

Data skills in geography Project review

**Royal
Geographical
Society**
with IBG

Advancing geography
and geographical learning



‘Geography helps us understand the world. It gives us the science, the data and the insights to plan for the future.’

Nicholas Crane

RGS-IBG Past President

Introduction

Data is the raw material of the 21st century. With more than 80% of all data geo-located, geographical approaches and techniques are essential in enabling a better understanding of, and decision-making in relation to, the world's people, places and environments.

Geography spans the natural and social sciences. As the 'spatial science' it enables students to collect, review, analyse, present and evaluate real world data within a context that addresses variations between places, at varying scales and in different geographical settings.

The data-rich elements of geography have been widely recognised. Reviews by the Nuffield Foundation, the Royal Geographical Society (with IBG), the British Academy, and the Royal Statistical Society¹ have highlighted geography's role in supporting data skills.

Geography is a popular subject and the 8th most studied subject at GCSE and A Level, with UK entry levels in 2017 at a 15-year high – ca. 245,000 GCSE and 38,000 A Level candidates². It is one of the most gender balanced subjects, recruiting broadly equal numbers of female and male students.

The Society, alongside others, called for a strengthening of data skills in geography as part of the reform of the National Curriculum, and at GCSE and A Level. GCSE and A Level qualifications now provide a greater emphasis on students being trained in, and assessed on, data skills, which are embedded in their geographical studies.

This has led to challenges for many teachers in relation to their:

- professional knowledge and skills;
- ability to integrate data skills into the new areas of geographical content and fieldwork; and
- confidence and competence in using data and geospatial technologies.

In response, the Society initiated the *Data Skills in Geography* programme. The Nuffield Foundation funded the programme over the period 2015-17. In June 2018, the Nuffield Foundation agreed to provide additional funds to support a second phase of the programme into 2019.

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Data skills in geography

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Launched in October 2015, the programme provided an integrated approach across Higher Education (HE) and schools to bring about a step-change in teachers' and students' understanding of data skills, confidence in their use, and knowledge of their value to further study and the workplace. The programme of activities, exemplified below, involved:

1 Working across HE and schools to inform both sectors of changes and opportunities, and to share good practice and expertise.

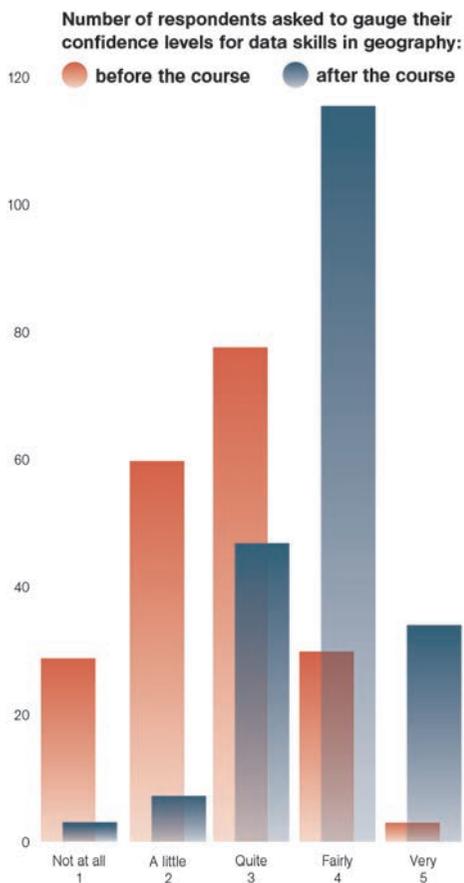
2 Producing teaching materials for the new GCSE and A Level specifications, complemented by a national programme of continuing professional development (CPD).

3 Collaborations with Awarding Organisations, Initial Teacher Training (ITT) courses, other Learned Societies and HE geographers in Q-Step centres to secure greater impact and underpin sustainability for the future.

The overarching aim was to upskill the teachers of today and to enhance the understanding of the teachers of tomorrow.

The project has had a demonstrable impact on teachers' confidence in their use of data skills. Evaluations conducted with 205

teachers before and after CPD training, revealed that, on average, confidence increased by 1.3 points on a 5-point scale, moving from an average of 2.6 to 3.9.



For further information about the programme
www.rgs.org/dataskills

Programme outcomes

Outputs met or exceeded

1

Working across higher education and schools to inform both sectors of changes and opportunities, and share good practice and expertise.

'The project has demonstrated strong links between schools and HE, highlighting the *why* as well as the *how* of data skills.'

Dr Simon Gallacher

The Nuffield Foundation



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This engagement helped colleagues across the school and HE sectors better understand the importance of data skills within transitions from school to university. It also facilitated engagement with the project by HE colleagues, from Q-Step centres and beyond, who took on substantive roles within the programme. This included writing overview papers and online resources for use in the classroom, contributing to CPD training and other events, and advocacy for the programme.

This work involved colleagues from: the universities of Bristol, Keele, Leeds, Loughborough, Oxford, Queen Mary, Sheffield, Sussex, University College London and the West of England.

