
Melbourne Centre for the Study of Higher Education

Pilbara Group

# **Working paper:** What does it cost to educate a university student in Australia?

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# Introduction

In 2020 the Commonwealth Government changed the funding model for teaching at Australian universities, through the *Job Ready Graduates* package of policies. One key justification for the policy was to better align funding with the average cost for each funding cluster. This is not a new aspiration and has been shared by most governments during the last thirty years in Australia after the changes that Minister John Dawkins brought in during the 1989. Seeking to align funding and costs potentially poses an inherent problem, as the cost of delivery may differ widely from course to course within a funding cluster, and from institution to institution, for legitimate reasons, such as variations in location and offerings. Some disciplines, like Engineering, have many different sub-disciplines that can incur a wide range of costs. For other disciplines, such as Allied Health, the average cost can be reduced by a few lower delivery cost programs, for instance Public Health, compared to higher cost programs, such as Physiotherapy.

This working paper analyses anonymised cost data from the 2019 academic year at 11 Australian universities to explore some of the different characteristics contributing to the cost of education in subjects their staff taught during a single academic year. These institutions account for 28 per cent of the Australian university student population and include metropolitan and regional institutions of different sizes and ages. Consistent definitions and a uniform data collection approach allow for fine grained comparisons between teaching costs at unit level or subject level and which incorporate specific characteristics of overheads at each university (see Appendix 1). The data set captures costs for the scholarly activity that forms part of teaching activities but excludes research costs, which is beyond the scope of this analysis, but was also beyond the scope of the analysis upon which the government relied for recent policy changes.

This analysis examines the cost per equivalent full-time student load (EFTSL) for 30,061 subjects delivered across the 11 universities.[1] The data exclude a small number of subjects where there are likely data quality issues, such as those that include outliers at very high or low cost per student, but these account for only a very small proportion of the data set. The analysis also excludes teaching that is part of higher degree by research programs, as well as non-award courses due to the different methods used at each university to account for the cost of such students. Based on the key characteristics of level of qualification, mode of delivery, individual subject enrolment size and campus location, as well as field of education, the data allow a detailed estimation of costs. It should be noted that these findings only capture a subset of Australian universities and further analysis is required for the conclusions to be generalisable for all universities, regions and disciplines. Nonetheless, the observations here provide useful insight into the different dimensions of teaching costs and suggest avenues for future detailed analyses, including approaches such as regression, to model the likely drivers of costs. Table 1 summarises the different characteristics used in this initial analysis.

1 These 'subjects' are defined through the data collection to ensure they are comparable between universities and each represents a unit of study. The total number varies from other ways individual universities denote subjects. For example, some subjects such as year-long ones may be split into two semester long subjects, or vice versa.

