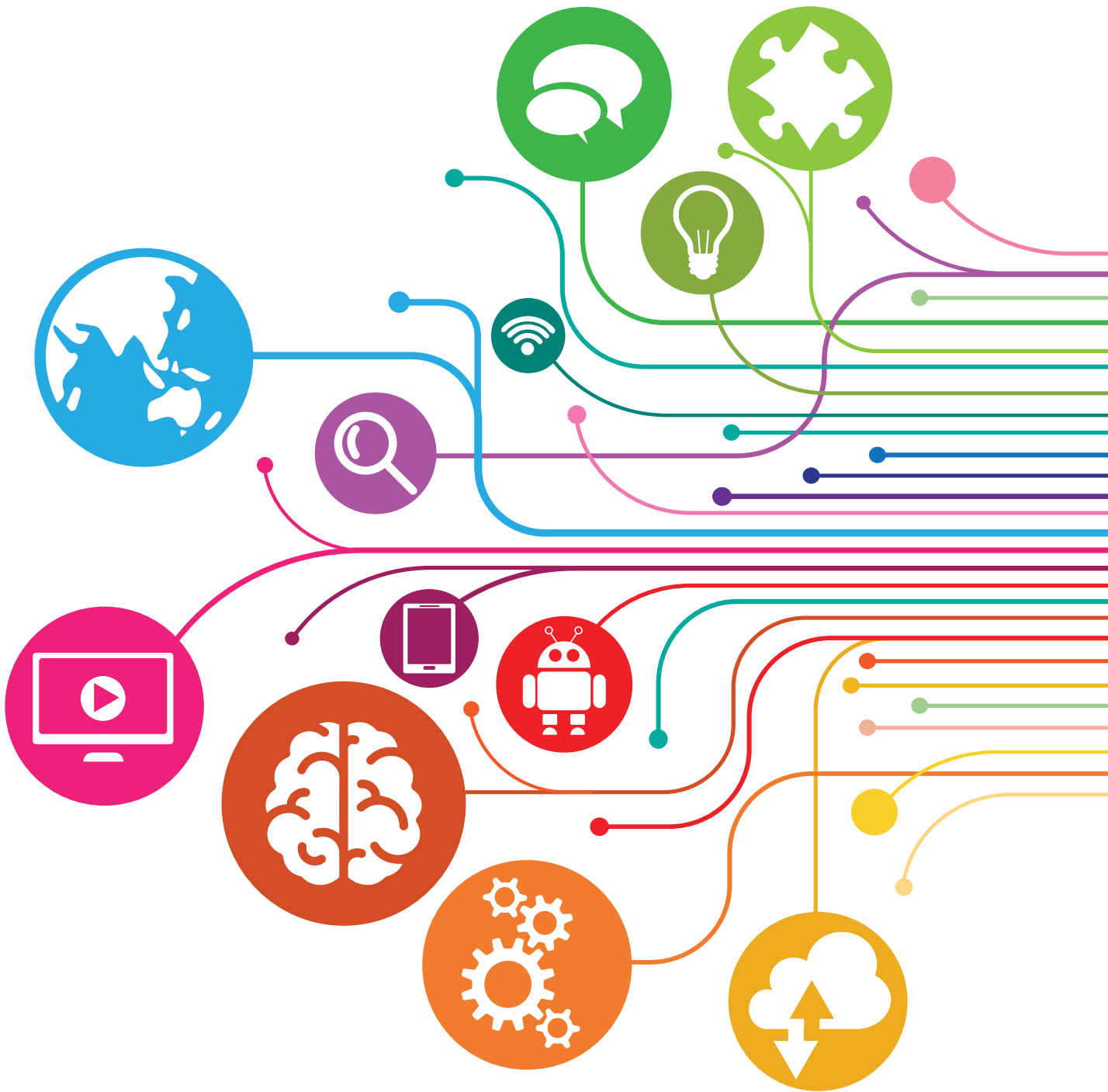




**Early Childhood
Australia**

A voice for young children



Early Childhood Australia Statement on young children and digital technologies

Date: September 2018

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Early Childhood Australia would like to thank the Digital Policy Group for their valuable expertise and enthusiasm over the past two years in supporting the preparation of this Statement.

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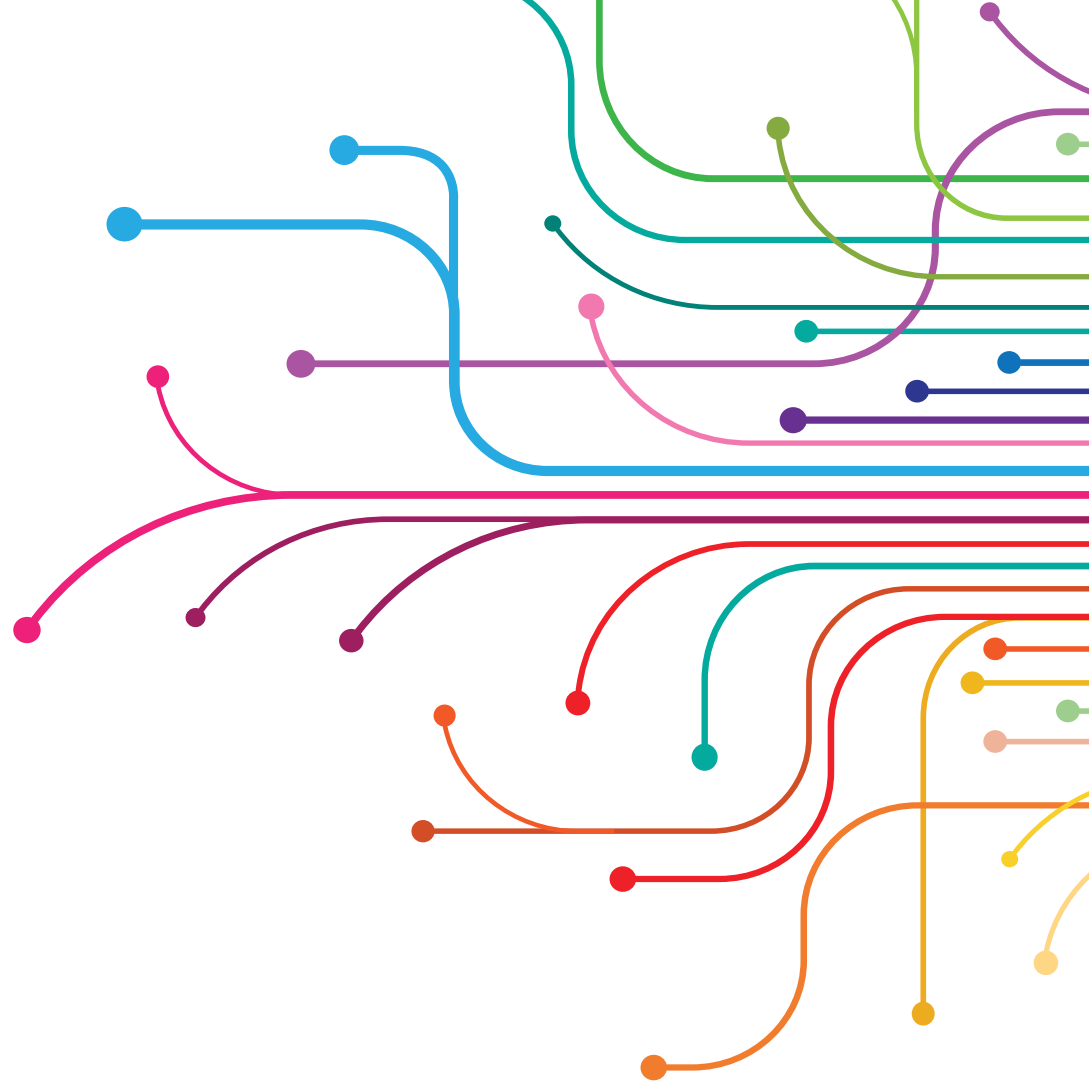
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Early Childhood Australia's (ECA) vision is that every young child is thriving and learning. To achieve this, we champion the rights of young children to thrive and learn at home, in the community, within early learning settings and through the early years of school. Our work builds the capacity of our society and the early childhood sector to realise the potential of every child during the critical early years from birth to the age of eight. ECA specifically acknowledges the rights of Aboriginal and Torres Strait Islander children and their families, and the past and current injustices and realities for them around Australia.

