

## THE ROYAL STATISTICAL SOCIETY AND STATISTICAL EDUCATION

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*This paper describes the role of the Royal Statistical Society in shaping statistical education within the UK and further afield. Until 2001 the Society had four agencies concerned with education at all levels. The work of these is discussed and recent new arrangements are outlined. The Society's efforts to disseminate good practice through organising meetings and running a network of Associate Schools and College are explored in some detail.*

### INTRODUCTION

The Royal Statistical Society (RSS) in the UK was founded in 1834 as a learned society and now boasts some 6400 Fellows worldwide. Until recently, as Hawkins (1998) described, there were four agencies within the Society concerned with statistical education:

- an Education Committee (EC);
- an Education Section (ES) with associated organising committee;
- a Centre for Statistical Education (CSE);
- a Professional Affairs Committee (PAC).

To many onlookers, not least within the Society itself, the distinctions between these various bodies was at best rather blurred. Indeed it was not uncommon for items of business to be passed from one committee to another – and sometimes back again - inevitably leading to a delay in decision-making. In December 1999 the Society's Executive Committee established a team to review the whole of RSS educational policy. The review included a survey of the Society's membership and also investigated practices within other similar professional bodies. This paper considers some of the issues surrounding professional body involvement in education. It draws firstly on the experience of the authors: Neville Hunt succeeded Neville Davies as chair of EC in 1998, Flavia Jolliffe chaired the ES committee from 1999 to 2002, Neville Davies is director of the CSE and has served on PAC since 1998. It also takes account of the report of the RSS education review team, whose recommendations were accepted in principle by the RSS Council in April 2001.

The recommendations of the review team included the discontinuation of the EC and the ES, and the establishment of an Education Strategy Group (ESG) which would be serviced by the Society's officers and whose members would be appointed by the RSS Council. The eight ordinary members of the ESG would be chosen to represent the various sectors of education and would be expected to form informal advisory networks to help ensure all relevant interests were covered. The director of the CSE would be an ex officio member of the ESG. The ESG exists solely to take responsibility for policy and strategy. It will delegate action and practice to others, particularly to the CSE. It held its first meeting in December 2001.

### VOLUNTEER LABOUR

One of the conclusions of the education review team was that, although many dedicated volunteers within the Society were working hard on matters concerned with statistical education,, the overall impact of their efforts was limited and may not be cost effective in terms of time and money spent. Serving on a committee is in itself a volunteer activity, but agreeing to be a committee member is the first step only. Spending time attending committee meetings of up to half a day's duration and time travelling to those meetings (when they do not conflict with employment commitments), and involvement in activities associated with the committees such as representation on other committees of the Society and responding to consultations on educational matters are also volunteered and largely unseen labour.

One area where volunteers certainly were working hard was in the programme of workshops on Statistics at school level organised by the ES, with the help of RSS office staff, and previously organised by the EC. Some of these were for teachers only, while others were more for students but with teachers in attendance. Many of these meetings have involved practical work and/or information technology. A typical example is a workshop held in June 2001 at a secondary school in Essex for 80 pupils in Year 9, comprising the following four sessions led by volunteer RSS Fellows:

- how to start statistical projects and where to get information/data from around the globe led by Susan Starkings (see Figure 1);
- probability in TV game shows, National Lottery and gambling led by Mike Fletcher;
- exploring sampling, based on a real population of African elephants led by David Cassell;
- an introduction to simulations in Excel led by James Nicholson.



*Figure 1. Susan Starkings in Action at a Workshop.*

In organising these meetings it is difficult both to find a suitable venue and people willing and able to make presentations. RSS policy was not to pay presenters (other than travelling expenses) at these workshops and, where possible, to use educational venues at little or no cost. This meant that the workshop fee could be kept to an absolute minimum. For example, students attending a sixth-form (aged 16-18) conference in 1998 were charged just £5 per head and required to bring a packed lunch, while accompanying teachers attended free of charge. Strangely perhaps, nobody involved in the running of these workshops questioned the funding policy. There is something very honourable about being a volunteer and there is perhaps a fear that asking for payment makes one sound like a mercenary.

