses for all postgraduate students by the Department of Education and Training. Specifically, overseas research students have a superior completion rate record to domestic research students. Based on the simplified analysis presented here the completions rate records for male and female students are very similar. A more complete refined analysis would require the personal enrolment record timeline for each research student to be tracked to achieve the differentiation obtained by the Department for all postgraduate students. This analysis, especially by field of education would be very informative.



## Policy Considerations.

The analyses conducted through this study on research completions and a previous study (4) on doctoral student enrolments highlight the vital role overseas students are playing in contributing to the research agenda of most Australian universities. The changing profiles over the past decade have been profound. The overseas postgraduate research enrolments increased from 21.8% of total enrolments in 2008 to 32.8% in 2017. Correspondingly, the completions increase from 22.6% in 2008 to 36.8% in 2017. A higher proportion of overseas students are researching fulltime and the completion rates are superior to the domestic students. It is not surprising therefore that Australian Universities have in recent years favoured the recruitment of overseas students. As noted in the previous paper (ref 4, table 3) universities had increased their intake of domestic research student by 11% in 2017 relative to 2008 while the intake of overseas research students increased by 111%. Female research students do have superior completion performances to their male counterparts.

In 2017 there were still more domestic research completions than overseas completions but the gap is narrowing. Indeed, in the very important technologically-oriented fields of information technology, engineering, agriculture and the environment there were more overseas research completions than domestic student completions in 2017. It is vital that Australia has an adequate supply of high level skilled research graduates in these field to sustain international competitiveness. For these three technologically-oriented fields 68.5% of the completions were domestic students in 2008; however, by 2017 the percentage of domestic student completions had decreased to 45.7%.

It is timely to question whether Australian universities are serving the national interest well enough. There is clear evidence that the change in block-grant performance-based funding to give greater importance to timely research student completions has been an important factor in improving completions rates. Now that research training funds can be used to support scholarships and stipend for overseas students universities are able to invest more funds in these students because they have the better prospect of achieving completions in the shortest time period. There also has to be a concern about the diversity in the country of origins for research students. While research student enrolments by country are not readily available it has been noted earlier (10) that in 2017 some 53.7% of all international student enrollees were from China or India. It is likely that the research student country profile will be very similar. This narrow country base does make the Australian research training program vulnerable to international political developments.

## References

1. Watt, I. J., Report of the Review of Research Policy and Funding Arrangements, Department of Education and Training, November 2015, <https://docs.education.gov.au/node/38976>.
2. Australian Government Department of Education and Training, Research Block Grants, <https://www.education.gov.au/research-block-grants>
3. Larkins F. P., Higher Degree Research Student Profile 2000-2010. 30<sup>th</sup> November 2011. <http://www.lhmartinstitute.edu.au/insights-blog/2011/11/70-overseas-students-help-boost-australian-universities-research-profile> and at

- <https://franklarkins.files.wordpress.com/2018/11/a7-higher-education-research-policy-analysis-frank-larkins-november-2011.pdf>
4. Larkins F.P., Australian Universities Increased Dependency on Overseas Research Students Highlight A National Policy Failing, 24 January 2019 <https://melbourne-cshe.unimelb.edu.au/lh-martin-institute/news/increased-dependency-on-overseas-research-students-highlights-a-national-policy-failing>. and at <https://franklarkins.files.wordpress.com/2019/01/a32.australian-universities-increased-dependency-on-overseas-research-students-highlights-a-national-policy-failing.docx>
  5. Australian Government Department of Education and Training, Award Course Completions Time Series, <https://app.powerbi.com/view?r=eyJrIjoiMjIwMjYzZGZmZDktODBiNS00NzA3LWJkOTYzZDlNjNmYmQ2MGZiIiwidCI6ImRkMGNmZDE1LTQ1NTgtNGIxMi04YmFkLWVhMjY5ODRmYzQxNyJ9>
  6. Australian Government Department of Education and Training, Student Enrolment Time Series, <https://app.powerbi.com/view?r=eyJrIjoiMWEwZWZmZDktODBiNS00NzA3LWJkOTYzZDlNjNmYmQ2MGZiIiwidCI6ImRkMGNmZDE1LTQ1NTgtNGIxMi04YmFkLWVhMjY5ODRmYzQxNyJ9>
  7. Australian Government Department of Education and Training, Completion rates of Higher Education Students, <https://app.powerbi.com/view?r=eyJrIjoiM2MwMWQ2ZDMtNGViNy00Mjc5LThkOTgtNzJhMmM5ZDQwYWUxIiwidCI6ImRkMGNmZDE1LTQ1NTgtNGIxMi04YmFkLWVhMjY5ODRmYzQxNyJ9>
  8. Australian Government Department of Education and Training, Completion Rates - Cohort Analyses, <https://www.education.gov.au/completion-rates-cohort-analyses>
  9. University Rankings, Bachelor Degree Completion Rates, <http://www.universityrankings.com.au/degree-completion-rates.html>
  10. Larkins F. P., Narrowing Diversity of International Students Attending Australian Universities can Compromise Educational Experiences and Regional Engagement, <https://melbourne-cshe.unimelb.edu.au/lh-martin-institute/resources/resources/innovation/tertiary-education-policy> , [https://melbourne-cshe.unimelb.edu.au/data/assets/pdf\\_file/0019/2830132/2018\\_-F-LARKINS\\_International-Students-in-Australian-Universities.pdf](https://melbourne-cshe.unimelb.edu.au/data/assets/pdf_file/0019/2830132/2018_-F-LARKINS_International-Students-in-Australian-Universities.pdf)

