



SCOPING PAPER

# Digital literacy for children: exploring definitions and frameworks

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## Acronyms

<b>ACARA</b>	Communication for Development
<b>AI</b>	Artificial Intelligence
<b>CoE</b>	Council of Europe
<b>CSM</b>	Common Sense Media
<b>EC</b>	European Commission
<b>EU</b>	European Union
<b>GKO</b>	Global Kids Online
<b>ICDL</b>	International Computer Drivers Licence
<b>ICILS</b>	International Computer and Information Literacy Study
<b>IEEE</b>	Institute of Electrical and Electronics Engineers
<b>ILO</b>	International Labour Organization (United Nations)
<b>IOT</b>	Internet of Things
<b>ISTE</b>	International Society for Technology in Education
<b>ITU</b>	International Telecommunication Union
<b>JRC</b>	Joint Research Centre
<b>LSE</b>	London School of Economics
<b>MIL</b>	Media and Information Literacy
<b>NGO</b>	Non-governmental organization
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>PPP</b>	Public-Private Partnership
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization

## In brief

This paper presents the results of a scoping exercise on children's digital literacy that has been undertaken with the following objectives:

- to understand the current digital literacy policy and practice landscape;
- to highlight existing competence frameworks and how they can be adapted to UNICEF's needs;
- to analyse the needs and efforts of UNICEF country offices; and
- to reflect on policy and programme recommendations, including a definition of digital literacy for UNICEF.

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# Executive summary

**Part one** of the paper presents an analysis of the actual debate and developments in the field of children’s digital literacy, together with the results of a survey conducted among UNICEF country and regional offices on their main activities and needs.

A review of both the most recent policy documents and literature reveals that digital literacy is a complex and somewhat scattered field, where different perspectives coexist. The field is evolving from an operational focus – that is, on technical digital skills – towards more holistic approaches that consider also the cultural and critical thinking aspects of digital literacy. In the area of children’s digital literacy, policy, research and practices are converging from a risk and safety paradigm towards rights-based approaches to children’s active digital media practices. In fact, research is starting to show that the benefits associated with children’s online participation seem to overtake the risks connected to being online (Livingstone et al. 2019).

In terms of policies and initiatives, digital literacy is high on the agenda of major international organizations such as UNESCO, the European Commission and International Telecommunication Union, mainly targeting citizens in general and not children specifically. At the same time, commercial actors, such as the International Computer Drivers Licence (ICDL), Microsoft, Intel and Google, actively promote digital literacy programmes based on their

specific approaches. In general terms, across the main national and international contexts there is a broad convergence on the areas of digital literacy that build on approaches put forward by both public and private actors. However, the use of international competence frameworks seems not to be the norm within national initiatives, where governments often adopt frameworks provided by commercial actors. Also, a lack of global consensus and standards makes it difficult for governments and other stakeholders to design and implement comparative and cost-effective initiatives, especially within developing countries.

This situation is confirmed by an analysis of UNICEF's efforts in the field of children's digital literacy, based on a consultation with 37 UNICEF country and regional offices. Responding to generalised demand by governments, 40 relevant initiatives were reported. The initiatives are normally run by multi-stakeholder partnerships and tend to engage parents and teachers, but they often remain uncoordinated across UNICEF and are not based on a common set of competence frameworks. The most pressing challenges of working in the field were also investigated, revealing the following most important issues: teachers' lack of capacity, problems with connectivity and infrastructure, and the limited understanding by governments of digital literacy issues.

**Part two** of the paper builds on these results and on a number of stakeholder interviews to start defining a possible UNICEF vision of digital literacy (based on a working definition) together with an integrated approach to support country offices and governments in developing successful digital literacy initiatives. Some ideas on how to advance this work are also presented.

Among the main concepts used by international organizations (digital literacy, digital skills, digital competence and digital citizenship), the paper proposes the concept of digital literacy as most suitable for UNICEF. To support this vision, a short working definition of children's digital literacy (see right) is proposed as input for future discussion.

This definition is complemented by a longer modular definition. Using a clear and child-specific definition would help UNICEF stress the importance of working on digital literacy for children specifically.

Many competence frameworks have been produced following broad consultations and can be used to support children's digital literacy; UNICEF should therefore not develop its own but rather adopt existing tools. The paper selects four frameworks that seem to fit particularly well for the purposes of UNICEF. These have been discussed with experts and stakeholders, reflecting on their characteristics and on the general challenges that UNICEF would face in adopting a competence framework. As a result, it is proposed that UNICEF should mainly rely on the DigComp framework of the European Commission, a well-established tool that has evolved over the last six years; it has been applied in more than 20 countries (especially in developed settings) and is accompanied by precise guidelines and measurement metrics. In parallel, when working in the context of developing countries and when a broader digital citizenship approach is preferred, the paper suggests the use of the Digital Kids Asia-Pacific framework developed by the UNESCO Asia and Pacific Regional Office in Bangkok. As a general recommendation, these competence frameworks should not be used as stand-alone tools but rather within an integrated approach, composed of preliminary guidelines and follow-up tools, through which they can be adapted to the socio-cultural context of application. The paper provides some ideas in this direction.

Based on the findings above, the paper offers some ideas for UNICEF to advance the work on digital literacy in terms of suggested approach, possible partnerships and promising research areas.

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**Proposed working definition**

Digital literacy refers to the knowledge, skills and attitudes that allow children to flourish and thrive in an increasingly global digital world, being both safe and empowered, in ways that are appropriate to their age and local cultures and contexts.





# Introduction and methodology

The paper presents the results of an initial scoping exercise on digital literacy undertaken by the UNICEF Policy Lab with the objectives of working towards a definition of digital literacy, highlighting existing competence frameworks and how they could be adapted to the needs of UNICEF, and analysing the needs and efforts of UNICEF country offices. This work will ultimately allow UNICEF to achieve its priority to “teach digital literacy to keep children informed, engaged and safe online” (UNICEF 2017), by effectively implementing digital literacy programmes. The paper also serves to inform a further stage of work in which UNICEF could develop policy guidelines as well as a set of tools to contextualize digital literacy interventions in order to respond to country-level realities. Apart from informing UNICEF’s work, the paper also aims to contribute to the international debate on digital literacy.

The importance of digital literacy in contemporary societies is paramount, for both adults and children. In a world where half of the population is online, including 70 per cent of 15- to 24-year-olds (ITU 2018b), it becomes of outstanding importance that citizens have the capabilities to make the most of digital opportunities and of the internet (OECD 2018,

World Bank 2018). This is even more important for children, since they tend to spend more time online than adults (Ofcom 2019) and therefore they are more exposed to both the benefits and the risks of being connected. As the second half of the world comes online and the internet penetrates new areas, digital literacy is needed for first-time users. Further, investing in children's digital literacy means building more responsible, employable and tolerant future citizens.

The paper is structured in two parts. The first part presents the state of the art of children's digital literacy in terms of current approaches, policy initiatives, challenges and trends. It also presents a snapshot of the activities and needs of UNICEF country offices in the field of digital literacy. The second part proposes a number of inputs for UNICEF to strengthen its work and position in the field of digital literacy: a working definition of digital literacy; suggestions for suitable digital literacy frameworks; an integrated approach to developing digital literacy interventions in line with country-level realities, and some ideas to advance work in this area.

In methodological terms, the findings of this paper are based on three sets of activities:

- **Policy and research literature review**

Trying to keep as much as possible a child-centric lens, we searched for: existing definitions of digital literacy, noting the contexts in which they were developed; the most-used competence frameworks and approaches; and the main barriers and enablers around developing digital literacy. Recent reports from international organizations and from national governments were reviewed (trying to keep as much as possible a North-South geographical balance) as well as research papers and publications, especially those containing policy recommendations. Emerging technologies and domains such as artificial intelligence (AI) or the Internet of Things (IoT), and especially what they mean for digital literacy policies and programmes, were included in the analysis.

- **A set of interviews with key stakeholders**

During the interviews, experts from a range of contexts including academia, government affiliated organizations, United Nations and international NGOs, non-profit organizations, as well as independent consultants helped to deepen and corroborate the findings of the literature review. The interviewees were asked how an organization such as UNICEF could play a role in the actual digital literacy panorama. Interview findings informed much of the results of the paper; some concepts emerging from the interviews are reported in sections 5.1 and 7.3 (see Annex for the list of interviewees).

- **An online survey among UNICEF country and regional offices**

Through the survey, data was collected from 37 UNICEF country and regional offices on their programmes as well as on their main challenges and needs for support in the area of digital literacy. The survey was complemented by a review of UNICEF country office annual reports from 2017, searching for the keywords: ICT, technologies, digital literacy, digital skills, online, digital (see Annex for the list of survey respondents).

The results of the analysis that emerged from these sources were finally validated by an external expert review team.

UNICEF recognises two main limitations of the paper. First, the literature review is not exhaustive of all existing digital literacy frameworks, programmes and policies, and was based on reports and documentation in English. Second, the analysis of UNICEF's efforts in the digital literacy field is solely based on input provided by the country and regional offices that responded to the survey, and therefore should not be considered as an exhaustive picture the organization's work in this area.







# Understanding child-related digital literacy concepts and frameworks

## 1.1 Digital literacy: current definitions

Digital literacy can be seen as an *umbrella term* that includes a continuum of meanings extending across the ability to use digital devices or software, to being capable of consuming and producing digital content, to meaningfully participating in digital communities (Alexander, Adams Becker and Cummins 2016). Further, multiple and overlapping understandings and uses of the terms ‘digital literacy’, ‘digital skills’ and ‘digital competencies’ exist<sup>1</sup> (Brown et al. 2016) as well as a number of sister concepts to digital literacy, such as computer literacy, information literacy, 21st century skills, new media literacies, media and information literacy. Without entering into the debate about these multiple concepts and meanings, in the present section we will describe a few definitions of digital literacy, with the aim of informing the following sections of the paper.

As with any relatively new concept, definitions of digital literacy abound, going from rather prescriptive ones that focus on what a digitally literate individual should be able to do, to others that take a broader perspective focusing on what a digitally literate individual should be able to achieve.

An example of the first is:

Digital literacy is the awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyse and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others, in the context of specific life situations, in order to enable constructive social action, and to reflect upon this process. (Stergioulas 2006)

Jisc in the United Kingdom provides an example of the second, broader, interpretation:

Digital literacies are those capabilities which fit an individual for living, learning and working in a digital society. (Jisc 2014)

The definitions used by the most active international organizations in the field (such as UNESCO, European Commission, ITU, CoE) tend to focus on all-age citizens, therefore a child-centric definition – that could be adopted by UNICEF – would be a valuable contribution to the field and would ensure that the specific challenges and opportunities for children in the digital space are correctly understood and considered.

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<sup>1</sup> Competencies are traditionally conceptualised as a combination of knowledge, skills and attitudes, where knowledge includes the facts and figures, concepts, ideas and theories which are already established and support the understanding of a certain area or subject; skills are the abilities and capacities to carry out processes and use the existing knowledge to achieve results; and attitudes are the dispositions and mind-sets to act/react to ideas, persons or situations (European Council 2018).

We will briefly describe some of these definitions here, and in section 2.3 propose a possible working definition of children's digital literacy that UNICEF could adopt.

