UWA Statistical Consulting Group
Half-Year Report to UWA Graduate Research School
January–June, 2008

The UWA Statistical Consulting Group (SCG)\(^1\) provides statistical and mathematical advice to the University community, government, business and private clients. Since 1995 the Group has given advice at no charge to UWA Postgraduate Research students through the Statistics Clinic, with the support of the Vice Chancellor's discretionary fund, from 1998, and more recently the Graduate Research School. In 2007, with encouragement and additional funding from the Graduate Research School, the SCG organized for the first time Short Courses on Statistics specifically for Postgraduate Research students. In 2008 there has been an expansion of such courses, both in terms of the number of days offered and the variety.

The present report is produced under a 2006 agreement with the Graduate Research School and is the first of two reports for 2008.

1 Statistics Clinic

Postgraduate Research (PGR) students can obtain statistical advice without a prior appointment by attending during one of the three scheduled hours per week, or they can make an appointment; phone and email enquiries are also handled. Normally this service is coordinated by Kevin Murray, who is presently the only full-time statistical consultant in the Group (or, apparently, in the University!). When attendance is heavy, or problems raised require further high-level advice, the Group is able to call on the assistance of other statisticians (or mathematicians) within the School of Mathematics and Statistics; available statisticians during the half were Dr Robin Milne, Professor Adrian Baddeley, A/Professor Kaipili Vijayan, Dr Berwin Turlach, Dr Nazim Khan and Marty Firth.

Details are gathered about every visit to the Statistics Clinic. Over the half-year, there were 117 visits to the Clinic, compared with 126 in the same period last year (70 and 56 in the component quarters). Annual figures were 200, 226 and 230 for the calendar years 2004, 2005 and 2006, respectively. Table 1 presents the data on number of Clinic visits for the half-year, classified by Faculty and Month, with totals for the 2007 first-half included for comparison. No adjustment has been made for the differing numbers of Clinic days in the months; these ranged from 10 clinics in January to 13 in February, May and June, giving a total of 72 Clinics for the half-year.

Figure 1 gives a histogram for the duration of visits to the Statistics Clinic over the first half of 2008. The median duration of a visit was 40 mins; the mean was 47.7 mins and the standard deviation 22.2 mins. (These values are similar to those of previous reporting periods.) Longer visits

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\(^{1}\) For further background on the SCG see Appendix A of this report.
often extend beyond the publicized Clinic hours or are separately timetabled. The duration of visits reflects the non-trivial character of most of the issues brought to the Clinic. Overall, 129 hours were devoted to Clinic related consulting; of this 72 hours were the scheduled Clinic times and 57 hours were provided outside these times.

In addition, over the quarter, there were a total of 208 emails and numerous phone calls relating to the Statistics Clinic.

2 Short Courses on Statistics

During the first half of 2008, the SCG ran three Short Courses having a total duration of 6.5 days: for comparison the total duration of Short Courses given over the calendar year 2007 was 7.5 days. The first two courses of 2008 were similar to courses run in 2007, but modified in the light of student feedback from the earlier courses; the third was a new venture. Details were as follows.

- **An Introduction to R** (8–9 January, 2 days): Presenter – Dr Berwin Turlach.
  R is a free and extremely powerful language and software environment for statistical computing, data analysis, and graphics. In particular, it facilitates dealing with data involving many variables and the fitting of complex models to such data. It has become the tool of choice for many statisticians and scientists, especially because it is actively being developed and supported by the worldwide statistical community. The R environment is highly flexible and extensible, and contains a wealth of functions to carry out both standard and non-standard statistical and graphical analyses. This course was designed for those with no previous knowledge of R. It provided an introduction to R syntax, and covered such topics as data entry and manipulation, and data exploration, plotting and summarization. It gave also an introduction to programming in R. This course had an enrolment of 35 PGR students.

- **Introductory Statistics** (27–29 February, 2.5 days): Presenters – Kevin Murray and Dr Russel John.
  The course was designed for people with little or no knowledge of statistics. It covered material ranging from means and standard deviations to simple linear regression, and basic ANOVA. Some elementary categorical data analysis was included. Emphasis was placed on applications rather than theory. The statistical package SPSS was used, with no prior knowledge of it assumed. Throughout the aim was to promote understanding of the statistical ideas and concepts rather than just explaining how to use the package. This course had an enrolment of 35 PGR students.

- **Linear Regression and ANOVA I** (22–23 April, 2 days): Presenter – Dr Russel John.
  The course assumed a knowledge of basic statistics, e.g. from the Introductory Statistics course.
It covered material ranging from simple linear regression to intermediate topics in regression and analysis of variance (ANOVA). Emphasis was placed on applications rather than theory. The statistical package SPSS was used, but throughout the aim was to promote understanding of the statistical ideas and concepts rather than just explaining how to use the package. Prior knowledge of SPSS was not assumed. This course had an enrolment of 35 PGR students.