However, reliance on volunteers undoubtedly reduced both the frequency and geographical coverage of these workshops. In recent years there has been a move towards 'greater productivity' (i.e. heavier workloads) within higher education in the UK, not to mention almost perennial upheaval and quality reviews within the school curriculum, which have severely limited opportunities for enthusiastic teachers to offer their services to the Society. Pressures at school level have also meant that there are few times in the year when teachers and pupils can spare time for what might be termed as non-essential activities. There is also a school of thought that says that a cheap workshop must be a poor workshop. Putting it another way, a volunteer can easily be mistaken for an amateur. This was certainly not the case – feedback from participants was invariably very positive – but, perversely, it suggests that the impact of RSS events might have been greater had a more realistic fee been charged. As it was, the cost to a school of providing a replacement “supply” teacher to cover for attendance at a workshop, either as a presenter or a participant, was many times greater than the workshop fee itself. At university level statistical education activities tend to be undervalued and individuals are expected to do them in their own time. In future workshops are to be put out to tender and fully resourced.

A regular column in the monthly newsletter RSS NEWS provides the means to disseminate information about statistical education matters and activities. This column has been edited by Flavia Jolliffe, the late Ed Redfern and currently by Susan Starkings.

## ASSESSING EFFECTIVENESS

The review team felt that there were no criteria for setting objectives in the area of statistical education, and hence no means of assessing the effectiveness of outcomes. Just how difficult this is to achieve is illustrated by the Associate Schools scheme run by the Society as a way of encouraging partnership between the Society and schools and colleges. For an annual fee of just £30 a school received a subscription to the *Teaching Statistics* journal, concessionary rates for attending RSS workshops and conferences, a copy of the monthly RSS News and meetings card, and a termly mailing of teaching resources compiled by members of the EC. Sometimes this mailing would comprise an existing resource that schools might either not be aware of or be unable to access, for example if it was only available on the Internet. Thus for example the Spring 1997 mailing consisted of a *Statistical Education through Problem Solving* (STEPS) (see, for example, Bowman et al, 1998) module, while the DISCUS (Hunt, 1996) material was sent out in the Summer 1999 mailing. On other occasions various members of the committee would provide resources that they had written, often for use in other educational contexts.

Each year a questionnaire was issued to associated schools, asking for their opinions on both the resources and the scheme as a whole. The response rate was invariably very poor, with typically less than 20 of the 80 or so schools in the scheme replying. Pooling the last two years' results gives the pattern of responses shown in Table 1.

Table 1

*Summary of Responses of Associate Schools to Questions about the Usefulness of Their Membership*

	<i>Resource packs</i>	<i>Teaching Statistics</i>	<i>Concessionary fees</i>	<i>RSS News</i>	<i>RSS Meetings Card</i>
Very useful	10	12	2	5	3
Useful	17	14	6	10	4
Limited use	8	9	21	17	22
Useless	0	0	6	3	5
Total	35	35	35	35	34

*Note:* The table shows numbers of schools (years 2000 and 2001 combined)

On the face of it this represents quite a positive picture of the resource materials, with 77% of respondents rating the resource packs as useful or very useful, more than for any of the other benefits of the scheme. However, it is difficult to judge the response bias - are disgruntled subscribers more or less likely than satisfied customers to respond to the questionnaire? An item in the questionnaire that asks schools to say why they have not used some of the resource sheets provides further evidence. Responses included:

- The activities required graphical calculators
- The activities required a computer
- The activities required computer software that we do not have access to
- The activities were difficult to integrate into the syllabus
- The activities were too time-consuming
- The activities were at an inappropriate level
- Lack of time for practical activity at A-level
- Our pupils prefer an exam-oriented approach
- Materials are interesting but don't help able candidates do better in exams.
- Although not used with classes directly, I have gained ideas for my teaching.
- We're not really looking for much help - time is so tight.
- Teaching materials useful to read even if not used regularly, or at all.

