TasICT & Australian Computer Society
11 October 2024

JOINT SUBMISSION TO THE
TASMANIAN INDEPENDNENT EDUCATION REVIEW

PROMOTING S.T.E.M. TO BUILD A HIGHLY SKILLED TASMANIAN WORKFORCE

This joint submission is focused on point 4 of the Review's Terms of Reference, which aims to enhance Tasmania's education system so that it:

> *"Contributes to the State's productivity by supporting a highly skilled local workforce to assist local businesses and industry to grow and compete."*

Both TasICT and the ACS believe that the Tasmanian education system needs to do more to promote Science, Technology, Engineering and Maths (STEM) subjects to ensure there is a steady graduation of qualified and engaged students ready to pursue high-productive STEM careers.

To achieve this, it is fundamentally important that Tasmanian schools adopt a technology-optimistic approach to teaching and learning that encourages students to master age-appropriate technology skills early in their school journey and continue this learning for life.

The Opportunity: STEM education delivers a more productive Tasmania

Addrising a key theme of the review, in today's rapidly evolving technological world, defining educational success to include an element of technological relevance is more critical than ever.

Graduating students face a rapidly changing work environment and must be equipped with the mental tools and agility to be able to stay abreast of technological change and have the confidence and capability to continually learn new skills as technology changes. Defining 'confidence with technology' as part of educational success not only involves setting clear achievement goals but

also fostering a learning environment where young people are encouraged to aspire to STEM careers.

Compared to Australia as a whole, Tasmania has below average productivity per worker – yet a significant boost in productivity can be achieved through growing the number of STEM jobs in the State which by their nature are highly productive jobs. For example, the productivity of jobs in the industry sector Information Media and Telecommunications measured as contribution to GDP per worker was $310,373 in 2022–23, compared with an all–industry average of $111,667 per worker.[1]

Added to the productivity bonus, STEM careers are crucial for the future as they drive innovation and economic growth. They are more likely to address immediate global challenges like climate change impacts, healthcare efficiency, and sustainable energy opportunities. STEM professionals are intrinsically involved in developing new technologies, improving investment in infrastructure, and enhancing quality of life. These careers also foster critical thinking, problem–solving, and creativity – skills essential in an increasingly complex world. STEM fields offer diverse and high–paying jobs and are welcoming of employee diversity and female participation. Encouraging more people into STEM careers ensures a skilled workforce ready to tackle the State's future challenges and help maintain Tasmania's economic competitiveness.

The Technology Sector in Tasmania

The latest *Digital Pulse* for Tasmania published by the ACS found that the ICT sector in Tasmania added $1.1 billion to the economy in FY22 as measured by value add, with over 1,600 ICT businesses having headquarters in the state. At the same time, the tech workforce reached more than 11,000, with many tech–empowered employees working outside traditional ICT roles. Two–thirds of tech businesses serve interstate customers, and a third export internationally. Technology investment is forecast to rise from $2.3 billion in 2022 to $3.2 billion by 2030.

The ACS study found that eight industries, including public administration, safety, and retail trade, will have over 80% of their work time affected by critical technology while sectors like financial, professional, and information services will see major changes due to data analytics and the widespread adoption of AI.

The technological change unfolding is already significant – embracing and adapting to these technological changes will be crucial for Tasmania's future.

The ACS study finds that Tasmania faces a significant challenge in meeting its future technology skills needs. By 2030, the state will require 8,600 critical tech skills, a substantial increase from the current 2,400. The demand will particularly rise for

[1] Australian Bureau of Statistics, economy.id 2022-23

people skills like communication, teamwork, and problem–solving, alongside technical skills such as scripting languages and software development.

Currently, Tasmania's digital skills gap is costing large businesses $51 million annually in lost output among large businesses alone.[2] This gap is expected to widen without significant action due to rapid technological advancements. To address this, Tasmania must attract and retain highly skilled tech workers and overcome labour market barriers.

