

Response from the Royal Geographical Society (with IBG)

Royal
Geographical
Society

with IBG

Advancing geography
and geographical learning

● Closing the STEM Skills Gap

1. The Royal Geographical Society (with the Institute for British Geographers) is the UK's learned society and professional body for geography and geographers. Founded in 1830, the RGS-IBG is one of the largest and most active geographical societies in the world, existing to advance geography: the integrated study of the Earth's landscapes, peoples, places and environments. Geographers specialise in the dynamics of these phenomena, with skills based in quantitative and qualitative methods in the natural sciences, social sciences, and humanities.
2. We encourage the Committee to adopt a broad understanding of what constitutes a STEM (Science, Technology, Engineering and Maths) subject. A number of subjects contribute to the provision of STEM skills, STEM learning and research, and to the STEM workforce. Geography is one such discipline (formally recognised by Hefce as 'part-STEM' in higher education). In the school context Geography spans and combines the social and physical sciences. This unique role has been recognised through its designation as both a core subject as part of the English Baccalaureate and a key 'facilitating subject' for entry to degree level study^{1,2}
3. Geography has been recognised as significant in delivering quantitative skills. Geographical fieldwork in particular has been identified by the Royal Statistical Society as a crucial enabler of the acquisition of skills in data handling and statistics, equipping students effectively for future work and study. Developing quantitative skills is likely to be most effective when students are required to address interesting, applied, problems; an opportunity which fieldwork provides.³
4. Geography graduates are less likely to be unemployed after their degree course than those studying almost any other subject due to the highly transferable skills that they acquire.⁴ Entries for geography examinations in secondary education are growing, whilst there has also been a substantial increase in the numbers studying geography at university; the number of geography entrants to higher education in 2015 was eight per cent higher than in the previous year and at any one time there are more than 30,000 full time or part-time geography students. Geographers have highly developed analytical capabilities related to collection, analysis, interpretation and visualisation of primary and secondary data (especially spatial data).⁵ Geographers are particularly valued for their high-end expertise in Geographic Information Systems (GIS), geostatistics, spatial econometrics and the use of geographic information in scientific visualisations; demand from employers for these capabilities is increasing in the era of 'big' and 'open' data.
5. Nevertheless, the RGS-IBG and others (for example the Nuffield Foundation, British Academy and the Economic and Social Research Council) have identified a 'general deskilling' in quantitative methods (QM) across the education sector in the UK, in schools, universities and in the workplace; a trend which has been well-documented for a number of disciplines, including geography.⁶ In a July 2014 report on 'Skills in Mathematics and Statistics in Geography and Tackling Transition', commissioned by the Higher Education Academy, three-quarters of the university staff surveyed stated that students were 'not very well' or 'not at all' prepared for their geography degrees in terms of their mathematical and statistical skills.^{7,8} The

¹ Nuffield Foundation, 2012. *Mathematics in A' Level assessments: a report on the mathematical content of A Level assessments in Business Studies, Computing, Economics, Geography, Sociology and Psychology*. Available at: <http://www.nuffieldfoundation.org/sites/default/files/files/Maths_in_A_Level_Assessments_Nuffield_Foundation_WEB.pdf> [Accessed 4 January 2017].

² Russell Group, 2016. *Informed Choices. A Russell Group guide to making decisions about post-16 education*. Available at: <<http://russellgroup.ac.uk/media/5457/informed-choices-2016.pdf>> [Accessed 12 January 2017].

³ Royal Statistical Society, Institute and Faculty of Actuaries, 2013. *A world full of data: statistics opportunities across A Level subjects*. Available at: <<http://www.rss.org.uk/Images/PDF/influencing-change/A-world-full-of-data.pdf>> [Accessed 4 January 2017].

⁴ Higher Education Statistics Agency, 2016. *Destination of Leavers from Higher Education Survey (2014/15)*. Available at: <<https://www.hesa.ac.uk/data-and-analysis/students/destinations>> [Accessed 3 January 2017].

⁵ RGS-IBG, 2011. *Higher Education in STEM Subjects. Evidence from the RGS-IBG to the House of Lords Science and Technology Committee Inquiry*. Available at: <http://www.rgs.org/NR/rdonlyres/B8F3EEF5-F1D7-48C1-82D6-E64FCD571598/0/2011_HE_STEM.pdf> [Accessed 3 January 2017].

⁶ Harris, Richard et al, 2013. *Quantitative Methods in Geography: Making the Connections between Schools, Universities and Employers*. London: Royal Geographical Society (with IBG). Available at: <<http://www.rgs.org/OurWork/Research+and+Higher+Education/Learning+teaching+and+research+in+higher+education/Quantitative+Teaching+and+Learning+in+Geography/Quantitative+Methods+in+Geography.htm>> [Accessed 3 January 2017].

⁷ Higher Education Academy, 2014. *Skills in Mathematics and Statistics and Tackling Transition*. Available at:

<https://www.heacademy.ac.uk/resources/detail/detail/disciplines/Maths_Stats_OR/Skills-in-Mathematics-and-Statistics-in-geography> [Accessed 3 January 2017].

views of the students differed; under a quarter reported that they were poorly, or very poorly prepared. The majority of the instructors surveyed for the report said that students underestimated the quantitative skills that would be required in their geography degree course.

