Review of Statistical Research Methods Training and Research Support (including the Statistical Consulting Unit)

Report

August 2014
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REPORT

TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>3</td>
</tr>
<tr>
<td>Executive Summary</td>
<td>4</td>
</tr>
<tr>
<td>Recommendations</td>
<td>5</td>
</tr>
<tr>
<td>Introduction</td>
<td>8</td>
</tr>
<tr>
<td>1. Statistical Training</td>
<td>8</td>
</tr>
<tr>
<td>2. Statistical Support</td>
<td>9</td>
</tr>
<tr>
<td>3. Accountability and Reporting</td>
<td>9</td>
</tr>
<tr>
<td>4. Classification of staff</td>
<td>10</td>
</tr>
<tr>
<td>5. Business Model of SCU</td>
<td>11</td>
</tr>
<tr>
<td>6. Related Initiatives and Developments</td>
<td>11</td>
</tr>
</tbody>
</table>
As a research-intensive, research-led university ANU aims to be at the leading edge in research methods and research training. Research in many disciplines increasingly requires advanced quantitative and statistical techniques for data analysis, the ability to handle large and small datasets and to design research questions and data collection with awareness of appropriate analytical methods from the outset. ANU aims to train students in research methodologies appropriate to their educational and research aims.

The ANU has undergraduate and graduate-coursework degree programs in Statistics located in the College of Business & Economics. Many other degree programs, including HDR programs, provide courses in statistical methods as compulsory or elective subjects. It has become apparent, however, that there are gaps in the coverage and reach of our research training in statistical methods.

The University also has a Statistical Consulting Unit (SCU), established in 1982 to provide guidance in statistical analysis to ANU researchers (staff and students) with varying backgrounds in statistics who require support in the design of experiments, construction of surveys, graphical analysis, collection of data in observational studies, statistical modelling and the analysis of results. The Unit provides some training in statistics but its main function is one-to-one consulting. It is currently centrally-funded and does not charge for its services. Current analysis suggest that the take-up of SCU services is uneven across the campus and the availability of its services is not uniformly known.

The University identified the need for effective organizational structures in its Strategic Plan, ANU by 2020, and has initiated a series of detailed reviews of structures, academic programs and service delivery to ensure they are fit for purpose. In the light of the retirement of senior staff in the SCU and of the renewal, since 2012, of the University’s program of research training for HDR, a review of the provision of training in statistical methods across the University was conducted in February and March 2014. The review also considered the need for statistical consulting advice to researchers and the most appropriate and efficient model for delivering it.

The review considered:
- the importance of individual statistical guidance and advice in the overall context of an effective high-quality research training environment and
- the most appropriate form of delivery of statistics support and research skills training for quality research outcomes as required by a research-intensive University, in the context of budgetary constraints.

To do this the review examined:
- ANU’s provision of statistical methods training against the needs of the University community and relative to comparator universities,
- the efficiency and effectiveness of ANU’s individualized method of providing consulting support for researcher projects and
- the allocation of the services across academic areas and disciplines.

Professor Jenny Corbett
Pro Vice-Chancellor (Research and Research Training)
EXECUTIVE SUMMARY

Following the findings by an internal Working Party (December 2013) of gaps in HDR training in statistical research methods and a need to re-examine the budget model of the SCU and the uneven take up of SCU services, an external review was initiated. The reviewer, Professor Ian Gordon of University of Melbourne, visited the campus on March 11 and 12, 2014. Submissions were received from 15 members of the university.

An abridged summary of the external review recommendations was circulated to the University community on May 20th. 11 responses were received during the consultation period. A draft report of the recommendations was considered at the SCU Advisory Committee meeting on May 21 and at Senior Management Group meeting on May 29.

The external review report contained 12 recommendations. After consultations, the University has made 13 recommendations which are contained in this report.

In broad terms it is recommended that:

- an audit of current training is carried out and once a gap analysis is completed there is further discussion on whether a general statistical methods course available across many degree programs should be provided,
- there is continued central funding for SCU, supplemented by some partial College funding (to be negotiated with heavy-user Colleges and areas with an interest in collaboration) and contributions from externally-funded research projects that use SCU services,
- SCU services are widely advertised to ensure access is equitably available,
- the extent of unmet demand for consulting services is assessed and methods of rationing services are reconsidered if needed,
- SCU record keeping and reporting are extended,
- A Director is appointed at Level D for a fixed term to guide the SCU and to contribute to new University initiatives in statistical methods research.
UNIVERSITY RECOMMENDATIONS

A. IMPROVING TRAINING AND SUPPORT IN STATISTICS FOR POSTGRADUATE STUDENTS

R1: A realistic catalogue of postgraduate subjects in statistical and related research methods at ANU should be assembled as a prelude to considering a more coordinated approach to statistics training. This task must be done with the practical involvement of a senior academic statistician.

