

# DIUS: Call for evidence: Analysis on Demand for STEM skills – A CPHC response

## Introduction

CPHC is the Council of Professors and Heads of Computing in the UK, the representative body for all those responsible for the management of UK University research and teaching in Computing. CPHC has long had an issue with the definition of STEM as used currently by DIUS, since the Technology component of the acronym is perceived by the broader community to include Computing but in fact does not do so. CPHC would argue very strongly, and has done so recently in a presentation to the Minister, that this exclusion is both inappropriate and damaging, not least since the exclusion of Computing from Technology leaves those subjects that do appear under the Technology heading, which are all heavily dependent on Computing, unable to promote their core activity. As a result HE Computing in the UK has been excluded from all additional funding initiatives and recruitment activities associate with the STEM initiative at a time when student recruitment in Computing has returned to levels equivalent to those of the mid-90s. Industrial employers, who are aware of the crisis in recruitment through its impact on the availability of Computing graduates to meet a growing demand, have until recently also believed that Computing was included under the STEM subjects and have joined CPHC in calling for this to be the case. e-skills UK, in their recent report on the UK IT jobs market have also highlighted the need for additional support and funding for HE Computing to meet the growing shortfall of graduates, and have therefore also echoed the call for Computing to be included under the STEM banner. It is in the light of these expressions of support that CPHC is providing a response to the DIUS call for evidence as if Computing were in fact included under Technology in the STEM subject group.

The most significant issue currently in relation to computing graduates is the decline in student numbers relative to a growing demand for computing graduates within the IT industry. This has been widely reported by ourselves, industry sources, technology journalists, professional bodies and the sector skills councils. These are referenced further in the specific responses below and the reference list provided. The decline in graduates will have a growing impact over the next few years resulting in a significant shortage of home-based experienced staff to meet industry needs. This is a disastrous situation for the UK knowledge economy as UK industry needs locally based high quality computing graduates to provide services for UK industry and to provide a strong competitive IT computing sector in the global market place. The UK currently has a world lead in research and innovation in the computing sector and high quality software and hardware products are being developed despite a relatively high cost base, but this cannot be maintained if UK HE Computing does not produce sufficient highly skilled high quality computing graduates to meet the needs of this industry, and the world lead we currently experience will be lost and difficult, if not impossible to recover. The problems presented by the offshoring of entry-level posts, described below, will be exacerbated as posts higher up the experience and value chain have to be outsourced or offshored in order to find the relevant talent, and the overall quality and capability of the UK IT sector will rapidly diminish as a result.

- The current labour market position of people with STEM qualifications, in terms of their earnings and occupations or industries they work in;

The UK IT sector currently employs 1,069,000 IT professionals, of whom over 225,000 have a Computing degree. The e-Skills UK report which published these figures predicts that this number will grow to 1,232,000 by 2016, which would require a growth of nearly 35,000 graduates to maintain the existing balance. Despite the recent credit crunch, the IT Salary Survey reported in Computer Weekly in February that job prospects in IT were robust and growing, although it is likely that more recent recessive forces will have had a negative impact on this picture. Both this report and a report by the Association of Technology Staffing Companies (ATSCo) highlight a growing problem brought on by offshoring, which is currently skewing the picture of IT job demand in the UK. As the use of offshoring has grown in the IT industry, the vast majority of the posts that have been moved to centres in India, China, Eastern Europe and, more recently, Indonesia and the Phillipines, have been support posts and junior programming and development posts. Unfortunately, such posts have usually provided the entry-point for new graduates, with the result that salaries for these posts in the UK have in fact dropped and the demand for new graduates, while still strong, is much lower than it would be without

the offshoring element. The demand for staff with two to three years experience, and for senior staff at the level above that, is considerable, and salaries have risen to reflect this, indicating a supply shortage which can only worsen with the decline in Computing graduates currently being experienced. Without some effort to address the availability of entry-level posts, the likelihood of posts further up the value and experience chain being offshored, due to lack of availability of UK-based staff, is significantly increased with resultant damage to the UK IT industry and its global competitiveness.