## Table 1: Summary of characteristics

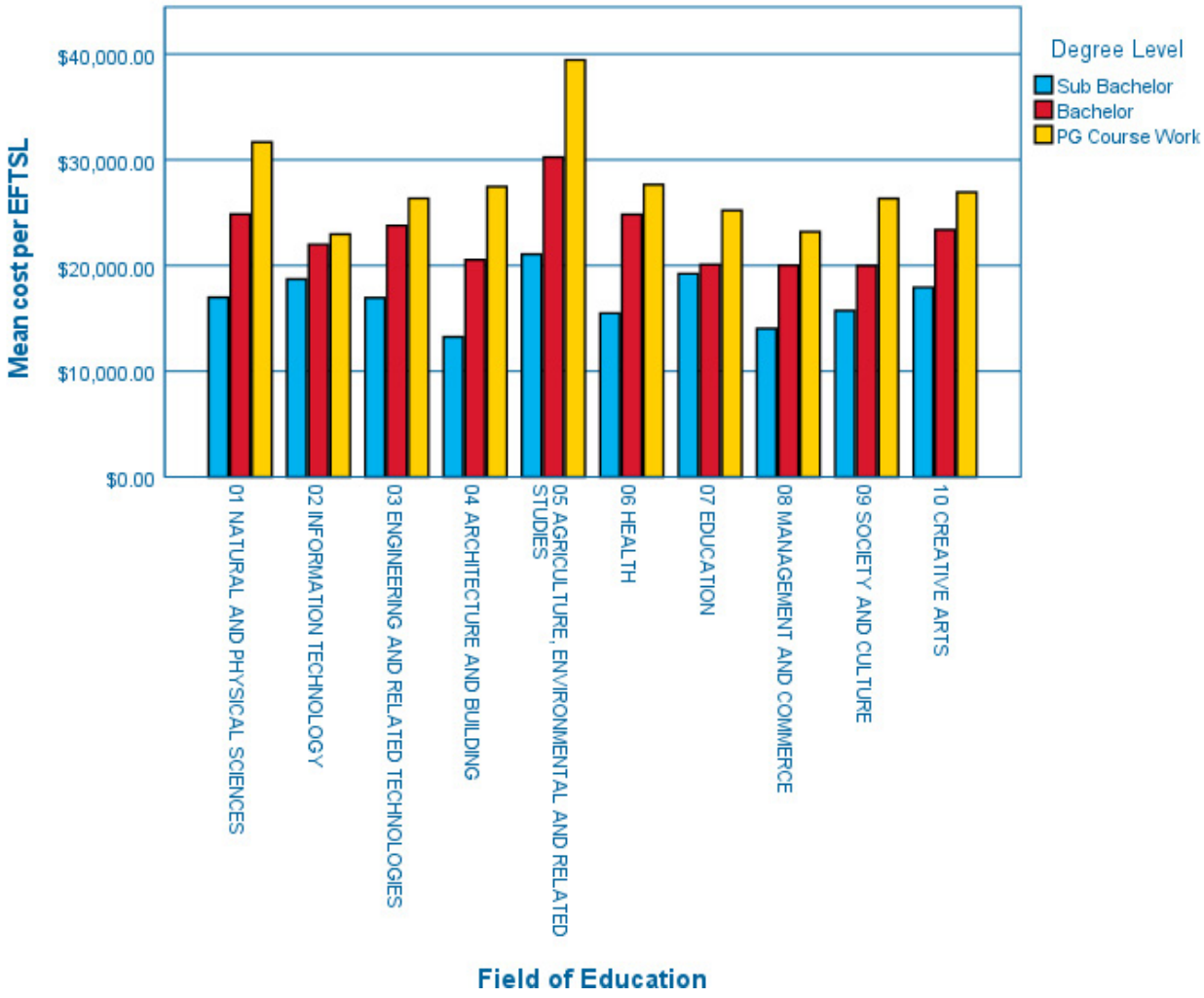
| Characteristic | Elements |
|---|---|
| **Field of Education** | ASCED classifications |
| **Qualification level** | Sub-bachelor, Bachelor and Postgraduate coursework |
| **Mode of delivery** | Online, campus or mixed mode |
| **Campus location** | Classification based on the ABS 'remoteness' index |
| **Subject Size** | For each subject during reference period |

The analysis in this paper starts from the premise that there are classifiable and meaningful distinctions between the cost of delivering education that relate to the level of education and field of education, as well as the mode of delivery and the location of the campus. In addition, it assumes that the size of a subject has a discernible influence on costs as delivering high quality education requires a minimum number of staff-hours irrespective of the number of students enrolled in that subject. As part of the analysis, these different characteristics were examined to identify their distinct influence on the mean cost of delivery per student in the sample, with different characteristics compared. In this way, the analysis highlights patterns in costs per student while partially controlling for the effect of the different factors, such as subject size, on the average cost of other key dimensions. Controlling for the different characteristics in this manner allows for the examination of the influence of specific characteristics, such as campus location, while isolating confounding factors in the analysis, such as lower average subject size at some regional campuses.

# Findings

Examining the cost of delivery by aggregated broad Field of Education (FOE) shows that there is a significant variation between different disciplines and between course levels. Figure 1 suggests that postgraduate coursework costs more overall per EFTSL for all FOEs, and sub-bachelor consistently costs the least, as is commonly assumed. However, caution needs to be exercised in comparing the cost between the FOEs at this aggregate level. For example, FOE 06 Health contains disciplines with very different requirements and likely costs, such as between medicine, dentistry and allied health. Nonetheless, figure 2 suggests there is not a clear pattern when comparing the mean cost of Science, Technology, Engineering and Maths (STEM) and that of the Humanities and Social Sciences (HASS), especially for Sub-bachelor courses. STEM here includes the broad fields of education of Natural and Physical Sciences, Information Technology, Engineering and Related Technologies, Architecture and Building, Agriculture, Environmental and Related Studies and Health, with HASS including Education, Management and Commerce, Society and Culture and Creative Arts.

Figure 1: Field of Education



Aggregated mode of delivery also suggests a commonly assumed pattern, with campus based face-to-face delivery costing more per student than mixed mode or wholly online. Some of this variation may be explained where subjects have a significant practical component with additional costs and no online equivalent was offered during 2019. The separate levels of education also show differences (Figure 2), and the difference is fairly consistent across broad Fields of Education, with some anomalies, such as Agriculture (Appendix 2) and between Bachelor and postgraduate (Appendix 3).

The location of subject delivery is another characteristic that appears to influence the cost of delivery per EFTSL in the sample, with subjects delivered in major cities and online being less costly than those in regional and remote areas (Figure 3 and Appendix 5). For completeness, included in Figure 3 are subjects taught in very remote locations. However, as the data set only includes a small number of these, caution needs to be exercised in interpreting the mean costs for this classification.