Regardless of whether a co-ordinated approach is desired, the University will undertake an audit of available postgraduate statistical-training research methods courses. The audit, and a gap analysis of essential statistical training needs, will be done with the involvement of a senior academic statistician. A realistic catalogue of available postgraduate courses should be created based on the audit, and available online. The audit and gap analysis should begin as soon as possible and be completed by December 2014, though it may take more time to create an online training catalogue.

R2: After the audit and gap analysis, consideration should be given to the provision of a general postgraduate statistics subject that could be taken for credit in many different degrees, particularly focused on postgraduates in programs where statistics training is not routinely provided. This should be discussed by HDRC in S1 2015 and recommendations forwarded to URC and UEC if a new course is to be approved.

When the gap analysis is completed, the University should revisit the question of whether to provide a general postgraduate statistics course that could be taken for credit in different degrees. Experience from the course on Computational Thinking will be a useful input. As noted below, the external review warned of the difficulty of achieving a coordinated approach to statistics training. Some responses to the review also noted a preference for discipline-specific training rather than general, so there will need to be flexibility in the approach. The consideration of this option should be led by the HDRC with advice from statisticians. While SCU staff could teach in to such a course, the SCU is not an independent academic unit and transfer of EFTSL would not be the appropriate mechanism by which it would be compensated.

R3: The Dean of the Medical School should be requested to provide an overview of the compulsory research project for medical students, outlining the statistical requirements to complete the project and the current arrangements to meet those requirements.

It is understood that some arrangements are in place providing basic support for the research project by medical students. Additional workshop-style teaching has occasionally been provided by SCU staff and others and some students have sought one-on-one consulting help from SCU. Further information is sought from the Dean of the Medical School to add to the audit of courses under R1 and will be considered as part of the gap analysis.

B. BUILDING CAPACITY THROUGH STAFFING

R4: Staff in the SCU should have academic appointments, if academic and professional are the only alternatives. The University should review the available categories of appointment and clarify appropriate performance criteria for staff in academic service positions.

Positions in SCU should be classified as academic, unless the University reviews the available
categories. ANU does not currently have a classification such as “academic specialist” which does exist in some other G08 institutions. The University should consider whether such an additional classification would be useful. The recently-revised promotion criteria are quite flexible in the weighting of contributions to teaching, service and research but guidance may be needed in considering promotion cases for academic support service staff. Staff in SCU should be closely associated with an academic home School or Department and should be mentored within the local area for career development and the preparation of promotion cases.

R5: A Director of the SCU should be appointed at level D for a fixed term of 3 years.

Consistent with a level D appointment, the Director of the SCU will be required to display academic leadership in the development of statistics consulting and training and to work with the senior management of the University on new initiatives in statistical methods research and training currently under discussion. The Director will need a coherent and flexible approach to defining the future role for the SCU as these new initiatives take shape. The appointment will be for a fixed term of 3 years in the first instance to provide for the possibility that the role might change as these developments roll out. The University recognises concerns about comparability with leadership positions in other academic specialist service units, but notes there are important differences in the types of service provided and there may not be a single solution to appointment classification that suits all such units.

R6: SCU, with other ANU statisticians, should propose mechanisms to build a cross-College network of people in statistics training. If support is needed to sustain this, a clear proposal should be developed.

See text below in Section 4.

C. THE STATISTICAL CONSULTING UNIT ROLE, BUSINESS MODEL AND MANAGEMENT

R7: The SCU should continue to be supported mainly by central funding.

The University should continue to provide central financial support while looking for greater contributions from users as outlined in other recommendations. The SCU should not be required to seek external paid consultancy as a way of raising revenue to fund the Unit’s core academic activity (see further discussion of business models, below). The budget for 2015 will be developed by PVC (RRT) and EDAP to include the current staff levels plus the Director, subject to R8 below.

R8: The SCU should pursue opportunities for some indirect funding from research or consulting projects and grants of ANU staff.

The University expects externally-funded research projects that use the expertise of the SCU to include provision for the consultancy services in grant applications. SCU staff should work with clients to develop such projects wherever possible. The SCU and its Advisory Committee should develop targets for increases in this type of funding during the budget cycle in 2014.