Following a recent review of a number of approaches from government and non-government agencies, **UNESCO** (2018) proposes the following definition for **digital literacy**:

Digital literacy is the ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital technologies for employment, decent jobs and entrepreneurship. It includes competences that are variously referred to as computer literacy, ICT literacy, information literacy and media literacy.

Another interesting definition, under the label of **digital literacy**, is used by the **London School of Economics** (LSE) in their work with the International Telecommunication Union (ITU):

Digital literacy is the opportunity and ability to use (or decide not to use) ICTs in ways that allow individuals to obtain beneficial and avoid negative outcomes of digital engagement across all domains of everyday life now and in the future. This includes (the understanding of the implication of) using different platforms and devices, skills that can be applied when using these platforms and devices, and the use of various types of content and platforms that allow the individual to achieve a broad range of high-quality outcomes.

This definition entails three components: the understanding of what types of technologies should be used for different purposes, the operational skills to use these technologies, and the ability to translate the use of these technologies into real tangible outcomes such as citizenship, well-being, avoidance of harm, problem solving, ultimately making sense of the use of ICT in our lives.

The **European Commission** uses the term **digital competence**.

Digital competence involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking. (European Council 2018)

Here, the concept of competence is understood as a combination of knowledge, skills and attitudes. Including a distinction between these three dimensions is particularly important for children, who might have the skills to complete a certain digital task but might lack knowledge about the context and critical approach to performing that task. Also, such a categorization can help in adapting digital literacy frameworks into educational curriculums, which are normally based on knowledge, skills, and attitudes.

The **Council of Europe** (CoE) uses the term **digital citizenship**.

Digital Citizenship may be said to refer to the competent and positive engagement with digital technologies and data (creating, publishing, working, sharing, socializing, investigating, playing, communicating and learning); participating actively and responsibly (values, skills, attitudes, knowledge and critical understanding) in communities (local, national, global) at all levels (political, economic, social, cultural and intercultural); being involved in a double process of lifelong learning (in formal, informal, non-formal settings) and continuously defending human dignity and all attendant human rights.

The concept of digital citizenship was also chosen by the **UNESCO Asia and Pacific Regional Office**, in its Digital Kids Asia-Pacific project that targets specifically children and defines digital citizenship as the capacity of

... being able to find, access, use and create information effectively; engage with other users and with content in an active, critical, sensitive and ethical manner; and navigate the online and ICT environment safely and responsibly while being aware of one's own rights. (UNESCO 2016)

Finally, it is worth mentioning a recently emerging concept, that of **digital intelligence**, put forward by the **DQ Institute** as

... a comprehensive set of technical, cognitive, metacognitive, and socio-emotional competences grounded in universal moral values that enable individuals to face the challenges of digital life and adapt to its demands. (Park 2019, p. 12)

This definition tries to encompass many of the existing 'labels', positioning digital intelligence as the last step in a scale that starts with digital citizenship and moves to digital creativity and then digital competitiveness.

## 1.2 Children's digital literacy: the emergence of a holistic, empowering and active approach

What these recent definitions show, as noted by Buckingham (2010) among others, and more recently by the ITU Broadband Commission (2017), is a shift from an instrumental view of digital literacy (somehow represented by the concept of digital skills and still common in some private sector competencies certification schemes) towards a more comprehensive understanding of what it should mean to be digitally literate today (sometimes under the label of digital citizenship). This increasingly holistic understanding is shared by the most active international organizations in the field, by national governments ("Digital literacy looks beyond functional IT skills to describe a richer set of digital behaviors, practices and identities", Jisc 2014), and by research (already in 2008 digital literacy was defined as the "complex integration between cognitive processes and dimensions as well as methodological and ethical awareness", Calvani et al. 2008, p. 186).

Recent definitions show a shift from an instrumental view of digital literacy ... towards a more comprehensive understanding of what it should mean to be digitally literate today.

In the area of children's digital literacy, such a holistic approach is advocated by the most important international research projects and networks. Research based on the Global Kids Online surveys<sup>2</sup> (Byrne et al. 2016) recommends a comprehensive approach for policy interventions dealing with children's well-being and rights in the digital age: "Access, skills, risks and opportunities are all part of the overall picture of children's well-being and rights in the digital age and should all, therefore, be kept in mind when developing policy interventions" (p. 81).

The DigiLitEY project,<sup>3</sup> supported by the European Commission, connects literacy and digital literacy suggesting that three elements are involved in children's digital literacy: operational, cultural and critical, where operational elements refer to the skills required to read and write in diverse media; cultural elements include understanding literacy as a cultural practice; and critical elements emphasize the need for critical engagement as well as to ask questions about power, representation and authenticity (Sefton-Green et al. 2016).

<sup>2</sup> Global Kids Online is an international research project that aims to generate and sustain a rigorous cross-national evidence base around children's use of the internet by creating a global network of researchers and experts. It is a collaborative initiative of the UNICEF Office of Research-Innocenti, the London School of Economics and Political Science (LSE), and the EU Kids Online network. More at <http://globalkidsonline.net>.

<sup>3</sup> The Digital Literacy and Multimodal Practices of Young Children Network is a COST action supported by the European Commission for the period 2015–2019, analysing what requirements multimodal and interactive media impose on the digital literacy of children of up to eight years old, and how they can support the use and interpretation of these services. More at [www.digilitey.eu](http://www.digilitey.eu).

Another important element emerging from research is the call for an active role for children: If children are to participate fully in the digital age, greater efforts will be needed to ensure that they become the content creators and engaged actors that many hope for. It is particularly crucial that efforts to keep them safe from risks do not, however unintentionally, also serve to constrain their opportunities. (Byrne et al. 2016, p. 82)

Livingstone and Third (2017) note that such an active role in the discourse of children's rights in the digital world is connected to the potential of children's rights to reshape the broader debate on digital rights.

Finally, we note that protectionist and empowering perspectives coexist within policy and research literature. The first perspective views media, ICTs and the internet in a negative light and calls for digital literacy as a way to protect children from digital risks, while the latter sees those as positive developments: here digital literacy becomes a means to empower children for access to information and for freedom of expression and participation. While research has shown that in the digital world the opportunities offered to citizens (at all ages) far outnumber the risks (Buckingham 2010), when it comes to children, evidence suggests the need to balance the two perspectives (Byrne et al. 2016). Increasingly, the empowering approach is being extended in viewing children's digital literacy as a way to increase future employability of children, for a future where there will be tens of millions of jobs for people with advanced digital skills (ITU and ILO 2017), as well as their entrepreneurial and innovative potential.<sup>4</sup>

### 1.3 Factors that influence the digital literacy of children

#### Existing data on children's digital literacy

While there is worldwide recognition of the importance for children to be digitally literate (CoE 2018, UNICEF 2017, UNESCO 2017, among others), there is a lack of global data for children's digital literacy. Data from the ITU, which is a major source of global ICT data, only starts at age 15. In the absence of data, country or regional studies provide some indication of digital literacy, even if incomplete. Carried out across 11 countries, the Global Kids Online study compared the digital competencies of 14,733 children aged 9–17, focusing on information-seeking skills, critical evaluation skills and privacy skills (Global Kids Online, forthcoming). The research found that while there were differences across the countries in the actual levels of self-reported skills, there was also a definite trend that older children had greater digital skills in the three categories.

Even though children are seemingly adept at using digital tools, this does not mean that they are digitally literate. In Bulgaria, for example, children use the internet at an earlier age and more frequently than ever but still need support and guidance for developing their critical evaluation skills and collaborative competencies (Kanchev et al, 2016). Skill inequalities exist between children as much between adults, debunking the 'digital native' idea. While there is little data available outside Europe, "available data suggest that digital inequalities are not a generational thing and will persist into the future" (ITU 2018b).

Despite there being an enormous range of digital literacy assessments worldwide, a single standard does not exist. The disparate approaches vary by "focus, purpose (admission, certification, training needs assessment, employment, etc.), target group, uptake, item development, reliability and validity, mode of delivery, cost, scalability and responsible authority" (UNESCO 2018). Whatever approach is agreed upon as the global standard (with recent attempts to do this, described below), it will need to be an affordable — and, therefore, scalable — way to measure digital literacy in low- and middle-income countries. Achieving this remains a challenge.

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<sup>4</sup> See for example the UNICEF [UPSHIFT programme](#), that aims to empower young – and often disadvantaged – people to identify challenges in their communities and create entrepreneurial solutions to address them.

## Main challenges to developing digital literacy among children

Beyond the lack of data and measurement, a number of challenges exist to realizing the goal of digitally literate children around the world. Building on recent research, we can identify four interconnected areas where challenges can emerge: the general social environment, the family context, the school context, and the role of private actors.

1. The challenges impacting the development of digital skills depend on **children's social environment**: low-quality technological infrastructure (low connectivity rates and low share of households with computers), cost of infrastructure needed for the use of ICT, poor quality or no online content in local languages, poor quality or no online content related to everyday life, low diversity of online activities (Tan et al. 2017). Further, while the technology landscape changes quickly, in most countries curricular reforms happen slowly, resulting in outdated digital skills education (ITU 2018a).
2. Research shows the **importance of the family context for digital literacy acquisition**: "Parental expectations of the role of ICTs in their children's future, discourses of the opportunities and risks of the internet, and the everyday practices of media engagement all shape the ways in which children are socialized into using digital media at home" (Mascheroni et al. 2016, p. 1). Livingstone and Byrne (2015) note that the role of parents and families as digital mediators varies depending on the local context, with a strong divide between developed and developing countries, and suggest that greater investments should be made by governments and other stakeholders to aid parents so that they can enable their children to learn and grow in the digital age.
3. **Schools play a role in the acquisition of digital competencies** including creativity when integrating digital technology as an active learning tool (Chaudron et al. 2018). Schools as well as community learning centres are key to raise awareness, build critical thinking and resilience, and to influence families' supportive technology mediation strategies. "Improving school access, supported by teacher training, could further link internet use with education and information benefits, specifically by developing children's digital skills, which have been shown in this report to include notable gaps in competence, especially among younger users" (Byrne et al. 2016, p. 81). Notably, already in 2014 the UN Committee on the Rights of the Child advised member governments to include digital literacy in their national school curriculums (Committee on the Rights of the Child 2014).
4. The **role of the private sector in supporting the development of children's digital literacy** is increasingly being recognised, both in terms of the expected attention of companies to the design of their devices and services, that should empower and protect children by embedding effective digital literacy and safety mechanisms (Kidron and Rudkin 2018) and in terms of their capacity to support initiatives aimed at promoting digital literacy, such as the Google Safety initiative.<sup>5</sup> Also, multinational companies have a prominent role in influencing the decisions of governments on the digital literacy competencies that should be taught and assessed, particularly in developing countries (UNESCO 2017).

All these challenges are interconnected. As shown by a recent UNESCO study that compares five different international skills surveys, the level of children's digital skills is connected to a multiplicity of factors. First, it is influenced more by usage than by access, meaning that having ICT equipment does not guarantee actual use. Second, what matters is not the amount of time spent on the computer but the use made of it, both at home and at school: a greater diversity of activities is associated with improved skills. Third, digital skills are affected by the number of years of computer use by children: the earlier digital skills are acquired, the greater the impact. Fourth, strengthening students' written-language skills, such as reading, comprehension and word processing, is necessary to develop their digital skills. Fifth, the use of ICT by teachers is positively correlated with

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<sup>5</sup> See [https://teachercenter.withgoogle.com/digital\\_citizenship/preview](https://teachercenter.withgoogle.com/digital_citizenship/preview).



students' digital skills levels: if schools wish to best develop their students' digital skills, they must invest in ICT training for teachers and support the integration of ICT into curricula (UNESCO 2017). In parallel with all these factors, a further level of complexity is added by the fact that digital literacy is developed at school, at home, in community centres, or simply by being active online, and that children's increasing online agency is connected with both opportunities and risks and is at the same time contributing to and shaping online environments.

