Digital Literacy in the Australian Curriculum Version 9.0

Abstract

This paper explores the Digital Literacy general capability in the Australian Curriculum Foundation to Year 10. Through examining various researchers' work, it provides a comprehensive background to support the theory and research that underpin the Digital Literacy learning continuum. Digital literacy has differing definitions around the world; the aim of this paper is to highlight the key understandings that support the definition and structure of digital literacy within the Australian Curriculum. It describes the models and processes used in the development of the Digital Literacy continuum and expands on the connections between Digital Literacy and the other general capabilities.

The research provides descriptions and the justification for the inclusion of digital literacy in the curriculum, highlighting its importance for almost all aspects of our daily lives. It makes links to learning and explains how the skills may be evidenced within a learning area.

Key words: digital literacy; capabilities; skills; curriculum; research

Introduction

Digital literacy is a fundamental component of literacy learning. It can be looked upon as an extension of the grounding literacy skills of reading, writing, listening and speaking. Literacy has always been an essential vehicle for the acquisition of knowledge. With our ever-increasing engagement with digital tools, we require the development of knowledge, values, communication skills and critical thinking relevant for the information or digital age.

Digital Literacy is one of 7 general capabilities in the Australian Curriculum. It encompasses the knowledge and skills students need when using digital tools to create, manage, communicate and investigate data, information and ideas; and solve problems. It helps students to engage with the digital tools around them in a time of profound transformation, and to work collaboratively at school and in their lives beyond school. Digital literacy involves students:

- critically identifying and appropriately selecting and using digital devices and systems
- · learning to make the most of the technologies available to them
- adapting to new ways of doing things as technologies evolve
- protecting the safety of themselves and others in and around digital environments.

The Alice Springs (Mparntwe) Education Declaration (COAG Education Council 2019:7) states that all young Australians will be supported to ensure they "... are productive and informed users of technology as a vehicle for information gathering and sharing, and are able to adapt to emerging technologies into the future".

In the Australian Curriculum, digital literacy is addressed in 3 ways, through:

- Digital Technologies as the foundational subject, which provides explicit opportunities to support the development of digital literacy through the teaching of the Digital Technologies curriculum F–8 and optionally in Years 9–10
- digital literacy for learning; that is, as a general capability across levels 1–6, across Foundation to Year 10 in all learning areas
- digital literacy of learning; that is, as an educational tool for teaching and learning to present information to students, enhance student engagement and interaction with content, and assess learning across all learning areas.

Students use and extend their digital literacy skills when they are required to use digital tools to investigate, plan, create or communicate; they also learn about appropriate selection, operation and management of the tools. Through this engagement with digital tools, students experience the contexts in which they apply appropriate social and ethical protocols and practices on a "just-in-time" basis. For example, if students are required, in Foundation, to create a digital story, then they would not only learn the basic functions of the software but also how to operate and manage the tool. When students use digital tools to communicate, they also learn "just in time" the practices associated with digital safety and wellbeing.

Research summary

In 1997 Gilster's seminal work provided the foundations for our understanding of digital literacy. Gilster (1997:1) defines digital literacy as "the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers". Subsequent research on digital literacy has attempted to capture the implications of technology developments, highlighting the shortcomings of an information literacy focus, with the appearance of new terms such as "media literacy" and "communication literacy" (Gallardo-Echenique et al. 2015; Coldwell-Neilson and Cain 2019). Belshaw (2012) highlights the difficulty with language in this space, pointing out that there has been a proliferation of terms that lack definition, which can lead to misunderstanding and invalid assumptions.

In Gilster's day, computers were large, expensive and located in specialised, air-conditioned environments, whereas now they reside in our pockets, on our wrists or on our desks. We may even have multiple devices such as a laptop, a tablet or iPad and a smartphone, to name but a few. Modern mobile devices have had a significant impact on how and why we use digital tools. They are no longer restricted to business applications and office work, but are used to communicate, to gather information and for entertainment. More importantly from an educational perspective, access to digital tools has increased in some areas, while equity issues can still remain in others.

