Trends and Issues of Digital Learning in Australia

Leanne Cameron[1] and Rehana Gulzar [2]

[1]Senior Lecturer and [2]Visiting Scholar, Education (Technologies),
College of Arts, Education & Social Sciences
James Cook University, Australia

Abstract

This chapter examines the state of digital learning in Australian schools. Digitalization has become integrated throughout schools, playing an essential role in teaching, learning, administration and communication. Despite infrastructure constraints, many Australian teachers actively employ digital technologies to enrich learning experiences to prepare students for a digitally interconnected world. The Australian education system's approach to digital learning diverges from its OECD counterparts in several ways: A national curriculum mandates technology and digital literacy education for all students, ensuring consistent exposure from Foundation to Year 8 or 10. A strong emphasis is placed on online safety and digital citizenship education to protect students from online harm and foster responsible technology usage. Furthermore, coding and problem-solving skills are explicitly integrated into the curriculum, acknowledging their significance in a technology-driven world. Current trends in digital learning in Australian schools include widespread technology integration; the growing prominence of online education; the popularity of *integrated* STEM (Science, Technology, Engineering & Mathematics) education, experimentation with artificial intelligence (AI) tools and the use of educational computer games in classrooms. While these developments offer valuable advantages to students' learning outcomes, increasing concerns are being raised by parents and community groups about students' excessive dependence on technology. Digital learning requires high-quality programs and support, with AI tools holding promise in addressing this. However, challenges loom over the future of quality digital learning in Australian schools. Anticipated acute teacher shortages pose a risk to educational standards. The digital divide, which limits access to digital learning, remains a pervasive issue, impacting disadvantaged students, with an over-representation of First Nations' students. While digitalization has made substantial progress, significant challenges must be confronted to ensure the realization of the 'Education Goals for Young Australians' (Education Council, 2019) which promotes excellence and equity in education so that Australia produces confident, informed and successful lifelong learners.

Keywords: Australia, technology integration, curriculum, online learning

Introduction

The stated Education Goals for Young Australians (Education Council, 2019), as declared by all Australian Education Ministers are:

Goal 1: The Australian education system promotes excellence and equity.
Goal 2: All young Australians become confident and creative individuals, successful lifelong learners, and active and informed members of the community.' (Education Council, 2019, p. 4)

The principals contained in these Goals underpin the direction of policy and curriculum in Australian education. When it comes to digital learning, it is the issue of 'equity' in Goal 1 that has been the most challenging to achieve. This difficulty will be addressed more fully in the Issues section of this chapter.

The Structure of the Australian Schooling System

The Australian education system is structured as Figure 1. The components of the Australian schooling system are described below:

Figure 1 Australian Education System

Early Childhood Education	Primary School	Junior Secondary	Senior Secondary	Tertiary Education
Birth-5/6 years	5/6-11/12 years	11/12-15/16 years	15/16-17/18 years	University/VET /TAFE

Early childhood education

Formal early childhood education serves various purposes, including childcare and supervision, preparing children for school, and ensuring their readiness for future learning opportunities. Early childhood education programs are offered through community programs, pre-schools, and various child-care settings, such as long day care and family day care. While the three most populous

states have just announced one year of free pre-school education for all (and the remainder are expected to follow soon), the cost of early childhood education has been historically subject to a means test based on parents' incomes, making it relatively expensive for some families (often amounting to as much as AUD $160 per day per child). Despite these costs, Australia witnessed a significant increase in participation rates for 4-year-olds, rising from 53% in 2005 to 87% in 2022 (AGDE, 2022a), representing the fourth highest increase in the OECD (OECD, 2016). It is anticipated due to the change in government policy, that this rate will rapidly rise from 2024.

Primary schools

Children are required to begin school by the age of 6, with most children commencing between the ages of 4½ - 5½ years. Primary school typically spans from Foundation to Year 6 and focuses on building essential literacy, numeracy, and social skills while imparting foundational knowledge about the world. As students progress from primary to secondary school, subjects become increasingly specialized, with specialist teachers being employed in secondary schools.

Secondary schools

Secondary schools cater to students aged between 12-18 years in Years 7 to 12. Upon completing Junior High School (Years 7-10), some students transition to Specialised Senior High Schools or Colleges to complete Years 11 and 12. In regions where there are small populations, students aged 5-15 years often attend Central Schools (Foundation-Year 10).

Students who complete their secondary education at Year 12 receive a Senior Secondary Certificate of Education. Subsequently, they may pursue vocational or higher education courses and/or enter the workforce. In 2022, the secondary retention rate in Australia (the percentage of students who started Year 7/8 and

completed Year 12) was 80.5% for males and 87.8% for females (ABS, 2022). Since 2010, all States and Territories mandate that students complete Year 10 and engage full-time in education, training, or employment until at least 17 years of age.

Features of the Australian schooling system

The Australian academic year typically commences in late January or early February, running through to mid-December, with most schools operating on a four-term school year. Funding for childcare, pre-schools and all schools (Government, Catholic, and Independent schools - the latter includes other faith-based institutions) is jointly managed by the Australian and State Governments, although the State Governments bear the bulk of the responsibility for funding all State schools. State schools charge nominal tuition fees; however, Independent school tuition fees can be as much as AUD $45,000 per annum for the final secondary school year.

The Australian education system features a high level of privatization, both in the school and higher education sectors, when compared to other OECD countries (OECD, 2016). In 2022, 30.4% of school student enrolments were in private schools (Independent and religious), while most higher education enrolments (93%) occurred in public universities (ABS, 2022).

Government control extends to student assessment, course accreditation for both government and non-government schools, and early childhood learning centres. It should be mentioned that the Australian education system is noted for its robust regulatory framework and transparent accountability mechanisms. Since 2012, Australia has implemented a National Curriculum, ensuring common curriculum frameworks and learning outcomes across all schools, from Foundation to Year 12. This curriculum was developed by ACARA (Australian Curriculum, Assessment and Reporting Authority), which also administers the annual assessment Program – Literacy and Numeracy (NA-

PLAN) for students in Years 3, 5, 7, and 9 (ACARA, 2022a).

Digital Transformation (DX) and Current Stage in Australian Schools

At all levels of the Australian Education system, Stage 2: Digitalization has been achieved. Technologies play an integral role in the administration, communication, and financial functions of each educational institution, as well as of the systems in which they are a part. Government and system regulations require all school reporting and record keeping for accreditation and certification purposes to be undertaken and submitted digitally.

Furthermore, Stage 3: Digital transformation is commonly realized at a systemic level. Governing bodies at each level of education (Early Childhood, Primary, and Secondary education), and across sectors (Government, Catholic, and Independent), routinely employ digital technologies to collect, analyse, and report on data received from individual institutions, aiding in decision-making. This practice allows schools, systems, and sectors to monitor and assess the effectiveness of their educational approaches and identify institutions requiring additional support (AERO, 2023).

Collected data are frequently utilized by teachers to assess student learning and plan future teaching programs. Student data collected from national testing (individual and aggregated), such as NAPLAN, are made accessible to schools and educators, who employ sophisticated analytical tools to identify trends, and actively work toward improving planning for future learning. According to the most recent Teaching and Learning International Survey (TALIS), Australian schools rank third among OECD countries in their consumption of information and communications technology (ICT) (OECD, 2019).

