Educating the Future Workforce

Submission to the Senate Select Committee on the Future of Work and Workers

Tom Worthington, *The Higher Education Whisperer*

This is a submission to the *inquiry on the impact of technological and other change on the future of work and workers in Australia*[1], reference "6. any related matters".

These are some thoughts on the subject of how well the education system suits the need for a more flexible workforce.

Australia needs an education system which is short sharp and mobile[2].

The Australian education system already allows for work-ready learning across schools, VET and university. Some minor adjustments are needed to make the system more flexible:

> 1. **Strengthen the VET system** and have it blended with secondary schooling at the lower end and university at the upper end. Students should be able to complete a VET qualification at secondary school, go on to further study in the VET system (while working part-time) and then to university.

> 2. **Make the university system more flexible**: Encourage universities to offer nested, standardized programs which offer sub-degree entry and exit points. Students should be able to start with a sub-degree program and then continue their studies for a degree. Most university courses are already blended, but government policy and university practice needs to recognize that most university students now, in effect, studying on-line so they can work at the same time.

Teacher's computing skills should be developed as part of their normal formal education, not some ad-hoc bolt-on program. Teachers teaching computing should be fully, formally, dual qualified in computing and teaching. Australia already has better systems for doing this than the UK.

Students should be encouraged to **undertake STEM subjects** at school, through subjects which address real world issues of concern to students and having computer professional role models who students can identify with. This requires, for example, project based work addressing issues such as climate change[3].

Innovation and hacking competitions[4] can help make make STEM look exciting for students.

Rather than focusing on traditional campus based three years university degrees, I suggest policy should **prioritize on-line, nested, programs** which offer sub-degree entry and exit points, with the flexibility to study off-campus.

Soft skills can be addressed in specific university courses and in project work. Soft skills figure

prominently in the ANU's "TechLauncher"[5] program of group project work for STEM students. Techlauncher students undertake team building exercises and have mentors, tutors and clients with industry experience. Some of this looks like fun, where students play with Lego[6], but there is also a lot of hard work on team and client relationship skills.

In addition, we need teachers in schools, VET and university, who have training and formal qualifications in how to teach these skills. This is particularly a problem in universities where academic staff have higher research degrees, but minimal teacher training. Academics need formal teaching qualifications[7].

Diversity can be improved by offering STEM subjects which address real world issues of concern to students and having computer professional role models who students can identify with. This requires, for example, female computing teachers.

As well as students fresh out of school, the same techniques can be used for **re-skilling adults**. On-line and blended learning, incorporating recognition of prior learning (RPL) and recognition of concurrent learning (RCL) are particularly useful. E-portfolios can be used for ensuring skills standards are met. Australia's VET system was set up with this need in mind.

Tom Worthington, MEd FHEA FACS CP

Biography: Tom Worthington is a computer professional, who advises on using technology for teaching and also does some part time teaching of computing at tertiary institutions. A Certified Professional[8] member of the Australian Computer Society, in 2015 Tom received a national gold Digital Disruptors Award for "ICT Education" and in 2010 was Canberra ICT Educator of the Year. He previously worked on IT policy for the Australian Government and in 1999 was elected a Fellow of the Australian Computer Society for his contribution to the development of public Internet policy. He is a Past President, Honorary Life Member, Certified Professional and a Certified Computer Professional of the society as well as a Fellow of the Higher Education Academy, a voting member of the Association for Computing Machinery and a member of the Institute of Electrical and Electronics Engineers.

Tom has a Masters of Education (specializing in Distance Education) from Athabasca University, a Graduate Certificate in Higher Education from the Australian National University and a Certificate IV in Training and Assessment from the Canberra Institute of Technology. He blogs as the Higher Education Whisperer and is the author of Digital Teaching In Higher Education. While an Honorary Senior Lecturer in Computer Science at the Australian National University and a member of the Professional Education Governance Committee of the Australian Computer Society, his views here do not necessarily reflect those of either organization.

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3   ICT Sustainability: Assessment and Strategies for a Low Carbon Future, Tom Worthington, 2018
     http://www.tomw.net.au/ict_sustainability/introduction.shtml
4   Canberra Start-up Business Boomerang, Tom Worthington, 2017
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5   TechLauncher, ANU College of Engineering & Computer Science https://cs.anu.edu.au/TechLauncher/
6   ANU Project Bootcamp with Lego and User Centered Process, Higher Education Whisperer, February 25, 2018
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8   Liability limited by a scheme approved under Prof. Standards Legislation