# Response to the Royal Statistical Society questionnaire

# "Statistics in the 14-19 curriculum"


## Roger Porkess (Project Leader) on behalf of MEI


**1. Please state and explain your views on the relative merits of carrying out core statistics teaching for the 14-19 age group within the mathematics curriculum as compared with spreading it across subjects such as biology, geography, etc.**

The main advantage of statistics being taught within the mathematics curriculum is that there is some prospect of it being taught correctly. There are two reasons for this:

(a) mathematics teachers are more likely (than those in other disciplines) to have an accurate knowledge of statistics from their own education;

(b) mathematics teachers are more likely to receive training in teaching it; in many other subjects the statistics element is likely to be regarded as peripheral.

The main disadvantage is that mathematics teachers will inevitably often use general contexts to teach the statistics, and so may not always relate it to its uses in other subjects.

**2. If statistics were taught across the curriculum in different subjects, what are your views on whether and how this might be co-ordinated ?**

A major danger with statistics being taught solely within other subjects is that it will happen on a need-to-know basis. When, for example, the need for rank correlation arises in geography it will be taught, but those not doing geography will not be taught it. Consequently the statistics that any student learns will be fragmentary and dependent on what particular subjects the student does. There is a real possibility that some students never encounter some important topics.

This could be overcome by some central co-ordination of statistics teaching with "missed out" topics being covered in special lessons. However the statistics learnt in those lessons will inevitably require general contexts, just like those that are used when it is taught within mathematics. So the main disadvantage associated with statistics being taught as part of mathematics is not overcome.

**3. Where should the responsibility for teaching statistics be based ?**

The conclusion from the two previous questions is that the responsibility for teaching statistics should lie within mathematics departments. However, we would add a number of provisos.

- Mathematics staff must engage in professional development in which they learn how statistics is used in other subjects
- Such professional development should be informed by a study of the statistics used in other subjects, leading to a core that forms part of the mathematics curriculum
- Other subjects should continue to duplicate the teaching of those core elements that are relevant to them
- Mathematics departments should be required to provide advice on any statistics used in coursework done for other subjects.

**4. What do you feel is meant by "statistical literacy" that should be acquired by all pupils by the end of compulsory schooling ? What should pupils know and be able to do ?**

The list that follows is a bit vague but maybe this is inevitable.

Students should leave school able to:

- interpret statistical information that is presented to them by the media
- know when information is being misrepresented
- use a number of measures and displays to interpret raw data
- understand the need for sampling
- be able to make judgements about the appropriateness of a proposed sampling technique in a given situation
- be able to make sensible inferences
- feel confident in looking at statistical information

**5. What are potential growth areas where statistics might be introduced ?**

A number of vocational courses could possibly be improved by having a stronger statistics element.

The Tomlinson interim report includes the idea of a Core of subjects, including mathematics, at Level 2. This core is actually little more than a restatement of the Key Skills, one of which is Application of Number. Much of Application of Number is statistics. While we see grave dangers for mathematics in this part of the Tomlinson proposals, it is nonetheless a possible growth area for statistics.

**6. The working definition of statistics given above refers both to what might be termed applied statistics and to what might be termed mathematical probability modelling**

**(a) To what extent should applied statistics be part of the provision for**

**(i) mathematics students**

**(ii) other students ?**

**(b) To what extent should probability modelling be part of the provision for**

**(i) mathematics students**

**(ii) other students ?**

(a) We would suggest that applied statistics is relevant to both types of students. It should involve a considerable amount of interpretation and that is a skill that is just as important in mathematics as it is elsewhere.

(b) At GCSE level the amount of probability required by users, i.e. “other students”, is likely to be very limited and we therefore suggest that this is kept largely to the mathematics. However the examples used in mathematics should include cases where probability can be applied to other subjects (e.g. very simple genetics), and not just be confined to dice and coins.

**7. Can you point to any research that has studied the relative merits of different approaches to where and how statistics is taught in schools ?**

With regret, no.