Figure 2: Mode of delivery

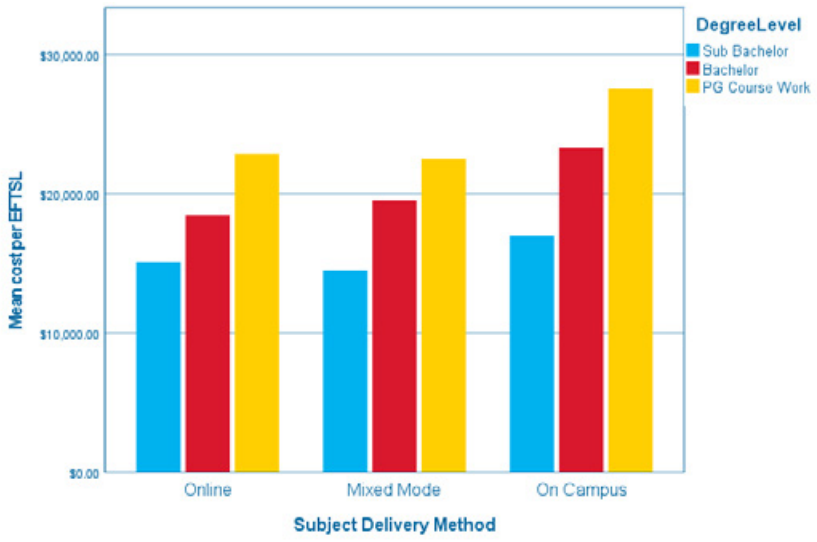
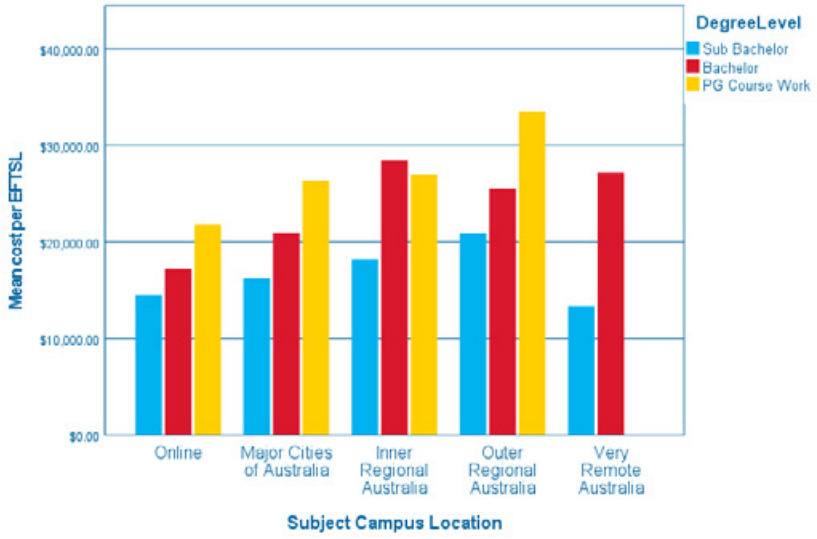



Figure 3: Campus location based on ABS remoteness index



Examining the data in this way illustrates that multiple characteristics might explain different cost outcomes per student for each subject captured in the data set.

Much of the difference in cost per EFTSL in the data set follows the significant variability in the enrolment numbers across the 30,061 subjects. Subject size appears the most significant characteristic in the sample, appearing to account for around two thirds of the variation in the mean cost. That subject size is a significant characteristic is to be expected given that a fixed number of staff are usually required to teach a subject, irrespective of subject enrolments, and that subjects have a fixed number of delivery hours. In this way it indirectly shows the influence of the staff:student ratio. While this finding is not surprising, isolating it is useful when examining the other characteristics included in the analysis. Keeping the other characteristics constant in the sample data, the estimated mean effect of having fewer than 10 students is likely several thousand dollars more costly per EFTSL than subjects with more than 20 enrolments. Fully isolating the effect of subject size requires additional statistical analysis, and so the analysis here should not be interpreted as predicting the exact influence of changing the number of students in a subject. However, it does provide a sense of the effect that subject size has on the cost of running a subject as contained in the sample (see Appendix 4).

Recognising the influence of subject size allows the analysis to provide some insight into the effect of the other characteristics on cost per EFTSL. One way to estimate the effect of differences in characteristics is to compare their cost with that of a baseline subject's estimated mean cost per EFTSL, in this case one that is for an on-campus Bachelor level subject taught at a metropolitan campus (Table 2).

For this comparison, the analysis suggests that, if the subject was delivered wholly online it might cost up to a third less per EFTSL, though around the same if delivered in a mixed mode. In the case of a Sub-bachelor subject, it might cost about the same per EFTSL, while a postgraduate subject might cost around 5 to 15 per cent more.

