



Task Force 4  
**Digital Transformation**

**Policy brief**

# DIGITAL LEARNING FOR EVERY CHILD: CLOSING THE GAPS FOR AN INCLUSIVE AND PROSPEROUS FUTURE

SEPTEMBER 2021

**Matt Brossard** UNICEF Office of Research – Innocenti  
**Marta Carnelli** UNICEF Office of Research – Innocenti  
**Stephane Chaudron** European Commission – Joint Research Centre  
**Rosanna Di-Gioia** European Commission – Joint Research Centre  
**Thomas Dreesen** UNICEF Office of Research – Innocenti  
**Daniel Kardefelt-Winther** UNICEF Office of Research – Innocenti  
**Céline Little** UNICEF Office of Research – Innocenti  
**Jean Luc Yameogo** UNICEF Programme Division

T20 NATIONAL COORDINATOR AND CHAIR



T20 CO-CHAIR



T20 SUMMIT CO-CHAIR



Università  
Bocconi  
MILANO





# ABSTRACT

Pre-Covid-19, half of the world's children were already unable to read a simple text by the age of 10. School closures have deepened pre-existing learning disparities, within and among countries, due to inequities in access to technology. This brief summarises research findings and provides actionable recommendations for how to equitably scale up digital learning and provide children and young people with the skills to improve their prospects and safeguard their well-being. It pinpoints solutions for education systems' use of digital and blended learning anchored in a sound pedagogical approach and urges the G20 and other countries to overcome the barriers that limit the potential benefits of digital learning.



# CHALLENGE

**Even before Covid-19, 48% of the world's children – and 90% of children in low-income countries – were 'learning poor': unable to read and understand a simple text by age 10** (World Bank, 2019). The global figure is expected to rise to 58% as a result of the pandemic (Azevedo, 2020).<sup>1</sup>

**Inaction not only threatens efforts to achieve Sustainable Development Goal 4 – to ensure inclusive and equitable quality education – but is also contrary to the Convention on the Rights of the Child and General Comment No. 25** on children's rights in the digital environment. Recognizing the importance of meaningful access to digital technologies, including in educational settings, it points out that "if digital inclusion is not achieved, existing inequalities are likely to increase, and new ones may arise."<sup>2</sup>

**Major barriers to digital learning persist.** During school closures, more than two-thirds of children globally were unable to access online learning (UNICEF and ITU, 2020). Lack of electricity (particularly in Africa), connectivity, affordable data and devices are compounding factors that impede equitable access to digital learning. Parents' lack of literacy and digital skills and reluctance to let children – girls in particular – access the internet are added obstacles. Children's own lack of digital skills, even in wealthier countries, can also stand in the way; children from the poorest families feel less confident in their capacity to cope with digital learning activities (Vuorikari et al., 2020).

**Designing content for specific context and learning goals are vital for effective learning platforms.** Incentivized by the pandemic and school closures, the digitalization of education is leading to profound changes. Evidence increasingly shows that digital learning is more effective when embedded in a clear pedagogical framework supporting teachers (Tamim et al., 2011). It raises new challenges regarding the role and required skills needed for teachers to effectively deploy technology.

**Shifting to more digital learning can change children's daily routines.** Unless well-managed, this can challenge their well-being and development in the long run, especially among the most deprived children. Children's time on the internet also generates growing volumes of data which raises risks in relation to cybersecurity, safety, privacy, data ownership and data privacy.

**While evidence has shown some positive results for the use of technology-enabled adaptive learning, significant evidence gaps remain, especially in low-income settings.** Specifically, evidence is still largely missing on i) the most efficient models and implementation strategies to reduce the digital divide; ii) the optimal conditions for the effectiveness of digital learning solutions within large-scale education systems – namely, to look beyond the technology itself to its integration within education professionals' skills, practices and



pedagogy; iii) the impacts of digital learning solutions (used either remotely or in the classroom) on learning outcomes in adverse settings, especially those areas with low or no connectivity; and iv) the impacts of the increased use of digital technology on children's safety, well-being, security and privacy.



