Australian National University

TECH POLICY DESIGN CENTRE

acs

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Tech skills for the next generation

Digital Technologies education in Australian schools

About us

The Tech Policy Design Centre is a nonpartisan, independent research organisation at the Australian National University (ANU). TPDC's mission is to shape technology for the benefit of humanity. We work to mature the tech-policy ecosystem in collaboration with industry, government, civil society, and academia.

The Australian Computer Society (ACS) is the leading professional association with over 40,000 members representing Australia's technology community, across industry, government, and education. ACS's key aim is to grow the nation's digital skills workforce and capabilities, industry capacity and inspire the next generation of technology professionals.

ACS conducts regular surveys aimed at gaining insights from educators immersed in digital technology across governments, Catholic, and independent school sectors. This survey is central to ACS's policy development efforts, advocating for better teaching support, delivery, and quality of Digital Technologies and the Australian Curriculum.

Independence Statement

TPDC's work is made possible by the generous support of external funders from government, industry, and civil society. In all instances, we retain full independence over our research and complete editorial discretion with respect to outputs, reports, and recommendations. If you would like to know more or support our work, please contact us at techpolicydesign@anu.edu.au

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Glossary

ACARA	Australian Curriculum, Assessment and Reporting Authority
ACS	Australian Computer Society
AI	Artificial Intelligence
AITSL	Australian Institute for Teaching and School Leadership
ANU	Australian National University
ATTEN	Australian Technologies Teacher Educators Network
ChatGPT	An online, publicly-accessible generative AI tool
DTC	Digital Technologies Curriculum
ICT	Information and communication technology
ITE	Initial Teacher Education
STEM	Science, Technology, Engineering and Mathematics
VET	Vocational education and training

Terminology

Digital Technologies Curriculum	The F-10 learning area in which students use computational thinking and information systems to define, design, and implement digital solutions.
Digital Technology/ies	In this report, the use of the term Digital Technology/ies (capitalised first letters) refers to the subject Digital Technologies as part of the Digital Technologies Curriculum. It covers teaching of computational thinking and information systems, and processes and production skills. The intended learning outcomes are for students to develop the underpinning knowledge and understanding that enable students to create digital solutions.
digital technology/ies	digital technologies (all lowercase letters) is a general term that refers to the technology itself rather than the school subject.
Digital Literacy/ICT General Capability	Encompasses the knowledge and skills students need to create, manage, communicate, and investigate data, information and ideas, and solve problems. The intended learning outcomes are for students to apply this collaboratively in their work at school and in their lives beyond school.

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Executive summary

Digital transformation, propelled by new and disruptive technologies such as artificial intelligence (AI), is spurring the need for new knowledge across the entire workforce and demanding a higher level of digital literacy for the whole Australian population. Productivity across all sectors is increasingly being driven by creative problem solving and technology working together. This is underpinned by the need for everyone in Australia to have an informed understanding of digital technologies and how they should be applied.

On our current trajectory, Australia will struggle to meet its growing need for digital and technology skills, and prepare all Australians for the digital world.[1] While the national average for digital abilities is improving, the digital divide is increasing for some, including low-income groups, people outside capital cities and for Australia's First Nations People.[2] In Australian schools, there has been a drop in student interest in information and communication technologies (ICT) subjects in Years 11 and 12, leading to fewer students likely to pursue ICT in further education and professional careers.[3] At the university level, there are too few graduates of ICT degrees per year to meet Australia's projected workforce requirements for technology professionals.[4]

Recognising the need to teach essential digital skills and capabilities from early education and across the whole population, the Australian Government introduced Digital Technologies into the Australian Curriculum for primary and secondary school students in 2014. This approach provides all students with the opportunity to learn digital literacy and the creative thinking skills they will need in the workforce, whatever profession they may choose to pursue. For some students, developing an interest in digital technologies through their school education can lead to further education in technology fields and into a technology-focused career. Introducing Digital Technologies learning from early education will also provide all students with the opportunity to learn how to think through and solve problems critically and creatively – skills that underpin the learning outcomes of the Digital Technologies Curriculum (DTC).

Teachers are critical to the success of the DTC. They are responsible for directly engaging young people in learning, developing their digital literacy and skills that teach them how to apply digital tools to creative problem solving throughout their schooling. However, teaching the DTC is presenting specific challenges for teachers in the classroom. Teachers are passionate about the subject, but often feel like they do not have the support they need for effectively preparing and delivering the DTC. Due to its relatively recent introduction, and rapidly evolving, sometimes highly technical content compared to more established subjects such as English and Mathematics, strategies and resources that teachers routinely apply to prepare lessons are not necessarily applicable, not available, or hard to access and find. These challenges are compounded by the additional pressures on teachers from broader issues like the national teacher shortage, which leads to more teaching out-of-field and difficulties in accessing and attending essential professional development and training.

Australia has the opportunity to take action by supporting teachers to overcome these challenges with Digital Technologies education and better engage students with technology throughout their education. In turn, this will help the next generation develop essential digital abilities and creative thinking skills which can also encourage more Australians to pursue a career in technology. Without action, Australia risks falling short of our future workforce needs and leaving our next generation ill-equipped for the future.

About this report

This report provides a roadmap for the Australian Government, state and territory governments, and the education sector over the next five years to best support teachers to deliver high-quality and engaging programs in Digital Technologies for Australian primary and secondary school students.

The goal is to better engage young Australians in Digital Technologies through their school years. This will equip them with the essential digital technology capabilities for their future participation in society and encourage more young people to pursue technology-related careers. The motivation behind this report, and the future skills outcomes it seeks to support, are discussed in further detail in the vision for excellence in digital technologies education section on page 8.

ACS aims to ensure that ICT education in Australian schools significantly contributes to the supply of domestic talent for the future ICT workforce. Palpable concern regarding the decline in students' interest in technical subjects and a decrease in Science, Technology, Engineering and Mathematics (STEM) performance across Australian schools[3] motivates ACS to help address this challenge.

In 2020, ACS's ICT Educators Committee commenced an initiative to provide the evidence base that is needed to inform educational strategy, public policy, and government investment, by conducting regular surveys on the development of digital skills in Australian schools.

The recommendations in this report are informed by the most recent ACS survey of Australian primary and secondary schools conducted in 2023. This survey provides insights into what is and is not working well in teaching the DTC, and where further support could be provided to teachers to increase student engagement and participation. ACS partnered with Australian Survey Research to conduct the 2023 survey, and with the ANU's Tech Policy Design Centre (TPDC) to explore the policy implications of the survey results. This report builds on the previous ACS survey from 2020, which is discussed in the report *Computer education in Australian schools 2022: Enabling the next generation of IT professionals.*[3]

Details of the ACS's 2023 survey are provided in Annex 1, including a summary of the survey results. ANU's TPDC developed, tested, and refined the recommendations of this report with input and insights from Australian education sector experts. For further information on methodology we used, please find a summary of the survey findings and expert working group Annex 2.

Vision for excellence in Digital Technologies education

> ***"Digital Technologies develops the foundational skills and knowledge for the application of Digital Literacy across the curriculum in a way similar to the way Mathematics develops the numeracy skills to support other learning areas, and English develops Literacy skills to support other learning areas".***
>
> *- Australian Curriculum, version 9.*[5]

Australia's ability to seize the social and economic benefits of technology will be determined by whether or not we equip our emerging generations with the knowledge and skills required to use it in a productive, safe and responsible manner.

It is therefore no surprise that Australia's National STEM School Education Strategy (2016-2026) calls for pursuing quality digital education and teaching to lift student engagement and performance in STEM.[6] This is supported by the call to increase diversity across STEM education and the workforce highlighted in the recommendations provided in the Pathway to Diversity in STEM Review report.[7]

Our vision for excellence in digital technologies education includes five key elements outlined below. These elements are informed by the ACS's 2023 survey findings and the perspectives of our expert working group (discussed in Annex 2).

Theme	Vision
Productivity driven by creative thinking & technology working together	Australians recognise that all roles in the workforce are underpinned by an informed understanding of digital skills and technologies and how to apply them.
Essential skills taught from early education	Australians learn digital literacy as well as creative and critical thinking skills from early primary school education throughout their schooling. This will focus on teaching students how to think through and solve problems, rather than limited to how to use specific tools (e.g. coding). They also gain an understanding of how these skills are useful and can be applied across the workforce, in technology specialist careers and in daily life.
Equity	Every Australian has the essential skills and knowledge to be a global citizen. No Australian's access to digital education is held back by their socio-economic status, location, cultural background, gender, disability, or other marginalised identity.
Independence	All Australians have abilities to apply their understanding of technology, critical thinking skills and digital literacy. For example, everyone will have the skills and understanding to use a smartphone without thinking that it is "magic".
Informed understanding	Australians recognise and understand the role of digital skills and technologies in society. This includes a clear recognition of the differences between digital literacy and the creative and critical thinking skills that underpin Digital Technologies education. Australians can identify how to use new technology, its appropriate uses, and its risks.

Summary of recommendations

To address the challenges confronted by teachers delivering the Australian Digital Technologies Curriculum, Australia should aim to boost student engagement by supporting teacher training, lesson planning resources, and raising awareness of its value among the broader community.

The recommended actions set out in this report address four key areas that need immediate attention so Australia can realise the full potential of the DTC. These actions respond to the challenges raised by teachers in the ACS's 2023 survey and by sector experts, such as the support that is needed now to improve teaching quality and capability, and confidence in Digital Technologies education.

Over the next five years, Australia should support teachers of digital technologies* by:

Ensuring there are accessible ready-to-use teaching resources		
1. **Expand support for, and increase visibility of, the online Digital Technologies Hub to ensure teachers have access to best practice exemplar teaching modules for the DTC.**	Australian Government	1 year
2. **Improve schools' internal information management processes regarding digital teaching resources to ensure they reach teachers who need them in the classroom.**	School leaders	1 year
3. **Support cross-fertilisation amongst professional associations and communities of practice for the DTC.**	State & territory governments Career employment groups	3 years
Embedding digital-readiness training in Initial Teacher Education (ITE)		
4. **The Australian Institute for Teaching and School Leadership (AITSL) should incorporate into ITE accreditation a requirement that ITE programs demonstrate their capacity to prepare our future teachers to:** • **teach with digital technologies (as expected by AITSL standards)** • **use digital technologies within all learning areas (including Digital Literacy development)** • **teach the F–10 Digital Technologies subject and/or senior secondary computer education courses.** **This could be supported through the Australian Technologies Teacher Educators Network (ATTEN) to provide end-user input from Digital Technologies teachers based in each state and territory.**	Australian Institute for Teaching and School Leadership Australian Technologies Teacher Educators Network	5 years

* Proposed responsible parties and target time frames for each recommendations are indicated.

Supporting ongoing professional development and training for teachers		
5. **Ensure that training courses suitable for teachers are available and accessible across all essential areas of digital technologies knowledge and skills.**	State and territory governments	3 years
6. **Identify and promote existing recommended courses that provide training in software tools and core principles of digital technologies for teachers of all year levels.**	Australian Government Department of Education with state and territory governments	1 year
7. **Invest in initiatives that support teachers to attend suitable training for digital technologies skills and in turn this will increase the number of skilled teachers at each school.**	State and territory governments	3 years
Elevating awareness of the Digital Technologies Curriculum in the community		
8. **Empower parents with the tools and capabilities to understand and communicate at home the value of digital technologies, including the types of technology careers that can be pursued and how the skills can be applied to solve problems in a range of industries.**	School leaders	3 years
9. **Ensure that tools and capabilities that empower parents are inclusive and increase visibility of underrepresented groups in STEM fields, such as women and girls and Aboriginal and Torres Strait Islander Peoples.**	School leaders	3 years
10. **Establish a national coordinated data collection of DTC learning outcomes, and communicate these outcomes to the community to build better understanding and awareness of learning and career outcomes.**	Australian Government Department of Education with State and Territory Departments of Education	5 years
11. **Recognise and reward excellence in digital technologies education to increase visibility to parents and the education community and promote best practice-teaching in Australian schools.**	School leaders	1 year

1 Introduction

Australians need to be ready for an increasingly digital world. Technology powers our daily lives and being able to use digital services effectively is now required for full participation in social, economic and civic life. Emerging technologies such as artificial intelligence (AI) are increasing in their use and application, becoming more integrated into our daily activities. In 2022, the record-breaking boom in ChatGPT, the new generative AI tool, to 100 million users in just two months left industry, education and governments rushing to catch up.[8,9,10,11]

But how many Australians have the necessary skills to apply new and disruptive technologies like generative AI safely, responsibly, and effectively in our personal and professional lives? While the digital ability of Australians is improving in recent years, there remains significant variation across the population. There is a growing divide in digital ability and inclusion for several groups, including people from low-income groups, regional and remote Australia, and First Nations communities.[2]

Prioritising digital literacy and digital technologies education from early schooling can help to address the gaps in digital ability and inclusion population-wide. With this approach, all who attend primary and secondary school have the opportunity to learn digital skills, regardless of their socioeconomic status or background. This approach can also equip students with the digital literacy and creative problem-solving skills they will need in the workforce and for full participation in society. Ensuring all students finish school with strong foundational knowledge in Science, Technology, Engineering and Mathematics, and related skills, has been recognised as a priority by the Australian Government in the National STEM School Education Strategy (2016-2026).[5]

New and emerging technologies are also shifting the skills and needs of the Australian workforce, increasing the demand for professional skills and expertise in digital technology and its applications. The growing demand for digital technology capabilities will likely not be limited to ICT professionals as new and existing critical technologies are adopted by Australian businesses, governments and education right across the economy.[9] It is estimated that Australia will need an additional 237,000 technical workers by 2030,[1] yet we produce only 10,600 tertiary graduates in ICT per year.[4] There is a significant shortfall for Australia's domestic talent pipeline, which is unlikely to be addressed by migration alone. Engaging young people in digital technologies as early as possible and throughout their school education also helps build Australia's domestic pipeline of skilled technology professionals. For some students it will not only equip them with essential skills but also nurture their interests in pursuing a technology-focused professional career.

The Australian Government introduced national objectives for digital technologies learning for primary and secondary school students (foundation to Year 10) in 2014 as part of the Australian Curriculum.[12] As well as building digital literacy and competency, the DTC was designed to build students' transferable thinking skills in areas such as creative problem solving and systems thinking. Development and regular review of the Australian Curriculum for Australian schools has been led by the Australian Curriculum, Assessment and Reporting Authority (ACARA) with broad public consultation. Technology continues to be one of eight learning areas prioritised in the current Australian Curriculum (version 9.0)[13], which was approved in 2022. The most recent revision expanded the DTC to include highly relevant topics of cybersecurity and privacy.

Teachers play a critical role in the success of the DTC. They ensure that lessons are aligned with curriculum learning objectives, educating young people with the skills they need beyond their school years. Through engaging lessons in the classroom, teachers can pique interest, nurture enthusiasm and help to identify future careers that build on students' preferred subjects and skills. However, teachers of Digital Technologies across Australia are facing challenges in implementing the curriculum, which slows Australia's progress in Digital Technologies and Digital Literacy education. While there is a national priority to increase Australia's technology capabilities, there is little focus on the essential role of teachers in training and education of the next generation to build these capabilities. Consequently, support for teachers at the classroom level can be overlooked and opportunities to boost learning outcomes are missed.

The ACS's previous report in 2022 adopted a broad lens on digital skills issues and the challenges faced by teachers, encompassing elements from curriculum design, school equipment, and digital capabilities in university education or vocational education and training (VET).[3] The report called for further investigation into how the curriculum was implemented, and identified areas for support that could empower teachers to overcome the challenges of implementing the DTC. Since then, there has been little progress in addressing these and other perceived challenges in teaching the DTC, in part due to the impact of the COVID-19 pandemic.

Many teachers have reported in ACS's more recent survey in 2023 that they are struggling to understand and implement the DTC. This is often because they found that approaches they would routinely use for other established subjects such as English and Mathematics are often not applicable or available, or hard to find and use. Many teachers also feel they are under-supported in their efforts to address this and other challenges that they face. For example, competing demands on their time make it difficult to attend relevant professional development or training.