There was also significant variability in the different analyses between the cost per EFTSL for different FOEs when these are disaggregated. There is no easily identifiable pattern in the sample between STEM and HASS subjects, and some FOEs such as Engineering and Allied Health showed significant cost differences between the different sub-disciplines, and further analysis is required.

## Table 2: Summary of the impact of different characteristics on comparative cost

| Characteristic | Compared to on-campus metro bachelor level student in the data sample |
|---|---|
| **Online delivery** | Estimated reduction in cost of around third once smaller subjects accounted for |
| **Mixed mode delivery** | No difference or small effect |
| **Sub-bachelor** | Estimated to cost is around the same once smaller subjects accounted for |
| **Postgraduate** | Estimated increase in cost of around 5 – 15 per cent once smaller subjects accounted for |
| **Field of Education** | No consistent pattern or small effect on cost |
| **Regional campus*** | Estimated increase in cost of up to a fifth more once smaller subjects accounted for |

* The analysis estimates cost differences for campus location, although it has a small effect overall due to the smaller number of subjects from these campuses in the sample

# Questions for higher education funding and avenues for further analysis

The analysis in this paper raises questions about whether the current Commonwealth funding model adequately reflects the significant dimensions affecting the cost of delivering higher education courses. It also suggests factors that must be considered in determining how best to fund higher education in Australia. By accounting for the impact of class size on cost, the analysis raises some questions about how higher education is funded.

## Funding clusters:

The significant variability between FOEs in the model does not neatly follow a traditional division between broad fields of HASS and STEM disciplines. The current HESA funding clusters are so broad that their average costs are not likely to reflect the range of costs associated with different subjects. For example, for the Engineering disciplines there is a significant variation in the cost of different sub disciplines when examined at the granular FOE Level. There is an argument for a review of the efficacy of the current funding clusters and, if the findings of the modelling here are confirmed, there is an argument for reducing the differences between discipline funding and seeking a common rate.

## Qualification level:

This analysis raises the question of whether there is a case for providing additional funds to support postgraduate courses, to recognise that their smaller class sizes often lead to a higher cost. Further analysis is required to determine what might cause such a difference but, *prima facie*, some possibilities include greater seniority of academic staff teaching these subjects or more practical elements included in them. Sub bachelor subjects in contrast appear to show no mean cost difference from bachelor subjects, suggesting that there is a case to continue to fund these subjects at the same rate as undergraduate courses.

## Regional provision:

The impact of class size as a major determinant of cost would seem to explain why regional provision can sometimes cost more. However, regional campuses appear to have additional costs when controlling for subject size and will need supplementary financial support if they are to operate effectively. This would mean that they can continue to deliver the social benefits accruing to a region from having a university campus. In addition to the multiplier effects on businesses and schools, other likely benefits include helping regional communities stay connected to advances in knowledge and the latest scholarship. This should be factored into the cost-benefit analysis of regional campuses, including determining the minimum enrolment size for subject viability.

## Delivery mode:

In this model there is a variation in cost for different delivery modes which suggests the need for further analysis, including the impact on the cost of the different modes brought about by the need to move subjects online, in response to the COVID crisis. As high-quality online education becomes expected, it will lead to additional costs that are not always acknowledged, for example, in the production of online materials and in the provision of support services equivalent to those students would normally receive on campus. This may mean it will cost more than what previously passed for online learning and as much as – if not more than – campus-based learning. Whether this will eventuate is an important question.

# Summary

Examining anonymised cost data from 11 Australian universities in metropolitan and regional areas that account for 28 per cent of the Australian university student population shows significant variability in the mean cost of delivery per EFSTL. Consistent definitions and a uniform data collection allow for fine-grained comparisons of specific characteristics. Through analysis of 30,061 subjects, the number of enrolments in a subject is shown as a significant characteristic explaining the variability in cost per EFTSL in the sample. Other characteristics, such as qualification level, mode of delivery and campus location are shown to account for less of the cost variation. The analysis in this paper raises questions about whether the current Commonwealth funding model reflects the real costs of delivering higher education courses in Australia and whether it should be reviewed by focusing on a more granular analysis than can be achieved through broad average costs.

