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Technologies Teacher Shortage Report

Victoria 2019

Survey conducted and compiled by

Design and Technology

Teachers' Association of Victoria

(DATTA Vic)

All enquiries should be directed to DATTA Victoria

Executive Officer / Laura Murphy / pl@datta.vic.edu.au / 03 9349 5809

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DATTA Victoria

The Design and Technology Teachers' Association of Victoria (DATTA Vic) represents design and technologies teachers across Victoria.

Our members are also often involved in the delivery of **Digital Technologies** and **Food Technologies**.

Introduction and Intent

This report is the result of a survey carried out by DATTA Australian in 2019. It was intended to compile accurate data on the perceived shortage of Technologies teachers across Victoria.

Along with a range of quantitative and qualitative data, we have also sought feedback from our members on the most appropriate steps to deal with this growing crisis.

The survey was conducted online in August 2019. It was completed, as part of a national survey, by **97 schools** across Victoria, representing **692 Technology teachers**.

Assumptions of the Survey

In order to ensure that the responses covered all areas of Technologies Education, including Design and Technologies and Digital Technologies, it was requested that this survey only be completed by the Head of Technologies in each school.

Where multiple submissions were received from any school, only one set of data (the most complete) was included in the State totals.

Results Overview

The Technologies Teacher Survey 2019 was fully completed by **97 schools** across Victoria, representing **692 Technologies teachers**. The 2019 results are compared with results from a similar State survey conducted by DATTA Victoria in 2013.

Technologies Curriculum Area

In the Victorian Curriculum F–10, the Technologies includes **Design and Technology** and **Digital Technologies**.

The Technologies provide a framework for students to learn how to use technologies to create innovative solutions that meet current and future needs. Students are encouraged to make decisions about the development and use of technologies, considering the impacts of technological change and how technologies may contribute to a sustainable future. The curriculum provides practical opportunities for students to be users, designers and producers of new technologies.

In Design and Technologies, students combine design thinking with technology to generate and produce solutions to real world problems. In Digital Technologies, students use computational thinking and information systems to analyse, design and develop digital solutions.

Executive Summary

The data contained in the 2019 Technologies Teacher Shortage Survey raises significant concern for the future of relevant and rigorous Technologies education in Victoria.

Technologies education prepares our students to be tomorrow's creative problem solvers and innovators. They will work in growth areas such as engineering, robotics, transport, construction, infrastructure and communications. They will be the innovators behind emerging fields like medical technology, generative design and renewable energies. Young people with these skills and knowledge will be essential to a successful Victorian economy in the future.

Employers already face difficulties in recruiting appropriately-skilled and qualified staff in these areas - evident in the statistics from the most recent [Victorian Occupational Cluster Reports](#). For example, in the construction industry, only 36% of vacancies were filled in 2018. In the same year, regional employers filled only 25% of engineering trade vacancies, and in 2019, 89% of qualified engineering professionals were deemed unsuitable for employment due to lack of appropriate experience.

Our survey gathered data reflecting the experience of nearly 700 Technologies teachers. 97% of the schools surveyed have experienced difficulty in finding qualified Technologies teachers. This is at a time when we also see large numbers of teachers leaving the profession due to retirement or stress.

88% of schools are currently using teachers from a variety of other learning areas to make up the shortfall and to deliver the expected level of Technologies education required by State and State curriculum authorities. This puts increasing pressure on qualified Technologies teachers to upskill and support teachers from Visual Arts, Health and Physical Education, Mathematics and Science, who are placed in subjects which they are not qualified to teach. This also represents a significant and growing Work Health and Safety risk to those teachers and their students.

28% of schools surveyed have reduced the amount of Technologies education they offer, and 68% of these schools have indicated that the quality of the remaining programs has also been affected by the shortage of qualified teachers.

There is also a serious concern that Technologies education is being neglected in the context of STEM, with 67% of Technologies faculties in the schools surveyed indicating that they have received no direct STEM funding, resources or support.

If we as leaders, educators and parents believe that technology and innovation are a part of a successful and prosperous 21st Century Victoria, then the results of this survey represent a significant risk, not just to that preferred future but also to the safety of our students and teachers.

We would like to call to action leadership in the government and in schools to bring their combined skills together to ensure that technology education remains sustainable beyond 2025.

DATTA Victoria would like to thank the remaining qualified Technologies teachers, and those stepping up from other learning areas, for their ongoing efforts to deliver quality Technologies education wherever and however possible as they face this crisis in Victorian education. We trust that those who are in a position to influence and take action are listening and that help is on the way.