The education review team concluded that materials were not always focused on teacher needs. This judgement of ineffectiveness calls into question the objective of the Society in running the scheme. Is the objective to satisfy teachers' "needs" or their "perceived needs"? It is clear that many teachers are dominated in their thinking by the need to cover a certain syllabus in a limited amount of time and to get students through examinations. Whether this makes for good

statistical education is another matter. Maybe teachers have overlooked the possibility that the increased understanding gained by their students in following a practical activity, might pay off in their examination performance? It is more likely that they have noted that UK public examinations in statistics are dominated by calculation and method with little requirement to demonstrate understanding. The EC, CSE, and the Society through its professional affairs officer have over the years attempted to influence both syllabi and examinations, but there is still a long way to go.

### SETTING PRIORITIES

What the experience of the Associate Schools scheme demonstrates is the need for strategic thinking in statistical education. No amount of good practice disseminated by the Society can counter bad practice engendered by the school curriculum. To change teachers' aims and students' achievements the Society must first change the school curriculum. The review team rightly perceived that almost all of the Society's activities are educational in the broadest sense and that without some setting of priorities the Society risked spreading itself too thinly. This is borne out by the remit that was given to each of the four educational agencies within the Society.

- The EC was "aiming to stimulate, monitor and offer advice on policy for educational activities of the Society, and to promote best practice in statistical education, *at all levels of the education system and among the general public*". Readers can only imagine a typical agenda for committee meetings – which often extended well beyond their three-hour allotted time.
- The ES was charged with organising meetings on *statistical education issues at all levels*. This is in itself ambiguous. Some within the Society read this as statistical issues within education, what one might call educational statistics. Thus the Section has held meetings on such topics as the interpretation of examination results, and the government's school performance league tables. Others interpreted this strictly as meaning the practice of teaching the subject of Statistics and meetings have been held on, for example, the teaching of statistics to first year undergraduates on business studies degrees and on the Children's Census. Yet others thought that there should be meetings on statistical education research.
- The CSE has a remit to promote the improvement of *statistical education and thinking at all levels and in all contexts*.
- The PAC is responsible for conferment of professional status on individuals with appropriate qualifications and experience, provision of professional examinations worldwide, accreditation of university courses, interaction with other professional bodies and with the various regulatory authorities for school and university examinations, and the continuing professional development of statisticians.

Apart from being very difficult to fulfil, these remits quite clearly overlap and the Society has rightly recognised the need to develop a coherent and focused strategy for its educational activities in the future. One of the first tasks of the ESG has been to work out how the many activities previously undertaken by the EC and ES will be covered under the new arrangement. During the interim period the ES was asked to plan a full programme for the 2001-2 session. This has included three workshops, meetings with invited speakers, and a session at the Society's conference on evidence-based education in September 2002. The Social Statistics, the Official Statistics, and the General Applications sections have been asked to include in their programmes meetings on topics on which the ES formerly arranged meetings. The ES has in fact held joint meetings with the first two of these sections, following Denise Lievesley's suggestion made as RSS president (1998-2000) that sections might hold joint meetings.

### LOOKING TO THE FUTURE

The education review team recommended that in future the Society's education practice should be properly funded, so that it can clearly be seen to be professionally organised and delivered. The CSE has already begun to take this on board with a series of fully funded workshops on Data Handling and ICT around the UK, where the services of presenters can be bought-in and the workshop materials can be professionally produced. Similarly the CHIME

booklet (Hunt & Tyrrell, 2001) is an example of a resource that started out as a homespun handout to Associate Schools but is now being published by the CSE and will thereby achieve a far wider circulation. The CSE has also broadened the base of its network of statistical education activists by appointing a number of full, part-time and where necessary, ad-hoc consultants. These work in four broad areas, namely: schools and further education; higher education; continuing professional development; and general educational projects.

It remains to be seen how well the new arrangements work and to what extent all the many diverse activities of the EC and ES are covered. The ES was created by the EC in 1996 in response to a perceived demand by some fellows for a section devoted to their interests and as a section for the Associate Schools and Colleges. It is interesting that sessions on an educational theme at the Society's biennial general conferences are among the most popular sessions. What is certain is that a change in the Society's structure as regards statistical education matters was needed, and it is because of the importance of statistical education, in its broadest sense, to the Society that the review was one of the first to be instigated in the review of services to fellows. Other statistical societies use different approaches (Tweedie, 1998) but have similar aims.

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