These courses, as with all our Short Courses to date, consisted of an alternating series of lectures and computer practicals that allowed participants to apply immediately what had been learned in lectures. For each course a $60 fee was charged to cover administration costs, a substantial course booklet, and provision of refreshments. Mainly because of constraints on the availability of suitably qualified demonstrators, we choose to restrict our Short Course enrolments to a maximum of 35 students. Usually many more people express interest than can be accommodated, and this is especially so with the Introductory Statistics course. This interest highlights the need for continuing and wider availability of such statistics courses.

3 Comments

As well as providing the basis for this report, our database about Clinic visits and the feedback obtained from Short Course participants are helpful in responding to demand. Partly as a result of such feedback the SCG has decided to modify the format of the Clinic.

From the beginning of August the Statistics Clinic has operated for one hour on each of two separate days (Tuesday and Thursday), at which times PGR students can attend the Clinic without an appointment (which has been the style for more than two years). These two hours are supplemented by two further (consecutive) hours on another day (Wednesday) during which students can make an appointment for one of four half-hour slots. In principle, this increases by one third the time formally set aside for the Statistics Clinic during any week. In addition, the new format will remove the need for some such students to wait (sometimes for considerable periods of time) in a queue, and hopefully encourage students to prepare better for appointment sessions (where the time slot is indicated in advance). It is important for us to strive for efficiencies in the operation of the Clinic, from the point of view of both PGR students and those of us who staff the Clinic, and we believe that the revised format is a step in this direction. Performance of the Clinic under this revised format will be closely monitored, with a view to making possible further adjustments in early 2009.

Three further courses, Introduction to MS Excel with Statistics (1 day), Introductory Statistics (2.5 days), and Design and Analysis of Experiments I (2 days) have been mounted already in the second half of 2008. The Introductory Statistics was a repeat (with some revision) of the course that was offered in late February. Details of these courses will be presented in the second-half report. Our ability to mount this expanded range of courses, and more that are planned in the second half of 2008, has been made possible through our good fortune in securing, from the beginning of 2008, the services of Dr Russel John to present both the Introductory Statistics, the Linear Regression and ANOVA I, and the Design and Analysis of Experiments I courses.

Our 2008 presentations are supported also by the continued availability of our colleagues Berwin Turlach and Nazim Khan, although both are currently resident overseas. We are reliant also on the availability of a suitable number of other statistics colleagues and students who provide assistance as demonstrators in computer laboratory sessions. The Group still hopes to offer also an introductory course on basic statistics using the statistical software SAS. This possibility, amongst others, was discussed during 2008, but not implemented due to lack of resources (and particularly the lack of availability of suitably experienced personnel to act as demonstrators).

The short courses have been widely publicized to UWA students, with the help of Graduate Research School/Student Services staff, and enrolments to date have been more than adequate to justify their provision. It is our intention eventually to advertise more widely to PGR students and staff at other universities in WA because, with such individuals paying a much larger fee, it should then be possible to leverage and offer some of our Short Courses more frequently to UWA PGR students. To date, because of the speed with which the available places get filled by UWA students
it has been difficult to get much leverage in this way.

As indicated in earlier reports, it is envisaged that there will be demand for specialist courses. Our first such course, Introduction to Structural Equation Modelling Using AMOS, will be offered in December 2008. Since such a venture involves considerable extra costs (air travel, hotel accommodation and increased presenter fees) enrolment fees much higher than our usual fees are necessary. We are grateful that special support from the Graduate Research School has enabled the fee for PGR student enrolments to be kept much lower than would otherwise have been possible.

4 Concluding remarks

Since early 2008 the SCG has been upgrading its website and this has now been launched. We are grateful to the Graduate Research School for encouraging this upgrade. In preparing for the new site, online forms were developed to facilitate expressions of interest, enrolment, and feedback for the Short Courses. These forms were live on the old SCG website for some time before the changeover and are proving to be a great advantage in efficiently gathering the required information.

The SCG is grateful for continued encouragement and financial support from the Graduate Research School to operate the Statistics Clinic and provide Short Courses on statistics for PGR students. By the end of this year we plan to have more than doubled the total duration of Short Courses offered in calendar year 2008 over that for the 2007. We continue to seek opportunities gradually to expand our activities, for example by providing more courses and a greater range of courses, and in ways that will enhance the quality of the UWA research effort. Although the SCG employs only one full-time consultant the workload is such that we are seeking ways of employing an additional person, at least on a part-time basis.

In addition to what has been foreshadowed above, the appointment from 1 July 2008 of two further statistics staff within the School of Mathematics and Statistics, and the possibility of further appointments in 2009, will significantly enhance the pool of statistics expertise available to the Consulting Group. This has the potential to enable the Group to further extend its services for PGR students, especially in Short Courses on Statistics.