# PROPOSAL

Unlocking digital learning for all children has the potential to create societies that are both more inclusive and more prosperous. As education systems recover from Covid-19 school closures, we can choose to reimagine education and address the learning crisis – to expand opportunity for millions of children and young people, giving them the chance to learn and earn a decent living.

Scaling up equitable digital learning requires actions by governments, international organisations, civil society, academia and the private sector to

1. Bridge the electrical and digital divides
2. Ensure the effective implementation of digital and blended learning for all children and their teachers
3. Protect children's well-being, safety and security
4. Invest in data collection and further research

## **1. BRIDGE THE ELECTRICAL AND DIGITAL DIVIDES: PROVIDE ALL CHILDREN WITH AFFORDABLE ACCESS TO HIGH-QUALITY ONLINE RESOURCES**

Digital technologies have the potential to deliver education content widely and rapidly. However, the promise of digital learning remains out of reach for most of the world's children.

Digital devices require electricity. World Bank data show that, in Sub-Saharan Africa, only 47% of the population has access to electricity and progress in electrification is slow. Disparities also exist within countries.<sup>3</sup> In some countries, less than 10% of the poorest households have electricity (Dreesen et al., 2020). Even with connectivity and access, lack of electricity would still prevent children in many parts of the world from using the internet.

In terms of connectivity, an estimated 2.2 billion – or two thirds – of children and young people worldwide do not have a fixed internet connection at home (UNICEF, 2020). These children predominantly live in the least developed countries where 4G mobile networks cover only 40% of the population, compared to 85% of the global population (ITU, 2020).

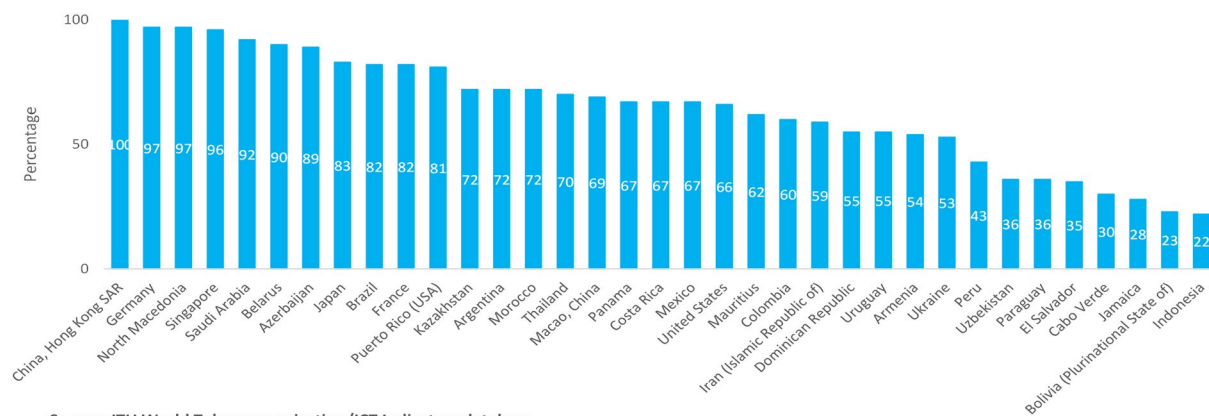
While detailed statistics on the proportion of child internet users remain scarce, internet use by children is usually associated with country wealth (Kardefelt-Winther et al., 2020; see *Figure 1*).

Even in high-income countries, where internet use seems ubiquitous, inequities persist. In Italy during COVID-19, one-third of children from connected households reported being un-



able to fully engage in digital learning due to a lack of adequate connectivity or devices (Mascheroni et al., 2021). In 10 European countries, grade 4 pupils from lower socio-economic backgrounds were half as likely to have internet access compared to their more advantaged peers (European Commission, 2020).

**Figure 1 – Proportion (%) of children under 15 years of age who are internet users, by country or area**



The digital divide is not only about having the basic systems and services that grant access to the internet. The kind of engagement and whether it is beneficial, highlighted as ‘meaningful connectivity’ by the Broadband Commission,<sup>4</sup> is equally important. For example, even a family with a broadband connection, or a mobile phone with 3G/4G technology, might not be able to afford going online in a meaningful way or for sufficient amounts of time.

