

5 The early childhood education and care workforce in the digital age

In the context of the evolving demands digitalisation places on early childhood education and care (ECEC) staff, this chapter explores how countries are preparing and supporting ECEC staff to meet these demands, as well as how technology can be integrated into ECEC staff practices more generally (e.g. for administrative tasks, work with parents). The chapter proposes a model for considering ECEC staff competencies around digitalisation, with foundational skills and knowledge for the entire workforce at the base, enhanced abilities for some groups of staff, and finally, the possibility for a group of ECEC digital specialists. The chapter ends with policy pointers.

Key findings

The ECEC workforce is essential for advancing policy goals around digitalisation in the early childhood sector. These goals are centred on children's experiences and exposure to digital technologies, from the safeguards in place to protect them from risks in the digital world to the curricular and pedagogical approaches for introducing early digital literacy. However, demands on the ECEC workforce also encompass the use of digital tools for administrative and management tasks, communicating with families and other stakeholders, and using digital tools to develop staff's own knowledge and professional engagement.

Results from the *ECEC in a Digital World* policy survey (2022) show that preparing ECEC professionals to use digital technologies safely and effectively in their pedagogical work with young children is a policy challenge rated as being of "very high" or "high" importance by most of the countries and jurisdictions that responded to the survey. Yet, frameworks for specifying the digital competencies needed by ECEC staff are scarce. A model for considering ECEC staff competencies around digitalisation includes foundational skills and knowledge for the entire workforce at the base, enhanced abilities for some groups of staff, and finally, the possibility for a group of ECEC digital specialists.

The *ECEC in a Digital World* policy survey (2022) shows that digital competencies are not generally required in initial education programmes for ECEC teachers, although many of the digital competencies are considered commonly included in these training programmes.

In most countries and jurisdictions, ECEC authorities provide some funding or support for training to develop the digital competencies of ECEC staff.

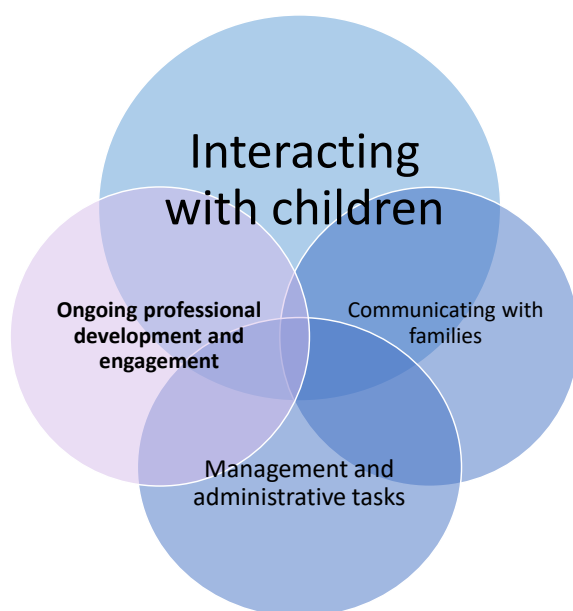
A majority of countries and jurisdictions support traditional online approaches to continuous professional development (e.g. online courses, seminars or massive open online courses) and blended online/in-person training activities. In contrast, a minority of countries and jurisdictions financially support staff induction activities that use digital tools (e.g. online content, communication or networking tools) or mentoring or coaching activities supported by digital tools (e.g. online content, communication or networking tools). Research suggests that digital trainings offer many advantages, such as allowing learners to interact with content at their own pace. However, training models that combine the strengths of virtual training with the benefits of in-person training, particularly opportunities to reflect on content and discuss challenges together, appear especially promising. In addition, ECEC staff need opportunities for hands-on technical support when engaging with new digital tools.

Several countries are cultivating online repositories of resources for teachers across levels of education. Support for digital solutions that address work processes, especially to facilitate data collection and administrative services, is also common.

Introduction

The ECEC workforce is at the centre of ensuring that policy and curriculum goals around digitalisation are met. Professionals working in early childhood settings have expansive responsibilities, providing a mix of both care and education adapted to children's ages and developmental needs, as well as to goals set by applicable curriculum frameworks and specific cultural contexts. In addition to their work directly with children, ECEC staff are responsible for documenting children's well-being, development and learning; engaging with families; ensuring compliance with standards; and for their own ongoing professional development. These responsibilities are interrelated and impacted by the digital transformation. This chapter touches on all these areas (Figure 5.1), but places a strong emphasis on ECEC staff training, particularly ongoing professional development, as well as other aspects of professional engagement, such as collaboration.

Figure 5.1. Early childhood education and care staff have multiple responsibilities



A key challenge for the ECEC workforce is understanding and adapting to the digital world to effectively support children's early digital competencies and allow them to experience safe and meaningful engagement with digital tools. In addition, technology offers numerous possibilities to expand professional learning opportunities, increase possibilities for interaction among ECEC staff, facilitate administrative responsibilities, improve communication with families and otherwise support work processes. However, ECEC staff do not necessarily have the resources or time necessary to make digital tools routine or helpful for these various aspects of their jobs, let alone for their work with children. Digital technologies are changing rapidly, as are expectations for their uses in ECEC settings. In this context, challenges are compounded for ECEC staff in their efforts to effectively use digital resources now, and to prepare both themselves and children for the future.

This chapter explores how countries are preparing and supporting ECEC staff to meet these demands, as well as how technology can be integrated into ECEC staff practices more generally (e.g. for administrative tasks, work with parents). The chapter explores what digital competencies ECEC professionals need, examining existing frameworks for digital competency and proposing a model for ECEC in particular. This model includes foundational skills and knowledge for the entire workforce at the base, enhanced abilities for some groups of staff, and finally, the possibility for a group of ECEC digital specialists. The chapter then describes policies that support equipping the ECEC workforce with foundational digital competencies

through initial education programmes and continuous professional development (CPD). Existing requirements and funding for CPD are considered, as well as ECEC staff's access to CPD. Access is considered broadly, to include the provision of CPD from public and private actors, the time necessary to engage in these opportunities, and the basic digital skills that enable ECEC staff to participate in virtual or hybrid trainings. The chapter then considers promising ways to foster enhanced and specialised digital competencies in the ECEC workforce, notably through training content focused on digitalisation in ECEC and the use of digital tools to expand opportunities for professional collaboration and coaching and mentoring. The chapter concludes with policy pointers related to digitalisation and the ECEC workforce.

Challenges and opportunities for the early childhood education and care workforce in a digital world

The COVID-19 pandemic emphasised the need for and potential of digital tools in ECEC, while also highlighting its limitations. To understand how digital technologies were deployed for early education during the pandemic in 2020, in early 2021, the OECD, in partnership with the G20, conducted a survey that was completed by 34 countries and jurisdictions (OECD, 2021^[1]). Results from the survey show that with ECEC settings closing or serving fewer children to minimise the spread of COVID, in 69% of the responding countries, pre-primary staff had to continue their work remotely. For many this meant not only carrying out administrative tasks and communication with families remotely, but also interactions with the children. For both families and staff, this required resources to connect online (e.g. a stable Internet connection, personal digital devices) as well as knowledge about how to use digital devices. However, 60% of the surveyed countries reported the lack of digital skills for teaching among pre-primary teachers as being a challenge.

As only 16% of the countries expected pre-primary teachers to use digital technology in their work with children to a great extent prior to the pandemic, it is perhaps not surprising that teachers were not well prepared for this shift in expectations and working methods. Due to the sudden increase in technology use, both teachers and parents/caregivers were faced with helping children to engage with technology in age-appropriate ways (e.g. limiting passive screen time). Accordingly, 25% of the surveyed countries and jurisdictions adopted new training in 2020 for pre-primary teachers to help children and parents/caregivers use technology in age-appropriate ways. The pandemic highlighted the potential of digital technologies in ECEC settings and accelerated the need to ensure staff are equipped to make use of them in the full range of their work, even as remote work becomes once again the exception for this field.

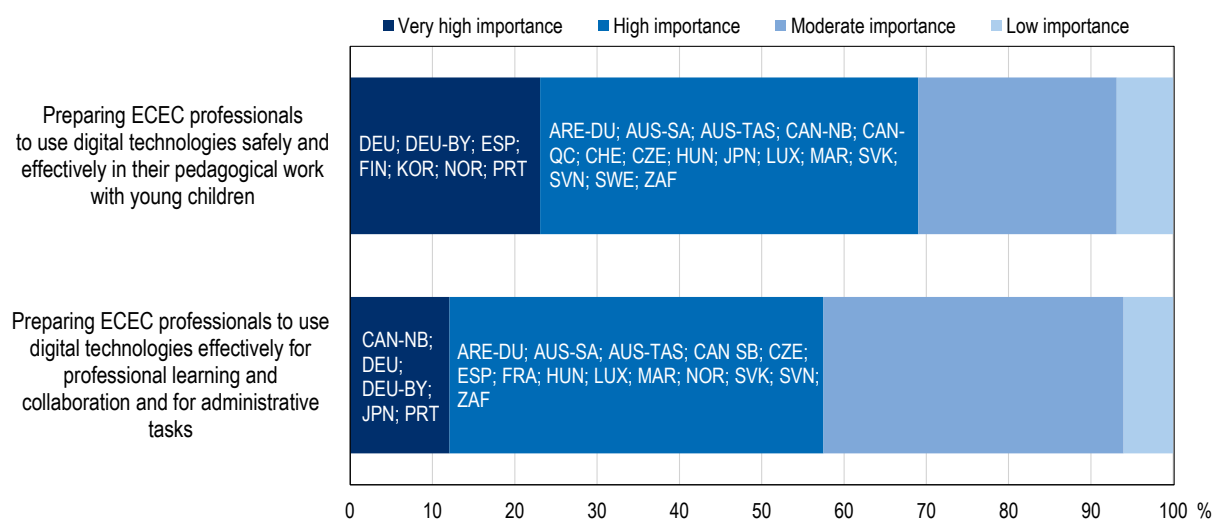
As the pressures of the COVID-19 pandemic ease, challenges around integrating technology into ECEC remain, and specific characteristics of the ECEC workforce make it complex to develop and implement effective supports. These challenges include fragmented training opportunities and requirements, goals and expectations depending on the settings in which staff work (e.g. school-, centre- or home-based settings), as well as staff's role within these settings (e.g. teacher or assistant) (Akaba et al., 2022^[2]; Campbell-Barr et al., 2020^[3]; OECD, 2022^[4]). In many places, overall levels of education and training are low for staff in many settings, particularly for assistants (OECD, 2019^[5]). Furthermore, the range of developmental stages covered by ECEC means that ECEC staff working with the youngest children (e.g. ages birth to three years) need different skill sets – especially related to digital technologies – than those working with somewhat older children (Caronongan et al., 2019^[6]; OECD, 2020^[7]). Staff's different backgrounds within the sector pose difficulties for developing training requirements adapted to the various capabilities, needs and circumstances.

Digital technologies themselves can address some of these challenges, by allowing for learning opportunities that are more tailored to individual staff and by connecting ECEC staff learners with similar needs or interests regardless of their geographic proximity, as well as streamlining work processes in ECEC settings (Mineia-Pic, 2020^[8]). Despite the potential for digital technologies to be a positive force, preparing ECEC professionals to use them safely and effectively in their pedagogical work with young

children is the policy challenge rated as being of “very high” or “high” importance by the most countries and jurisdictions having responded to the *ECEC in a Digital World* policy survey (2022) (see Chapter 2 and Figure 5.2). Moreover, this was the challenge selected as being of “very high” importance by the greatest number of countries and jurisdictions (7). Likewise, more than half of responding countries and jurisdictions rated preparing ECEC professionals to use digital technologies effectively for professional learning and collaboration and for administrative tasks as being of “very high” or “high” importance. Still, countries and jurisdictions identified other policy challenges as being important as well, and these have implications for the work of ECEC staff. For instance, preparing young children for the digital world and adapting the goals of ECEC to the changing importance of cognitive and social-emotional skills in the digital age are also among the top five policy challenges identified by respondents, and ECEC staff are at the centre of all of this work.