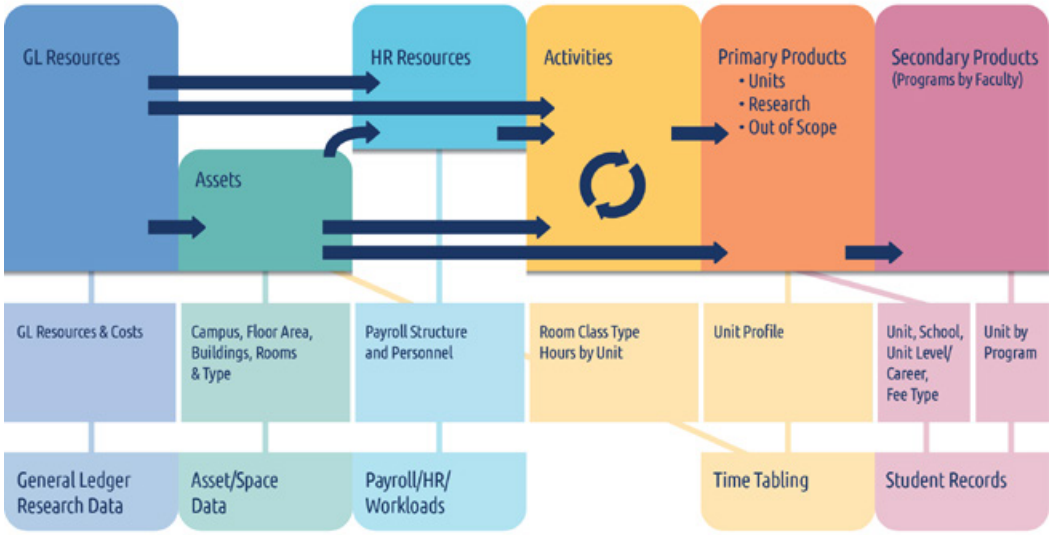
# Appendix 1

## Pilbara Higher Education Cost Model Methodology Overview

The data set used in this analysis is derived from the *Pilbara Higher Education Cost Model Methodology*. The *Cost Model* has been built up over 20 years and draws on experience from a range of industries including the Australian and United States Military, Oil/Gas Industry, Insurance, Government, Gaming and for about 15 years a specific focus on Higher Education. The *Cost Model* is used by all eleven Australian universities that provided data for this analysis.

The underlying approach in the *Cost Model* is Activity-Based Costing (ABC). Cost is a function of resources consumed, and to calculate full costs, the approach uses data from a range of university systems in conjunction with institutional finance systems. Data is taken from the General Ledger as well as from HR, Payroll, Facilities / Asset Registers, Time Tabling, and Student Enrolments systems. This is combined with research contract and metric data, workload models (for several but not all universities) and *Uniforum* professional workload data where available. This resource data is then allocated to activities (tasks performed) and these activities allocated to the appropriate product, with each product falling into one of four primary product types - Teaching, Research, Community Support, and Commercial. Activities are allocated to products using a wide range of cause-and-effect drivers. The overall architecture of the model is shown in the diagram below.