Even with improved connectivity and more affordable data and devices, many children are still not able or allowed to use the internet for their benefit. Digital divides – linked to social norms, poverty, gender, limited skills and literacy and availability of relevant content (EQUALS, 2019; Datta et al., 2020) – endure even after connectivity is provided.

Efforts to provide meaningful access to children must, therefore, address more than just connectivity and infrastructure. Poor and marginalised girls and boys, including those with disabilities, ‘children on the move’<sup>5</sup> and those living in remote areas, are often left out of education. Moreover, students from disadvantaged backgrounds are more likely to experience a stressful home environment – with no quiet space to study or limited or lack of devices, for example – and parents who face financial and job security pressure that can prevent them from supporting their children (Di Pietro et al., 2020). However, with specific learning provisions in place that ensure inclusivity and accessibility, technologies can be game-changing for vulnerable groups.

Quick wins can stem from using readily available technology already familiar to children and families (Trucano, 2013). Research shows that children in Europe are most at ease with smartphones and tablets (Chaudron et al., 2018), which is likely to be the case globally as



smartphones are now the device most used by children. Still, only a small proportion of children own these devices (Lobe et al., 2021), which limits their access and use, and ownership is not synonymous with having digital devices that are appropriate for learning (Cachia et al., *forthcoming*).

Technologies evolve rapidly. Today's high-speed internet will soon be low-speed. Investments in infrastructure should ensure that marginalised communities are not left behind and can in fact leapfrog to higher speed networks. At the same time, digital learning solutions should be accessible to those with varying levels of connectivity. To reach all children requires finding the right balance between producing high-quality, interactive content, while also optimising applications and content to be lightweight and function with low or no bandwidth.

To address the digital divide and enable equitable digital learning:

1. **Invest in electricity and connectivity with a focus on marginalised communities and users.** Coordinated, large scale investments from G20 member states, national governments and the private sector are needed to bring electricity and connectivity to the millions of unconnected children around the world. Based on current trends, Sub-Saharan Africa won't reach electricity for all before 2081. This can, however, be accelerated through partnerships and significant capital investments to the enormous benefit of children and their future societies and economies. The GIGA initiative, for instance, leverages public-private partnerships to digitally connect every school, especially those hardest-to-reach. This initiative works not only to connect schools but also their surrounding neighbourhoods because it recognises that all households need access to electricity and connectivity.
2. **Reduce the cost of connectivity and devices.** The right to non-discrimination requires States to ensure that all children have equal and effective access to the digital environment in ways that are meaningful to them.<sup>6</sup> Yet, cost is a common barrier to access. Governments working with telecommunication companies can address this by subsidizing -appropriate for learning- devices; lowering costs to make data and content affordable; and providing educational content for free – without monetizing children's data. For instance, in May 2020, the Airtel Africa-UNICEF partnership made browsing selected websites hosting educational content free of any data charges in 13 African countries.
3. **Design inclusive digital learning and increase investments in learning systems that reach the most marginalised.** Critically, digital learning systems must not crowd out investments in quality education that can be used by the unconnected. Where digital solutions are used, minimise data costs and prioritise lightweight options that are usable offline and on affordable devices.
4. **Recognise and address cultural and social norms as barriers to access for children.** Perceptions of internet use as more or less meaningful and entrenched gender



norms reducing girls' access to digital devices are barriers that need to be addressed at a normative level. Efforts to provide electricity and connectivity will help reduce the digital divide only if these barriers are also addressed and children are given the opportunity to use the internet and build digital skills. Awareness raising and providing information and education to parents, teachers and community and/or religious leaders are essential steps.

## **2. ENSURE EFFECTIVENESS OF DIGITAL LEARNING SOLUTIONS AT SCALE**

While societies work to address challenges around infrastructure and social and gender norms, digital learning solutions must be designed and implemented in ways that promote inclusive learning for all children.

Digital learning solutions have the potential to accelerate learning through various pathways. Software can be designed to support self-paced learning; enable access to learning opportunities in times of emergency (Tauson and Stannard, 2018; De Hoop et al., 2019); and adapt to each student's level through computer-assisted learning (Muralidharan et al., 2019).