There is an opportunity to prepare Australia's next generation for the future, and build our future workforce by better supporting teachers to engage students in Digital Technologies during their primary and secondary education. This report outlines where the key challenges lie, what teachers need to succeed and where support could be targeted over the next five years to maximise the success of the DTC. The recommendations set out in this report build on the outcomes of two surveys of Australian school teachers teaching Digital Technologies, which were conducted by ACS in 2020 and 2023, and draw on expert input and research by TPDC. Increasing student engagement and learning outcomes in the DTC addresses a key step in the domestic talent pipeline, and can equip the next generation of Australians with the skills and capabilities they will need for the future.

What do we mean when we talk about digital technologies?

To achieve our vision and effectively address the challenges with teaching Australia's DTC there needs to be a shared understanding of the language we are using, particularly terms like 'Digital Technologies' and 'Digital Literacy'.

The Australian Curriculum provides guidance to understand the difference and the relationship between Digital Literacy and Digital Technologies. The key factor is that Digital Technologies develops skills and knowledge so that students can apply Digital Literacy across the curriculum. For example, Mathematics develops numeracy skills and English develops literacy skills to support other learning areas.

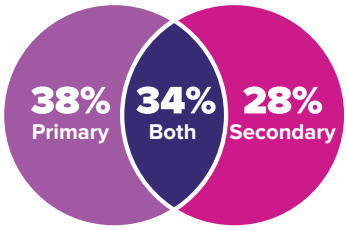
Outcomes from the ACS's 2023 survey and discussions among the expert working group highlight that the approach taken by the Australian Curriculum in version 9 is not yet widely adopted among teachers and the broader education sector. Just over half (56%) of teachers that responded to the ACS survey believed that the concepts were very different, while the others (44%) viewed the terms as the same, similar, or found them confusing (Annex 1, Table 9).

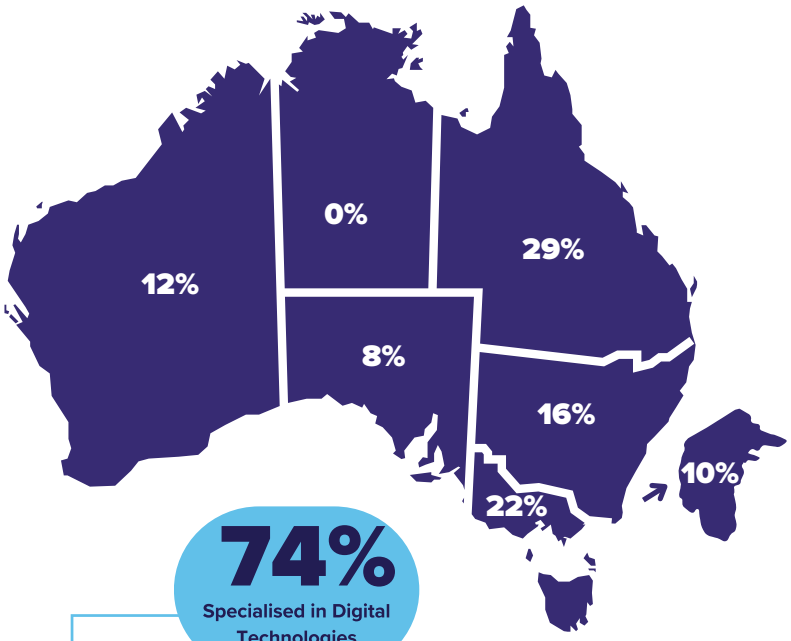
For consistency, this report assumes the meanings set out in Australian Curriculum Version 9 when referring to 'Digital Technologies Curriculum' the subject 'Digital Technologies' and 'Digital Literacy' or 'ICT General Capability'.

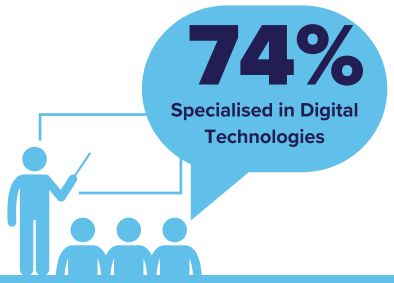
- **Digital Technologies Curriculum**: refers to the F-10 learning area in which students use computational thinking and information systems to define, design and implement digital solutions. The core concepts specific to this curriculum are digital systems, data representation, data acquisition, data interpretation, abstraction, specification, algorithms, implementation, and privacy and security. The **Digital Technologies** subject develops the underpinning knowledge and understanding of computational thinking and information systems, and processes and production skills that enable students to create digital solutions.[14]
- **Digital Literacy/ICT General Capability**: encompasses the knowledge and skills students need to create, manage, communicate, and investigate data, information and ideas, and solve problems. It assists students to work collaboratively at school and in their lives beyond school.[15]

Who was surveyed?

Teachers from across Australia were asked to complete the survey with respondents from both primary and secondary schools.

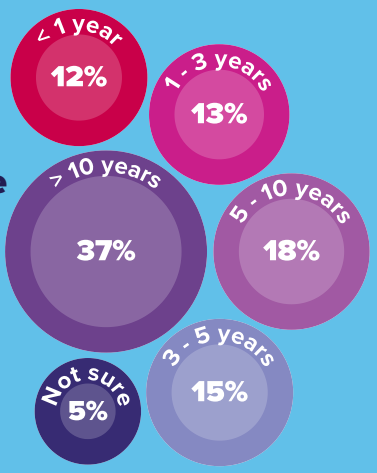






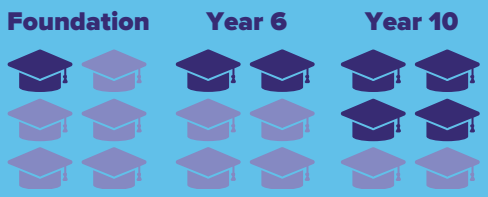
Years of Experience

On average respondents had been teaching the Digital Technologies Curriculum for over 5 years.



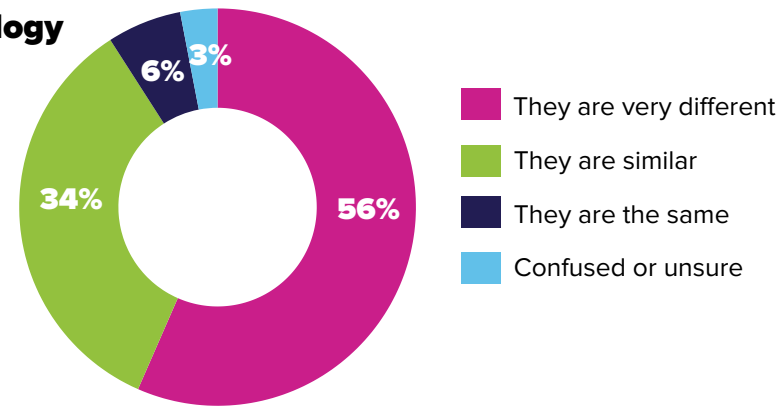
Teaching Digital Technologies

Respondents averaged one to two hours of teaching per week. As expected, the hours per week of teaching increased with the year level.



Understanding of terminology

When asked if respondents understood the difference between the Digital Technologies Curriculum and Digital Literacy/ICT General Capacity, responses were mixed.



2 Empowering teachers to realise the potential of the Digital Technologies Curriculum

Impact of broader challenges in the education sector on Digital Technologies teaching

Current teachers of Digital Technologies are passionate about the subject matter.[3] However, few feel they have the support they need to deliver the curriculum.[16] In this report, we explore immediate actions to best support teachers of Digital Technologies to increase their capability and confidence, and deliver high-quality teaching of the curriculum. While this exploration is predominantly informed by the ACS's surveys and insights from our expert working group, we acknowledge that these challenges have emerged against the backdrop of broader issues in the education sector, such as the national teacher shortage.

The impact of the national shortage of teachers in Australian schools cannot be ignored when considering any challenges faced by current teachers. It has placed additional time and resource pressures on current teachers leading to a range of issues including:

- the need for many more teachers to teach subjects out-of-field, including for Digital Technologies
- shortages of specialist teachers, including ICT specialists
- an increased workload for current teachers, leaving them time-poor and rarely able to prioritise any activities other than essential day-to-day lesson planning. For example, receiving professional learning and training sessions is impacted because it is much harder to find time and replacement teachers, both of which enable current teachers to attend.

We also acknowledge that equitable access to digital hardware, software, and internet connectivity plays a key enabling role for students to develop their digital literacy and knowledge of digital technologies. Our expert working group noted that access to these resources can vary greatly among schools across Australia, often influenced by socio-economic status of the area, location of the school in metro, remote or regional areas, and the cultural and linguistic diversity among the school community. However, these systemic and fundamental issues are beyond the scope of this report.

In this report, we have focussed on the immediate opportunities to provide support that is sensitive to the specific dynamics and challenges of teaching the DTC, while acknowledging that the underlying causes often arise from broader challenges in the education landscape.

Key challenges for teachers of Digital Technologies

Responses to the ACS's 2023 survey reveal that teachers perceive a range of challenges that impact their ability and confidence to implement the DTC in the classroom. Two thirds (67%) of respondents indicated that they faced challenges when teaching the DTC (Annex 1, Table 48), where only one quarter (27%) of this group reported that they had enough support to address them (Annex 1, Table 50). This is unlikely to be caused solely by lack of experience or knowledge as more than half (55%) of the respondents reported that they have been teaching Digital Technologies for more than five years (Annex 1, Table 13, also see Tables 14-16) and three quarters (74%) self-identified as digital technologies specialists (Annex 1, Table 18).

Digital Technologies presents distinct challenges compared to other subjects

Exploring this further, responses from teachers about their biggest barriers indicate that teaching Digital Technologies presents distinct challenges compared to established school subject areas such as Science and Mathematics, including:

- **Speed of change**: New technologies and their applications are a fast-moving subject area, making it challenging to keep lessons relevant to applications in students' current and future lives and potential careers.
- **Low awareness of resources**: Teachers identified that practical guidance about what does and does not work well in the classroom is often harder to find than those for more established subjects that have been taught in the Australian Curriculum for many decades.
- **Limited specialist ICT knowledg**e: Not all teachers of Digital Technologies are ICT specialists, and as a result they often do not have the relevant foundational knowledge and skills. Many reported that they need to spend significant amounts of time learning the tools and principles of the DTC so that they are able to prepare effective lesson plans and teach them to students. Teachers also noted competing demands on their time and that it was difficult to dedicate more time to Digital Technologies than their other subjects and teaching duties.
- **Equity and access**: All these challenges are underpinned by issues with equity related to teacher access, training, and of reaching low socio-economic and marginalised communities. ACS called for research into the equitable access of Australian students to computer education, covering teacher training, schooling sector, regionality, gender, ethnicity and socioeconomic status in their previous report.

These challenges reported by teachers are not new, which further highlights the need for urgent action. Critical recommendations emerging from the previous study by ACS continue to be relevant and have been highlighted throughout this report.

Opportunities to support teachers of Digital Technologies

Taken together, the findings from both ACS surveys indicate that teachers of the DTC have different levels of experience and expertise, which impacts effective teaching and student engagement in the subject matter. As a result, many teachers will find it difficult to overcome these specific challenges without support or intervention through investment, training and teaching resources.

In the following sections, we tease out the key challenges and seize the opportunities to address them by supporting teachers of Digital Technologies to succeed.

Our recommendations are set out across four domains:

1. Ensuring there are accessible ready-to-use teaching resources
2. Embedding digital readiness into Initial Teacher Education
3. Supporting ongoing professional development and training
4. Elevating awareness of the DTC in the community

1. Ensuring there are accessible ready-to-use teaching resources

A key area for support is providing ready-to-use teaching resources to assist with lesson planning and delivery of the DTC. Many respondents to the 2023 ACS survey noted the need for greater direction and practical examples of effective lesson plans to reduce the extra time they spend on teaching preparation for Digital Technologies compared to other subjects. More than three quarters (76%) of respondents reported that they develop their own Digital Technologies lesson programs and plans (Annex 1, Table 45), and a higher proportion (82%) of respondents reported that they had difficulty finding lesson plans and content (Annex 1, Table 46 and chart).

Teachers highlighted the need for go-to resources for:

- updates on the curriculum, supported by practical examples to efficiently include in their lesson and program planning
- training for updates and new material in the curriculum which can be accessed
- career and industry examples of digital technologies applied in real-world using relatable examples for primary and secondary school age children
- sharing lesson and program resources for Digital Technologies among teachers (e.g. local school networks).

Conversely, other teachers reported finding and successfully applying a range of useful ready-to-use Digital Technologies resources, lesson plans and teaching methods that are working well in the classroom. Specifically, the Digital Technologies Hub, a central, accessible online repository for self-directed training and practical teaching resources, was highlighted as helpful and relevant.[16] The Hub was commissioned by the Department of Education and developed by Education Services Australia and aims to support and enable teachers to deliver best practice teaching.

Awareness of resources

Responses to the ACS 2023 survey indicate a clear opportunity to bring greater awareness among teachers about existing resources and how to locate them. Relevant resources are available but are not necessarily finding their way to those who need them. The expert working group observed that this could result from difficulty navigating a large volume of unfiltered information available online, rather than a lack of appropriate resources. For example, many resources appropriate for Digital Technologies might be more easily found using a “STEM” search term, but teachers may not necessarily connect the relevance for the two areas.

Existing resources that are working well for some teachers could be promoted, distributed and shared more widely and effectively among Digital Technologies teachers to help address this gap in awareness. For example, targeted investment for the Digital Technologies Hub should continue and ensure that support is included to create and promote resources that increase teacher capacity and teaching quality.

Recommendation 1: Australian Government (1 year)

Expand support for and increase visibility of the online Digital Technologies Hub, ensuring that teachers have access to best practice exemplar teaching modules for the Digital Technologies Curriculum.[17]

The Department of Education should continue to support the Digital Technologies Hub, ensuring that teaching materials are regularly updated, and new modules developed with advice from ACARA to align them with new curriculum content.

This includes promoting and communicating to teachers that these resources exist, and investing in Digital Technologies resources to increase teacher capacity and teaching quality by building on national collaborative actions outlined in the National STEM School Education Strategy.[5]

Professional associations and communities of practice

Just over half of teachers who responded to ACS’s 2023 survey said that they were a member of a relevant subject association (54%) whereas the other half (47%) reported not being a member of any associations (Annex 1, Table 19). Since ACS’s 2020 survey, reports of association membership has dropped by 8% (Annex 1, Table 21).

Through these associations, teachers can access best practice knowledge and information for the DTC from their peers and shared resources. For teachers who are not members of relevant associations, existing professional networks of teachers and region-based school clusters could be expanded and accessed to bring Digital Technologies teachers together. Both approaches will boost opportunities for sharing of professional learning and build communities of practice among Digital Technologies teachers.

For example, teachers could express their interest in Digital Technologies as part of their annual teacher registration to create a central contact database in each state and territory. The impact of these networks could be maximised through sector-wide cooperation – with investment from the Australian Government, coordination by education departments (national and state/territory) and in partnership with universities, who train teachers, and industry, who can provide insights about relevant skills and knowledge for the workforce.

Recommendation 2: School Leaders (1 year)

Improve schools' internal information management processes regarding digital resources to ensure that they reach teachers who need them in the classroom.

School leaders could support their Digital Technologies teachers by establishing school-level resource hubs, such as part of the staff learning management system accessible by all staff. Similarly, effective processes could be established for receiving, triaging and internally distributing information about Digital Technologies resources that are sent to school points of contact by external partners.

It was noted that the point of contact at the school for communications of this type may not be appropriate for recognising and distributing information about digital resources and training to interested staff.

Better communication between schools and governments about where to send information about available resources within the school could also assist teachers.

