# STATISTICAL TRAINING FOR NON-STATISTICAL STAFF AT THE OFFICE FOR NATIONAL STATISTICS

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*Within the Office for National Statistics there is a high percentage of operational delivery staff involved in the day to day production of statistics who, although competent within their specific roles, have limited understanding of statistical concepts or the wider statistical process. The challenge facing ONS's statistical training unit has been to develop a course that, without placing too much emphasis on technical methods, will enable staff to take a more statistical approach to their work, which should result in greater job satisfaction. A 'statistics for non-statistical staff' course was developed and this paper will set out the challenges faced when designing this course and will explain how these challenges were overcome.*

## INTRODUCTION

The Statistical Training Unit (STU) at the UK's Office for National Statistics (ONS) is responsible for the statistical training of all staff, either through direct delivery or coordination of external courses. With courses ranging from basic mathematics skills to post graduate courses, the unit attempts to cater for the statistical training needs of staff at all levels of statistical ability/knowledge. However, with much of the training qualification based, the programme has been lacking a short course in survey statistical processes, both at a basic and intermediate level. A training needs analysis identified that there is a demand for this type of course, both within the ONS and other government departments. To fill this gap, development on two courses covering the statistical process of the ONS has been undertaken, on an introductory level and an intermediate level. The latter has been developed by the ONS's Methodology Consultancy Service and is currently delivered to graduate recruits in the Government Statistical Service to aid the transition from academia to the workplace. STU have been responsible for the development of the introductory course, initially to be delivered to ONS staff, with rollout to other government departments at a later date. This paper will discuss the development of the introductory course, set out lessons learnt from the pilot and identify possible ways forward.

## BACKGROUND

The Statistical Training Unit has two main aims:

- to provide staff with the relevant training to enable them to improve their statistical knowledge and skills in order to become more effective in their roles;
- to offer a pathway of statistical training which allows staff to gain the necessary statistical qualifications to move into statistical posts, if desired.

Table 1 sets out the programme of statistical training. Non-statistical staff obtaining the Royal Statistical Society (RSS) Higher qualification and relevant work experience are eligible to apply for statistical posts, as this is equivalent to first/second year degree level.

Whilst the programme offers a wide range of courses it lacks a short course introducing the statistical processes of the ONS. Such a course would be suitable for new entrants as well as for existing staff, for example, those who may be reluctant to undertake a full course, or feel unable to take qualification based training. In particular, there are a large number of operational delivery employees within the ONS who are involved in the day-to-day production of statistics but, although competent within their specific roles, have limited understanding of statistical concepts or the wider survey process. As these staff make up more than 50 per cent of the ONS workforce, there is significant scope for the development of in house talent.

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Table 1. Statistical Training Programme

| Course | Delivery | Length of Time |
|---|---|---|
| Basic Maths Skills | External, on site | Weekly sessions over 15 weeks |
| RSS Ordinary Certificate | Internal | Weekly sessions over 9 months |
| Intermediate Methodology Workshops | Internal | 1 day per workshop |
| Statistical Analyst Scheme – 6 Intermediate Workshops + assignments | Internal | 1 day per workshop, taken over 6 – 12 weeks |
| 'A' Level Maths and Statistics | External, on site | Weekly sessions over 2 years |
| RSS Higher Certificate | Internal/University of Southampton | Weekly sessions plus distance learning material over 2 years |
| Higher Methodology Workshops | Internal | 1-2 days |
| MSc in Official Statistics | ONS and University of Southampton | Block sessions, taken over 2-5 years |

Offering staff a short introductory course would provide an overview of the statistical process whilst increasing awareness of the importance of the work of the ONS. By raising statistical awareness and providing staff with an understanding of where they fit in the survey process, participants would feel more job satisfaction and improve their performance, reducing output errors. An introductory course would also offer participants a taster of statistics, which could consequently lead to the take up of further training. Staff are also likely to feel more engaged in their roles, leading to greater job satisfaction.

## DEVELOPING THE COURSE

In an attempt to fill this recognised training gap development a two-day course was undertaken, designed around the ONS's Statistical Value Chain (SVC). The SVC provides a standardised framework for ONS processes and breaks down the survey process into 15 distinct stages, as detailed in table 2. It is broadly equivalent to the UNECE/Eurostat/OECD Generic Statistical Business Process Model.

Table 2. Statistical Value Chain

| | |
|---|---|
| 1. | Decision to undertake a collection or analysis |
| 2. | Collection design |
| 3. | Accessing administrative data |
| 4. | Sample design |
| 5. | Implementing design |
| 6. | Implementing collection |
| 7. | Editing, validation, derivation and coding |
| 8. | Weighting and estimation |
| 9. | Analysis of primary outputs |
| 10. | Index number construction |
| 11. | Time series analysis |
| 12. | Further analysis |
| 13. | Confidentiality and disclosure |
| 14. | Dissemination (data and metadata) |
| 15. | Data archiving and ongoing management |

When developing the course, it was necessary to overcome several challenges. Firstly, with a limit of two days for delivery of the course, it quickly became evident that it would not be possible to cover all aspects of the SVC. A decision was made to focus on certain stages of SVC; these stages are noted in table 3.