R9: Where usage dictates, some partial College funding of the SCU should be sought. In particular, discussion should begin on whether the College of Medicine, Biology and Environment (CMBE) will fund half of one position in the SCU.

The University will look to heavy-user Colleges to consider joint appointments with the SCU.
and will trial other forms of co-contribution including payment for teaching services and joint externally-funded projects (c.f. R7). Discussion should proceed immediately with CMBE on co-funding a position and should follow with other heavy-user units when these can be identified. These trials will be monitored by the Advisory Committee in consultation with the Director of SCU.

R10: The SCU should establish the level of “unmet demand” and initiate policies and practices to deal with it.

The SCU should propose methods to establish the extent of unmet demand. These should include raising the Unit’s profile, including improving its website and other methods.

The external review suggested a limit of 20 hours free consulting time for HDR students. This proposal should be revisited along with other rationing methods that could be suggested by the SCU once the evidence on the need for a rationing mechanism is available. In the interim, the Advisory Committee should set expectations for a more equal allocation of client consultations across the Colleges, recognising there will always be more usage in some areas than others so absolute equality is not the objective.

Workshop-style support for cohorts of students with similar project requirements can be an efficient way to support research training and could be used as a model in areas with cohorts doing research projects as part of a structured program. Since this is an additional service, beyond the consultancy service SCU is designed to provide, an appropriate payment arrangement should be reinstated (as formerly applied) when workshops and short courses are provided. When the extent of excess demand and the need for a rationing mechanism is established under R10, the question of limits on one-on-one consulting for medical students and other coursework student projects will be revisited.

R11: The SCU should produce an annual report with some reasonable statistical summaries of its activities to be forwarded to URC and Academic Board.

The Director of SCU provides reports to the Advisory Committee meetings twice yearly. These should be combined and expanded to provide an annual report for wider distribution and to appear on the website of the Unit. The Advisory Committee should provide guidance on what reporting is required. The report should be forwarded to the University Research Committee and to Academic Board. Minutes of the Advisory Committee meetings should be forwarded to URC on a regular basis.

R12: The SCU should keep records of the time spent in collaboration with researchers, staff and postgraduates, in some detail. It should also include time spent on other legitimate activities, in itemised form.

SCU staff members should keep records of the allocation of their time across consulting, teaching (where relevant), own research and HDR supervision and other ANU service. The SCU should design a method by which these records will be used to indicate how resources are allocated, how much time is spent on particular projects and clients and which projects result in joint publications. The aggregated data will form part of the Advisory Committee’s annual assessment of the performance of the Unit.

R13: The SCU should be reviewed 3 years after the appointment of the Director and then on a regular cycle of 4 to 5 years.
INTRODUCTION

The Statistical Consulting Unit has had a long and productive history at ANU, dating back to its establishment in 1982. This is, for example, two years older than the similar Statistical Consulting Centre at the University of Melbourne.

A statistical consulting group (now the Statistical Consulting Unit, SCU) was established by ANU in 1982 to provide statistical support to ANU researchers (staff and students) who may have varying levels of statistical knowledge but require support in the design of experiments, construction of surveys, graphical analysis, collection of data in observational studies, statistical modelling and the analysis of results. Support is available without charge to Honours students with research projects, graduate students and staff in all parts of the University. In addition to one-to-one consulting sessions, the SCU also occasionally provides specialized training courses at the request of Schools and Colleges but these courses are intended as awareness-creators not full-spectrum training in statistics and are not a substitute for the main function of one-to-one consultations. As a means to provide training to a wider audience, three online courses have been developed, delivered and supported by SCU since 2011. The SCU has been internally reviewed on a number of occasions with a full report produced from the review of 1992.

In late 2013 the Advisory Committee for the SCU set up a Working Party to examine business models that would contribute to budget sustainability and would enable extended reach of the SCU to make its services more widely known and more equitably distributed across different areas. This was prompted by the budget challenges facing the SCU and the evidence on uneven client usage presented to the AC meetings. The Working Party drew attention to the extent of gaps in HDR training in statistical research methods, as well as the resource challenges in the SCU (particularly following several retirements) and the uneven take up of SCU services. The University executive therefore initiated an external review of HDR statistical training and the role of statistical consulting services.

The report that follows is drawn from the work of both the internal Working Party and the Report of the External Review.

