Continuing Education in Social Statistics

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1. Introduction

For nearly twenty years the Department of Mathematics at Swinburne Institute of Technology has been involved in teaching statistics to social science students, including separate introductory courses for sociology and psychology students, and a second year course for psychology students. In the latter course, students study the analysis of variance, multiple regression, and some multivariate methods using the SPSS package. Around 1982, unsolicited requests from people in government departments, industry, and business, brought an awareness of the need for courses in statistics and computer packages such as SPSS and SAS for the wider community. In an effort to meet this need, short courses on SPSS and SAS for workers in the field were run regularly through the 80s. As these courses do not form part of the normal course offerings, a fee was charged for those participating. In a related development, some members of the Department of Mathematics were invited to participate in the teaching programme of a Summer School in quantitative methods run by the Australian Consortium of Social and Political Research Incorporated. This summer school is a means of improving the quantitative skills of the members of the consortium, mostly professionals working in the area of social and political science research. This involvement has continued and grown since the summer school's inception in 1985. In addition, there has been a steady growth in demand for "in-house" training programmes in applied statistics and computer packages such as SPSS/X, SPSS/PC+, SAS, and SAS PC.

While the short courses developed by the department achieve their immediate goal, that is to equip people with a specific set of skills or knowledge, they do little to further the participants' general statistical knowledge. The lack of confidence of many of the participants with even the most basic statistical ideas, indicated that there was a need for a more substantial form of training for people who wanted to use statistics and the associated computer packages in their employment, but who had only a minimal background in the field. In the main, these were graduates from arts and business courses in which they had some exposure to statistics, but who had not specialised in the subject. Almost all would have completed their undergraduate training at a time when the use of

computer packages was non-existent or minimal. Commonly, statistics was something they had done in the dim dark past with little enthusiasm and little expectation that they would ever need it in the future. For most, all that remained were bad memories. The advent of the computer and, more recently, personal computers, coupled with an increased reliance on data in decision-making in the workplace, has meant that even arts graduates are increasingly expected to have a range of quantitative and computer-based skills. It was against this background that the Post Graduate Diploma in Social Statistics was developed. This course is now in its second year of operation.

2. The students and the course

The students currently in the course come from a variety of backgrounds and workplaces. Their qualifications include a range of Bachelor's degrees, mainly in Arts, but also in Business, Science, and Town Planning. A few have Master's degrees. Many are employed in the private sector in such things as market research, computing services, and surveys, often at a management level. Those from the government sector have similar roles with perhaps more emphasis on social issues and statistical services.

A number (around 25%) who started the course have either withdrawn or dropped out as is expected with a clientele who are almost all holding down full-time professional positions and family responsibilities. Reasons vary, but include changing jobs, lack of relevance of some of the material, and insufficient time (or in some cases, money, with the recent introduction of tertiary fees in Australia). There has also been a number of deferrals for personal reasons such as overseas travel or pregnancy. A recent survey of those who have continued the course has shown that to date the course is meeting most of their expectations.

The course is offered on a part-time basis and consists of eight subjects, two per semester for four semesters. These consist of an introductory methods subject which aims to bring all students up to a basic level of statistical competence, two statistical subjects based on computer packages, plus single subjects on survey research methods, sampling, demographic techniques, and multivariate analysis. In the final semester students undertake a major project in which they utilise the knowledge and skills they have acquired from the subjects already studied.

The content of the course has to satisfy accreditation requirements but there is a reasonable degree of flexibility to cater for student needs. A considerable amount of time is spent on practical work, whether working at computer terminals or on projects. Since many of the students are working in the field they are able to base some of their projects on their own work experience. They give presentations to the class and also take part in the assessment of each other's reports.

3. Instructional and assessment strategies

The instructional strategy adopted has been very much influenced by the nature of the students, most of whom have completed a number of undergraduate courses in statistics, although often long ago, and without extensive exposure to computer packages. Most of the courses they took were based on theory rather than data. Yet

almost all have come to the course with the aim of improving their ability to work with data, and see value in learning statistics as a means of solving their everyday work-based problems. Thus, while the course is formally divided into units such as Introductory Statistical Methods, Computer Packages, etc., an attempt has been made to teach the course as an integrated whole. The focus is on data as a generator of problems and issues, with statistical theory and computer packages together providing means of dealing with these problems and issues. The strategy is illustrated in Figure 1 below.