In the 1990s computer users were trained to use software specific to their employment. These days the technology is available to most and is designed to eliminate the need for specialised training to use it. Software is readily available on mobile devices targeted at children as young as 2. Herein lies the problem. Many researchers have explored how technologies are now used and have concluded that being able to use digital tools does not equate to being digitally literate (Ng 2012; Savin-Baden 2015; Coldwell-Neilson 2018). In his Adobe Blog, Gay (2019) makes the distinction that "digital literacy is not to be confused with a digital lifestyle, which refers to passive use of digital platforms".

Research from around the world has identified the need to build capacity in the digital space, with many recognising that digital literacy is a key competence for daily living and for lifelong learning (European Union 2007). The United Nations (2015) positions digital literacy as a key component in its 2030 Agenda for Sustainable

Development. Numerous industry bodies have responded to the UN positioning, developing frameworks and models of digital literacy with the goal of increasing digital literacy proficiency locally and globally. As early as 2015, the Foundation for Young Australians (FYA) identified digital literacy as one of 8 core transferable skills underpinning Australia's future growth and success, recommending that it be embedded at all education levels. More recently, FYA (2017:21) has pointed out that skills in high demand are digital literacy, critical thinking, creativity and presentation skills, reinforcing the work of Hajkowicz et al. (2016:13), who state: "to enter the labour market of the future Australians will need to be literate, numerate and digitally literate. These capabilities will be threshold requirements for most jobs."

In light of the changing nature of our digital environment in the 21st century, there has been an urgent need to develop a broad, inclusive and holistic understanding of what digital literacy entails, which then informs how digital literacy capability is supported in the classroom and elsewhere. As Coldwell-Neilson (2020:10) suggests, "the dynamic nature of the digital world requires a continuing discourse around meanings and interpretations to maintain a shared understanding". This approach is well reflected in the Digital Literacy general capability, which draws on the strengths of the Information and Communication Technologies (ICT) general capability, which it replaces, and addresses the shortcomings that contemporary digital developments had exposed.

Building on previous research, derived from the Jisc (2014) definition and capturing the key aspects of the 8 elements of digital literacies (Belshaw, 2012), Coldwell-Neilson (2018:104) proposes a definition of digital literacy that captures the need for digital skills across all aspects of our lives:

... digital literacy is the ability to identify and use technology confidently, creatively and critically to effectively meet the demands and challenges of living, learning and working in a digital society.

As Coldwell-Neilson (2020) suggests, maintaining our digital literacy skills needs to be aligned with the evolution of technologies and digital media. The skills need to be flexible, expanding and transferable across technologies and disciplines. "Digital literacy is a mindset and an attitude, not just a skill set" (Coldwell-Neilson 2020:18); this entails an exercise in lifelong learning scaffolded by a strong foundation that starts in a child's early years.

Coldwell-Neilson (2020) presents an underlying framework – the Decoding Digital Literacy (DDL) framework – which elaborates on the broad skills and capabilities that underpin digital literacy and captures the ever-changing skills and capabilities that are needed to navigate our digital world. The framework Coldwell-Neilson (2020:6) presents captures the essential elements of digital literacy, which include:

- 1. ICT proficiency
- 2. information and media literacy
- 3. communication, collaboration and participation
- 4. information and data management
- 5. creation and innovation
- 6. digital identity and wellbeing
- 7. privacy and security.

Each of these elements provides the foundation to:

- develop an understanding of how digital technologies work and build confidence in using them
- develop the agility and flexibility to engage with, and manoeuvre in, a rapidly changing digital environment
- actively develop skills to understand the modern media world and engage critically with the environment

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- develop the skills to recognise when information may be unreliable at best, or fake at worst
- develop the skills and capabilities to be a responsible, digital, global citizen
- find balance in a world that revolves largely around technology
- develop the skills and capabilities to harness the power of digital technology for the betterment of oneself, one's community and more broadly, the world we live in
- understand the role that digital technologies have in facilitation, promotion and obfuscation.

This research has contributed to refining and expanding the Version 8.4 Australian Curriculum: ICT Capability into the Version 9.0 Australian Curriculum: Digital Literacy general capability, recognising the changing use and abuse of technology, and the increasing demands placed on individuals and organisations. The sub-elements developed recognise the importance of a holistic approach to developing digital literacy with a breadth beyond information literacy and acknowledging the growing importance of understanding privacy and security.