The expert working group highlighted other opportunities to build networks of teachers interested in digital technologies, including:

- encouraging cross-fertilisation between existing groups such as professional associations or other subject areas' special interest groups for teachers. This approach is underway in New South Wales but could be encouraged in other states and territories
- encouraging membership of professional teaching associations. Many new teachers do not see the value in the associations and some associations have lost state government financial support. Professional associations could better highlight their role in building the community of practice for Digital Technologies teachers at their local level and in turn, encourage more teachers to join.

Recommendation 3: State & Territory Governments and Career Employment Groups (3 years)

Support cross-fertilisation amongst professional associations and communities of practice for the Digital Technologies Curriculum

Establish a Digital Technologies professional learning network to support teachers, schools and school systems to share best practice and teaching resources.

There is an opportunity to invest in networks that rapidly raise the effectiveness of Digital Technologies teaching across more schools and year levels by enabling teachers to share experiences and expertise among their peers through professional networks. This could assist in identifying specific areas for future training and support.

An immediate opportunity is for state and territory governments to invest in, expand and connect existing professional networks that are working well but under-resourced, such as volunteer-led and run Career Employment Groups that are already established in each state and territory.

2. Embedding digital readiness into Initial Teacher Education

A key area that continues to pose a significant challenge is the lack of foundational Digital Technologies skills and knowledge in ITE – the courses that train our future teachers. ACS's previous findings proposed that ITE should be "ensuring [teachers] graduate with sufficient digital literacy, thinking skills and digital technologies skills to be able to effectively teach the Australian Curriculum subject of Digital Technologies and senior secondary computing courses".[17]

Several pathways were recommended to improve foundational Digital Technologies knowledge in ITE (see Annex 3), including:

- academics training and preparing students in ITE should have sufficient digital literacy to engage and teach ITE students, sufficient experience with educational technologies to engage ITE students with the use of digital technologies in their teaching practice and sufficient understanding of the curriculum and applied Digital Technologies skills (including programming)
- acting on recommendations made in the Teaching Teachers for the Future (2013) report and the institution-specific recommendations made by the project officers employed by their faculties[18]
- benchmarking and extending ITE programs in their development of digital literacy, educational technologies, digital technologies and thinking skills.

Our expert working group reported that there was a lack of clarity about whether the current ITE training was providing sufficient understanding of digital technologies for new teachers to support their teaching and meet the Australian Professional Standards for Teachers set out by the AITSL. This issue was also previously noted by ACS.[3]

Furthermore, the working group identified that digital technologies is not included an essential component of training Australia's new primary and secondary teachers, across all subjects – a missed opportunity for setting new teachers up for success with the DTC. Equipping all teachers, particularly primary school teachers, with the tools to teach digital technologies from day one in the classroom will help share the responsibility of on-site support for digital technologies in schools among teachers, rather than relying on one go-to specialist teacher.

With this in mind, we propose that Recommendation 53 from ACS's 2022 report be carried forward. This could be supported through ATTEN, a nationwide organisation connecting teachers through their active presence in each state and territory.

Recommendation 4: Australian Institute for Teaching and School Leadership (AITSL) and the Australian Technologies Teacher Educators Network (ATTEN) (5 years)

AITSL should incorporate into ITE accreditation a requirement that ITE programs demonstrate their capacity to prepare our future teachers to:

- **teach with digital technologies (as expected by AITSL standards)**
- **use digital technologies within all learning areas (including Digital Literacy development)**
- **teach the F–10 Digital Technologies subject and/or senior secondary computer education courses.**

Development of new accreditation resources by AITSL could be supported through ATTEN to provide end-user input from Digital Technologies teachers nationwide and in each state and territory.

These three aspects of ITE preparation should not be conflated, and it should be made clear to what extent each is addressed in ITE programs when they are considered for accreditation. This aligns with AITSL priorities to improve preparation and induction of teachers and leaders, and provide stronger standards-based support for quality teaching and leadership through the career life cycle across Australia's schools and early childhood settings.

3. Supporting ongoing professional development and training

Simply receiving access to resources is not sufficient to help teachers unlock the potential of the DTC. Teachers of Digital Technologies may have a range of skill levels, suited to their teaching situation. There will likely be specialists teaching a standalone Digital Technologies subject, specialists in other subjects who integrate the principles and tools in their teaching program, or teaching primary age students where Digital Technologies is integrated across a more holistic lesson structure.

All teachers of Digital Technologies will need to have the skills to:

- use a range of digital software, platforms and tools
- apply design thinking, computational thinking and systems thinking using the digital tools
- demonstrate how to use the tools and apply them to a range of subject areas
- design practical tasks and assessments for students to develop critical thinking skills.

To ensure this, teachers will need access to, and be supported to attend, annual professional development for:

- major updates to the DTC
- skills development in new tools to support implementation of the DTC
- current technology trends and emerging areas, including where they are applied (which settings and industries)
- the practical translation of the DTC into lesson plans and programs.

Results from the 2023 ACS survey indicate that teachers may not be receiving sufficient professional development in Digital Technologies. Just under half the respondents (42%) reported completing professional development for DTC in the 2023 school year (Annex 1, Table 23). Of those who did, about half (49%) reported that it was not enough (Annex 1, Table 25). Several respondents commented that it was difficult to find time for additional training with competing demands and teaching responsibilities.[3]

Responses indicate that some teachers would value the opportunity for professional development training focusing on the Australian Curriculum, including how to integrate new content and practical examples for lesson planning. More than 80% of respondents indicated that they had some difficulty using available Digital Technologies lesson plans and content (chart above Table 39). Teachers noted that it was difficult to keep lesson plans up to date with changes in the curriculum and to keep the content relatable for students.

However, other teachers also indicated that they had attended professional development on a range of topics related to the DTC that are likely suitable for other teachers seeking training in similar areas. Several respondents noted that they had attended training in relevant areas such as programming, coding, networks, design process and 3D printing, which contributed to building confidence and core knowledge in Digital Technologies subject matter.

This reveals a similar tension to that discussed above regarding resources: some respondents reported not having access to courses, while others report knowledge of relevant courses. This points to awareness and accessibility being core issues.

Steps should be taken to enable all teachers to learn and build core competencies in digital technologies. 2023 ACS survey results highlight three areas where intervention can make a difference: availability, awareness, and accessibility of relevant training, which were also proposed previously by ACS in 2022.[3] These areas include the role of states and territories in funding systematic professional development, and the role of schools and the school system in developing learning support programs and providing support for teachers to obtain formal training in the DTC.

Availability of up-to-date training on emerging technologies

The emergence of generative AI, and the sudden abundance of tools such as ChatGPT in everyday life, provides an illustrative example of how a rapidly emerging technology can go from unknown to very relevant to digital technologies teaching in less than a year (see Box 1). This pace of change means that even digital ready ITE would not overcome the need for resources and professional development opportunities for teachers to keep on top of rapid changes in technology. Many new technologies can be applied in a range of settings and subject areas, meaning that all teachers will need access this type of training and support.

Providing access to training for teachers who are not ICT specialists, out-of-field teachers and for new teachers as part of ITE in universities will help build expertise and experience in the technical content and skills needed for the DTC. This will help all teachers seeking to integrate Digital Technologies into subject programs gain a strong foundation in the core subject matter and skills using essential digital tools.

Recommendation 5: State and Territory Governments (3 years)

Ensure that training courses suitable for teachers are available and accessible across all essential areas of digital technologies knowledge and skills.

As the DTC is updated in new versions of the Australian Curriculum, there are likely to be new technology areas not covered in existing, recommended training courses developed for teachers.

Guided by ACARA and state and territory curriculum authorities, Australian governments should support development of training courses for teachers that align with new technologies included in updated versions of the DTC.

Case study: responding to disruptive technology

ChatGPT in the classroom

Many new digital tools like ChatGPT, the text-based generative AI tool, have been made available to everyone online and free of charge. Instant public access to these types of digital tools – including by school-aged children – means that teachers need to be supported to discuss in the classroom what these technologies are, how to use them and where they could be applied.

To build a digitally-ready Australia, ChatGPT could be used in the classroom:

by teachers to help students understand and use new technologies.

Teachers can help students understand the underlying generative AI technology, where it can be accessed and how it can be applied effectively to solve problems.

This includes not only an understanding of its capabilities and limitations but it's vulnerabilities and ways that a user could be exposed to potential risks while using it. This should also cover a discussion of relevant aspects that are in the public discourse or are not yet defined, such as the role of generative AI in Australian education which is the subject of a current Australian Parliamentary Committee Inquiry.

To teach these concepts, teachers can use examples in other subject areas like English, Mathematics or Sciences to show the range of problems where ChatGPT could be applied, balancing that with the limitations set by the quality of the data set used to train the AI program. Teachers can discuss how biases are created from inputs and the impact this can have on the accuracy and relevance of its outputs.

Teacher-student discussions can cover associated issues such as online safety, privacy, security and copyright issues.

if teachers are supported with training and go-to teaching resources.

Relevant, current and accessible training and go-to teaching resources for teachers will help them build a highly effective learning environment for students that can respond to rapidly evolving technologies.

Professional training and professional development programs enable teachers to link the Australian Curriculum learning objectives to generative AI as an example of a new, disruptive digital technology. Teachers currently in the classroom will learn how generative AI tools work, how to use them and how to safely and responsibly demonstrate their capabilities and limitations as a digital tool.

Teachers should also have access to readily available and accessible examples of lesson plans appropriate to the year level that use generative AI as a digital tool in dedicated digital technologies subjects and integrate into programs for other subject areas. Newly-trained teachers will learn skills in their Initial Teacher Education so they are able to quickly get across a new and unfamiliar technology and apply it to the classroom.

to build school students' skills, awareness and confidence in using new technologies that they will use now and in the future.

Students will gain an understanding of generative AI technology, how it works and what it is for. They will then have the skills and confidence to find and effectively use generative AI safely, ethically, responsibly to solve problems, including what is acceptable in the school setting.

Students will also be able to recognise and understand the role of generative AI technology in civil society. They will be able to identify careers and industries that may be applying it and the types of problems it could be used to solve. They can also engage in conversations with parents, friends, relatives and community members about any issues or public debate around applications of generative AI.

Awareness of training

The range of responses in the 2023 ACS survey indicates that there are already some existing training programs and courses available in technology areas that teachers are seeking, but that teachers may need support to find those that are most suited.

Some respondents noted that they were interested in training in specialist areas but had not attended any, while others noted that the training they attended was not pitched appropriately for those outside industry. Respondents who had attended training in the last year predominantly found the training courses by searching for them on their own (Annex 1, Table 29). Many respondents also reported that they did not have time to seek additional training in relevant technology areas because of competing demands from other subjects and teaching responsibilities.

Recommendation 6: Australian Government Department of Education with State and Territory Governments (1 year)

Identify and promote existing recommended training courses that provide training in software tools and core principles of Digital Technologies for teachers of all year levels.

The Department of Education should support and coordinate state and territory governments to work together to create a curated list of courses suitable for teachers wishing to develop their relevant ICT skills. At state level, this process should involve sector consultation and be informed by recommendations from teachers who have participated in relevant courses. The list could then be promoted to teachers through schools, education department and relevant professional associations (building on recommendations 2 and 3).

There is an opportunity to better promote existing training courses relevant to the DTC among teachers, connecting them with immediate opportunities to develop the knowledge and skills they are seeking to build.

Accessibility of training

In the 2023 ACS survey, some respondents noted that they were interested in training in specialist areas but have been unable to attend. Many respondents also reported that they did not have time to seek additional training in relevant technology areas because of competing demands from other subjects and teaching responsibilities. This is likely – at least in part – a product of the general time pressures experienced by Australian teachers in the context of the national teacher shortage (discussed on page 15).

For this reason, promoting available courses may not be sufficient to ensure that teachers receive the training they are seeking to enhance the quality of their digital technologies teaching. Support will also be needed for teachers to be able to attend training alongside their other teaching duties.

Increased access to professional development training for new and current teachers of Digital Technologies will ensure that teachers with lower levels of confidence in new and current DTC content are sufficiently supported to deliver best practice teaching and use available teaching resources successfully in the classroom.

Recommendation 7: State and Territory Governments (3 years)

Invest in initiatives that support teachers to attend suitable training for digital technologies skills and, in turn, this will increase the number of skilled teachers at each school.

Australian governments should invest in initiatives to better enable teachers to attend specialist training relevant to the DTC by supporting teachers and their schools.

There is an opportunity for governments to support more teachers to attend the specialist training in relevant technology areas through targeted initiatives.

4. Elevating awareness of the Digital Technologies Curriculum in the community

Parents and school leadership play an influential role in supporting teachers to realise the full potential of the DTC.

Empowering parents

Reinforcing the value of skills and knowledge learned in Digital Technologies at home and in the broader school community is a powerful way to support success of the curriculum.

Responses to ACS's 2023 survey showed that the majority of responding teachers said that parents were provided with information about the DTC through parent information nights (58%) followed by ongoing communications through the year (41%) (Annex 1, Table 58). Some said that no information was given (15%) or were unsure if any was provided (8%) (Annex 1, Table 58). This figure has greatly improved since the previous survey was conducted in 2020, with 21% more respondents saying that information was provided to parents (Annex 1, Table 59).

Of those that did provide information, the channels and type of information varied greatly. Over 70% of respondents said that information to parents at the school included potential ICT career pathways some or all of the time. However, 26% of respondents reported that parent information did not include student work or learning outcomes (Annex 1, Table 61).

If parents and others in the community who frequently interact with school students are advocates for the subject, it can provide a consistent message about the importance and value for the student beyond their schooling. Raising awareness among parents and the school community can also lift the engagement in digital technologies of groups who are currently underrepresented in technology fields at multiple stages of school and further education, such as women and girls and First Nations Peoples.

Recommendation 8: School Leaders (3 years)

Empower parents with the tools and capabilities to understand and communicate at home the value of digital technologies, including the types of technology careers that can be pursued and how the skills can be applied to solve problems in a range of industries.

There is an opportunity for schools to lift student engagement in the curriculum by better promoting student's work and showing the value of the DTC, types of technology careers and how the skills can be applied to solve problems in a range of industries.

For example, student and parent engagement could be further supported by incentivising specialist teachers to act as school champions of the DTC. Champions can provide an approachable and personal point of contact, which may be more likely to encourage better engagement from parents and students about the subject. Appointing champions has been an effective strategy for driving and supporting change in a range of settings, such as driving gender equity in the workplace.

Recommendation 9: School Leaders (3 years)

Ensure that tools and capabilities that empower parents are inclusive and increase visibility of underrepresented groups in STEM fields, such as women and girls and Aboriginal and Torres Strait Islander Peoples.

Excellent resources and recommendations for Australian best practice is provided in the report from the Pathway in Diversity in STEM Review (2023), which should be implemented to support Digital Technologies awareness and education in the community.

Better understanding and awareness of learning and career outcomes

The expert working group suggested that low recognition of the value of DTC is present and is likely due to largely incorrect perceptions such as Digital Technologies having a narrow focus on using devices where students seem to already have a high level of proficiency, or that it involves 'screen time'. The subject of Digital Technologies and its learning outcomes can also be viewed as niche, highly technical, or limited to specialist ICT teachers. These kinds of perceptions can impact teacher confidence and influence decisions by parents and students about subject choice and career pathways.

Communicating nation-wide learning outcomes to the community could build better understanding and awareness of learning and career outcomes of Digital Technologies and help to address this issue. However, the expert working group identified that there is limited data to help communicate and promote understanding and awareness of the DTC among parents and school communities. Rigorously reporting to parents on student learning outcomes for the Digital Technologies subject was previously recommended by ACS, to be coordinated by state and territory governments.

We propose an evidence-based approach to raising awareness and understanding of learning and career outcomes from Digital Technologies education through collection of a national data set and targeted communications to parents and school communities.

Recommendation 10: Australian Government Department of Education & State and Territory Departments of Education (5 years)

Establish national coordinated data collection of Digital Technologies Curriculum learning outcomes and communicate these outcomes to the community to build better understanding and awareness of learning and career outcomes.

The transparent measurement and reporting of learning outcomes and provide a means of improving perceptions among teachers and parents, and to more broadly promote the DTC by making it a priority for schools and school leadership.