- The current and prospective supply of STEM qualifications, and how students progress from level to level;

Since 2001 student applications have declined, despite continuing demand from the sector, to the extent that the numbers are now less than they were in 1996. Given the time lag between application and graduation, the decline has been reflected in graduate numbers over the past two years and, without significant intervention, we know that these numbers will continue to decline, at around 8% per year, for at least the next three years, giving an overall decline in the order of 50% by 2010 and taking graduate numbers back below the level of 1996. The vast majority of students taking degree-level qualifications in Computing come through the A-level/Scottish Higher route into University study. Unfortunately, the decline in student numbers is reflected by a similar level of decline in school pupils following A-level/Higher Computing studies, which predicates further decline without significant intervention. Students coming to degree studies through Further Education routes, such as HNC/HND and Foundation degrees, have also declined significantly.

Another route that was widely used by those wishing to obtain Computing degree qualifications to work in the IT industry was through re-skilling of those who had already obtained degree qualifications in another area. This could either be through taking a second undergraduate degree, or one of the generalist Masters programmes such as MSc IT, but the opportunity to follow this route has been severely restricted through lack of availability of funding for students and through the recent decision by DIUS to remove a significant amount of funding for ELQ (Equivalent and Lesser Qualifications). Although many HE institutions are currently bearing the cost of this themselves, this is not sustainable in the longer term. This means that students wishing to follow this route will have to find the entire cost of their studies themselves, or obtain employer sponsorship, a significant disincentive to many potential students.

Without significant intervention, the supply of Computing degree-qualified staff for the UK IT industry will continue to decline and the gap between supply and demand will grow even wider, seriously damaging the competitiveness of the UK IT industry and knowledge economy in the global marketplace.

- Employer views of the value of STEM skills, and how this varies across STEM disciplines and by level of qualification;

As already indicated there is a significant gap between the employer demand for HE Computing graduates and the available pool. Based on the decline in applications of 8% per year impacting graduate numbers until 2010, and assuming steady state thereafter until 2016 (since we do not have entry statistics to predict numbers past 2010, and we cannot accurately predict the effect of the demographic dip), there will be a total shortfall of 31,893 HE Computing graduates by 2016. The result of this shortfall is that, far from growing at 15.25%, the number of IT professionals with a computing degree will decline by 11% in the same period (over 25,000 staff) from 21% of the IT professional population in 2007 to 16% in 2016 – as a result, in order to meet the existing requirements for IT professionals, without any development or growth of the technical base, this would require employers to be able to bring in an additional 59,610 HE Computing graduates from other sources. Employers of IT professionals are already complaining of increasing difficulties in recruiting sufficient volumes of Computing graduates, with volumes now falling well below employer need (AGR report 33% of UK IT employers predict a graduate shortfall in 2008). The shortage of skilled talent to fill these IT professional roles is not unique to the UK, and the challenge for the immediate future will be in the global competition for talent, which we must address to remain competitive.

The recent e-skills UK report highlighted once again a need for Computing graduates with business knowledge and skills, and there has already been considerable effort in the HE sector in developing programmes that meet this need. However, there is also a significant need identified for the development of technical skills levels, particularly for IT Managers and senior staff, reflecting a requirement for upskilling opportunities and CPD (Continuing Professional Development) programmes offering support for degree-level Computing inputs. The UK IT industry has identified considerable needs and shortfalls in graduate provision and skills development, and now is the time to encourage greater industry-academic partnership in resolving these issues and to find and support mechanisms to encourage far greater take-up of study in Computing, to provide the highly-skilled personnel need to maintain competitive edge both in this industry sector and in the HE sector itself.

- The feasibility of constructing projections or modelling scenarios of future demand or employment patterns for those with STEM qualifications.

In terms of the demand for HE Computing graduates and the needs of the UK IT industry, a number of projections and scenarios have already been modelled, with the projections contained in the recent e-skills UK report being the most relevant and descriptive

## **Conclusion**

CPHC would argue there is a clear need to include Computing in the STEM subject group, as it is the major technology subject area and it is currently under serious threat. Without intervention, the reduction in student numbers and the relationship of this decline to the demand for skilled personnel, will have a significant negative effect on the UK IT industry and, as a result, the capability of the UK Knowledge Economy and the global competitiveness of UK industry.

## **References**

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