Unpacking the Digital Literacy general capability

The Digital Literacy learning continuum is organised into 4 elements: *Practising digital safety and wellbeing; Investigating; Creating and exchanging; Managing and operating,* as shown in Figure 1.

Figure 1: Digital Literacy elements



Practising digital safety and wellbeing

The focus of this element is on personal safety and security in online environments. This element addresses the development of digital identity and wellbeing, and privacy and security (of self) as described in the DDL framework. It is organised into 3 sub-elements, each of which contribute to students' ability to be critical and safe when using digital tools as well as developing good habits as digital citizens. The sub-elements are:

• Manage online safety: focuses on using age-appropriate online tools safely. Students develop the range of skills needed to recognise and address online risks as well as strategies to deal with them. This is analogous to students learning to cross a busy road. The first steps are under the supervision of a trusted adult, learning

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the process of crossing a road, how to recognise where it is safe to do so, and when it is safe to act. As students develop their skills and confidence in managing their personal online safety, they will be enabled to act as positive role models in online environments.

- Manage digital privacy and identity: students progressively develop skills to recognise that the online environment is a public forum and any information shared with apps, or posted on websites, in social media and other online forums, is likely to be stored permanently. Students are guided to recognise and manage their personal digital footprint and identity. They build an understanding of the potential future impact that personal data online could have (positive and negative). Associated with this is learning how their use of digital media impacts their digital footprint. Managing online safety and managing digital privacy and identity go hand in hand, the former being more reactive to online situations and the latter being proactive.
- **Manage digital wellbeing**: as with any tool or activity, overuse can have negative implications for our health; learning, working and playing in online environments is no different. Ongoing research has shown that excessive screen time can negatively impact health and wellbeing, with extreme use leading to addiction. From the early years, students are guided to develop strategies for healthy and productive use of digital tools, recognise when usage is becoming unhealthy and progressively develop strategies to self-regulate their actions.

Investigating

This element includes finding, collating, analysing and interpreting data to support problem-solving and decisionmaking. It is related to information and media literacy, and information and data management in the DDL framework, and organised into 3 sub-elements:

- Locate information: students learn how to use search engines to find relevant and reliable information. As they progress, they can use advanced search functionality to find relevant information. An important aspect of this sub-element is the development of information and media literacy the ability to recognise credible information sources, and to recognise unreliable information and misinformation. The proliferation of information about COVID-19 is a good example. Information underpinned by research and shared by credible sources was readily available, but there was also a considerable amount of misinformation that may have been perceived as credible because it was widely available and shared on social media.
- Acquire and collate data: sources of information are readily available online, allowing students to address a wide range of complex situations. Students develop an understanding of how data can be generated and processed to provide insights and solutions to problems and to support decision-making. Different tools will be appropriate for different contexts and age levels, and should be introduced in the discipline context.
- Interpret data: in discipline contexts, students create and build knowledge by analysing data, using appropriate tools such as data visualisations, simulations, presenting patterns and trends to facilitate problem-solving and decision-making. This could be using graphs and charts to explore numerical data, for example, or analysing textual and graphical data.

Creating and exchanging

This element is organised into 3 sub-elements and is aligned with Communication, collaboration and participation; and Creation and innovation in the DDL framework. The global pandemic highlighted the skills we all need to work from home and to support online learning. Blended work and education is becoming the norm, further increasing the importance of staying connected in online environments and being able to work collaboratively online. The sub-elements are:

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- **Plan:** students use digital tools to plan and manage a process that considers design constraints and risks. A simple example is managing their time by using a scheduling assistant to plan their learning, play and other activities effectively, or using a Gantt chart to develop a timeline for process development.
- Create, communicate and collaborate: students are often adept at communicating in social media contexts, but how should these skills be adapted and developed in a collaborative learning environment or, later, in a work environment? Group and project work online require good planning and shared documents that are developed collaboratively. How can version control be implemented when more than one person may be working on a document at the same time? What communication protocols should be used? There is a myriad of communication channels available to us: email, video calls and chat to name just a few. What are the strengths and weaknesses of each? Within the constraints of what is available to them, students need to be able to assess which methods, tools and strategies are most effective to support their individual and collaborative goals.
- **Respect intellectual property:** students are increasingly using and sharing content online. The ease with which content can be copied, remixed and shared has masked the ethical and legal responsibilities around ownership of digital content. Just because we can copy and re-use an image or logo, should we? Plagiarism, copyright, fair dealing and licensing are just as relevant concepts in the digital world as they are in the physical. Through understanding our legal and ethical responsibilities, we demonstrate respect for others by protecting their digital creations and crediting others' content.

Managing and operating

This element, organised into 3 sub-elements, is mainly aligned with ICT proficiency, with connections to Privacy and security in the DDL framework. There are often assumptions made about students' operational knowledge of their digital devices simply because they are using them. This element focuses on providing students with the key skills to effectively and efficiently engage with digital tools.

- **Manage content:** focuses on students organising information and data in appropriate and logical ways, so they can easily retrieve it when needed. This is equivalent to a filing cabinet where documents are placed in a logical sequence and grouped together appropriately, as opposed to thrown in randomly. There are many storage opportunities available within a device itself and online. Can students save their work in a purposefully selected location? Can they retrieve it easily? Can they distinguish between local, networked and cloud storage solutions; and do they understand the implications of using each?
- **Protect content:** using secure login and passwords is the most often touted solution, but along with this is the need to understand what constitutes a strong password and to have a safe strategy to be able to recall it; for example, by using a password manager. Implementing virus protection, and using virtual private networks and encryption to keep data and devices safe and secure are actions that are often overlooked when considering protection from digital harm. Students need to be able to identify potential threats to implement relevant cyber security practices to avoid harm. This sub-element is strongly aligned with Practising digital safety and wellbeing.
- Select and operate tools: students need to have some technical knowledge of the hardware and software components of the devices they are using to select, use and troubleshoot appropriate digital tools. An understanding of computer basics will give students a strong foundation to understand that digital literacy skills are transferable between devices. It will enable students to be flexible and adaptable as they are faced with different and evolving technologies. The Digital Technologies curriculum will support this sub-element, but the learning from this needs to be contextualised in the other learning areas.

Structure of the continuum

Each general capability is presented as a learning continuum or learning progression. The Digital Literacy learning continuum is organised as a series of elements and sub-elements describing the skills, behaviours and knowledge students are expected to demonstrate from Foundation to Year 10 (see Table 1). Elements are the organising features that contain a set of related but specific skills and behaviours. Sub-elements describe the specific skills in detail from Foundation to Year 10.

Skills described within a sub-element are aligned to the content descriptions and achievement standards in the learning area curriculum. Generally, the development or progression across the sub-element is expressed in the following ways:

- supported to independent demonstration of the skill
- concrete to abstract concepts
- familiar to less familiar contexts
- simple to highly complex contexts
- applying the skill for an increasing range of purposes
- · increasing flexibility when applying the skill to learning
- · increasing ability to select the appropriate course of action
- increasing ability to respond independently.

Table 1: Learning continuum structure

Levels	Level 1 (Foundation)	Level 2 (Years 1-2)	Level 3 (Years 3-4)	Level 4 (Years 5-6)	Level 5 (Years 7–8)	Level 6 (Years 9–10)
Element: Organising category for a set of skills and behaviours						
Sub-element	Describes a specific skill or behaviour from Foundation to Year 10					
Sub-element	Supported and scaffolded demonstrations				;	Independent and flexible application
Sub-element	Concrete and simple concepts				;	Abstract and complex concepts
Sub-element	Familiar or simple contexts					New or complex contexts

Connections across the general capabilities

There are interrelated and complementary skills across Digital Literacy and other general capabilities.

Digital Literacy and Critical and Creative Thinking

The Digital Literacy *Investigating* element and the Critical and Creative Thinking sub-element *Identify, process and evaluate information* are interrelated. The skills described in *Investigating* relate to the use of digital tools and platforms to efficiently search for and select information or data. Students collate, interpret and visualise data from different sources when solving problems. *Identify, process and evaluate information* describes the skill of identifying and organising information from a widening range of sources. Students evaluate information for accuracy, validity, bias and relevance.