The Status of Digital Learning in Australian Schools

Digital learning within the Australian Education system is influenced by several key documents and frameworks. These documents help shape how digital learning is delivered to different age groups in Australian classrooms.

Contexts of Digital Learning in Australian Schools

Early childhood education

For those in Early Childhood Education, the Early Years Learning Framework (EYLF) serves as a guiding document. It outlines a shared vision for young children's learning, the principles and practices that underpin teaching and learning, along with five learning outcomes – two of which directly reference digital learning:

'Outcome 2: Children are connected with and contribute to their world.' This acknowledges that children increasingly connect with others through digital contexts, involving sharing and communicating information via digital technologies and the internet.

'Outcome 4: Children are confident and involved learners.' This outcome encourages children to choose and use appropriate tools, technologies, and media to enhance their learning (AGDE, 2022b).

Primary and secondary schools

In primary and secondary schools, the Australian Curriculum is the most influential document when determining what occurs in Australian classrooms. All schools are required to demonstrate that they are teaching the content and skills outlined in this curriculum. The national curriculum aims to provide a high standard of curriculum content for every Australian student, regardless

of their individual circumstances. One of the biggest challenges to this aim is geographical location. Australia is a large, and often sparsely populated country, and the challenges this brings will be addressed later in the chapter.

The Australian Technologies Learning Area Curriculum recognizes technology education as a vital component of students' learning, and Digital Literacy Capability outlines how digital literacy is considered an essential skill and is to be taught across all learning areas (ACARA, 2022a). The curriculum emphasizes the need for students to be active participants in a technologically rich environment. The curriculum's goal is to equip students with the skills to make ethical and moral choices about emerging technologies and to modify technologies to suit their needs. The Technology Learning Area encompasses a range of knowledge and skills designed to help students become confident producers, not just users, of technology. Students are expected to develop their skills while exploring various technologies through projects and activities that include experiences with coding and robotics (Cameron, 2020).

Every three years, primary and secondary students' technology skill levels are assessed through national standardized testing. Unlike NAPLAN tests, which are administered to all students in Years 3, 5, 7, and 9, the Technologies test (NAP-ICTL) evaluates a random sample of Year 6 and Year 10 students from schools across Australia. The test measures students' ability to use digital technologies appropriately and safely, develop new understandings, apply computational and design thinking, communicate & collaborate, and engage with emerging technologies. De-identified results are made publicly available (ACARA, 2022b).

Digital learning policies, projects/programs, strategies and R&D

While Australia's mandated overarching policy documents are outlined above, Early Years Learning Framework (AGDE, 2022b) and the Australian Curriculum (ACARA, 2022c), the Australian Government have introduced a range of

other initiatives to support digital technologies in schools:

- The *Digital Education Revolution Project* (DER) (DEEW, 2011) was an initiative to provide every Year 11 & 12 high school student with access to computers and digital resources. It was later integrated into broader school support programs.

- The *National Innovation and Science Agenda* (NISA), (AGDE, 2017) aimed to improve digital literacy skills by funding a wide range of projects:
  - Digital Technologies massive open online courses (CSER MOOCs) to provide free professional learning for teachers and a National Lending Library to provide new technologies to schools.
  - The Digital Technologies in Focus (DTiF) project to provide support for 160 disadvantaged schools to assist them in implementing the Australian Curriculum: Digital Technologies.
  - Australian Digital Technologies Challenges series of free online teaching and learning activities for students in Years 3 to 8.
  - digIT series of summer schools targeting Year 9 and 10 students from under-represented groups to engage them in digital technologies and related careers.
  - Digital Literacy School Grants that provided funding to 114 projects supporting innovative ways of implementing the Digital Technologies curriculum in schools.

- The *National STEM School Education Strategy 2016–2026*. (AGDE, 2016) focuses on developing foundational skills in mathematical, scientific and digital literacy, and promoting problem solving, critical analysis and creative thinking skills. The strategy aims to coordinate current activities and improve STEM education.
- Education Services Australia (ESA, 2023) has ongoing funding to manage the *Digital Technologies Hub* (www.digitaltechnologieshub.edu.au), an online repository of teaching resources for F–10 Digital Technologies cur-

riculum resources.

- The *Office of the eSafety Commissioner* (2023) has ongoing funding to provide resources to promote safe online environments for children and young people. This includes resources for educators and schools to help them integrate digital technologies in a safe and responsible manner.

Australia's Technologies Curriculum was influenced by a range of international research, namely Bloom's Taxonomy (Krathwohl, 2002), TPACK (Mishra & Koehler, 2006) and the SAMR model (Puentedura, 2013). However, the research centres listed below regularly collaborate with government and non-government organizations, schools, and communities to conduct research, trials, and implementations in Australia. They play a pivotal role in shaping the digital education landscape.

- *Australian Council for Educational Research (ACER)*

Research Areas: Assessment and reporting, digital literacy, teacher professional development, and curriculum design.

- *Learning Sciences Institute Australia (LSIA) - Australian Catholic University*

Research Areas: Learning analytics, digital technology's role in pedagogy, and technology-driven student engagement.

- *Science of Learning Research Centre (SLRC)*

Research Areas: Role of technology in enhancing cognitive processes, digital tools for classroom engagement, and learning analytics.

- *Innovative Learning Environments and Teacher Change (ILETC)*

Research Areas: Spatial reasoning in digital environments, technology-driven pedagogical change, and design of digital learning spaces.

- *Centre for School Leadership, Learning and Development (CSLLD) - University of Tasmania*

Research Areas: Digital pedagogies, technology-driven curriculum development, and leadership in the digital age.

- *Centre for Children and Young People (CCYP) - Southern Cross University* Research Areas: Online safety in schools, digital citizenship, and the role of technology in holistic child development.

Digital learning implementation in Australian schools

In Australian schools, the integration of digital learning is influenced by several factors, including government-funded initiatives (as listed above), teacher attitudes, and infrastructure challenges. With significant government funding supporting digital learning, a substantial 78% of Australian teachers frequently allow students to use technologies for projects or classwork (Gonski, 2020). This percentage is notably higher compared to the OECD average of 53% (OECD, 2019).

A recent study (Gonski, 2020) revealed that teachers who integrated digital learning enjoyed various advantages in their classrooms, including employing student-directed learning, access to global information, and the ability to share and receive knowledge in real time. The study reported that teachers recognized many benefits of digital learning for their students. For instance, two-thirds of teachers agreed that technology enhances inquiry-based learning, and 43% thought that digital learning improves classroom teaching and learning. Moreover, digital technologies were seen as particularly beneficial for students with special educational needs, with 60% of teachers believing it positively contributes to their learning. The OECD (2019) reported that Australian students spend at least 39 minutes per day online at school, and they perform better in digital reading compared to print reading.

Digital learning is extensively implemented in Australian K-12 schools, driven by government support and recognized benefits. Despite challenges in digital infrastructure and the impact of COVID-19, schools and teachers are actively using technology to enhance learning outcomes and prepare students for a digitally connected world.