The Society has longstanding and close links with HE geography programmes and secondary school geography departments. Through existing and new partnerships, the Society provided briefings, via papers and presentations at events, for both sectors, outlining the changed nature of GCSE and A Level in terms of data skills and the demands of undergraduate courses.

2
Producing high quality teaching materials for GCSE and A Level for the new curricula, complemented by a national programme of continuing professional development (CPD).

a High Quality Educational Resources.

'Practical jargon-free advice from the experts through free, easy to use resources.'

Teacher feedback



Overview papers and resource modules relevant to GCSE and A level have been published. They were written by HE colleagues, expert teachers and Society staff. They include subject knowledge updates for teachers, lesson plans, activities and resource materials.

The overview papers written by Professor Richard Harris include materials on the role of quantitative methods in geography,

examining inequality, using Geographical Information Systems (GIS), population change, exploring development, the availability of data and using data 'badly'. Dr Jon Reades provided an insight into the ubiquity of cheap data and how this will influence geography's future.

For GCSE, there are data rich units on ecosystems, examining urban change in suburbs, the Galapagos and the water cycle. For A Level, there are resources that examine a range of data in relation to changing places, coastal processes, exploring places, GIS, glacial sediments, population, climate, statistics, and the water and carbon cycles.

The Society also developed a resource bank of relevant data sets, spanning climate change to crime data, and published a collection of newly-created gridded cartograms produced by Dr Ben Hennig.

These resources are all available at www.rgs.org/dataskills

By the end of December 2017, they had received 60,000+ views.

Target To produce and disseminate 10 resource units and achieve 50,000 online views of the resources web views.

Outcome Target exceeded.

b Professional development for teachers and initial teacher education students.

'Great ideas and examples of how to apply the (exam) criteria and access suitable data.'

Teacher feedback



Seventy-one CPD events were delivered. The majority took place in England, with a number of events running in Wales and more modest activity in Scotland; 40% of the events took place outside London. CPD events included one-day courses, twilight sessions and weekend residential courses.

Courses were run in partnership with university departments, all of the Awarding Organisations (AQA, Pearson Edexcel, OCR and WJEC/Eduqas), and with other key partners including Esri UK, the Field Studies Council, Transport for London and Multi Academy Chains.

The courses demonstrated ways of embedding data skills into the teaching of different topics, as supported by the project resources. Sessions were also run examining the role of data in fieldwork and through the application of GIS.

Training was also provided for ITT students from the universities of Brighton, Bristol, Cambridge, Canterbury, East London, Institute of Education - University College London, Queen Mary and Warwick, as well as trainees at the Harris Federation and Teach First. Teachers reported increased confidence in their use of data skills following the training.

A case study, from the ITT programme at the University of Cambridge, showing how data skills can be developed through a collaboration between geography and maths ITT PGCE courses is available here: www.rgs.org/DataITT

1,070+ delegates attended the CPD sessions.

Target To provide CPD events for GCSE and A level (along with other twilight, ITT and partnership events) to reach 1,000 teachers and ITT students.

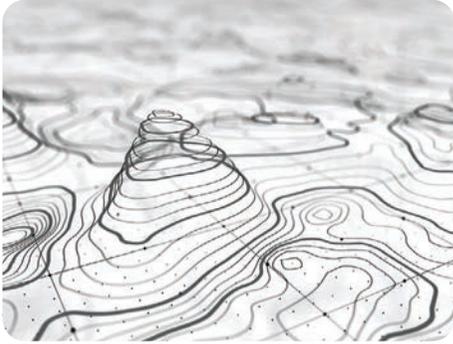
Outcome Target exceeded.

d The importance of data skills to further study and careers.

'Data and data analysis underpins everything that we do.'

Hannah Rignell

Hertfordshire County Council



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To demonstrate the importance of data skills to further study and careers, the RGS-IBG commissioned a series of careers interviews (presented as videos and written articles) to demonstrate how geographers use data skills in the workplace. A number of other career profiles, previously developed through the RGS-IBG Quantile project were represented through this programme. These profiles, spanning a range of careers and roles, are available at www.rgs.org/datawork

Target To present data rich career profiles.

Outcome Target met.

3 Collaborating with Awarding Organisations, Initial Teacher Education, other Learned Societies and geographers in Q-Step centres to secure greater impact and underpin sustainability for the future

'This excellent project blazes a trail for other learned societies to follow and develop.'

Professor John MacInnes



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The Society worked with a wide range of partners to deliver this work and to advocate for the importance of data skills within geography and in the wider social sciences.

Presentations about the programme have been given at a number of fora to many stakeholders including the British

Academy, Data Skills Task Force, Geographical Association, Royal Society, Royal Statistical Society, the Westminster Education Forum and at Nuffield Foundation convened Q-Step events.

The Society continues to advocate the importance of data skills in geography within its ongoing work with:

- The Department for Education
- Higher Education stakeholders including the QAA
- across the geographical community
- with other subject bodies and the wider data skills community

Data skills and quantitative methods are also embedded in the evaluation framework for the Society's undergraduate degree accreditation. Over 50% of all UK HEIs delivering a degree in geography are now accredited through this initiative.