Figure 5.2. Policy challenges for equipping the early childhood education and care workforce for the digital world

Percentage of countries and jurisdictions identifying the following policy challenges, 2022



Notes: Responses are weighted so that the overall weight of reported responses for each country equals one. See Annex A.

The response category “very high importance” was limited to three out of ten response items maximum.

CAN SB: School-based sector in Canada.

Items are sorted in descending order by the share of countries selecting response categories “very high importance” or “high importance”.

Source: OECD (2022^[9]), *ECEC in a Digital World* policy survey, Table B.2.

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Aside from questions around digitalisation in ECEC, workforce preparation and ongoing training is a fundamental challenge for governments (OECD, 2021^[10]). As attention to ECEC as a component of education systems grows, so too do expectations for a professionalised ECEC workforce (Oberhuemer, 2005^[11]; Peeters, 2008^[12]). Identifying core digital competencies for ECEC staff, to support their roles as education professionals and for providing high-quality care to young children, and integrating these digital competencies into training programmes is a key challenge for governments.

Digital competency frameworks for early childhood education and care professionals

Digital competency comprises a far-reaching set of areas, all of which have relevance for ECEC professionals. For example, the European Commission's analysis of frameworks on digital competency identifies seven competency areas (Ferrari, 2012^[13]); Table 5.1 illustrates how each of these can be important in the context of ECEC.

Table 5.1. Digital competencies and their relevance to early childhood education and care staff

Core competencies	Examples of relevance for ECEC
Information management	Track attendance and information on individual children, such as health/allergy/medication needs
Collaboration	Plan activities with colleagues or develop ideas with professional networks, outside the early childhood education and care (ECEC) setting
Communication and sharing	Inform families about the ECEC setting or individual children
Creation of content and knowledge	Develop resources to use in work with children or help children learn to create with digital tools
Ethics and responsibility	Protect children's privacy, well-being and health
Evaluation and problem solving	Monitor children's well-being, development and learning
Technical operations	Access ongoing professional development opportunities

Note: Examples are illustrative and not exhaustive of the ways each competency area may relate to ECEC practice.

Source: Ferrari (2012^[13])

Several frameworks for digital competency focus specifically on teachers, recognising that taking individual digital competencies and moving them into pedagogical settings is yet another skill set compared to what is required for other types of jobs. Frameworks that look more specifically at competencies for teachers include the European Commission's DigCompEdu (Redecker, 2017^[14]) and the Technological Pedagogical and Content Knowledge (TPACK) framework (Mishra, 2019^[15]) (Box 5.1). Although these frameworks cover education broadly and not ECEC specifically, their content can be informative for the early childhood sector.

Box 5.1. Digital competency frameworks for teachers

DigCompEdu (European Commission)

The DigCompEdu framework aims to promote the digital competencies of educators regardless of their nation, region, position or level of education (Redecker, 2017^[14]). It consists of 22 elementary competencies in 6 areas: 1) digital technologies for professional engagement; 2) effective and responsible use of digital technologies for creating and sharing in an educational setting; 3) managing digital technologies in teaching and learning; 4) digital strategies to improve assessment; 5) the potential of digital technologies for empowering learners; and 6) facilitating learners' digital literacy. The 22 basic competencies are captured through various typical tasks that assign educators' digital competencies to one of six levels. These levels are called Newcomer, Explorer, Integrator, Expert, Leader and Pioneer. The first two levels involve processing new information and developing basic digital practices. In the next two levels, knowledge is further developed and structured in digital practices. At the two highest levels, educators can share their knowledge, but also critique and develop new practices.

TPACK

The Technological, Pedagogical, and Content Knowledge (TPACK) framework proposes a holistic approach to the knowledge required of teachers for the successful integration of technology in teaching. It describes the relationship between the areas of technological, pedagogical and content knowledge and their interactions (Mishra, 2019_[15]). This framework, therefore, makes it possible to identify approaches to overcoming the problems teachers face when using digital technology in their teaching, based on content and pedagogy. The possible combinations of domains can enhance teachers' knowledge in a sub-domain and reinforce the implementation of technology in a school setting with supportive pedagogical approaches, taking into account students' prior understanding and learning needs. The intersection of technological and pedagogical knowledge addresses the relationship and interaction of technological tools and pedagogical practices. The pedagogical and content knowledge shows the interaction of pedagogical practices and specific learning goals. The technological and content knowledge shows the interaction of technologies and learning objectives. This framework does not propose a progression of competencies, but rather a way to understand how teachers engage with and balance different aspects of their work. An extension of the framework to early childhood education and care proposes that the "A" in TPACK should stand for "affective" elements, such as teacher confidence and motivation to use technology (Dardanou et al., 2023_[16]; Park and Hargis, 2018_[17]).

Sources: Dardanou et al. (2023_[16]); Mishra (2019_[15]); Park and Hargis (2018_[17]); Redecker (2017_[14]).

Similarly, some countries have developed digital frameworks for their educators, which are generally intended to cover professionals working across the full age range covered by the education system. For instance, Luxembourg has developed a Media Compass, which is a national reference guide for education about and through media. It is intended to develop, promote and deepen the media literacy of educators at all levels of education (Case Study LUX – Annex C). In Norway, the Professional Digital Competence Framework for Teachers has two areas of focus recognising the different needs and requirements in the profession: teachers' professional development and their practices with children (Dardanou et al., 2023_[16]). In Spain, the National Institute of Educational Technologies and Teacher Training's Teaching Digital Competence Framework 2022 adapts DigCompEdu to the national context, and is part of the overall Plan of Digitalisation and Digital Competences of the Educational System in Schools. It offers teachers a descriptive framework for training purposes as well as evaluation, certification and accreditation processes (Dardanou et al., 2023_[16]).

In other countries, clear goals for what children should learn about digital technologies are linked to expectations for teachers. This is the case in Australia, for example, where according to the curriculum, teachers should be able to adequately guide young children to develop digital literacy and computational thinking (Murcia, Campbell and Aranda, 2018_[18]) (see also Chapter 4). This means teachers should know and understand digital systems, but also how to collect and manage data, and how to develop digital solutions to problems. Similarly, in Finland, the ECEC curriculum framework views teachers' digital competencies as developing children's transversal competencies (Dardanou et al., 2023_[16]).

Foundational, enhanced and specialised competencies for early childhood education and care staff

Digital competency frameworks targeted to ECEC professionals are rare (Dardanou et al., 2023_[16]). Despite the value of aligning digital competencies for teachers and staff throughout the educational system and overall applicability of general frameworks for teachers' digital competencies, some aspects of working in ECEC merit specific attention. The model presented in Figure 5.3 illustrates some of these specificities, describing three levels of competencies that are relevant for staff in the ECEC sector, building on ideas from more general digital competency frameworks (Mishra, 2019_[15]; Redecker, 2017_[14]). For each of the

three levels, competencies are described in three areas: 1) pedagogy; 2) management and leadership; and 3) knowledge development and professional engagement. The three levels of the model (foundational, enhanced and specialised) recognise that not all staff need the same level of expertise regarding digital technologies. Assistants, teachers, leaders and more specialised staff are likely to need different digital competencies. However, all ECEC staff need competencies to ensure they can participate in and benefit from increasing digital opportunities as well as protect and support the children with whom they work. A balance is needed between ensuring foundational competencies with digital technologies for all staff and supporting a deeper level of skill and expertise for some staff.

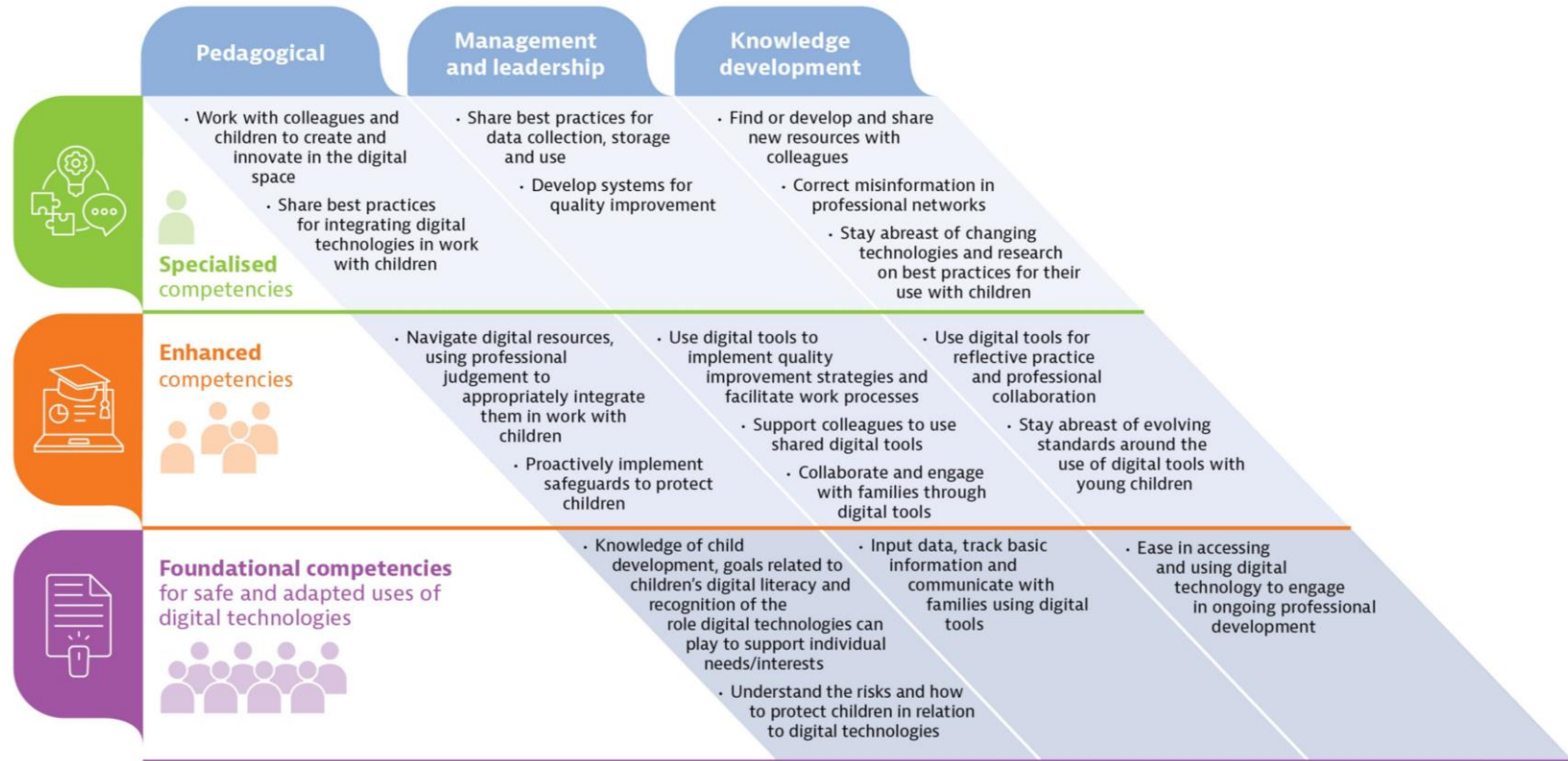
The base of this model describes foundational competencies. These are the skills and abilities related to digital technologies that all ECEC staff should be supported to develop. In particular, this level acknowledges that foundational knowledge of child development is essential for ECEC staff to successfully foster children's development, learning and well-being, and is a prerequisite for understanding how digital technologies can be safely and meaningfully integrated into ECEC settings. From a pedagogical perspective, at this level, ECEC staff should have a general understanding of the risks associated with using digital technologies in ECEC settings and how to protect children from these risks. They need good knowledge of relevant curriculum frameworks and goals related to children's digital literacy. More generally, ECEC staff at this level should recognise the role digital technologies can have in ECEC and be aware of how these technologies can be adapted to different purposes and age groups, in particular regarding differences for children under age 3 and their slightly older peers. In other words, staff at this level should understand that practices involving digital technologies at later levels of schooling may not be well adapted to ECEC contexts, and that even within the context of ECEC, best practices will differ based on the age and developmental stage of the children in the group.