Digital literacy implementation in early childhood education centres

The Early Years Learning Framework (EYLF) (AGDE, 2022b) outlines the principles, practices, and learning outcomes essential for supporting and enhancing young children's learning. While the EYLF does not prescribe specific technologies or digital tools, it does emphasize a holistic approach to learning, recognizing the potential of technology to support various areas of children's development. While digital learning is embraced, there is also a strong emphasis on ensuring children continue to have plenty of natural, hands-on, play-based learning experiences. Outdoor play, physical activities, and real-world interactions remain fundamental in early childhood settings.

To support digital learning, early childhood centres often invest in technologies such as iPads, tablets, interactive whiteboards, and high-speed internet. Interactive digital storybooks, educational apps and games that enhance cognitive skills and digital drawing and art programs are the tools which children of this age most regularly engage with.

Digital platforms are often used to enhance communication between educators and families. Apps and platforms allow parents to receive updates about their child's day, view photos, and communicate directly with educators. With the introduction of digital learning, there are valid concerns regarding screen time, data privacy, and the commercialization of education to the point that some centres elect not to have any digital devices for children's use.

Digital literacy implementation in primary schools

Many Australian primary schools take a multifaceted approach that integrates technology into various Learning Areas of the curriculum, while also ensuring that students remain safe, informed, and engaged. Most frequently these schools provide students with access to school-owned digital devices while in class, such as iPads, tablets, laptops, or desktop computers. Some primary

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schools have 1:1 device programs where each student has access to their personal device for learning, but this is not common and usually only occurs in the upper Primary Years (Years 5 & 6).

The Australian Curriculum outlines the required knowledge, skills, and dispositions for all primary students. Consequently, coding is increasingly being integrated into the curriculum. Resources such as Scratch Jnr, Bee-Bots, Cubetto and/or Dot & Dash can be found in the lower Primary Years' classrooms. Upper Primary years students will be undertaking more explicit visual (block) coding activities using technologies such as Scratch, Code.org, Minecraft Education Edition, LEGO Mindstorms and/or LEGO Education Spike.

Learning Management Systems (LMS) like Google Classroom, SeeSaw, Canvas, Microsoft Teams, Moodle or Edmodo are commonly used in primary schools. These platforms enable teachers to distribute materials, assign tasks, provide feedback, and communicate with students and parents. Interactive whiteboards or digital projectors, and educational software applications are also evident in most primary schools.

Digital literacy implementation in secondary schools

Technology education becomes more specialized as students transition from primary to secondary school, reflecting the diverse subjects and the depth of content explored. The Australian Curriculum has a Digital Technologies subject for Years 7 & 8, in which students learn key computing concepts, information systems and digital systems. Students engage in more advanced general purpose (text-based) coding programs, for example, Python or Ruby. In Years 9-12, students can elect to delve deeper into specialized courses related to information technology and explore programming languages such as Java or C++.

Bring Your Own Device (BYOD) programs and school-based devices are

common in secondary schools. Students use these devices for research, assignments, and various learning activities. Depending on the courses the students elect to take, they may use specialized software. For example, Design & Technology students might use CAD software, while music students might use digital audio workstations. Increasingly schools are integrating virtual reality (VR) and augmented reality (AR) tools to provide immersive learning experiences, especially in subjects like science, history, or geography.

Learning Management Systems (LMS) become even more integral in secondary schools. They facilitate the distribution of resources, assignment submissions, feedback, and communication between teachers, students, and parents. Staff and students can often access online databases, e-journals, and digital libraries through their LMS. Senior students may have opportunities to undertake online courses, sometimes from universities, to supplement their learning or to get a head start on tertiary education.

The impact of COVID-19 on digital learning in Australian schools

It is important to note that the impact of COVID-19 on digital learning in Australian schools was not uniform. It varied depending on factors like the geographical location of the school, the resources available, and the readiness of teachers and students to embrace digital learning. Some Australians experienced prolonged lockdowns due to COVID-19 where everyone had to remain in their homes (Melbourne had six lockdowns totalling 262 days during 2020-2021). The rapid shift to remote learning in 2020 brought equity and access issues to the forefront. The digital divide became evident when students were suddenly required to learn from home. Some students faced challenges due to a lack of devices or reliable internet access. Many schools were able to provide devices to those students without access, while state governments subsidized home internet and device costs for the most disadvantaged students. The Australian government and education sectors worked to improve internet connectivity in remote and underserved areas to ensure that all students had

access to online learning.

Many students had to share devices among family members, and some relied on printed worksheets posted out by schools. Even with ready access to devices and home internet, keeping engaged and motivated in a digital learning environment was challenging for even the best students. Many students struggled with self-discipline and staying focused without the structure of a traditional classroom. It was expected that parents would become more involved in their children's education, with many required to take on the role of at-home teachers which required them to navigate digital learning while often trying to maintain their own jobs. The success of this very much depended on the parents' education levels and their comfort with digital learning.

Much of the disconnect experienced during this period was due to how quickly schools had to pivot to solely relying on remote digital learning during lockdowns. Many schools started using learning management systems for the first time to deliver online lessons, share resources, and track student progress. Popular platforms like Google Classroom, SeeSaw, Canvas, Microsoft Teams, Moodle or Edmodo became essential tools for teachers, and have commonly remained in use.

All teachers were required to adapt to the new digital learning environment, leading to a desperate need for increased professional development in the use of educational technology. This included online professional development and sharing best practice. The pandemic forced schools to rely more heavily on digital textbooks, e-books, and online educational content. The increased screen time and isolation due to remote learning raised concerns about the mental health and well-being of students. Schools have had to address these issues and provide support.

The aftermath of education during this period is still being felt by many students and teachers. Most schools have continued to use simple hybrid or

blended learning models as a long-term digital learning strategy, combining in-person and online scaffolded instruction, as the benefits of enhanced flexibility and the accommodation of different learning styles were made evident during the pandemic.

Digital Learning Infrastructure

Digital learning infrastructure in Australian schools

In Australia, there is at least one computer per student, with 95% connectivity (OECD 2019). The increased reliance on IT infrastructure in the Australian education system has put pressure on aging IT systems, and has strained limited IT budgets. Poor infrastructure can affect Wi-Fi connections and limit internet access. Slow internet due to network bandwidth limitations is a significant challenge, especially in rural schools and older buildings. Government initiatives are being undertaken to enhance internet access, particularly in rural areas (NSW Government, 2023a). However, in some schools the reliability of Wi-Fi remains an issue. In those schools, teachers often need to plan two versions of lessons, one for when technology works and one for when it does not (Krueger, 2022).

Technology infrastructure varies by school and location. However, there has been a push for improved connectivity and bandwidth in K-12 schools. The government, through initiatives like the Schools Broadband Initiative (AD-DMC, 2022), aims to ensure that schools have access to high-speed internet. Many schools have also invested in Wi-Fi networks and upgraded their IT infrastructure. Since 2021, the COVID-19 pandemic has accelerated the adoption of digital learning and the government has committed to enhancing the digital infrastructure in schools to support remote and blended learning.

Realising digital learning in Australian schools is a complex undertaking which relies heavily on leadership and budgetary considerations. It is not sole-

ly a federal government responsibility; state and territory governments also exert influence by implementing and financing digital learning programs in accordance with their specific needs and priorities. At the school level, leadership and management are entrusted with the crucial task of allocating budgets for technology infrastructure, teacher training, and digital learning resources. This intricate relationship between federal, state, and school-level leadership sets the stage for inconsistent digital learning in Australian schools.