Further information about the *Statement on young children and digital technologies* and associated resources can be found at: www.earlychildhoodaustralia.org.au/digital-tech-statement.

DOI: <http://dx.doi.org/10.23965/ECA.001>

Cite as: Early Childhood Australia (ECA). (2018). *Statement on young children and digital technologies*. Canberra, ACT: ECA. <http://dx.doi.org/10.23965/ECA.001>



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INTRODUCTION

Early Childhood Australia (ECA) is the peak early childhood advocacy organisation, acting in the interests of young children, their families and those in the early childhood field. ECA advocates to ensure that every child is thriving and learning.

The *ECA Statement on young children and digital technologies* was developed in response to an identified need for guidance for early childhood professionals on the role and optimal use of digital technologies with, by and for young children in early childhood education and care settings. This need has grown as children are increasingly growing up in digital contexts.

ECA established and worked in consultation with an advisory Digital Policy Group, which comprised representatives of Australian-based organisations and academics with an interest and expertise in young children and digital technologies.

This *Statement on young children and digital technologies* is informed by sector consultation, published research and expert advice from within Australia and internationally. Extensive sector engagement included a national online survey (Zabatiero, Straker, Mantilla, Edwards & Danby, 2018), social media participation and feedback on a publicly released Discussion Paper (ECA, 2018). Young children were also consulted on their perspectives about digital technologies in early childhood education and care settings.

Expert advice was sought regarding young children and digital technologies in areas including health and wellbeing, ethics and citizenship, and digital media consumption. In addition, a critical review of specifically relevant literature was completed.

The national and international policy context

The *Statement on young children and digital technologies* aligns with existing Australian and

international policy documents and guidelines about young children and digital technology. These include Australian documents relevant to children's education and care settings that commit to ensuring all Australian children receive quality early childhood education, such as the *Early Years Learning Framework* (EYLF), the Melbourne Declaration and the *National Quality Framework* (NQF). The EYLF and the Melbourne Declaration each reference learning to use digital technologies for full and active participation in society.

This Statement builds on other state-based documents including the *Victorian Early Years Learning and Development Framework* and the *Western Australian Curriculum: Digital Technologies—Pre-Primary to Year 10*. These documents consider the use of digital technologies and the early acquisition of digital technology skills to be part of young children's communication development.

This Statement recognises national and international health guidelines and policies on movement and child health and wellbeing, including the *Australian 24-Hour Movement Guidelines for the Early Years (birth to 5 years)*, the American Academy of Pediatrics policy statement *Media and Young Minds*, and the Canadian Paediatric Society position statement *Screen time and young children: Promoting health and development in a digital world*. These documents focus on the implications of screen-based technologies on children's physical and mental health.

ECA is not the first organisation to develop a statement about young children and digital technologies. One of the most widely recognised statements is the National Association for the Education of Young Children (NAEYC) and Fred Rogers Center position statement on *Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth through Age 8* (2012), which provides research-informed advice about young children using digital technologies in American early learning settings.

Finally, this Statement sits within the context of the United Nations Convention on the Rights of the Child and ECA's *Code of Ethics*. These documents provide a rights-based perspective for thinking about young children and digital technologies.

Why a Statement on young children and digital technologies?

Young children today are growing up in digital contexts (Plowman, 2016). Digital contexts involve people in the use of digital technologies for a range of purposes. Digital technologies are different from other types of technology, such as analogue technologies (e.g. film-based photography, painting, drawing) or mechanical technologies (e.g. gears, levers, wheels). Digital technology is based on the use of small microprocessors or 'chips' that convert information into numbers or 'digits'. Today, the many types of digital technologies used by people in daily life include computers, tablets, smart televisions, smartphones and smart watches. Digital technologies are frequently networked or connected, enabling people to share, communicate, store, retrieve and manipulate digital data for education, entertainment, recreational, organisational and work purposes.

Young children and their families participate in digital contexts according to the access they have to digital technologies and the internet, and the views they hold about the relevance and role of digital technology in their lives. Research shows that digital technology and internet access for children and families is influenced by socioeconomic resources, geographic location, gender and age (Judge, Puckett & Cabuk, 2004). Adult beliefs and attitudes about digital technology also influence the access young children have to different types of digital technologies (Blackwell, Lauricella, Wartella, Robb & Schomburg, 2013). This means the experience of growing up in digital contexts is not universally the same—not every child and family will use, value or understand digital technologies in the same way.

How people use, value or understand digital technologies can depend on the views they hold about the relationship between digital

technology and society. The different ways of thinking about this relationship are informed by a body of knowledge called 'Philosophy of Technology' (Gibbons, 2010). One viewpoint, called 'technological determinism', considers that technology will cause or 'determine' what happens to people in society. People can have differing stances on how technology determines social outcomes. For example, an educator might think that children's play is negatively influenced by their consumption of digital media, or that children's learning is positively influenced by using an educational app.

Another way of thinking about the relationship between digital technologies and society is known as 'substantive'. This viewpoint argues that digital technologies become part of how society operates and that often people do not notice the actual technology, but focus on the social practices associated with using the technology. For example, when using a mobile phone, people do not always think about the actual object; they are more focused on how it allows them to communicate through video-chat, talking or texting.

The relationship between digital technology and society can also be understood using a 'critical perspective', which argues that technologies are always created and used by people with values in mind. For example, assistive technologies for young children such as screen-readers are designed and used in practice to support children who may not otherwise be able to read or view a screen to access digital content.

These ways of thinking about digital technologies highlight that there is no simple answer to understanding the role and optimal use of digital technologies with, by and for young children in early childhood education settings.

Digital contexts involve both actual access to digital technologies and the ways in which people think about and value the use of digital technologies in their lives.

A Statement on young children and digital technologies can benefit the early childhood sector by providing an evidence base from which educators can make decisions regarding digital technologies that are relevant and sensitive to the digital contexts experienced by children and their families. Instead of working towards 'one-size-fits-all' advice, a contextual approach recognises that educators are skilled at working in partnership with children and families in the best interests of the child.

This Statement therefore provides an overview of existing research about young children and digital technologies in four known areas of importance in early childhood education. These are:

1. Relationships
2. Health and wellbeing
3. Citizenship
4. Play and pedagogy.

Each area canvassed in this Statement is accompanied by a guiding principle and 'practice advice'. These are intended to facilitate professional reflection (DEEWR, 2009) on the role and optimal use of digital technologies with, by and for young children, according to the digital contexts in which young children, their families and educators play, live and work.

PART 1: RELATIONSHIPS



Young children in digital contexts interact, engage, access and learn how to use digital technologies in relationships with other people, including the adults (e.g. family members, parents, kinship members, educators) and peers (e.g. friends, siblings, extended family members) in their lives. These relationships facilitate and influence children’s engagement with digital technologies.

1.1 Children, adults and digital technologies

Positive child–adult relationships are well-recognised as essential to children’s healthy development and learning. Research shows that it is through the formation of relationships and attachment with caregivers that children develop cultural competence, a sense of identity, language skills, and knowledge about the world around them (National Scientific Council on the Developing Child, 2004). In building relationships with young children, adults play a key role in modelling skills and sharing cultural knowledge about social behaviours (Rolfe, 2004)—including those behaviours that involve the use of digital technologies.