Digital Literacy and Personal and Social capability

The Digital Literacy sub-element *Create, communicate and collaborate* and Personal and Social capability subelements *Communicate* and *Collaborate* are interrelated. The skills described in *Create, communicate and collaborate* relate to selecting appropriate digital tools and the ability to control their features to successfully create content. It also requires students to use digital tools as they effectively communicate and collaborate with a widening group of contacts and audiences. In the Personal and Social capability, *Communicate* describes the skill of using a variety of methods and forms when communicating in different situations. It includes identifying influencing factors and enacting feedback to improve communication. *Collaborate* describes how the skill of collaborating develops from Foundation to Year 10. It details specific behaviours such as cooperation, perspective taking, role performance and strategy identification.

Linking to the learning areas

Digital Literacy is context dependent and involves students developing the knowledge and skills needed to learn effectively in the digital world. It is developed through technical, cognitive and emotional elements. In the Australian Curriculum, Digital Literacy is included across all learning areas. Digital Literacy is developed as students are provided with authentic opportunities to practise and apply the skills as they engage with the content of the learning areas.

Digital Technologies is the foundational subject; it explicitly supports the development of digital literacy. Together, Digital Literacy and Digital Technologies give students the opportunity to become discerning users, productive creators, critical analysts and effective developers of digital solutions. While specific elements of Digital Literacy are addressed in Digital Technologies, concepts and skills are consolidated and extended across all learning areas and subjects.

When applied across all learning areas, Digital Literacy can take on a variety of forms. Students learn how to operate specific digital tools to help them realise their design ideas. This occurs when they generate and communicate design ideas, processes and solutions (from basic drawing and modelling programs to computer-aided design or manufacture, rapid prototyping and creating simulations). Students draw on digital literacy skills to perform computations, construct graphs, conduct probability simulations and experiment mathematically.

Using digital tools, students present and represent their learning, and collaborate, discuss and debate to coconstruct their knowledge. They explore the nature of digital tools and the implications for establishing and managing relationships. Students learn about ethical online behaviour, including protocols and practices for using digital tools for respectful communication.

The following links to work samples show what Digital Literacy looks like for student learning in the classroom.

Practising digital safety and wellbeing

Under development

Investigating

Year 2 Mathematics <u>The most popular use of the play space</u> Year 6 HASS F–6 <u>Australia's Federation</u> Year 9 Economics and Business <u>Managing financial risks and rewards</u> Year 10 Geography <u>Geographies of human wellbeing</u> Year 10 Mathematics <u>Predict a winner</u> **Creating and exchanging**

Year 3 Media Arts Machinima: Rowan of Rin

Years 3 and 4 Japanese 家族に日本語を教える (Teaching family members Japanese)

Year 7 Health and Physical Education E-journal: Badminton

Years 7 and 8 French Le Pain (The Bread)

Year 10 Economics and Business Business improvement processes

Year 10 English Essay on the Romantic poetry movement with visual representations

Managing and operating

Foundation Year Digital Technologies Observations: Data is all around us

Years 5 and 6 Design and Technologies Design project: Kitchen garden

Years 5 and 6 Digital Technologies Explanation: School networks

Resources and advice

The increased recognition around the world of the need for digital literacy capability has led to a proliferation of resources and advice online. An internet search for "digital literacy" results in a huge number of hits. Searching for "digital literacy" AND "learning resources" reduces the number of hits by about half, but it is still a very large number. A selection of credible resources from local and global sites is included and listed according to relevance for the Australian Curriculum.

• The need to be digitally responsible is coming to the fore, particularly in educating our younger generations. The **Digital Responsibility** website (<u>www.digitalresponsibility.org</u>) was developed by a group of Silicon Valley employees who aim to inform young people of the consequences of technology, emphasising the need to use and share it responsibly.