ACARA provides overarching guidelines but schools and educators enjoy a degree of autonomy in shaping the design and delivery of digital content. This flexibility at school level does, however, allow for adaptation to local needs and pedagogical philosophies. Commonly, learning management systems (LMS) and online platforms are leveraged to deliver content, assignments, and assessments. These tools offer an interactive platform that allows student engagement and collaboration, helping students explore their subject resources. Course design and delivery have experienced significant evolution, as a result of the COVID years.

In the pursuit of student success, there is an increasing focus on providing equitable access to digital resources and support. Personalised learning and adaptive technologies have emerged as strategies to cater to individual student needs, allowing for differentiated instruction that aligns with varying learning paces and styles. Data-driven interventions play a critical role in this process, helping teachers identify and support struggling students, thereby promoting student success in digital learning environments. Evaluation and analytics are integral components of this process. Teachers and schools utilize data analytics to monitor student progress and gauge the effectiveness of digital learning tools. Concurrently, government bodies and educational institutions often engage in research and evaluation studies to ascertain the impact of digital learning on educational outcomes. These evaluations provide valuable insights for refining and enhancing digital learning strategies.

Budget constraints have led some schools to adopt Bring Your Own Device (BYOD) policies, wherein students bring their own devices for classroom use. This strategy helps mitigate the financial burden on schools while still providing students with access to essential technology. A recent Australian Computer Society (ACS) report (Zagami, 2022) found that 70% of high schools and 32% of primary schools used bring-your-own-device (BYOD) programs in 2022. Furthermore, Service Level Agreements (SLAs) have been established between schools and various service providers. These agreements often include provisions for high availability to ensure that digital services remain accessible and dependable, guaranteeing a smooth learning experience for students.

Teacher and staff professional development stands as a critical component of this digital transformation. Many schools offer training programs to ensure teachers are proficient in using technology in the classroom. Additionally, organizations like the Australian Institute for Teaching and School Leadership (AITSL) have developed guidelines for incorporating digital skills into teaching, ensuring that educators are equipped to harness the full potential of digital tools for the benefit of their students.

While student success in digital learning is stated as a primary goal of the Australian education system, schools are increasingly focused on providing equitable access to digital resources and support. Personalized learning and adaptive technologies are used to cater to individual student needs. Data-driven interventions help identify and support struggling students, however finding the funds to provide the recommended support is sometimes challenging.

Key statistics and practical examples

Below is an outline of digital learning infrastructure in Australian schools. This list provides a very broad overview of some of the key elements of the digital learning infrastructure in Australian schools (ACARA, 2022a; DESE, 2021):

- 97% of Australian schools have access to the National Broadband Network (NBN).
- 95% of Australian students have access to a device at school.
- 86% of Australian teachers feel confident using digital technologies in the classroom.
- 82% of Australian schools have a digital learning strategy in place.
- 75% of Australian schools have a dedicated digital learning leader.

Examples of the most common digital learning infrastructure found in Australian classrooms are:

- Interactive whiteboards: Interactive whiteboards are a common feature in Australian primary classrooms, providing teachers with a large, interactive surface to work on.
- Learning management systems (LMSs): LMSs such as Google Classroom, SeeSaw, Canvas, Microsoft Teams, Moodle or Edmodo are used by many Australian schools to provide students with access to learning resources and assignments.
- Digital libraries: Digital libraries such as OverDrive, ClickView and Wheelers ePlatform provide students with access to a wide range of ebooks and audiobooks.
- Coding programs: Many Australian schools now offer coding programs to students, teaching them the skills they need to create their own digital content, eg. Grok Academy.
- Robotics programs: Robotics programs are also becoming increasingly popular in Australian schools, helping students to develop their problem-solving and critical thinking skills.
- Virtual Reality (VR) and Augmented Reality (AR): VR and AR technologies are being used in some Australian schools to create immersive and interactive learning experiences.
- Maker spaces: Maker spaces are dedicated spaces in schools where students can use a variety of tools and materials, including 3D printers and

laser cutters, to create their own projects.

Below are some specific examples of how digital learning infrastructure is being used in Australian schools (ACARA, 2022a; ESA, 2020):

- Callaghan College (New South Wales) students are using 3D printers to design and create prototypes of new products.
- Bendigo Senior Secondary College (Victoria) students are using coding to develop their own video games and apps.
- At Northmead Creative and Performing Arts High School (New South Wales), students are using digital storytelling tools to create and share their own stories.
- At St Patrick's College (Queensland), students are using virtual reality headsets to explore historical sites and scientific concepts.
- At Melbourne Girls Grammar (Victoria), students are using a maker space to build robots, design and print 3D objects, and create animations.

These are just several typical examples demonstrating how digital learning infrastructure is being used to support learning in Australian schools. As technology continues to evolve, it is expected schools will adopt even more innovative ways to use digital tools and resources to enhance student learning.

Features of Digital Learning

One Technology curriculum for all Australian students

It has previously been mentioned in this chapter that Australia has a national curriculum that is prescribed for all schools to deliver. That is, all students study Technology and Digital Literacy from Foundation-Year 8 (in some states it is through to Year 10). This is a key feature of the Australian education system, and it has been designed to ensure every Australian child has cohesive and sustained experiences with digital learning.

Technologies is a Learning Area of rapid change and in recognition of this, the advisers and writers of the Australian Technologies Curriculum were careful to ensure the new curriculum was as future-proof as possible. Their approach demonstrated a desire to prepare our students to make informed choices about their future. The over-arching Core Concept of the Technologies Curriculum is 'creating solutions for preferred futures' (ACARA, 2022a). This provides a methodology for identifying and moving towards socially responsible and sustainable patterns of living. Students are required to identify the possible benefits and risks of creating solutions and recognise that views about preferred futures are contested (Cameron, 2020a).

There are two distinct subjects within the Technologies Learning Area: Design & Technologies and Digital Technologies. Design and Technologies has a strong focus on design thinking, the application of the design process and producing (making) solutions to design products, services and environments. In the Digital Technologies subject, the focus is on the use of digital systems, information and computational thinking to create solutions for identified needs and opportunities (Cameron, 2020).

The Digital Technologies subject content focusses on a comprehensive understanding of the key ideas of Computer Science that have remained constant for decades. Along with the Core Concepts of the curriculum, these establish a way of thinking about problems, opportunities and information systems which provide a framework for knowledge and practice that automation cannot currently duplicate.

The critical role of the general capabilities

In addition to the content in the various Learning Areas, the Australian Curriculum includes General Capabilities which encompass the knowledge, skills, behaviours and dispositions to equip students to live and work successfully in the future (ACARA, 2022b). These Capabilities are taught through the

Learning Area content and can readily be incorporated into any subject. They include the skills that have been highlighted as being critical to preparing our students for the workforce. Future workers will need to be literate, numerate, ethical and digitally literate (Hajkowicz et al., 2016). The Digital Literacy, Ethical Understanding, Critical & Creative Thinking, Literacy and Numeracy General Capabilities align directly with these characteristics.

There is much work to be done around the ethical, legal and governance frameworks to ensure that robotics and AI technology are used for good, and that transparent processes are in place to ensure accountability at all levels (Southgate et al., 2019). The General Capabilities, most especially the Digital Literacy, Critical & Creative Thinking and Ethical Understanding Capabilities, provide topical and authentic source material with which Australian students can discuss/debate how the issues surrounding emerging technologies might relate to their own lives and future careers.