With regard to management competencies, at this foundational level, ECEC staff should be supported to develop their skills around data management to store and track basic information (e.g. attendance records or lesson plans), as well as to use digital tools to support other forms of communication with families. In addition, all ECEC staff need foundational competencies to support their own knowledge development to ensure continuing professional learning. At this level, staff need to feel confident accessing and using digital technology to engage in ongoing professional development, regardless of its focus.

The next levels of the framework assume that staff retain and build on these foundational competencies. At the second level of the model are enhanced competencies for using digital technologies in ECEC. Not all staff need to reach this level, but it is important for ECEC leaders as well as some ECEC teachers/lead staff to develop the competencies described here. In terms of pedagogical competencies, staff at this level should proactively implement safeguards to protect children from risks, using their understanding of both digital risks and child development to go beyond basic required protections, as appropriate. Furthermore, staff at this level should be able to navigate available digital resources, using professional judgement to appropriately and selectively integrate them into their work with children. This level of pedagogical skill goes beyond being able to make age-appropriate adaptations in the use of digital technologies that are provided or easily available to taking a critical stance that considers what types of digital resources could be the most meaningful in the context of the particular ECEC setting and with individual children.

Also at this level, staff should be capable of routinely using digital tools for management and leadership tasks. This includes informing and implementing ongoing quality improvement strategies at the ECEC setting, as well as facilitating work processes, such as meeting reporting and monitoring requirements, tracking children's enrolment, and managing human resources in the setting. In addition, as digital leaders in their ECEC settings, these staff should be able to provide some support to their colleagues in accessing and using common digital tools. With regard to knowledge development, at this level of competence, staff should also be using digital resources to proactively engage with the profession, in addition to continuing their knowledge development. For instance, staff at this level should effectively use digital tools to engage in reflective practice and professional collaboration, as well as to stay informed of evolving recommendations and requirements around the use of digital tools with young children.

Figure 5.3. Digital competency framework for early childhood education and care staff



Finally, the third level of competencies in the model is relevant for only a subset of ECEC staff, referred to here as ECEC digital specialists, and similar to media literacy specialists described elsewhere (Guernsey, 2014^[19]). This group of specialised staff can be viewed as similar to librarians or others who work in targeted ways with both staff and children. The ECEC digital specialists' competencies may be most relevant for staff who work across ECEC settings, supporting their peers as well as engaging directly with children in focused ways, although some ECEC settings may wish to cultivate this level of expertise within their own programmes. Pedagogical competencies for ECEC digital specialists involve working with both colleagues and children to create and innovate in the digital space, as well as sharing best practices for integrating technologies into work with young children. From the perspective of management and leadership, competencies at this level include sharing best practices for data storage and use, and developing systems for quality improvement that make good use of the benefits of digital tools. Lastly, regarding knowledge development and professional engagement, staff at this level should be able to find and share new resources with colleagues, correct misinformation and outdated information in professional networks regarding the use of digital technologies in ECEC, and stay abreast of changing technologies and research on best practices for their use with children.

In many cases, ensuring staff reach the level of foundational competencies for safe and adapted uses of digital technologies is not straightforward. Recommendations for safely and effectively integrating technology and media into early childhood settings underscore the importance of staff's professional judgement to identify when and how to use technology with young children (National Association for the Education of Young Children and Fred Rogers Center for Early Learning, 2012^[20]) (see Chapter 4). Such principles are also visible in countries' policies. For example, Sweden's digital strategy for the education system highlights the role of leaders, in particular, but also of staff, for making the education system (including ECEC) responsive to digitalisation (2022). This need for a workforce to navigate the intersection of ECEC and the digital world is consistent with growing expectations more generally for the professionalisation of the ECEC workforce (OECD, 2021^[10]).

Foundational competencies around digital technologies for ECEC staff depend largely on having a workforce with strong knowledge of child development, applicable curriculum frameworks and relevant pedagogies. However, this is challenging to ensure, given the limited initial training for much of the ECEC workforce (OECD, 2022^[4]; 2020^[21]). With the myriad demands placed on ECEC staff aside from those in the digital space, ensuring that training and expectations around digitalisation are complementary, and ideally supportive, to other existing requirements is of paramount importance for policy efforts to bring into and engage the ECEC workforce in the digital world (Dardanou et al., 2023^[16]).

In response to the urgent requirement of protecting children in the digital world, guidelines and recommendations for ECEC staff are needed (see Chapter 3). Supporting staff to harness the opportunities of digital tools in different aspects of their work is critical to developing segments of the ECEC workforce with enhanced and even specialised skill sets with regards to digital technologies, building on a solid foundation of protecting children from risks. This evolution in expectations for ECEC staff can promote their management and leadership practices, facilitate their knowledge development and professional engagement, and align their pedagogies with the reality of the digital experiences children bring with them to their ECEC settings (Mertala, 2019^[22]; Schriever, 2021^[23]).

Building foundational competencies for safe and adapted uses of digital technologies

Staff need foundational training and skills to take professional decisions about the best way to use technology in their contexts, and to avoid using digital tools in ways that could introduce or magnify risks for children (see Chapter 2). The OECD Recommendation of the Council on Children in the Digital Environment calls on governments to support educators in identifying the opportunities and benefits of the

digital environment for children, and to evaluate and mitigate the possible risks. It also emphasises the importance of helping educators to ensure children become responsible participants in the digital world (see Chapter 3). However, it is not always evident how ECEC staff should undertake these tasks, especially for the youngest children or in age-integrated settings where curriculum frameworks may provide less specific perspectives on digitalisation compared to pre-primary curriculum frameworks (see Chapter 4).

In ECEC, requirements for initial education and CPD vary greatly across countries as well as within countries by segment of the workforce (OECD, 2021^[10]). The emphasis placed on initial education requirements versus CPD also varies: A relatively stronger emphasis on CPD may complement and compensate for a more limited focus on initial education requirements and vice versa. It is, therefore, important to look across initial education and CPD and how these can work together and complement each other to develop foundational competencies for safe and adapted uses of digital technologies for all ECEC staff (Dardanou et al., 2023^[16]). Both initial education and CPD are needed to develop ECEC staff's digital competencies generally, and in particular to support learning goals for children around digitalisation, as these evolve based on changing circumstances, needs and values (see Chapter 4).

This section first discusses the initial education for ECEC staff, highlighting the range of requirements in general, and specifically those related to digital competencies. It then considers CPD, first focusing on requirements to develop digital competencies and available government funding for this purpose. The section next addresses a wide range of issues that are relevant for ECEC staff to access digital CPD, including the time, availability of digital resources (e.g. hardware and software) and the sources of existing training opportunities. Particular attention is paid to the need to develop practical skills to support ECEC staff in successfully accessing and capitalising on digital tools across their various work responsibilities, ultimately in order to successfully support children. As training opportunities become increasingly digital themselves (e.g. online courses), the ECEC workforce (and prospective workforce) needs foundational skills and access to digital tools to fully engage in professional learning.

Initial education programmes

ECEC staff need solid training in child development in general, and in understanding children's development in digital contexts in particular. Initial education programmes are a central mechanism through which policies can shape staff's preparedness to provide high-quality ECEC. The level of qualification required for teachers in ECEC varies across countries but is typically above secondary schooling (International Standard Classification of Education [ISCED] level 3); however, requirements for those entering assistant roles are most often at ISCED level 3 (OECD, 2021^[10]). Importantly, research highlights the value of initial education programmes that focus on ECEC specifically, providing specialised training adapted to the overall level of qualification, for the future professionals who will be working directly with young children (Bendini and Devercelli, 2022^[24]; OECD, 2018^[25]). These initial training programmes have the potential to equip staff with a good understanding of the goals of ECEC, relevant curriculum frameworks, and a range of topics related to protecting and supporting children in the digital world, in addition to the range of other tasks they will encounter in their jobs (e.g. engaging with families).

As higher entry-level qualifications are typically required for teachers than for assistants in ECEC, thus permitting greater breadth and depth in the topics covered, the OECD *ECEC in a Digital World* policy survey (2022) asked specifically about the inclusion of different topics related to digitalisation in initial education programmes for teachers (Table 5.2). Results show that digital competencies are not generally required in initial education programmes for ECEC teachers, with notable exceptions in Denmark and Luxembourg, where all eight of the competencies included in the survey are required for pre-service teachers. In other countries and jurisdictions, many of the digital competencies are considered commonly included in these training programmes, albeit not formally required.

Table 5.2. Digital competencies in initial education programmes for early childhood education and care teachers

	Number of required elements	Basic operational skills for digital tools	Understanding and identifying risks and benefits of using digital technologies with young children	Using digital technologies for professional communication, collaboration and learning	Sourcing, selecting and creating/modifying digital educational materials to be used with young children	Using digital technologies for documentation and assessment of young children's learning and development	Personalising learning and development experiences and promoting young children's engagement and agency with digital technologies	Facilitating young children's content creation, collaboration and problem-solving with digital technologies	Facilitating young children's safe and responsible uses of digital technologies
Australia	0								
Australia (<i>Tasmania</i>)	0								
Australia (<i>Victoria</i>)	0								
Belgium (Flanders PP)	0								
Belgium (Flanders U3)	0								
Canada CB	1			m	m	m		m	m
Canada SB	2			m	m	m		m	m
Canada (<i>Alberta</i>)	0								
Canada (<i>British Columbia</i>)	0								
Canada (<i>Manitoba</i>)	0								
Canada (<i>New Brunswick</i>)	0								
Canada (<i>Quebec</i>)	1								
Czech Republic	2								
Denmark	8								
Finland	1								
France	3						m		
Germany	0								
Germany (<i>Bavaria</i>)	0								
Iceland	5								
Ireland	0								
Israel	0								
Italy	0								

	Number of required elements	Basic operational skills for digital tools	Understanding and identifying risks and benefits of using digital technologies with young children	Using digital technologies for professional communication, collaboration and learning	Sourcing, selecting and creating/modifying digital educational materials to be used with young children	Using digital technologies for documentation and assessment of young children's learning and development	Personalising learning and development experiences and promoting young children's engagement and agency with digital technologies	Facilitating young children's content creation, collaboration and problem-solving with digital technologies	Facilitating young children's safe and responsible uses of digital technologies
Japan	4								
Korea	0								
Luxembourg	8								
Morocco	0								
Norway	4								
Portugal	0								
Slovak Republic	0								
Slovenia	2								
South Africa	1								
Spain	0								
Sweden	0								
Switzerland	0								
United Arab Emirates (<i>Dubai</i>)	0								
Percentage of countries requiring the element in most programmes		33	29	20	8	16	13	12	24
Percentage of countries commonly including the element in most programmes not formally		56	52	54	61	50	41	64	40
Percentage of countries without the element in most programmes		0	2	10	11	11	17	7	15

Notes: Responses are weighted so that the overall weight of reported responses for each country equals one. See Annex A.

Belgium (Flanders PP): pre-primary education in Belgium (Flanders). Belgium (Flanders U3): ECEC for children under age 3 in Belgium (Flanders). Canada CB: centre-based sector in Canada. Canada SB: school-based sector in Canada. Canada (Manitoba): kindergarten sector only in Canada (Manitoba).

■ Required in most programmes / ■ Commonly included but not a formal requirement / ■ Absent from most programmes / ■ Not known / m: Missing

Source: OECD (2022^[9]), *ECEC in a Digital World* policy survey, Table B.11.

StatLink  <https://stat.link/ps40jd>

Notably, only 29% of participating countries and jurisdictions reported that understanding and identifying the risks and benefits of using digital technologies with young children is a required element of most initial education programmes for teachers, and 52% reported that it is commonly included but not formally required. Furthermore, 24% reported that facilitating young children's safe and responsible uses of digital technologies is a required element of teachers' education programmes, and 40% that it is commonly included but not formally required, compared to 15% reporting that it is absent from most programmes.