- **Mozilla's web literacy** map (<u>https://foundation.mozilla.org/en/initiatives/web-literacy/</u>) identifies core web literacy skills and 21st-century skills that are considered essential to participation in a modern, digitally supported environment. This includes supporting understanding of the web and web technologies.
- The **All Aboard** Metro Map (<u>https://www.allaboard he.ie/</u>) uses a transport map as a metaphor to visualise the complex, interconnected array of skills and capabilities that are needed to navigate teaching and learning in a digitally enhanced environment. Underlying the visualisation is a range of resources to support educators and students.
- The mission of the International Society for Technology in Education (ISTE) is to help educators use technology to solve problems in education. ISTE has developed standards (<u>www.iste.org/iste-standards</u>) for students, educators and others that can be used as a framework to support innovative educational practices to scaffold digital literacy capabilities. Each element of the standard is supported with a definition and elaborations, each with provided exemplars.
- The **New Media Consortium's Horizon** series of reports explore the digital outlook for education annually. The <u>2017 report</u> (<u>https://library.educause.edu/resources/2017/2/2017-horizon-report</u>) focuses on digital literacy in higher education but is also relevant to the school context. It explores the landscape of digital literacy, aiming to foreground current frameworks, exemplars and challenges. It provides useful insights into the foundations and development of a variety of digital literacy understandings and frameworks.
- An outcome of the work done by the European Commission Joint Research Centre is the **Digital Competence Framework for Citizens (DigComp**), a framework for developing and understanding digital competence. The most recent edition, DigComp 2.2 (<u>https://publications.jrc.ec.europa.eu/repository/handle/JRC128415</u>), was released in March 2022. It provides an understanding of digital competence and a range of examples of knowledge, skills and attitudes to help individuals engage with digital tools. The framework consists of 5 competence areas (such as information and data literacy), each of which is broken down into a number of competences. There are 8 proficiency levels and examples of use for each, making this a complex framework to articulate, but its thoroughness is particularly useful to support programs to improve digital literacy.
- <u>Be Connected</u> is aimed at improving digital literacy for older Australians. That said, it provides excellent information for students and teachers including hints, tips and learning modules covering a wide range of topics to support living in a digital world. Learning modules include using a digital device, being safe online, communicating online, shopping and banking online, and sharing documents.
- The aim of the eSafety Commissioner is to help promote safe, positive online experiences and to minimise
 online harm. The web resources (<u>www.esafety.gov.au</u>) include useful information for educators,
 parents/carers, children, young people and others. There are a range of age-appropriate modules that can be
 used in the classroom and home to support all aspects of online safety.

Conclusion

Digital tools continue to develop at a rapid rate, impacting our lives in a myriad of ways. For example, smart watches came onto the market in 2015, and are already a very popular digital accessory. They deliver emails and information, monitor health, and provide even more opportunities to be digitally connected 24/7. What are the implications of such devices for our and our children's wellbeing? We can anticipate that there will be little

slowdown of opportunities to digitally enhance our lives, so how do we prepare future generations to manage their digital lives?

Digital literacy is not an end in itself but rather a supporting tool. Improving digital literacy has to be approached holistically, requiring integrated, contextualised learning experiences. The Digital Literacy general capability addresses this requirement very well, as evidenced by the areas of interrelated and complementary skills described in this paper.

Digital literacy learning is further supported by integrating the continuum to support all learning areas. An analogy is learning to drive a car. It is not sufficient to be able to make a car move on a particular road. The driver must know, understand and be able to apply the road rules. They must be able to manoeuvre safely and effectively on any road, while being aware of the actions of other road users. This requires learning the basics and lots of practice in different situations. This learning starts when you step into a car, even as a passenger. Developing digital literacy needs to start as soon as a young person holds a digital device.

The need for comprehensive digital literacy is growing in importance with almost all aspects of our daily lives requiring some form of digital interaction or intervention. When Gilster articulated a definition of digital literacy in 1997, the digital divide was understood to relate to access to the technology. As digital technologies become more accessible (through mobile phones in particular), the digital divide is now related to being able to use the technology to support living, learning and working (van Dijk 2020). Digital literacy is key to ensuring future generations will be critical and confident digital citizens, enabled to use digital technologies effectively in their personal, working and learning lives.

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