Online safety and digital citizenship education

The Digital Literacy Capability (ACARA, 2022c) was revised to place more significant emphasis on teaching students about online safety, that is, how to protect themselves from harm online, including understanding the risks of on-line interaction and developing strategies for staying safe (ACER, 2020), and digital citizenship (the ability to use technology responsibly and ethically, in-cluding understanding one's rights and responsibilities as a digital citizen and developing critical thinking skills to evaluate online information and make informed decisions (ACER, 2020).

This change came about as a growing body of research emerged that called for online safety and digital citizenship education in schools. A study by the eSafety Commissioner (2020) found that students who participated in online safety education programs were more likely to be aware of online safety risks and to have strategies for staying safe online. The Australian Council for Edu-

cational Research (ACER, 2020) also found that students who participated in digital citizenship education programs were more likely to use technology responsibly and ethically.

The Digital Literacy Capability includes an element, 'Practicing Digital Safety and Wellbeing' where the focus is on educating students about managing their online safety, their digital privacy and identity and their digital wellbeing (see Figure 2).

Figure 2 The Elements of Digital Literacy Capability

Source: ACARA V9.0: Understand this general capability: Digital Literacy

As students increasingly used digital devices and online platforms both in their school and at home, there were concerns about their online safety knowledge and practices. It was clear that schools needed to educate students about online safety, including protecting personal information and avoiding cyber threats. Additionally, the necessity to teach students responsible digital citizenship was also considered essential, but, even with this change to the curriculum,

it is challenging to ensure that students practice these principles consistently both in and out of school.

Compulsory coding and 'thinkings' for all students Year 3 and above

The Australian Technologies Learning Area requires students to learn a wide range of fundamental computing concepts while developing their thinking skills (Computational, Systems and Design) and problem-solving capability. Coding (also known as computer programming) is introduced to Australian students from Year 3, but it is used primarily as a tool, not as the main outcome of the subject (Zagami, 2022).

Students learn and use several programming languages to varying degrees during their time at school. None of these will be learnt comprehensively to the detailed level of specific programming language courses in industry and tertiary studies, but collectively students will explore all the fundamentals common to scripting, procedural and functional programming languages, and query languages, and have an introduction to object-oriented programming in the Year 9 and 10 elective. Senior secondary computer education courses are generally more comprehensive in their coverage of computing languages (Zagami, 2022).

The Technology curriculum requires the explicit teaching of several different ways of thinking, ideally to be incorporated in practical ways as students complete Technology projects (Education Services Australia, 2020):

Computational thinking - a process where a problem is analysed and solved so that a human, machine or computer can effectively implement the solution. It involves students using strategies to organise data logically, break down problems into parts, interpret patterns and design and implement algorithms to solve problems.

Systems thinking - an understanding of how related objects or components in-

teract to influence how a system functions. It is important they understand the complexity of systems and the interdependence of components for the creation of solutions to technical, economic and social challenges.

Design thinking - involves a process where a need or opportunity is identified, and a design solution is developed. The consideration of economic, environmental and social impacts that result from designed solutions are core to design thinking. Design thinking methods can be used when trying to provide a structure to assist students in understanding a problem, generating ideas and refining a design based on evaluation and testing (Cameron, 2020).

This knowledge included in the Technology curriculum was designed to help students work in innovative and creative ways – essential skills for the entrepreneurial needs of a rapidly changing future.

Trends and Issues in Digital Learning

Trends in Digital Literacy in the Australian Schooling System

1. The integration of technology in all aspects of the education system

Technology has become an integral part of Australian schools for delivery of learning, communication, and administration. The integration of laptops, tablets and interactive whiteboards is commonplace in most classrooms. With the sudden introduction of online remote teaching due to COVID-19 lockdowns, schools were rapidly forced to incorporate digital learning and online platforms into their lesson delivery. Learning Management Systems (LMS) have become a staple, allowing teachers to organize content, assignments, and assessments online. During the COVID-19 pandemic, easy access to content in LMSs not only streamlined administrative tasks but also provided a central

hub for students to access course materials and submit assignments. This allowed both teachers and students to access educational materials from home, ensuring anywhere, anytime learning is possible.

With a lack of government ongoing funding to fully support digital infrastructure in schools, many schools have adopted BYOD (bring your own device) programs. Students are required to provide their own laptops or tablets, to enable them to access classroom learning materials. This approach fosters more individualized learning, as students can progress at their own pace and explore subjects in depth.

The traditional chalkboard or whiteboard has been replaced in most classrooms. Interactive whiteboards are still commonplace in many primary schools but data projection from a teacher's laptop is now more typical. This allows digital displays of teacher presentations which can offer more dynamic teaching tools, allowing educators to create interactive lessons, use multimedia resources, and engage students with hands-on activities.

Technology has become deeply integrated into the Australian school classroom, offering numerous benefits, including access to information, enhanced collaboration, and engaging learning experiences. While technology's advantages are clear, Australian teachers are becoming increasingly aware of the dangers of an overreliance on technology (this issue is developed later in the chapter).

2. The growing importance of digital learning for both teachers and students

Digital learning and blended learning are becoming increasingly popular in Australian schools, as they offer both teachers and students more flexibility, convenience and choice. Digital learning is the delivery of instruction and assessment through digital technologies, while blended learning is a combina-

tion of digital (remote) and face-to-face instruction. Employing digital learning can also be more cost-effective for schools than traditional face-to-face instruction. However, it is important to ensure that digital learning programs are of high quality and that students have the necessary support to succeed.

Digital delivery can also help teachers to better differentiate their instruction. Teachers can use online learning platforms to create modified assignments and learning activities for students with different learning needs and abilities. Learning can be undertaken at the learner's own pace and in their own time, and learning resources can be accessed from anywhere with an internet connection. In a country the size of Australia, there are obvious advantages to this form of instruction over traditional face-to-face learning. Digital learning is now the go-to form of delivery for much teacher professional development.

There is a growing body of research that supports the use of digital learning in schools. For example, a study by the Australian Council for Educational Research (ACER) found that students who participated in online learning programs made significant gains in academic achievement (2022). Online platforms, which include LMSs now commonly used in schools, offer features such as discussion forums, shared documents, and multimedia integration, fostering a dynamic environment where students collaborate irrespective of geographical constraints.

Digital assessment and feedback technologies have recently begun to emerge in Australian schools. These tools have the potential to transform the way that learning is assessed and supported. However, it is important to ensure that teachers are adequately trained on how to use these tools effectively and that all students have access to the necessary digital devices and internet connectivity.

The impact of digital and blended learning for many students in Australian schools has been significant. Schools have been required to develop effective

policies and practices for implementing digital and blended learning to safe-guard student wellbeing and address student disadvantage, and for managing student data in online environments. Ensuring the quality and accuracy of online educational content is also of vital importance to the success of digital learning.

3. Utilization of artificial intelligence (AI) is gaining popularity in teaching and learning

Australian teachers and students are beginning to use generative AI tools in a variety of ways. With the recent declaration that AI tools are permitted to be used for teaching and learning activities by both teachers and students in all Australian schools from 2024 (Cassidy, 2023), their use in the classroom is predicted to rise exponentially. For this reason, the Education Minister has announced that a 'National AI in Schools Framework' will be introduced, and a Consultation document is currently available (NSW Government: Education, 2023b).

