Report on "Data Skills at University" seminar

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On Monday 24th November, an event run by Westminster Briefing and sponsored by the British Academy and House Magazine, entitled "Data Skills at University: Developing Students' Numerical and Statistical Literacy" took place at the British Academy in London.

In the morning, there were three presentations by Sharon Witherspoon (Nuffield Foundation), Neil Sheldon (RSS) and John MacInnes (University of Edinburgh). These presentations had a number of common themes including the low level of quantitative skills of those coming onto social sciences degrees, the poor quality of the school statistics curriculum, the increasing need for quantitative methods in the social sciences, the resistance of some academic colleagues to change, the hope (rather than expectation) that the new Core Maths qualification might have a positive impact and the need for Learned Societies in the social sciences to be much more interested in both the school curriculum and school outreach.

At times, the presentations seemed to have a sub-text of "being the poor relation" in two ways: statistics as opposed to mathematics and social sciences as opposed to STEM. There was a very strong message that statistics should not be thought of as a branch of mathematics but as a discipline in its own right and a very different discipline at that. Mathematics was characterised as being about certainty ("there is a single right answer") whilst statistics is about uncertainty ("mathematicians do not like the idea that there isn't a single right answer"). Some of the discourse might have been regarded as a little shallow. For example, the statistics problem solving cycle (Plan, Collect, Analyse and Interpret) was presented as something beyond the experience of mathematicians, completely overlooking its strong similarity to the modelling cycle presented in most textbooks on mathematical modelling.

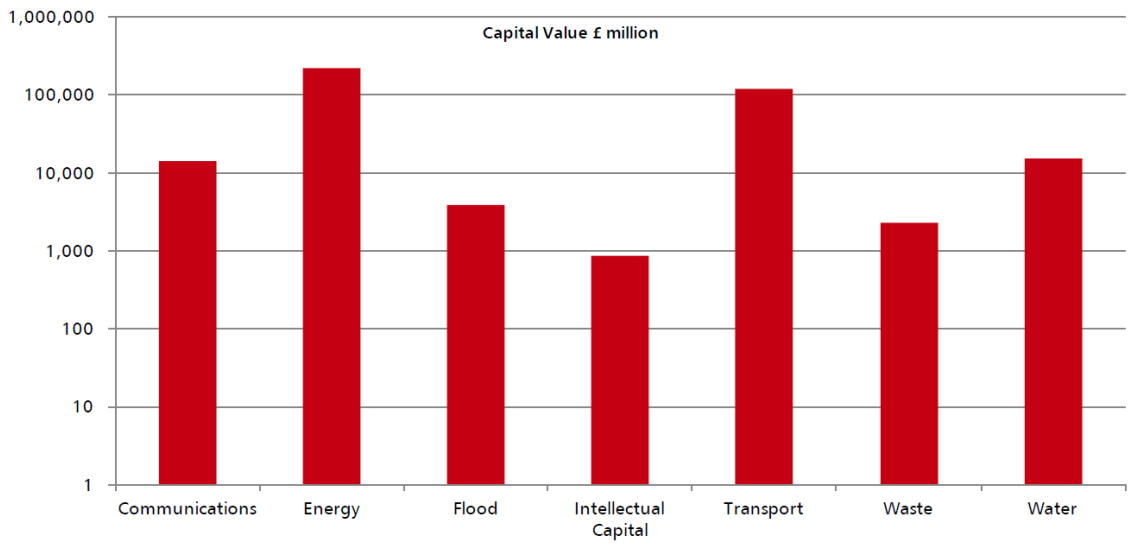
The importance of communicating to learners that statistics is not a collection of procedures and dreary calculations but a way of gaining insight into situations was repeatedly stressed. The University of Auckland's MOOC Data to Insight was promoted as a high quality learning resource that presents statistics in the right way.

In the afternoon, there were three further presentations by Sir Andrew Dilnott (Chair of the UK Statistics Authority), Professor Duncan Lawson (Newman University) and Dr Denes Szucs (Cambridge University).