Digital technologies can be used to support positive child–adult relationships. For example, adults and children can share positive experiences by co-viewing digital media, co-playing digital games and/or discussing digital media content together (Takeuchi & Stevens, 2011). Infants and toddlers often enjoy looking at digital photographs and videos of themselves, family members and peers. These images and videos can be re-visited by educators and children to promote opportunities for collaborative language development. When educators and other adults model appropriate engagement with technologies, such as co-viewing and co-playing, this helps young children understand that digital technologies can be used to facilitate communication within person-to-person relationships (Danby et al., 2013).

Young children can also use digital technologies for purposeful communication in their relationships with adults, by sending and receiving digital photos, co-sharing social media with adults, or creating text messages and emails. Many children maintain relationships with geographically distant family members or other important people in their lives using video-chat. Research shows that using digital technologies for video communication can be socially beneficial for young children (Roseberry, Hirsh-Pasek & Golinkoff, 2014).

While children can benefit from co-using digital technologies with adults, it is important that when engaging with young children, adults model person-to-person relationships that do not always involve using digital technologies, and moderate their own use of digital technologies. Research has noted situations when adult family members can be distracted by digital technology while with their children (McDaniel & Radesky, 2018). When adults are preoccupied with digital activities they might not notice young children’s social cues or requests for attention. These cues and requests are a fundamental part of relationship-building between children and adults. For example, in early childhood education and care settings, educators might be trying to use digital documentation platforms during routines with infants and toddlers, such as recording nappy changes or feed-times. If adults are preoccupied with their own digital technology use, this may reduce the quality of the child–adult interaction.

Adults can model self-regulated digital technology use during sustained social interactions with children. During sustained interactions, adults and children listen to, respond and pay attention to each other (Siraj-Blatchford, 2007). For example, when going on a walk with young children, adults can capitalise on the opportunity to have conversations with children that build language and social skills—without checking their digital devices. Modelling self-regulated digital technology use helps children learn that people can make active decisions about how, where and when they engage with digital technologies.

It is appropriate for children and adults to focus on person-to-person interactions that do not always involve digital technologies.

1.2 Children, peers and digital technologies

Child-to-child relationships involve social interactions with same-age peers, older children, siblings and other young kinship members. These relationships help children develop social and emotional capacities such as interpreting the perspectives of other people, paying joint attention to a task or topic, self-regulating behaviour and/or improving impulse control (Hay, 2005).

Digital technologies can be used within child-to-child relationships in ways that create opportunities for social and emotional development. Research shows that many young children enjoy using digital technologies with others (Arnott, 2016). Children are interested in sharing how they have learned to use digital technologies, and will often actively teach each other the functions of different technologies. During these interactions, children benefit from listening to others and appreciating that other people may have a different point of view.

In educational settings, educators can create opportunities for children to use digital technologies collaboratively for shared purposes. This could involve creating content, developing ideas and documenting learning. For example, two or more children might use a digital microscope to examine natural materials found in the outdoor environment, then share these observations with their peers on a large display screen. Drawing other children into the experience creates opportunities for discussion. In this example, children use digital technologies to pay joint attention to a shared learning episode.

Children benefit from the active involvement of adults when co-using digital technologies with peers. In the same way that they must learn to share and collaborate during non-digital activities, children may require support with turn-taking, listening and contributing to the achievement of a common goal. When playing a digital game or taking turns on a touchscreen

device, young children may be tempted to touch, swipe or click screens when it's not yet 'their turn'. While co-viewing digital games and content with peers creates opportunities for discussion, children may benefit from adult support to understand when it is socially appropriate to have a turn at controlling the device (Ljung-Djärf, 2008). Turn-taking and appropriate behaviours are important pro-social skills that children will use when collaborating with others in digital contexts.

Children's relationships with other children at home and in their communities also influence how and why they use digital technologies. Research shows that younger children often learn digital technology skills, such as how to turn computers on and off, navigate games or access digital content from older siblings (Chaudron et al., 2015). Young children are often given 'hand-me-down' digital technologies such as out-dated mobile phones from their parents, other family members, siblings or older peers (Plowman, McPake & Stephen, 2008) to be used in play.

Younger children can also be exposed to social media and texting through the digital technology use of siblings and older family members. When young children see other people using social media and texting, they may incorporate this into their own play scenarios. When children incorporate social media and texting into their role-play, educators can use this as an opportunity to help children learn about how digital technologies are used by people to communicate and share information. Building children's knowledge about how to participate in digital contexts through role-play helps children understand the safe and appropriate use of digital technologies with other people.

1.3 Educator and family partnerships

Strong partnerships between educators and families are important for young children's wellbeing and developmental outcomes. Research shows that collaboration between educators and families improves young children's social and emotional outcomes

(Huang & Mason, 2008; Hujala, Turja, Gaspar, Velsson & Waniganayake, 2009; Nzinga-Johnson, Baker & Aupperlee, 2009). Children benefit from observing their educators and families respectfully sharing information about their learning and their lives at home. Educators and families both benefit from feeling that they are listened to and respected (KidsMatter Early Childhood, 2018). Educators are accustomed to working in partnership with families in many areas of children's lives, from sleep and toileting, through to behaviour and social skills. Now that young children are growing up in digital contexts, it's also important for educators and families to work in partnership regarding the use of digital technologies with, by and for young children. Families may also view educators as trusted sources of information and advice about digital technologies and young children (Donohue, 2016).

All families have different perspectives on digital technologies. These perspectives may reflect the values parents and caregivers place on the role of digital technologies in their own lives, and those of their children. Family perspectives shape young children's access to, and experiences with, digital technologies at home and in the community (Plowman, Stevenson, Stephen & McPake, 2012). Some families may view digital technologies as useful tools for accessing and enjoying digital content and information. Other families might appreciate digital technologies as a way of staying in touch with distant family members. Being aware of differing family perspectives helps educators consider the range of experiences young children have with technologies in their digital contexts.

An important area of partnership between educators and families is regular communication about children's learning, development and daily routines when participating in educational settings (Parnell & Bartlett, 2012). For many years, educators have documented and assessed young children's learning and development. This has taken the form of observational records, running records, notes and Learning Stories (Carr & Lee 2012). When digital cameras were first released, digital photography was considered an engaging means of sharing

children's learning with parents (Boardman, 2007). As digital innovations in networked technologies and social media have evolved, educators now frequently document children's learning using digital photographs, comments and videos. This documentation is easily shared with parents and family members via social media or dedicated documentation platforms, which provide a flexible way for educators to communicate with families. Many families appreciate being able to see real-time updates of their children's learning and activities on their personal mobile devices (Reynolds & Duff, 2016). However, when using digital documentation platforms, educators should consider the security of their digital data and the privacy of children and families (Lindgren, 2012). Educators and families can cooperate in the use of digital documentation so that all parties understand how digital data about children is being used, stored and shared.

A final area of partnership concerns how educators and families model digital technology use in front of children. For example, when children enter and leave early childhood education and care settings, adults may be involved in their own digital technology use (ECA, 2018). Educators and families may consider developing policies, procedures and/or expectations about digital technology use during these periods. For example, services might decide that educators will not use digital technologies when children are entering and leaving a service so they can devote their full attention to welcoming and farewelling children. Services might share these expectations with families and encourage them to also avoid using digital devices at these times. Other services may consider these periods as opportunities for co-viewing children's digital documentation with families. This can create extended conversations between educators, children and their families about a child's learning and daily activities. It also provides an example of respectful shared digital technology use between adults, which young children can regularly observe. Educators and families can work in partnership to make decisions about how and why digital technologies are used by adults during these situations.