This situation reflects the relative autonomy of higher education programmes in many countries, with curriculum design and discretion often occurring more at the level of individual programmes than at a systems level (OECD, 2022^[4]). Data from the OECD's *Quality beyond Regulations* policy questionnaire show that at least 70% of content areas considered in the questionnaire are required to be included in teachers' initial education and training programmes in the majority of participating countries and jurisdictions, indicating that a good breadth of topics is covered (OECD, 2021^[10]). However, even the topic of child development was not a required learning area in initial education in all of the 26 countries that responded to the questionnaire, underscoring the limitations of policy regulation in this area. Furthermore, training requirements for assistants were less common in most countries, highlighting the variability in knowledge and skills with which staff enter the ECEC workforce. The OECD Teaching and Learning International Survey (TALIS) Starting Strong 2018 data similarly show that ECEC staff report a range of content that was included in their initial training programmes, with gaps favouring a breadth of knowledge for teachers compared with assistants. Furthermore, while most staff participating in TALIS Starting Strong 2018 had training specifically to work with children, this was not universally the case (OECD, 2020^[21]).

Looking across countries, some digital competencies are more often required or commonly included in initial education programmes than others. These differences reflect, to some extent, a progression from more foundational to more enhanced digital skills. Among the competencies included in the *ECEC in a Digital World* policy survey (2022), the most commonly required digital aspects of initial education for ECEC teachers are “basic operational skills for digital tools” and “understanding and identifying risks and benefits of using digital technologies with young children.” In contrast, the least commonly required aspect is “sourcing, selecting and creating/modifying digital educational materials to be used with young children.” As this aspect of digital competencies reflects an enhanced or even specialised skill set for ECEC staff, it is not surprising that it is less commonly required in high-level regulations.

Although approaches to including digital competencies in initial education for future ECEC staff may not be comprehensive, countries and jurisdictions are nonetheless finding innovative strategies to improve training on digital skills (Box 5.2). For example, the College of Education in Iceland offers an elective on “information technology in learning and teaching” that can be taken at any point during the bachelors-level programme of kindergarten teacher studies (University of Iceland, 2021^[26]).

Box 5.2. Integrating digital competencies in initial education programmes for future early childhood education and care staff

In **Germany (Rhineland-Palatinate)**, a pilot project entitled “Media Education at the Technical Schools for Social Work in Rhineland-Palatinate” was introduced in 2018 (Türen zur Medienerziehung, 2020^[27]). The project aimed to train future early childhood education and care (ECEC) professionals in digital technologies by using them in their training. In the first phase of the project, vocational college instructors took part in a two-day training event. This event dealt with the topics of age-appropriate teaching of media competency, the possibilities of using media in portfolio work, transfer of learning modules of the vocational college curriculum, educational work with parents and how to align digital technologies with educational recommendations for ECEC centres. In the second phase, the training also included students from the technical schools who are becoming future ECEC professionals. The

focus was on the practical implementation of digital technologies in ECEC settings. Nine classes received equipment (e.g. tablets) as well as learning materials, such as articles, to support their work.

In **Slovenia**, the project “Developing Teachers’ Skills to Educate Preschool Children with and through Digital Technologies” aims to support future and current preschool teachers in developing children’s digital competencies and support computational thinking. It is based on the DigCompEdu framework (Redecker, 2017^[14]) and the principles of unplugged approaches, to scaffold young children’s computational thinking without the use of computers. The project is funded for a two-year development period (2021-23), after which the materials will be freely available to ECEC staff throughout the country and integrated into elective courses in a bachelor’s level training programme for future preschool teachers (Case Study SVN_2 – Annex C).

Sources: Redecker (2017^[14]); Türen zur Medienerziehung (2020^[27]).

As governments consider how to equip staff with digital skills to conduct their work efficiently and protect and support children in the digital world, initial education programmes have the potential to provide key foundational competencies to the next generations of ECEC staff. Yet, as broader findings on staff training profiles show, integrating requirements on digital training should not be done in isolation, but rather in conjunction with other foundational training requirements (Edwards, 2015^[28]; OECD, 2020^[29]). Ensuring staff are prepared for work with young children and understand basic principles of child development is a component of ensuring digital technologies are safely adapted to ECEC settings. This type of training can be facilitated through alignment with curriculum frameworks, enabling staff to understand curricular goals in context, as well as any specific goals around children’s access to and engagement with digital tools. In addition, practical experience is essential to ensure staff are prepared to implement the tools and strategies they learn in their courses (Botturi, 2019^[30]); without this, staff may feel their training was inadequate, despite having been exposed to relevant content (Masoumi, 2020^[31]). Strengthening initial training can help future staff engage in the full range of activities with digital tools that will be required of them in their careers.

The importance of continuous professional development

Continuous professional development complements initial training and is critical to support staff to adapt as technologies change and new best practices emerge. CPD is a strong tool for ensuring quality in ECEC and a key mechanism for ensuring ECEC staff keep up-to-date, or receive foundational skills for those with limited initial training, on digital technologies and children’s development in a digital world (OECD, 2018^[25]; OECD, 2022^[4]).

TALIS 2018 data show that, on average across 31 participating OECD countries, only 43% of lower secondary school (ISCED level 2) teachers felt “well” or “very well” prepared for using information and communications technology (ICT) in teaching, a finding echoed in other data sources (Guernsey, 2014^[19]; OECD, 2019^[32]). Moreover, teachers who had participated in online courses or seminars as part of their professional development were also those who reported greater comfort with and use of ICT in the classroom (Mineia-Pic, 2020^[8]). These data highlight that CPD is indispensable for bringing educators in general into the digital world. As digital technologies become increasingly part of initial training programmes, teachers and ECEC staff may become more and more confident using such tools in practice. Nonetheless, given the pace of technological change as well as the need to further train the existing workforce, CPD is important for helping all staff acquire foundational digital competencies, especially until these skills become more embedded in initial preparation.

ECEC staff need specific skills and training, adapted to the particular needs of working with young children. The flexibility of digital CPD to connect ECEC staff with similar training needs and interests, and to address

learning goals in a timely manner, is a clear advantage of digitalisation. However, when efforts to engage in CPD become a demand on ECEC staff that is not appropriately balanced with pay, flexibility in working hours and direct contact time with children, or professional recognition, an expectation to engage in digital CPD can create stress. These demands on staff and the instability of the workforce can have an impact on the quality of ECEC children experience overall.

Requirements and funding for continuous professional development

Policies can support CPD on digital competencies by ensuring training is available to ECEC staff, as well as by funding and/or making participation in the training mandatory (Figure 5.4). The types of CPD opportunities that are funded (Figure 5.5) can also have an important influence on the extent to which staff engage with digital tools and, ultimately, the potential for improving quality in ECEC settings. This section looks at the different ways countries require or fund opportunities to develop digital competencies for ECEC staff, as well as some specific types of CPD using digital tools that receive government funding. Digital tools are considered both a topic for CPD and a mode of accessing it.

The most appropriate approach depends on the governance and systems in place for the ECEC sector. The national or federal authority is responsible for determining policies for professional development on digital competencies for ECEC staff and leaders in only 15 of the 37 countries and jurisdictions that responded to the *ECEC in a Digital World* policy survey (2022). This responsibility is often shared across multiple levels of governance (i.e. regional/state, local/municipal, ECEC centre/governing board, leaders/staff in the ECEC setting) and may depend on the type of management of the ECEC setting (i.e. public or private). For instance, in Slovenia, where the national government shares responsibility for professional development on digital competencies with ECEC leaders/staff, the Ministry of Education defines priority themes for CPD. Each year the ministry publishes a catalogue of trainings available to teachers and leaders across levels of education. The courses' content is updated regularly to reflect identified needs and many are co-financed by the ministry. For several years now, one of the priority themes has been "Teaching, learning and evaluating achievements in the learning and study process with a focus on modern learning technology and innovative teaching and learning approaches."

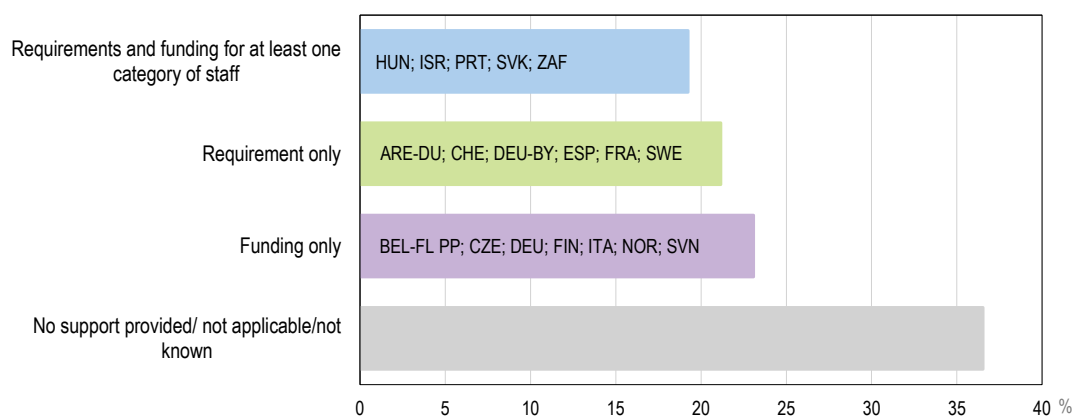
The *ECEC in a Digital World* policy survey (2022) asked whether countries and jurisdictions have requirements or funding for CPD on digital competencies for different groups of staff: leaders, teachers and assistants. Overall, both requirements and funding are more common for leaders and teachers than for assistants. Only five countries have both requirements and funding to participate in CPD that support staff to develop digital competencies, although countries may have strategies to encourage participation, such as by providing funding for relevant CPD, even when it is not required. For example, in Estonia, although it is not compulsory, as of 2022, 99% of kindergartens had participated in the ProgeTiger programme, which offers resources for procuring digital tools and materials, but also ongoing training opportunities to advance teachers' digital skills (Case Study EST – Annex C). However, of the countries that responded to the survey, a plurality (37%) indicated there was no support provided for digital competencies in CPD or that the question was not applicable in their context (Figure 5.4). These data underscore the varying degrees to which CPD for ECEC staff is supported in general across countries, particularly regarding supporting this workforce in the digital world.

The *ECEC in a Digital World* policy survey (2022) further asked about the funding for specific types of digital CPD activities, regardless of the roles of ECEC staff targeted by these funds (Figure 5.5). Responses show that a majority of countries and jurisdictions support traditional approaches to CPD, with 53% of respondents indicating that online courses, seminars or massive online open courses (MOOCs) receive government support for ECEC staff participation, and the same percentage of countries and jurisdictions provide funding support for blended online/in-person training activities. In contrast, only 19% of respondents indicate funding for mentoring or coaching activities supported by digital tools (e.g. online content, communication or networking tools), and 18% of respondents indicate financial support for staff

induction activities that use digital tools (e.g. online content, communication or networking tools). The potential for mentoring/coaching and induction programmes to improve staff practices is great, and discussed in more detail later in this chapter. Funding this type of CPD could be a meaningful strategy to build quality in ECEC, making the most of what digital tools can offer.

Figure 5.4. Digital competencies in continuous professional development

Percentage of countries and jurisdictions supporting in-service training on digital competencies for ECEC professionals implemented at a national/jurisdiction level for any category of staff, 2022

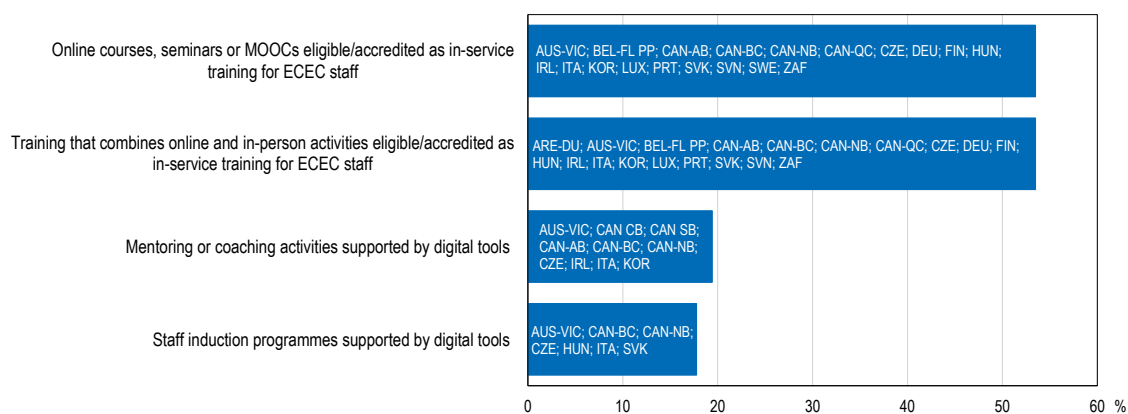


Notes: Responses are weighted so that the overall weight of reported responses for each country equals one. See Annex A. Staff include leaders, teachers, assistants or any other unspecified staff groups. BEL-FL PP: pre-primary education in Belgium (Flanders). Items are sorted in ascending order of the share of countries selecting each option. Source: OECD (2022^[9]), *ECEC in a Digital World* policy survey, Table B.12.