Figure 4: ACE Management Model



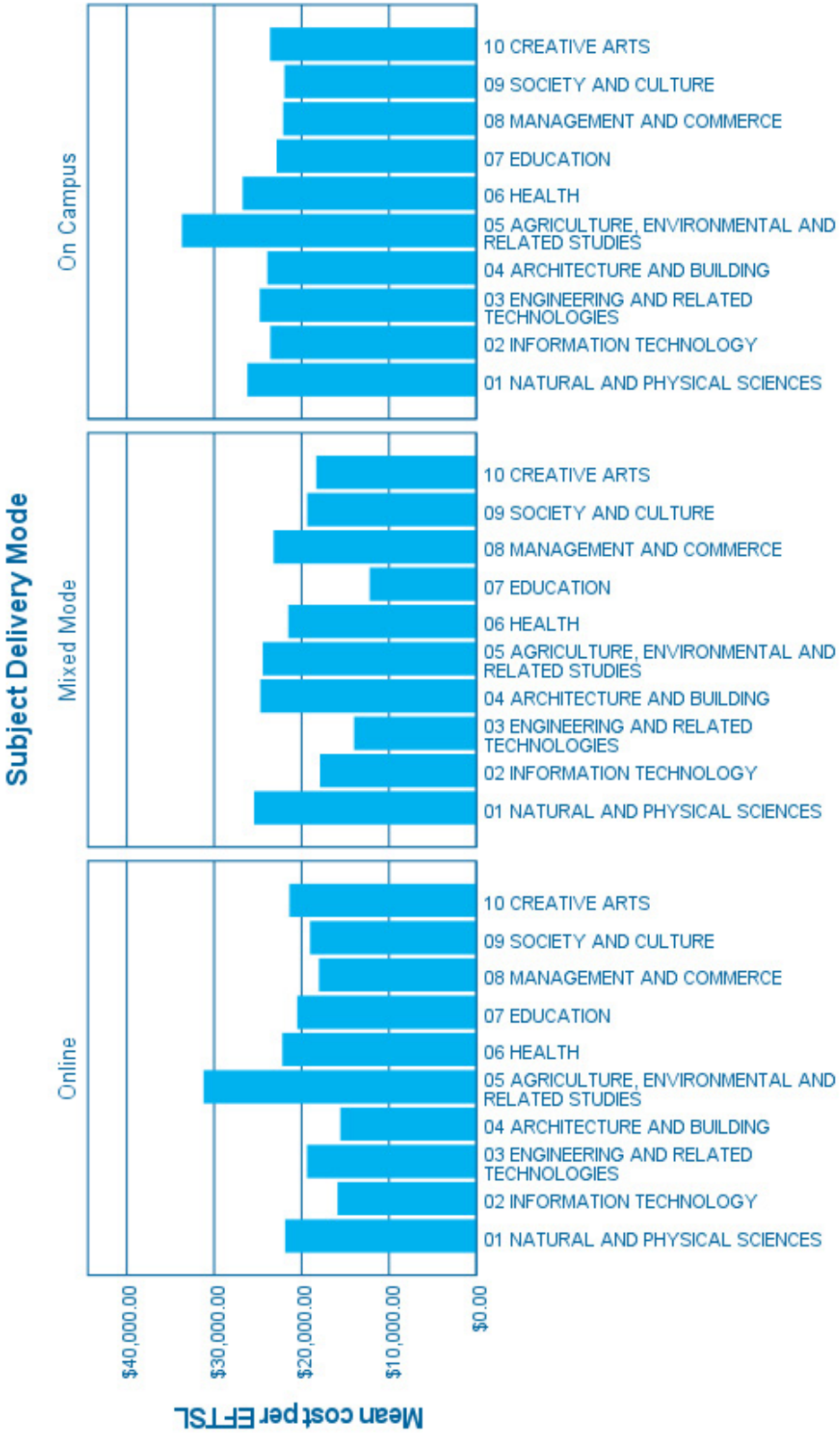

The ABC approach employed here uses robust methods for allocating overhead costs. Overheads in large institutions can often account for at least half of all costs, so if institutions use a single simple allocation method (like EFTSL), or an even spread of overhead, this can lead to large and misleading cost errors. The models developed can easily have many millions of individual allocation paths, using cause and effect formulas (drivers) for calculating cost at a very granular level. This results in the final costing (for Teaching) occurring at an extremely detailed level:

- Course Instance (when, where and how a course is taught). For example, Introduction to Electronics 101, (Semester 1, Campus A, On-Campus)
- Program, for example, Bachelor of Engineering (Semester 1, Campus A, On-Campus)
- Faculty / School / Discipline
- Campus

Even though the models are built using a wide range of source data, the results of the model are reconciled to the statutory financial reports of the university to ensure they match.