Whilst the intermediate level course has a variety of presenters, it was decided that a consistent presenter was important for the introductory course. Covering such a wide range of topics during the course meant that the presenter was required to have knowledge of many areas and furthermore be aware of anecdotes and interesting examples. A request was sent to all ONS methodology staff for examples and a seminar was held with a number of methodologists. During the seminar staff discussed concepts they felt were commonly misunderstood, and raised a number of specific points they felt the course should cover. These included topics such as the difference between self selection and random probability; how administrative data might have different definitions to survey data and why it is so important to check sensitive data before releasing it.

Table 3. Stages of SVC covered by the course

| | |
|---|---|
| 1. | *Decision to undertake a collection or analysis* |
| 2. | *Collection design* |
| 3. | *Accessing administrative data* |
| 4. | *Sample design* |
| 7. | *Editing, validation, derivation and coding* |
| 8. | *Weighting and estimation* |
| 9. | *Analysis of primary outputs* |
| 10. | *Index number construction* |
| 11. | *Time series analysis* |
| 13. | *Confidentiality and disclosure* |
| 14. | *Dissemination (data and metadata)* |

As one of the reasons for developing the course was to provide statistical training to those with little or no statistical or mathematical skills it was important to design the course so that statistical concepts were introduced without the use of formulae and quantitative data was kept to a minimum. This was done by discussing concepts in general, rather than detailed specifics. Whilst it was not possible to develop the course without any use of numbers, formulae were avoided. Concepts were related to everyday examples, utilising the fact that we all use statistics in some way in our lives (Rowntree, 1981). Participants were encouraged to discover basic statistical concepts themselves, achieved through discussion rather than in the traditional classroom manner. This, along with many practical exercises, helped to engage participants in the course. This was particularly important, as a number of operational delivery staff have traditionally demonstrated a reluctance to formal statistical training with qualifications, perhaps for fear of failure. A negative experience of training could then deter staff from further training (Hackett, 2003). It was therefore essential that the course was designed so that the material was accessible to all and the exercises engaging.

PILOT

A pilot of the course was held in April last year. The pilot group was carefully selected and included a variety of staff, including two new members of staff and two experienced line managers. Whilst the majority of participants were from survey areas there were a small number with roles not directly involved in the production of statistics. Feedback from the pilot was generally positive, particularly with the new members of staff. The staff who didn't work directly on the production of statistics also found the course interesting, stating it as a useful course to gain understanding of the core function of the Office.

The exercises were well received but some felt that certain topics on the course, namely data collection, had taken too much time at the expense of other stages. This was mainly voiced by those whose daily work was focussed around the earlier levels of the SVC, namely editing and validation. These staff tend to be familiar with the questionnaires that are sent out for the surveys

they work on and consequently the problems that can arise from misinterpreting questions, etc. However, the participant who worked on the primary analysis of outputs found this part of the course useful, as he was not familiar with questionnaires or other data collection methods.

Concern was raised by the two experienced staff about the length of the course. They commented that they would be reluctant to release staff from their roles to attend a course which, in their eyes, was not directly relevant to their day-to-day work. This will need to be considered during further work on the course, by demonstrating the benefits of understanding the link between all the SVC stages. However, this view was not shared by the rest of the group, who found the length of the course appropriate.

## NEXT STEPS

Although generally successful, the pilot course highlighted several possibilities for improvement. Several changes to the course are being considered. In order to reduce the time away from the desk, development of a shorter, ½ day course is being considered. This would give a brief overview of the SVC, and a longer 1½-2 day course would be available covering the stages in more depth. If this ½ day course goes ahead and is successful, linking the course to the current general induction for new starters could be considered. The longer course could then be recommended for staff who have been ONS employees for 6-12 months, or for any existing staff who show an interest.

One possibility for the longer course is to develop it around different surveys. Although time consuming, this would likely increase line managers' willingness to allow staff to attend. It would also increase participants' engagement in the course, and their understanding of the relevance of the content to their jobs. A course outline would be followed, with the examples being changed to suit the relevant survey. This course would be delivered by a member of STU alongside a statistician from the relevant survey area. However, there are several potential barriers to this: resource would need to be made available for statisticians from relevant areas to deliver the course; many staff work on more than one survey; participants may see the course as job-specific training and not understand the wider application of the information. A 'general' course would also still need to be delivered for staff who work outside survey areas.

These options are being considered in the longer term. The immediate priority is to roll out the 2 day course, whilst continually updating the content where possible in response to participant feedback. The impact of the course on participants' work and career prospects will be monitored through evaluation and changes made to the course where required. As other organisations have similar training needs the possibility of working with other national statistical institutions who have an interest in this area, such as the Australian Bureau of Statistics is being explored.

## REFERENCES

Hackett, P. (2003). *Training Practice*. London: Chartered Institute of Personnel and Development.
Rowntree, D. (1981). *Statistics Without Tears*. London: Pelican Books.