

MAKING STATISTICS REAL: WORKING WITH STATISTICS NEW ZEALAND

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At University of Canterbury (UC) the statistics group have developed a statistics teaching program that has a high level of involvement of the official statistics agency, Statistics New Zealand. Statistics NZ involvement in the teaching programme includes participating in the teaching of courses, providing statistics examples for student assignments, industry placement of student and student financial support. Their involvement is more in-depth than these tangible contributions. By having Statistics NZ staff in our department, and joint research projects between the department and the statistics group at UC, students come in contact with "statistics in action". The students have regular interaction with practicing statisticians and have the opportunity to formally, or informally, discuss trends and developments in statistical methods.

INTRODUCTION

University of Canterbury offers undergraduate and postgraduate degrees in statistics. A typical undergraduate degree such as a BSc is a 3-year programme. In the first year students would take eight courses and these may include one course in introductory statistics and two courses in elementary mathematics. Students intending to continue on in statistics would then take a further three courses in statistics in their second year, along with more mathematics and other related subjects, and in their third year, five or six courses in advanced statistics. Throughout this programme we emphasis the application of statistics to solving real-world problems. One of the ways we do this is by active and close links with Statistics New Zealand.

Statistics New Zealand is a government department and the country's major source of official statistics. Its chief executive has the title of Government Statistician. There are three major offices of the department, one of which is in Christchurch, the city where University of Canterbury is found.

Statistics New Zealand is a major employer of statisticians in New Zealand and as such they are active in contributing to the University of Canterbury statistics programme. One of their roles is to support the official statistics system (OSS), and thus they have statistics responsibilities beyond their department. An underlying need of the OSS is to have a regular supply of trained statistician to ensure the long term viability of the system. Unfortunately, a regular supply of trained statistician is increasingly difficult to achieve.

We discuss the ways in which the statistics programme at University of Canterbury is enhanced by the links with Statistics New Zealand.

STATISTICS TEACHING PROGRAMME

Statistics New Zealand contribute to the undergraduate statistics programme in a number of tangible ways, from contributing to lectures, offering ideas for, and advice on, research projects, offering summer employment and scholarships and by awarding prizes to high achievers.

In the final year of study for an undergraduate degree at University of Canterbury we aim for the students to have regular contact with Statistics New Zealand by having a number and variety of guest lecturers. Guest lectures are usually one-off lectures on subjects ranging from how the survey team for the national census are trained to statistical experimental design. These lectures not only provide some variety for the students but they also help explain the range of work that the Government department is involved in.

Guest lectures into lower level classes, particularly at first year are more limited. We have found that often first year students have little enthusiasm for statistics mainly because they

can not see the interesting uses of statistics. There is a perception that statistics and Statistics New Zealand as a future employer are “boring”. In later years in their undergraduate degree as their subject knowledge increases, and their knowledge of other subjects increase, students begin to appreciate the complexity of statistics and how interesting it can be.

Probably the most beneficial arrangement between the Statistics New Zealand and the University department is the commitment of Richard Penny from Statistic New Zealand. The University has provided Richard an office and computing facilities within the Mathematics and Statistics Department and he is located there ½ day per week. He is in direct contact with staff and students. Richard is often called on to give one-off lectures, and for one course, works closely with the lecturer in preparing and presenting the course material throughout the semester. The students in this class build up a close working relationship with Richard and by the end of the course the students know him in person. They are comfortable to talk in person to a Statistics New Zealand staff member, and use this to find out more about opportunities within Statistics New Zealand and are more confident about applying for positions there.

Other arrangements with Statistic New Zealand at University of Canterbury have been to provide lecturers to teach a complete term of statistics courses (as compared with once-off guest lecturers) and offering postgraduate supervision on topics related to official statistics. Arrangements with other Universities have included part-funding a lecturer position in statistics.

Development of statistics courses within the statistics programme at University of Canterbury has often involved Statistics New Zealand. At University we are looking to ensure the statistics being taught is relevant to industry. We have also developed specific courses that while being part of the mainstream statistics programme meet a training need of Statistics New Zealand. For these courses staff at Statistics New Zealand enrol and receive a University-level certificate of proficiency. The cost to Statistics New Zealand is simply course enrolment fees. The University benefits by increased student numbers.