The NAPLAN-ICTL program currently collects and reports on Year 6 and Year 10 learning outcomes. The data is made available and provides some insight into student learning outcomes from a small sample. This model could be expanded to cover a broader sample with outcomes communicated in an accessible and highly visible way to parents, teachers and the community.

Celebrating success

ACS previously proposed Critical Recommendation 5 of their 2022 report that school achievement awards can be used to signal to principals and teachers the importance of implementing Digital Technologies within their schools. Similarly, recognising and rewarding excellence in digital technologies education at parent nights or at professional development training of teachers can promote the importance of the subject and capability to parents and the teaching community.

Recommendation 11: School Leadership (1 year)

Recognise and reward excellence in digital technologies education to increase visibility to parents and the education community and promote best practice teaching in Australian schools.

Recipients of current Australian awards recognising excellence in digital technologies teaching could be supported to speak at school events such as parent nights or at professional development training to share their approaches with the teaching community.

There are several existing award programs at national and state or territory level that recognise Digital Technologies teachers for excellence which can be leveraged for this purpose, for example the ACCE/ACS Digital Technologies Teacher of the Year.[19]

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3 Annexes

Annex 1: Results of the ACS Computer Education in Australian Schools Survey (2022/2023)

In this annex, we provide the results of the ACS's 2023 survey produced by Australian Survey Research.

> As part of its advocacy program, Australian Computer Society (ACS) conducts a regular survey of Australian teachers of digital technology, or teachers building digital capability with students in all sectors of Australian schools (government, Catholic and independent). ACS uses the information to inform policy development which is then used to advocate for changes to Australian curricula relating to digital technology and/or for increased or new types of support for teachers in this domain.

Introduction

The 2023 survey is the second in this series of surveys. The previous survey was conducted in 2020 with a similar scope and purpose.

In 2022, ACS engaged Australian Survey Research (ASR) to help refine the survey instrument and to conduct survey with Australian teachers and then report on survey findings. This report will then help inform policy development.

The report presents findings for each question in the survey, presented within topics and some questions include detailed cross-tabulations using key demographics. A copy of the survey instrument can be found in Appendix A of this report.

Survey administration

ACS and ASR drafted survey questions using the 2020 survey questions as a base. The survey was loaded into SurveyManager, ASR's proprietary online survey platform hosted in a high security data centre in Sydney. No data was sent offshore.

In May 2023 the instrument was pilot tested with a mix of 11 respondents and their feedback suggested changes and improvements to questions and answer options. A full copy of the survey is included in Appendix A. ASR and ACS staff tested the survey online before fieldwork commended to ensure that the look and feel and all the logic was aligned with the intended question design and routing. ACS signed off on the survey prior to fieldwork.

The survey was infield from 19 July to Monday 16 October. ACS obtained ethics approval from Australian National University. ACS promoted the survey through the Gateways to Industry School program – ICT, ACS Foundation, Questacon, Micromelon, The Brainary, Gork Academy, technology based subject associations across Australia, Victorian Academy of Teacher Excellence, ClassCover and promoted the survey through LinkedIn, Facebook and Facebook teacher groups (STEM Teachers Australia, Digital Technologies Teachers Australia, Victorian Teachers Community. ACS also purchased teacher lists from Australian School Lists www.australianschoollists.com.au

ASR distributed invitation emails with unique survey links to 3151 staff members at schools' nationwide and across each school system listed in Table 1 below. Invitation emails were addressed to individual staff members, school administrators and generic school email addresses. Within invitation emails, the person receiving the email was asked to forward the email to a staff member responsible for digital technology teaching within their school. During the fieldwork period up to four additional reminder emails were sent to people who had not yet completed the survey. Three people contacted ASR directly and requested a link to the survey.

Table 1: Count of email distribution by state and school system (%)

Count	Government	Independent	Catholic
ACT	114	32	89
NSW	-	567	70
NT	-	35	-
QLD	-	329	333
SA	-	168	-
TAS	-	53	-
VIC	-	507	195
WA	-	209	265
Total (n)	***952***	***1900***	***952***

Analysis notes

Weighting

No weighting was applied to the data.

Rounding and counts in tables

In all tables with a total of more than 100% some rounding errors may occur, that is, it may appear that a column total should be 99% or 101%. If decimal points were presented in sub-items, the totals would be 100%. All results are presented with zero decimal places. Throughout this report, cells in tables displaying zero percent (0%) represents percentages less than 0.05%. Cells in tables with a "–" indicate lack of data, or no answer for a particular option.

Variable n counts occur because not all respondents answered all questions. Unless otherwise specified, n counts in table headers or footers refer to the maximum number of respondents in a particular.

Percent positive calculations

For some questions in this survey the percent positive score (% pos) for rated items (those using a Likert-type scale) was calculated by adding the proportions of respondents who selected any of the agreement or positive answers in a rating scale, for example: *strongly agree* and *agree* or *very good* and *good* When calculating these scores, ASR has deliberately chosen to remove *don't know, unsure, not applicable* and no answer type responses. We believe this gives a more accurate reading of sentiment, as it only considers those who had a view. As a result, the n count (sample) used in calculations varies between survey items.

Survey participants

This section provides a brief profile of the survey respondents. Tables refer to the 2023 survey unless otherwise specified.

Table 2 shows that most commonly respondents had a digital technologies background (specialist teacher and/or head of digital technology department), but a high proportion were also classroom teachers.

Table 2: Digital technologies teaching role (%)

Teaching role*	%
Classroom teacher	42%
Digital technologies specialist teacher	47%
Head of department (Digital Technologies)	40%
Head of department (other than Digital Technologies)	9%
Year level co-ordinator	4%
School leadership (Principal, Assistant/Vice Principal)	14%
Total (n)	***218***

**Respondents were allowed to select multiple responses, so the total percentage in Table 1 is >100%. Percentages based on n=218.*

Most commonly respondents were from Queensland and then Victoria. There was only one respondent from Northern Territory in 2023. As the most populous state in Australia, it is expected that the highest proportion of respondents would come from New South Wales, but achieving a higher proportion was made difficult because approval for ACS to conduct research in department schools was not granted in time.

Table 3 shows that survey results should be treated as indicative only of the Australian school experience in teaching digital technologies. The survey sample cannot be treated as being representative of Australian schools mainly due to the relatively small sample size and the disproportionate responses from states / territories, that is, the survey sample breakdown does not match the distribution pattern of the Australian population.

Table 3: School state (%)

State	2020 %	2023 %
ACT	2%	10%
NSW	13%	16%

State	2020 %	2023 %
NT	0%	0%
QLD	28%	29%
SA	19%	8%
TAS	6%	4%
VIC	17%	22%
WA	15%	12%
Total (n)	***306***	***218***

Table 4 shows that respondents were predominantly from major cities and that there were very few remote or very remote respondents.

Table 4: Remoteness classification (%)

Classification	%
Inner regional Australia	17%
Major cities of Australia	65%
Outer regional Australia	17%
Remote Australia	0%
Very remote Australia	0%
Total (n)	***217***

Note: Remoteness classification based on ABS geographic classification of postcode data.

Table 5 shows that there was a fairly even distribution of responses from levels of schools (primary and secondary). It would be expected that secondary schools were much more likely than primary to teach digital technologies as a specialist subject compared with primary schools. Consequently, many respondents probably taught digital capabilities within their classrooms.

Table 5: School description (%)

Description	%
Primary	38%
Secondary	28%
Both	34%
Total (n)	***218***

Table 6 is a breakdown of the *Both* category in the table above. It shows that a majority of teachers in P/F-12 schools (58%) were teaching at a secondary level.

Table 6: Stage of schooling description of teachers in settings reported as Both (%)

Teacher school level setting	%
Primary	8%
Secondary	58%
Both	34%
Total (n)	***74***

Table 7 shows that respondents came from a range of school sizes (not all very small or very large), and this is likely to be similar to the distribution of school sizes across all sectors within Australia.

Table 7: Size of school (%)

Number of students	%
Less than 100	5%
100 - 500	33%
501 - 1000	31%
1001 - 1500	20%
1501 - 2000	6%
2000+	6%
Not sure	-
Total (n)	***218***

Table 8 shows that predominantly 2023 respondents came from independent schools. There were far more government schools across Australia than schools in other sectors, so this is an indication that the sample was not representative of school types.

Table 8: School type (%)

School type	2020	2023
Government / public	49%	27%
Independent	24%	41%
Catholic	27%	32%
Other	1%	0%
Total (n)	***301***	***218***

National results

This section begins with a focus on the survey results for 2023 survey. Some questions include a deeper examination of results by one or more demographic variables.

About digital technology teachers

This section focuses on teachers of digital technology. For this survey, respondents were asked to only answer for themselves rather than for the school as a whole.

Understanding of different curricula

Respondents were given an explanation of the digital technologies curriculum and of digital literacy / ICT general capability.

Digital Technologies Curriculum: refers to the F-10 learning area in which students use computational thinking and information systems to define, design and implement digital solutions. The core concepts specific to this curriculum are: digital systems, data representation, data acquisition, data interpretation, abstraction, specification, algorithms, implementation and privacy and security. Source: Version 9 Australian Curriculum

Digital Literacy/ ICT General Capability: encompasses the knowledge and skills students need to create, manage, communicate and investigate data, information and ideas, and solve problems. It assists students to work collaboratively at school and in their lives beyond school. The continuum is organised into four elements: practising digital safety and wellbeing, investigating, creating and exchanging, managing and operating. Source: Version 9 Australian Curriculum

Not all states and territories are implementing this curriculum, and definitions may vary between jurisdictions.

Respondents were then asked to select the response that best described their view of these two concepts. Table 10 shows that a total of 56% of all respondents believed that the concepts were very different, but that only 6% believed that they were the same. Respondents from independent schools were more likely to view them as different concepts, while equal proportions of respondents from all sectors viewed them as the same concept.

Table 9: Understanding of different curricula (%)

Understanding	%
They are very different	56%
They are similar	34%
They are the same	6%
They confuse me	1%
Not sure	2%
Total (n)	***218***

Table 10: Understanding of different curricula by school type (%)

Understanding	Government	Independent	Catholic
They are very different	53%	64%	50%
They are similar	38%	26%	41%
They are the same	5%	5%	6%
They confuse me	2%	2%	-
Not sure	2%	2%	3%
Total (n)	***58***	***87***	***70***

Table 11 shows that respondents from NSW and SA were least likely to view them as very different concepts, while respondents from WA were most likely to view them as very different. Note very small sample sizes so results must be treated as indicative only.

Table 11: Understanding of different curricula by school type by state (%)

Understanding	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
They are very different	57%	39%	100%	59%	44%	63%	58%	73%
They are similar	38%	36%	-	37%	5-	25%	31%	23%
They are the same	-	12%	-	5%	6%	13%	4%	4%
They confuse me	-	6%	-	-	-	-	2%	-
Not sure	5%	6%	-	-	-	-	4%	-
Total (n)	***21***	***33***	***1***	***63***	***16***	***8***	***48***	***26***

Results for the understanding of different curricula by survey year were very similar. Refer to Table 12.

Table 12: Understanding of different curricula by survey year (%)

Understanding	2020	2023
Aware of the difference	95%	91%
Not aware of the difference	5%	9%
Total (n)	***259***	***216***

Length of time teaching DTC

A total of 55% of the national sample had taught the DTC from five or more years. Refer to Table 13. There were similar proportions across all sectors. Refer to Table 14. Respondents from secondary schools were more likely to have been teaching the curriculum longer than those from primary schools. Refer to Table 15. ACT and Tasmanian respondents were more likely to have been teaching the curriculum for 3-5 years (refer to Table 16) but these cell sizes are small, so results are only somewhat indicative of states / territories.

Table 13: Length of time teaching the Digital Technologies Curriculum - total (%)

Length of time teaching DTC	%
Less than 1 year	12%
1 - 3 years	13%
From 3 - 5 years	15%
From 5 - 10 years	18%
More than 10 years	37%
Not sure	5%
Total (n)	***218***

Table 14: Length of time teaching the Digital Technologies Curriculum by school type (%)

Length of time teaching DTC	Government	Independent	Catholic
Less than 1 year	7%	15%	11%
1 - 3 years	12%	10%	17%
From 3 - 5 years	19%	10%	19%
From 5 - 10 years	22%	21%	11%
More than 10 years	38%	37%	36%
Not sure	2%	7%	6%
Total (n)	***58***	***89***	***70***

Table 15: Length of time teaching the Digital Technologies Curriculum by teaching level (%)

Length of time teaching DTC	Primary	Secondary
Less than 1 year	17%	8%
1 - 3 years	16%	11%
From 3 - 5 years	19%	12%

Length of time teaching DTC	Primary	Secondary
From 5 - 10 years	13%	22%
More than 10 years	27%	43%
Not sure	8%	3%
Total (n)	***88***	***130***

Table 16: Length of time teaching the Digital Technologies Curriculum by state (%)

Length	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Less than 1 year	-	21%	-	6%	18%	13%	21%	4%
1 - 3 years	14%	9%	-	11%	24%	13%	15%	12%
From 3 - 5 years	29%	9%	-	13%	12%	25%	15%	19%
From 5 - 10 years	5%	29%	-	14%	18%	25%	15%	31%
More than 10 years	43%	24%	100%	52%	29%	25%	31%	27%
Not sure	10%	9%	-	3%	-	-	4%	8%
Total (n)	***21***	***34***	***1***	***63***	***17***	***8***	***48***	***26***

Teaching specialisation

The question about teaching specialisation was only asked of those teaching at a secondary level including at P12 schools.

Table 17 shows that respondents' teaching specialisations were most likely STEM subjects.

Table 17: Teaching specialisation of *secondary* teachers (%)

Specialisation	%
Digital Technologies	74%
Sciences	23%
Design and Technologies	22%
Mathematics	22%
The arts (performing and visual)	11%
Humanities and social sciences	10%
English	5%
Other^	5%

Specialisation	%
Health and physical education	4%
Languages	2%
Total (n)	***130***

Note: This was a multiple response question so total is >100%. Percentages based on n=130.

^The Other teaching specialisations mentioned by respondents were VET, business, generalist primary, librarian, multimedia, software engineering, IPT, IST and first year teaching digital technology to secondary students.

Table 18 shows a variable (Teaching in / out of specialisation) which was created by examining the following information from a respondent at a secondary school:

> *Teaching in specialisation (n=96) = any respondent who answered Digital Technologies as shown in* Table 17.
>
> *Teaching out of specialisation (n=34) = anyone who did not select Digital Technologies in the question* above.

It indicates that three-quarters of secondary teachers were teaching within their specialisation, but that one quarter were not in their specialisation.

Table 18: Teaching inside or outside of specialisation (%)

Specialisation	%
Digital Technologies specialist	74%
Teaching out of specialisation	26%
Total (n)	***130***

Subject association membership

Respondents were asked if they were current members of a subject association and provided the following examples of these types of subject associations: DLTV, ECAWA, EdTechSA, InTEACT, ICTENSW, QSITE, TASITE. Table 19 shows that most commonly respondents were members of a relevant subject association (54%), but that 47% were not members of any associations.

Table 20 shows that NSW and SA respondents were more likely not to be members of any associations, while Queensland respondents were most likely to be members of a digital technologies subject association, noting that this result could be closely related to how survey links were distributed in Queensland.

Table 21 shows that there was not a lot of difference between years when proportions of subject associations were compared, particularly given the small sample size.

Table 19: Current member of a subject association (%)

Membership	%
Not a member of any associations	47%
Subject association for digital technologies	34%
Subject association for design and technologies	11%

Membership	%
Subject association that is not mentioned	9%
Professional association (eg, Engineers Australia, ACS, SESA, ACCE)	9%
Subject association for Science/STEM	7%
Other^	2%
Total (n)	***214***

Note: This was a multiple response question so total is >100%. Percentages based on n=214.

^The Other associations mentioned were, QASSP, ISTE, ECAWA, CSIRO – Technology, AISWA.