**Appendix A. Postgraduate Research Domestic and Overseas Completions for 2008 and 2017.**

Completion Numbers 2008 and 2017	Domestic Male 2008	Domestic Female 2008	Overseas Male 2008	Overseas Female 2008	Total Completions 2008	Domestic Male 2017	Domestic Female 2017	Overseas Male 2017	Overseas Female 2017	Total Completions 2017
Natural and Physical sciences	621	606	194	136	1557	699	693	596	476	2464
Information Technology	126	35	75	13	249	117	73	173	53	416
Engineering and Related Technologies	490	149	228	57	924	560	182	659	242	1643
Architecture and Building	50	39	19	20	128	49	48	21	16	134
Agriculture, Environmental and related Studies	121	96	62	33	312	112	123	142	118	495
Health	299	538	83	94	1014	426	752	176	218	1572
Education	123	259	54	74	510	125	293	61	95	574
Management and Commerce	167	174	119	56	516	180	192	157	168	697
Society and Culture	514	790	141	125	1570	633	1047	253	263	2196
Creative Arts	159	219	16	26	420	198	285	36	29	548
<b>Total</b>	<b>2670</b>	<b>2905</b>	<b>991</b>	<b>634</b>	<b>7200</b>	<b>3099</b>	<b>3688</b>	<b>2274</b>	<b>1678</b>	<b>10739</b>

## Appendix B Postgraduate Research Domestic and Overseas Enrolments for 2008 and 2017.

Enrolment Numbers 2008 and 2017	Domestic Male 2008	Domestic Female 2008	Overseas Male 2008	Overseas Female 2008	Total Enrolments 2008	Domestic Male 2017	Domestic Female 2017	Overseas Male 2017	Overseas Female 2017	Total Enrolments 2017
Natural and Physical sciences	3730	3690	1243	1020	9683	4332	4210	3073	2708	14323
Information Technology	864	306	393	169	1732	873	363	994	396	2626
Engineering and Related Technologies	2699	770	1587	533	5589	3319	1148	3856	1412	9735
Architecture and Building	326	247	96	81	750	328	356	184	131	999
Agriculture, Environmental and related Studies	915	849	377	286	2427	626	732	605	535	2498
Health	1917	3810	480	603	6810	2865	5680	1053	1164	10762
Education	1225	2379	281	455	4340	1065	2353	320	514	4252
Management and Commerce	1499	1203	692	486	3880	1299	1167	861	785	4112
Society and Culture	4218	6246	1038	935	12437	4366	6554	1343	1421	13684
Creative Arts	1158	1619	117	162	3056	1207	1622	149	176	3154
<b>Total</b>	<b>18551</b>	<b>21119</b>	<b>6304</b>	<b>4730</b>	<b>50704</b>	<b>20280</b>	<b>24185</b>	<b>12438</b>	<b>9242</b>	<b>66145</b>