Principle: Young children's relationships with adults and peers matter in digital contexts

Practice advice:

1. Use digital technologies in early childhood education and care settings to promote social interactions between children, peers and adults.
2. Support children in turn-taking and learning to share when using digital technologies in collaboration with others.
3. Foster children's peer-to-peer interactions as opportunities for co-learning about and with digital technologies.
4. Model self-regulated digital technology use with children and families that recognises the importance of sustained social interactions between children and adults.
5. Create shared understandings between families, educators and services about digital technology use, by adults, in front of children.



The way that young children interact, engage with and experience digital technologies can have implications for health and wellbeing. This includes their physical activity, posture, vision, sleep and emotions.

2.1 Digital technologies and physical activity

Regular physical activity is important for young children's development (Active Healthy Kids Australia, 2016). Children benefit from physical activity that makes them breathe hard to stimulate their lungs, heart and blood vessels. Physical activity that uses energy from sugars and fats helps encourage a healthy metabolism. It also builds strength in children's muscles, joints and bones; challenges the coordination of hands, eyes and limbs; and delivers cognitive and social benefits.

Physical activity in infancy starts with activities like 'tummy time', which helps babies build strong neck muscles. These muscles are needed so that babies can sit and reach for objects and develop their trunk coordination. For older children, crawling, walking and running help develop the muscular and nervous systems that promote coordination and physical development.

Some digital technologies can be used to support or provide movement opportunities for young children, which assist with physical development. These can include:

- playing with digital robots or using virtual game devices that require whole-body movement (e.g. playing a dance step game on an electronic dance mat)
- using screen-based devices to research tasks or learning inquiries that involve physical activity (e.g. watching a video-tutorial on how to prepare the soil when planning a vegetable garden)
- using functions on mobile devices to record physical activity (e.g. recording activities such as jumping, skipping or climbing and re-watching these in slow-motion to refine learning of the skill)

- employing wearable technologies to measure levels of physical activity with children (e.g. measuring children's daily activity levels in the classroom when learning about health and wellbeing).

When children use digital technologies for movement opportunities it is important that they develop an awareness of their physical surroundings so they do not bump into other people, or trip over objects in their environment. Children can learn when it is appropriate to use digital technologies and move around at the same time (e.g. avoiding screen use when walking in public places or near roads or transport).

Digital technologies that incorporate gamepads, haptics (that respond to touch or motion), styluses and touchscreens require a certain degree of fine motor skill. There is some evidence that fine motor skills, such as pinching, dragging and pointing, may be developed using touchscreen technologies (Axford, Joosten & Harris, 2018). However, it is important that young children also have the opportunity to develop their fine motor skills by participating in three-dimensional (3D) experiences, such as using utensils or their hands for eating or managing their clothing (Kucirkova & Zuckerman, 2017; Lin, Cherng & Chen, 2017). Traditional activities in early childhood education and care settings that build young children's fine motor skills, such as modelling with clay and using writing, drawing and painting implements, help children to develop strength and control in their fingers.

Children may also feel discomfort if they do the same simple movement repeatedly, such as rapid tapping or swiping on touchscreen devices. Cases have been reported of adults developing inflammation injuries from repeated movements while using digital technologies, such as playing electronic games (Bonis, 2007). Although there is no clear evidence about repetitive strain injuries in early childhood, educators might still consider limiting digital activities that involve children performing rapid, repeated fine movements.

Young children do need periods of sedentary behaviour to rest and recuperate after participating in physical activity. Children routinely engage in sedentary behaviours during the day, for example, when listening to a story, sitting in a pram or travelling in a vehicle. However, too much sedentary time is inappropriate for young children. Consuming digital media on screens or playing electronic games can involve long periods of sitting. High amounts of screen viewing by children have been shown to contribute to poor health outcomes, such as obesity and low bone strength (McVeigh, Smith, Howie & Straker, 2016; McVeigh et al., 2016). However, it has not been established whether these outcomes are due to snacking in response to junk food advertising on television, the displacement of physical activity by screen viewing, or by the actual time spent by children in sitting. Excessive sitting and long periods of uninterrupted sitting have been linked to poor physical and mental health in adults (de Rezende, Lopes, Rey-López, Matsudo & do Carmo Luiz, 2014). It is not yet clear if this link is also evident for children (Cliff et al., 2016).

The *Australian 24-Hour Movement Guidelines for the Early Years* (Australian Government, 2017) advise against long periods of sitting for young children, although they do not specify a maximum time limit. They do suggest that sitting time specifically with screen-based digital technologies by children two years and older should be no more than one hour per day. The guidelines also indicate that toddlers and preschool-aged children should spend at least 180 minutes of their awake-time being physically active every day. For preschoolers, this should include at least 60 minutes each day of energetic play that makes them 'puffed'. Energetic play involves activities such as jumping, leaping, dancing, chasing, swimming, digging, climbing and bike-riding. Encouraging children to be less sedentary and more physically active helps develop lifelong, health-promoting habits.

2.2 Digital technologies and posture

Children's physical flexibility, strength and coordination develop when they use different postures in their everyday activities. Children can use digital technologies in ways that promote

different postures. For example, when children lie on their stomach to play with screen technologies they develop strong back and neck muscles. Likewise, playing with digital technologies such as robots involves crawling and moving around on the hands and knees. This can help build strong shoulder and hip muscles. Sitting with legs straight out in front while watching television encourages leg flexibility. Standing at a bench or low table while video-chatting with friends will provide opportunities for children to develop standing balance.

Maintaining the same posture for a long period of time can result in children experiencing physical discomfort. Young children will start to feel uncomfortable more quickly in postures that are extreme or awkward, such as bending their neck while drawing, writing or using a touchscreen device while sitting at a table. It has been shown that school age children use many postures when using laptops, which may alleviate some of their discomfort (Harris & Straker, 2000), but it is not yet known whether young children self-vary their posture to alleviate discomfort when using screens. Research about young children's posture when using screen-based devices is limited (Howie, Coenen, Campbell, Ranelli & Straker, 2017) and there is currently a lack of Australian Government health guidelines on posture for children. However, sustained and awkward postures, along with repetitive movements, are noted risk factors for musculoskeletal disorders in adults (Safe Work Australia, 2016). Educators should therefore remind children to regularly change their physical position when using digital technologies, and create physical environments that prompt postural variety, such as benches or tables at different heights for standing and sitting, combined with large cushions for kneeling or soft carpeted areas for lying.

2.3 Digital technologies and vision

Regular visual stimulation helps develop young children's eyes and brain. Infants develop focus, depth perception, facial recognition and tracking in the first year of life. Young children are also developing eye-hand and eye-body coordination to support fine motor and gross motor skills in the early years of life. Children's use of digital technologies—particularly those that offer a

more two-dimensional (2D) experience, such as computer screens, televisions and touchscreens—may have implications for vision development and coordination. These technologies provide a visual target that young children may find attractive and stimulating. However, the development of depth perception requires coordination of both eyes and interpretation in the brain. This development is supported by regular exposure to 3D objects (Aramis, Roy, Christian & Niechwiej-Szwedo, 2016).

Closely viewing the face of a parent or caregiver helps infants and young children develop vision (Hyvärinen, Walther, Jacob, Chaplin & Leonhardt, 2014). When children are a few months old, they require opportunities to focus on objects positioned at a variety of distances. Spending too much time focused on something very near may result in discomfort for children and limit opportunities for looking at objects that are different distances away. There is some evidence that too much near-vision activity (such as looking at a smartphone) is linked to eye problems in adolescents (Kim et al., 2016). There is a concern that short-sightedness in children is associated with more frequent participation in near-vision activities (e.g. book reading, using computers, completing writing for school work) (Huang, Chang & Wu, 2015). However, available evidence suggests that short-sightedness is linked to insufficient exposure to ultraviolet sunlight, which can occur when children do not have enough opportunity to play outdoors (Torii et al., 2017).