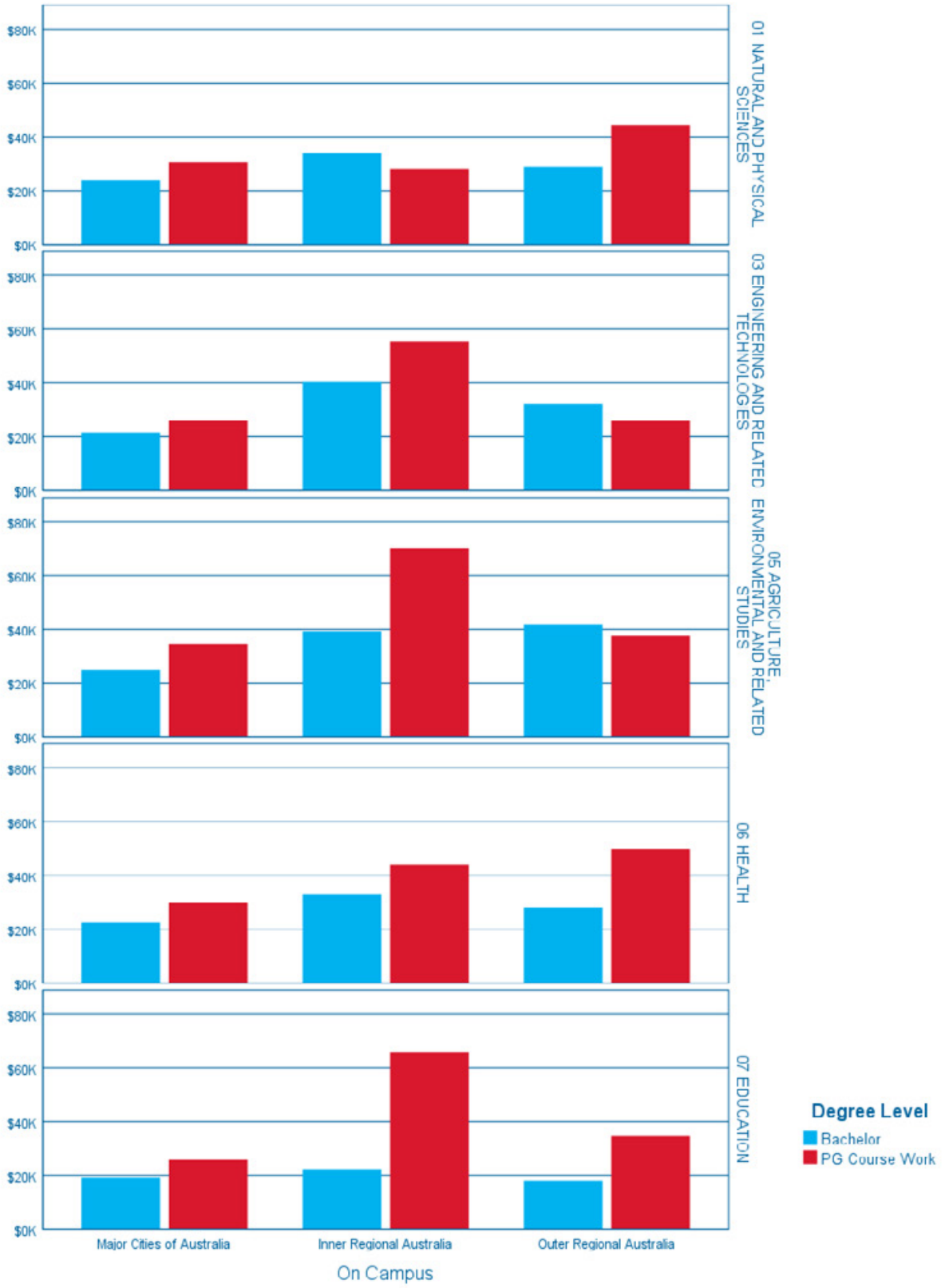
# Appendix 2

Comparison by mode of delivery



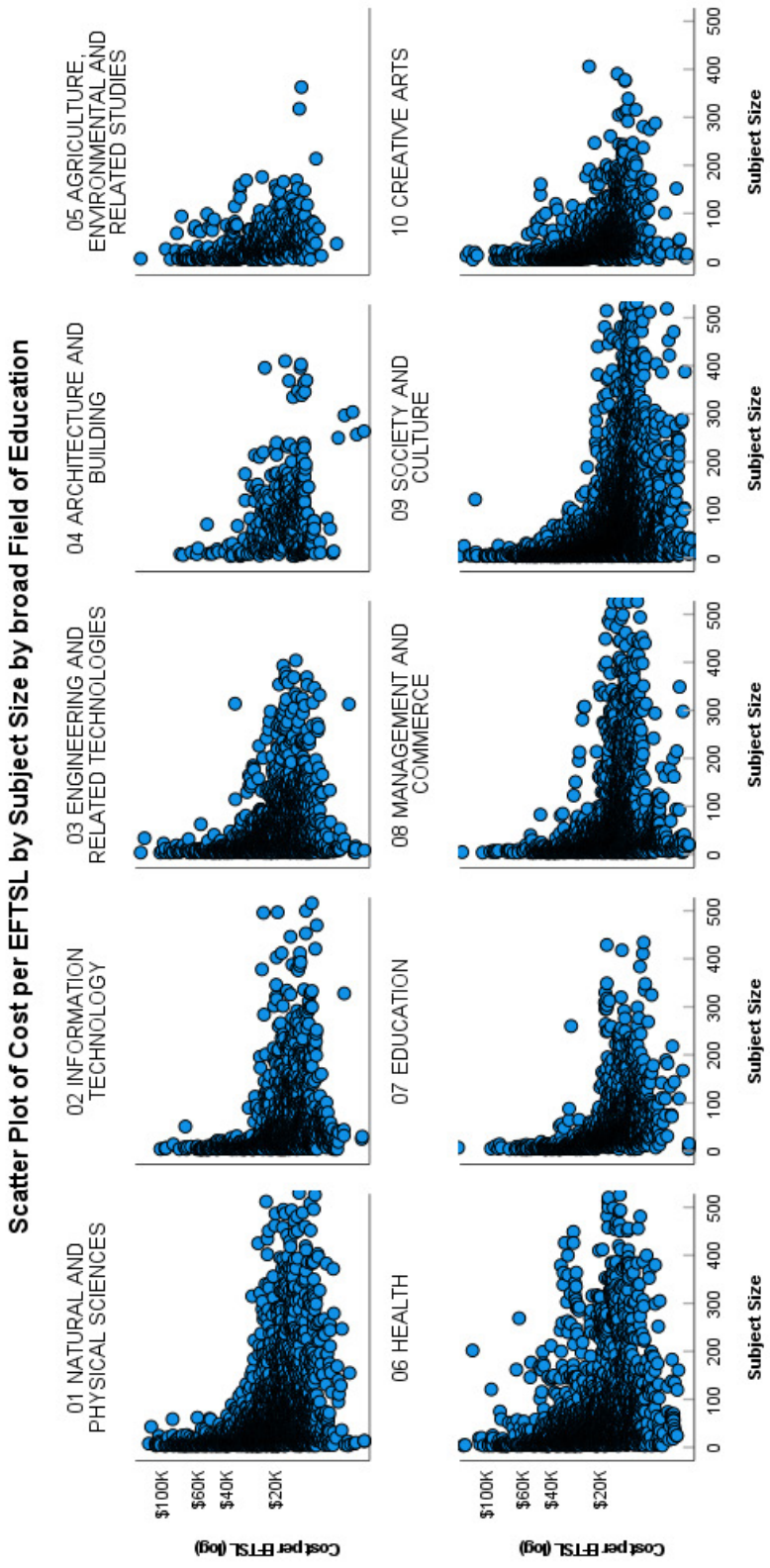
# Appendix 3

Comparison between Bachelor and Postgraduate coursework, on-campus mode of delivery, by mean cost per EFTSL