A particular need is the availability of a more suitable computer laboratory in which to hold our Short courses. Currently we are able to use at no cost the large computer laboratory (120 PCs) within the School of Mathematics and Statistics. This is not ideal because there are at present no dedicated projection facilities within this computer lab, and also because it is seldom possible to get sole use of this venue. (Sole use is, for example, impossible during teaching semesters.) Educationally it would be preferable to lecture and conduct the computer labs in the one venue, because this ideas could then be reinforced sooner by analysis of data. Whilst other more suitable (in terms of both size and projection facilities) venues do exist on the UWA campus the costs of hiring these are outside our current budget capabilities, and furthermore such venues would require additional expense and nuisance to install relevant statistical software. We continue to consider these matters and would welcome any suggestions on ways to solve what is becoming one of the more serious restrictions to improving our present Short Courses and offering more such courses.

Robin K. Milne and Kevin Murray
Directors
26 November, 2008
Appendix A: More about the UWA Statistical Consulting Group

The SCG was first given formal recognition as a UWA Research and Training Centre by a resolution of the Senate of The University of Western Australia in late 1986. The calendar year 1987 was its first full year of operation. After a review in 2003, an application to continue as an existing UWA Centre was approved by Academic Council in November of that year. An interim report was submitted in February 2006 summarising the progress that the SCG had made with respect to the performance indicators approved at the time of its renewal as a UWA Centre. One of these indicators was the level of usage of the Statistics Clinic.

The SCG regards its activities as a vitally important contribution to enhancing the quality of the UWA research effort. Whilst a significant part of this contribution is the provision through the Statistics Clinic of a statistical consultancy which offers advice, especially on the analysis and interpretation of data, the Group sees its primary role more broadly as involving education and research training of UWA PGR students and staff.

Currently the SCG employs only one full-time consultant. Additionally, the Statistical Consulting Group draws, if need be, on the expertise of the staff of the School of Mathematics and Statistics (and, if necessary, other organizations including UWA Schools). Most members of the Statistics section of the School of Mathematics and Statistics are also members of the Group and offer consulting services through it. Our charges for UWA students, UWA internal clients, and for external clients, are $110 per hour, $135 per hour and $175 per hour, respectively. (For external clients GST must be added.) These charges are at the level required to cover salary and administrative costs, equipment costs and UWA overhead.

Many UWA students and staff approach the SCG for statistical advice on various issues. Common issues include:

- assistance with preliminary design aspects (e.g. of questionnaires and experiments), including sample size calculations;
- advice about appropriate statistical methods for analysis of data, and presentation of results;
- assistance with interpretation of the results;
- requests by researchers/students to perform an analysis involving unfamiliar software;
- remedial help with statistical concepts and methods;
- assistance in learning about more advanced, specialised statistical methodology;
- data analysis problems requiring new methodology;
- resolving disagreements over statistical issues, e.g. between researchers and referees but also between supervisors and students;
- problems of statistical methodology encountered part-way through a thesis project;
- enquiries on how to respond to examiners’ or referees’ critiques about the statistical methodology used, or about the validity of the conclusions that were drawn.

Some further more detailed comments, especially about the Statistics Clinic, can be found in Section 3 of the UWA Statistical Consulting Group Final 2007 Report to UWA Graduate Research School.
Appendix B: UWA Statistical Consulting Group – Summary of Short Courses, 2008

The Short Courses mounted during 2008 were constrained partly by availability of suitable presenters and partly by lack of availability during teaching semesters of suitable venues (lecture rooms and computer laboratory space). At the time of writing this report the following courses have already been given.

- *An Introduction to R* (8–9 January, 2 days):
  Presenter – Dr Berwin Turlach.  (Enrolment 35.)

- *Introductory Statistics* (27–29 February, 2.5 days):
  Presenters – Kevin Murray and Dr Russel John.  (Enrolment 35.)

- *Linear Regression and ANOVA I* (22–23 April, 2 days):
  Presenter – Dr Russel John.  (Enrolment 35.)

- *Introduction to MS Excel with Statistics* (1 July, 1 day):
  Presenter Dr Nazim Khan.  (Enrolment 35.)

- *Introductory Statistics* (21–23 July, 2.5 days):
  Presenters – Kevin Murray and Dr Russel John.  (Enrolment 35.)

- *Design and Analysis of Experiments I.* (18–19 September, 2 days):
  Presenter – Dr Russel John.  (Enrolment 35.)

In addition, the following two courses have been organized for later this year.

- *Introduction to Structural Equation Modelling Using AMOS.* (9–12 December, 4 days):
  Presenter – Dr Everada Cunningham.

- *An Introduction to R* (15–16 December, 2 days):
  Presenter – Dr Berwin Turlach.