Table 20: Current member of a professional association by state (%)

Membership	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Not a member of any associations	43%	64%	-	35%	63%	63%	47%	46%
Subject association for digital technologies	38%	24%	-	42%	19%	38%	34%	35%
Subject association for design and technologies	14%	15%	100%	10%	6%	-	15%	-
Subject association that is not mentioned	-	9%	-	11%	-	-	15%	12%
Professional association	10%	3%	-	18%	6%	-	6%	8%
Subject association for Science/STEM	14%	6%	-	8%	19%	13%	2%	4%
Other	-	-	-	3%	-	-	2%	8%
Total (n)	***21***	***33***	***1***	***62***	***16***	***8***	***47***	***26***

Table 21: Current member of a professional association by survey year (%)

Membership	2020	2023
Member of an association	61%	53%
Not a member of an association	39%	47%
Total (n)	***144***	***214***

Note: In 2020 Not sure was an answer option. Not sure has not been included in the 2020 calculation. The smaller base size in 2020 was affected by an answer rule / ski p logic that meant the question was only shown to a certain group of respondents.

2023 Association member = all options apart from Not a member of any associations in the table above.

Teaching hours

The hours per week spent teaching the Digital Technologies Curriculum increased with year level, as would be expected. Most commonly across all year levels except Years 9 and 10, it averages from 1 to 2 hours teaching per week. Refer to Table 22.

Table 22: Hours per week spent teaching the Digital Technologies Curriculum (%)

Year level	0 - 1 HPW	From 1 - 2 HPW	From 2 -4 HPW	From 4 - 6 HPW	More than 6 HPW	Total (n)
Foundation	64%	24%	9%	1%	1%	74
Y1	63%	27%	10%	0%	0%	78
Y2	57%	29%	14%	0%	0%	77
Y3	43%	39%	18%	0%	0%	79
Y4	38%	42%	19%	1%	0%	86
Y5	36%	42%	19%	2%	0%	88
Y6	36%	41%	21%	1%	1%	87
Y7	19%	38%	31%	8%	3%	99
Y8	16%	36%	41%	3%	3%	97
Y9	15%	25%	46%	11%	4%	81
Y10	17%	18%	42%	17%	7%	84

Note: HPW refers to hours per week spent teaching the DTC. Not applicable, not sure and no answer not included in the calculation.

Professional development

Completed PD in current year

Table 23 shows that a majority (56%) of respondents had not completed any DTC professional development in the current school year. This was more likely to be the situation in NSW and Victoria (refer to Table 24).

Table 23: Completed DTC professional development in the current school year (%)

Completed PD	%
Yes	42%
No	56%
Not sure	2%
Total (n)	***218***

Table 24: Completed DTC professional development in the current school year by state (%)

Completed PD	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Yes	43%	26%	-	46%	47%	50%	35%	58%
No	52%	74%	100%	54%	47%	50%	63%	35%
Not sure	5%	0%	-	-	6%	-	2%	8%
Total (n)	***21***	***34***	***1***	***63***	***17***	***8***	***48***	***26***

Of those respondents who indicated that they completed some PD in the current school year, 45% indicated that it was enough or more than enough. Refer to Table 25. This varied by state / territory (Table 26) but very small cell sizes need to be considered when looking at the results in this table.

Table 25: Amount of DTC professional development received in current school year (%)

Amount of PD*	%
More than enough	12%
Enough	33%
Some, but not enough	49%
None	3%
Not sure	2%
Total (n)	***91***

**Only asked of people who completed some PD.*

Table 26: Amount of DTC professional development in the current school year by state (%)

Amount of PD*	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
More than enough	11%	11%	-	7%	-	-	29%	13%
Enough	22%	33%	-	34%	38%	50%	29%	33%
Some, but not enough	67%	44%	-	52%	63%	25%	35%	53%
None	-	-	-	7%	-	-	6%	-
Not sure	-	11%	-	-	-	25%	-	-
Total (n)	***9***	***9***	***0***	***29***	***8***	***4***	***17***	***15***

**Only asked of people who completed some PD.*

PD topics completed

Respondents were asked to comment about the main / common topics covered when they undertook professional development for the DTC. The three most common DTC professional development topics were programming languages and coding, curriculum updates and curriculum overviews. Refer to Table 27 below. Table 28 displays a statewide breakdown of professional development topics mentioned by respondents, noting that the sample sizes in some state / territory cells are very small.

Table 27: Main topics covered by completed DTC professional development (%)

Topic	%
Programming languages and coding	27%
Curriculum updates (incl. Australian Curriculum Version 9)	21%
Curriculum / overview of whole curriculum	18%
STEM	18%
Robotics and hardware	16%
Lesson planning, units of work and scope and sequences	15%
AI	15%
Networks	13%
Cyber safety	8%
Data and databases	7%
Assessment	7%
Cybersecurity	7%
Game design and gaming	6%
Conferences (EduTech, DATTA)	6%
Virtual Reality / Using Unity for virtual reality	5%
Working with peers and colleagues	5%
Design Thinking and design	4%
Drones	4%
Online Conferences	4%
Grok Academy run P.D	4%
Technology as learning tool	4%

Topic	%
Curriculum Mapping	2%
Digital literacy or ICT Capability	2%
Technology / 3D printing	2%
Self-guided online courses	2%
Professional reading	2%
esports	2%
Careers	2%
Industry partnerships	2%
Female representation	2%
Total (n)	***85***

Note: Respondents were able to mention multiple areas / themes when responding to this question so total is >100%. Percentages based on n=85. Respondents who mentioned the words None or NA were not included in the table.

Table 28: Main topics covered by completed DTC professional development by state (%)

Topic	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Programming languages and coding	63%	-	-	15%	63%	25%	36%	21%
Curriculum updates (inc. Australian Curriculum Version 9)	13%	11%	-	52%	25%	-	-	-
Curriculum / Overview of whole curriculum	-	33%	-	11%	25%	25%	21%	21%
STEM	13%	22%	-	11%	-	25%	43%	14%
Robotics and hardware	13%	-	-	11%	38%	-	21%	29%
Lesson planning, units of work and scope and sequences	-	-	-	19%	13%	-	36%	14%
AI	-	44%	-	11%	-	25%	29%	7%
Networks	25%	11%	-	11%	-	25%	14%	14%
Cyber safety	25%	-	-	7%	-	-	21%	-
Data and databases	-	11%	-	4%	-	25%	7%	14%
Assessment	-	-	-	7%	-	-	14%	14%

Topic	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Cybersecurity	25%	11%	-	4%	-	-	-	14%
Game design and gaming	13%	11%	-	-	13%	25%	7%	-
Conferences (EduTech, DATTA)	-	11%	-	4%	-	25%	14%	-
Virtual Reality / Using Unity for virtual reality	13%	-	-	-	13%	-	14%	-
Working with peers and colleagues	-	-	-	7%	-	-	7%	7%
Design Thinking and design	13%	-	-	4%	-	25%	-	-
Drones	-	-	-	-	-	25%	-	14%
Online Conferences	-	11%	-	4%	-	-	-	7%
Grok Academy run P.D	-	-	-	-	-	25%	7%	7%
Technology as learning tool	-	-	-	7%	-	-	-	7%
Curriculum Mapping	-	-	-	-	-	-	7%	7%
Digital literacy or ICT Capability	-	-	-	7%	-	-	-	-
Technology / 3D printing	13%	-	-	-	-	-	7%	-
Self-guided online courses	-	-	-	-	13%	-	7%	-
Professional reading	-	11%	-	-	-	-	-	7%
esports	-	-	-	-	-	-	7%	-
Careers	-	-	-	4%	-	-	-	-
Industry partnerships	-	-	-	4%	-	-	-	-
Female representation	-	11%	-	-	-	-	-	-
Total (n)	***8***	***9***	***0***	***27***	***8***	***4***	***14***	***14***

Note: Respondents were able to mention multiple areas / themes when responding to this question so total is >100%. Percentages based on n=84. Respondents who mentioned the words None or NA were not included in the table.

Finding out about DTC PD opportunities

Respondents used multiple sources to find out about PD opportunities, but by far the most common source was themselves (84%). Refer to Table 29. This was a common finding across states / territories (Table 30).

Table 29: Finding out about DTC professional development opportunities (%)

Finding PD opportunities	%
Me - I find them on my own	84%
A professional association I am a member of	48%
Suggestions from my colleagues	32%
My school	32%
Other^	7%
Not sure	-
Total (n)	***91***

Note: This was a multiple response question so total is >100%. Percentages based on n=91.

^Other sources of information mentioned by respondents included, social media and professional project work.

Table 30: Finding out about DTC professional development opportunities by state (%)

Finding PD opportunities	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Me I find them on my own	89%	78%	-	76%	100%	75%	94%	80%
A professional association I am a member of	33%	44%	-	72%	25%	-	59%	27%
Suggestions from my colleagues	22%	33%	-	41%	25%	25%	29%	27%
My school	22%	11%	-	41%	63%	25%	18%	33%
Other	-	-	-	3%	13%	25%	6%	13%
Not sure	-	-	-	-	-	-	-	-
Total (n)	***9***	***9***	***0***	***29***	***8***	***4***	***17***	***15***

Topics for future PD

Respondents were asked to list areas they would like to see offered for DTC professional development that they had not yet received. The two tables below display the common areas mentioned by respondents nationally and broken down by state / territory, nothing that the latter has very small cell sizes.

Table 31: Areas for future Digital Technologies Curriculum professional development (%)

Areas for future PD	%
Curriculum planning units of work and scope and sequence, lesson plans	23%
Understanding and unpacking the curriculum (inc. Version 9 and updates)	20%
Specific curriculum topic: programming and coding	19%
Curriculum integrated across other learning areas	14%
Emerging technologies like ChatGPT AI, machine learning, 3d printers	14%
Supporting staff and helping out of field teachers	9%
Curriculum planning and creating assessments	9%
Digital literacy ICT Capability using technologies in learning and the classroom	6%
Specific curriculum topic: algorithms and computational thinking	6%
Specific curriculum topic: Data concepts	6%
Specific Curriculum topic: Networking	6%
Specific Curriculum topic: Cybersecurity	5%
Specific Curriculum topic: Databases	4%
Robotics	4%
Uncertainty / Unsure / none	4%
Software	3%
Unplugged activities	3%
STEM	3%
Design and design thinking	2%
Supporting regional areas	2%
Female engagement	2%
Pedagogies	2%
Total (n)	***124***

Note: Respondents were able to mention multiple areas / themes when responding to this question so total is >100%. Percentages based on n=124.

Table 32: Areas for future Digital Technologies Curriculum professional development by state (%)

Areas for future PD	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Curriculum planning units of work and scope and sequence, lesson plans	25%	33%	-	27%	14%	25%	11%	23%
Understanding and unpacking the curriculum (inc. Version 9 and updates)	8%	22%	-	24%	29%	25%	18%	15%
Specific curriculum topic: programming and coding	33%	17%	-	12%	14%	-	29%	23%
Curriculum integrated across other learning areas	-	22%	-	15%	14%	-	14%	15%
Emerging technologies like ChatGPT AI, machine learning, 3d printers	-	11%	-	20%	14%	-	18%	8%
Supporting staff and helping out of field teachers	-	-	-	7%	-	-	21%	15%
Curriculum planning and creating assessments	25%	-	-	12%	-	-	4%	15%
Digital literacy ICT Capability using technologies in learning and the classroom	8%	11%	-	12%	-	-	-	-
Specific curriculum topic: algorithms and computational thinking	8%	-	-	2%	14%	25%	11%	-
Specific curriculum topic: Data concepts	17%	-	-	5%	14%	-	-	15%
Specific Curriculum topic: Networking	17%	-	-	2%	-	-	11%	8%
Specific Curriculum topic: Cybersecurity	8%	6%	-	2%	14%	-	7%	-
Specific Curriculum topic: Databases	-	6%	-	2%	-	-	4%	15%
Robotics	-	-	-	5%	14%	-	4%	8%
Uncertainty / Unsure / none	-	-	-	7%	-	25%	4%	-
Software	-	6%	-	2%	-	25%	-	8%
Unplugged activities	-	-	-	2%	-	-	7%	8%
STEM	-	-	-	2%	-	-	11%	-

Areas for future PD	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Design and design thinking	8%	6%	-	-	-	-	4%	-
Supporting regional areas	-	-	-	2%	-	-	4%	-
Female engagement	-	-	-	2%	-	-	-	-
Pedagogies	-	-	-	-	-	-	-	8%
Total (n)	***12***	***18***	***0***	***41***	***7***	***4***	***28***	***13***

Note: Respondents mentioned multiple areas / themes when responding to this question so total is >100%. Percentages based on n=123. Table sorted in descending order by national figures. .

Cyber safety, privacy and security

Respondents were asked if they taught cyber safety and then if they taught cyber privacy and security. They were given the following explanations:

Refer to Table 33 and Table 34. Both tables show very similar results (78% and 74% teaching the relevant subject).

Table 33: Teach cyber safety (%)

Teach cyber safety	%
Yes	78%
No	19%
Not sure	2%
Total (n)	***218***

Table 34: Teach cyber privacy and security (%)

Teach cyber privacy and security	%
Yes	74%
No	19%
Not sure	7%
Total (n)	***218***

Equipment and resources

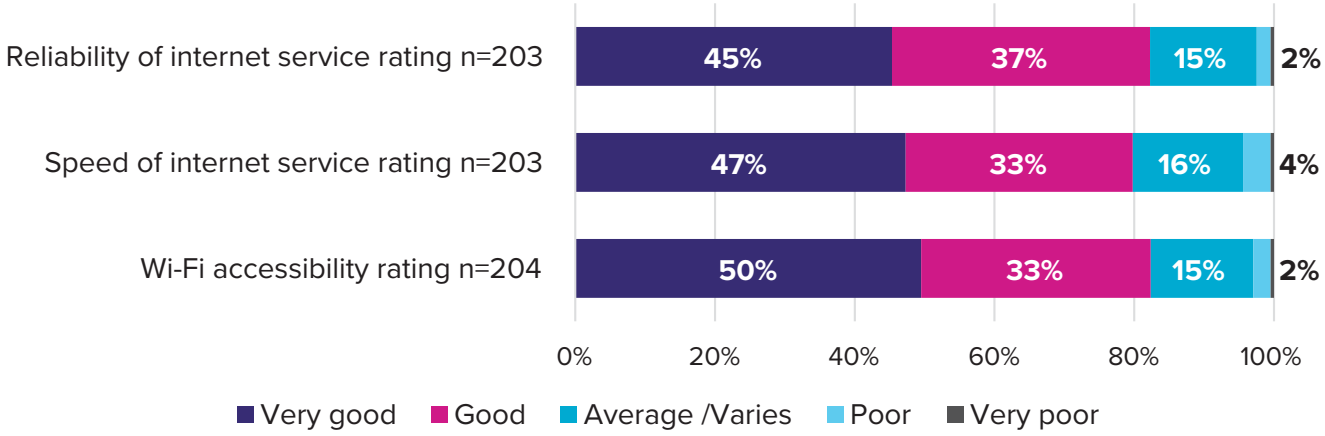
Respondents were asked about the use of the internet when teaching DTC. A total of 80% indicated that they used the internet in all or the majority of their lessons, noting that 3% only used it occasionally or never. Refer to Table 35.

Table 35: Frequency of use of internet when teaching DTC (%)

Use of internet when teaching DTC	%
In all of my lessons	30%
In the majority of my lessons	50%
In some of my lessons	16%
Occasionally	2%
I don't use the internet when teaching the DTC	1%
Total (n)	***208***

Internet

Those who used the internet when teaching DTC were asked to rate various dimensions of the internet at their school. A large majority of respondents indicated that the internet was *very good* or *good* at their school in terms of reliability, speed and accessibility. Refer to the chart immediately below.



When comparing results over time for the internet question, results were similar. Refer to Table 36.