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Figure 5.5. Funding for participation in continuous professional development

Percentage of countries and jurisdictions where ECEC authorities provide funding for in-service training that uses digital tools, 2022



Notes: Responses are weighted so that the overall weight of reported responses for each country equals one. See Annex A. MOOCs: massive open online courses. BEL-FL PP: pre-primary education in Belgium (Flanders). CAN CB: centre-based sector in Canada. CAN SB: school-based sector in Canada. Items are sorted in descending order of the share of countries selecting each option. Source: OECD (2022^[9]), *ECEC in a Digital World* policy survey, Table B.13.

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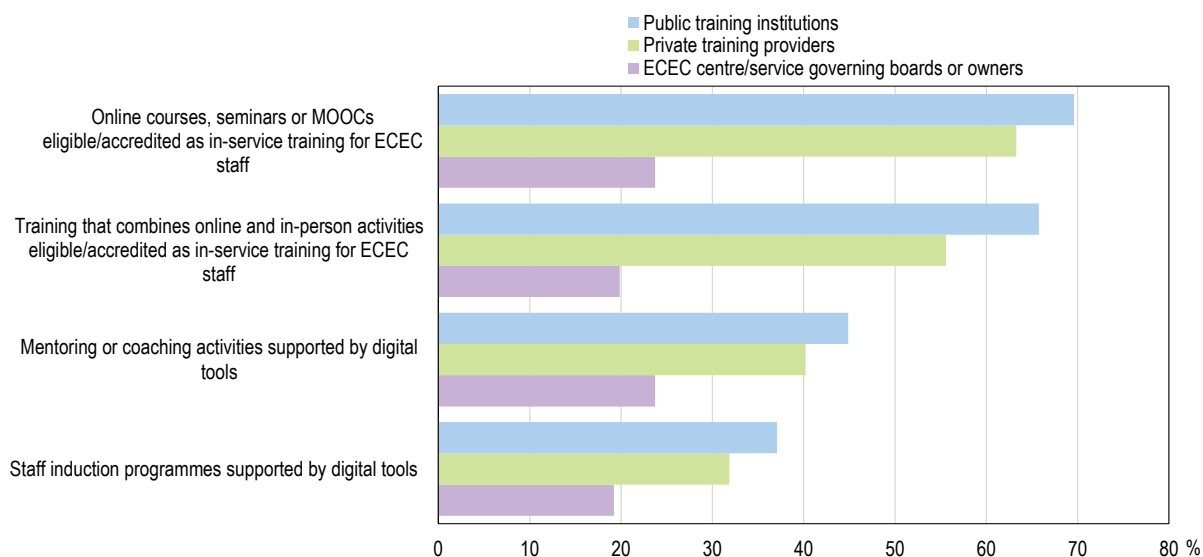
Participation in digital continuous professional development

Staff must have access to and be able to successfully engage with digital technologies to participate in many types of CPD. In these instances, digital tools are the mode of training, meaning staff digital resources and competencies can hamper participation in digital CPD or, alternatively, accelerate their access to a wide array of training opportunities. Digitalisation itself can be the topic of CPD that is delivered using digital technologies, but this is not necessarily the case.

As the responses from the *ECEC in a Digital World* policy survey (2022) show, online or combined online and in-person training activities are available in most countries (Figure 5.6). However, data from ECEC staff participating in TALIS Starting Strong 2018 and from teachers participating in TALIS 2018 indicate that participation in online courses/seminars as part of professional development is not widespread, averaging only 34% of lower secondary teachers across OECD countries with available data (Minea-Pic, 2020^[8]). Across the nine countries included in TALIS Starting Strong 2018, participation of ECEC staff in online CPD is even lower, under 25% in all countries, with the exception of Korea, where 81% of staff reported having online professional development (OECD, 2019^[5]).

Figure 5.6. Digital technologies for continuous professional development

Percentage of countries and jurisdictions supporting the continuous professional development of ECEC professionals, by type of provider, 2022



Notes: Responses are weighted so that the overall weight of reported responses for each country equals one. See Annex A.

Response categories are not mutually exclusive: countries and jurisdictions could select all applicable responses.

MOOCs: massive open online courses.

Source: OECD (2022^[9]), *ECEC in a Digital World* policy survey, Table B.13.

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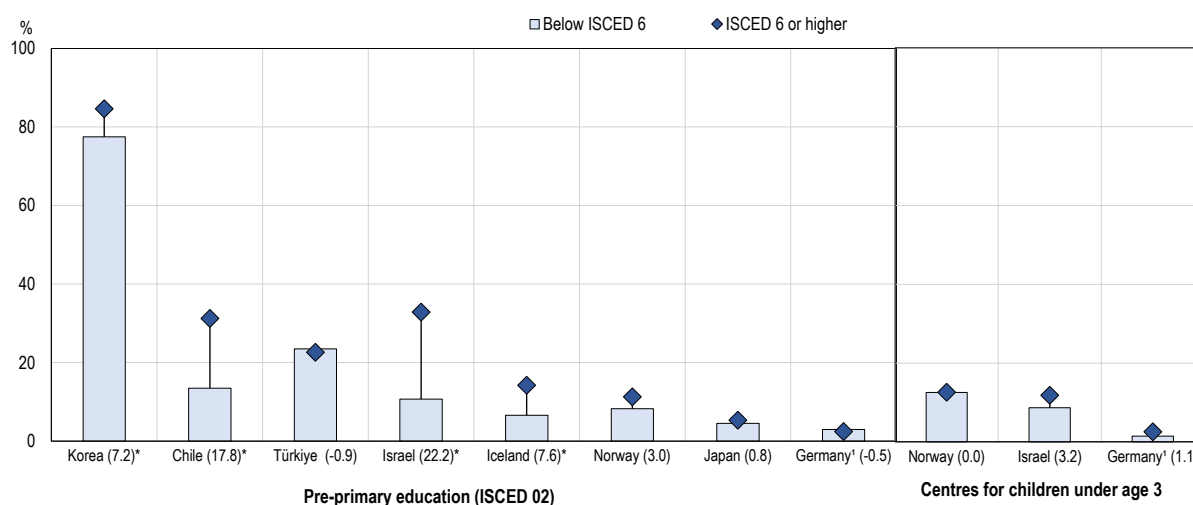
The mismatch between the high availability of online training resources and low participation by ECEC staff may be partly related to shifts that occurred beginning in 2020 due to the COVID-19 pandemic to make online resources more available, which was two years after the data collection for TALIS Starting Strong 2018. Yet, available evidence on adult learning highlights that the skills and equipment necessary to access or take full advantage of digital learning opportunities should not be taken for granted. For example, it is generally younger, more skilled and more educated people who engage in open online

courses and distance education (OECD, 2019^[33]). Among teachers specifically, there is a higher online course dropout for those with less experience participating in online professional development (Dash et al., 2014^[34]). Furthermore, teachers' participation in distance learning for professional development occurs mainly outside working hours, suggesting an element of convenience to take these courses at any time. However, this situation also underscores the fact that these learning opportunities are often in addition to other professional demands (Minea-Pic, 2020^[8]).

Given the heterogeneity of the ECEC workforce and the low levels of education required to work in many ECEC roles, challenges of accessing CPD through digital platforms are likely to be accentuated. Data from TALIS Starting Strong 2018 confirm that in several participating countries, staff with a higher level of education are more likely than their colleagues to participate in online CPD (Figure 5.7). In addition, a strong link exists between staff and leaders participating in *online* courses or seminars and those participating in *in-person* courses or seminars, indicating that the uptake of online trainings is led by those more engaged in training activities in general. This finding suggests that online trainings may currently complement rather than replace in-person trainings. Although this situation is not necessarily problematic, it does suggest a missed opportunity to capitalise on digital tools to expand CPD opportunities to a wider group of ECEC staff.

Figure 5.7. Early childhood education and care staff participation in online courses/seminars

Staff reports of their participation in online courses/seminars during the last 12 months, by educational attainment, 2018



1. Estimates for sub-groups and estimated differences between sub-groups need to be interpreted with care. See OECD (2019^[5]) for more information.

Notes: Differences in participation rates based on staff's educational attainment are shown next to the country name. Statistically significant differences are marked with an asterisk. See Annex A.

Countries are ranked in descending order of the total proportion of staff who participated in online courses/seminars.

Source: OECD (2019^[35]), TALIS Starting Strong 2018 Database, <https://www.oecd.org/education/school/oecdalisstartingstrongdata.htm> (accessed on 10 December 2022).

StatLink  <https://stat.link/308jma>

It is also clear that the ECEC workforce does not have sufficient time to engage in CPD as part of their regular professional duties, compared with teachers at other levels of education (OECD, 2022^[36]; Dardanou et al., 2023^[16]). A lack of time to engage with and explore the potential of technology can itself limit how teachers implement these tools in their practice (Kontovourki et al., 2017^[37]). Across countries,

pre-primary teachers generally have less paid time outside of their work with children than primary teachers; however, there is great variation from country to country (OECD, 2022^[36]). In Germany, although paid hours outside of work with children tend to be low for pre-primary teachers, other strategies are emerging to support ECEC staff engagement with digital technologies. For instance, in Germany (Bavaria), the government identified through a pilot project that staff needed more support to engage with digital tools and has thus developed guidelines in several areas, such as “Tablets in day-care centres – Clues for getting started” and “App list for educational activities in day-care centres” (Case Study DEU_Bav – Annex C). Although in-service training is compulsory in many countries, only a few countries offer financial and time compensation for ECEC teachers’ ongoing training. This can impact their participation in CPD, whether online or in-person, particularly in countries where in-service training is not compulsory. It may also limit the extent to which teachers engage in available CPD beyond meeting the minimum requirements.

The *ECEC in a Digital World* policy survey (2022) on the use of digital technologies for early education during COVID-19 shows that, with the first wave of COVID-19 in 2020, many ECEC facilities were closed worldwide and staff in many places had to continue their work remotely (OECD, 2021^[11]). While before COVID-19, digital technologies were mainly used for communication with parents/caregivers, during COVID-19 they were also expected to serve as a platform for education and care for young children. In this context, a lack of digital resources such as tablets or Internet connections was observable in both pre-primary and primary school, although shortages were more widespread at the pre-primary level: about 40% of the participating countries reported that these shortages were a challenge at the pre-primary level, versus about 30% at the primary level.

In addition to staff’s skills and competencies to engage with digital CPD, the sources of these training opportunities are important to consider to fully understand how and what ECEC staff can access. Provision of CPD for the ECEC workforce often comes from a wide variety of actors, both public and private. This is the case for digital CPD as well (see Figure 5.6). While this model of mixed provision of CPD is essential in many countries to ensure a sufficient supply of ongoing training opportunities for ECEC staff, this situation can contribute to variability in the quality of training staff receive (OECD, 2022^[4]). Perhaps even more than for CPD that occurs only in-person, it is important to consider which actors are offering CPD through digital platforms. For instance, companies with commercial interests that offer digital trainings may encourage or even require participants to purchase specific software or resources for use with children. Country-level data from the OECD’s *Survey of the Use of Digital Technologies for Early Education During COVID-19* (OECD, 2021^[11]) show that the use of commercial distance education platforms and apps was common for primary school settings during the pandemic, with 33% of countries indicating they were used to a great extent and another 42% indicating they were used to a moderate extent. The use of these commercial products was somewhat less for pre-primary settings (7% and 57%, respectively), but with the increasing use and awareness of digital tools in ECEC, this situation has the potential to evolve rapidly. Although such commercial tools and products can be useful, there is a need for monitoring to ensure ECEC staff receive ongoing training that is relevant to their work, of good quality and consistent with policy goals for engaging the ECEC sector with digital tools.