Diversity in tech remains a challenge, with only 36% of IT university course enrolees being women, and just 28% of women working in tech occupations. This is much lower compared to other industries like professional services, where 47% of the workforce is female.

The skills gap challenge identified in the ACS research has been mirrored in survey results from Tasmania's tech industry through TasICT.

In September 2024, TasICT which represents technology business in Tasmania, surveyed its members and found that:

- 85% of respondents felt the State Government was not doing enough to advance the digital economy in Tasmania
- More than 91% of respondents answered "yes" or "somewhat" to the question: "Do you consider Tasmanians' current level of digital literacy hinders the growth of the tech industry?"
- However, despite the skills challenges, 45% of respondents said they were planning to hire new starters in the current year – but below the figure reported by the industry nationally
- 30% of respondents said that skills shortages were a top barrier to expanding their business
- 89% of respondents said that they had started using AI technologies including 2% for critical functions – compared to 17% for critical functions nationally.

Taken together these statistics show an alarming skills gap in the technology sector at a time when there are significant job opportunities.

More concerning is that the inability to encourage a pipeline of engaged and qualified graduates from year 12 that can further their interest in STEM subjects is causing difficulty for local ICT businesses and is a factor in limiting the growth of the sector in Tasmania.

It is also important to realise that increasingly recruitment into the technology sector will come from mid–career employees who upskill/reskill to take on ICT roles.

[2] *Australia's Digital Pulse 2024,* ACS, p. 8

This is to be encouraged through a general technology education received in the Tasmanian education system at an earlier age.

As a result, Tasmania's ICT industry is increasingly faced with the difficult choice to relocate business functions – or even the entire business – to mainland or overseas workforces. The Tasmanian education system has an opportunity to promote STEM subjects and help provide a pipeline of interested and engaged students who see working in technology as a viable career.

Finally, the AI revolution is already providing the processes and content to drive innovation and productivity without a high-proportion of tech-trained Tasmanian graduates – a warning sign that unless Tasmania rapidly develops an engaged technology-optimistic workforce, these jobs will be filled by workforces elsewhere or through increasing use of AI by existing businesses.

Decline in student enrolments in technology subjects

It would be possible to think given the massive increase in use of technology by all generations and especially the young in recent years, that there would be increased interest in technology careers – yet this does not appear to be the case.

In fact, there is a declining interest in STEM qualifications among younger generations and this is already exacerbating the skills shortage in the tech sector. Emerging skills, particularly in AI, data science, machine learning, and deep learning, will be crucial in the future. However, less than half of current tech workers feel their formal education has adequately prepared them for these critical skills.[3]

It is crucial to understand why fewer students are entering STEM courses at University and TasTAFE to design programs to encourage students to stay with STEM.

The digital disadvantage for Tasmanian students begins early at home before school years even start.

Tasmania consistently records among the lowest levels of digital literacy and inclusion in Australia as measured in the Australian Digital Inclusion Index.[4]

As a student moves through years of schooling, it is the extent to which an individual student receives positive exposure to technology and encouragement to consider a STEM career that contributes strongly to making a difference.

The decline in students pursuing technology subjects in Tasmania is a concerning trend that will have significant implications for the state's economic future.

[3] *Australia's Digital Pulse 2024,* ACS, p. 8
[4] https://www.digitalinclusionindex.org.au/

In 2024, the University of Tasmania sounded the alarm STEM enrolments in Bachelor degrees, where enrolments in Physics, Maths specialised, Biology and Chemistry have consistently fallen since 2018.

There is a similar story at TasTAFE where completion rates for Certificate IV courses in technology are around 20%.

At TasTAFE, ICT Training package completions have declined by almost 52% since 2018. ICT enrolments have fallen by almost 30% since 2018.[5]

Several factors contribute to this decline, including educational challenges, socioeconomic issues, and a lack of awareness about the opportunities within the technology sector.