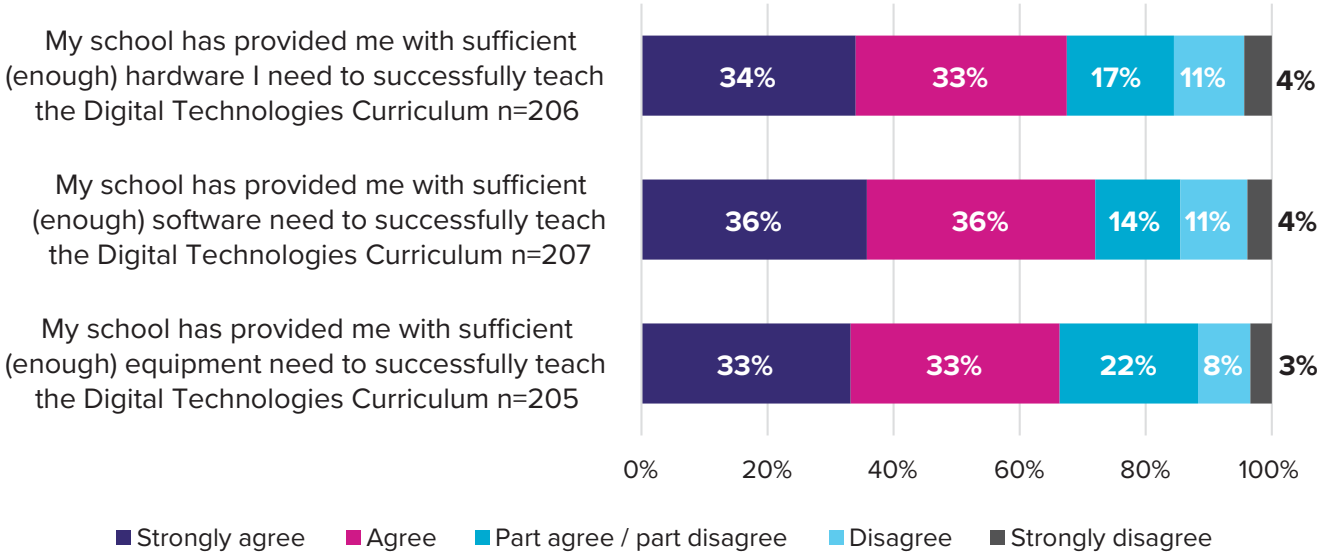
Table 36: Rating of internet and Wi-Fi elements, percent positive (%)

Internet dimensions	2020	2023
Reliability of internet service	86%	82%
Speed of internet service	NA	80%
Wi-Fi accessibility	NA	82%

Note: 2023 Percent positive score was calculated by summing Very good and Good proportions and dividing by total. The 2020 Percent positive score was calculated by summing Extremely and Moderately and dividing by total. Don't know and no answer data were excluded in both 2020 and 2023 calculations.

School-supplied resources

From 66% to 72% of respondents agreed in some way that their school provided them with sufficient resources (hardware, software and equipment) to teach the DCT. However, from 11% to 15% disagreed that they had sufficient school-supplied resources. Refer to the chart immediately below. Note not sure was not included in the calculation for the chart below.



The percent positive score for each of the school-supplied resource questions is shown below in Table 37.

Table 37: Rating of school-supplied resources, percent positive (%)

School-supplied resources	% positive*
My school has provided me with sufficient (enough) **hardware** I need to successfully teach the Digital Technologies Curriculum	67%
My school has provided me with sufficient (enough) **software** I need to successfully teach the Digital Technologies Curriculum	72%
My school has provided me with sufficient (enough) **equipment** I need to successfully teach the Digital Technologies Curriculum	66%

**The 2023 percent positive score was calculated by summing Strongly agree and Agree proportions and dividing by total. Don't know and no answer data were excluded from the calculations.*

Table 38 and Table 39 show the breakdown of each resource question by state / territory and school sector. They show that Queensland and independent school respondents indicated more school-supplied resources than other states / territories or sectors.

Table 38: Rating of school-supplied resources, percent positive by state (%)

School-supplied resources	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
My school has provided me with sufficient (enough) **hardware** I need to successfully teach the DTC	58%	69%	-	72%	76%	50%	64%	67%

School-supplied resources	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
My school has provided me with sufficient (enough) **software** I need to successfully teach the DTC	74%	66%	-	80%	76%	50%	70%	71%
My school has provided me with sufficient (enough) **equipment** I need to successfully teach the DTC	58%	65%	-	80%	76%	50%	57%	63%

Table 39: Rating of school-supplied resources, percent positive by school sector (%)

School-supplied resources	Government / public	Independent	Catholic
My school has provided me with sufficient (enough) **hardware** I need to successfully teach the DTC	56%	77%	64%
My school has provided me with sufficient (enough) **software** I need to successfully teach the DTC	59%	79%	73%
My school has provided me with sufficient (enough) **equipment** I need to successfully teach the DTC	56%	74%	64%

Teaching DTC

Resources used

Respondents were asked to list the resources (software programs or robotics) they used to help them teach the DTC. Table 40 below displays the 20 most frequently mentioned resources used to help teach the DTC. A full list of resources mentioned by respondents is available in Appendix 2. The three most commonly mentioned resources used by primary teachers were Programming Scrath (74%), Robotics BeeBots & BlueBots (74%) and Programming Scratch Junior (52%). The three most commonly mentioned resources used by secondary teachers were Online Learning / Grok Academy (75%), Programming Python (61%) and Robotics Hardware (55%), refer to Table 41 and Table 42. A full list of resources used by teacher level (primary and secondary) and state is available in Appendix 2.

Table 40: 20 most commonly mentioned resources used to help teach the DTC (%)

Resource	%
Programming Scratch	56%
Online Learning / Grok Academy	51%
Robotics hardware	45%
Code.org	44%
Programming Python	37%
Robotics BeeBots & BlueBots	37%
Minecraft	33%

Resource	%
Programming Scratch Junior	27%
Robotics Spheros	22%
Robotics Drones	18%
Database Languages including SQL and SQLite	13%
Robotics LEGO Spike	12%
Robotics LEGO Mindstorm EV3	11%
Programming & 3D Design TinkerCad	11%
Robotics Vex Robotics	10%
Google & Google Products including Classroom, YouTube	10%
Adobe Creative Cloud Suite including Animate	10%
Robotics Arduino	10%
Microsoft Office and 365 tools, including Teams	10%
Programming platform for micro:bit Makecode	9%
Total (n)	***187***

Note: Respondents mentioned more than one resources, this was treated as a multiple response question so total is >100%. Percentages based on n=187. Only the 20 most commonly mentioned resources are presented in the table. For a full list of resources see Appendix 2.

Table 41: 20 most commonly mentioned resources used to help teach the DTC by primary teacher (%)

Resource	Primary %
Programming Scratch	74%
Robotics BeeBots & BlueBots	74%
Programming Scratch Junior	52%
Code.org	51%
Minecraft	36%
Robotics Spheros	32%
Robotics Hardware	31%
Robotics LEGO Spike	19%

Resource	Primary %
Online Learning / Grok Academy	17%
Robotics Dash & Dot	17%
Programming & 3D Design TinkerCad	12%
Google & Google Products including Classroom, YouTube	12%
Robotics Edison	12%
Robotics Makey Makey	10%
Robotics Drones	9%
Robotics LEGO Mindstorm EV3	9%
Microsoft Office and 365 tools, including Teams	9%
Robotics LEGO not specifically identified	9%
Robotics LEGO WeDo	9%
Programming platform for micro:bit Makecode	8%
Total (n)	***77***

Note: Respondents mentioned more than one resource, this was treated as a multiple response question so total is >100%. Percentages based on n=77. Only the 20 most commonly mentioned resources are presented in the table, for a full list of resources see Appendix 2.

Table 42: 20 most commonly mentioned resources used to help teach the DTC by secondary teacher (%)

Resource	Secondary %
Online Learning / Grok Academy	75%
Programming Python	61%
Robotics Hardware	55%
Programming Scratch	44%
Code.org	40%
Minecraft	31%
Robotics Drones	25%
Database Languages including SQL and SQLite	23%
Adobe Creative Cloud Suite including Animate	16%

Resource	Secondary %
Robotics Arduino	16%
Robotics Spheros	15%
Robotics Vex Robotics	15%
Code Editor / Visual Studio	13%
Game Design Unity	13%
Robotics LEGO Mindstorm EV3	12%
Programming JavaScript & Java	12%
Robotics BeeBots & BlueBots	11%
Programming & 3D Design TinkerCad	10%
Microsoft Office and 365 tools, including Teams	10%
Programming platform for micro:bit Makecode	10%
Total (n)	***110***

Note: Respondents mentioned more than one resource, this was treated as a multiple response question so total is >100%. Percentages based on n=110. Only the 20 most commonly mentioned resources are presented in the table, for a full list of resources see Appendix 2.

Subject integration

Table 43 shows that the DTC curriculum is primarily taught as a separate subject (75% of respondents indicating this.)

Table 43: How DTC is taught in the current school year (%)

DTC integration	%
Taught as a separate subject	75%
Integrated into other subjects	25%
Not sure	0%
Total (n)	***208***

The respondents who indicated that the DTC curriculum was integrated into other subjects were then asked to select which subjects it was integrated with. Most commonly these were science, maths, English and humanities subjects. Refer to Table 44

Table 44: Subjects DTC is integrated with (%)

Subject integration	%
Science	71%
Maths	63%
English	59%
Humanities	55%
Arts (Media Arts, Visual Arts, Music etc)	33%
Other^	20%
Health & Physical Education/Sport	14%
Languages	10%
Not sure	4%
Total (n)	***51***

Note: This was a multiple response question so total is >100%. Percentages based on n=51. ^Other subjects mentioned included Technology, Design Technology, Business and economics, Entrepreneurial projects, different units of inquiry.

Lesson planning

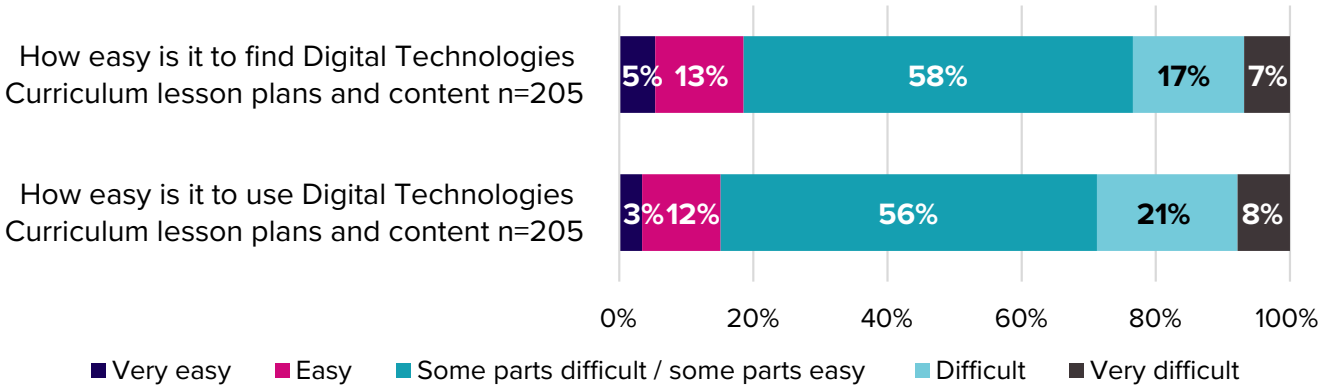
A large majority of respondents (75%) developed their own DTC programs / lesson plans, while a third used third party developed programs / lesson plans. Some of these would be in conjunction with each other. Refer to Table 45.

Table 45: Lesson planning of DTC (%)

How DTC lessons are planned	%
I develop my own programs	76%
I use third party developed programs	34%
I use a school/department developed program modified for my students	28%
I use a school/department developed program / lesson plans	21%
Other	3%
Not sure	1%
Total (n)	***207***

Note: This was a multiple response question so total is >100%. Percentages based on n=207.

When asked how easy it was to **find** and **use** DTC lesson plans and content, more than 85% of respondents found it *somewhat difficult* to *very difficult* to find and use. Refer to the chart immediately below.



Consequently, the percent positive scores for these two questions were relatively low. Refer to Table 46 and Table 47. These were some of the lowest scoring items in the survey with less than 30% of respondents indicating that it was easy to find and use DTC lesson plans and content, and most difficult in NSW.

Table 46: Finding and using lesson plans and content, percent positive (%)

Ease of finding / using lesson plans	% positive*
How easy is it to **find** Digital Technologies Curriculum lesson plans and content	23%
How easy is it to **use** Digital Technologies Curriculum lesson plans and content	29%

**The 2023 percent positive score was calculated by summing Very easy and Easy proportions and dividing by total. Don't know and no answer data were excluded in both calculations.*

Table 47: Finding and using lesson plans and content, percent positive by state (%)

Ease of finding / using lesson plans	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
How easy is it to **find** Digital Technologies Curriculum lesson plans and content	35%	9%	-	24%	38%	13%	22%	29%
How easy is it to **use** Digital Technologies Curriculum lesson plans and content	35%	16%	-	27%	38%	13%	31%	38%

**The 2023 percent positive score was calculated by summing Very easy and Easy proportions and dividing by total. don't know and no answer data was excluded in both calculations.*

Teaching DTC challenges

Just over two-thirds of respondents indicated that they faced challenges when teaching the DTC. Refer to Table 48. Slightly more respondents from Queensland, SA, Tasmanian and Victorian indicated that they faced challenges. Refer to Table 49. Note that 10% did not answer the question directly, probably because they did not teach DTC in their current role, for example they were a principal or equivalent.

Table 48: Challenges when teaching the DTC (%)

Face challenges	%
Yes	67%
No	22%
Not sure	9%
Not applicable	1%
Total (n)	***208***

Table 49: Challenges when teaching the DTC, by state (%)

Face challenges	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Yes	65%	66%	-	75%	76%	75%	67%	46%
No	25%	19%	100%	18%	18%	25%	20%	38%
Not sure	10%	16%	-	5%	6%	-	9%	17%
Not applicable	-	-	-	2%	-	-	4%	-
Total (n)	***20***	***32***	***1***	***60***	***17***	***8***	***46***	***24***

Support with challenges

Those respondents who indicated that they faced challenges when teaching the DTC were asked a follow up question: *Were you able to get the support you needed to help you with these challenges?* A majority (60%) answered that they received some support but not enough. Refer to Table 50.

Table 50: Support when facing challenges when teaching the DTC (%)

Amount of support	%
Yes - enough support	27%
Yes - some support but not enough	60%
No support	12%
Not sure	1%
Total (n)	***139***

Comments about support with the DTC

Respondents who experienced challenges teaching DTC were asked to provide any comments about the support they received when teaching the curriculum. A total of 70 people provided a comment and the common themes are presented in the table below.

Table 51: Comments about the support received when teaching the DTC (%)

Issue	%
Not enough support - eg, access, support from leadership, from IT / tech	19%
Time allocated to subject lacking	11%
Lack of resources / money to update resources / outdated resources	10%
School lacks qualified DTC staff	10%
Want a professional network	9%
Find resources on my own	6%
Time to update skills and knowledge wanted	6%
Good dig tech support at school	4%
Online sites / tools blocked by security	4%
remote School	4%
Teach in isolation	4%
Assistance not readily available	3%
Broad curriculum hard for staff to have knowledge	3%
Lack of resources / money to update resources	3%
More resources with examples wanted, eg video resources	3%
PD - not enough/ not at the right time / right level	3%
Other	9%
Total (n)	***70***

Note: Respondents were able to mention multiple areas / themes when responding to this question so total is >100%. Percentages based on n=70.
^Comments / ideas that were mentioned only once were combined and grouped into the Other category.

Comments about teaching DTC

Teaching barriers

Respondents were asked to comment about the biggest barriers to teaching the DTC. Table 52 below demonstrates that gaps in knowledge of the curriculum, lack of resources and experience / expertise were the three most commonly mentioned barriers to teaching the DTC.

Table 53 displays barriers to teaching the DTC by state / territory, noting very small cell sizes in the latter table.