Educators should also consider the impact of screen glare and reflections when using digital technologies in educational settings. Glare and reflection can make it difficult for children to see what is happening on digital screens and lead to eye discomfort for children.

2.4 Digital technologies and sleep

Sleep duration, quality, timing and regularity are critical for young children's healthy development. Children who have irregular sleep habits, do not get enough sleep every night, or frequently have interrupted sleep, are at risk of health and wellbeing problems. These problems include being overweight and obese, experiencing

depression, and/or having poorer emotional regulation than those children who regularly experience sufficient duration of high-quality sleep (Chaput et al., 2017). The *Australian 24-Hour Movement Guidelines for the Early Years* recommends:

- 10-13 hours of sleep per day for three- to five-year-olds
- 11-14 hours per day for one- to two-year-olds
- 12-16 hours per day for babies aged four to 11 months
- 14-17 hours per day for babies aged birth to three months.

(Australian Government, 2017.)

Children's sleep can be affected by screen-based digital technologies. Substantial evidence shows that exposure to television, video games, desktop and/or laptop computers before bedtime results in reduced quality and duration of sleep for children (Carter, Rees, Hale, Bhattacharjee & Paradkar, 2016; Cheung, Bedford, Saez De Urabain, Karmiloff-Smith & Smith, 2017). Evidence indicates this is due to bright light from screens influencing the release of sleep hormones, time spent on digital devices displacing time for sleep, and/or digital media content being overly arousing for children when they are trying to settle to sleep (LeBourgeois et al., 2017).

Bright screen light delays the body getting ready for sleep when children experience exposure to this light in the evening (LeBourgeois et al., 2017). The blue light emitted by digital screen technologies is more arousing to children than other colours of light (Chellappa et al., 2013). Children are more sensitive than adults to both the amount of light, and the blue light specifically. In the hour before bedtime, adults should help children avoid too much light, as well as the blue light of screens, to reduce the impacts on the amount and quality of children's sleep.

There is strong evidence that having digital screens available in sleeping spaces is associated with poorer quality and reduced sleep for young children (AAP Council on Communications and Media, 2016). Using digital technologies during sleep time can displace and interrupt sleep. Sleep quality can also be influenced by the media

content young children consume either shortly before bedtime or during the day. Research shows that content that is violent, confronting, or otherwise arouses children has a negative effect on the quality and quantity of sleep (Garrison & Christakis, 2012). Using interactive digital technologies (such as games or apps) just before bedtime may be more disruptive to children's sleep than viewing digital media (Hale & Guan, 2015). This is because interactive activities can be more arousing and cognitively stimulating for children than watching digital media. It is difficult for children to settle to sleep if they are over-stimulated.

2.5 Digital technologies and emotional wellbeing

Emotional wellbeing is critical to young children thriving. Children experience positive and negative emotions, and learning to recognise and understand their different emotions helps children to manage their behaviour in social situations.

Children may associate using digital technologies with positive feelings. As with any non-digital activity, a child who is engaged with a digital activity is likely to feel happy and/or satisfied. Children can also feel positive emotions when they achieve success with digital games or apps. Depending on the features of the digital game-playing experience, playing can help young children learn to concentrate on one task for an extended period, and can also provide opportunities for children to develop qualities such as persistence, resilience and self-confidence (Warburton & Highfield, 2017).

However, while research shows that using digital technologies can provide children with learning and development opportunities such as skill mastery, concentration and self-regulation, children can become unduly attracted to using digital technologies (Gentile et al., 2017). Designers of digital games, apps and other digital technologies aim to create highly engaging experiences for users. This can include tailored content or built-in rewards, such as digital game money. When children play games with built-in rewards they may experience similar neural responses that adults have when gambling. Educators can consider how games

and apps are designed for children's interactions and help children become aware of how these are constructed.

The immediate feedback experienced by children within digital games and activities can be enticing, even without a reward component. When children experience frustration or disappointment within a game, or are invited to move onto another activity, this can lead to some challenging behaviours (Hiniker, Suh, Cao & Kientz, 2016). Sometimes these behaviours are interpreted as being caused by technologies, for example, digital technologies causing tantrums or a reluctance to participate in other activities like outdoor play. However, early childhood educators recognise that leaving an absorbing activity is not always easy. In these situations, young children benefit from adults helping them with time-management strategies and emotional support. Establishing timeframes for technology use, advising how much time remains and helping to plan when they can return to an interesting digital activity helps children to learn how to self-regulate their own use of digital technologies.

Adults can use digital technologies to distract children. This can be helpful in situations where children may need to be calm and patient. At other times, adults may use digital technologies to distract children from their feelings. While this can be a helpful, short-term strategy, distraction from emotion is not the same as experiencing and responding to feelings (Radesky, Schumacher & Zuckerman, 2015). Children may benefit from adult support to manage their feelings without using digital technologies.

Some studies suggest that high use of screen-based digital technologies is associated with anxiety and depression in older children (Maras et al., 2015). However, it is not clear if this occurs because using screen-based technologies leads to negative emotional outcomes for children, or if children who are already unhappy are attracted to using screen-based digital technologies to manage their feelings (Hoge, Bickham & Cantor, 2017). The research is not yet established on this association for young children. However, young children will benefit from adult interaction to help them identify alternative activities that

do not involve screen-based technologies. These may be digital-free experiences, or other digital technology-based activities that provide movement opportunities, such as playing with a robot or having a dance activity on a screen for children to follow along. Digital technologies that promote physical activity can be helpful because there is a known positive relationship between movement and mood (Ludwig & Rauch, 2018).

Principle: Young children's health and wellbeing is actively supported in digital contexts

Practice advice:

1. Provide digital technology experiences for young children that promote movement opportunities.
2. Ensure children participate in both digital and non-digital activities to build strength and skills in their hands and fingers.
3. Ensure that screen-based digital technology use while sitting is only for short periods and does not replace periods of active physical movement.
4. Promote postural awareness and change by providing a variety of spaces and heights for children to use digital technologies.
5. Minimise screen glare and reflection and promote regular breaks with a variety of visual distances when using screen-based technologies.
6. Support families to understand that exposure to disturbing or arousing content and screens in the hour before sleep time decreases the length and quality of children's sleep.
7. Promote screen-free sleeping areas and the use of non-screen-based calming activities with children before nap times and evening bedtimes.
8. Help children develop self-regulation for using digital technologies and support them to transition from digital to non-digital activities.
9. Establish routines and structures that promote access to a variety of digital and non-digital activities in the early childhood education and care setting.

PART 3: CITIZENSHIP



Citizenship in digital contexts recognises that young children are active participants in their communities now and into the future. As citizens, young children respect their own rights and those of other people, and develop an appreciation for cultural, racial, gender and religious diversity. Digital rights, digital privacy, online safety and cyber-safety education provide a foundation for early citizenship in digital contexts.

3.1 Children's rights to digital access

The increased use of networked digital technologies by people from around the world underpins the notion of digital rights. Across the globe, people now use the internet as a primary method of communication, and to share, store, retrieve and collect digital information or 'data'. It is used daily for activities associated with education, employment, health, entertainment and political participation. In the digital age, the internet is recognised as an important form of social infrastructure that enables people to participate in their communities (Livingstone & Third, 2017). For this reason, it is increasingly considered that all people should have the right to access digital technologies and the internet. In 2016, the United Nations Human Rights Council passed a non-binding resolution recommending that countries should not block citizen access to the internet (United Nations Human Rights Council, 2016).