Travis Burroughs

President, DATTA Victoria

Survey Results

“Qualified” was defined in the survey as those being teachers who had received Technologies teacher training as one of their methods within their tertiary teaching qualification.

	2013	2019
Schools in Victoria having difficulty finding qualified Technologies teachers	94%	97%

	2013	2019
Schools in Victoria using unqualified teachers from other learning areas due to shortage of qualified Technologies teachers	86%	88%

	2013	2019
Schools in Victoria that have reduced their Technologies Education programs due to shortage of qualified teachers	26%	28%

	2013	2019
Schools in Victoria that believe the quality of their Technologies Education programs have been compromised by the shortage of qualified teachers	52%	68%

Survey Results

To further investigate the effects of Technologies Teacher shortages, additional data was collected in the 2019 survey.

Percentage of Technologies Teachers in Victoria predicted to leave the teaching profession over the next five years.

2019

27%

Schools in Victoria that believe Work Health and Safety for students and teachers is being compromised in the Technologies learning area due to widespread use of unqualified teachers from other learning areas

2019

69%

Number of qualified Technologies teachers in surveyed schools in Victoria that come from an industry or professional background

2019

40%

Number of schools that have indicated they have received no direct STEM funding, resources or support

2019

67%

Survey Data

To further investigate the effects of Technologies Teacher shortages, additional data was collected in the 2019 survey.

Percentage breakdown of types of Technology teachers in Victorian schools.

Resistant Materials 30%

Food 27%

Digital 18%

Engineering 13%

Textiles 13%

Ranking of the most in demand Technology teaching roles to fill in Victorian schools.

Resistant Materials 1st

Engineering 2nd

Textiles 3rd

Digital 4th

Food 5th

Percentage of students studying Technologies education in Secondary education

Year 7 and 8 100%

Year 9 and 10 64%

VCE 20%

Breakdown of teachers from other areas delivering Technologies education without formal training.

Art 42%

Science 24%

Maths 17%

HPE 17%

Recent data from VCAA shows numbers of students in Technology courses at VCE level

Systems Engineering 1100

**Product Design and Technology
2500**

Computing 3000

Recommendations

The following strategies have been suggested and supported by DATTA Victoria's committee and its members who responded to the 2019 survey. These strategies have been developed following extensive consultation with Technologies Education leaders, academics and both qualified and unqualified Technologies teachers in each state.

1. Upskilling of existing teachers through Professional Development courses

Funding state-based upskilling courses for existing teachers, supported by DATTA Victoria and RTOs, is essential. We must focus on Work Health and Safety in the Technologies learning area, effective pedagogies for teaching design and specialist skills, and safe operation of tools and machinery. Schools in most states have no incentive to pay for this type of upskilling as they can currently appoint any available teacher to teach in the Technologies learning area without Technologies education qualifications.

2. Industry supported State Technologies teacher recruitment campaign

Potential candidates must be made aware of the fantastic opportunities in contemporary Technologies Education, which has evolved greatly over past 10 - 20 years. Poor perception of the learning area has been identified as a major cause of potential candidates not pursuing a career in Technologies Education. This perception has been compounded by the shortage of qualified Technologies teachers in schools, resulting often in the poor delivery of Technologies Education in many schools.

3. Removing financial barriers through subsidisation of initial Technologies Teacher education and increased starting salaries for candidates who retrain from industry or professional backgrounds

Technologies Education relies heavily on suitable candidates leaving industry or professional positions to retrain as educators. Cost has been identified as a significant barrier for those considering retraining. A financial recognition of prior experience would be a significant motivator in people choosing to undertake a lengthy and demanding period of study.

4. Improved and consistent initial Technologies Teacher education

A State Standard for all Technologies Education courses to ensure consistent and rigorous Technologies Education training throughout all universities should be developed, in consultation with DATTA Victoria. This will ensure all states have contemporary and consistent Technologies Teacher registration standards and processes.

5. Mandate that all schools employ a Technologies technician

It has been identified through our consultation that one way to greatly improve the safety of the Technologies Learning area for teachers and students is to employ a technician who is qualified and capable of using machines and supporting students and teachers during school hours. Many schools expect teachers, whether qualified or not, to supervise students, handle heavy materials and operate dangerous machinery at the same time.

Appendix 1

“In Desperation”: An All Too Familiar Story

A letter received from one of our 2019 survey respondents - 13 August 2019

“I completed the survey and hopefully included enough factual feedback to support our quest!!!

Just thought I would share my experience from the last two weeks, as it is good supportive evidence for a massive recruitment drive.

