1. Summary of Project Findings (circa 500 words)

Please summarise your main findings from the project. You are also invited to briefly indicate any plans for further research in this, or a related area.

For ESRC Seminar Series and projects under the Research Development Initiative please detail the outcomes of the activities carried out and provide information on the level of demand for participation.

The research was concerned with undergraduate social science student’s statistical anxiety and identifying the impact of pedagogic reform in QM teaching delivery on students statistical anxiety and competence.

Data were collected at the beginning and end of a quantitative methods teaching module for two cohorts of students. Cohort one completed a traditional didactic twelve week introduction to quantitative data analysis course and cohort two a more interactive twenty-four week course which emphasises learning core statistical tasks using data visualization techniques.

Both cohorts reported a statistically significant reduction in statistical anxiety and a concurrent increase in self-confidence to complete statistical tasks (p = 0.00). This trend was more pronounced for students who completed the twenty-four week course (p=0.00).
It appears that increasing student exposure to statistical teaching and innovating in the delivery of pedagogic material, by in part focusing on the visualisation of statistical concepts and data, could help to address the well-recognised quantitative methods skills deficit amongst social science graduates in the United Kingdom.

However, it is important to note that most students remained statistically anxious and lacked confidence in their ability to complete numeric study tasks. There was a 12% reduction in self-report anxiety from 55% to 43% for cohort one and a 20% reduction from 47% to 27% for cohort two. Meaning that between a third and half of both student cohorts remained statistical anxious in spite of completing an introductory quantitative methods course.

Furthermore, although there was an increase in students self-reported statistical competence their self-report efficacy to both complete and to learn to complete core statistical tasks moved from the negative to neutral mid-point of the confidence scale. Meaning that students moved from disagreeing that they are competent to reporting that they feel neutral about being competent.

These findings reinforce that in spite of receiving high quality statistical teaching students nevertheless remain anxious about completing a quantitative methods course and their ability to complete core statistical analysis tasks.

The investigators concluded that this may well be because the statistical analysis of social science-based quantitative data is restricted to research method teaching modules and numeric study tasks more generally do no form part of the broader curriculum and its substantive modules. As a result, it appears that the curriculum may well be unintentionally reinforcing to students that the importance of numeric forms of data within their studies is minimal. This could result in students devaluing the role and value of numeric forms of analysis in their discipline.

The investigators concluded that further research is needed to identify how best to promote statistical literacy in the social sciences and hypothesize that this must involve embedding numeric study tasks and forms of analysis within substantive modules belonging to the broader curriculum rather than just in research methods modules.

2. Exploitation Routes (circa 250 words)

Please describe the process and activities through which you plan to ensure that your findings obtain the maximum potential impact. This can include both scientific impact and economic and societal impact.

Project activity has generated impact in four streams:

**Pedagogic reform at Loughborough University**

Project activity has led to an integrated first and second year quantitative methods course for students studying criminology, social policy and sociology at Loughborough University. Project activity has also influenced quantitative method teaching delivery more generally across several
undergraduate social science programmes; including, geography, politics, history, international relations, communication and media studies and social psychology.

Workshops

A workshop was held on the role of “visualisation in quantitative method teaching”, sponsored by both the ESRC and the HEA, on the 29th May 2014 at Loughborough University, Dept Social Science. This was attended by QM teachers and researchers from throughout the UK.

A workshop was held at the ESRC Research Methods Festival 2014 9th July 2014 entitled: “Teaching quantitative methods: what can qualitative researchers and teachers learn?”

Academic papers


Quantitative Method Teaching Network

Project activity and teaching resources are to be made available via the ESRC quantitative Methods teaching web resource: http://www.quantitativemethods.ac.uk/ overseen by the ESRC strategic Advisor for quantitative method teaching, Professor John MacInnes

3. Potential use in a non-academic context (circa 250 words)

Please outline any anticipated or potential economic or societal impacts that you believe your project might have in future on the 'user' community.

Project outputs are specific to the classroom teaching of core statistical competences belonging to social science disciplines. However, they are two avenues whereby project activity will have a broader long-term impact.

Graduate employment and educational pathways

Currently approximately 80 UG social science students with advanced quantitative research design and statistical skills will complete the programme annually from June 2016 onwards. The impact this will have on their employment and educational pathways is unknown but the project
team are seeking funding to track Loughborough social science graduates as it is hypothesized, based on students self-reports, that they will have a broader set of options available to them than has traditionally been the case.

Nuffield Q-Step programme, pre-university maths education and student outreach and recruitment

Project findings will be disseminated to the Nuffield and ESRC sponsored Q-Step programme and it is expected that this will result in, firstly, their wider dissemination across the UK higher education sector, and secondly, as part of this influence broader debate surrounding pre-university maths education and student outreach and recruitment.

4. URL

If your project has its own website/web page, please enter the URL here.

None

5. Sector Coding

Please select the sector(s) from the list that best indicates where the findings of your grant will potentially be of most relevance to (delete those not applicable):

Education