Learning and Teaching: Telling Stories about and with Data (research-based)

Learning and Teaching Telling Stories Project

There is concern about levels of data and statistical literacy skills of UK social science students, even though the cutting edge of social science relies on use of real-world datasets, and there is a great desire to improve research-led teaching in the area.

The project collates the experience of attempts to upskill students in data and its discipline-related usage, and it provides an illustration of educational practice at both disciplinary and national levels. The stories attempt to show how learning about data can be a less passive experience.

A recently commissioned report by the Economic and Social Research Council (ESRC) provides advice and recommendations to the Council for a possible programme of activity to enhance undergraduate teaching in quantitative methods (QM) across the UK social science community.

Key facts

ESDS International
- 20,000 users since 2003
- 6,700 users download 121,000 data reports last year
- 63% of users are from economics/econometrics; 17% from Business/Accountancy/Finance; 6% from Politics and International studies
- 8 intergovernmental organisations (IGOs) provide the data including UN, OECD, World Bank and IMF

Census
- 38,000 users to date
- Over 3,000 logins from around 800 users, from 80 institutions, carrying out 6,000 data downloads per month
- Data supplied from the UK census office (1971-2001), and other organisations (Experian)
- Over 9 billion counts across 200,000 geographical zones

The data

Two data services are included in this work: ESDS International (esds.ac.uk/international/) and the Census Dissemination Unit (cdu.mimas.ac.uk).

Both provide socio-economic data for the UK academic community and are hosted at Mimas, a Centre of Excellence at the The University of Manchester in the UK.

Mimas, hosts socio-economic data that can be used by academic staff and students in a variety of social science disciplines. These data are aggregated counts at different geographic levels. This includes census data (e.g. unemployment levels) and time series macrodatabanks (e.g. GDP per country).

Licensing agreements have been negotiated to enable UK academics to access these data freely. Support and advice is available to the sector for the use of these data.

Learning and teaching resources

All e-learning materials described here are open access.

ESDS International
Countries and Citizens - These are a comprehensive set of e-learning materials, split into five units:
- Unit 1 - the basics
- Unit 2 - making cross-national comparisons using macro data
- Unit 3 - making cross-national comparisons using micro data
- Unit 4 - combining macro and micro data
- Unit 5 - multilevel modelling using macro and micro data

esds.ac.uk/international/resources/learning.asp

Census Area Statistics Materials
The following materials are available to help with understanding the Census Area Statistics produced in the UK Census of Population since 1971. The 14 units provide a range of resources including online tutorials, exercises and exemplary based case studies.

cdu.mimas.ac.uk/materials/

UN Millennium Development Goals
The UNMDG e-learning materials have been designed to help learners explore the United Nations (UN) Millennium Development Goals (MDGs). In addition they guide learners through using ESDS International providing an understanding of the data available and the potential of that data for use in their own research or teaching.

esds.ac.uk/international/resources/unmdg.asp
Here, we focus on how Nick Weaver of The University of Manchester and Paul Turner of Loughborough University are using data to teach applied econometrics to undergraduates and Masters students.

Learning from early exposure

The main benefit for students using real-world data, as opposed to fictional or pre-configured, is that they learn how economics data looks in its raw state. They have to extract the data themselves, and so experience first-hand the complexities and difficulties of working with it.

Nick Weaver expands on this:

"...it's connected with getting your hands dirty and looking at the real world. Standard courses have data that's already in some sense cleaned and used to show an econometrically interesting point of view, when you actually start to investigate the world...things aren't straightforward."

One particularly useful lesson students need to learn is that often there simply isn't enough data for some of the advanced techniques economists want to use.

As well as letting students discover for themselves the problems of working with real-world data, Nick also encourages them early on to take a scientific approach to econometrics.

So, they don't just use data extraction and analysis skills – they also document the data they use, where it's from, and the techniques they use to manipulate it, in a way that makes their work replicable.

Studying realistic scenarios

With real-world data, learning activities can be based on real-life situations, which makes them all the more relevant and interesting for students.

At Loughborough University, Paul Turner combines topics such as consumption, investment and imports, giving his undergraduates different projects, which they can change each year.

Nick Weaver's Masters students at The University of Manchester receive assignments that mimic a real workplace research task. They can choose their own topic, as they're certain to find their choice within ESDS International's broad range of data.

Gaining essential Skills – improving job prospects

Working through projects in labs, students can extract, then re-extract data any number of times. They can try out different methods and learn from their mistakes, without worrying about losing data.

It's a risk-free way to gain statistical, computer and information skills, which are directly applicable to the workplace. Students also have the opportunity to develop a portfolio of realistic project work, which they can use to demonstrate their skills and experience to prospective employers.

So, in an area that's often seen as dry and difficult, using real-world economic data from ESDS International makes study more enjoyable – and enhances employability.

Learning the realities of census data

When students handle census data in its raw state, they soon learn the complexities and difficulties of working with it. As well as making studies more relevant and rewarding, this experience is excellent preparation for employment – and even improves job prospects.

Putting theory into context

The University of Leeds students use Casweb, the CDU's user-friendly web interface, as well as a Geographical Information System (GIS), to look at concentrations of ethnic groups in Leeds – a good way to demonstrate the Modifiable Area Unit Problem (MAUP).

Motivation through meaningful scenarios

Real-world data gives teachers the opportunity to develop learning activities around situations that really matter to students – that build enthusiasm by sparking curiosity or personal interest.

Students can analyse recent news stories to show how the media may rightly or wrongly depict census data. Or they can investigate the relationship between unemployment and ill health in a particular area of Leeds, and then make comparisons with their own home ward.

Improving employability

As they work through projects in IT labs, students can extract and re-extract data from Casweb as often as they like. As there's no risk of losing data, they can experiment with different methods, learning from their mistakes as they go. They gain the statistical, computer and information skills that employers look for, and create a portfolio of realistic project work to demonstrate their experience.

Learning to learn

Working with census data, the Leeds students have to use a range of online tools and software packages, each with its own features, flaws and idiosyncrasies. So, another valuable skill they acquire is how to learn a new system. This develops critical thinking skills, and prepares them for learning any new application they may encounter in the workplace.

Professor John Stillwell is clear about the benefits this brings:

"That's why a lot of our kids who go out of this department, go down to get a job in Leeds City Planning Dept, or XYZ Ltd, and do very very well!"