Table 52: Barriers to teaching the DTC (%)

Barriers	%
Lack of knowledge of curriculum	19%
Limited resources and equipment (inc. robotics, hardware and software)	17%
Lack of experience or expertise	16%
Student knowledge digital literacy & subject skills (including coding and curriculum)	12%
Time (not further specified)	11%
Technology issues	10%
Restricted access/ block content software and resources due to school and department	8%
Budget limitations and costs of resources	8%
Content planning (scope and sequence, lessons and assessment)	8%
Time to teach the class/contact time	7%
Finding quality and appropriate resources	7%
Student engagement	6%
Content current and relevant for students	6%
Training	5%
Time needed to up skill on curriculum	5%
Staff knowledge and capability	5%
Teachers availability to teach the subject	5%
Leadership support	5%
Learning to use technology	4%
Time to plan and prepare	3%
Technology issues updates of hardware and software	3%

Barriers	%
Aging Tech and resources	3%
Internet Accessibility & reliability	3%
Student enrolment numbers	3%
Lack of in school collaboration support	2%
Career pathways	1%
Professional Development inc. cost of professional development	1%
^Other	4%
Total (n)	***155***

Note: Respondents were able to mention multiple areas / themes when responding to this question so total is >100%. Percentages based on n=155.
^Comments / ideas that were mentioned only once were combined and grouped into the Other category.

Table 53: Barriers to teaching the DTC (%)by state (%)

Barriers	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Lack of knowledge of curriculum	35%	19%	-	15%	25%	5-	12%	17%
Limited resources and equipment (inc. robotics, hardware and software)	18%	24%	-	10%	25%	-	21%	22%
Lack of experience or expertise	12%	19%	-	17%	17%	25%	18%	11%
Student knowledge digital literacy & subject skills (including coding and curriculum)	12%	5%	-	10%	17%	5-	12%	17%
Time (not further specified)	12%	5%	-	8%	8%	-	21%	11%
Technology issues	6%	14%	-	6%	17%	25%	9%	17%
Restricted access/ block content software and resources due to school and department	-	10%	-	19%	8%	-	3%	-
Budget limitations and costs of resources	12%	10%	-	6%	8%	25%	12%	-
Content planning (scope and sequence, lessons and assessment)	12%	10%	-	8%	-	-	12%	-

Barriers	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Time to teach the class/contact time	6%	10%	-	-	8%	25%	9%	17%
Finding quality and appropriate resources	6%	10%	-	8%	8%	-	9%	-
Student engagement	-	5%	-	13%	8%	-	-	6%
Content current and relevant for students	-	5%	-	6%	-	25%	6%	11%
Training	6%	5%	-	6%	8%	-	6%	-
Time needed to up skill on curriculum	12%	-	-	8%	8%	-	3%	-
Staff knowledge and capability	-	-	-	4%	-	-	15%	-
Teachers availability to teach the subject	6%	-	-	6%	-	25%	6%	-
Leadership support	-	5%	10-	4%	-	-	6%	6%
Learning to use technology	6%	10%	-	-	17%	25%	-	-
Time to plan and prepare	-	-	-	8%	-	-	3%	-
Technology issues updates of hardware and software	-	5%	-	4%	8%	-	-	6%
Aging Tech and resources	6%	-	-	2%	-	-	3%	6%
Internet Accessibility & reliability	-	-	-	6%	8%	-	-	-
Student enrolment numbers	-	-	-	4%	-	25%	3%	-
Lack of in school collaboration support	-	5%	-	2%	-	-	-	6%
Career pathways	-	5%	-	-	8%	-	-	-
Professional Development inc. cost of professional development	6%	-	-	2%	-	-	-	-
^Other	-	-	-	4%	8%	25%	3%	6%
Total (n)	***17***	***21***	***1***	***48***	***12***	***4***	***34***	***18***

Note: Respondents mentioned multiple areas / themes when responding to this question so total is >100%. Percentages based on n=155. Table sorted in descending order by national figures. . ^Comments / ideas that were mentioned only once were combined and grouped into the Other category.

Comments about what works well in teaching DTC

Respondents were asked to comment about what works well when teaching the DTC. The three most commonly mentioned areas were *lessons and topics that are engaging for students* (19%), *hands-on activities* (17%) and *using robots and hardware* (14%). Refer to Table 54 below. Table 55 displays the things that worked well by state-territory.

Table 54: What works well when teaching the DTC (%)

Works well	%
Lessons and topics are engaging for students	19%
Hands-on activities	17%
Using robots and hardware (mentioned Makey Makey, micro:bit. LEGO, Beebots)	14%
Teaching style Project based learning	12%
Incorporating real world relevance into activities	10%
Grok Academy	10%
Software programs (inc. Minecraft, code.org, Makecode)	9%
Student driven and led	8%
Materials and content to support learning (slides, videos information for teachers and students)	8%
Integrated learning programs across subjects	6%
Coding / Programming (inc. code HS)	6%
Content relevant for students	6%
Method/style of teaching	6%
Building teacher capacity and knowledge of the curriculum	6%
Making Games and gaming	6%
Resources	5%
Computational thinking	4%
External Engagement/ industry experts	4%
Teacher support and collaboration	3%
Competitions and challenges	3%
Explicit instructions	2%
Cybersafety program	2%

Works well	%
Feedback	1%
Total (n)	***139***

Note: Respondents were able to mention multiple areas / themes when responding to this question so total is >100%. Percentages based on n=139.

Table 55: What works well when teaching the DTC, by state (%)

Topic / area	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Lessons and topics are engaging for students	15%	31%	-	7%	14%	40%	28%	24%
Hands-on activities	8%	13%	-	20%	21%	20%	16%	18%
Using robots and hardware (mentioned Makey Makey, micro:bit. LEGO, Beebots)	15%	19%	-	12%	14%	-	19%	12%
Teaching style Project based learning	-	19%	-	7%	-	40%	16%	18%
Incorporating real world relevance into activities	8%	13%	-	7%	7%	40%	13%	6%
Grok Academy	15%	19%	-	2%	7%	-	9%	24%
Software programs (inc. Minecraft, code.org, Makecode)	15%	6%	-	15%	14%	-	3%	6%
Student driven and led	-	-	-	5%	14%	40%	9%	12%
Materials and content to support learning (slides, videos information for teachers and students)	23%	13%	-	10%	-	-	3%	6%
Integrated learning programs across subjects	8%	-	-	12%	-	-	9%	-
Coding / Programming (inc. code HS)	8%	13%	-	2%	14%	-	-	18%
Content relevant for students	-	6%	-	5%	7%	-	6%	12%
Method/style of teaching	-	6%	-	7%	7%	-	3%	12%
Building teacher capacity and knowledge of the curriculum	-	6%	-	5%	14%	-	6%	6%
Making Games and gaming	8%	6%	-	10%	-	-	-	12%
Resources	8%	-	-	5%	7%	20%	6%	-

Topic / area	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Computational thinking	-	6%	100%	2%	7%	-	-	6%
External Engagement/ industry experts	15%	-	-	2%	7%	-	3%	-
Teacher support and collaboration	-	-	-	10%	-	-	-	-
Competitions and challenges	8%	19%	-	-	-	-	-	-
Explicit instructions	-	13%	-	2%	-	-	-	-
Cybersafe program	-	-	-	2%	-	-	6%	-
Feedback	-	-	-	2%	-	-	-	-
Total (n)	***13***	***16***	***1***	***41***	***14***	***5***	***32***	***17***

Note: Respondents mentioned multiple areas / themes when responding to this question so total is >100%. Percentages based on n=139. Table sorted in descending order by national figures. .

Promotion of DTC

Information

Most commonly parents of students receive information about the DTC as part of a general parent information night (58%), followed by ongoing communications to parents throughout the year (41%). Note that 15% of respondents indicated that no information was given to parents. Refer to Table 56. This pattern was repeated in sector and state / territory breakdowns. Refer to Table 57 and Table 58 respectively.

Table 56: How information about the DTC is provided to parents (%)

Information activities	%
As part of a general parent information night	58%
Ongoing communications to parents throughout the year	41%
Standalone information night	16%
No information is given to parents	15%
Not sure	8%
Total (n)	***182***

Note: This was a multiple response question so total is >100%. Percentages based on n=207.

Table 57: How information about the DTC is provided to parents, by school type (%)

	Government	Independent	Catholic
Standalone information night	17%	17%	14%
As part of a general parent information night	53%	64%	53%
Ongoing communications to parents throughout the year	53%	36%	39%
No information is given to parents	17%	11%	20%
Not sure	6%	11%	7%
Total (n)	***47***	***76***	***59***

Table 58: How information about the DTC is provided to parents, by state (%)

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Standalone information night	20%	4%	0%	17%	7%	20%	22%	17%
As part of a general parent information night	50%	52%	100%	63%	87%	60%	46%	57%
Ongoing communications to parents throughout the year	50%	36%	0%	33%	40%	60%	49%	43%
No information is given to parents	15%	24%	0%	12%	0%	0%	22%	17%
Not sure	5%	8%	0%	8%	0%	20%	7%	17%
Total (n)	***20***	***25***	***1***	***52***	***15***	***5***	***41***	***23***

When comparing survey year results, it appears that more DTC information has been given to parents in 2023 than in 2020. Refer to Table 59.

Table 59: School provides information about the DTC to parents, by survey year (%)

	2020	2023
Yes, information is given to parents	55%	88%
No information is given to parents	45%	24%
Total (n)	***210***	***182***

Note: Question wording in 2020 was Does the school educate parents/guardians about any aspect of Digital Technologies/ IT? Question wording in 2023 was "How is information about the Digital Technologies Curriculum provided to parents? In 2023, no information is given to parents includes the categories, not sure and no information.

When respondents were asked *How do you promote students' work and learning specific to the DTC?*, most commonly the answers were through school social media (43%) and newsletters (41%). Refer to Table 60.

Table 60: How students' work and learning specific to DTC is promoted(%)

DTC promotion method	%
Through the schools' social media channels	43%
Newsletters	41%
The school does not promote student work and learning specific to Digital Technologies Curriculum	26%
Awards	24%
Display board/s around school	20%
Other	10%
Not sure	7%
Total (n)	***205***

Career pathways

Most respondents indicated that they / their school promoted IT career pathways some of the time. Refer to Table 61. This pattern was repeated in sector and state / territory breakdowns. Refer to Table 62 and Table 63 respectively.

Table 61: Promotion of IT career pathways to students (%)

IT career pathways promotion	%
Yes, all the time	13%
Yes, some of the time	58%
No	17%
Not sure	12%
Total (n)	***205***

Table 62: Promotion of IT career pathways to students, by school type (%)

	Government	Independent	Catholic
Yes, all the time	20%	12%	10%
Yes, some of the time	50%	66%	54%
No	14%	13%	25%

	Government	Independent	Catholic
Not sure	16%	9%	11%
Total (n)	***56***	***85***	***63***

Table 63: Promotion of IT career pathways to students by state (%)

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Yes, all the time	20%	13%	-	13%	18%	14%	11%	8%
Yes, some of the time	50%	53%	-	63%	53%	43%	55%	71%
No	15%	16%	100%	15%	18%	29%	25%	4%
Not sure	15%	19%	-	8%	12%	14%	9%	17%
Total (n)	***20***	***32***	***1***	***60***	***17***	***7***	***44***	***24***

Encouraging Year 11 & 12 students

Most commonly schools encourage Year 11 and 12 students to enrol in digital technology subjects / courses through information sessions for students (72%) and parents (60%). Refer to Table 64.

Table 64: How school encourages Year 11-12 students to enrol in DT subjects and courses (%)

	%
Information sessions for students	72%
Information sessions for parents	60%
Subject flyers	31%
The school does not encourage Year 11-12 students to enrol in technology/computing-based subject	19%
Promotional video/s	15%
Through the schools' social media channels	15%
Not sure	7%
Other	6%
Total (n)	***122***

When comparing survey year results, it appears that similar proportions of respondents' schools encouraged Year 11 and 12 students to enrol in DT subjects / courses in 2023 and 2020. Refer to Table 65.

Table 65: Encouragement of Year 11-12 students to enrol in DT subjects and courses, by survey year (%)

Encouragement of DT subjects / courses	2020	2023
Yes	78%	74%
No	22%	26%
Total (n)	***143***	***122***

Note: The No category in 2023 includes Not sure and The school does not encourage Year 11-12 students to enrol in technology/computing-based subject.

Students in technology / computing-based subjects

Year 11 numbers

When asked about trends in enrolments for technology / computing-based subjects in Year 11, respondents reported about equal proportions of increase, decrease and staying the same compared with the previous year (25% to 28%). Refer to Table 66.

Table 66: Enrolment numbers in technology/computing-based subjects in Year 11 at a school (%)

Year 11	%
Increased from last year	25%
Decreased from last year	28%
Approximately the same as last year	26%
Technology based subjects are not offered in Year 11	15%
Not sure	7%
Total (n)	***122***

Year 12 numbers

When asked about trends in enrolments for technology / computing-based subjects in Year 12, about a third indicated that enrolments had stayed the same and a quarter indicated that they had decreased compared with the previous year. Note that only a small proportion indicated an increase (9%) and that just under a quarter did not offer technology-based subjects in Year 12. Refer to Table 67.

Table 67: Enrolment numbers in technology/computing-based subjects in Year 12 at your school (%)

Year 12	%
Increased from last year	9%
Decreased from last year	27%
Approximately the same as last year	34%
Technology based subjects are not offered in Year 12	22%

Year 12	%
Not sure	7%
Total (n)	***122***

Gender ratio

Table 68 shows that most students studying DTC as an elective subject were male. Just over half of respondents reported that they had 1-20% of female students in their classes studying elective DTC subjects.

Table 68: Approximate gender ratio when teaching the DTC as an elective subject (%)

	%
100% male (single sex school)	9%
1-20% female	54%
21-40% female	26%
41-60% female	6%
61-99% female	-
100% female (single sex school)	4%
Total (n)	***95***

Full list of resources used by respondents to help teach the DTC

Table 69: Resources used by respondents to help teach the DTC (%)

Resource	%
Programming Scratch	56%
Online Learning / Grok Academy	51%
Robotics Hardware	45%
Code.org	44%
Programming Python	37%
Robotics BeeBots & BlueBots	37%
Minecraft	33%

Resource	%
Programming Scratch Junior	27%
Robotics Spheros	22%
Robotics Drones	18%
Database Languages including SQL and SQLite	13%
Robotics LEGO Spike	12%
Robotics LEGO Mindstorm EV3	11%
Programming & 3D Design TinkerCad	11%
Robotics Vex Robotics	10%
Google & Google Products including Classroom, YouTube	10%
Adobe Creative Cloud Suite including Animate	10%
Robotics Arduino	10%
Microsoft Office and 365 tools, including Teams	10%
Programming platform for micro:bit Makecode	9%
Robotics Dash & Dot	7%
Robotics LEGO not specifically identified	7%
Code Editor / Visual Studio	7%
Game Design Unity	7%
Robotics Edison	7%
Programming Tynker	7%
Programming JavaScript & Java	7%
Programming HTML & CSS	6%
Robotics Robots	5%
Robotics Raspberry Pi	5%
Code Editor Replit	5%
Technology Hardware / VR	5%
Technology / 3d printers	5%

Resource	%
Robotics Makey Makey	4%
Robotics Ozobots	4%
Robotics LEGO WeDo	4%
Robotics Micromelon	4%
Programming Platform CoSpaces	4%
CS First	3%
Spreadsheet Tool Excel	3%
Digital Education / e-Smart schools	3%
Productivity Tools / Canva	3%
Programming Platform MU Editor	3%
Diagramming Tools including draw.io, Visio, lucidchart	3%
Online Course Zenva	3%
Online Courses programming W3schools	3%
Network simulation Cisco Packet Tracer	3%
Databases	3%
Robotics Hardware Cubetto	2%
Programming Platform Makeblock	2%
Programming C#	2%
Platform and program / CS in Schools	2%
Website Digital Technologies Hub	2%
Digital Education / eSafety Commission resources	2%
Graphic Design Software / Blender	2%
Robotics mBot	2%
Programming Code Spark	2%
Programming platform Thonny (using python)	2%
Online course Khan Academy	2%

Resource	%
Online courses Code Academy	2%
Technology / iPads	2%
Programming Hopscotch	1%
Bebras Computational Thinking Challenge	1%
Digital Education / Education Perfect	1%
Technology / Laser Cutters	1%
Technology / Green screen	1%
CS unplugged	1%
Videoing Editing Software / WeVideo	1%
Total (n)	***187***

Note: Respondents mentioned more than one resources, this was treated as a multiple response question so total is >100%. Percentages based on n=187.