## 1.4 Children's digital literacy: policy landscape

### International initiatives

In the last couple of decades, the need to equip citizens with digital skills for economic and societal improvement has emerged as a key concern for international organizations. This interest has been on the rise in the last couple of years: from 2017 to date, all major international institutions dealing with citizenship and human development have in fact produced important reports and policy documents in the area of digital literacy, some of which specifically target children's development in the digital world.

Equipping European citizens with digital competencies is at the core of the **European Union** strategy. In 2006 the European Parliament recognized digital literacy as one of the eight key competencies that every European citizen should master and as one of the four foundational skills for learning. Further, enhancing digital literacy is one of seven pillars in the European Commission's 2010 Digital Agenda for Europe. In 2017, the European Commission has released the second version of the EU Digital Competence Framework for Citizens (DigComp),<sup>6</sup> that has inspired policies in more than 20 countries in Europe and beyond (Kluzer and Pujol Prego 2018).<sup>7</sup> In addition, for over 15 years the European Commission has supported the Better Internet for Kids initiative,<sup>8</sup> a programme with important digital literacy components that is being deployed across the European Union.

**UNESCO** is equally active, in the fields of both adult and children's digital literacy. In 2018 the organization issued the Global Framework of Reference on Digital Literacy Skills,<sup>9</sup> a synthesis of existing digital literacy competence frameworks relevant for the global context aiming to contribute to measuring Sustainable Development Goal 4.4, and specifically the indicator "4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill." In a recent report UNESCO analysed five international studies and produced an international benchmark of best policy initiatives identified among top performing countries (UNESCO 2017). Finally, the UNESCO Asia and Pacific Regional Office is running the Digital Kids Asia-Pacific project, aiming at supporting governments from the region in developing children's initiatives in the area of digital citizenship.

The **CoE** is probably the most advanced international organization in terms of policy-making in the field of children and the digital society, under the flag of Digital Citizenship Education.<sup>10</sup> Recognizing that digital citizenship is important for its three missions related to human rights, democracy and rule of law, the CoE has produced 'Guidelines to Respect, Protect and Fulfil the Rights of the Child in the Digital Environment' and the 'Strategy for the Rights of the Child' (2016-2021). These two documents form a solid set of binding rules to assist states in developing policies for safeguarding children's interests in digital environments.

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6 <https://ec.europa.eu/jrc/en/digcomp>

7 The DigComp framework as well as the other competence frameworks presented in this section will be analysed later in section 1.5.

8 <https://www.betterinternetforkids.eu>

9 <http://uis.unesco.org/sites/default/files/documents/ip51-global-framework-reference-digital-literacy-skills-2018-en.pdf>

10 <https://www.coe.int/en/web/digital-citizenship-education>

Other international organizations that are active in policy support in the area of digital literacy are the International Telecommunication Union through its Broadband Commission Working Group on Education, which in 2017 produced the report 'Digital Skills for Life and Work' (ITU and ILO 2017) and the Organisation for Economic Co-operation and Development (OECD), whose report 'Which Skills for the Digital Era?' (OECD 2018) presents the organization's position on the needed skills for the digital age and some guidelines for policymaking in the field of digital literacy. It should be noted that these two organizations do not consider children's specificities and use approaches that are not immediately transferable to children.

The **Coalition for Digital Intelligence**<sup>11</sup> is a recent international multi-stakeholder initiative which includes the OECD, the IEEE Standards Association, and the DQ Institute in association with the World Economic Forum. Launched in September 2018, the initiative aims to set a global framework for digital skills development, which includes a common set of definitions, language, and understanding of comprehensive digital literacy, skills, and readiness that can be adopted by stakeholders worldwide, including national governments, educators, and technology companies.

Alongside these institutional initiatives, **multinational programmes promoted by commercial actors, mostly focusing on developing countries**, are also relevant. One example is the IBM Digital — Nation Africa project,<sup>12</sup> run in collaboration with the United Nations Development Programme, aiming to reach out to African youth who need digital literacy to succeed in the local and global workforce. The project, launched in 2017, aims to reach 25 million African citizens during the five years of its implementation. A second example is the Digital Skills for Africa programme,<sup>13</sup> run by Google in collaboration with a number of training partners, offering 89 courses through an online portal and face to face training in more than 20 African countries. The programme, which addresses the needs of small business owners who want to take advantage of the web across Africa, aims at training 10 million young Africans by 2022. A third example is the Indian Digital Wellness Programme<sup>14</sup> by INTEL, that has developed a Digital Wellness curriculum for school children aged 13–18 with a set of guidelines for safe ICT practices. In 2015, the programme organized a Digital Wellness Online Challenge, with almost one million participants, resulting in 144 winners from across 36 countries.

Since 2016, the Finnish Ministry of Education has reformed the national core curriculum ... digital literacy is embedded into all competence areas, with a specific area called multiliteracies and ICT.

### National initiatives

The work of these international organizations has inspired a number of national initiatives in the field of children's digital literacy, either as independent programmes or as actions embedded within broader policies that promote the use of ICT for children or the protection of children on the internet.<sup>15</sup> These can be of a very different nature, along four broad categories (ITU, BBC and UNESCO 2017).

1. Initiatives aiming to **ensure digital literacy for all**, for example by integrating digital competencies into school curricula or by building ICT labs and community learning centres. As an example, since 2016 the Finnish Ministry of Education has reformed the national core curriculum (from pre-education to the ninth grade), shifting the focus from subject-based learning objectives to broader cross-cutting competencies. In the new core curriculum, digital literacy is embedded into all competence areas, with a

11 <https://www.coalitionfordigitalintelligence.org>

12 <https://www.borgenmagazine.com/increase-digital-literacy-in-africa>

13 <https://learndigital.withgoogle.com/digitalskills>

14 [https://aim.gov.in/pdf/Digital\\_Wellness\\_Curriculum\\_Learner\\_Edition\\_by\\_Intel.pdf](https://aim.gov.in/pdf/Digital_Wellness_Curriculum_Learner_Edition_by_Intel.pdf)

15 Some reports presenting national cases are described in *DigComp into Action: Get inspired, make it happen. A user guide to the European Digital Competence Framework* (2018) by the European Commission, a collection of 38 existing inspiring practices of DigComp implementations. See also the *Digital Skills and Jobs Coalition initiatives repository*, a repository of Europe's best digital skills projects, or the *Digital Inclusion Newslog* by the ITU, searchable by topic and target group of initiatives and the ITU-ILO 2017 report *Digital skills for life and work*, which contains nine case studies of successful initiatives, including six targeted to children.

specific area called multiliteracies and ICT (Ministry of Education and Culture 2011). This approach offers extended possibilities for developing students' digital literacies and digital citizenship through local curriculum and culture adaptation and the engagement of individual teachers.

2. Projects to **teach coding skills to children**, including the integration of coding in national school curricula, the creation of outside-school coding clubs, or the distribution of low-cost computers with preloaded courses and applications. As an example, in 2015 the French government launched the Digital Plan for Education, with a funding of one billion euro for the first three years, aiming to innovate teaching and learning to prepare French students for the future digital job markets. The Digital Plan aims to ensure that every French high school student can learn computer programming while at school, through both curricular and extracurricular activities (French Ministry of Education 2015).
3. Programmes to **develop youth digital skills with a view to future employability**, including national employability strategies, training programmes for unemployed or marginalized youth and other forms of skills development. For example, the Indian Government has launched the National Digital Literacy Mission Programme,<sup>16</sup> an integrated platform for digital literacy awareness, education and capacity building that will help rural communities to take the lead in the global digital economy and to remain competitive in a technologically empowered society. One of the initiatives of the Digital Literacy Mission Programme is the START programme,<sup>17</sup> that has developed a digital learning and media literacy toolkit to promote digital inclusion and fight information poverty, reaching more than five million beneficiaries in 23 Indian states.
4. Actions to **foster 'soft digital skills'**, that aim to ensure digital safety, develop digital participation, or increase awareness of how digital technology, big data and algorithms shape society. If we look at Europe, a recent study in the field of online safety (O'Neill and Dinh 2018) has demonstrated that policies to support young people's technical skills are well established in almost all European Union countries, while activities to foster critical thinking and evaluating reliability of online content exist in just three-quarters of the countries. In the Netherlands, these issues are addressed by the MediaMasters initiative,<sup>18</sup> a project that introduces young people to digital skills through a gamified approach: in 2017, around a third of the total Dutch school population aged 10 to 12 played MediaMasters. In Australia the Office of the Children's eSafety Commissioner,<sup>19</sup> developed a one-stop web portal aggregating information on all children's cybersafety national initiatives and programmes, with resources for children, parents and schools.

Although national initiatives in the field are abundant, few of them are based on competence frameworks developed by national governments or by international organizations. Based on an analysis of 47 developed and developing countries where digital literacy policies have been launched, UNESCO (2017) found that only 11 countries had developed their own national frameworks, while 36 of the sampled countries have adopted competence frameworks developed by commercial actors. Among these enterprises, the International Computer Drivers Licence (ICDL)<sup>20</sup> was adopted in 31 countries, while the Certiport Internet and Computing Core Certification<sup>21</sup> and the Microsoft Digital Literacy Standard Curriculum<sup>22</sup> were used in 13 and 11 countries respectively.

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16 <http://nielit.gov.in/calicut/content/national-digital-literacy-mission-ndlm>

17 <https://defindia.org/education-empowerment-2/#START>

18 <https://ec.europa.eu/digital-single-market/en/digital-skills-initiatives/mediamasters>

19 <https://www.esafety.gov.au>

20 See <https://icdl.org>

21 <https://certiport.pearsonvue.com>

22 <https://www.microsoft.com/en-us/DigitalLiteracy/curriculum4.aspx>

## 1.5 Digital literacy frameworks

Competence frameworks are conceptualizations aimed at structuring a set of intertwined competencies which aim to enhance the capacities of a specific target group, and can be found within policy documents, school curricula, certification schemes and academic papers. These frameworks are abundant in the digital sphere, as shown by the All Aboard research that has identified more than one hundred models to map the digital competencies that would be needed in a contemporary economy and society (All Aboard 2015).