It is estimated that one in three people who access the internet worldwide are under 18 years of age (Livingstone, Carr & Byrne, 2016). Research suggests that children also consider digital access a basic human right (Livingstone et al., 2016). Technological innovations such as voice recognition, Internet of Toys, Internet of Things, virtual reality and artificial intelligence are increasingly shaping the digital context in which children participate. As such, while the concept

of digital rights in early childhood education and care settings is new, it is likely to grow in importance.

Yet digital access is not fairly and equally available to all children. Issues of finance, geographical location, cultural background and gender (Warschauer & Matuchniak, 2010) influence digital access by children and their families in ways that promote and/or reduce social participation. For many children, early childhood education and care settings may provide their primary point of access to digital technologies and the internet. For this reason, young children's digital rights regarding technology use, internet access, and learning how to participate in digital contexts safely and productively will become increasingly important areas of professional learning and practice for the sector over time.

3.2 Digital privacy

In addition to recommending citizen access to the internet, the United Nations Human Rights Council (2016) also promoted the human right to privacy online. Digital privacy considers how people and their information are represented and stored on the internet—with and without personal permission. Digital privacy is a serious issue for young children who often do not have explicit knowledge or control over how their digital data is created and managed by adults. For example, a young child might view a digital photograph of themselves on screen as a source of immediate pleasure and delight. However, young children are not always aware of how images or videos of them are used by well-meaning educators and family members. Many adults do not routinely ask young children for permission to take their photograph, or to post pictures and videos of them on social media sites and/or digital documentation platforms.

Even in situations where parental consent is required for images of children to be used in early childhood education and care services, social media and digital documentation can be inadvertently shared by educators or families, and children may appear in posts or data-

sharing among adults they do not know. Other issues can arise when services do not confirm with families or children about how long their digital data will be held and how it will be destroyed once children leave the service. This can include personal and sensitive information such as their name, address, age, social security details, health information, immunisation status, employment details of kinship members, parents and/or caregivers, and the number of adults and/or other children living in the child's home. By attending to these issues, early childhood education and care services can provide some of the first models of appropriately enacted digital privacy that children and families experience as they enter the education system.

3.3 Online safety

In previous generations, managing online safety was generally only considered necessary for older primary and secondary school age children. However, current research shows that many young children now regularly access the internet via touchscreen technologies and the Internet of Toys (Holloway & Green, 2016). Touchscreen technologies enable children to watch online content, use internet-connected apps or go directly online for gaming experiences. Using the Internet of Toys, children can integrate internet-connected, popular-culture figurines, dolls and/or soft toys into digital media, digital games, and/or have the toys record their voices and actions in ways that generate an internet-based response from the toy. The increasing level of interaction that young children have with the internet means early childhood educators must consider how to promote online safety for young children.

There are three main areas of online safety for educators to consider: content, conduct and contact (Livingstone & Haddon, 2009).

Content refers to the material children access and view online. Young children can be exposed to inappropriate content via the internet, such as violent and/or sexualised materials, advertising and games that promote gambling, and promotions for unhealthy food products (Warburton & Highfield, 2017). Research shows that high levels of product advertising via digital media increases young children's requests for unhealthy food and drink (Cairns, Angus &

Hastings, 2009; Livingstone, 2006; McGinnis, 2006). Consumption of these products is associated with higher levels of overweight and obesity in early childhood. Online material accessed by young children can also reinforce gender, religious and/or cultural biases in ways that are unhelpful for building children's capacity to participate in and contribute to their communities.

Educators can reduce content risks by using filters and setting restrictions on devices and networks used in early childhood education and care settings. Educators can use these practices as examples to help families learn how to promote and provide safe online experiences for children at home. Educators can also seek guidance about appropriate digital content for young children from trusted providers and/or promoters of digital games, apps and online content. Appropriate online content for young children fosters citizenship values of respect, tolerance and avoidance of discrimination, promotes pro-social behaviours and provides opportunities for learning. Trusted providers and promoters of appropriate and safe online material for young children may include recognised government agencies and not-for-profit groups focused on the best interests of children.

Conduct is about how children interact, engage and behave with other people and digital activities online. Young children have slightly different conduct risks online to older children. Older children may be more likely to experience bullying, sexting or social exclusion online due to using social media (Office of the eSafety Commissioner, 2018b; Office of the eSafety Commissioner [Australia], Netsafe [New Zealand] and UK Safer Internet Centre with the University of Plymouth [UK], 2017). For young children, conduct risks can occur if they accidentally access or download copyrighted or illegal material. Also, when using Internet of Toys, touchscreen devices and/or apps on mobile devices, young children experience conduct risks by accepting pop-ups (Kervin, 2017). This occurs when children click on pop-ups thinking it will close and enable them to continue with their activity, or when they are not yet able to read pop-up text and so select an option that makes the pop-up disappear. These clicking actions typically engage the pop-up so that children

inadvertently download viruses to the device they are using, proceed to make digital in-game purchases without adult approval, and/or are re-directed to another online site where they may be exposed to inappropriate content.

At other times, Internet of Toys used by children may retain their online connection even when children are not playing with them, and continue to record data (such as conversations) without children's knowledge. Some apps used by children and educators in early childhood education and care settings—even those that appear to operate offline—can record large amounts of data about children without user knowledge. Digital data about the amount of time children spend using an app and their engagement levels can be recorded and sent over the internet to the app developer to inform future iterations of the app, or to directly target children for continued play and/or advertising and promotional materials. Microchips embedded in children's clothing, and wearable technology such as wristband activity trackers, can also record data about young children's activities and location. Data recording via Internet of Toys, apps and wearables is called data harvesting, and may be used to initiate further contact with children to promote additional purchase of products.

Not all digital technologies, apps, toys and digital platforms developed for use with, by and for young children have been designed with in-built conduct safety protections, and online safety concerns associated with these products may not be identified until after market release. Being aware of conduct risks in terms of accidental downloads, in-app purchasing, site re-direction and data harvesting can help educators take a proactive approach to young children's online safety. For example, if using activity trackers with children to promote learning about health and wellbeing, educators can first check permission options for data harvesting and ensure these are turned off. Educators can also help young children learn how to respond to unwanted pop-ups by clicking the corner 'x' to close, or to seek adult help if they encounter pop-ups. During online game or app play, educators can engage young children in conversations about respectful interactions with other people, such as avoiding name-calling and teasing, and/or promoting turn-taking among peers.

Contact involves children engaging with people online. Children may have contact with known people online, such as friends, family or kinship members through video conferencing, digital documentation platforms or social media. But they may also have contact with people unknown to them, for example when playing in online virtual worlds or participating in multi-player, internet-based games. Children may reveal personal information such as their name, age and address to people they meet online, or they may be exposed by others to inappropriate material or interactions.

Proactive adult supervision of young children's online activities is important (Buckleitner, 2008). Supervision may vary according to the online environment children are using. For example, watching educator-selected content on an approved government or not-for-profit streaming app may not carry the same contact risk for children as engaging in a networked gaming platform. Educators can also help children learn that not everyone they encounter when using internet-enabled devices is someone they know. Early childhood educators are already well-versed in teaching young children the importance of talking with trusted adults, and can build on this skill to help young children learn that not everyone they will engage with while using the internet is a trusted adult. It is important that adults remain open to hearing from children about their online experiences (both positive and negative) so that children learn from a young age that adults can support them in their engagement with other people online.

3.4 Cyber-safety education

Children can learn how to participate safely and productively in digital contexts through cyber-safety education (Office of the eSafety Commissioner, 2018a). International research shows that children worldwide are accessing the internet more and more often (Livingstone, Mascheroni & Staksrud, 2017), which has led to national and international recommendations that cyber-safety education begin with young children before they start school (Children's Commissioner for England, 2017; Joint Select Committee on Cyber-Safety, 2011). Cyber-safety education in the year before school can support the capacity of young children to share information in safe online environments

as per the 'Digital Technologies Process and Production Skills' Learning Area for Foundation through to Year 2 of the Australian Curriculum.

