GIS Jobs - Too Many or Not Enough?

Nathan Heazlewood works in New Zealand where the industry also has similar skills shortages to those here. He shares some thoughts on how we define our jobs and how we might better encourage the supply of skilled people and better match them to the jobs available. Many people who use GIS in 'mainstream' jobs get paid much more than those who have GIS in their job title!

In the past few weeks I have had discussions with some recent graduates who said that there is a lot of competition for GIS jobs. At the same time some employers are saying that they can't attract the right job candidates. Do these two statements make sense?

If the statements are both true then there is an imbalance of 'employer demand' against 'employee supply'. This is particularly surprising given that there is plenty of evidence that the geospatial industry is growing, so I had thought that there should be more than enough jobs to go around. A related consideration is that, if there is a skills shortage is it reasonable to seek 'special immigration' regulations to fill the gap?

I manage projects for a wide range of clients across all sectors, so I have an understanding of what is happening right across the industry. This perspective may be unusual as most people are busy doing their own jobs and don't have time to consider how important these issues are for our future.

- Do we understand, at a detailed enough level, where there are skills shortages now and where they will be in the future?
- Do we understand the current skills and demographics of our own industry?
- How can we encourage the current and future workforce (including you and me) to adapt to a changing employment environment and target training to meet those requirements?

Too Many and Not Enough Jobs at the Same Time

A recent GIS Lounge article by Matt Sheehan writes that "The demand for maps and location intelligence has been increasing exponentially. There has been a huge groundswell in interest from non-GIS users. GIS is moving from a niche sector to the centre of many software stacks". Other evidence indicates that the GIS industry is growing – but is it growing in directions for which the 'industry' is not structured or prepared?

1. Across the industry very few people currently have a good understanding of where the technology is heading. A few years ago who was seriously talking about 'the cloud', 'the Internet of Things' (IoT) and 'big data'? It certainly appears that there are shortages of skills in 'new' areas/aspects of GIS. Understanding these new areas is critical for planning the future workforce and for planning one's own personal development.
2. If the industry struggles to keep pace with its own technology and trends, then it is much more difficult for academia to plan. There is some useful material from companies in the industry to guide educators, students and re-trainees through the skills likely to be in high demand in the future. Esri's videos on "the top 5 important skills for a GIS career" come to mind. The private sector must continue to engage, as an adviser, with academia and other training channels. For example: If 'Big Data' is currently 'hot' and is, arguably, being driven primarily for marketing, shouldn't GIS students consider doing a marketing or statistics course to complement their GIS studies? Are messages like this being passed adequately from industry to academia and on to the future workforce?
3. Do too many people just want to do the 'fun' GIS stuff, and not put some of their time into the 'boring bits'? Most geospatial people LOVE being assigned a complex problem and having to find a solution using nice free datasets they found on the net. They plan a sequence of buffers and spatial joins, etc. to get to a clever result. Who doesn't love completing a jigsaw puzzle? Creating a beautiful map can feel satisfyingly artistic! But isn't it worrying that these exciting applications generate competition for some niche jobs while leaving the more 'boring' roles to struggle for attention? Long-term projects can be very rewarding as well – particularly when reaching fruition after several months of real teamwork. Developers can also feel great satisfaction when completing a complex programming task. Shouldn't these facts be better communicated to students and trainees?
4. GIS is, arguably, much easier than it used to be! I started out writing command lines in UNIX and AML (if you don't know you don't need to ask!) and now it is all drag-and-drop on a touchscreen. This applies to data capture as well: photogrammetry used to involve huge opto-mechanical machines, equipped latterly with digital encoders. Now it is carried out on a standard PC, perhaps with 3D goggles and is also being significantly impacted by other technologies such as LiDAR.
5. GIS is a broad term that penetrates many different industries but also has many different jobs, which may be so specialised that even another GIS person would need retraining to cope. Petroleum GIS analysts won't know much about water supply networks. Remote sensing specialists would struggle to step into a geodesist's job (even if they have done geodesy 101). This means that although there might be jobs available in some specialisms there may be few in some others. The transition from a GIS analyst in one

organisation to a GIS analyst in another is often far from straightforward.

Important Point 6

So we are already admitting that there are no easy and consistent terms for different GIS roles. My organisation's GIS consultants also cover database administration and software development; other organisations may have GIS consultants with no knowledge of these tasks but much more emphasis on the content or the data quality. Looking at my list of contacts I would have great difficulty is deciding exactly what they do for a living: GIS analyst, geospatial analyst, spatial analyst, GIS specialist, ArcGIS analyst, GIS officer, geomatics analyst, geodata administrator, geographer, GIS technician, environmental analyst, GIS engineer, land information analyst, GIS advisor, mapping advisor, GIS researcher etc.

Whether these job titles indicate similar or very different job descriptions is impossible to determine without much more information about the required experience; the organisation's remit; and, perhaps the types of data being used. In other professions there is more consistency with the names and grades of particular roles. There have been some attempts to standardise GIS position titles, which is something that, as an industry, we should perhaps encourage. Some international, national or commercial certifications such as GIS-P and Esri's Technical Certifications can help.

This vagueness/inconsistency makes it more difficult to match job openings to job candidates. It also makes it difficult to identify trends for the specific subsets of geospatial skills. Do we understand the demographics, available skills, and the required skills for our own industry well enough?

Some industry organisations have undertaken some useful initiatives to understand the structure and composition of the GIS industry (at least within their jurisdiction) and I think that continued effort is required, particularly in New Zealand where I work.

The URISA Salary Survey contains many useful hints about CURRENT skills requirements. Employers, educators and students would do well to look for these hints including, for example, what software is most commonly used, and what combination of GIS and non-GIS skills are demanded most often.

New Zealand Geospatial Office and SIBA NZ's report The geospatial skills shortage in New Zealand explores the important "dimensions" of the problem with some of the considerations that I am trying to highlight: that there are areas of distinction within geospatial (down to a detailed level). I would certainly recommend that future studies should refine these levels even further with more exact specialities, software and functional knowledge.

I am also concerned that, although individuals, organisations and the media within the industry are starting to examine the demographics with small voluntary sample surveys, there doesn't seem to be a 'combined overview'. I think we need a comprehensive review of the structure of the industry which would attempt to determine where there are shortages and exactly what skills are in demand. On the supply side, we should determine the numbers of students from GIS courses and others that come into the industry, which courses they have favoured and where they get their jobs.

Geospatial Skills Shortages and Special Immigration Allowances

The NZ report has been used to argue for easier immigration pathways for skilled professionals. Immigration is a contentious subject and the report has been the subject of a vigorous debate. Personally, I was fortunate to spend some time working in the UK under a similar arrangement and I like to think that I made a valuable contribution. But how can we 'prove' a shortage of suitable people if we cannot agree amongst ourselves on how to describe the industry itself or the specialities within it?

Some would argue that, rather than encouraging skilled immigration, the answer might be to increase relevant salaries. There are some interesting articles in the Washington Post and payscale.com indicating the salary rates available for different professions in the USA, in which 'Geographic Information Systems' is disappointingly ranked 120th. However, there are many professions in which GIS is used that rank much higher - geography at 106th, environmental studies at 90th, geology at 41st or possibly even petroleum engineering at number 1!

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