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TITLE: Partnerships between official statisticians and statistics educators.

ABSTRACT: Statistics New Zealand has collaborated with teachers and academics to support the development of a new 'Mathematics and Statistics' curriculum in schools. Statistics New Zealand makes resources available to school teachers via 'schools-corner' on its website (www.stats.govt.nz/schools-corner). Most of these were developed by teaching 'fellows'. They include a synthetic unit record file (SURF) based on labour force and income survey data and CensusAtSchools (jointly funded by the Ministry of Education and delivered by contracted university statisticians). Collaboration with other public sector agencies and statistical academics produced a vocational Certificate in Official Statistics. Course material for this is being developed collaboratively with a number of universities. In 2007 a formal partnership between Statistics New Zealand and Victoria University was created with the establishment of a half-time Adjunct Professorship in Official Statistics. The aim of this and other partnerships between statistics educators and Statistics New Zealand is to increase the awareness and use of official statistics, to enhance the statistical capability of the general community and to develop a community of teaching and research in official statistics.

PAPER:

Introduction:

Statistics New Zealand recently increased its investment in both internal and external statistics training. There are a number of reasons for this; to ensure increased general capability in the community to use statistics resulting in better decision making, to maintain our own capacity to produce high quality official statistics and to ensure government officials provide advice to government that is based on sound statistical analysis. The need for intervention was identified by a lack of numerical capability and recruitment and retention problems for statistically competent staff in the public sector.

Statistics New Zealand's response to this demand has been to develop a three-pronged strategy was developed. The three priorities for enhancing statistical capability (diagram 1) are:

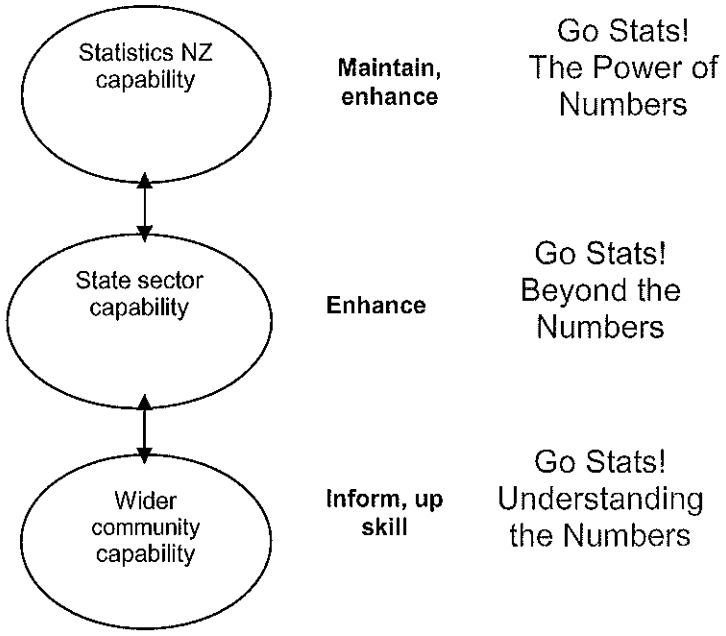
1. Within Statistics New Zealand
2. Other public sector agencies
3. Targeted communities of users.

The overall strategy is called Go Stats! with the three sub-strategies being respectively Go Stats! The power of numbers, Go Stats! Beyond the numbers and Go Stats! Understanding the numbers. These strategies are interconnected, based on the premise that an official statistics agency provides leadership to the public sector in the collection and use of official statistics and that having a statistically competent general public will, in the long-term, ensure greater capability in all sectors of the community. Each strategy contains a number of initiatives (some overlapping between strategies). The majority of the indicatives involve some partnership arrangement with statistics educators.

Diagram 1

Statistics New Zealand's Statistical Education Strategy

What works for the national statistics office, works for the rest of the public sector



Increased community understanding of statistics results in increased understanding in the public sector

Current or Ongoing Initiatives:

Statistical capability initiatives currently undertaken by Statistics New Zealand include providing:

- In-house training in statistical methods
- One-off basic statistics courses to other agencies, businesses and community groups (generally in response to specific requests)
- Partial funding (jointly with the Ministry of Education) for the international internet based CensusAtSchools (delivered by Auckland University under contract to the two agencies)
- Teaching resources for schools that promote the use of official statistics in classroom activities (A number of these were developed by teachers working in the agency under Royal Society fellowships)
- A web-page ('Schools Corner') and newsletter for primary and secondary school teachers.

