Cyber security skills crisis: a view from academia

Prof. Keith Martin, Information Security Group, Royal Holloway, University of London

We hear much about a so-called cyber security "skills crisis", mainly from employers struggling to fill vacancies. Where are the required cyber security experts? Shouldn't universities be supplying more? We need them now!

There is a chronic cyber security skills crisis and it's at societal level. We all genetically understand physical security but intuitively lack common-sense cyber security principles. Technology has been adopted at a greater rate than our ability to securely develop and engage with it. At a more fundamental level, perhaps it's more of a cyber security awareness crisis than a skills crisis.

We really need to improve cyber security awareness and skills at *all* levels in society, from the schoolroom to the boardroom. We, as information security professionals, all have responsibilities to engage with this process. This will take time and energy, especially since the target is evolving. However, I am optimistic that society will eventually develop an understanding of "cyber health" sufficient to alleviate most day-to-day cyber security issues that arise from ignorance and naivety.

Universities undoubtedly have their role to play, particularly in developing cyber security skills. There are two major ways in which I believe universities should be contributing.

The first is to provide courses for the development of cyber security specialists. This is, I suspect, the role expected of academia by many who decry the production rate of new professionals. UK academia has engaged with this and there are a number of excellent cyber security courses on offer. Sure, there are also less outstanding offerings, but the UK Government has initiated the Certified Masters degrees in Cyber Security programme to help applicants and employers to identify quality. A government initiative to more broadly identify Academic Centres of Excellence in Cyber Security Education is eagerly anticipated.

So is this component of the solution to the skills crisis sorted? Well, seemingly not. Coming from Royal Holloway, the university which offered the first dedicated cyber security programme and now with over 3000 graduates around the world, you would think that we were fully doing our bit. But, somewhat surprisingly given the apparent skills crisis, we have retained some capacity in recent years on our programmes. The skills crisis issue perceived by some employers is not necessarily down to a lack of supply channels. At least with respect to UK students, there is also an apparent lack of demand for such skills. Put more brutally, universities cannot supply cyber security experts if students don't wish to become them.

One organisation that has long recognised the above issue is the Cyber Security Challenge UK, which has worked hard to raise the profile of cyber security careers through its imaginative suite of competitions. We are enthusiastic supporters of the Challenge for this reason. I accept that universities have a role to play in trying to entice students into cyber security careers. We, for example, also run a cyber security residential programme for the Smallpeice Trust, which is dedicated to attracting schoolchildren to consider science and engineering careers. However I strongly believe that the main promoters of careers in cyber security should be those who wish to employ cyber security experts. If the cyber security profession can create the demand for cyber

security skills amongst potential new entrants to the profession, rather than bemoaning the lack of supply, then universities can comfortably deliver those skills.

The second role that universities can play is long term and relates to the much more fundamental societal cyber security skills crisis. While there will always be a need for specialist cyber security courses, our need to establish a future notion of societal cyber health requires that cyber security skills be embedded in all forms of training, including those provided by higher education. While this is beginning to happen with computer science programmes thanks to efforts by organisations such as the BCS, every student, whether on a business administration or a medical programme, needs to be equipped with relevant cyber security skills in order to be fit for the modern workplace. Indeed cyber security skills should probably feature in the list of high-demand "transferable skills" that currently includes topics such as presentation and writing proficiency.

The UK Cyber Security Strategy has one thing absolutely right. No sector can address cyber security issues without help from the others. UK academia is able and more than willing to play its part.