Submission to the 2023-2030 Australian Cyber Security Strategy

Prof. Asha Rao and Dr Joanne Hall

School of Science, RMIT University

There is a current cybersecurity skills shortage in Australia and around the world. The World Economic Forum's 2023 Global Security Outlook Report[1] states that more than half their respondents do not have the people or skills needed to respond to cyberattacks. Australia needs to play a crucial role in solving "the challenge of creating and retaining cyber talent"[2].

There are two sides to the supply issue. The provision of education and skills training, and the uptake of such education and skills training. Several Australian universities and TAFEs offer specialist cybersecurity programs of study, including RMIT[3]. However, just as with the cybersecurity Industry, recruiting and retaining teaching staff across the cyber security subdisciplines is a struggle.

This struggle to attract and retain teaching staff in STEM disciplines, of which cybersecurity is just one, is across the entire education landscape. Mathematics (the M in STEM) underpins cyber security, and the problem can be traced back to mathematically-anxious teachers in primary school and the lack of mathematically-trained teachers in high schools. Research shows that primary school teachers are maths anxious, and spread this anxiety to their students, especially girls[4][5]. The problem worsens in high school with around 1/3 of high school mathematics classes in years 7-10 are being taught by and out-of-field teachers, i.e., a teacher not trained in mathematics, and who would rather be teaching something else[6].

Australia's future cybersecurity workforce is and will continue to be significantly impacted by out-of-field high school teaching. There is the issue of the gender composition of our high school mathematics classrooms, but the more worrying trend is that year upon year fewer and fewer students (of all genders) are choosing to study mathematics in senior high school[7].

Mathematics is a key enabler of both the technical and business aspects of cybersecurity. The Australian Government must act to make teaching careers across schools, universities, and vocational education more attractive to those with cyber security skills, especially the enabling discipline of high school mathematics. Neglecting our education sector will lead to an even greater skills shortage in the future.

---

[1] https://www.weforum.org/reports/global-cybersecurity-outlook-2023/

[2] Page 24, https://www3.weforum.org/docs/WEF_Global_Security_Outlook_Report_2023.pdf

[3] http://www1.rmit.edu.au/handbook/mc159p18auscy

[4] https://amsi.org.au/?publications=maths-anxiety-students-pre-and-in-service-teachers

[5] https://www.pnas.org/doi/10.1073/pnas.0910967107#supplementary-materials

[6] https://amsi.org.au/2018/11/26/crunching-the-numbers-on-out-of-field-teaching/

[7] https://amsi.org.au/?publications=year-12-participation-in-calculus-based-mathematics-subjects-takes-a-dive