Introduction

As part of the Royal Statistical Society Centre for Statistical Education (RSSCSE) investigation into the Extent and Form of Statistics Pedagogy in British University teacher training courses, a series of visits to Education Departments in five English Universities took place during the 2010-2012 academic years. The institutions visited included both Russell Group universities and post 1992 universities.

Focus Groups

For each visit a group of students attending the event took part in a focus group discussion at the end of which they were invited to complete a questionnaire. In the focus groups the participants were invited to talk about their experience of statistics both before they graduated and as part of their PGCE courses.

On all of the visits active and enthusiastic discussions took place under the four general headings:

- the students’ perceptions of statistics;
- the students’ experience of statistics within the PGCE;
- the students’ experience of statistics while on teaching practice in school;
- and what constitutes ‘good teaching’ of statistics.

At the end of the discussions arising from the first two of these headings the participants were asked to record their views in writing. This was repeated after the second pair of headings and the session ended with the participants completing a short questionnaire.

Findings

Just over half of the PGCE students taking part were graduates from degrees that contained a substantial mathematics component. A large majority of these graduates (78%) consider statistics to be part of mathematics.

The students’ exposure to statistics, both before and during their degree courses, left something to be desired with nearly 70% of them stating that less than 11 per cent of their courses comprised statistics modules.

The focus group discussions also revealed that many students thought that they were taught statistics badly at school by uninterested teachers. Their university experience was rather more positive with a number saying it had changed their attitude to
statistics but some felt their experience at university had been no better than school.

Many believed statistics should be taught separately at some point before degree courses commence and many recognised that it appears and is used within a wide range of other subjects. They also supported the view that it should be taught as a practical subject. A good number also recognised the wider importance of statistics in the community at large.

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Questioned about their knowledge on entry to the PGCE the students gave a mixed message. In the focus groups, some of the few mature entrants who had work experience said their knowledge of statistics was poor. They either had little experience of being taught statistics or could not remember it. However the responses to the questionnaire indicate that more than half knew about each of the individual topics they were asked about with more than 70% knowing about the key stage 3 curriculum content topics. When asked about their using the individual topics, fewer students expressed confidence in their abilities to do so, however the percentages were still high for confidence in the use of:

- the data handling cycle;
- sampling and surveys;
- data collection and data presentation.

For the remaining topics the proportion of students having confidence in using them dropped below 50% even where large numbers had indicated they knew about them (for example for ANOVA, 76% knew about it but only 36% had any confidence in using it).

When the focus group topic turned towards the students’ experience within the PGCE there was a general feeling that they were not served very well. Very few indicated that they had any pedagogical support in statistics and this was borne out by the questionnaire in which about 80% said that only just over 10% of the content of their PGCE course was devoted to statistics. This contrasts starkly with the response for mathematics with 72% of the students indicating that at least 25% of the content was concerned with mathematics.

The discussions on experience in teaching practice and what constituted ‘good teaching’ of statistics also painted mixed pictures. Many indicated that they had seen statistics being taught but that much of the teaching was lacklustre or even boring. Not many could give examples of good teaching that they had seen but from the questionnaire it is clear that the majority know what the data handling cycle (statistical problem solving approach) is and 86% of those would use it in teaching at least ‘sometimes’.

Conclusions

The emerging picture of the attention paid to statistics pedagogy in British PGCE courses in mathematics is somewhat depressing. It is also clear that the attitude to statistics as a subject brought by students to university from their experience with studying it at school does not lay very good foundations for either learning or teaching it.

In fact our research supports the broad findings of the Porkess (2012) report for the Royal Statistical Society and Institute of Actuaries [1], namely that the statistics provision in schools, from primary through to A levels, should be improved by giving prominence to the use of statistics as a collection of tools for solving problems using real data.

Implicit in the Porkess report is the attitude transmitted by some teachers of statistics in schools that the subject would be better replaced by more mathematics. This is reflected by the attitudes to statistics expressed in our focus group discussions by many graduates training to be mathematics teachers.

The RSSCSE will publish a full report on the findings of the statistics pedagogy research project later in the year.

Reference