HOW DO WE ADDRESS THE SKILLS SHORTFALL?

GEOSPATIAL IS FLOURISHING, WITH GROWING INTEREST ACROSS A RANGE OF SECTORS, BOTH PUBLIC AND PRIVATE. BUT CAN WE MEET THE FUTURE DEMAND FOR SKILLED PROFESSIONALS? **BRUCE GITTINGS, TOM JANES** AND **DR ASHLEY STEWART** ASSESS THE SITUATION NORTH OF THE BORDER

Location Data Scotland, the University of Edinburgh and the Association for Geographic Information in Scotland have been working in partnership to explore the Scottish geospatial skills landscape to assess whether there is a geospatial skills shortage and, if so, how it could be addressed.

Jointly supported by Scottish Government, Scottish Enterprise and the Geospatial Commission, Location Data Scotland (LDS) was established to connect, inform and facilitate collaboration between industry, academia, public and third sector, across multiple sectors, to drive innovation, unlock skills and enable economic growth through the better use of location data.

For some years it has been suggested that employers in the geospatial sector have both struggled to grow their workforce and retain existing staff given the large number of positions available and the limited supply of graduates. However, this was very much anecdotal information and given the remit of LDS to support growth and Scottish Government's ambition to ensure Scotland is recognised as an international hub for the geospatial industry, a skilled workforce is necessary to support this aspiration. Therefore, we sought to validate the skills challenges and consider how these could be addressed to future-proof the industry.

A widely-distributed survey revealed concerns around the current and future recruitment and retention of suitably skilled staff within the sector, as illustrated in Fig.1.

These findings demonstrate a developing geospatial skills gap in Scotland. The concentration of skills development in higher education, particularly at Masters-level risks narrowing the pool of available applicants and excluding sections of society we would wish to welcome into our profession.

Broadening the base

Higher education is not for everyone, and there are significant barriers to access, not least cost. Many students attending our universities do not see their future in the UK; for example, more than 70% of those taking the GIS Masters at Edinburgh are from overseas and can't or won't remain in the UK.

Equally many geospatial roles do not need the level of educational attainment that four or five years at university provides. We would propose the broadening of educational provision to colleges (where there is currently no provision in Scotland) and schools (where provision is at best patchy).

We would also argue the need for work-based apprenticeships which, while developing, are very limited and rarely focused on geospatial. The goal being to increase awareness of geospatial and ultimately the skills base for the geospatial industry in Scotland.

We have undertaken research specifically on the current provision, needs and aspirations within schools. The research examined the curriculum content, teachers' attitudes towards geospatial skills, and opportunities to improve current teaching.

Falling behind

Documented experience reveals the benefits of using geospatial skills in the classroom are well established and embedding these into schools are consistent with aspirations of Scottish Government's Digital Strategy and school curriculum. However, the development of geospatial skills in Scottish schools is falling behind other countries, with a survey revealing their teaching is largely informal and piecemeal. Some course content encourages teachers to consider it as

Fig.1: Findings of the survey revealed recuitment and retention concerns

a teaching tool, but a lack of curricular guidance, assessed work and resources present barriers. However, geography teachers are generally positive towards the use and teaching of geospatial skills. This leads to three main conclusions:

• Scotland is falling behind in teaching geospatial skills in schools, and this is inconsistent with the curriculum and the Government's digital strategy.

• Teachers are willing to teach geospatial skills but reluctant to devote time and resources to them at the expense of teaching assessed work.

• Proposed education reforms present an opportunity to improve geospatial skills development in schools, hopefully narrowing the skills gap.

However, the ubiquitous nature of geospatial and the parlous position of geography in Scottish schools (geography is often the forsaken for history or modern studies, and is unfortunately not seen as a STEM subject) suggest success is founded on geospatial being embraced well beyond the geography curriculum. Surely geospatial should be central to data science skills within the curriculum?

Geospatial thinking could also inform history; cartography could be introduced in Art & Design; GIS used for ecological surveys in biology; and routing, location, altitude, and simple spatial analysis be used within Physical Education. This requires geography teachers to serve as geospatial evangelists and for careers teachers to be aware of the number of lucrative roles available in our profession.

Given that geospatial and geography are inexplicably linked, our profession can undoubtedly enhance the position of school geography and give geography teachers a reinvigorated *raison d'etre*.

The benefits of using geospatial skills in the classroom are well established

Meeting of minds

A series of roundtables was also hosted, which saw a meeting of minds between industry, government, academia, and research, to consider these findings and explore the geospatial skills gap in Scotland. A number of key themes emerged from these discussions:

• Awareness - there is a need in the geospatial sector to develop an online resource that provides information for anyone looking for a career in the field of geospatial. This will significantly increase the awareness of geospatial and, ultimately, the skills base for geospatial in Scotland. The importance of language and terminology cannot be underestimated when developing resources and communicating with target audiences.

• Consistency – we need a clear and consistent message for pupils, teachers, and careers advisors. Current approaches are piecemeal and confused; we struggle even to agree on what we call ourselves - is it GIS, geospatial, spatial analysis, digital mapping…?

• Collaboration - there is a need for greater collaboration between geospatial/GIS professionals and wider departments; thus, improving awareness and understanding of the applications of geospatial. For example, improved links between geography and ICT departments with education.

• Participation - expose children to maps and geospatial thinking; whet their appetite and showcase the fun side of it - let them play with data. There is also a need to improve the routes to participation e.g., introduce it via school, college or university courses, apprenticeships and jobs.

Roadmap

These themes alongside the survey and research findings have informed the development of a Geospatial Skills Roadmap which sets out a work plan of Engagement, Communication and Practical short, medium and long-term actions that are believed to address the identified challenges and ensure a pipeline of talent coming into the geospatial industry in the future.

Additionally, our work was created awareness-raising resources and practical materials which can be used in school, and has recognised and will signpost a significant existing material will contribute to the study of GIS and geospatial skills development in Scotland.

Our work has shown there is a skills shortage and this will most-likely get worse. The last university undergraduate geospatial programme in the UK has recently closed, leaving only Masters courses. Social diversification will benefit not just employers but will provide future entrants into higher education.

As our industry continues to grow (DataCity suggests geospatial is the UK's 5th fastest-growing sector, and predicts a 10.5% annual growth that will be worth £9 billion by 2027[†]). As such, the geo skills shortage will become magnified, damaging the prospects for new innovative start-ups and the ability to attract inward investment. The problem is significant, requiring better awareness of the career possibilities within our industry, professional ambassadors, curricular buy-in at schools and colleges, and the goodwill and support of private industry and government. But working together, with a coordinated approach, solutions are possible. We have no choice.

[†] *DataCity UK Geospatial Economy, https://thedatacity.com/rtics/geospatial-economy-rtic0008/*

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