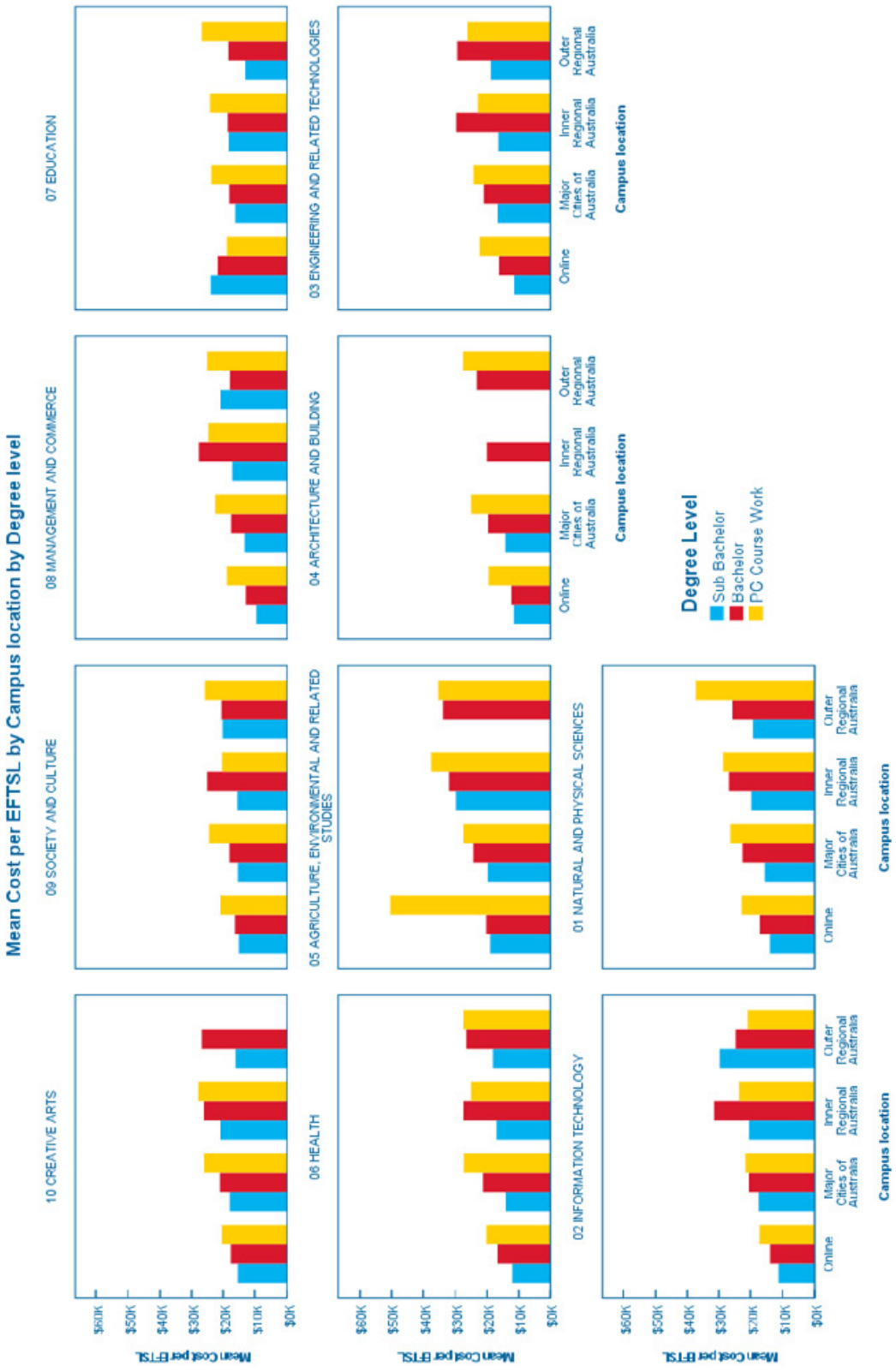
# Appendix 4

## Cost per EFTSL by Subject (Unit) Size



# Appendix 5

Cost per EFTSL by Campus location by Qualification (Degree) level

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