1. STATISTICAL TRAINING

An ideal program of statistics training for graduate researchers would require a great deal of re-organisation. The situation at ANU is similar to many other universities in Australia and elsewhere, although it may be a little more fragmented and complicated due to the history of the “two Universities”. The steps required to set up a coordinated approach, which could lead to considerable efficiencies, would be experienced by many as impositions. One submission noted:

“Universities are not inherently well placed to handle demands that require wide co-operation across departmental and other boundaries.”

However, wide co-operation is exactly what would be required. For that reason, it requires a decision by the senior management on whether the long-term benefits of a smaller number of subjects with larger enrolments would justify the costs of implementing this. The main obstacles are the University’s devolved financial model and the view that training needs to be tailored to specific disciplines. In feedback, there was some enthusiasm for centrally-provided training from students but less from staff.

A useful first step would be carefully cataloguing the existing offerings and making information clearly available online. Even this step will require commitment of resources.
2. **STATISTICAL SUPPORT**

It is obvious that many researchers, staff and postgraduates, have benefited from the work of the SCU over the course of its existence, and some individuals have benefited greatly. The ANU’s strong research culture has supported the sustained existence of the Unit through a variety of administrative arrangements; most recently it has been physically located in the Mathematical Sciences Institute and line-managed within the Chancery. The evidence of the value of the SCU comes from surveys of its clients, publications and warm personal anecdotes from members of the Advisory Committee and in interviews conducted by the external reviewer.

Because of the evidence of the value of the SCU, and also because it is widely accepted that a high-ranking research university needs to have statistical expertise available to its quantitative researchers, both the internal Working Party and the external review recommend that the SCU should continue to exist, and provide the kinds of services it has historically. The recommendations below are aimed at enhancing and refining the work of the SCU, sharpening its function and efficiency and positioning it to play a role in new initiatives developing at ANU.

3. **ACCOUNTABILITY AND REPORTING**

The SCU currently provides some documentation of its activities and productivity, including lists of publications for which its staff are co-authors. The Director has provided reports to its Advisory Committee. To raise the profile and add transparency, there is a need for fuller reporting of the activity of the SCU in an annual report that includes summaries of the number of clients seen, the activities of the SCU over the year and important collaborative research projects it has supported. It is recommended that some summary of the level of time spent on various activities should be included. This will require introducing a method of recording time allocation by staff.

The recording of time will also reveal the time staff spend on a student’s project outside the period of formal consultations. In an environment in which it is believed there is unmet demand (on the one hand) but unmonitored amounts of time may be spent with an individual researcher (on the other hand), more informative data would help decision-making about the dilemma. Time recording also enables summaries of SCU time spent on various categories of activities, in broad terms, such as staff, PhD students, courses, personal research, professional development and so on. When time allocation records are introduced, there must be a “general” category which includes all the non-specific work that cannot be aligned directly with a “project”, however broadly this is defined. Staff cannot work on “projects” 100% of the time since they need to deal also with other general University tasks. The format of the time use survey used for reporting to government could provide a benchmark.

As part of the recommended annual report, clients’ views on SCU services should be sought. A regular or periodic survey, or a variant of the SELT process, could be used. The survey conducted by SCU in 2012-13 had a 38% response rate. This is rather low, and may indicate either a lack of intensive follow-up effort, or a possible concern that non-respondents may not wish to offend by reporting negative feedback. With a well-defined target population that can be sent reminders, and has a prima facie reason to participate, a response rate of more than 38% should be achievable. It is understood the Advisory Committee is considering methods to address this issue.

When the ANU Graduate School was disestablished in 2006, management of SCU was
transferred to the Registrar’s Division and in 2012, line management transferred to the PVC (Research and Research Training). The external reviewer noted that the current arrangement of the SCU reporting to the Chancelry is somewhat unusual, and that an alternative management structure could be to locate the SCU within a larger group of closely-related academics, namely, statisticians. This issue has been raised several times in past reviews of SCU but, given the current, devolved College structure at ANU there is no recommendation to change the current arrangement. Locating the SCU within one College could send a signal about ownership and might limit access to users from other Colleges. Given that a large part of SCU’s role is training and support for HDR students, the previous location within the Graduate School was a natural fit. In the current structure, the nearest equivalent is to maintain close links with the Division of Research Services and the HDR Research Skills and Training team, both of which report to the OVC. However the wider problem, about the dispersal of academic statisticians at ANU remains and the external reviewer suggested that the senior executive consider ANU’s strategic interest in strengthening its presence in statistics. As noted in section 7, there are a number of related developments in train.