My woodwork teacher took ill at the end of Semester 1 and was unable to return until Monday this week. This left us covering classes with a retired (but VIT registered) Tech teacher. My other woodwork teacher has had to shuffle her timetable around to cater for his senior classes and I have had to find time to teach our CRT how to teach the design process. See, even when we can scrounge up a trained teacher they don't even know how to teach the design process. I have monitored my time spent these last few weeks just making sure classes are organised, planning each class for the juniors (CRT does not do this even though there is a comprehensive unit, week by week breakdown) and the time spent is phenomenal.

In addition to my current load of 29, yes 29 which is 4 over (I agreed to this so our senior D&T classes would run knowing we would never get any applicants to replace the teacher who was ill) I spent 4 hours getting stuff ready, checking materials, ordering surplus and undertaking a tool stocktake to ensure nothing goes missing. All this on top of putting out spot fires in my domain and developing new curriculum for our new school and ensuring that students are actually getting taught stuff!

This is an example of what the teacher shortage looks like on a day to day basis. Further to this my other teacher has given 2 weeks' notice and will finish in a fortnight. If you read the top half again and then double it, this will be my workload until I get a replacement teacher. The CRT can only do so much due to pension constraints so what we do in this situation is drag in anyone who can hold a hand tool from our immediate staff.

This means that I have to teach not only one teacher how to teach our process (safety doesn't get a look in at this stage) but most likely 4 teachers. Student outcomes are continually compromised due to the lack of competent staff. This leads to a skills/problem solvers shortage which affects the economy etc.

It's beyond dire. My take on it now is that the lack of available staff coupled with a ridiculous teaching load as the Domain Leader has led me to contemplate becoming an apprentice butcher, seriously. The stress and anxiety this situation is causing me would not be any different to other domain leaders in regional areas.

We need the option to get willing professionals from all areas into the system on an equitable pay structure and flexible university hours.

In the meantime, I will be having the discussion with my wife about doing another apprenticeship!

In desperation

NB from Shepparton, Victoria”

Appendix 2

Comments from 2019 Survey Respondents

On the Value of Technologies Education

“Technologies is a critical area in a student's education, particularly given the emphasis placed on creative and critical thinking abilities by industry. Technologies teachers have to bring a range of skills, knowledge and ability to schools to be able to effectively teach across specialties, which involves targeted education, placement and preferably industry experience.”

On the Effects of Teacher Shortages

“If no significant action is taken many schools in NSW will struggle to adequately implement our mandatory and elective courses. It is already extremely difficult to find suitably qualified staff and a large percentage of those staff are looking at retiring in the next 5 years. If a staffing solution is not found many schools will have no option but to staff mandatory and elective courses with untrained and unqualified staff. This may lead to a reduction in the learning opportunities provided to students, a drop in their academic success, exposing students to potential hazards in the work environment and students graduating high school without the skills necessary for an evolving workforce. Technologies subjects are at the forefront of equipping students with the knowledge and skills necessary to be creative, innovative and critical thinkers. Skills that are now pre-requisites for many future career paths.”

“Urgent action is needed to supply secondary colleges with well-educated Technologies Teachers, from an improved tertiary education, that reflects the current and emerging industry technologies, to provide quality education for future students to equip them with the needs of the economy.”

“We have implemented a new and challenging syllabus here in NSW with little to no fully qualified teachers to implement it. We need action.”

“Staff find it difficult to take leave or relieve in higher positions due to trained casuals' availability. This affects health and wellbeing as well as stymies professional advancement.”

“I'm looking to leave within 5 years, as I have no support as a teacher and coordinator.”

On the Reduction of Technologies Education

“Subject areas will not continue if they are not able to be staffed. We have significant student interest and uptake of these subjects, but these students will not have access if staffing is not addressed. We are doing our best to provide a holistic education for our students. In a world where technology knowledge is essential, Victoria's education system is letting students down.”

“Schools across the state are closing facilities due to lack of staff available or lack of skills and knowledge.”

“There will be a lot of schools that are unable to deliver Technologies subjects into the future.”

“As there are going to be insufficient teachers to deliver subject options, I feel in the next few years that subject offerings to students will decline as there will be insufficient teachers to deliver appropriate courses.”

On Teacher Recruitment

“The question is "Why would anybody want to be a Technologies Teacher?", and it is important that there is a clear incentive that is beyond the normal rhetoric, and the pathways to becoming a Technologies Teacher are easy, cost effective (scholarships?) and achievable, especially for people who are currently employed in industry and have fixed financial commitments which may normally prevent swapping employment for further education.”