A number of digital literacy competence frameworks have been developed by **international organizations**, such as the UNESCO Global Framework of Reference on Digital Literacy Skills, the European Commission DigComp framework, the UNESCO Media and Information Literacy (MIL) framework, the Digital Citizenship Education framework by the CoE, the OECD Skills Research framework or the Digital Intelligence (DQ) framework. Others were designed to be used at the **national or sub-national level**, such as the UK Jisc Digital Capability Model,<sup>23</sup> the LearningWales programme<sup>24</sup> or the British Columbia Digital Literacy Curriculum.<sup>25</sup> Others, such as the International Computer Driving Licence (ICDL) or the Microsoft Digital Literacy Standard Curriculum, are maintained by **commercial private sector actors**. Finally, some NGOs and foundations have developed widely known digital literacy competence frameworks, such as the Common Sense Education K-12 Digital Citizenship Curriculum<sup>26</sup> or the Mozilla Web Literacy Framework.<sup>27</sup>

Another category of digital literacy competence frameworks aims to foster the use of technology for learning in schools and universities. These frameworks, which are included in formal education curricula, generally focus on the digital competencies of students and teachers (Nascimbeni 2018). Examples of this kind of digital literacy framework are the International Society for Technology in Education (ISTE) standard,<sup>28</sup> the International Computer and Information Literacy Study (ICILS),<sup>29</sup> the UNESCO ICT Competency Framework for Teachers,<sup>30</sup> and the International Association for K-12 Online Learning (iNACOL) National Standards for Quality Online Teaching.<sup>31</sup>

Having analysed this plethora of digital literacy competence frameworks and approaches and having discussed them during the interviews, we believe that four recent competence frameworks are of particular relevance for UNICEF: the Digital Competence Framework for Citizens (DigComp) developed by the European Commission (2018), the **Digital Kids Asia-Pacific** framework of the UNESCO Asia and Pacific Regional Office (2019), the **Digital Intelligence** framework of the DQ Institute (2019) and the **Digital Citizenship Education** framework of the CoE (2019). These have been selected for a number of reasons. First, they have been developed from mapping exercises of other public and commercial digital literacy competence frameworks, and therefore include a first level of aggregation of the competencies present in the majority of existing approaches. Second, they do not represent theoretical categorizations but rather practical approaches that have been used and implemented in different contexts, as we will briefly present below. Third, they have an international scope, and therefore take into account some needed degree of adaptability to different contexts and cultures.

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23 <https://www.jisc.ac.uk/building-digital-capability>

24 <https://hwb.gov.wales/curriculum-for-wales-2008/digital-competence-framework>

25 <https://www2.gov.bc.ca/gov/content/education-training/k-12/teach/teaching-tools/digital-literacy>

26 <https://www.common Sense.org/education/digital-citizenship/curriculum>

27 <https://learning.mozilla.org/en-US/web-literacy>

28 <https://www.iste.org/standards>

29 <https://icils.acer.org>

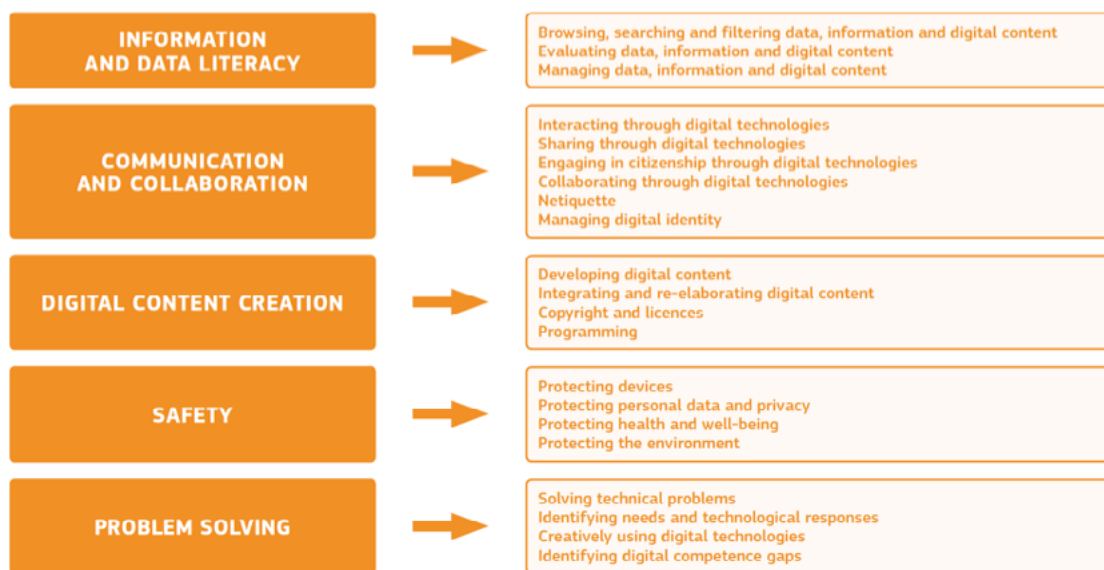
30 <https://unesdoc.unesco.org/ark:/48223/pf0000213475>

31 <https://www.inacol.org/resource/inacol-national-standards-for-quality-online-courses-v2>

## Digital competence framework for citizens (DigComp) (European Commission)<sup>32</sup>

DigComp is one of the best known and widely applied digital literacy competence frameworks. Developed in 2013 by the Joint Research Centre (JRC) of the European Commission following an intensive consultation of stakeholders, DigComp has become a reference for the development and planning of digital competence initiatives both at European and Member State level. In June 2016 the JRC published DigComp 2.0, updating the terminology and conceptual model (Vourikari et al. 2016). The current version is labelled DigComp 2.1 (Carretero et al. 2017) and it focuses on expanding the initial three proficiency levels to a more fine-grained eight-level description as well as providing examples of their use. DigComp identifies 21 competencies along five areas (see Figure 1).

FIGURE 1: DIGCOMP'S FIVE KEY AREAS AND 21 COMPETENCIES



Source: DigComp

Although it has been developed with an all-age objective, DigComp can easily be adapted to children, as indicated by the high level of correspondence between the DigComp competencies and the latest version of the Global Kids Online questionnaire.<sup>33</sup> In addition, the proficiency levels of the framework can be translated into criteria for children's study goals, which is normally difficult for teachers due to the rather abstract nature of such frameworks. Finally, DigComp has been evolving during its life: what was for example information literacy in DigComp 1.0 became information and data literacy in DigComp 2.0 while communication became communication and collaboration. In 2018, the Flemish Parliament (Belgium) adopted a new curriculum for the first grade of secondary education which is generic for all students, where digital competence and media literacy is one of the 16 key competencies, the detailed description of its learning outcomes being fully based on DigComp. In Estonia, a national training initiative to develop digital competence for enhancing youth job market participation is fully based on DigComp, which has been adapted for the youth vocabulary (see Kluzer and Pujol Priego 2018, p. 100). Starting from 2019, secondary students in France will access the Pix tools<sup>34</sup> through their school's digital learning platform to acquire digital competence and to get certified, based on the DigComp competencies (see Kluzer and Pujol Priego 2018, p. 99).

<sup>32</sup> See <https://ec.europa.eu/jrc/en/digcomp>

<sup>33</sup> Some DigComp competencies connected to digital identity and personal data that have become more important in the EU since the entry into force of the General Data Protection Regulation, will be added to the Global Skills Online survey, showing a dynamic convergence between the DigComp and the Global Kids Online approaches.

<sup>34</sup> Pix is a platform for assessment and certification of digital competencies for French citizens, run by the French Ministry of Education together with a number of research institutions. More at [www.pix.fr](http://www.pix.fr).



Notably, DigComp has recently (UNESCO Institute for Statistics 2018a) been selected as a starting point and extended by UNESCO with the Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2, that has added a first level on devices and software operations. This element focuses on identifying and using hardware tools and technologies as well as information and digital content needed to operate software tools and technologies; a further level of career-related competencies, focuses on operating specialized digital technologies and understanding, analysing and evaluating specialized data, information and digital content for a particular field (UNESCO Institute for Statistics 2018b).

### Digital Kids Asia-Pacific competence framework (UNESCO)<sup>35</sup>

The Digital Kids Asia-Pacific project, run by the UNESCO Office for the Asia and Pacific Region in collaboration with a number of stakeholders including UNICEF, has designed a digital literacy competence framework specifically targeting children aged 10–19, that was built by mapping a number of public and private frameworks.<sup>36</sup> The Digital Kids Asia-Pacific framework identifies two principles, a prerequisite and five domains corresponding to sixteen competencies, representing a balance between protection from online risks and fostering digital opportunities (see Table 1).

TABLE 1: DIGITAL KIDS ASIA-PACIFIC COMPETENCE FRAMEWORK

PRINCIPLES	RIGHTS-BASED, CHILD-CENTRED APPROACH
PREREQUISITES	EQUITY IN QUALITY OF ACCESS TO ICT
DOMAINS	COMPETENCIES
1. Digital Literacy	1.1 ICT Literacy 1.2 Information Literacy
2. Digital Safety and Resilience	2.1 Understanding Child Rights 2.2 Personal Data, Privacy and Reputation 2.3 Promoting and Protecting Health and Well-being 2.4 Digital Resilience
3. Digital Participation and Agency	3.1 Interacting, Sharing and Collaborating 3.2 Civic Engagement 3.3 Netiquette
4. Digital Emotional Intelligence	4.1 Self-awareness 4.2 Self-regulation 4.3 Self-motivation 4.4 Interpersonal Skills 4.5 Empathy
5. Digital Creativity and Innovation	5.1 Creative Literacy 5.2 Expression

### Digital Intelligence framework (DQ Institute)<sup>37</sup>

The Digital Intelligence framework is supported by the members of a recently launched multi-stakeholder initiative involving the IEEE Standards Association, the DQ Institute, and the Organisation for Economic Co-operation and Development (OECD) in association with the World Economic Forum. The framework, originally developed for children and then enlarged to all-age citizens, was built starting from 23 digital literacy frameworks

<sup>35</sup> See <https://bangkok.unesco.org/content/digital-kids-asia-pacific-insights-childrens-digital-citizenship>.

<sup>36</sup> Including the Australian Curriculum, the Assessment and Reporting Authority (ACARA), CommonSense Media (CSM), the Digital Intelligence Framework, DigComp, Global Kids Online, the International Computer and Information Literacy Study (ICILS), the International Society for Technology in Education (ISTE), OECD Skills Research, the Thinkyoung-Google Digital Resilience study, UNESCO ERI-NET Transversal Skills, UNESCO's GCED Framework, UNESCO Media and Information Literacy and UNICEF's State of the World's Children Report.

<sup>37</sup> See <https://www.dqinstitute.org/dq-framework>

from different countries and organizations.<sup>38</sup> The DQ Institute framework identifies 8 competence areas and 24 competencies, with three levels of proficiency: digital entrepreneurship, digital creativity and digital citizenship (see Figure 2).

FIGURE 2: THE DIGITAL INTELLIGENCE FRAMEWORK



Source: DQ Institute

### Digital Citizenship Education framework (CoE)<sup>39</sup>

A strong point of this competence framework is that it is complemented by a set of learning activities aligned with the competencies mapped.<sup>40</sup> The framework is used in several important contexts such as in the City of London where the digital skills strategy is based on the DQ framework, and the Australian e-safety commission is using it in their teacher training strategy. However, this digital literacy framework also contains some competencies that are not entirely relevant to children, such as Organizational Cyber Security Management.