6. In response, the Society, funded by the Nuffield Foundation, began a two-year funded project in 2015: '*Data Skills in Geography*'. The project focuses on schools, whilst drawing upon expertise in higher education. The initiative aims to enhance and support teachers in their understanding of data skills, confidence in the use and application of these, and the integration of such skills into schemes of work. This includes teachers' knowledge of the value of data skills to students' further study and employment.⁹
7. Outputs of the '*Data Skills in Geography*' project will include: 10 high-quality online resource modules to support the teaching of data skills that are required in GCSE and A' Level geography courses; a programme of Continuous Professional Development (CPD) for 1,000 geography teachers, and those entering Initial Teacher Training (ITT) partnerships with examination boards, ITT departments, Teaching Schools, Academy chains, along with other relevant organisations and individuals, to further embed data skills in their work and share good practice; and workshops and seminars to share expertise and learning from the programme. Twelve courses have been run so far, to approximately 144 individuals. Of those who responded to a feedback survey (58), 29 reported that they were not confident in the use of data skills in geography before attending the course (on a scale of one to five, with one 'not confident' and five 'very confident', they recorded a one or a two). Ten stated that they were confident in the use of data skills (they recorded a four or a five). As a result of attending the course, 40 of the 58 respondents reported that they were confident, whilst only one teacher recorded themselves as still 'not confident' (i.e. a score of one). Although this is a relatively modest sample, it nevertheless shows a positive shift in the right direction amongst geography teachers, gaining confidence in teaching data skills to students through their participation in the programme. A full review of the project will be conducted later this year.
8. In addition to the '*Data Skills in Geography*' project, specifically supporting teachers, and therefore students, to be more prepared for the quantitative rigors of a higher education in geography, the RGS-IBG accredits geography degrees. This provides assurance to students and employers that geographical knowledge, skills and approaches are being taught to the highest standards, in accordance with the QAA Subject Benchmark Statement for Geography. The recent revision of this enhanced expectations about methods generally, quantitative methods more specifically and included recent developments in Geographic Information, spatial analysis and new data streams. Sixty three undergraduate and Masters degrees are currently accredited, at 22 universities across the UK.¹⁰
9. The ability to design and conduct fieldwork has been identified as a skills gap in STEM.¹¹ Quality fieldwork, at both school level and in higher education, provides essential skills, knowledge and understanding to students. Participants gain crucial experience in data collection and analysis, mathematics, map work, observation and investigation, computer and technology skills and communications, plus an appreciation for other cultures and traditions. The Society established the Learning and Leading programme in 2008, partly to address this gap; supporting students who had faced challenging circumstances to access high quality fieldwork opportunities. The programme provided bursaries for summer fieldwork apprenticeships to undergraduates, who through lack of opportunity had not been able to access such experiences before.¹² The programme, which ran until 2016, also provided teachers (primarily A 'Level teachers but with provision for those teaching GCSE Geography) with the opportunity to attend twice-yearly, funded, masterclasses to enhance the quality of schools' and students' fieldwork. Over the eight years of the scheme, over 400 teachers and young people benefited from the opportunity to participate in high-quality fieldwork.
10. The RGS-IBG also supports the acquisition, development and maintenance of geographical skills in the workplace. To enhance the significant STEM skills that geographers contribute as professionals in a range of settings, the Society awards 'Chartered Geographer' (CGeog). This is the only internationally recognised professional accreditation presented to those with competence, experience and professionalism in the use of geographical knowledge, understanding and skills in the workplace. Four post-nominals reflect Chartered Geographers' skills in GIS, economics, geomorphology and teaching. There are currently around 650 Chartered Geographers; the accreditation provides an impetus and incentive to individuals for CPD and training, ensuring that employers benefit from a workforce with a high level of geographical skills.¹³

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⁹ ESRC, 2013. *International Benchmarking Review of UK Human Geography*. Available at: <http://www.esrc.ac.uk/files/research/research-and-impact-evaluation/international-benchmarking-review-of-uk-human-geography/> [Accessed 12 January 2017].

⁹ RGS-IBG. *Data skills in geography*. Available at: <http://www.rgs.org/OurWork/Schools/Data+skills+in+geography/Data+skills+in+geography.htm> [Accessed 3 January 2017].

¹⁰ RGS-IBG. *Accreditation of university geography programmes*. Available at: <http://www.rgs.org/OurWork/Research+and+Higher+Education/Accreditation+of+programmes/Accreditation+of+university+geography+programmes.htm> [Accessed 4 January 2017].

¹¹ Natural Environment Research Council, 2012. *Most Wanted II. Postgraduate and Professional Skills Needs in the Environment Sector*. Available at: <http://www.nerc.ac.uk/skills/postgrad/policy/skillsreview/2012/most-wanted2-report/> [Accessed 3 January 2017].

¹² RGS-IBG. *Learning and leading*. Available at: <http://www.rgs.org/OurWork/Learning+and+Leading/Learning+and+Leading.htm> [Accessed 3 January 2017].

¹³ RGS-IBG. *Chartered Geographer*. Available at: <http://www.rgs.org/OurWork/CharteredGeographer/Chartered+Geographer.htm> [Accessed 3 January 2017].