“It is getting to crisis stage - we don't have enough well-trained, highly engaged new teachers coming through the system. The pathways through from undergraduate to Technologies teacher training are unclear and unknown by most in the discipline area and universities and Federal and State Education departments are taking no responsibility for ensuring the supply of teachers in the Technologies area. This cannot be a 'market-led' training situation - direct action is desperately needed to increase the number of new Technologies teaching graduates. The learning area is vitally important for innovation in the design and manufacturing industry, and to develop a Technology-aware community, but it is dying out due to lack of new teaching staff, and limited energy and currency in existing staff.”

On Student Employment and Industry

“Technologies learning area delivers what employees are looking for – problem-solving, teamwork, project-based learning – reading literacy texts in a practical context, performing maths in real situations. How is the current shortfall in the workforce going to be overcome if our students don’t have the teachers to teach them the skills?”

“Nothing will be designed or made in Victoria. There will be no innovation in the country.”

“Victoria will be left behind globally as it will not be equipped to deal with industry 4.0.”

“I would like them to know that the largest emerging field for jobs and development of Victoria's future is being neglected because of a lack of proper training and funding for teachers and schools.”

On Digital Technologies

“Subsidised external PD for teachers so that schools can afford to use it to help develop stronger skills and confidence in Technologies, particularly the Digital Technologies.”

“We have such a shortage of Engineering and Digital Technologies teachers that our students will not receive adequate training in years to come as our ageing teaching population retires.”

“The shortages in Digital Technologies and Design and Technologies teachers is hampering the ability to advance new employment opportunities in the areas of data sciences and advanced manufacturing vocations.”

“Certain subjects will disappear from some schools such as the Computing / Digital subjects.”

On STEM

“STEM is being pushed in the media but we do not have enough adequately trained staff to deliver these courses. There are large numbers of staff who are currently teaching the new Digital Technologies syllabus who have not had adequate training in this area and are struggling to cope with this as well.”

“This area is crucial to Victoria's future - STEM. Yet there are no teachers. More status is needed with regards to this teaching area.”

On Regional Issues

“The regions suffer this issue the most. Without attention the regions will fare far worse in any achievement data analysis and suffer the subsequent loss of status. It will contribute further to a decline in the quality of education in the regions particularly in publicly funded schools. It seems as though the leaders / influencers of the entire educational sector Stately DONT CARE!”

On Safety

“Schools will stop delivering Tech subjects and the problem-solving skills will be lost. More accidents in classrooms due to untrained teachers.”

“Student and equipment safety at extreme risk due to lack of training and knowledge. Unfair workload on qualified teachers to cover / train unskilled teachers in our area. We need university specific courses.”

On the Need for Technicians

“I have wanted to quit without a Tech assistant. I can't be expected to do the level of job I know would do me proud whilst doing the job of two. For years it was only me in the Technologies department and I found it really hard. I see Technician Assistant support the most vital part to keeping Technologies teachers.”

Appendix 3

Impacts of Technologies Education on Industry and Society

Creating Preferred Futures

The Technologies curriculum provides students with opportunities to consider how solutions that are created now will be used in the future. Students will identify the possible benefits and risks of creating solutions. They will use critical and creative thinking to weigh up possible short- and long-term impacts.

This is critical to all areas of industry and society as students will learn to identify possible and probable futures, and their own preferences for the future. They develop solutions to meet needs, considering impacts on liveability, economic prosperity and environmental sustainability.

Project Management

Key to all industries, students will develop skills to manage projects to successful completion through planning, organising and monitoring timelines, activities and the use of resources. This includes considering resources and constraints to develop resource, finance, work and time plans; assessing and managing risks; making decisions; controlling quality; evaluating processes and collaborating and communicating with others at different stages of the process.

Crucial for our future society, all Technologies students are taught to plan for a sustainable use of resources when managing projects and take into account ethical, health and safety considerations and personal and social beliefs and values.

Transferable Thinking Skills in Technologies

Careers relating to Design and Technologies are often thought to be concerned only with designing and making / engineering. Digital Technologies is viewed as linking directly to a range of ICT professions. While this has been the case for many students, it is also true that through Technologies education, a range of transferable 21st Century thinking skills are taught that are central to all of these areas and beyond.

Systems Thinking

Systems Thinking is a holistic approach to the identification and solving of problems where the focal points are treated as components of a system, and their interactions and interrelationships are analysed individually to see how they influence the functioning of the entire system.

Design Thinking

Design Thinking involves the use of strategies for understanding design needs and opportunities, visualising and generating creative and innovative ideas, planning, and analysing and evaluating those ideas that best meet the criteria for success.

Computational Thinking

Computational Thinking is a problem-solving method that is applied to create solutions that can be implemented using Digital Technologies. It involves integrating strategies, such as organising data logically, breaking down problems into parts, interpreting patterns and models and designing and implementing algorithms.