www.dattaaustralia.com

Technologies Teacher Shortage Survey

National Overview 2019

Survey conducted and compiled by

Design and Technology Teachers' Association of Australia

Published during **Design and Technologies Week**

14th – 20th Oct 2019 www.dattaaustralia.com

All enquiries should be directed to DATTA Australia President
Peter Murphy - pl@datta.vic.edu.au / 03 9349 5809

Contents

	Page
Introduction and Intent	2
Executive Summary	3
Survey Results	4
Comparisons	4
Additional 2019 Data	5
Recommendations	6
Appendices	7
1. A Letter “In Desperation”: An All Too Familiar Story	7
2. 2019 Respondent Comments	9
3. The Australian Curriculum: Technologies	11
4. Impacts of Technologies Education on Industry and Society	12

DATTA Australia

The Design and Technology Teachers' Association of Australia (DATTA Australia) is the peak organisation representing **Design and Technologies** learning area educators.

Our Association is comprised of individual state and territory associations that exist to promote and improve the quality of Design and Technologies education in Australia.

Our members are also often involved in delivery of **Digital Technologies** and **Food Technology**, so these have been included in this survey to offer a national perspective on all areas of Technologies education in Australia.

Introduction and Intent

This survey was intended to gain more accurate data on the perceived shortage of Technologies teachers across Australia.

This survey follows a similar process undertaken in 2013 which has given us accurate and credible longitudinal data and thus allowed us to make informed predications about the future condition of Technologies Education in Australia in 2025.

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 by **404 schools** across Australia, representing **2,941 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 national totals.

Results Overview

The Technologies Teacher Survey 2019 was fully completed by **404 schools** across Australia, representing **2,941 Technologies teachers.** The 2019 results are compared with results from a similar national survey conducted by DATTA Australia in 2013 which had 460 schools submit responses.

Predications for **2025** are based on continuing data trends should no significant interventions take place.

Technologies Curriculum Area

Each state and territory in Australia has traditionally used different terminology and structures to deliver Technologies education. Those approaches still have an impact on how the learning area is delivered today. However, the Australian Curriculum has now provided a common language and framework that has a direct relationship to Technologies education across the country.

The Australian Curriculum: Technologies describes two distinct but related subjects:

- **Design and Technologies**, in which students use design thinking and technologies to generate and produce designed solutions for authentic needs and opportunities
- **Digital Technologies**, in which students use computational thinking and information systems to define, design and implement digital solutions

For more information, see Appendix 3: **The Australian Curriculum: Technologies,** Page 11

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 Australia.

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 Australian economy in the future.

The survey gathered data reflecting the experience of nearly 3,000 Technologies teachers. 96% 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.

84% 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 National 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.

39% 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 71% of Technologies faculties in the schools surveyed indicating that they have received no direct STEM funding, resources or support.

If we as educators, leaders and parents believe that technology and innovation are a part of a successful and prosperous 21st Century Australia, 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.

In our professional and informed opinion, if significant action is not taken as outlined in this report, the Technologies learning area in Australia will be unsustainable by 2025.

DATTA Australia 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 Australian education. We trust that those who are in a position to influence and take action are listening and that help is on the way.

Peter Murphy
President
DATTA Australia

Comparative Survey Results

Results of the 2013 and 2019 surveys are compared below, with extrapolation of the data to 2025 following its current trend.

"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	2025
Schools having difficulty finding qualified Technologies teachers	**92%**	**96%**	**100%**

By 2025 100% of schools will have difficulty finding qualified Technologies Teachers

	2013	2019	2025
Schools using unqualified teachers from other learning areas due to shortage of qualified Technologies teachers	**60%**	**84%**	**100%**

By 2025 100% of schools will be using unqualified teachers from other learning areas to deliver Technologies Education

	2013	2019	2025
Schools that have reduced their Technologies Education programs due to shortage of qualified teachers	**28%**	**39%**	**50%**

By 2025 over 50% of schools will have reduced their Technologies education due to lack of qualified teachers

	2013	2019	2025
Schools that believe the quality of their Technologies Education programs have been compromised by the shortage of qualified teachers	**51%**	**68%**	**85%**

By 2025 approximately over 80% of schools will have the quality of their Technologies education programs compromised by lack of untrained teachers

Additional 2019 Survey Data

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

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

2019

26%

By 2025 over a quarter of our current Technologies Teachers will have retired or resigned due to stress relating to the shortage of qualified Technology Teachers.

Schools 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

70%

By 2025 Work Health and Safety for students and teachers in the Technologies learning areas will be a serious concern in most Australian schools.

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

2019

42%

Financial barriers to retraining as a qualified Technologies teacher are a significant threat to the future of the Technologies learning area.

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

2019

71%

As a neglected area of STEM education in terms of funding, resources or support, students will lose vital opportunities to integrate creative problem-solving skills and new technologies into their learning experience.

Recommendations

The following strategies have been suggested and supported by DATTA Australia'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 Australia 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 National 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 National Standard for all Technologies Education courses to ensure consistent and rigorous Technologies Education training throughout all universities should be developed, in consultation with DATTA Australia. 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, Australia'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 Australia. There will be no innovation in the country.”

“Australia 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 Australia'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 Australia'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 nationally 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
The Australian Curriculum: Technologies

The Australian Curriculum: Technologies describes two distinct but related subjects:

- **Design and Technologies**, in which students use design thinking and technologies to generate and produce designed solutions for authentic needs and opportunities
- **Digital Technologies**, in which students use computational thinking and information systems to define, design and implement digital solutions.

Rationale

Technologies enrich and impact on the lives of people and societies globally. Australia needs enterprising individuals who can make discerning decisions about the development and use of technologies and who can independently and collaboratively develop solutions to complex challenges and contribute to sustainable patterns of living. Technologies can play an important role in transforming, restoring and sustaining societies and natural, managed and constructed environments.

The Australian Curriculum: Technologies ensures that all students benefit from learning about and working with traditional, contemporary and emerging technologies that shape the world in which we live. By applying their knowledge and practical skills and processes when using technologies and other resources to create innovative solutions, independently and collaboratively, they develop knowledge, understanding and skills to respond creatively to current and future needs.

The practical nature of the Technologies learning area engages students in critical and creative thinking, including understanding interrelationships in systems when solving complex problems. A systematic approach to experimentation, problem-solving, prototyping and evaluation instils in students the value of planning and reviewing processes to realise ideas.

All young Australians should develop capacity for action and a critical appreciation of the processes through which technologies are developed and how technologies can contribute to societies. Students need opportunities to consider the use and impact of technological solutions on equity, ethics, and personal and social values. In creating solutions, as well as responding to the designed world, students consider desirable sustainable patterns of living, and contribute to preferred futures for themselves and others.

Aims

The Australian Curriculum: Technologies aims to develop the knowledge, understanding and skills to ensure that, individually and collaboratively, students:

- investigate, design, plan, manage, create and evaluate solutions
- are creative, innovative and enterprising when using traditional, contemporary and emerging technologies, and understand how technologies have developed over time
- make informed and ethical decisions about the role, impact and use of technologies in the economy, environment and society for a sustainable future
- engage confidently with and responsibly select and manipulate appropriate technologies – materials, data, systems, components, tools and equipment – when designing and creating solutions
- critique, analyse and evaluate problems, needs or opportunities to identify and create solutions.

https://www.australiancurriculum.edu.au/f-10-curriculum/technologies

Appendix 4
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.