

Statistics Teaching and textbooks

I spent five years teaching statistics - mostly at 'A' level. Over the past year I have, amongst other things, been looking at statistics textbooks which aim at the II - I8 age range. It is difficult to get an overview of what is going on in classrooms around the country, and the following is based largely on personal experience.

Statistics teaching in secondary schools may be usefully considered in the following three areas

1. In the II - I6 age range.
2. Sixth form 'A' level non-specialist statistics as taught to the biologist, geographer etc.
3. Sixth form 'A' level specialist statistics, taught either as a subject in its own right, or, more usually, within a Pure maths. and statistics course.

The first group remains relatively virgin territory. Most modern 'O' level mathematics courses include elementary descriptive statistics in their 'lollipop' section, but 'O' level statistics courses are somewhat embryonic. It is not till the sixth form stage that one gets a whiff of revolution. It has started with biology and is beginning to infiltrate geography, but surprisingly (?) has yet to make a serious impact on economics teaching. My feeling is that mathematical statistics (group 3) is still largely being taught from the blackboard, although London Examining Board has now incorporated project work into its Maths./Statistics 'A' level course.

I have looked through quite a number of school level statistics texts recently. Here are some impressions of those directed at groups 2 and 3 above.

(a) Only in the field of biology are there a number of texts which purport to teach statistics to a particular non-specialist at school level. Consequently what follows relates to my impressions of 'A' level biostatistics textbooks.

Almost without exception they struck me as being too difficult for the level of mathematical expertise of the students at whom they were aimed. From a recent survey I conducted with biology

teachers it would seem that a common solution is for the teacher to attempt to digest the contents of one or more of these texts themselves (and not without a little difficulty) and then offer their students some of the bits, in a lower gear. Most biologists seem to believe that these statistical 'bits' can only be forced down sandwiched between thick layers of biological context and illustration. This is certainly consistent with a second feature of the biostatistics texts which I examined - the smell of biological chloroform was strong enough to make the statistical nitty gritty practically impossible to spot, never mind grasp as a principle for future application. It is not surprising that cook-book techniques are still the only means of survival for non-specialist students who don't even have a common-sense notion of what statistics is about.

(b) Books aimed at mathematicians were very homogeneous. Not surprisingly, emphasis is on proof, mathematical justification and distributions, rather than on applications or an enticement to empiricise. The 'A' level syllabuses are quite demanding for the level of student - the high flyers would probably be taking further maths. with mechanics - and this is a further disincentive for the teacher to 'waste time by actually doing statistics'. Having taught pure maths./statistics through two different syllabuses for several years, I am left with the feeling that this particular territory, although no longer virgin, is certainly sterile. The texts are examination oriented - thorough and thoroughly boring. However, this is no fault of their authors, rather to do with the nature of mathematics and its ostrich-like attitude to the rest of mankind. Sad that this is so dutifully ^{reflected} in its teaching at school level.

(A classified list of most school level statistics texts can be found in the June editions of Mathematics Teaching and School Science Review.)

The approach being adopted by the Sheffield-based School Council Project on Statistical Education seems to answer some of the above criticisms. It is aimed at the 11 - 16 year old average citizen

and seeks to develop in him/her a 'statistical perspective'.
A problem for the R.S.G. will be finding a strategy which most effectively brings about any desired change. Whether supporting and pressing new approaches like the SCP on SE above, or knocking the mathematicians' isolationism, it would only seem sensible to identify the focus of control. I suspect that the content and approach of secondary teaching is largely manipulated through the exam. system by the various examination boards. These bodies are not widely known for their radical views on educational matters. The compartmentalised nature of secondary education makes 'interdisciplinary statistics' an almost impossible goal. Few teachers seem to have much interest or experience in this sort of murky area between the disciplines as they are defined at present. They are no-one's responsibility; noone's area of teaching expertise.

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