For higher level undergraduate students, and with postgraduate students, Statistics New Zealand has a wealth of research topics for projects. Having a research project which is helping solve a real-world problem is far more motivating for students than one based on an abstract idea.

Statistics New Zealand offer summer work for students either based within their offices or at University. This type of summer employment has a number of benefits beyond the obvious student-need for summer employment, and the Statistics New Zealand-need for the project to be completed. A number of students have reported that it was the opportunity to work on a statistics research project after their 2nd or 3rd year at university that swayed them to continue on in statistics rather than complete their degree in some other field. The actual experience of hands – on statistics in their undergraduate degree helped them see the future potential for a career in this field.

The less easily measured, intangible benefits of working with Statistics New Zealand are that students have regular contact with staff in Statistics New Zealand. Students see and interact with Statistics New Zealand staff when staff are guest lecturers, when staff are enrolled and participate in a statistics course, and by having staff physically located in the statistics building on the University campus. Students realise that Statistics New Zealand is an interesting place to work, they see potential jobs there and a potential statistics careers. These students may not all end up working in the statistics government department and some may be employed by other agencies, but any contribution to the OSS in New Zealand is a positive outcome for Statistics New Zealand. Statistics New Zealand and University are aware that the idea of a job as a statistician is rather conceptual, whereas being an accountant, a doctor, or an engineer is a familiar idea. By increasing the profile of people who work as statisticians, the idea of a career in statistics where statistics is the focus of the job becomes more real.

The University benefits from working with Statistics New Zealand because if students can see a future for themselves in statistics they are interested in completing their degree in the subject and the more students that enrol in statistics courses and complete statistics degrees the better the viability of the statistics group within the University. The statistics group is aware of the need to maintain a critical number of statisticians active in both research and teaching for the future of the statistics teaching programme.

FUTURE PLANS

We have a number of initiatives that we are exploring to further our links with Statistics New Zealand. One of these is to develop a course where higher level students (fourth year postgraduate students) have industry placement. The idea is that students work for a period of time each week during the academic year, or in a condensed block of time, at Statistics New Zealand on a project. The students are directly supervised by a statistics teacher at University of Canterbury, and by a mentor at Statistics New Zealand. The students are expected to complete the project and gain degree-credit for the course. The students gain experience in working outside University, and have the opportunity to apply their statistical knowledge, and to participate in statistical consultancy.

Other initiatives are to develop summer research projects for higher level undergraduate students, and to explore what financial support would be most effective for encouraging students to complete statistics degrees. Options for financial support are annual prizes to high-achievers, summer work placements, and fees-scholarships. We are also looking at opportunities for more joint appointments between University and Statistics New Zealand.

The current arrangements are informal and rely on the enthusiasm of individuals and goodwill of Statistics New Zealand. We are working to establish formal links and to maintain a long-lasting relationship. This is being done by working with the Deputy Government Statistician and senior executives. This involvement of senior executives is important for commitment from government departments.

CONCLUSION

The benefits of the strong link between University of Canterbury and Statistics New Zealand from the University's point of view are that students are able to see statistics in action. Student enthusiasm for statistics increases through the degree programme, at their first year at University students rarely appreciate the need for statistics and complete the course work out of diligence. Returns from even the best statistics lecturers who are enthusiastic, motivated and active in statistics research, invariably include replies to the question on whether the lecturer has stimulated their interest in the subject, such as "nothing would stimulate my interest in statistics". After 3 years the comments are far more positive. One of the reasons for this shift is that as students mature, spend more time at University, and learn more about other subjects, they can visualize applications where statistics may be useful. The students become to appreciate the necessity for research on new statistical methods and start to see a career path in statistics. Having Statistics New Zealand involved in the teaching programme allows these students to see in-person practicing statisticians, the face of the large Statistics New Zealand is "humanized", and the Statistics profession becomes a real option.

For Statistics New Zealand increasing student numbers in statistics courses above introductory statistics will be a benefit either to their department directly by employing graduates, or indirectly by improving statistical skills in the OSS. Other benefits are the opportunities presented for statistical projects to be completed by either summer students, or by postgraduates, and the option for input into course curriculum development.

Overall we have developed a very positive learning environment for statistics students with the links between University of Canterbury and Statistics New Zealand.