

## LEARNINGS FROM A DECADE OF DATA FELLOWS: CO-CREATION OF A DATA SKILLS FRAMEWORK FOR NON-STEM STUDENTS

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*This workshop provided a reflection on an experiential learning model developed in the UK. The Data Fellows initiative supports undergraduate social science and humanities students to develop their data skills through work placements. The findings have resulted in a book, academic articles and international presentations which collectively provide a substantial body of evidence to illustrate how non-Stem (science, technology, engineering and maths) students can learn and practice their data analytic skills and progress into data and technical careers. 25% of the 373 data fellows placed to date have been from historically under-represented groups and 70% have been female. A case study was presented to show a journey from a first degree in social science to a postgraduate degree in data science. The aim of the workshop was to challenge the deficit narrative that can accompany the teaching of data skills in the social sciences and explore whether a suitable data skills framework exists or could be developed.*

### THE WORKSHOP

The aim of the workshop was to challenge the deficit narrative that can accompany the teaching of data skills in social science degree programmes and explore whether a suitable data skills framework exists or could be developed. The co-presenters set out to provide a body of evidence from a UK initiative that shows how teaching data analysis skills in the higher education classroom and accompanying this with workplace experience can result in opening up opportunities to non-Stem (science, technology, engineering and maths) students for progression into data careers. A case study from one of the presenters went on to show how graduates can navigate from a social science background to a role in data science research.

The workshop started with two presentations. The first provided evidence from the University of Manchester, UK, which has developed an experiential learning model to enable undergraduate students on social science or humanities bachelor's degrees to put the data and statistical skills and techniques they have been taught in their courses into practice in the workplace. This initiative, known as the Data Fellows programme, was set up in 2013. Academic papers (e.g. Buckley et. al (2015), Carter et al (2017), Carter (2021a)) have captured the learnings, and the initiative has been presented in multiple international conferences. Ten case studies and a series of vignettes including many from the Data Fellows programme are featured in Carter (2021b) and two booklets, reflecting stories of pathways into policy and research careers, drawing on social science alumni including some who have undertaken data fellowships, are available on open access (Carter, 2023a, Carter 2023b). The programme has also resulted in two external industry accolades for Jackie reflecting the value placed on building bridges between higher education and the workplace: One in Twenty Women in Data in 2020 and Everywoman in Technology industry award in 2021 (both in the academic category). Advance HE (the higher education body for the professionalisation of teaching) has awarded both National and Principal Teaching Fellowship to Jackie as the Data Fellows programme lead.

The Data Fellowship programme helps create a diverse talent pipeline into data and tech graduate careers. Of the 373 students to have undertaken the programme (to 2025) 70% have been female and 25% from historically underrepresented groups. The aim of the first part of the workshop was therefore to present evidence of the successful outcomes of the programme, and to illustrate how teaching data skills together with enabling these to be practiced in a workplace setting can combine to create transformative opportunities for those from non-Stem degree pathways. An important discovery through the data fellowship initiative has been to help students reflect on their work placed learning, using an Analytical and Skills framework and a list of Professional skills (Carter, 2021b Chapters 6-8). This framework, and the associated reflection tools, derived from The British Academy (2017) and the list of professional skills drawing on industry reports (LinkedIn (2019) and McKinsey (2018)) enables

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students to be able to elicit and capture their learning in a way that will be beneficial to them when applying for graduate roles or graduate study.

Finally, Jackie reflected on the strengths that social science and humanities students offer. These include, but are not limited to, extensive subject knowledge, high levels of critical thinking, ability to develop nuanced arguments to complex societal issues, training in distilling meaning from large volumes of textual information (often theoretical in nature) and good communication skills. These need to be borne in mind when discussing where in the curriculum data analysis is taught, as these are all essential skills for data driven careers.

The second part of the workshop focused on the unique perspective of Adriana whose vignette features in Carter (2021b). Adriana shared her journey from complementing her bachelor's degree in International Relations with a Data Fellowship in 2013 to pursuing a PhD in Mathematics a decade later. She highlighted how the programme influenced her interdisciplinary work, emphasizing how combining social sciences with data science has shaped her career and ultimately led her to create Project AIMS (AI Against Modern Slavery) (2020).

## DISCUSSION

Following the presentations, the workshop was divided into groups who were asked to reflect on the presentations and consider several issues that had been raised:

- What has been learned from the UK Data Fellowship programme presented?
- Are there any data skills frameworks that the participants know about?
- Which data, statistics and software techniques do the group think are critical for social science graduates to pursue a career requiring data analysis skills?
- How do we teach social science students to be critical in interpreting the code and software used in data analytics and data science?
- How can we make the most of the opportunity that these tools provide?

In the workshop we discussed how the Data Fellows model provides a compelling case of the need for data skills to be practiced in real world and workplace settings. Questions were raised however about how scalable and practical this is, especially for large teaching cohorts of the type represented in the roundtable participants' experiences. It was suggested that the social science community could learn from work undertaken on quantitative reasoning with the ten questions developed at Carleton by Neil Lutsky ([serc.carleton.edu/quirk/CarletonResources/10questions.html](http://serc.carleton.edu/quirk/CarletonResources/10questions.html)) offered as a place to start.

We also delved into the significant challenges teachers and students face in adapting to an education system increasingly influenced by AI developments. We discussed the need for students to differentiate between traditional and widely used Google searches and generative AI results while critically considering the biases present in AI models. Additionally, we explored the unresolved issues surrounding the use of software tools in non-English languages and the disparities between paid and free AI tools. Some participants suggested incorporating AI tools like ChatGPT into learning by analyzing prompt results, emphasizing the importance of teachers developing their own critical evaluation skills when using generative AI in the classroom.

The conclusions were broadly that to develop data skills (i) workplace learning matters (ii) AI literacy needs further development for instructors and students (iii) trajectories into careers from social science to data science are possible for students to pursue and (iv) there is no clear data skills framework that workshop participants were aware of, suggesting an area for future research.

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