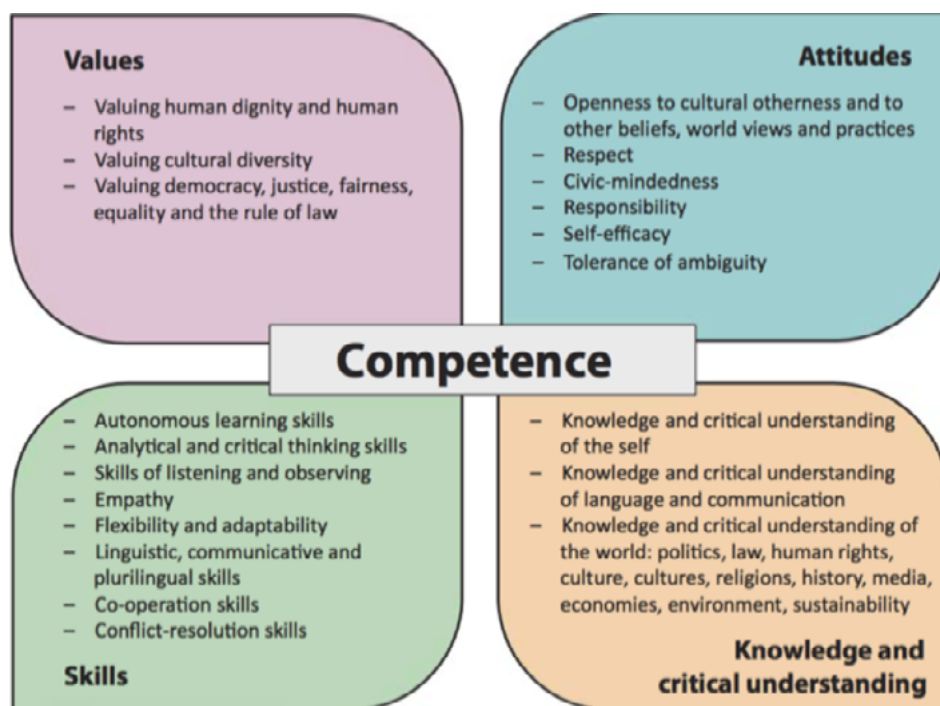
The Digital Citizenship Education framework was produced by the CoE Working Group on Digital Citizenship, following a review of existing literature on the concept of digital citizenship (Frau-Meigs et al. 2017) as well as a multi-stakeholder consultation (Richardson and Milovidov 2017). The CoE competence framework identifies a mix of knowledge and critical understanding, skills, attitudes and values, for a total of 20 competencies, as shown in Figure 3 below.

38 Including for example the UK Council of Child Internet Safety's (UKCCIS) *Education for a Connected World*; British Columbia's Digital Literacy Framework, *DigComp2.0*; the UN *Global Media and Information Literacy Assessment Framework*; the Mozilla Foundation's *Web Literacy* map; the International Society for Technology in Education's (ISTE) *Standards for Students*; Common Sense Media's *K-12 Digital Citizenship Curriculum Framework*; MediaSmart's *Classroom Guide* for integrating digital literacy into pedagogical practice; and Microsoft's *Digital Literacy* curriculum.

39 See <https://www.coe.int/en/web/digital-citizenship-education/digital-citizenship-education-project>.

40 See <https://www.dqinstitute.org/dq-framework>

FIGURE 3: THE COE DIGITAL CITIZENSHIP EDUCATION FRAMEWORK



Source: CoE

The CoE framework is being operationalized through a Digital Citizenship Education Handbook (Richardson and Milovidov 2019), that is structured along three macro areas (Being Online, Well-being Online and Rights Online) and ten dimensions (access and inclusion, learning and creativity, media and information literacy, ethics and empathy, health and well-being, ePresence and communications, active participation, rights and responsibilities, privacy and security, consumer awareness). This Handbook builds on the Internet Literacy Handbook (now in its 4th edition), a very broadly used tool that has been translated into 10 languages. An interesting feature of the above competence framework (reflected in the accompanying Handbooks) is the attention given to children’s relationship with emerging technologies such as the Internet of Things (IoT), AI systems, and virtual and augmented reality (Richardson and Milovidov 2019).

## 1.6 Snapshot of UNICEF's work in the field of digital literacy

### Mapping of UNICEF initiatives

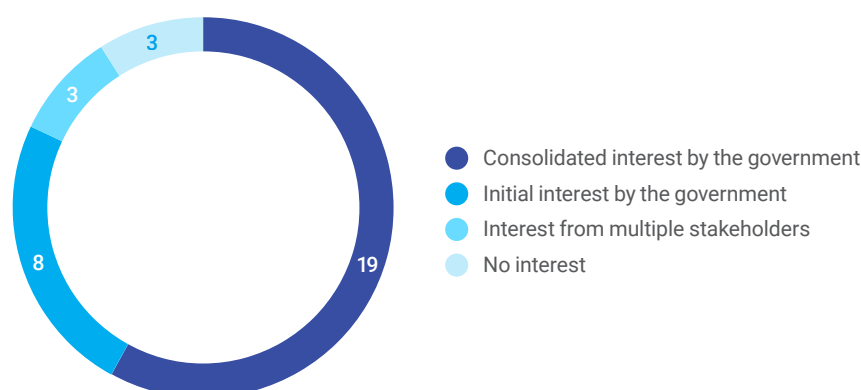
This section presents a brief analysis of the UNICEF digital literacy initiatives that were collected from the UNICEF country and regional offices,<sup>41</sup> The objective was to gather recent initiatives (implemented in the last five years), possibly with demonstrable impact and with potential for transferability. The data reported by UNICEF staff has been integrated with desk research from the UNICEF Annual Country Reports as well as other reports. The analysis must be seen as an initial and non-exhaustive attempt to map UNICEF’s efforts in the field. While the results are not fully representative, they nevertheless provide a snapshot of the kind of initiatives that UNICEF is engaged in and of their characteristics.

Before presenting the characteristics of the initiatives mapped, it is interesting to note that the survey results confirm a generalised interest by governments and other stakeholders in working in the area of digital literacy as illustrated in Figure 4.

41 See Annex for the list of survey respondents and Annex 2 for a brief description of the initiatives.

FIGURE 4: GOVERNMENT INTEREST IN DIGITAL LITERACY

Is there an interest in digital literacy on the part of the government and other stakeholders in your country/region?



Source: Authors

The majority of respondents stated that their respective governments of reference have a consolidated interest in digital literacy, meaning that they have been supporting actions in the area for a number of years and are building on the results of previous initiatives. This finding confirms the results of the UNESCO Policy Review on Digital Citizenship in South East Asia, which found that about three-quarters of Asia Pacific Member States have policies promoting basic ICT literacy skills among children (UNESCO 2016). The open responses made it clear that within the concept of government interest, respondents meant different things. In some cases, governments are interested in piloting innovative initiatives, while in others – such as in Kenya – this interest is witnessed by multi-year governmental investments in national digital literacy initiatives, often supported by UNICEF, among others. Further, in a number of cases government interest is mirrored by the involvement of more than one ministry, such as – in the case of Moldova – the Ministry of Education and the Ministry of Economy, or – in the case of Ghana – the Ministry of Communications and the Ministry of Education.

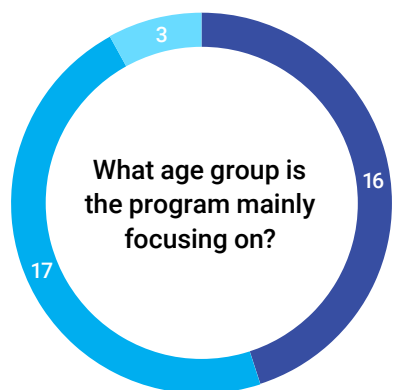
Next, Figure 5 provides an overview of the characteristics of the mapped initiatives, the majority of which (23) are in their implementation phase, with some (7) about to start. The range of UNICEF's efforts is well balanced:

- in terms of focus: 25 initiatives aim at building competencies and skills, 19 focus on internet safety (with 8 initiatives covering both areas);
- in terms of age target: 17 projects work with young children, 16 with adolescents and 3 with both adolescents and younger children; and
- in terms of educational context: 23 initiatives are in formal learning contexts, and 24 in non-formal learning environments (with 11 initiatives covering both areas).

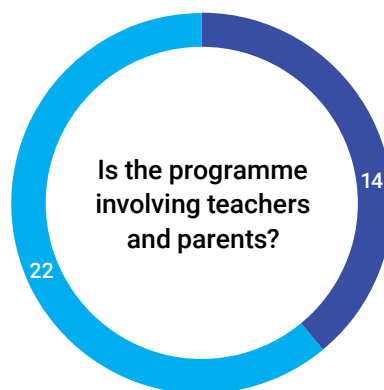
Even if the data collected represent a fraction of all the UNICEF initiatives in the field of digital literacy, this balance indicates two things. First, governments and local contexts call for different kinds of solutions; and second, the UNICEF offices seem to be able to provide these solutions, in a rather tailored and multi-stakeholder way. These data confirm the findings of the UNESCO Policy Review for the Asia Pacific region, that stresses the diversity and the multistakeholder nature of the majority of existing digital literacy initiatives in the region (UNESCO 2016). Two aspects show space for improvement: only 14 out of 36 initiatives are targeting those around children (families and teachers), and only 11 initiatives were reported to be based on a digital literacy competence framework (in 6 cases aligned with the national curriculum, in 5 developed by the project). As we will see in the next section, these areas for improvement correspond to the needs expressed by the survey respondents.

FIGURE 5:

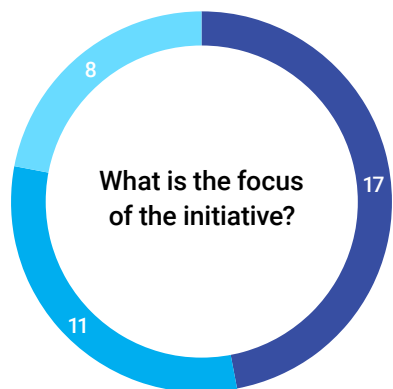
MAIN RESULTS OF THE DIGITAL LITERACY SURVEY AMONG UNICEF OFFICES



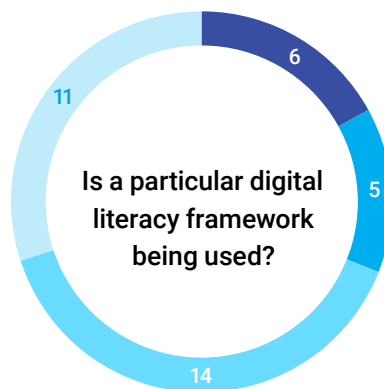
● Adolescents and youth ● Children  
● Both children and adolescents



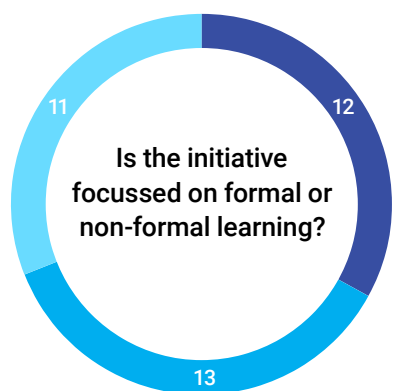
● Yes ● No



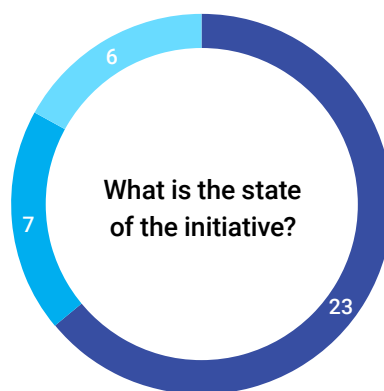
● ICT skills, digital literacy and coding  
● Internet safety ● Both internet safety & ICT skills



● Yes, aligned with the national curriculum  
● Yes, the initiative has its own ● No  
● No answer



● Formal learning settings (schools)  
● Non formal learning settings  
● Both formal and non formal settings



● Being implemented ● Being planned  
● Completed



## Barriers and needs

The main challenges that the UNICEF offices responding to the survey have identified are presented in Table 2. Unskilled and unmotivated teachers and trainers are confirmed as the main barrier both in terms of lack of digital capacity (position 1) and of cultural resistance to adopt ICT solutions and approaches. Then, if we consider that ICT infrastructure and poor connectivity are “structural” issues that go beyond digital literacy initiatives, another fundamental barrier is the lack of understanding of the digital literacy problem by governmental decision makers. This issue, also raised in the study interviews, will be discussed in Part 2 of this paper. Other important barriers are the low integration of digital literacy into education, both in schools and outside, hindering recognition, and the lack of online content suitable for local use.