The *Data Skills in Geography* programme has been referenced in two key reports and also covered in *Teaching Geography* and the *Times Educational Supplement*:

'The increased mathematics content in new (geography) A Levels means that some teachers require extra support to teach mathematics effectively. The Royal Geographical Society (with IBG)'s programme *Data Skills in Geography* is supporting this transition.'

Sir Adrian Smith

Review of post-16 mathematics 2017 **3**

'It's critical the work in schools and colleges continues beyond successful pilots, and initiatives by The Urban Data School and Royal Geographical Society are rolled out further.'

Data Skills for the Future

2017 **4**

From data to knowledge: teaching data skills in geography.

Professor Richard Harris

Teaching Geography (2018) **5**

Chewing the statistics together.

Times Educational Supplement

December 2017



Future opportunities

Consolidating and extending impact



Maintaining data skills CPD support, teaching resources and careers profiles

This is an important area of work for the Society. Having made significant progress through the Data Skills programme, the Society will maintain an active role in this sector.

This will be through the provision of CPD training and ensuring continuing online access to the resources and career profiles.

Data Champions, regional engagements

At the suggestion of the Nuffield Foundation, the Society piloted a regional network of 'Data Champions'.

These Data Champions are teachers who have been involved in the programme and who have helped encourage activity and collaboration at a local level. Data Champions are in place across England and Wales. There is additional work to be undertaken with the Data Champions to further embed training and support on a regional basis, build up a network of expert teachers and continue to engage Multi Academy Chains with this support.

Enhancing data skills within GIS

The GCSE and A Level qualifications require students to collect and use data within Geographical Information Systems (GIS).

Despite these requirements, Esri UK estimated that ca. 90% of secondary schools had not been using GIS sufficiently well with their students, either because of a lack of resources to subscribe to a GIS platform or a lack of confidence in its use.

In April 2017, Esri UK made its ArcGIS online platform freely available to all UK schools. As of June 2018, more than 1,700 schools have taken up the free subscription, with ca. 65,000 school-based users now accessing this technology. Alongside this free access, the Society has been working with Esri UK to provide CPD training to teachers so that they become confident in their use of ArcGIS. In addition, the Society has also supported the growth of Esri UK's national network of 'Geomentors' – GIS professionals who can provide local, bespoke support for teachers in their locality. This work will continue.



Continuing engagement with Awarding Organisations, Initial Teacher Training and with other data rich subject disciplines

The Society will continue to work with the Awarding Organisations, Initial Teacher Training providers and others to promote the value of data skills within geography. In relation to ITT, the Society has also provided specific support to its national network of Geography ITT Scholars so they are better prepared for the move from their training into the classroom.

In addition, the Society will work with colleagues from other data rich social science disciplines in order to share our experience and learning with them.

There is an opportunity to explore the contribution of geographical data and geographical contexts and the expertise of geography teachers to the take up of the Core Maths qualification.

Conclusion

Over the two years of the programme, much has been achieved through the direct work of those involved with teachers and through partnerships developed with key stakeholders.

The programme has directly reached over 1,070 teachers and built their confidence in the use of data skills, received positive feedback to the online resources and CPD delivered, and had very productive engagements with many stakeholders.

The experience of geography also provides an exemplar from which other subject communities can draw lessons in relation to how data skills could be strengthened within their own disciplines.

However, there is an ongoing challenge and much still remains to be done to ensure that teachers and their students in all schools benefit from greater confidence and competence in their use of data skills.

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Former Head teacher

Claire Allen

Consultant, geography assessment

Dr Alex Standish

IOE / University College London

Paul Adams / Neil Lawson

Department for Education

Philip Avery

Director of Education, Bohunt Trust

Professor John MacInnes

Professor of Sociology; Associate Dean
Quantitative Methods CHSS,
University of Edinburgh

Dr Simon Gallacher

The Nuffield Foundation

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www.nuffieldfoundation.org | @NuffieldFound

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- 5 *From data to knowledge: teaching data skills in geography.* **Professor Richard Harris,** Teaching Geography (2018)
- 6 *Count Us In.* **British Academy** (2015)

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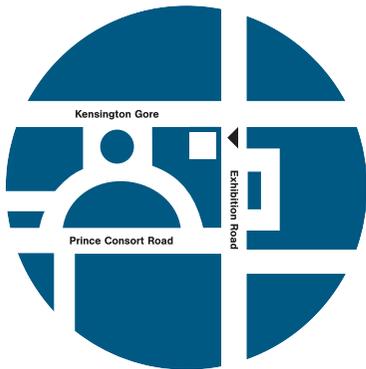
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‘The ability to understand and interpret data is an essential feature of life in the 21st century: vital for the economy, for our society and for us as individuals. The ubiquity of statistics makes it vital that citizens, scientists and policy makers are fluent with numbers. Data analysis is revolutionising both how we see the world and how we interact with it.’

Count Us In

British Academy (2015) ⁶



Royal Geographical Society (with IBG)
1 Kensington Gore London SW7 2AR

- T** +44 (0)20 7591 3000
- E** education@rgs.org
- W** www.rgs.org
- T** [@RGS_IBGschools](https://twitter.com/RGS_IBGschools)

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