There are many examples of well-designed, cyber-safety education resources for primary and secondary school age children, for example www.thinkuknow.org.au, www.esafety.gov.au and www.esmart.org.au. Because older children are more likely to understand the internet as a network of technologies, these approaches focus on teaching children how to engage in safe behaviours online.

However, cyber-safety education for young children provided in the years prior to school cannot simply be adapted from programs developed for older children, because young children do not understand digital technologies and the internet in the same way as older children and adults (Ey & Cupit, 2011; Yan, 2005). Young children identify the internet as the device they are using, or as the social practices they observe people engaging in online. For example, children describe the internet as being 'in my iPad', or suggest the internet is for 'doing emails' and 'playing games' (Edwards et al., 2016). These descriptions provide an important insight into what young children understand about the internet.

For younger children, education needs to start by building early thinking about the networked nature of digital technologies. Because children learn best through play and social interactions, educators can design play activities that help build young children's understanding of how digital technologies are interconnected, or networked. For example, children could send 'emails' as messages in an envelope attached to a series of pretend computers or touchscreens that have been 'networked' with each other in the home-corner using string. This can help children visualise how digital networks are created and used to 'send' emails as a way of sharing information.

Using the internet with young children in early childhood education and care settings also creates real-life learning opportunities for cyber-safety education. Educators can explain how information is created and shared by people on the network. Educators and children can consider the quality of the content and information they access on the internet and the extent to which it meets their purposes.

Principle: Young children's citizenship is upheld and fostered in digital contexts

Practice advice:

1. Participate in professional learning opportunities to build educator understanding about young children's digital rights and how these relate to young children's socioeconomic, geographic, gender and culturally based experiences in digital contexts.
2. Seek permission from children and families to use digital documentation, including photographs of children via social media and/or other digital documentation platforms.
3. Develop policies and guidelines about the collection, use, retention and deletion of digital data held about young children and families.
4. Ensure proactive adult supervision of young children's online activities, including the use of filters and restrictions on devices and networks in the early childhood education and care setting.
5. Maintain conversations with young children about their online experiences, both positive and negative, to ensure they are supported by adults in their online engagements.
6. Help children develop an understanding of the internet as a network that people use to generate, store, retrieve and share information.
7. Model internet use with children for learning purposes and provide opportunities for assessing the quality and relevance of information.
8. Direct families towards government and/or not-for-profit organisations for advice on the selection of digital media, content, apps and games that are appropriate for use by young children.



Young children have opportunities for play and pedagogy in digital contexts. Play and pedagogy involve children using a range of digital devices for exploration, meaning-making, collaboration and problem-solving. Educators engage in active decision making about the use and non-use of digital technologies for learning.

4.1 Digital play

Play is an established part of early childhood education. Educators understand that open-ended and exploratory play by children provides opportunities for children to explore ideas, experiment with materials and engage with other people for learning (Pyle, DeLuca & Danniels, 2017). Both indoor and outdoor play are important for young children's learning and development. Through play, children build language skills, engage in social interactions, develop concepts about the world and experience physical and cognitive challenges. Educators engage with children during play using strategies such as modelling, questioning, discussions and conversations to build their knowledge, skills and capabilities (Wood, 2010).

Digital play involves children in many combinations of activities using a range of digital and non-digital resources, either by themselves or in collaboration with others. Children may create and share digital content using software and apps, make their own videos, access digital content to inform their learning or play scenarios, deploy digital time-keepers in running races or obstacle courses, use digital microscopes, access apps for physical activity games, download music for singing and dancing, or re-enact their favoured popular-culture characters from digital media.

Sometimes young children are described as 'digital natives' with a natural aptitude for using digital technologies. Research shows that this is not the case (Bennett, Maton & Kervin, 2008). Children learn to use digital technologies in

the same way they learn in other areas of the curriculum, such as language and literacy, science and mathematics. Exploratory play, observations of adults using digital technologies, and social interactions with knowledgeable peers, siblings, co-players and adults help build children's knowledge and expertise in using digital technologies (Marsh, Hannon, Lewis & Ritchie, 2017).

Exploratory play is how children learn the properties of materials. When using traditional materials, this refers to children becoming familiar with the texture, function, surface and colour of materials such as paint, paper, clay, sand, textas (markers) and glue. In digital contexts, exploratory play involves children becoming familiar with how the different functions on digital technologies operate (Bird & Edwards, 2015). For example, video and audio recording; taking digital photographs; storing, retrieving and printing data; and 2D and 3D printing. When children repeatedly press buttons or use the same function over and over, it is part of the exploratory play they engage in to learn how to apply the functions of digital technologies for different purposes. For example, it is difficult for a child to create a digital film when they have not yet learned how to start and stop the 'record' button. Educators can support children during exploratory digital play by showing them how different functions operate. Shared joint attention between children and adults when using digital technologies is important in this learning (Kervin, 2016).

In early childhood education and care settings, children also learn to use digital technologies by playing with objects that represent digital technologies, such as pretend phones, touchscreen tablets or scanners (Bird, 2017). Educators can use multiple materials for this type of play. Some may be purpose-designed, pretend digital technologies. Others might be simpler, such as a block or cardboard box that children pretend is a phone or touchscreen device, and use it to enact sending a text message to a friend. Educators can join in this play by responding to the text message using

their own 'block' mobile phone. This type of digital play builds opportunities for children and educators to understand the social uses of digital technologies (Yelland, 2011).

4.2 Digital technologies in play and learning

Touchscreen devices (smartphones and tablets) are among the digital technologies that are most commonly used by children. Popular images of young children and digital technologies often feature touchscreen technologies. These technologies incorporate icons, and audio and visual instructions that are readily interpreted by young children and can be operated using their fingertips (Geist, 2012). The inherent user-friendliness of touchscreen technologies has led to a rapid uptake in their use among young children worldwide (Lauricella, Blackwell & Wartella, 2017). Educators can make decisions about how, when and for what periods of time young children use touchscreen devices. Current advice suggests that children aged two years and under should mostly use screen technologies for video-chatting (McClure, Chentsova-Dutton, Barr, Holochwost & Parrott, 2015). For children aged two to five years, advice suggests a limit of one hour of sedentary screen time per day (AAP Council on Communications and Media, 2016; Australian Government, 2017).

Preschool aged children in early childhood education and care settings can benefit from touchscreen technology use that involves the considered use of apps. Apps have various levels of quality and educational design. Educators can consider how different apps meet the play interests of children in their classrooms or create new opportunities for children to mix and match modes of communication in digital form, such as video, audio, images and text. This is important for sustaining the quality of children's in-app digital play (Troseth, Russo & Strouse, 2016). Quality apps and digital content can support learning through well-structured narratives and activities that promote problem-solving and reasoning (Herodotou, 2018; Hirsh-Pasek et al., 2015). Appropriate apps and other digital content for children will also contain pro-social content, be non-violent, promote gender and cultural diversity, and have low levels of advertising. Content that is too

fast-paced for young children can negatively influence executive function (Lillard & Peterson, 2011; Lillard, Drell, Richey, Boguszewski & Smith, 2015).

Young children's learning using touchscreen devices can be maximised by educators through joint media engagement (Takeuchi & Stevens, 2011). Joint media engagement involves children, peers and/or adults participating in digital activities together, for example, co-playing games and apps, or co-viewing digital content. When children experience joint media engagement they can ask questions, put forward ideas and receive feedback from adults and other children in relation to a common activity. This helps build opportunities for language development and fosters collaborative learning (Neumann & Neumann, 2013). Joint media engagement reminds adults that young children do not just use touchscreen technologies to consume digital content or play games and apps. Research shows that young children use touchscreen technologies for different purposes—many of which can be described as playful, collaborative and interactive (Marsh, Plowman, Yamada-Rice, Bishop & Scott, 2016). For example, viewing digital media can inspire young children's play narratives; support them to create new digital and non-digital images through painting, drawing, photography and video; and enable peer relationships by sharing digital media of common interest.