**TABLE 2: MAIN BARRIERS TO DIGITAL LITERACY DEVELOPMENT  
(SURVEY AMONG UNICEF OFFICES)**

POSITION	QUESTION: IN YOUR VIEW WHAT ARE THE MOST IMPORTANT BARRIERS THAT LIMIT THE DIGITAL LITERACY AND SKILL LEVELS OF CHILDREN?	TIMES QUOTED
1	Lack of teachers and trainers capacity	15
2	Lack of ICT infrastructure	12
3	Low connectivity (especially for remote areas, including cost)	10
4	Lack of understanding from decision makers (lack of evidence-based information, lack of sufficient regulation in relation to privacy and transparency, limited understanding of the complexity of digital literacy, methodologies not consolidated)	8
5	Digital literacy is not mainstreamed into the curricula of schools and learning centres	7
6	Lack of quality content for local cultures and in local languages	6
7	Resistance from schools and teachers (due to fear, increased workload...)	6
8	Lack of parents’ and families’ digital skills	5
OTHER	General socioeconomic issues (patriarchal social norms that restrict access for girls, distance to internet centres...), lack of funds, digital platforms not disability friendly	2 OR LESS

Finally, the fact that five respondents identified the lack of parents’ digital skills as a barrier confirms the importance of families in such initiatives presented earlier in the paper. Interestingly, the barriers mentioned do suggest a general understanding of a need for initiatives aimed at empowering children online rather than at protecting them, as appears evident from the fact that the presence of harmful or dangerous situations on the web was not reported. This could also be interpreted as insufficient information or awareness about online risks, so caution should be taken.

The UNICEF offices also reported on the type of support that they would mostly need in order to develop effective initiatives (see Table 3). This question is particularly important because it represents a starting point for shaping the work on the best possible support actions that UNICEF could put in place. These findings are in line with the main barriers that have emerged during the interviews and show a generalised need for global policy guidelines and support, that can be adapted to the needs of different contexts.

**TABLE 3: SUPPORT NEEDED TO ENGAGE IN DIGITAL LITERACY PROGRAMMES  
(SURVEY AMONG UNICEF OFFICES)**

POSITION	QUESTION: WHAT TYPES OF SUPPORT WOULD YOU FIND MOST VALUABLE IN ORDER TO ENGAGE IN DIGITAL LITERACY PROGRAMMES?	TIMES QUOTED
1	Policy guidelines (UNICEF position paper, a clear policy agenda, guidance to support digital literacy advocacy, policy briefs) including guidelines on how to establish successful partner-ships (Public-Private-Partnership, how to engage the government)	16
2	Digital literacy competence framework	14
3	Curriculum guidelines	13
4	Practical tools: training manuals, toolkits, recommendations on platforms	5
5	Best practices of digital literacy programmes to provide inspiration (research/evaluations of what works and what are the challenges, especially for reaching the most disadvantaged)	4
6	Country and regional data (including digital needs assessment) and evidence to advocate for digital literacy	3
7	Openly licensed content that can be adapted for a variety of programmes and mediums (booklets and tools to engage with children, parents and teachers)	2

## 1.7 Key takeaways

- In both the policy and research discourse, a shift is happening from an instrumental view of digital literacy, in other words, what a digitally literate individual should be able to do, towards a more comprehensive understanding of what it should mean to be digitally literate today, namely what a digitally literate individual should be able to achieve. An internationally accepted definition of children’s digital literacy does not exist.
- Many international organizations are prioritizing the need to equip citizens with digital skills for economic and societal improvement, and some standard approaches are starting to emerge, usually focused on citizens of all ages. Four digital literacy competence frameworks show the best potential for adaptation and relevance to the needs of children and hence for UNICEF’s work: the Digital Competence Framework for Citizens (DigComp) developed by the European Commission (2018); UNESCO’s Digital Kids Asia-Pacific framework (2019); the DQ Institute Digital Intelligence framework (2019); and the Digital Citizenship Education framework of the CoE (2019).
- In addition, there is a plethora of national and international initiatives on children’s digital literacy, including extended programmes promoted by commercial actors. While some are based on the frameworks mentioned above, the majority are based on frameworks developed by commercial organizations, especially in the developing world.
- Despite recognition of the importance of digital literacy, there is still a lack of reliable global data on the levels of children’s digital literacy; an affordable and scalable standard to measure digital literacy in low- and middle-income countries is needed.

- The challenges impacting the development of children’s digital literacy strongly depend on children’s social environment: research shows the importance of the family and school contexts for digital literacy acquisition. The role of the private sector in supporting development of children's digital literacy is also increasingly being recognised.
- UNICEF’s work in this field has largely been driven by the needs of country offices or interests of national governments. Currently there is no standard definition in use or common framework to structure their interventions. A wide range of UNICEF projects exists to promote digital literacies but it seems that few of them focus on strengthening systems and only some have been evaluated.







# Towards a holistic vision for digital literacy

## 2.1 Introduction

Given the gaps and needs described earlier, there is clearly a space for UNICEF to play a key role in the field of digital literacy with a specific focus on children, as of its mandate. Such a strategy would be a continuation of UNICEF's recent work in the field of children's digital inclusion, following one of the six recommendations from the 2017 State of the World's Children report on developing children's digital skills. Such a commitment by UNICEF would also have a positive effect on public perception of the organization as contemporary societies are aware that digital literacy for children is important and urgent. There is a growing recognition that children who are excluded from digital activities will have much weaker access to educational and social resources, community and government services as well as opportunities for digital civic engagement and success in the digital economy. Finally, strengthening the UNICEF position in the field will also have a positive advocacy effect for policies that are more attentive to the rights of children.

A common and coherent vision of digital literacy should be developed and implemented in all UNICEF interventions, based on an agreed definition and supported by a set of tools, including competence frameworks and glossaries. The challenge is to foster holistic and systemic interventions, at the same time allowing multiple support pathways, recognizing that digital literacy can be supported in formal and non-formal settings and that this approach enhances equity.

## 2.2 Digital literacy as part of the broader skills for learning

Digital literacy should also be viewed as part of UNICEF's broader approach towards holistic, skills- and rights-based quality education and learning that prepare children and adolescents for school, work, and life. UNICEF's skills framework identifies four sets of interconnected skills that should develop alongside subject knowledge to realize this holistic vision of education and learning:

- **Foundational skills** (consisting of literacy and numeracy): skills that are needed regardless of employment aspirations. Foundational skills are essential for further learning, productive employment and civic engagement.
- **Transferable skills** (also known as life skills, 21st-century skills, soft skills, or socio-emotional skills): skills that allow young people to become agile, adaptive learners and citizens equipped to navigate personal, social, academic, and economic challenges. They include skills such as problem solving, negotiation, self-management, empathy and communication.
- **Job-specific skills** (technical and vocational skills): skills associated with one or more occupations such as carpentry, coding, accounting, or engineering.
- **Digital skills**: skills and knowledge that support the development of digitally literate children.



## 2.3 Towards a UNICEF definition of digital literacy

UNICEF believes that digital literacy and skills are essential for children to have meaningful access to the internet, allowing them to be both safe and successful online and to be able to fully exercise their rights, such as the right to privacy, freedom of expression, information and education (UNICEF 2018a). In a number of recent documents (for example UNICEF 2017, UNICEF 2018a), UNICEF calls for a holistic approach to digital literacy, in terms of skills (stressing that children should be empowered with the technical, cognitive and social skills needed to be protected and productive in a digital age), stakeholders (claiming that parents/caregivers and educators should play an active role in children's digital literacy) and connection with traditional literacy (noting that digital literacy should be grounded within a broader skills framework for life and work).

UNICEF does not have an official definition of digital literacy. In its 2017 State of the World's Children report and in the follow-on 2018 Policy Guide on Children and Digital Connectivity, the organization has used the definition of the European Commission: "Digital literacy implies a set of competences that goes beyond digital and technical skills. It includes the ability to search, evaluate and manage information found online; interact, share and collaborate online; develop and create content; use safety and protection features, and solve problems and be creative."

In another section of UNICEF's Policy Guide, the areas of action of digitally literate children are indicated: "Children should be able to: 1. Access and operate in digital environments safely and effectively; 2. Critically evaluate information; 3. Communicate safely, responsibly and effectively through digital technology; and 4. Create digital content."

UNICEF calls for a holistic approach to digital literacy, in terms of skills ... stakeholders ... and connection with traditional literacy.

A number of considerations emerged from the interviews on how UNICEF should approach the use of a definition of digital literacy. First, interviewees agreed that choosing the right label among *digital competence*, *digital skills*, *digital literacy* and *digital citizenship* is important. While digital competence has the benefit of embedding knowledge, skills and attitudes, it may be seen as overly technical. On the other hand, *digital citizenship* is connected to the political concept of citizenship and touches upon human rights. For the scope of UNICEF's work, *digital literacy* is arguably the most fitting concept, as it is more generic and neutral. As regards digital skills, from a logical point of view these are equivalent to knowledge and attitudes (components of the concept of competence) and are therefore by definition included in the *digital literacy* concept. Moreover, combining *digital literacy and skills* would represent a departure from the holistic shift envisioned above. In line with the LSE definition presented in section 1.1, *digital literacy* is preferable because it clearly entails skills, uses and outcomes.

The following recommendations for a possible UNICEF definition of digital literacy were collected during the interviews:

- **The definition should be short, simple, concrete and usable**, and the details regarding competencies should be provided in the competence framework. This would make it adaptable to the very different contexts UNICEF is working in.
- **The definition should be specific to children**, including important terms and concepts such as resilience, self-awareness, self-regulation, interpersonal skills, empathy, agency, awareness of one's own and others' rights while engaging with contents and other users. Further, the definition should refer to being free and safe when playing online or with digital devices.

- **The definition should accommodate context specificities** and foster a culturally appropriate use of technology. Moving away from one-size-fits-all solutions that often guide private sector interventions is particularly important since it allows the coexistence of different understandings of what it means to be digitally literate for different cultures (for example, different ways of considering intergenerational relations) and contexts (such as urban vs rural).
- While being technology neutral, **the definition should take into account current technology development dynamics**, connecting with data literacy and AI literacy. The development of AI systems, the IoT, data-driven economies, algorithm-driven decision-making and other forms of automation will create a situation where the most important skills may not involve the direct use of digital technology, but will relate to an awareness of the way digital technologies influence our lives (ITU and ILO 2017, p. 12).
- **The definition should take into account the need to deal with different age groups of children.** Having a definition that is able to accommodate the needs of pre-school children, school-age children,<sup>42</sup> adolescents and young adults would represent an important advance with respect to most existing approaches that, with few exceptions, rarely reflect the wide diversity of different age-groups when it comes to the digital world (Kidron and Rudkin 2018).
- **The definition should embed a critical dimension of digital literacy**, enabling “children to build on their critical self-reflection when using digital technologies and develop a critical disposition” (Pangrazio 2006, p. 169), and engaging critically in all kinds of digital practices, whether designing and producing or reading and viewing (Sefton-Green et al. 2016).