Across countries, it is most common for the types of digital CPD covered by the *ECEC in a Digital World* policy survey (2022) (including induction programmes, where relevant) to be provided by a mix of public and private actors (see Figure 5.6 and Box 5.3). Only a handful of countries and jurisdictions rely exclusively on publicly provided CPD using digital resources for ECEC staff, and even fewer rely exclusively on private providers. In addition, in a relatively small share of countries and jurisdictions (19-24%), these types of CPD are provided by the ECEC centre/service governing boards or owners, although typically, this is in conjunction with public and/or private training institutions as well (there are exceptions in South Africa and the United Arab Emirates). While it is important to ensure the quality of the CPD programmes offered across different types of providers through oversight and monitoring, supporting local ECEC programmes to implement CPD opportunities using digital tools could help improve staff’s

access. If ECEC centres are engaged with the provision of CPD, staff may have better hands-on support to overcome any barriers to digital participation, and receive necessary foundational training on digital tools from their colleagues. In general, training to develop basic digital skills, of the sort that would help staff take part in digital CPD, can be relatively easily developed, but it is not clear that there are consistent mechanisms to reach the ECEC workforce with these kinds of trainings (Guernsey, 2014^[19]).

Finally, while online training expands the possibilities for CPD, face-to-face CPD offers the opportunity to reflect with colleagues, receive feedback, get support, and share challenges in real-time and with a greater focus on interpersonal connections. This is an important strength of this approach to training (Dunst, 2015^[38]; Lawless and Pellegrino, 2007^[39]).

Training approaches that combine the strengths of both virtual and face-to-face experiences are gaining momentum. For example, evidence suggests that training models that allow learners to familiarise themselves with information, such as through videos, before meeting face-to-face for reflection and support, are highly promising for promoting teachers' integration of technology in their teaching (Yurtseven Avcı, O'Dwyer and Lawson, 2020^[40]). Similarly, the effect of virtual CPD can be strengthened when combined with support from a responsive coach or colleagues (Crawford et al., 2021^[41]). Furthermore, a review of 11 experimental or quasi-experimental studies that integrated technology-delivered CPD with in-person contact for ECEC staff shows that these models were effective in changing teaching practices, and also generally demonstrated impacts on children's learning as well (Snell, Hindman and Wasik, 2019^[42]).

Box 5.3. Connecting early childhood education and care staff to digital training resources

The **Australian** eSafety Commissioner has developed a series of free online learning modules for educators and service leaders (Case Study AUS – Annex C). While the modules for educators focus on the practical benefits and risks of technology, primarily as a communication, creativity, information and entertainment tool, the module for leaders addresses policies and processes. These are designed to ensure a safe environment in early childhood education and care (ECEC) facilities. In general, educators should strengthen the child's self-regulation skills and critical thinking and build good habits regarding digital technologies through the four messages of being safe, being kind, asking for help and making good choices.

The provincial government of **Manitoba** in **Canada** has partnered with the Science of Early Child Development platform to provide free access to online self-study materials to everyone in the province (Science of Early Child Development, 2022^[43]). This is designed to support the continuous professional development of ECEC staff, and to be relevant for parents and others interested in early childhood. The platform also offers a wide range of resources, such as virtual textbooks, that are freely available in the provinces of British Columbia, Manitoba, and Newfoundland and Labrador.

In **Costa Rica**, the National Child Care and Development Network began offering training webinars for ECEC staff in May 2020, both as a response to the COVID-19 pandemic and to address a need for training in the sector more generally (Case Study CRI – Annex C). The initiative provides technical support to ECEC staff as needed. By using common videoconferencing technology and providing free webinars, the initiative has reached staff across the country.

Italy has launched the Scuola Futura platform as part of the National Plan for Recovery and Resilience in the wake of the COVID-19 pandemic (Scuola Futura, 2021^[44]). It offers staff from all levels of education the opportunity to adapt to the digital transformation through training. The courses are run by three different institutions that are spread all over Italy and offer different face-to-face and online

courses. The courses address the digital transformation of schools and ECEC settings as organisations, and offer tools and materials for digital teaching.

In **Korea**, the i-Nuri Portal was established to disseminate resource materials developed by central and local governments for the play-based Nuri Curriculum (OECD, 2022). The portal has five domains: 1) Nuri for Learning (disseminating materials developed at the national level); 2) Nuri for Sharing (sharing materials for practices by themes); 3) Nuri for Supporting (providing up-to-date trends on play and materials to respond and prevent COVID-19); 4) Nuri for Communication (an online community among users, such as experts, teachers, parents); 5) Nuri for Parents (providing materials for parents). There are more than 2 700 resource materials, including distance learning contents, video clips, forms for observational records and more.

Spain has developed a mobile application, EduPills, which offers teachers across ECEC and school education access to micro-learning opportunities to strengthen their digital competency across the domains reflected in their Digital Competence Framework (INTEF, 2017^[45]).

Sources: INTEF (2017^[45]); OECD (2022^[9]); Science of Early Child Development (2022^[43]); Scuola Futura (2021^[44]).

Building enhanced and specialised competencies for using digital technologies

Foundational training through initial education and access to CPD are core to ensuring all ECEC staff are able to navigate the digital world in ways that protect children from risks and recognise the role digital technologies can have in ECEC settings. With regular access to digital tools (e.g. Internet, computers) and ease of using them, staff can move beyond the basics of navigating digital resources and begin to integrate them into practice in meaningful ways. Building on foundational competencies, some ECEC staff will be ready to engage more deeply with digital technologies to bring added value to their pedagogical work with children, grow further as professionals, and streamline management and leadership tasks.

A lack of information on what works best with young children in terms of ideal or optimum engagement with digital technologies creates another layer of challenges for developing ECEC staff's digital competencies (see Chapters 2 and 4). The speed of development of new technologies and emerging research on their use with young children mean that knowledge and best practice are constantly evolving. Likewise, identifying who is responsible for ensuring staff are successfully making use of digital tools, with success defined in the context of national/subnational goals for digitalisation in ECEC and with the reality of ECEC systems that are often highly decentralised, creates further complexity for developing a digitally competent ECEC workforce.

Staff with enhanced digital competencies are well positioned to use these skills to benefit from digital resources to stay abreast of changes in the field and generally to engage proactively with these tools in a professional capacity. Specialised staff have an important role to play in supporting the ECEC workforce, and are already part of the workforce to varying degrees (OECD, 2022^[46]). Further developing a specialised workforce in ECEC systems could permit the most motivated and competent staff with regards to digital technologies to take on roles to support both staff and children to benefit from and navigate risks associated with the digital world.

This section addresses how professional development activities (in any format, online or in-person) can help staff enhance their engagement with digital technologies in all aspects of their work, going beyond the foundational issues of requirements, funding and access discussed in the previous section. It then turns to how digital tools can facilitate the professional engagement of ECEC staff through opportunities for professional collaboration as well as continuous quality improvement through coaching and mentoring. Opportunities to support ECEC staff to become digital specialists and for such specialists to bring benefits

to the work of their colleagues and the experiences of children in ECEC settings are noted throughout the section.

Continuous professional development to enhance staff's digital skills in their work with children and beyond

The content of ongoing training for ECEC staff needs to be tailored to working with young children with digital tools as both a professional resource and a pedagogical tool. This is consistent with the idea of skilled integration of technology into pedagogy that is proposed in the TPACK model (Mishra, 2019^[15]) (see also Chapter 4). In addition, CPD for ECEC staff should address how digital tools can facilitate the full range of their work, including for management and leadership tasks as well as engaging effectively with families, and beyond.

The content of CPD is essential to support countries' and jurisdictions' goals for children in a digital world (see Chapters 2 and 4). Several countries are developing and offering trainings for ECEC staff based on the recognition that developing children's early digital literacy is essential for them to grow into engaged digital citizens, making the most of the opportunities technology affords while mitigating risks (Box 5.4). For example, Spain has set goals of empowering children to thrive and have agency in a constantly evolving society, while supporting digital equity across gender and socio-economic background (Case Study ESP – Annex C). Recognising the core role of teachers in achieving this outcome, the country is offering training modules to teachers, and specifically pre-primary teachers, to enhance their digital pedagogy. It is also supporting school-based project work. Similarly, the ProjeTiger programme in Estonia includes digital pedagogy as a target for 2035, ensuring educators (including in ECEC) are familiar with trends, opportunities, risks and methodologies related to new technologies (Case Study EST – Annex C).

Unfortunately, Mertala (2019^[22]) finds that training for ECEC staff is often overly focused on using technology to teach academic subjects, leaving out uses around socialisation and care that are fundamental to ECEC. Staff also tend to view technology more positively related to education themes (e.g. academic performance) than to care themes (e.g. physical and emotional well-being).

Box 5.4. Early childhood education and care staff professional development designed to support children's early digital literacy

The National Education Institute in **Slovenia** organises ongoing training in various forms (e.g. conferences, seminars, study groups) for professionals throughout the education system. In the school year 2021/22, the theme for early childhood education and care (ECEC) staff was on how to provide a stimulating learning environment and optimal opportunities for children's learning and development, along with the principles and approaches of innovative learning environments for the 21st century. These trainings aim to highlight the importance of safe and meaningful uses of digital technology in the group of children, and for collaboration between professionals and parents as well as for improving their own digital competencies. Examples and suggestions for ways to use technology directly with young children are a central component (OECD, 2022).

Similarly, in **Germany**, the foundation Little Scientist's House (*Haus der kleinen Forscher*) is working to provide children ages 3-10 with their first experiences in computer science, with or without computers (Case Study DEU_2 – Annex C). To accomplish this goal, the foundation offers training for ECEC staff: a one-day in-person training as well as two one-hour online courses. The in-person course is offered at a low fee through a network of local partners, and the online modules are available for free through the foundation's learning platform. These trainings aim to foster ECEC staff's motivation to use an

unplugged approach to introducing computer science to children, and are an opportunity for staff to explore technologies (e.g. robotics kits) that they may implement as appropriate in their settings.

Source: OECD (2022^[9]).

In addition to content on using digital technologies pedagogically, CPD is important for updating and developing staff's capabilities to use digital tools for management and leadership tasks. As business practices in the sector, including requirements around reporting for monitoring and quality assurance, become more digital, ECEC staff and leaders need a range of skills to navigate new software for these purposes. While there is tremendous potential to streamline the work required around record-keeping and reporting with digital tools, shifting requirements and changing digital systems necessitate retraining and investing staff time that can impose steep burdens on a workforce already responsible for a wide range of tasks in addition to their core work with children.

Responses to the *ECEC in a Digital World* policy survey (2022) show that in a majority of countries and jurisdictions, ECEC authorities provide support for specific work processes with digital solutions (Table 5.3). This is especially the case for supporting digital solutions for ECEC settings to facilitate data collection and administrative services. For example, in Ireland, an online tool is available from the government for ECEC settings to manage participation in the ECEC subsidy system. In Japan, to reduce administrative burdens on staff, the government subsidises ECEC centres' investments in digital systems for planning and record-keeping, for instance to track changes in child enrolment (Ministry of Health, Labour and Welfare of Japan, 2022^[47]). Nonetheless, in nearly a quarter of countries and jurisdictions, this kind of support is up to the ECEC setting to provide. This is the case in Canada (British Columbia), where ECEC centres receive funding from the province to support operating expenses, but it is up to the ECEC centre whether to use any of this funding to support digital solutions for administrative tasks. However, the ECEC authority in British Columbia supports other aspects of work processes, such as by providing an online platform to assist ECEC staff in finding relevant training opportunities, as well as keeping track of their participation to meet requirements for CPD (earlyyearsbc.ca). Support for digital solutions for facilitating communication and engagement with parents/families is the least often provided by ECEC authorities: it is left to the ECEC setting in a third of countries and jurisdictions with available data (see Chapter 6).