One of the most popular applications of these AI tools has been in content generation for teaching. Traditional methods required teachers to spend long hours preparing lessons and classroom activities. With the assistance of generative AI, teachers can create a wide array of content, from poems and stories to coding exercises, in a fraction of the time. This not only provides teachers with more time to focus on students but also ensures a diverse range of teaching materials, tailored to current trends and knowledge.

Professional development sessions for teachers on the effective use of AI tools have surged in popularity, indicative of the enthusiasm for AI tools within the education sector. Teachers are keen to harness the capabilities of generative AI, not only for content creation but also for personalizing the learning journey for each student. Traditional teaching materials are often generic, designed for the average student. Generative AI, however, offers a paradigm shift. By

analysing a student's performance, preferences, strengths, and weaknesses, the AI tool can create customized quizzes, worksheets, and even assessment tasks. This level of personalization ensures that no student is left behind, and each receives an education tailored to their unique needs.

Students, too, are benefiting from the AI-driven approach. Immediate feedback provided by AI tools enables students to identify and rectify their mistakes. This immediate response not only accelerates the learning process but also builds students' confidence. Encouraging students to submit first drafts for AI review means that teachers receive a final polished version for evaluation, making the grading process more efficient and accurate. It also allows teachers to focus on providing qualitative feedback, which can significantly improve a student's learning experience.

4. The rise of integrated STEM education

One of the most notable shifts in Australian schools in recent years is the emphasis on integrated STEM (Science, Technology, Engineering and Mathematics) education. In this interdisciplinary approach, students typically undertake practical, hands-on projects, events or competitions where they can showcase their creations and solutions. STEM projects in Australian schools often focus on real-world problems. This can include designing sustainable housing solutions, creating water filtration systems, or programming robots to perform specific tasks; students are given hands-on opportunities to solve challenges. When students see the practical application and relevance of what they are learning, it assists their understanding.

By combining STEM subjects in this practical way, students see the inter-connectedness and relevance of these subjects. This problem-based learning approach fosters creativity, critical thinking, and collaboration - essential skills, not just for STEM fields but for any future profession and life in general. It is projected that many of the jobs of the future will require STEM skills. How-

ever, this is not just about producing scientists and engineers, it is to equip all students with a STEM literacy that will benefit them regardless of their career paths. The Australian government and educational bodies recognize this and have invested significantly in STEM education.

While the benefits of integrated STEM projects are many, they are not without challenges. For effective implementation, schools require adequate resources, trained teachers, and a curriculum that supports interdisciplinary learning. Moreover, striking a balance between academic rigor and hands-on exploration is essential to ensure students receive a comprehensive education. Inclusivity is also a crucial factor. Historically, certain groups have been underrepresented in STEM fields. Australian schools are increasingly recognizing the importance of ensuring that all students, regardless of gender, cultural background, or socio-economic status, have equal opportunities and encouragement to engage in STEM.

5. The increased use of computer games, gamification, and eSports

Computer games are being used increasingly in Australia. Games like 'Minecraft: Education Edition' have found a place in many primary schools, helping students understand complex concepts such as mathematics, ecology, and history in an interactive way. Through these games, students can construct virtual worlds, solve problems, and collaborate with peers.

Many schools have purchased educational games tailored to specific subjects to provide an adaptive learning environment; for example, in secondary schools, games designed to teach languages or science are common. These games adapt to a student's progress and understanding and offer targeted challenges and feedback. This personalized approach ensures that students remain engaged while learning at their own pace.

Gamification, the application of game-like elements in non-gaming scenarios,

has proven effective in motivating students and enhancing the learning process. Teachers incorporate scoring systems, badges, leaderboards, and challenges into regular lessons. For instance, reading a certain number of books might earn a student a badge, or correctly solving math problems might give points leading to a leaderboard. This competitive yet supportive environment encourages students to take ownership of their learning. Gamification tools, such as Classcraft or Kahoot! have become popular in many schools. These platforms turn lessons into interactive experiences, where students can work in teams, answer questions, and earn rewards, making the learning process more engaging and enjoyable.

Schools across the country have started recognising eSports not only as a legitimate sport but also as a platform for skill development. Many Australian secondary schools now have their own eSports teams, participating in national and regional tournaments. While playing games, students learn about teamwork, strategy, communication, and analytical skills. Participating students often exhibit improved concentration, critical thinking and collaboration skills.

The principles of game design are included in an elective Digital Technologies Curriculum topic so the inclusion of eSports in schools has legitimate educational value. It also provides students with some of the skills that are required for careers in game design, broadcasting, event management, and even scholarship opportunities in universities that have their own competitive gaming teams.

While the integration of games and gamification offers numerous benefits, it is crucial for educators to strike a balance. Over-reliance on gaming mechanisms could detract from essential traditional learning experiences. Additionally, the risk of screen addiction and ensuring that content is age-appropriate are concerns educators must address. However, with careful planning and a balanced approach, computer games, gamification, and eSports can significantly enrich the Technologies curriculum.

6. Using digital learning tools for collaboration

Australian schools have been at the forefront of incorporating collaborative digital tools into their curricula. Rather than use digital technologies to run drill-and-practice programs, or have students focussed on individual tasks, Australian teachers have a preference for group work. Collaborative technologies enable teachers and students to share presentations, worksheets, classroom resources, assessment tasks and communicate via collaborative tools. These tools not only enhance learning outcomes but also promote the development of 21st-century skills (Jefferson & Anderson, 2017).

While Learning Management Systems (LMS) like Google Classroom, SeeSaw, Canvas, Microsoft Teams, Moodle or Edmodo are now common in both Australian primary and secondary classrooms, it is the widespread adoption of cloud-based platforms such as Google Workspace for Education and Microsoft that have had the largest role in working collaboratively. Google Docs and Microsoft Word Online, for instance, have become essential tools, allowing multiple users to work on a single document simultaneously. This concurrent access means that students and teachers can collaboratively edit, comment, and provide peer feedback in real time, streamlining the group work process and encouraging interactive learning.

Assignments can now be distributed digitally, and students can submit their work back via the same platform. Teachers can then annotate, provide feedback, or grade assignments directly within the document, creating a centralized and organized workflow. The immediacy of this feedback loop ensures that students understand their mistakes and can make revisions more promptly.

Moreover, digital portfolios have grown in prominence, allowing students to create, curate, and share their work over time. Platforms like Seesaw offer students a space to document their learning journey, share it with their peers, teachers, and even parents, emphasizing reflection and continuous growth.

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Most schools also allow limited parental access to these platforms so they can keep abreast of their children's workload requirements.

One of the benefits of this sharing-centric approach is the development of the skills required to be addressed as part of the Digital Literacy Capability which includes addressing online etiquette among students, including respecting others' contributions, understanding version histories, and managing digital permissions.