4. CLASSIFICATION AND SUPPORT OF STAFF

One of the terms of reference of the review concerned the balance of academic and professional staff in the SCU. The external reviewer and the majority of members of the Working Party and the Advisory Committee have strong views about this. Several submissions on the recommendations also strongly supported academic appointments. There are few, if any, examples in universities around the world where staff providing applied statistical support within the institution are employed as professional staff. There are certainly no instances of this in Australia.

The external review noted the academic/professional alternative is very stark and does pose a problem for academic appointments, when “research active” and promotion criteria are involved. It is for this kind of reason that the University of Melbourne has introduced four types of academic classifications, each with their own promotion criteria. These are “teaching and research” (the traditional academic), “research only”, which includes postdocs among others, “teaching specialists”, and “academic specialists”. The “academic specialists” category is intended to categorise academics who have a non-standard, specialised role.

This issue is not simple to resolve but the University should now have a discussion about how academic staff in similar, highly-valued but non-standard roles, can be considered for promotion. The reviewer, the Working Party and the Advisory Committee are of the view that appointing SCU staff to professional staff positions is not the answer. However, staff in SCU and those in other academic specialist service units should have an academic home unit where they are well-integrated and receive guidance and mentoring for performance and career development.

The staff at SCU have individually maintained good links with other statisticians and with professional and academic associations and it is recommended that the SCU consider ways to enhance and develop the network across the University, particularly bringing together people involved in statistics training into a mutual support network. A modest degree of financial support may need to be found to support an ongoing network.
5. BUSINESS MODEL OF SCU

The internal Working Party looked at different approaches to funding statistical consulting services used in the Group of Eight and in comparator universities in the IARU group. The models were categorized according to the ways in which limited consulting resources are allocated and how funding is provided. The variants fall broadly into quantity- or price-rationed and centrally-funded or some fee-for-service. The WP view was that there is a strong academic case for treating statistical research support as a core part of research support like library, IT, research training and research management, which should be centrally funded. Most Go8 universities are moving in this direction. This requires a central budget allocation that covers the major part of the cost of staffing. The exact dollar amount depends on the age, experience profile and number of the appointments. Where there is scope for joint appointments with Colleges it will enable expanded resources.

The external reviewer’s view was that moving to an external consulting model to cross-subsidize internal research support could not be achieved in the current structure and culture of the SCU at ANU. This would require a complete strategic shift in thinking about statistical support at ANU and is not recommended. The external reviewer did recommend rationing the time available to HDR students (setting a limit of 20 hours free consultation) and that externally-funded research projects should pay for services. Heavy-user groups, mainly within the Science Colleges should contribute by making joint appointments. The feedback from the University community did not generally favour imposing limits on HDR student access to free consulting and this recommendation is deferred until a more accurate measure of the unmet demand is available. However it is not rejected as a possible necessary measure in future. ANU currently provides the most generous free access for HDR students amongst the G08 universities.

As noted in the recommendations, both users and SCU should look for ways to provide financial support for SCU services when it can be included in grants. Where SCU provides short courses and workshops for College student groups working on projects, these should be remunerated. Efficient administration of payment arrangements will need to be considered.

6. RELATED INITIATIVES AND DEVELOPMENTS

ANU is currently considering ways to leverage its considerable resources in computational analysis, the handling of “big data” in an interdisciplinary context, digital Humanities, Social Science data analysis and “eResearch” and to capitalize on synergies. Various institutional arrangements might facilitate this and the University Research Committee has discussed an eResearch strategy, the appeal of Doctoral Training Centres for HDR training in related methodologies across disciplines. There is a project on computational analysis crossing disciplines of engineering and social science in development. The recently announced centre on social research methods brings potentially relevant developments in social science survey and data methods at both a University and College level (within CASS) which may significantly expand resources in social science statistical analysis. It is too early to map the direction of these discussions, or to be clear about their implications for a unit such as SCU and for the organization of HDR research training in statistical methods. It does seem likely that the ANU environment in this area will change significantly over the next few years. For these reasons
it is recommended that a Director be appointed to SCU who will engage with the University’s strategy and will enthusiastically bring the talents of the SCU into the mix in a productive way. Recognising that the role of the Director may change as other developments unfold, it is recommended that the Director be appointed for a fixed term of 3 years in the first instance. It is also recommended that the SCU be reviewed initially 3 years after a Director is appointed and then on a normal cycle every 4 or 5 years.