Table 5.3. Digital technologies to support work processes in early childhood education and care settings

Percentage of countries and jurisdictions supporting work processes with digital solutions in ECEC settings, by source of support, 2022


	Digital solutions for ECEC settings to facilitate data collection and administrative tasks	Digital solutions for professional collaboration and peer learning	Digital solutions for the exchange of learning or pedagogical materials	Digital solutions for facilitating communication and engagement with parents/families
Australia				
Australia (<i>South Australia</i>)				m
Australia (<i>Tasmania</i>)				
Australia (<i>Victoria</i>)				
Belgium (Flanders PP)				
Belgium (Flanders U3)				
Canada CB			m	
Canada SB				
Canada (<i>Alberta</i>)				


	Digital solutions for ECEC settings to facilitate data collection and administrative tasks	Digital solutions for professional collaboration and peer learning	Digital solutions for the exchange of learning or pedagogical materials	Digital solutions for facilitating communication and engagement with parents/families
Canada (<i>British Columbia</i>)				
Canada (<i>Manitoba</i>)				
Canada (<i>New Brunswick</i>)				
Canada (<i>Quebec</i>)				
Czech Republic				
Denmark				
Finland				
France				
Germany				
Germany (<i>Bavaria</i>)				
Hungary				
Iceland				
Ireland				
Israel				
Italy				
Japan				
Korea				
Luxembourg				
Morocco				
Norway				
Portugal				
Slovak Republic				
Slovenia				
South Africa				
Spain				
Sweden				
Switzerland				
United Arab Emirates (<i>Dubai</i>)				
Percentage of countries with support from ECEC authorities AND ECEC centre/service governing boards or owner	32	27	27	28
Percentage of countries with support from ECEC authorities only	41	36	41	25
Percentage of countries with support from ECEC centre/service governing boards or owner only	22	25	24	33

Notes: Responses are weighted so that the overall weight of reported responses for each country equals one. See Annex A.

Belgium (Flanders PP): pre-primary education in Belgium (Flanders). Belgium (Flanders U3): ECEC for children under age 3 in Belgium (Flanders). Canada CB: centre-based sector in Canada. Canada SB: school-based sector in Canada. Canada (Manitoba): kindergarten sector only in Canada (Manitoba).

 ECEC authorities AND ECEC centre/service governing boards or owner

 ECEC authorities only

 ECEC centre/service governing boards or owner only

 No

 Not applicable or Not known

m: Missing

Source: OECD (2022^[9]), *ECEC in a Digital World* policy survey, Table B.14.

StatLink  <https://stat.link/apfhyq>

Professional collaboration

Digital technologies offer expanded possibilities to connect with colleagues and reflect on practice in meaningful ways, promoting continuous improvement in practice and deepening professional engagement. Professional collaboration can take place through digital platforms, connecting ECEC staff across settings and geographies, but it can also be a tool through which staff within an ECEC setting support one another to develop digital competencies. Staff beliefs about technology and how to use it are shaped by discussion and reflection within ECEC centres; this is particularly true for interns learning from ECEC staff in their practicum placements (Mertala, 2019^[22]).

As Table 5.3 shows, it is common for ECEC authorities to support digital solutions for professional collaboration and peer learning and exchanging learning and pedagogical materials. Once again, however, the ways in which countries/jurisdictions implement these supports can vary widely, and generally ECEC services have autonomy to engage with the supports as they see fit (see Box 5.5). In Israel, the “Physital Spaces” programme is designed around this principle, that the ECEC setting needs to adapt digital pedagogy to match its needs and expertise (Case Study ISR – Annex C). Leaders and staff receive training on how to combine physical and digital environments for young children, as well as needed materials (e.g. computers) and technical support. ECEC leaders are then expected to help staff implement these approaches at a level that matches their own digital competency.

Several countries are cultivating online repositories of resources for teachers across education levels. For example, in Finland, the Ministry of Education and Culture and the Finnish National Agency for Education are developing a Library of Open Educational Resources. In Belgium (Flanders), KlasCement is a government-organised platform for teachers to share resources with one another, covering all ages and subjects. There is a dedicated segment of the platform for pre-primary teachers, as well as possibilities to ask questions and dialogue with other educators on the platform. In Canada (British Columbia), the provincial government supports several privately run digital initiatives to share resources and promote collaboration among ECEC staff. These include the Westcoast Early Learning Library, a publicly accessible collection of more than 12 000 loanable early learning resources, and a range of work in collaboration with the group Early Childhood Educators of British Columbia (ECEBC). The ECEBC is a partner for the Early Years Professional Development Hub, a platform connecting ECEC staff to one another and to CPD opportunities. In Germany (Bavaria), the ECEC Hub provides free online resources: the platform is being scaled up with the goal of eventually becoming available to all ECEC staff, although at present, it is only available to staff participating in affiliated CPD (Case Study DEU_Bav – Annex C). The European Commission also supports a free, online educational community of teachers at every level of schooling, known as eTwinning (European Commission et al., 2021^[48]).

While collaboration with other ECEC staff can be a powerful strategy to enhance professional development, with the breadth of available information and resources online, staff may not always know how to find tools that are tailored to their needs and interests. In this context, the European Education Area launched the online tool, “Self-reflection on Effective Learning by Fostering the use of Innovative Educational technologies” (SELFIE) in October 2021 (SHERPA, 2022^[49]; European Commission, n.d.^[50]). SELFIE is based on DigCompEdu (Redecker, 2017^[14]) and uses reflection questions to assess staff confidence and experience in using digital technologies. Based on the answers, a personal report with suggestions for improvement is produced. The areas covered are: learner empowerment, teaching and learning, assessment, digital resources, and promoting learners’ digital literacy. Although SELFIE is aimed primarily at primary and secondary teachers, it is available to teachers at all levels around the world. A version of the tool specifically for ECEC staff is expected to be released in 2023 (European Commission, 2023^[51]).

Box 5.5. Digital resources to support professional collaboration

In **Iceland**, learning communities in participants' workplaces include courses for teachers, staff and administrators from pre-primary through secondary school (Menntamidja, 2022^[52]). The courses are offered remotely, using videoconferencing tools, but are embedded in both daily work and practice, with in-person meetings for small groups scheduled regularly. Visits from the course instructors to the early childhood education and care (ECEC) settings during working hours are also part of the learning process. This model aims to ensure the successful development of all participants and involves constant communication and dialogue between professionals, which can have the side effect of more successful professional development. Central to this is a shared vision and values around learning and teaching, reflection, support for professional development, trust and job satisfaction, a culture of collaboration, and distributed and supportive leadership. In general, leaders are an important component of successful development. They can encourage their staff and provide an appropriate framework, e.g. time for reflection and discussion. For example, one course is about science, technology and language development in kindergarten. In a first step, the participants familiarise themselves with the topics and prepare questions, they then discuss with the team how the topic can be implemented in practice. Next, the implementation is observed and, finally, discussed again with the team.

The **Norwegian** curriculum focuses on digital judgement, especially the rules for protecting privacy on the Internet, and on developing an ethical understanding of digital media (Norwegian Directorate for Education and Training, 2017^[53]) (Case Study NOR – Annex C). To support staff's professional development, the Norwegian government provides online competency packages as well as informative web pages (Norwegian Directorate for Education and Training, 2022^[54]). The competency packages are kindergarten-based, and aim to increase staff knowledge and support planning for activities to test new practices, followed by sharing, reflecting on and discussing these practices. This process is expected to support continuous improvement. The packages are divided into several modules: an introduction, contextualisation and definition of digital judgement, learning how to use the Internet safely and securely, developing skills to assess the credibility of online content and to interact with children to develop these skills, understanding copyright laws and finding open-access products, followed by a final feedback section. Each module includes reading and visual material, audio clips, activities and discussion topics. The website is accessible to all in the education field. For ECEC, it provides films and guiding questions appropriate for children and adults. Another website has been created specifically for kindergarten (*Rammeplan for barnehagen*), and conferences have also been held to connect more easily with kindergarten leaders and teachers.

In **Slovenia**, the initiative Kindergarten Litija brings ECEC staff together for the purpose of shared critical reflection through peer observation (Case Study SVN_1 – Annex C). Recognising that observation from external actors can be threatening for staff who may fear negative evaluation, and that engaging with digital tools to fully engage in this type of work entirely remotely can be a barrier, this programme aims to provide opportunities for teachers and assistants to collaborate and reflect with their colleagues locally. The observation is filmed so that staff can revisit and continue to reflect on the strengths and areas for improvement, and as needed, the discussions among staff can also take place through videoconferencing tools. The government supports ECEC settings to purchase the digital tools needed to make and store these recordings, and also have access to technical assistance, such as help setting up the equipment. Through this process, staff in ECEC centres can build a common understanding of quality practice, learn from each other and improve.

Sweden has implemented a continuous learning approach for digitisation in its 2018 preschool curriculum. To this end, both staff and leaders can participate in various competency packages provided by the Swedish National Agency for Education. In these courses, staff are introduced to the topic theoretically, followed by a practical exercise, after which they are encouraged to discuss the topic with their colleagues in a reflection phase. Finally, they are encouraged to find a way to integrate the course content into their work with children (Skolverket, 2021^[55]). Training content targeted to ECEC leaders is also available. The National Agency for Education provides free online resources to help leaders establish a plan for developing digital competencies in their settings, which should be tailored to each setting through the organisation of a local, collaborative working group (Skolverket, 2022^[56]). Ideally, each working group has a process manager and a supervisor, appointed by the ECEC leader. The process manager informs participants about the purpose of the skills development and organises working group sessions. Supervisors lead the groups and are responsible for becoming familiar with the online training content in advance of the working group meetings. Recently, another course was implemented in Sweden on the digitalisation of teaching practice and its impact on children. Each teacher familiarises themselves with the topic using the materials provided, then discusses what they have learnt with their colleagues. This is followed by classroom visits where notes for improvement can be made and a follow-up reflecting on the classroom visits (Skolverket, 2018^[57]).

Sources: Menntamidja (2022^[52]); Norwegian Directorate for Education and Training (2022^[54]); Skolverket (2022^[56]; 2018^[57]; 2021^[55]).

Coaching and mentoring

Coaching and mentoring are highly promising strategies for ongoing improvement in ECEC staff practices (Kraft, Blazar and Hogan, 2018^[58]). Research shows strong outcomes from participation in coaching, and there are clear possibilities for expanding and enhancing coaching capabilities through the use of digital technologies. The benefits of coaching programmes include their ability to tailor professional development to individual staff or teams of staff working together, as opposed to more traditional coursework where staff are left to make the connections to practice on their own (Elek and Page, 2018^[59]). In addition, coaching typically takes place over an extended period of time, allowing staff to try new things and reflect on their practice with the coach as they learn to adapt new resources and strategies. Integrating digital tools into the provision of coaching and mentoring can allow coaches to meet more regularly with staff (e.g. through video-chat), provide a wider variety of support and expertise to staff in rural areas, and permit staff to reflect on their own practices with children by watching video recordings of themselves.

Policy data show this is an area of investment for countries that responded to the *ECEC in a Digital World* policy survey (2022) as well, with 45% of countries providing mentoring or coaching activities through public training institutions (Figure 5.6). In addition, these services are offered by private training institutions in 40% of countries, and by the boards or owners of ECEC settings in 24%. Nonetheless, compared to other types of CPD, overall opportunities to participate in coaching and mentoring are rather low. For example, the possibility of online courses, seminars or MOOCs offered by public education institutions is reported by 70% of the countries. To some extent, countries such as Estonia and Lithuania are using digital tools to provide rapid feedback to training course participants (Case Studies EST and LTU – Annex C). This type of feedback is not as extensive or in-depth as other coaching models (Box 5.6). It is, nonetheless, a strategy to capitalise on the strengths of digital technologies to offer professional development that is more tailored to individual learners.