Beyond touchscreen devices, the range of digital technologies used by young children is extensive. Research shows that young children use desktop and laptop computers, game consoles, digital toys, robots, 3D printers, coding toys, wearables, voice-activated technologies, Internet of Toys and haptics (Druga, Breazeal, Williams & Resnick, 2017; Goldstein, 2011). Children themselves describe digital technology use in active terms, using words such as 'learn', 'make', 'build', 'paint', 'write', 'watch' and 'feel' to explain what they do with them (Mertala, 2016). This active positioning connects with the idea that digital play in early childhood provides opportunities for exploration and experimentation (Fleer, 2014; Leinonen & Sintonen, 2014). For example, children and educators might take apart and reassemble

discarded technologies to see how they operate. They might also use programmable robots as a hands-on digital technology experience. Children can touch and observe this technology, responding to the coding they create. When the robot responds in a way unintended by the child's coding, an educator and child can problem-solve the coding together—why does the robot appear to be turning the wrong way? This promotes computational thinking, which involves identifying problems, and proposing and testing solutions to those problems (Bers, Flannery, Kazakoff & Sullivan, 2014).

Digital media enjoyed by young children, such as television programs, movies or online content can inform complex play narratives that children enact within their early childhood education and care settings (Wohlwend, 2015). These narratives may involve children in high-level physical activity (e.g. running, climbing, chasing, jumping and leaping when playing superheroes). Digital re-enactment also provides opportunities for children to create their own play resources, such as 2D or 3D print-outs of characters; drawing, photographing or painting background landscapes; designing and fashioning costumes; and/or digitally recording themselves as characters. This helps children to appreciate the range of digital technologies available for meaning-making and sharing ideas with other people.

4.3 Digital pedagogy

A hallmark of being an early childhood educator is the capacity to make informed decisions that are in the best interests of young children. Early childhood educators are equipped with professional knowledge about how young children play, learn and develop. They understand the importance of social engagement and building strong relationships with children. They apply this knowledge and understanding to provide children with play opportunities and experiences that support children in the achievement of learning outcomes aligned with the *Early Years Learning Framework: Identity, Connected and Contributing, Wellbeing, Confident and Involved, and Effective Communicators* (DEEWER, 2009). When educators support children in these learning outcomes, they make pedagogical

decisions about what, how, where and why children engage in different play experiences and activities.

Digital pedagogy involves educator decision making about using digital technologies with, by and for young children. This can include the decision to not use digital technologies with children in certain situations. For example, it is important that young children have opportunities to experience outdoor play without digital technologies. It is also appropriate that activities such as painting, drawing, book-reading or sharing cultural rhymes are experienced by children and educators alike without always using digital technologies. At other times, educators might decide to use digital technologies because they are the most appropriate way of helping children to develop and communicate an idea, access information required to progress play, to develop an inquiry-based project, or learn about networked technologies for cyber-safety education. Sometimes children may benefit from a brief period of rest and relaxation, enabled using digital technologies, such as viewing digital media or enjoying a favourite app. While joint media engagement is beneficial for children's learning, and sitting with screens is part of children's daily sedentary time, a short period of supervised digital technology use (such as viewing digital media or playing with an app) can be a pedagogical decision made by educators according to the best interests of the child. Educator modelling of decision making regarding the use and non-use of digital technologies helps children learn how to balance a range of digital and non-digital experiences and activities within their own lives.

Principle: Play and pedagogy promotes young children's exploration, social interaction, collaboration and learning in digital contexts

Practice advice:

1. Provide opportunities for children to explore and experiment with the functions of a diverse range of digital technologies alongside adult modelling and instruction in digital technology use.
2. Promote play involving children in digital technology use with digital and non-digital tools and materials to build knowledge about the use of technologies for communication, collaboration and information sharing.
3. Seek young children's perspectives regarding the role and use of digital technologies in their own lives, play and learning.
4. Model active decision making regarding digital technology use with, by and for young children that provides a balance of digital and non-digital experiences and activities in early childhood education and care settings.

CONCLUSION

Australian children today are growing up in digital contexts. This Statement provides an overview of contemporary research and thinking about the role and optimal use of digital technologies with, by and for young children in early childhood education and care settings. Four principles, and practice advice for each principle, are identified.

It is intended that this Statement will be regularly reviewed and refined as educators, researchers, policy-makers and affiliated early childhood education and care professionals continue to build the evidence base required to further understand what is in the best interests of young children growing up in digital contexts.

GLOSSARY OF TERMS

App: An abbreviation of the term 'Application', used here to refer to small programs that can be downloaded or installed on mobile phones and tablet devices.

Coding: The process of creating and inputting messages that can be understood by others, or by a digital device such as a computer, robotic toy or app.

Co-playing: When two or more children and/or an adult and child(ren) engage in play together, communicating about their actions, about the content, or interacting in any way.

Co-viewing: Occurs as two or more people view the same content together, promoting opportunity for conversation and communication about the content they are viewing.

Cyber-safety education: Education that supports online safety and responsible digital citizenship.

Digital data: Information that is transmitted digitally, including (but not limited to) text, audio, images and video.

Digital documentation: Recording and analysing children's engagement and learning using digital tools. This can include photos, text and video and may be communicated via an online platform.

Digital technology: First developed in the 1960s with the advent of microprocessors or small 'chips' that convert information into numbers, digital technology enables large amounts of data to be stored and shared so that it can be accessed, created and used by people anywhere, at any time.

Early childhood education and care setting: Includes long day care, kindergarten/preschool, occasional care, family day care and/or outside school hours care.

Educators: Early childhood practitioners who work directly with children to facilitate learning in early childhood settings.

Executive functioning: A collection of processes associated with children's guiding thoughts and behaviours that help them plan and execute a goal. Some examples are working memory, focus, cognitive flexibility and emotional regulation including inhibition and control.

Haptics: Technologies that use touch sensation or movement to control interactions with digital devices.

Interactive whiteboard: A digital screen that projects content for groups of children to co-view or co-engage. Interactive whiteboards incorporate touch sensitive or responsive controls so the user may engage via the screen rather than by using a mouse or keyboard.

Internet of Things: 'Smart tools' and objects that are connected to the internet to transmit or receive information. These include items such as interactive air-conditioners or lights that can be controlled remotely.

Internet of Toys: Toys that are connected to the internet and can transmit or receive data over the internet.

Joint engagement: When people (children and adults) engage in an activity together, for example, two children working together to code a robotic toy.

Pedagogy: Educator decision making about children's learning experiences and opportunities made in the best interest of the child.

Screen time: A general term that includes any time a child engages with an electronic screen, including (but not limited to) watching television, engaging with educational games or creating digital books.

Sedentary behaviour: Sitting or lying down; awake but relatively inactive or stationary.

Self-regulation: The capacity for children (and adults) to regulate their behaviour in response to their emotions and thinking.

Technology: The development of new objects or tools by people that help them in their lives. Three broad types of technology are mechanical technology (e.g. wheels, blocks, levers, gears); analogue technology (e.g. film-based photography, drawing, painting); and digital technology (e.g. mobile phones and computers).

Video-chat: Online video screen to have a social engagement with a family or friend.

Wearable technologies (wearables): Digital technologies that can be worn, e.g. watches, fitness tracking devices, jewellery and clothes made with electronic textiles.

Young children: Children aged from birth to eight years.

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