New Initiatives

Initiatives have recently been implemented to raise statistical capability in the short, medium and long-term. Those designed to increase capability in the short-term are mainly focussed within the public sector. By working in collaboration with the agency with overarching responsibility for the public sector, and with the public sector training organisation, a vocational (between secondary school and university) qualification for public sector employees was developed. The Certificate in Official Statistics contains four compulsory units:

- **Assess a sample survey and evaluate inferences in a public sector context**
- **Evaluate and use statistical information to make policy recommendations in a public sector context**
- **Interpret statistical information to form conclusions for projects in a public sector context**
- **Resolve ethical and legal issues in the collection and use of data in a public sector context**

and several non-statistical units of the candidates choosing. The qualification is currently being piloted within Statistics New Zealand, and a second pilot of students from other agencies is planned for the near future. Course material is being developed collaboratively with several New Zealand universities, and one university has been contracted as the formal assessor for these units.

In addition, Statistics New Zealand is working with the journalism training organisation on a compulsory statistical literacy component so that in the medium term there will be improved reporting of official statistics by the media.

A small fund (NZ$500,000) has been allocated from the Statistics New Zealand budget to support methodological research in official statistics. It is intended that academics and other researchers work on projects in collaboration with public sector staff and as part of this up skill and mentor the public sector staff. This has been a successful initiative in creating a pool of researchers in official statistics with 9 research papers available publicly via the web, but it has been less successful in terms of knowledge transfer to public sector staff. It has, however, resulted in a collective of academics working with official statistics being formed across New Zealand universities. It is hoped that this will minimise duplication of teaching effort and assist the universities to develop complementary areas of research speciality.

In 2007 a formal partnership between Statistics New Zealand and Victoria University was created with the establishment of a half-time Adjunct Professorship in Official Statistics. The intent of this position is to create a body of teaching and research in official statistics and to make students aware of official statistics as a career opportunity (Statistics New Zealand is the country's biggest employer of statistics graduates).

Improved statistical capability in the long-term will result from having a better informed and more statistically literate general public. The major initiative to achieve this involves support of the new 'Mathematics and Statistics' curriculum that has been developed for school children from their entry to primary schooling to their completion of secondary schooling. While not directly involved in the development of the curriculum Statistics New Zealand staff were provided with paid time to comment on, and in one area – probability – provide direct input, as part of their responsibilities to their professional society, the New Zealand Statistical Association.

Statistics New Zealand is providing teaching resources that support the learning activities within the new curriculum. Some of these are ideas for using currently available official statistics (for example, sheep and cattle numbers, migration figures, a sample class survey form in both English and Maori languages) as a basis for learning activities. The activities are made available to teachers Schools Corner on the Statistics New Zealand website (www.stats.govt.nz\schools-corner).

Consultation with teachers highlighted the need for 'real' datasets for students to use in the classroom. In response a SURF (synthetic unit record data file) for schools

based on the CURF (confidentialised unit record data file) was created from the 2004 Income Supplement to the Household Labour Force data set. The SURF contains a small sample of 200 respondents from the 28,000 respondents in this survey. It has only a small number of variables from that survey, with some categorical variables being generated from census data. The seven variables are:

- Age (15-45)
- Sex
- Usual gross wages and/or salary for a week (NZ$0-2000)
- Hours worked per week in the first job (1-80)
- Highest qualification gained (4 categories only)
- Marital status (from census data)
- Ethnicity (from census data).

The records are not information about real people, but were generated using statistical techniques to have the same characteristics as the respondents to the survey. This modification procedure helps Statistics New Zealand prevent any unintentional disclosure of an individual's personal information. The sample was based on weights so that it represented the population distribution rather than the sample distribution. The data in SURF for Schools shows many of the same patterns as the original dataset, and it has been designed so that all the analyses done within classes will give results that are close to the results from the original survey. A CD was containing the SURF for Schools dataset (in excel format), information on how the dataset was constructed, and teaching resources designed to give some ideas on how SURF for Schools can be used at different levels (both primary and secondary) in the classroom was made, distributed free to interested teachers and is downloadable from the web.

Example of a teaching resource using the SURF for Schools:

AM I AVERAGE?

Plan

Working in groups, you are going to investigate what defines the average person by using the information collected for the SURF for Schools dataset.

Data and Analysis

The group needs to:

1. Construct a frequency table for each variable in the dataset. Remember that some variables will need to be grouped.
2. Draw a different type of graph for each variable on the dataset. You must draw at least one histogram, one bar graph and one pie graph.
3. Do at least one calculation for each variable. Choose from: mean, median, mode, proportion and range.

Conclusion

1. Write a sentence about what you have discovered for each variable.
2. Design a poster which shows the characteristics of the average person from the dataset.

There has been widespread interest in the SURF resulting in a second printing (of 150 CDs). Further SURFs are planned and it is hoped that they will become part of Statistics New Zealand's standard survey outputs.

Summary:

Partnerships between statistics educators and Statistics New Zealand were set up to increase the awareness and use of official statistics, to enhance the statistical capability of the general community and to develop a community of teaching and research in official statistics. Educators at all levels have been eager to actively participate resulting in some successful and innovative projects being implemented. Whether or not they increase statistical capability will be determined over time.