Table 70: Resources used by respondents to help teach the DTC, by teacher level (%)

Resource	Primary %	Secondary %
Programming Scratch	74%	44%
Online Learning / Grok Academy	17%	75%
Robotics Hardware	31%	55%
Code.org	51%	40%
Programming Python	4%	61%
Robotics BeeBots & BlueBots	74%	11%
Minecraft	36%	31%
Programming Scratch Junior	52%	9%
Robotics Spheros	32%	15%
Robotics Drones	9%	25%
Database Languages including SQL and SQLite	0%	23%
Robotics LEGO Spike	19%	6%

Resource	Primary %	Secondary %
Robotics LEGO Mindstorm EV3	9%	12%
Programming & 3D Design TinkerCad	12%	10%
Robotics Vex Robotics	3%	15%
Google & Google Products including Classroom, YouTube	12%	9%
Adobe Creative Cloud Suite including Animate	1%	16%
Robotics Arduino	0%	16%
Microsoft Office and 365 tools, including Teams	9%	10%
Programming platform for micro:bit Makecode	8%	10%
Robotics Dash & Dot	17%	1%
Robotics LEGO not specifically identified	9%	6%
Code Editor / Visual Studio	0%	13%
Game Design Unity	0%	13%
Robotics Edison	12%	4%
Programming Tynker	8%	6%
Programming JavaScript & Java	0%	12%
Programming HTML & CSS	0%	10%
Robotics Robots	8%	4%
Robotics Raspberry Pi	1%	7%
Code Editor Replit	0%	8%
Technology Hardware / VR	5%	5%
Technology / 3d printers	6%	4%
Robotics Makey Makey	10%	0%
Robotics Ozobots	8%	2%
Robotics LEGO WeDo	9%	0%
Robotics Micromelon	0%	6%
Programming Platform CoSpaces	5%	3%

Resource	Primary %	Secondary %
CS First	4%	3%
Spreadsheet Tool Excel	3%	4%
Digital Education / e-Smart schools	5%	2%
Productivity Tools / Canva	4%	3%
Programming Platform MU Editor	0%	5%
Diagramming Tools including draw.io, Visio, lucidchart	0%	5%
Online Course Zenva	0%	5%
Online Courses programming W3schools	0%	5%
Network simulation Cisco Packet Tracer	0%	5%
Databases	0%	5%
Robotics Hardware Cubetto	4%	1%
Programming Platform Makeblock	3%	2%
Programming C#	0%	4%
Platform and program / CS in Schools	1%	3%
Website Digital Technologies Hub	1%	3%
Digital Education / eSafety Commission resources	4%	1%
Graphic Design Software / Blender	1%	3%
Robotics mBot	1%	2%
Programming Code Spark	4%	0%
Programming platform Thonny (using python)	0%	3%
Online course Khan Academy	0%	3%
Online courses Code Academy	0%	3%
Technology / iPads	3%	1%
Programming Hopscotch	3%	0%
Bebras Computational Thinking Challenge	1%	1%
Digital Education / Education Perfect	0%	2%

Resource	Primary %	Secondary %
Technology / Laser Cutters	0%	2%
Technology / Green screen	3%	0%
CS unplugged	1%	0%
Videoing Editing Software / WeVideo	0%	1%
Total (n)		***77***

Table 71: Resources used by respondents to help teach the DTC by state (%)

Resource	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Programming Scratch	50%	54%	-	54%	80%	63%	61%	45%
Online Learning / Grok Academy	38%	61%	-	50%	33%	63%	46%	68%
Robotics Hardware	44%	50%	-	41%	40%	63%	29%	82%
Code.org	50%	50%	-	41%	40%	-	54%	45%
Programming Python	13%	29%	100%	50%	20%	25%	32%	59%
Robotics BeeBots & BlueBots	69%	25%	-	32%	47%	13%	51%	18%
Minecraft	38%	36%	-	38%	7%	25%	29%	45%
Programming Scratch Junior	31%	29%	100%	21%	33%	-	44%	5%
Robotics Spheros	38%	21%	-	21%	27%	-	27%	14%
Robotics Drones	-	11%	100%	25%	20%	13%	12%	32%
Database Languages including SQL and SQLite	6%	4%	100%	25%	7%	-	7%	18%
Robotics LEGO Spike	6%	11%	-	7%	27%	13%	17%	9%
Robotics LEGO Mindstorm EV3	19%	11%	100%	13%	7%	38%	5%	-
Programming & 3D Design TinkerCad	13%	11%	-	5%	13%	25%	15%	9%
Robotics Vex Robotics	6%	14%	-	9%	27%	-	12%	-
Google & Google Products including Classroom, YouTube	19%	14%	-	2%	-	38%	17%	5%

Resource	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Adobe Creative Cloud Suite including Animate	6%	14%	-	11%	7%	13%	7%	14%
Robotics Arduino	6%	11%	-	9%	13%	13%	7%	14%
Microsoft Office and 365 tools, including Teams	6%	11%	-	9%	7%	-	15%	9%
Programming platform for micro:bit Makecode	13%	7%	-	11%	7%	13%	-	23%
Robotics Dash & Dot	-	7%	-	5%	7%	-	20%	-
Robotics LEGO not specifically identified	-	7%	-	9%	13%	13%	5%	9%
Code Editor / Visual Studio	6%	7%	-	9%	-	13%	7%	9%
Game Design Unity	6%	4%	-	11%	7%	13%	5%	9%
Robotics Edison	6%	7%	-	7%	7%	-	7%	9%
Programming Tynker	19%	7%	-	4%	7%	-	5%	14%
Programming JavaScript & Java	6%	7%	-	7%	7%	38%	5%	-
Programming HTML & CSS	-	7%	-	9%	-	25%	5%	-
Robotics Robots	-	4%	-	11%	-	-	-	14%
Robotics Raspberry Pi	6%	7%	-	5%	-	-	5%	5%
Code Editor Replit	6%	4%	-	2%	-	25%	5%	9%
Technology Hardware / VR	-	-	-	5%	13%	-	5%	9%
Technology / 3d printers	-	4%	-	2%	13%	13%	7%	5%
Robotics Makey Makey	6%	-	-	2%	20%	-	7%	-
Robotics Ozobots	13%	-	-	7%	-	-	-	9%
Robotics LEGO WeDo	-	7%	-	2%	7%	-	7%	-
Robotics Micromelon	-	4%	-	9%	-	-	2%	-
Programming Platform CoSpaces	-	7%	-	2%	7%	-	5%	5%
CS First	6%	-	-	2%	7%	13%	2%	5%

Resource	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Spreadsheet Tool Excel	-	4%	-	5%	-	-	5%	-
Digital Education / e-Smart schools	-	4%	-	4%	-	-	7%	-
Productivity Tools / Canva	6%	4%	-	-	-	25%	2%	5%
Programming Platform MU Editor	6%	-	-	2%	-	13%	-	9%
Diagramming Tools including draw.io, Visio, lucidchart	-	7%	-	2%	-	-	-	9%
Online Course Zenva	-	-	-	7%	7%	-	-	-
Online Courses programming W3schools	-	4%	-	4%	7%	13%	-	-
Network simulation Cisco Packet Tracer	13%	4%	-	2%	-	-	-	5%
Databases	-	4%	-	-	7%	-	5%	5%
Robotics Hardware Cubetto	-	4%	-	2%	7%	-	-	5%
Programming Platform Makeblock	-	4%	100%	4%	-	-	-	-
Programming C#	6%	-	-	4%	7%	-	-	-
Platform and program / CS in Schools	6%	-	-	-	7%	-	5%	-
Website Digital Technologies Hub	6%	-	-	4%	-	-	-	5%
Digital Education / eSafety Commission resources	6%	-	-	2%	7%	-	2%	-
Graphic Design Software / Blender	-	4%	-	-	7%	13%	-	5%
Robotics mBot	-	4%	-	4%	-	-	-	-
Programming Code Spark	-	4%	-	-	-	-	2%	5%
Programming platform Thonny (using python)	-	-	-	-	-	13%	2%	5%
Online course Khan Academy	-	4%	-	2%	7%	-	-	-

Resource	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Online courses Code Academy	-	-	-	-	7%	-	-	9%
Technology / iPads	-	-	-	-	13%	-	2%	-
Programming Hopscotch	6%	-	-	2%	-	-	-	-
Bebras Computational Thinking Challenge	-	-	-	-	-	-	2%	5%
Digital Education / Education Perfect	-	-	-	2%	-	-	-	5%
Technology / Laser Cutters	-	4%	-	-	-	-	2%	-
Technology / Green screen	-	-	-	2%	-	-	2%	-
CS unplugged	-	-	-	-	-	-	2%	-
Videoing Editing Software / WeVideo	-	4%	-	-	-	-	-	-
Total	***16***	***28***	***1***	***56***	***15***	***8***	***41***	***22***

Note: Respondents mentioned more than one resources, this was treated as a multiple response question so total is >100%. Percentages based on n=187.

Annex 2: Method – Survey & Peer Review

In 2023, ACS partnered with the Australian Survey Research to conduct a survey that built on the survey conducted in 2020. It sought to understand how the Digital Technologies Curriculum (DTC) was being implemented and aimed to develop solutions to improve its quality and delivery. This included a focus on the issues faced by teachers of Digital Technologies, aiming to develop specific recommendations for increasing their support to deliver high quality teaching of the Australian DTC.

The survey was open online from 19 July 2023 to 16 October 2023 and distributed electronically to approximately 3,151 individual staff members with responsibility for teaching the DTC at schools across Australia.

Participants were identified using lists from Australian School Lists, with approval sought from relevant education departments and Catholic education dioceses across Australia to conduct research in schools (see Annex 1 for details). The research was conducted in accordance with the National Statement on Ethical Conduct in Human Research and was approved by the ANU Research Human Ethics Committee (Human Ethics Protocol 2023/369). The survey questions are available in Annex 1, along with a detailed summary of the results.

Summary of survey findings

The survey received a total of 218 complete responses. Table 1 provides a summary of the proportion of responses received from participants by State and Territory. The survey sample, while small, is indicative of the Australian school experience in teaching digital technologies. It provides a relevant and timely snapshot of the challenges facing teachers of the DTC across Australia and insights into how these challenges can be addressed.

State	Participants %	Responses %
ACT	8%	10%
NSW	21%	16%
NT	1%	0%
QLD	22%	29%
SA	6%	8%
TAS	2%	4%
VIC	24%	22%
WA	16%	12%
Total (n)	***3151***	***218***

Table 1: The proportion of subjects sampled by state, compared to the proportion of those that responded by state.

School profile

Almost two thirds of respondents were teaching in major cities, followed by inner (17%) and outer regional Australia (17%)(Annex 1, Table 4). While internet services and Wi-Fi accessibility was generally reported as good, when asked whether their school provided teachers with sufficient resources to teach DTC, approximately one third of teachers responded negatively (Annex 1, Table 37 and associated chart). Survey results do not reflect remote schools, as no responses were received from remote or very remote Australia.

The majority of respondents were teaching in schools with between 100 and 500 students (33%), or between 501 and 1000 students (31%), only 5% of respondents came from smaller schools with less than one hundred students (Annex 1, Table 7). The teachers selected were from predominately independent schools (41%), with Catholic school educators making up around one third of respondents, followed by government or public schools (27%) (Annex 1, Table 8).

The largest percentage of respondents were primary school educators (37%), while secondary school teachers made up the smallest proportion of respondents (28%). One third of respondents identified as teachers of both primary and secondary students.

Teacher experience and support

Of the 218 teachers who responded, the majority identified as digital technologies specialist teachers (47%) or classroom teachers (42%), and 40% of these respondents identified as the Head of Digital Technologies Department (Annex 1, Table 2). Less than 20% of respondents held school leadership positions such as Principals or Vice Principals.

The largest proportion of respondents had been teaching the DTC for 'More than 10 years' (37%), with 18% teaching 'from 5 to 10 years' and only 12% teaching for less than one year (Annex 1, Table 13).

Most respondents specialised in STEM, including Digital Technologies (74%), Sciences (23%), Design and Technologies (22%) and Mathematics (22%), with about one quarter (26%) of respondents reporting that they were teaching outside of their specialisation (Annex 1, Table 17). The majority of respondents had not completed any DTC professional developments in the current school year (56%) (Annex 1, Table 23) and less than half of respondents felt they have received an adequate amount of professional development (Annex 1, Table 25). There were 67% of respondents who reported that they faced general challenges when teaching DTC (Annex 1, Table 48) and only 27% of respondents said they were given enough support to face these challenges (Annex 1, Table 50).

Implementation of curriculum

Respondents were asked to compare the definitions of DTC and Digital Literacy/ICT General Capability. While most responded that they were 'very different' (56%), over one third responded that the two concepts were similar (Annex 1, Table 9). Roughly one tenth of the respondents said they were unaware of a difference between the two curricula, which has risen 4% since the 2020 survey (Annex 1, Table 12).

Three quarters (75%) of respondents taught DTC as a separate subject rather than integrated into other subjects such as Science or Mathematics (Annex 1, Table 43).

Additionally, 76% of respondents developed their own lesson plans rather than use third party or school/department-developed programs (Annex 1, Table 45). There were 85% of respondents who reported that finding and using DTC lesson plans and content was somewhat difficult, difficult, or very difficult (Annex 1, Table 46 and associated chart). Just under one fifth (19%) of respondents reported that they did not teach either cyber safety (which is not part of the curricula) or cyber privacy and security (which is part of the curricula) (Annex 1, Tables 33 and 34). A small number of respondents admitted that they were unsure whether they taught cyber safety, with that number rising when asked about cyber privacy and security.

There was a significant difference in teaching hours of Digital Technologies between teachers of primary school (Years 1 to 6) and secondary school (Years 7 to 10) (Annex 1, Table 22). Just under half of primary teachers spent between 0 to 1 hour per week teaching Digital Technologies. However, there was a gradual increase with one third of foundation respondents teaching the curricula for between 1 to 6 hours a week, compared with two thirds of year six teachers. This trend continued with secondary teachers as the number of those who teach more than 6 hours per week rose 4% from year 7 to year 10.

These survey findings inform the discussion and policy recommendations described in this report.

Expert working group

To guide the preparation of this report and formulation of its recommendations, we consulted a group of experts from organisations across the education sector:

- ACS
- ACARA
- Questacon
- Australian Library and Information Association
- Future Skills Organisation
- Education Services Australia
- The University of New England

Experts were involved in two ways - . as peer reviewers of this report and through direct contributions at an interpersonal workshop held on 21 February 2024 where the vision and recommendations were shaped.

The workshop was an interactive event where experts were invited to discuss Australia's vision for a digitally-ready population by 2050 and what actions the nation needs to take now and over next five years to achieve it.

The role that Australian school teachers play in developing digital skills in the next generation was in focus. Insights into challenges faced by teachers in digital technologies education from the ACS 2023 survey were presented to set the scene, and experts discussed how findings fit with the national conversation about digital education and the impact on achieving the 2050 vision. Peers were asked to assess a set of draft recommendations proposed to address the challenges presented in this report and refine them to best capture the steps needed to achieve the 2050 vision. The outcomes of this workshop have shaped the drafting of this report.

Annex 3: Critical Recommendations – ACS's 2022 report on Digital Technologies education in Australian schools

Of the 55 recommendations proposed in ACS's 2022 report, eight were highlighted as critical:

Recommendation 3: 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 4: 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 5: 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 9: 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 25: 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 39: 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 41: 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 55: 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.

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