The UK Statistics Authority's statutory objective is to promote and safeguard the production and publication of official statistics. In practice, this seems to mean repeatedly responding to claims that ministers and other Government officials have used statistics inappropriately. In an entertaining presentation, Sir Andrew gave several examples of where the Authority had intervened. In a speech, the Prime Minister had claimed that "under the Conservatives, the country was paying down its debt". In fact, the National Debt has risen year on year throughout the time in office of this Government (and the last). However, the level of annual government borrowing is reducing (in other words the National Debt is going up more slowly). The Prime Minister's speech writer had (possibly deliberately or possibly not) referred to the wrong official graph. In another example, James Brokenshire, a junior minister, had claimed that the Government's policies had reduced immigration by 25% from its peak under the Labour Government. At first sight, the statistics do support this – the current official figure for immigration is almost 25% lower than the maximum during the previous Labour administration. However, that maximum had occurred in 2005 and for the remainder of Labour's term of office the figure had dropped. The current figure is only about 1,000 lower than the figure during the last year of Labour rule.

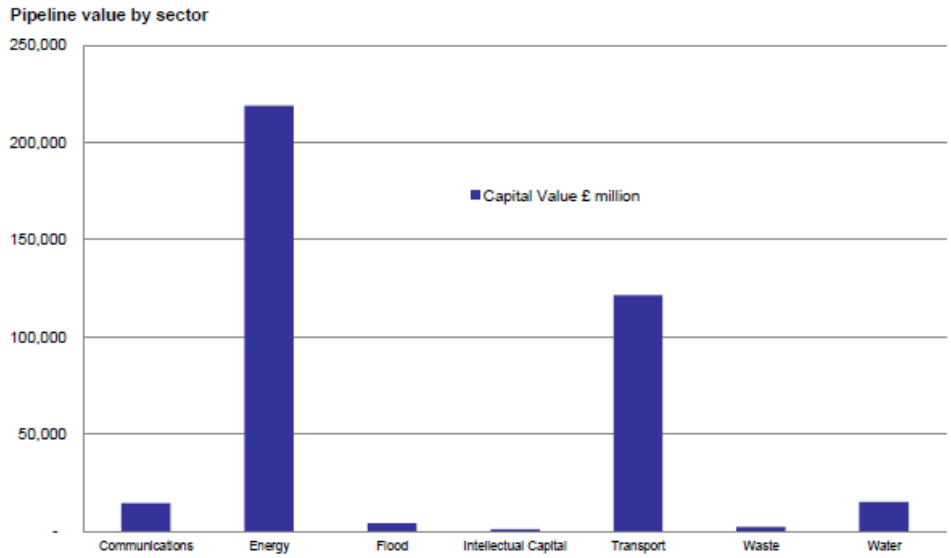
He also gave examples related to the presentation of data, with the graph below from a Treasury report being an example that particularly drew his wrath.

Chart 2.A: Pipeline value by sector



Source: HM Treasury Major Infrastructure Tracking Unit

If you are not sure why he was so exercised by this, try estimating the capital value of "Flood".



The figure above shows the same data on with conventional linear vertical axis. The immediate impact of the two figures is totally different.

A key conclusion from his presentation was that it is important that as many people as possible are able to recognise when data is being abused.

Duncan Lawson presented an overview of the national situation with regard to mathematics and statistics support. This included information about the **sigma** Network and the current HEFCE-funded project. An open invitation was given to delegates to join the **sigma** JISCmail list. The impending report on the high level sector needs analysis sparked the interest of some delegates.

The final session of the day was a preliminary report on a Nuffield Foundation sponsored investigation of mathematics anxiety amongst school children, covering both primary and secondary. The investigators are undertaking a large scale study and have completed a first round of data gathering. The initial findings are there is a significant gender difference in the levels of mathematics anxiety, with girls reporting higher levels than boys but there is no gender difference in relation to mathematical performance. Weak mathematical performance does not appear to be a cause of mathematics anxiety as many average performing and several high performing pupils report high levels of mathematics anxiety. An extensive programme of work is planned over the next two years before final findings of the project are published.

Although the day was primarily focused on developing the quantitative skills of social scientists, there was a wider message for all disciplines. In his presentation, Neil Sheldon had asserted that what steam had been to the 19th century and oil had been to the 20th century, so data will be to the 21st century – a revolutionary

resource transforming the nature of economic and social activity. To this end, it was suggested that data literacy is an essential skill for all – not only those seeking to be at the cutting edge of research in their discipline, but also for everyone to be an informed citizen of a data driven world.