However, with the increased capability to share, concerns about online safety and integrity arise. The Digital Literacy Capability (ACARA, 2022c) addresses this content to promote a safe digital environment. It is the requirement that teachers ensure students, at all school levels, are familiar with the ethics of digital sharing, avoid plagiarism and understand the privacy of personal information.
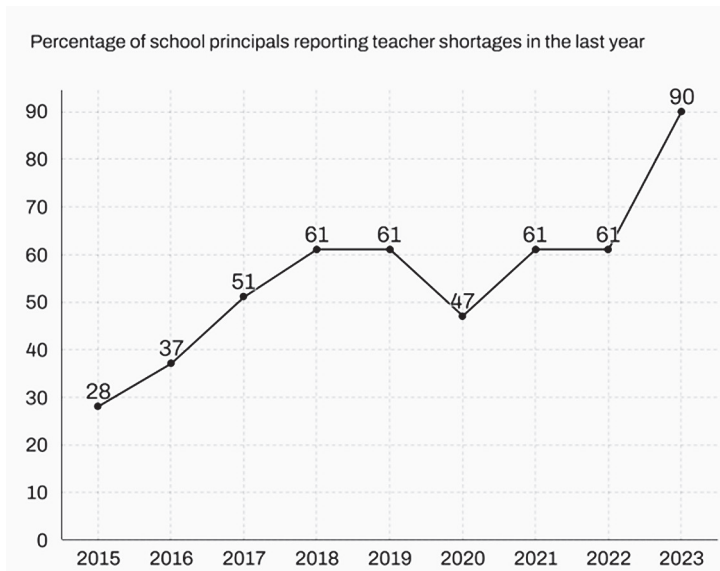
Teachers have found that the inclusion of collaborative digital tools has led to a more efficient, convenient, inclusive, and transparent educational experience.

Issues in Digital Learning

1. General teacher shortage

In 2023, the Australian Government Department of Education predicted that there would be a shortfall of 4,100 secondary school teachers by 2025. This shortage is already being felt in schools across the country, with many schools reporting difficulty filling vacant teaching positions (see Figure 3).

Figure 3 AEU State of Our Schools Survey 2023

Percentage of school principals reporting teacher shortages in the last year

	2015	2016	2017	2018	2019	2020	2021	2022	2023
	28	37	51	61	61	47	61	61	90

Note. Australian Education Union, 2023; Cited in 'Investing in Australia's Future: For every child, fully funded public schools'

Secondary schools are currently experiencing more teacher shortages than primary schools. This is due to a number of factors, including the higher turnover rate of secondary school teachers and the increasing demand for teachers in STEM (Science, Technology, Engineering and Mathematics) subjects. The situation for Technology teachers is dire in all Australian states and territories. However, schools in rural, regional and remote areas are experiencing more severe teacher shortages due to the difficulty in attracting and retaining teachers in areas with more limited services.

The issue is being exacerbated by a number of factors (Kuestenmacher 2023), including:

● Declining numbers of new graduate teachers: The number of students entering initial teacher education (ITE) has been declining in recent years.

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In 2022, the number of first preferences for education degrees was down 19.24% from 2023, the lowest rate since at least 2016.

- Increasing demand from a growing student population: Australia's student population is projected to grow by 11% between 2021 and 2031, putting further strain on the teacher workforce.
- An ageing teacher and leadership workforce: More than a third of all registered teachers in Australia are aged 50 years and over. This means that a significant number of teachers are approaching retirement age, and there is a need to attract and retain new teachers to replace them.

The teacher shortage is currently having a number of negative consequences for Australian schools (Kuestenmacher, 2023), including:

- Teachers are having to work harder to cover for vacant teaching positions. This is leading to burnout and a decline in the quality of teaching.
- Schools are having to increase class sizes to cope with the teacher shortage. This can make it difficult for teachers to provide individualized attention to their students.
- Schools may have to reduce the number of subjects or programs they offer due to the teacher shortage. This can limit students' learning opportunities. Fewer Senior High School elective Technology classes are being offered in 2023 and teachers report it is not due to a drop in student interest but a lack of qualified teachers able to teach at this level.

The Australian Government is taking a number of steps to address the teacher shortage (Kuestenmacher, 2023), including:

- The Australian Government is providing scholarships to increase the number of students entering Initial Teacher Education (ITE) programs in universities.
- The Australian Government is working with state and territory governments to improve the salaries and working conditions of teachers.

- The state and territory governments are offering financial incentives and other support measures to attract and retain teachers in rural and remote areas.

Despite these efforts, the teacher shortage is likely to remain a challenge for Australian schools in the coming years. Being a knowledge-driven economy, Australia needs to uphold the standard of its education system. Encouraging talented, skilled and enthusiastic individuals to pursue teaching careers is a crucial step in preparing the country for the future (Kuestenmacher, 2023).

2. The need for teacher professional development

Many teachers did not grow up using digital technologies in the same way that their students have and consequently they are not always confident in their own digital skills. As digital learning becomes increasingly ubiquitous in Australian classrooms, there is a growing demand for teacher training programs that can help teachers to confidently integrate digital technologies into their teaching practice. Even those who were formally trained in digital learning can find it difficult to keep up with the rapid pace of change in the field (Zagami, 2022).

According to a recent survey by Seven Steps (2023), a leading provider of teacher professional development, 92% of Australian teachers believe that digital learning is important for their students, and 83% said that they would like more professional development on the topic. Despite this, higher proportions of Australian teachers, compared to the OECD average, indicated that they had received training in teaching in the use of digital learning in teaching (ACER, 2018).

There is a growing body of research that supports the implementation of ongoing teacher training programs for digital learning. For example, a study by the Australian Council for Educational Research (ACER, 2023) found that teach-

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ers who participated in digital learning training programs were more likely to use digital technologies in their teaching practice and to report positive outcomes for their students. Some of the key areas teachers state they need further training in include:

- The integration of digital technologies in teaching and learning activities
- The development of digital learning resources
- The assessment of digital learning
- The management of digital learning environments
- The ethical use of digital technologies in schools

This research demonstrated that the potential benefits of teacher training programs for digital learning are significant. By providing teachers with the skills and knowledge they need to use digital technologies effectively, these programs can help to improve student learning outcomes.

In addition to the topics listed above, demand for teacher training programs for digital learning is increasing in topics such as:

- Using artificial intelligence tools in the classroom
- The use of social media in education
- How to leverage mobile learning
- Fully utilizing digital collaborative tools
- Using virtual reality and augmented reality in education
- Realising the potential data analytics in education

These topics are becoming increasingly important as digital technologies continue to evolve. By providing teachers with training on these topics, teacher training programs can help teachers to stay up to date with the latest trends in digital learning.

The Australian government is taking steps to support teachers in developing their digital learning skills by funding the development of several digital

learning resources and tools for teachers' professional development programs for teachers on digital learning, some of which have been outlined earlier in this chapter. Both the various governments and individual schools need to play a role in supporting teachers in developing their digital learning skills so that they can provide their students with the best possible education.

3. Uneven access to digital learning – the digital divide

The digital divide refers to the gap between students who have the devices and internet access they need to learn online and those who do not. This gap can have a significant impact on student outcomes, as students without access to digital learning infrastructure may be unable to complete their schoolwork, participate in class activities, and/or access online resources.

The digital divide can manifest in a number of ways. Students from low-income families are less likely to have access to a computer or tablet at home, those living in rural areas may have difficulty accessing reliable internet service, and students with disabilities may need specialised hardware or software that is not available to them. Students who feel like they are falling behind academically are more likely to drop out of school, which then limits their opportunities for future education and employment.