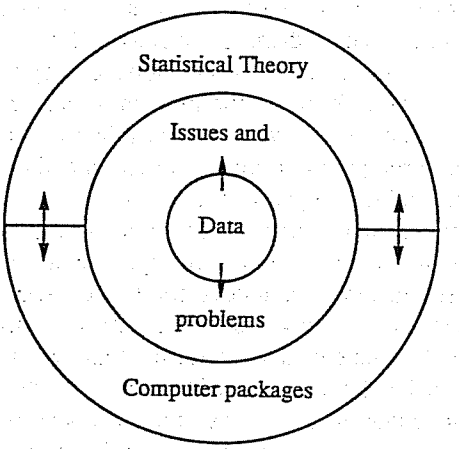

FIGURE 1
Integration of course elements

Furthermore, with almost all of the students working in a professional capacity, although not necessarily directly in the field of statistics, they bring a wealth of experience-based knowledge, and work-based learning skills to the classroom. Where possible, every attempt has been made to tap this valuable resource in the instructional process. One way has been to use the students to make class presentations on computer packages and techniques used in their workplace or of special interest to themselves. In fact this has been one of the more successful parts of the course with the staff often learning as much as the students. Also, we have made use of the workplace approach of working in teams to take on a relatively large-scale project such as a household survey that would be beyond the capability of one or two individuals.

One of the problems in such a course is to match assessment with the course learning objectives and instructional strategies. Because much of the course revolves around practical data analysis, a considerable amount of time is spent with the students working at the computer. This may involve using computer simulations to develop understanding of key statistical concepts or applying their statistical knowledge to analyse and extract meaning from real-world data sets. Learning outcomes from such activities are not easy to assess in formal written testing, and considerable effort has been put into developing appropriate assessment strategies. While there are some formal written tests, these tend to be short and primarily concerned with testing conceptual understanding, or open-book syntax testing. Other assessment strategies include: "real

time" testing of computer package and data analysis skills; take-away assignments or essays; group or individual projects and reports; peer assessment as well as instructor assessment of class presentations.

4. Problems

While having a group of professional people as students has many advantages, there are also some major disadvantages. First and foremost, most students hold demanding jobs which often require them to travel away from home or back to work to deal with work crises. As a result, very few can hope to attend 100% of classes and on occasions it has been as low as 50%. While most make an effort to get materials and catch up in their own time, it is almost impossible to make up for the learning experiences lost by not participating in the group-based activities and interactive data analysis sessions that are an integral part of the course.

Another problem, which is one of maintaining student interest, is that such students generally come to the course with some specific needs in mind, and there is a tendency to lose interest in a subject that does not directly address that need. One way around this problem has been to allow students to enrol for groups of subjects rather than be required to take the whole course. Another strategy is to develop material such that students can take a subject at a variety of "depths", but this is not proving an easy task. A related problem is that in some areas, students come to the course with a more detailed practical knowledge of parts of a subject than the instructor. While this can be a positive thing as they can supplement the formal instruction by relating their own particular experiences, with some students there is a tendency to think that attending this part of the course is a waste of their time and there is often a consequent loss of interest which can also translate itself to other areas of the course. The obvious solution is to exempt the student from that subject. However, the nature of practical experience is that it is often very narrow, and such people often lack the breadth of knowledge that the course is attempting to provide. In addition, other students can benefit from their particular knowledge, but the opportunity is lost if such students are exempted from the subject. This remains a problem that is yet to be satisfactorily resolved.

5. Conclusion

While the emphasis in tertiary education in Australia in the past has been on pre-employment training, the rapid expansion in knowledge has meant that there is an increased need to provide graduates with the opportunity to continue their education. This will often be in areas to which they have had minimal exposure in their under-graduate course. Such is the case with Arts graduates, most of whom will have had at best only a basic introduction to statistics and little opportunity to become computer literate. One way of providing this continuing education is through short courses. These are appropriate when the training needs are limited and well defined. Often a more substantial form of training is needed and this has been the motivation for the development of the Post Graduate Diploma in Social Statistics that has been described in this paper.