In order to accommodate the above considerations, it is suggested that UNICEF could adopt a short and a long version of the working definition. The **short definition**, which could be used for ‘policy’ contexts, would stress the aims and the general principles of UNICEF’s understanding of digital literacy, stressing the tension between the need to empower children to thrive in a global digital world and the importance of local context adaptation, along these lines:

**Digital literacy** refers to the knowledge, skills, and attitudes that allow children to flourish and thrive in an increasingly global digital world, being both safe and empowered, in ways that are appropriate to their age and local cultures and contexts.

The **long definition** should be composed (also visually) of different building blocks (idea adapted from Ferrari 2012), that are: the objects of the definition, the activities covered, the modes of operation, the age and context specificities, the purpose of activities and a reference to digital societies (see Table 4). Having such a ‘modular’ definition allows the components and the relations among them to be identified and to update parts of the definition if need be. Also, such a modular definition could be used by UNICEF as a tool for brainstorming when discussing digital literacy.

<sup>42</sup> Based on age-specific online opportunities, risks, as well as expected digital literacy proficiency levels, the group of school-age children could further be divided into three groups (e.g. 7–9, 10–12, 13–15), corresponding to primary school, middle school, and early high school respectively.

**TABLE 4: PROPOSED MODULAR DEFINITION OF CHILDREN’S DIGITAL LITERACY**

DEFINITION	BUILDING BLOCKS	NOTES
Children’s digital literacy is the set of knowledge, skills, attitudes, strategies, values and awareness that are required ...	Objects of the definition	Knowledge, skills and attitudes, strategies, values and awareness are all included
... to search for, analyse, evaluate and manage information, communicate, collaborate, create and share content, build knowledge, solve problems...	Activities covered	This list could be enlarged when new activities will emerge
... safely, effectively, efficiently, critically, creatively, autonomously, flexibly, ethically, reflectively and appropriately ...	Modes of operation	These refer to “how” children should ideally use/interact with ICTs and digital media
...with respect to their age, local language, local culture, and socioeconomic context...	Age and context specificities	This represents an advance with respect to existing definitions
... for playing, civic participation, learning, socialising, consuming, working ...	Purpose of activities	Playing is added here in a prominent place
... in digital and connected environments and societies.	Reference to digital societies	This is more than “when using ICT tools”
Children’s digital literacy is the set of knowledge, skills, attitudes, strategies, values and awareness that are required ...	Objects of the definition	Knowledge, skills and attitudes, strategies, values and awareness are all included

Using the above building blocks, a work-in-progress definition could be as follows:

**Digital literacy** is the set of knowledge, skills, attitudes and values that enable children to confidently and autonomously play, learn, socialize, prepare for work and participate in civic action in digital environments. Children should be able to use and understand technology, to search for and manage information, communicate, collaborate, create and share content, build knowledge and solve problems safely, critically and ethically, in a way that is appropriate for their age, local language and local culture.

UNICEF will need to refine this definition, in collaboration with key actors in the digital literacy space.

## 2.4 Suggested digital literacy frameworks for UNICEF

During interviews, while discussing the most appropriate digital literacy competence framework – or combination of frameworks – that UNICEF could use to support the development of coordinated and meaningful initiatives in the field of children's digital literacy, two main considerations emerged.

- 1. The digital literacy competence framework must be technology-neutral.** This means that competencies should not solely be related to technology and platforms, because these will evolve with time. And in some aspects they should be related not to the use but to the understanding of technology as, when IoT and AI systems will

become embedded in our everyday environments, they will lessen the need for operational digital skills and increase the need for critical ones (O'Reilly 2017). Within increasingly data-driven societies, where users will have limited control over what content is delivered and created, having a critical understanding of the mechanisms behind technological solutions and platforms will probably become more important than being able to practically use ICT tools (Van Deursen and Mossberger, 2018).

- 2. The digital literacy competence framework must be flexible enough to be applied to different contexts.** This means that the framework would have to accommodate cultural and linguistic specificities, allowing a socially appropriate use of technology. This can be done by privileging the macro competency areas, instead of the detailed description of the competencies, that need to be adaptable to the different contexts. These macro areas are quite well established and overlap within the four frameworks presented earlier, but must be adapted for different age groups of children and different contexts. A way to guarantee framework adaptability is to distinguish skills from expected outcomes (such as safety, well-being or employability), since in different contexts and at different ages different competencies are important to achieve similar outcomes. As an example, the key outcome of being safe online, that is common to all children throughout the world, can be achieved through different sets of competencies for younger or older children, or for children in different developing contexts. Such an approach would also help to instill among children – at the appropriate age – the motivation to engage with “the civic, informational and creative activities online that are heralded as the opportunities of the digital age” (Livingstone et al. 2019).

Starting from these two assumptions, we recommend that UNICEF should not develop its own digital literacy competence framework, but rather use existing and well-fitting frameworks and add value to them through a mechanism of contextual adaptation support to implementation that is integrated in the organization's existing work. These frameworks need to be adapted to take into account the proposed child-specific definition.

Two digital literacy competence frameworks are proposed for use by UNICEF in the short term. DigComp is a widely implemented framework that could be used when a detailed description of the different proficiency levels of ICT competencies is required. The advantages of this framework are its maturity, its applicability to children, and the fact that it is accompanied by clear guidelines for implementation based on lessons learned. Further, while it was created for the European context, it has been used in countries outside Europe, such as Costa Rica.

In parallel, the **Digital Kids Asia-Pacific** competence framework could be used in contexts where a citizenship approach is to be preferred. The advantages of this framework are that it was developed specifically for children and for developing country settings (it was developed for the Asia Pacific region but can easily be adapted to other regions) and the fact that it has been validated in four countries. These two proposed digital literacy frameworks are compatible with the most widely used private sector frameworks such as ICDL (UNESCO Institute for Statistics 2018a), are already in use, and will be further developed and updated by their respective authoring organizations, with whom UNICEF should engage in a collaborative partnership.

The current review also suggests that UNICEF should closely follow the development of two other promising frameworks and engage in a dialogue with their promoters: the DQ Institute framework, developed by the Coalition for Digital Intelligence, and the CoE's Digital Citizenship Education framework.

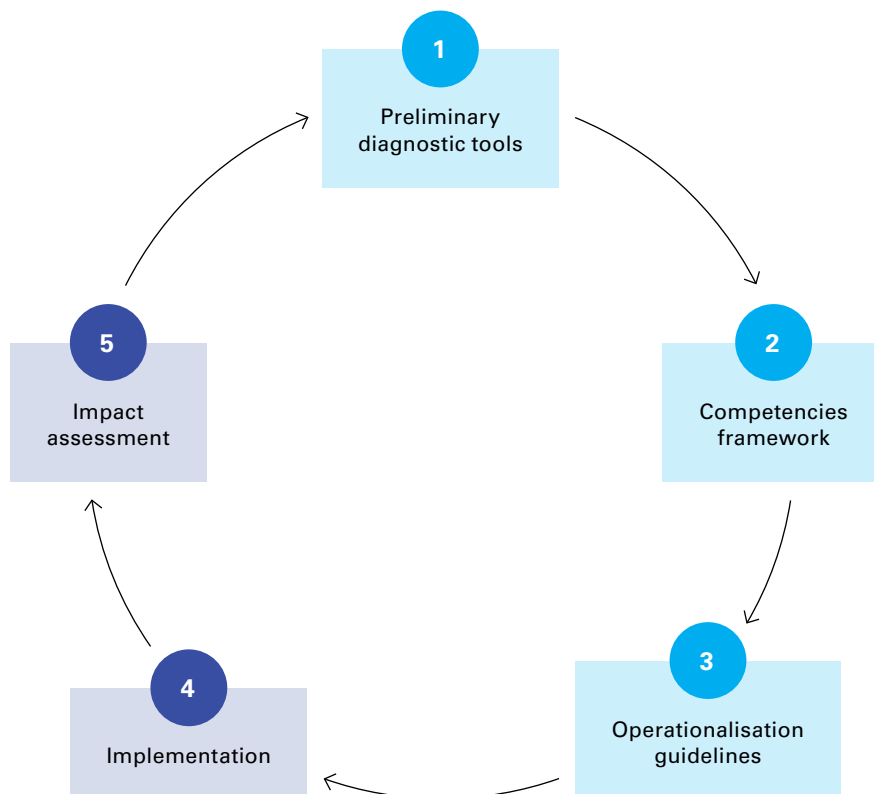
## 2.5 Proposal for integrated UNICEF support

The recommended competence frameworks should not be used as stand-alone support tools but rather within an integrated approach, composed of preliminary guidelines and follow up tools, that can be adapted to the socio-cultural context, as indicated by the UNICEF programming cycle.<sup>43</sup> Responding to the main needs of the UNICEF country and regional offices that emerged from our survey (see Figure 4 in section 1.6), UNICEF should not only foster the use of these competence frameworks in children’s contexts, but also add value by building an integrated set of support tools around them, as in Figure 6.

### Step 1: Preliminary diagnostic

Before using one of the two competence frameworks proposed above (or a combination of them), a set of Preliminary Diagnostic Tools should be used, in order to adapt the framework (in terms of areas, competencies and proficiency levels) to the specific context. Adaptation should regard the country specific e-readiness (connectivity and infrastructure can heavily influence digital literacy programmes), age groups (research shows that certain skills are learnt better at different ages) and cultural contexts (concepts can have very different meanings in different contexts). These diagnostic tools could be a set of questions and checklists on the context of use, cultural practices, languages, and on the basis of the answers the competence framework should change to become fully appropriate for local interventions. Inspiration to develop such tools could be taken from the ITU Digital Skills Toolkit (ITU 2018a), a useful report which contains guidelines for policymakers and other stakeholders to facilitate the development of digital skills strategies at the country level. The modular working definition presented in section 2.3 could be used as a working tool to discuss how to adapt the suggested frameworks to local conditions.