The digital divide became particularly apparent in Australia during the COVID-19 pandemic, as many schools shifted to online remote learning. Students without access to digital learning infrastructure were at a significant disadvantage during this time.

While the technological infrastructure in Australian schools for digital learning is on a positive trajectory (Thomas et al., 2023), there is still some work to be done to ensure that all students have access to the resources and the support they need to succeed in a digital world. Even now, some schools in rural and remote areas have limited access to high-speed internet (NSW Dept of Educa-

tion, 2023; Queensland Audit Office, 2023).

It is important to address the digital divide so that all students have the opportunity to succeed in school and in life. While the Australian Government has a number of initiatives in place to address the digital divide, such as the 'Schools Broadband Initiative' (ADDMC, 2022) and the 'Digital Inclusion Program', the statistics below illustrate more needs to be done to ensure that all Australians have access to the digital tools and skills they need to succeed.

- 11% of Australians do not have a smartphone (Deloitte, 2019).
- 16% of Australians have difficulty using the internet (ACMA, 2020).
- 22% of Australians do not have access to a fixed broadband connection (ACMA, 2020).
- 34% of Australians in the lowest income quintile do not have a home internet connection (ACMA, 2020).

These statistics show that the digital divide is a significant issue in Australia, and one that is important to address so all Australian students have the opportunity to participate fully in their classroom activity.

4. Community push back against digital technologies use

Australian parents and community members are starting to push back against the use of digital devices in schools and pre-schools for a variety of reasons (Gonski Institute for Education, 2020; Royal Children's Hospital, 2021), including:

- Australian children spend an average of seven hours per day in front of screens, and this can lead to a variety of health problems, including obesity, sleep deprivation, and eye strain.
- Digital devices can be a major distraction in the classroom, making it difficult for students to focus on their work.
- Digital devices can make it easier for bullies to target their victims, both

inside and outside of school.

- Schools often collect a lot of data on students' digital activity, and parents worry about how these data are being used and protected.
- Digital devices can make it easier for students to cheat on tests and assignments.
- Digital devices can discourage face-to-face interaction between students, which is important for their social and emotional development.

In addition to these general concerns, some parents and community members also have specific objections to certain types of digital devices or educational software. For example, some parents worry that the use of tablets and smartphones in the classroom can lead to addiction. Others are concerned about the use of educational software that tracks student data or uses artificial intelligence to personalize their learning.

It is important to note here that research that suggests that digital learning enhances learning continues to grow. For example, recent studies have shown that utilising digital learning can help students to develop their critical thinking skills, creativity, and problem-solving skills (Ibrahim et al., 2021; Van-Sickle & Rupp, 2020). However, this research also suggests that digital devices should be used in moderation and in a way that is aligned with learning outcomes.

While the Australian government continues to invest in the use of digital devices in schools, the need to address parental concerns has been recognised. In 2020, the government released a 'Digital Education Strategy' which outlined several ways to address the risks associated with the use of digital learning in schools. These include:

- Providing training for teachers on how to use digital devices safely and effectively in the classroom.
- Developing resources for parents on how to manage their children's use of

digital devices at home.

- Working with industry partners to develop safe and effective digital educational products and services.

The Australian government is also developing a national online safety strategy for schools. This strategy aims to protect students from online harm, including cyberbullying, online predators, and inappropriate content. Extensive educational resources have been developed on the eSafety Commissioner's website (eSafety Commissioner, 2023). The eSafety Commissioner is the world's first government agency dedicated to keeping people safer online.

At this stage it is not clear what affect these actions will have on the parental and community resistance to device use in Australian schools, but it will be a space to watch in the coming years.

5. Lack of engagement with digital learning by Australia's First Nations students

Australia's First Nations students are less likely to engage with digital learning and technology than their non-Indigenous peers. This is due to a number of factors (Department of the Prime Minister and Cabinet, 2020; Robinson & Bidwell, 2019), including:

- First Nations students are more likely to live in remote communities with poor internet access and limited availability of devices. This can make it difficult for them to participate in digital learning activities.
- Some First Nations students may be reluctant to use digital technologies due to cultural factors. Some communities may place a higher value on oral storytelling than on written communication.
- Much of the digital learning content available in Australia is not culturally relevant to First Nations students. This can make it difficult for them to engage with the material and see how it relates to their own lives.

- Not all teachers in Australia are trained to teach using digital technologies in a culturally responsive way. This can lead to First Nations students feeling alienated and excluded from digital learning activities.

There are a number of things that can be done to address the lack of engagement with digital learning and technology by First Nations school students (Department of the Prime Minister and Cabinet, 2020; National Indigenous Australians Agency, 2020). These include:

- Governments and schools need to invest in improving access to devices and internet in remote communities. This could include providing free or subsidized devices to students and installing Wi-Fi hotspots in public places.
- More needs to be done to develop culturally relevant digital learning content for First Nations students. This might involve working with First Nations communities to create content that reflects their culture and values.
- All teachers need to be trained to teach using digital technologies in a culturally responsive way. For example, providing training on how to use digital technologies to teach Aboriginal and Torres Strait Islander culture and history, and how to create culturally relevant digital learning resources.

The lack of engagement with digital learning and technology can limit First Nations students' access to educational resources, hinder their learning outcomes, and disadvantage them in the job market. However, it is important to note that there is no one-size-fits-all solution to the issue of lack of engagement with digital learning and technology of Australia's First Nations school students. What works for one student may not work for another. It is important to consult with First Nations communities and students to develop solutions that are tailored to their specific needs.

Conclusion

The Education Goals for Young Australians (Australia Council, 2019) emphasize excellence, equity and the development of confident and creative individuals. Achieving equity in digital learning in Australia's classrooms has been challenging. Digitalization is well-established in the Australian education system, with technology playing a vital role in classroom education, administration and communication. Most Australian teachers actively employ digital technologies to enhance learning and prepare students for a connected world.

Several features differentiate Australian digital learning from many of its OECD counterparts. A national curriculum mandates technology and digital literacy education for all Australian students, with the goal of ensuring consistent experiences with digital learning from Foundation to Year 8 or 10. Emphasis is placed on online safety and digital citizenship education, addressing protection from online harm and responsible technology use, and coding and problem-solving skills are integrated into the curriculum, acknowledging their importance in an increasingly technological world.

Current trends in digital literacy in Australian schools include widespread technology integration, the growing significance of digital learning, STEM education and the increased use of artificial intelligence tools. These developments offer benefits but also raise concerns about overreliance on technology. While digital learning offers flexibility, it also requires high-quality programs and support. Artificial intelligence tools may assist in this and in other related areas of digital learning.

However, a number of issues threaten the future of quality digital learning in Australian schools. A predicted shortage of school teachers poses a challenge to maintaining education standards. The digital divide affects disadvantaged students' access to digital learning resources and impacts their outcomes, and

some parents and community members are concerned about digital device use in schools, prompting the government to work on a national online safety strategy.

In conclusion, Australian education utilises digital learning and online safety education, while striving for excellence and equity. However, challenges such as teacher shortages, the digital divide, and First Nations students' engagement must be addressed if the stated Education Goals for Young Australians (Education Council, 2019) of excellence and equity are to be met in the future.

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