Box 5.6. Combining online learning with coaching to improve early childhood education and care staff practices

In **Canada (British Columbia)**, a peer-mentoring programme is being developed and expanded through combined public and private funding (Doan, 2019^[60]; Early Childhood Educators of British Columbia, 2022^[61]). This programme aims to build infrastructure to support early childhood education and care (ECEC) staff and reduce turnover in the sector. In the first year of funding, mentors and mentees met monthly in person at group gatherings, with opportunities to meet weekly in person, online or by phone. Communities of practice were developed and groups were given a private online platform to post and engage in discussion; facilitators posted weekly. Findings from the pilot phase of this initiative show that ECEC staff valued the opportunity for mentorship, noted increased self-efficacy and had suggestions for further developing the peer-mentoring model, including through expanded use of digital resources.

One example of many from **Germany** is the project “Quality development in ECEC through a web-mediated training of supportive interactions between ECEC practitioners and children of heterogeneous groups of toddlers” (iQuaKi) (Binational Center for Early Childhood, 2022^[62]). The project is funded by the German Federal Ministry of Education and Research. In the first phase of the project, an online training for ECEC practitioners was created which presents theoretical content about the quality of interactions with the aid of videos. For a reflection with the coaches and colleagues, ECEC practitioners are encouraged to record themselves in a daily situation. The coaching part is divided into three sessions. The first session aims to understand on what and how the ECEC practitioners have been working and to set some goals for the next two sessions. The second and third coaching sessions focus on the video recordings, which will first be analysed alone then discussed together. In these sessions, ECEC practitioners are encouraged to analyse their own pedagogical actions and identify their strengths and weaknesses.

To address the shortage of qualified ECEC staff in **US** military ECEC settings, the Virtual Lab School (VLS) was developed, and has now been implemented in community-based settings as well (Lang, 2022^[63]; Virtual Lab School, 2022^[64]). VLS aims to ensure all ECEC staff have core knowledge and skills by providing courses through an online platform. In addition to these courses, completed on a self-paced schedule, staff receive ongoing support from highly trained coaches. Course topics are adapted to staff working with children in different age groups. Specialised topics include safe media and technology use, guidelines for incorporating technology in practice, and developing language through media literacy. As VLS participants complete lessons and activities, their results are reviewed by their coaches to highlight areas for improvement. Research findings show that participants in VLS have significant knowledge gains, and participating ECEC centres show greater improvement on external monitoring assessments than non-participating centres.

Sources: Binational Center for Early Childhood (2022^[62]); Doan (2019^[60]); Early Childhood Educators of British Columbia (2022^[61]); Lang (2022^[63]); Virtual Lab School (2022^[64]).

ECEC digital specialists

Countries are recognising the need to equip ECEC staff with competencies to support children in a rapidly evolving digital world, but the challenges are great. Fortunately, there is also great capacity in the ECEC workforce to develop and adapt to new demands in the context of necessary supports. As the preceding sections highlighted, ongoing training that includes interpersonal connections, such as collaboration and coaching, has important potential for achieving learning goals among participants. Supporting a segment

of the ECEC workforce to develop specialised skills around applications of digital technologies for early childhood can have far-ranging potential to provide ongoing training opportunities for ECEC staff, as well as safe and innovative digital experiences for children. Developing ECEC digital specialists is a way to capitalise on interest and motivation within the sector while promoting goals for children (Box 5.7).

Box 5.7. Early childhood education and care digital specialists

Finland’s New Literacies Development Programme

Finland’s New Literacies Development Programme (2020-22) aims to strengthen media literacy, ICT and programming skills in early childhood, pre-primary and basic education (Ministry of Education and Culture of Finland, 2022^[65]). As part of the programme, teams of teachers and experts have developed and piloted detailed descriptions of key related competencies. For media literacy, this includes skills related to digital safety, well-being, positive interactions and digital responsibility. To support staff to engage with and apply the descriptions, Finland has developed a user guide for early childhood and preschool educators; a video training series disaggregated by education level; a free, accredited study package for early childhood education and care (ECEC) staff which combines online study and workshops; and a curated list of useful, practical tools. The ministry has also granted financial support to 46 project groups to develop related teaching and learning modules.

Bavaria’s ECEC digital coaches

In Germany (Bavaria), the government supports a network of coaches as part of the overall Bavarian Digitalisation Strategy for ECEC (Case Study DEU_Bav – Annex C). These coaches typically work in a freelance capacity, providing ongoing training to ECEC through different partners in Bavaria. They have specific additional training from the State Institute for Early Childhood Research and Media Literacy and the Institute for Media Research and Media Education to provide trainings for ECEC staff as part of the Digitalisation Strategy. Thus, these coaches have media educational expertise in the early childhood field, and typically provide support beyond the courses they teach, such as around technical and legal issues ECEC settings are facing.

Lithuania’s Innovations in Kindergarten

In Lithuania, a commitment to improving practices in general in ECEC settings, and specifically practices regarding the practical use of digital tools, has led to the project “Innovations in Kindergarten” (2018-22) (Case Study LTU – Annex C). This is an effort to respond to challenges found through research and consultation with the ECEC sector, highlighting that all kindergartens in Lithuania use technology, but that uptake and application of various tools are uneven. To maximise limited resources, the country has essentially built specialised competencies among 89 lecturers, who then train their colleagues throughout the country. Training sessions for ECEC staff make use of blended in-person and online tools, allowing staff to freely explore digital tools (e.g. apps and recommended software) while also having access to all materials and rapid feedback from the lectures on proposals for integrating these tools into practice through an open-source digital learning management system.

Luxembourg’s Media Compass: A national reference guide for education about and through media (2020)

One of the four pillars of Luxembourg’s national digital education strategy, the Media Compass, aims to support teachers across formal education (ages 3-18) to confidently integrate media and digital literacy into their teaching (Case Study LUX – Annex C). The reference guide defines media and digital literacy across 15 competencies, 5 of which relate to digital safety (i.e. “netiquette”, protecting equipment, protecting personal data and privacy, protecting health and well-being, and evolving

responsibly in the digital world). Each of these has a description and illustrative examples of their practical application. The guide has been adapted from European frameworks to the national context.

To support implementation, Luxembourg has developed the Media Passport to record learners' progress in acquiring each competency, targeted to each cycle of education. Teachers can access a curated online library of lesson ideas and materials – created by fellow teachers – and professional development opportunities covering technical and pedagogical skills in various formats (e.g. online learning, seminars, events, coaching). A cohort of specialised “digital competency teachers” was established in 2021 to support teachers in applying the Media Compass in classrooms and schools. They support teachers in pre-primary and primary education (ages 4-12).

Source: Ministry of Education and Culture of Finland (2022^[65]).

Policy pointers

With the breadth of training profiles of ECEC staff, as well as the scope of digital demands, a wide range of policies is needed to support the ECEC workforce in the digital world.

Policy pointer 1: Ensure ECEC staff and settings have resources to engage with digital tools

- Responsibility for the education and training of the ECEC workforce is often diffuse, with many levels of governance and different actors involved. In addition, Chapter 3 shows that ECEC staff are not always part of countries' overall digital education strategies, and previous findings highlight that the pre-primary education sector often lacks digital tools and resources to a greater extent than the primary education sector. Basic infrastructure is necessary to ensure staff can easily and reliably engage with digital tools: Internet access and appropriate devices are needed in ECEC settings to facilitate staff's regular engagement with and exploration of digital tools.
- Foundational trainings as part of initial education and through access to CPD are key to building the human resources necessary for an ECEC workforce that can confidently and selectively use digital tools across the range of their work responsibilities. Guidelines and recommendations leave the burden of responsibility with the individual staff member. Integrating the teaching of digital safety skills into curriculum frameworks for ECEC staff's initial education and other formal training requirements can more evenly share responsibility across ECEC actors, and take advantage of pre-existing accountability/compliance mechanisms through these training systems. Developing standards for required training around digitalisation can help ensure that both initial training and CPD reach all ECEC staff, complementing funding that is provided for these purposes. Strong partnerships with providers of education and training, including higher education institutions, are also needed to achieve this goal.
- Ensuring that education and trainings address the risks and opportunities that change and grow with children can allow staff to work confidently across the full age range covered by early childhood, or to specialise as appropriate for work with infants and toddlers (ages 0-2) or preschool age children (from age 3). ECEC staff must clearly understand their responsibilities for safeguarding children in digital environments.
- Implementing quality assurance programmes for ECEC staff training is especially important given the mix of providers (public, private, local) of CPD. The pace of technology change means governments need to have ongoing mechanisms to check the quality of related trainings staff are receiving. Developing an assessment process for the purpose of understanding ECEC staff's

access to and the quality of training through and on digital tools is a key component of this ongoing monitoring (see Chapter 8).

Policy pointer 2: Tailor supports to specific digital needs

- Efforts to develop digital competencies, whether for professional engagement or use with children, need tailored supports. This should include specific trainings as new curricula are developed/implemented that address children's digital learning goals, particularly when guidelines and curriculum frameworks are broad and unspecific (see Chapter 4). As the field develops and research progresses to show best practices for engaging children with digital resources, staff need updated trainings on how to adapt their pedagogies to make the best use of new tools while continuing to protect children from risks.
- Similarly, as administrative and monitoring infrastructure are modernised, or as digital tools become part of assessment frameworks, staff need to be trained to make these investments work efficiently rather than as additional burdens. The timing is also important: staff should not be trained after new systems are in place, but rather included in their development and deployment.
- Digital systems to connect with families and other community resources are increasingly common, and preferred by many partners (see Chapter 6). ECEC staff need training on best practices for engaging with families and other partners using digital tools, including on data protection and privacy when using different digital platforms.
- It is unclear whether digital delivery of training content is sufficient for all purposes, and notably for developing practices that integrate safe and meaningful uses of digital technologies in direct work with children. Hybrid training approaches can capitalise on the benefits of virtual learning while also offering the expertise and resource of human connections, such as through coaching or mentoring. Initial education programmes that involve a practical component are needed. In addition, in-person technical support, whether provided by colleagues or by someone with more specialised expertise, can allow staff to confidently use new digital tools and reduce barriers to participating in online training. Ongoing evaluations are needed to identify successful CPD programmes, as well as to distinguish core components of their success (e.g. individual or team coaching; availability of self-paced course content).

Policy pointer 3: Differentiate staff roles to enable a broader range of digital competencies in ECEC settings

- Not all staff need to develop the same digital skills, although all need a strong foundation in this aspect of their work. Countries do this to some extent with differentiated requirements for leaders, teachers and assistants, although more nuance is needed to build on the foundational training available to all staff. For those interested in pursuing the topic in more depth, and for leaders or lead teachers whose jobs demand more engagement in the digital world, more advanced opportunities are needed to develop enhanced and specialised competencies to then trigger/disseminate best practices within settings and across the sector. Creating clear career pathways within the ECEC profession can help current and future staff understand their roles and responsibilities, as well as offer directions for personal career growth. Developing digital competencies should not be restricted to certain groups of staff (e.g. teachers, leaders), but should be fostered throughout the sector.
- Mechanisms are needed to assess ECEC staff's training needs and interests, as well as to address those needs and interests. By capitalising on motivation from some staff to enhance their digital competencies, countries can support segments of the workforce to move beyond foundational digital competencies. Regularly surveying staff and leaders to determine the types of trainings that are useful is a first step, with strategies to implement relevant trainings in response as a crucial

next step. In addition, appropriate sequencing of training content is needed to support the mastery of more fundamental aspects of working with digital technologies before expecting staff to successfully attain more advanced skills.

- Coaching and mentoring are especially valuable given the range of backgrounds and training among ECEC staff. Ensuring that investments in CPD on or with digital technologies include this type of support for ECEC staff can enable more staff to attain foundational digital competencies. In addition, creating mechanisms to develop a segment of the workforce to provide mentoring and coaching around digital technologies will embed enhanced and specialised digital competencies in the sector and provide opportunities for career growth to those who are motivated to engage in this aspect of work.

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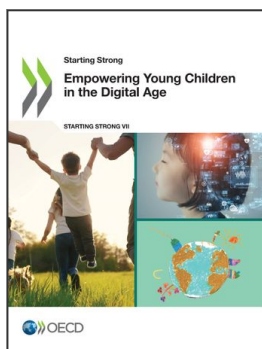
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