FIGURE 6: PROPOSED SUPPORT CYCLE



Source: Authors

● Preparation and design programme phases

● Implementation and assessment phases

43 [https://www.unicef.org/lifeskills/index\\_12074.html](https://www.unicef.org/lifeskills/index_12074.html)



## Step 2: Use of the competence framework

Once the framework has been properly adapted to a given context, it should guide the inclusion of capacity development activities in school curriculum or in informal learning activities, depending on the kind of intervention. The framework should also help in setting some required minimum levels for the acquisition of competencies that are appropriate for the age of use. A good example in this sense is the work of the Government of British Columbia in Canada, where a competence framework has been implemented that is adaptable across the different K12 school levels.<sup>44</sup>

## Step 3: Operational guidelines

Once the competence framework has been used to ‘structure’ a given curriculum, some practical guidelines must be offered on how to develop the corresponding learning resources or on which existing content could be used; these would be similar to the DigComp users guide,<sup>45</sup> the webportal of the DQ Institute<sup>46</sup> or the LearningWales programme.<sup>47</sup> In this last case, the corresponding competence framework is provided in both a web format, where the competencies proficiency levels automatically adapt depending on the selected school year, and in a spreadsheet format, that allows use and modification. Further, curriculum mapping tools are provided for both primary and secondary schools, complemented by detailed Digital Competence Framework guidance and set of Frequently Asked Questions. Providing such a complete set of tools would allow the full design of an intervention around the proposed competence framework and would facilitate appropriate impact assessment and therefore evidence-based policy improvement. This would be particularly important since impact assessment in digital literacy seems not to be widespread: confirming the results of our survey among UNICEF offices, UNESCO has noted that the majority of Asian Pacific countries do not seem to have assessment systems in place to measure the efficacy of their digital literacy programmes (UNESCO 2016).

## Step 4: Implementation

During the intervention implementation phase, it will be important to keep in mind a few overarching guiding principles:

- Multi-stakeholder engagement – based on the diagnostic mapping, key stakeholders will be identified that have a role to play in the programme design and implementation such as parents, teachers and private sector actors and children;
- Social Inclusion – supporting children from underserved or marginalized communities (focusing on digital infrastructure, affordability, content in local languages, gender norms); and
- Staying current – paying attention to the impact of emerging technologies and domains (such as AI systems, Internet of Toys, augmented reality) and to changes in digital usage (increased misinformation, excessive screen time, etc.).

## Step 5: Impact assessment

The Monitoring, Evaluation and Assessment guidelines of the Life Skills programme<sup>48</sup> seem to fit well with the proposed approach. It is important that the impact assessment matrices that will guide the evaluation work should consider, as much as possible, holistic and critical impact dimensions, moving away from assumptions that, for example, the use of ICT automatically translates into better grades.

The integrated approach proposed is in line with the recent work of international organizations. First, the *UNESCO Global Framework of Reference on Digital Literacy Skills*

44 See <https://www2.gov.bc.ca/gov/content/education-training/k-12/teach/teaching-tools/digital-literacy>

45 See <https://publications.europa.eu/s/kRJa>

46 [https://www.dqinstitute.org/dq\\_everychild/](https://www.dqinstitute.org/dq_everychild/)

47 <https://hwb.gov.wales/curriculum-for-wales-2008/digital-competence-framework>

48 [https://www.unicef.org/lifeskills/index\\_10489.html](https://www.unicef.org/lifeskills/index_10489.html)

report (2018) suggests using case examples to design initiatives and to define digital literacy levels and assessment – thus at the practical level and not at the conceptual level. The report presents (in its Appendix 8) a detailed pathway mapping methodology, where each pathway comprises competencies and contexts using examples for countries, that stakeholders in different country/sector/personal contexts can customize. Second, the report by the ITU Broadband Commission and *UNESCO Working Group on Education: Digital skills for life and work* (2017) calls for context-specific planning and provision, underlining that “successful digital skills programmes and initiatives are tailored to meet the needs of target beneficiaries and respond to local contexts; they avoid ‘one-size-fits-all’ approaches, privileging flexibility and iterative growth” (p. 5). The proposed approach also addresses many of the UNICEF support requests made in the survey (see Table 3).

## 2.6 Moving ahead

The working definition, the suggested frameworks and the integrated support approach presented in this part of the paper could constitute the initial building blocks of UNICEF’s work in the area of children’s digital literacy. How UNICEF engagement in the field of digital literacy will further evolve needs to be discussed with internal and external stakeholders and goes beyond the scope of the current paper. In this concluding section, we present some ideas on what could come next that have emerged from both the survey and the stakeholder interviews. In order to take these suggestions forward, UNICEF must develop the capacity of its staff to internally and externally engage, coordinate and collaborate to deliver high quality programming.

UNICEF must support government and partners in embedding digital literacy, alongside other skills and knowledge, within education and learning systems, throughout the life course and for all children through multiple pathways.

### UNICEF should continue with and strengthen its holistic approach

UNICEF should strive to position digital literacy within a holistic vision of skills- and rights-based education and learning that prepares young people to be successful learners, engaged citizens, and productive workers. To realize this vision, it recognizes the need for multi-sectoral and cross-sectoral approaches that promote digital literacy and integrate digital skills with other skills and knowledge (see section 2.6). As such, **UNICEF must support government and partners** in embedding digital literacy, alongside other skills and knowledge, within education and learning systems, throughout the life course and for all children through multiple pathways (formal, non-formal, and community-based). Entry points for this work include: sequenced and resourced reforms that address skills development, including digital skills, within pedagogy, assessment and curricula; and creation of safe and positive environments, physical and digital, conducive to the development of digital skills.

### UNICEF could strengthen collaboration with the major stakeholders in the field

As emerged from the interviews, **there is interest among major institutional players to collaborate with UNICEF** in the area of digital literacy. As recommended in the 2018 *UNICEF Policy Guide on Children and Digital Connectivity*, UNICEF should “partner with UNESCO, CoE, European Commission and other international agencies and bodies who have experience and resources in the field of digital and media literacy, as well as with the private sector partners who have strong interest, access and technical resources” (UNICEF 2018a, p. 15). Also, we suggest that the major research projects in the area such as Global Kids Online (where UNICEF is a lead partner), the DigiLitEY and the Better Internet for Kids projects should engage in this partnership.

Demonstrating the genuine interest in collaboration mentioned above, a number of collaborative ideas were proposed by important stakeholders during the interviews:

- Creation of a collaborative **observatory on children’s digital literacy** (with UNICEF, UNESCO, ITU, CoE, JRC, the Coalition for Digital Skills, industry stakeholders) to follow and share developments in the field. This could be complemented by a periodic research scheme, where the involved actors could concentrate on a specific theme every year and produce joint reports (to avoid fragmentation);
- Development of **digital skills foresights**, investigating what will be the digital skills needed in 5, 10, 20 years, focusing on new areas such as the skills needed for the AI era;
- Creation of an **open repository with anonymized data** on digital literacy for children, with input from UNICEF, DQ Institute, Global Kids Online, JRC-European Commission, to be used by researchers to improve understanding of the issues at stake; and
- Creation of an **official shared glossary** on children’s digital literacy (similar to the Luxemburg Glossary<sup>49</sup> in the field of migration) that would represent the standard for new initiatives.

### UNICEF should shape and support research and analysis on children’s digital literacy

UNICEF is already a leading actor in the area of digital literacy research, for example through the work of the Global Kids Online project. To further strengthen this role, UNICEF could support research and analysis in areas of particular relevance for the immediate future:

- Digital literacy in different contexts, exploring the difference between the digital literacy needed in developing and developed countries, of what is expected from children of different ages in terms of digital literacy development;
- Digital literacy for marginalized children, focusing on children’s resilience and on how digital technologies can provide psychosocial support for children living in marginalized settings (e.g. refugees), and what kind of tools are most valuable for these children;<sup>50</sup> and
- Digital literacy around children, looking at the immediate surroundings of children, as it has been demonstrated that skills, attitudes and values of people close to children matter (Livingstone, Mascheroni and Staksrud 2015), and at what type of education is effective in cultivating digital soft skills such as digital emotional intelligence and digital participation and agency.

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49 [http://www.emnluxembourg.lu/?page\\_id=823](http://www.emnluxembourg.lu/?page_id=823)

50 One initiative that includes a focus on children’s psychosocial well-being is the EduApp4Syria project. See <https://norad.no/eduapp4syria> and Comings 2018.

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## Annex: List of experts and stakeholders consulted

### Experts interviewed

Ellen Helsper, Associate Professor, London School of Economics, UK  
Shafika Isaacs, Education consultant, South Africa  
Jonghwi Park, Programme Specialist, UNESCO Asia-Pacific Regional Bureau, Thailand  
Yuhyun Park, Founder and Chief Executive Officer, DQ Institute, Singapore  
Yves Punie, Joint Research Centre Seville, European Commission, Spain  
Janice Richardson, Consultant, Council of Europe, France  
Michael Trucano, Global Lead for Technology & Innovation in Education, World Bank, US  
Riina Vuorikari, Joint Research Centre Seville, European Commission, Spain

### Respondents to the online survey

Sitraka Andrinivo, Digital Communication Officer, UNICEF Madagascar  
Andrei Arias, Communications Associate, UNICEF Costa Rica  
Josianne Galea Baron, Children's Rights and Business Specialist, UK National Committee for UNICEF  
Roshni Basu, Regional Advisor ADAP, UNICEF East Asia and Pacific Office (EAPRO)  
Sean Blaschke, T4D Business Analyst, UNICEF Eastern and Southern Africa Office (ESARO)  
Frank van Cappelle, Education Specialist, UNICEF Regional Office for South Asia (ROSA)  
Panji Chamdimba, Education Specialist, UNICEF Sudan  
Katherine Crisp, Innovation Specialist, UNICEF Innovation  
Emma Day, Child Protection Consultant, East Asia and Pacific Office (EAPRO)  
Verena Katharina Fisch, Intern, UNICEF Namibia  
Ticiana Garcia-Tapia, Youth and Adolescent Development Specialist, UNICEF Indonesia  
Ben Grubb, Business Analyst (T4D), UNICEF East Asia and Pacific Office (EAPRO)  
David Gvineria, Child Protection Specialist, UNICEF Albania  
Jorge Luis Hernandez, Education Specialist, UNICEF Nicaragua  
Jennifer Hofmann, Education Chief, UNICEF Bolivia  
Sema Hosta, Chief of Communication, UNICEF Turkey  
Mayke Huijbregts, Chief Social Policy and Child Protection, UNICEF South Africa  
Linda Jonsson, Education Specialist Innovation, UNICEF Niger  
Sanja Kabil, Education Specialist, UNICEF Bosnia and Herzegovina  
Muhammad Rafiq Khan, Chief of Child Protection Section, UNICEF Ghana  
Irene Leino, Corporate Responsibility Advisor, Finnish National Committee for UNICEF  
Sara McGinty, Chief, Education, UNICEF Rwanda  
Jadranka Milanovic, Communication Officer, UNICEF Serbia  
Fabrice Musoni, Consultant, UNICEF Uganda  
Hiromasa Nakai, Chief, Information and Public Affairs, Japan Committee for UNICEF  
Amal Obeid, Adolescent and Youth Specialist, UNICEF Lebanon  
Saadhna Panday-Soobrayan, Education Specialist, UNICEF South Africa  
B.P. Panwar, T4D Business Analyst, UNICEF Europe and Central Asia Office (ECARO)  
Alex Petrov, Adolescent and Youth Development Officer, UNICEF Moldova  
Florian Rabenstein, Education Officer, UNICEF Kenya  
Cora Steinberg, UNICEF Argentina  
Nenad Tomic, Education Officer: Data Systems and Technology, UNICEF Namibia  
Giorgia Varisco, Chief of Youth and Adolescents Section, UNICEF Jordan  
Mario Volpi, Chief of Youth and Adolescent Programme, UNICEF Brazil  
Nikola Vulic, Adolescent Development Officer, UNICEF Montenegro  
Lisa Wolff, Director, Policy and Research, UNICEF Canada (National Committee)  
Tamara Zakharia, Innovation Youth Officer, UNICEF Lebanon



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