

SKILLS

Meeting of the Parliamentary and Scientific Committee on Tuesday 23rd April

SKILLS – An industrial perspective



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*'Do not train to learn
by force or harshness;
but direct them to it
by what amuses their
minds, so that you
may be better able to
discover with accuracy
the peculiar bent of
the genius of each',
Plato.*

Society depends on the nurturing of learning and development of each of us, as individuals. In today's society we should be able to rely on a good science, technology, engineering and mathematics (STEM) education to help us understand, develop and manage the increasing technological changes that face us. As an economy, we trade in a global market against countries which have pursued STEM-growth over much longer periods of time. The challenge critical to our economic growth therefore is to create a sustainable workforce with STEM qualifications.

The Government's Industrial Strategy highlights those economic sectors seen to offer future value to our economy through growth:

- advanced manufacturing and related services (especially the aerospace, automotive and life science industries, but also the emerging industries)
- digital/creative industries
- knowledge-intensive traded services (professional and business services)
- enabling industries (energy, low carbon economy and engineering/construction industries).

With a current 20% of the workforce in science-based roles across all sectors of the UK

economy, there is therefore expectation of a need for a 20-25% rise in this workforce by 2030 (representing almost 60% of the new jobs, pre-2017) to meet demand. Yet we face science-skilled workforce shortages already of 200,000, rising to >500,000; technician shortages have already been documented.

Whilst the skills required by this workforce differ between the different sectors and career levels within them, it is possible to identify broad translational skill requirements:

- technicians able to work with cutting edge scientific techniques
- graduates able to adopt a common scientific language of statistical enquiry, when undertaking and communicating discovery and innovation
- researchers able to understand the need for strong interdisciplinary collaboration and commercial opportunity and related financials.

LGC, formerly Laboratory of the Government Chemist, is a science-based company operating in a variety of international markets which underpin the safety, health and security of the public and the regulation of industry, for both

public and private sector clients. With its origins as a customs laboratory and privatised in 1996, LGC has since grown nationally and internationally from a £15m, non-profit organisation to a >£200m, 20% profit organisation. Its workforce has increased 20% during the last year to almost 2000 people (70% UK-based and 30%

... strong interdisciplinary collaboration ...

international), an almost 8-fold rise since privatisation. Around two-thirds of its workforce is science graduate or post-graduate level representing many disciplines from academia, public sector organisations, the third sector and industry, with its science quality having been retained as an important ingredient of success.

During this time certain common skills shortages have become evident across the organisation in our applicants/recruits:

- sufficient key principles of core practical training
- ability for self-motivated problem solving
- attention to detail
- strong written and oral communication skills
- exposure to an industrial environment.

As a fast-growing organisation in changing market sectors, there are additional, more particular, skills requirements and

... skills shortages have become evident ...

challenges that are currently being faced:

- well-developed business skills such as communication, negotiation, sales and business development
- key project management skills to deliver quality data in time and at cost
- the pace of technological development and growth means skill demands have had to be resourced in a

... an opportunity for school leavers ...

timely fashion to avoid the potential for outstrip of supply

- dependence on a secure supply of strategically important skills leads to a natural nervousness over the on-going and future supply of scientists.

Two case studies from the company highlight the approaches that we as an industry have faced.

LGC Forensics, the UK's largest, full-service forensic science provider, now operates in a highly commoditised marketplace. Fashionable sector-specific, multi-disciplinary qualifications at Masters level have generally shown themselves to be insufficiently appropriate. We therefore wanted to make a change to the way that we recruit forensics scientists; we saw an opportunity for school leavers, with the right training, to offer a real contribution to our business. We therefore recruited our first cohort of 20 apprentices.

LGC chose the optional units from the lab technician framework so that the technical certificate (teaching qualification)

was a BTEC in Applied Science (Forensic Science) equivalent to two A levels – awarding body, EDEXCEL – and the NVQ was also equivalent to A level or level 3 standard – awarding body, PAAVQSET. The Royal Society of Chemistry (RSC) Registered Science Technician Award was added by ourselves as external validation of the programme, as we didn't just want to deliver what was needed, rather something that was an example of best practice.

LGC enriched the 18-month apprenticeship framework by offering training in a range of other areas, including courtroom training and general forensic awareness, crime scene and disaster victim identification awareness, blood pattern recognition and exposure to a body bequeathal centre.

Many of the apprentices out-performed original expectations to levels comparable with graduate examiners. LGC has therefore developed a new career structure within the business to allow successful graduate apprentices to continue to develop with us. As of today, 80% of our cohort have employment with LGC as junior examiners or with other employers in the science sector or have accepted places at University this autumn. Due to its success, LGC will have extended its apprenticeship programme into 4 of 5 of its Divisions by summer 2013.

LGC Science and Technology measurement research, the home of the designated UK national metrology institute (NMI) for chemical and bioanalytical measurement, and of the

Government Chemist, has traditionally recruited post-graduates and provided them with in-house training to develop the ethos and capability for high accuracy reference measurements and reference standards.

Recruitment has however become increasingly more of a challenge over the last 10 years, nationally, such that we have had to recruit internationally to find the necessary skills and aptitude. At the same time, the nature of work also changed with an increasing maturity of available skills; so the staff mix was reviewed to draw on Masters level students with in-house training on the job and potential for PhD programmes with academia (four LGC staff currently completing PhDs in-

... apprentices out-performed original expectations ...

house, with different academic institutions). We also fund a number of Collaborative Awards in Science and Engineering (CASE) studentships at other academic institutions. We have a Knowledge Transfer Partnership programme to bring in particular expertise to underpin a future potential service offering. By the summer of 2013, our first apprenticeship will also have been placed.

Currently, recruitment is somewhat better, nationally, perhaps due to changes in the pharmaceutical and financial sectors or with the introduction of academic course and future career potential considerations, but a longer-term provision of measurement science skills, say through a suitable broad-sector post-graduate institute, may offer huge potential benefit to the UK and our business.

In summary, I would like to highlight the following points:

- Business needs to be an integral partner in the development of a demand-led STEM framework which incorporates clear career pathways based on labour market information
- There is a need to gather deeper skills intelligence across ALL business sectors with a view to identifying best practice for STEM engagement and career development
- There should be an increase in focus on the teaching of core sciences and mathematics
- STEM learning needs to be flexible and transportable for easy movement within career pathways and

between employment platforms. Learning should also be more investigative and enquiry-based, with the relevance of STEM in everyday life emphasised, so that the changing demands of the economy can be met

- There needs to be greater opportunity for work experience and the development of training and qualifications, especially for technicians.

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We also had presentations from Diana Garnham (Science Council) and Bill Twigg (SEMTA).

A summary of these will be published in our next issue.