Many students may not fully understand the diverse and rewarding opportunities available in the technology sector.

To address this decline, it is essential for the Tasmanian government, educational institutions, and industry stakeholders collaborate on strategies that enhance STEM education, provide targeted support for students, and promote the benefits of technology careers. By investing in these areas, Tasmania can ensure a steady pipeline of skilled professionals to support its growing technology sector and drive economic growth in the coming years.

As a parallel, it is important to recognise that the skills gap is now also being filled by existing workers upskilling and reskilling into technology roles – involving undertaking courses at university and VET level in order to obtain qualifications to take on these roles.

The Way Forward: A Technology–Optimistic Education System that champions STEM Subjects

Educationally, Tasmania has not emerged well from the COVID–19 pandemic. Although Tasmanian did not suffer wide–spread lockdowns as did Victoria for example, the absence of events that brought together learners, teachers, industry and new technology in retrospect has been disastrous for interest and enrolments in STEM subjects.

To build a positive way forward, specific action areas recommended are:

- Develop a technology–optimistic approach to teaching technology in Tasmanian schools that encourages learners to embrace life–long curiosity and skills in adopting technology and technological systems

[5] NCVER 2022. Total VET Students and courses 2022 via Future Skills Organisation

- Address the digital divide by prioritising digital literacy support for learners, families and the wider school community from the first years of schooling
- From year 10, provide opportunities for industry mentors to engage with students on the benefits of STEM careers.

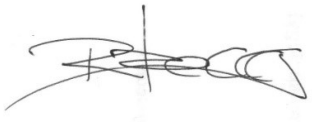
Referencing the 2024 ACS *Report into Digital Technologies Education in Australian Schools*[6], of the 55 recommendations proposed in the report, eight are highlighted as critical to the current review:

- Schools and school systems should provide increased support for Digital Technologies teachers to obtain formal training and qualifications in Digital Technologies, with the aim of at least one teacher in every primary school having formal qualification in the teaching of Digital Technologies; all secondary computer education teachers having at least some formal training in a programming language; and all senior secondary computer education teachers having formal tertiary qualifications in a computing field (Recommendation 3)
- States and territories should rigorously report to parents on student outcomes in the Digital Technologies subject, to provide a key initial indicator of their success in implementing the subject in their schools. (Recommendation 4)
- Government school systems and schools should use Digital Technologies initiatives and school achievement awards to signal to principals and teachers the importance of implementing Digital Technologies within their schools (Recommendation 5)
- Schools and school systems should implement annual equipment, software and network audits in line with industry–wide norms, to ensure frontline teachers have the requisite resources to effectively teach computer education subjects and the Digital Literacy curriculum (Recommendation 9)
- To guide state and territory curriculum development, ACARA should develop a national senior secondary computer education curriculum with the agreement of all states and territories, as has been achieved for English, Mathematics, Science, and Humanities and Social Sciences (Recommendation 25)
- Schools and school systems should develop appropriate and systematic professional learning support programs to upskill all teachers in the Digital Literacy curriculum and all primary teachers and secondary teachers in the DTC (Recommendation 39)

[6] Digital Technologies Education in Australian Schools, ACS, 2024 – available online at Tech skills for the next generation (acs.org.au)

- State and federal education ministers should prioritise funding large systemic professional learning programs to support the teaching workforce to implement the Digital Literacy and Digital Technologies curricula (Recommendation 41)
- Further investigation, supported by research, should be conducted into the implementation of senior secondary computing courses in each state and territory, and into the equitable access of Australian students to computer education, including issues of teacher training, schooling sector, regionality, gender, ethnicity and socioeconomic status (Recommendation 55)

Together TasICT and the ACS therefore propose a STEM–led approach to developing the Tasmanian education system, to ensure a strong pipeline of graduating students that can help fill the skills gaps that already exist in the technology sector that will sustain Tasmania's economy into the future.



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