Evidence increasingly shows that the introduction of technology alone is not sufficient to improve learning outcomes. Much depends on *how* technology is used within a learning system (Bulman and Fairlie, 2016). Digital solutions are effective in improving learning when they supplement and support teachers rather than replace them (Tamim et al., 2011).

To support the implementation and scale of effective digital and blended learning:

- 1. Develop a clear pedagogical approach to guide the use of digital learning from a young age.** Digital initiatives work best when they are underpinned by pedagogical principles and incorporated into the educational process (Redecker et al., 2017). Co-creation between software developers and educators helps ensure that digital programmes are fit for their educational purposes (Karamperidou et al., 2020). Digital solutions – especially when scaled across different countries – need to be culturally sensitive, contextualised and curated to meet learners' needs.
- 2. Start with foundational literacy and numeracy and use engaging and age-relevant content to benefit learners from various levels.** Personalised digital learning tools tailor education content to a student's level. Also, interactive platforms with games and instant feedback increase learners' motivation, self-esteem and engagement in the learning process. Such features ensure that more advanced learners remain engaged while other learners can catch up at their own pace.
- 3. Provide teachers with the skills they need to incorporate technology in the classroom.** Teachers' professional development on how to use technology to enhance





learning and how to facilitate the learning of digital skills is fundamental. Teachers can use digital solutions to accelerate learning and offer engaging interactive experiences for learners, through digital tutors, curricular playlists and virtual classrooms.

#### **4. Beyond pedagogy, teachers' use of technology may reduce the burden of completing repetitive administrative tasks and allow them to focus more on teaching.**

Teachers' education is especially important as the role of technology as a tool in the classroom continues post COVID-19.<sup>7</sup>

### **3. PROTECT CHILDREN'S WELL-BEING AND SAFETY**

Children need the time and space to be children. This includes time to play and interact freely with peers, online and offline. During Covid-19, the world witnessed a sudden shift of many children's activities into the digital world. The online world offered new possibilities, including as a substitute for in-person interactions. In general, children handled lockdown in reasonable and resilient ways.

However, research also reveals profound changes in children's daily lives during the pandemic. For instance, with digital learning added to their existing online entertainment activities – important to maintain a sense of normalcy – children (10-18 years old) across Europe now spend most of the day online (Vuorikari R. et al., 2020; Lobe B. et al., 2021). For some, being in lockdown has meant greater exposure to domestic violence, abuse or exploitation. Children with pre-existing physical or mental health conditions, or in vulnerable socio-economic contexts, have also faced added hardship (Marques de Miranda D. et al., 2020; Mascheroni et al., 2021; Europol, 2020).

Moreover, the digital environment, like any other, comes with a range of risks for children. One of the most severe is sexual exploitation and abuse, experienced either virtually or with digital technology as a facilitator of physical abuse.

Universal digital access (see section 1) and effective digital learning (see section 2) for every child can be successfully achieved only if the risks to children's online safety and well-being are addressed.

To protect children's well-being, safety and security in this changing context:

1. **Provide psychological assistance and develop concrete guidelines** for children, parents and caregivers to help manage the transition to digital learning during crises such as COVID-19. These should include ways to maintain healthy sleeping patterns, school-life balance, social life and quality family time. Some children have reported digital fatigue and boredom towards technology as a result of increased time online. This calls for a better balance between digital learning and other activities, and more time for play (Vuorikari et al., 2020; Cachia et al., *forthcoming*).



2. **Protect children's security online and avoid biases against vulnerable groups by ensuring that digital learning solutions have built-in safeguards.** With increased experiences online, vulnerable children can find themselves more exposed to risks and less able to find support (Stoilova et al., 2021). Industry commitment and clear policy guidance and dialogue between stakeholders is imperative for developing strategies (EU COM, 2012, 196 final), norms, rules and regulations to protect children's safety, security, privacy and ownership in the digital world. A first step toward universally agreed legal standards is to review government frameworks that effectively protect children's rights in the digital world and to assess these against relevant international laws and conventions. Developing safe-by-design products should be prioritised by the industry with a view to keeping up with rapid technological change.
3. **Implement innovative, child-friendly prevention and response strategies for children at risk of violence, abuse or exploitation online.** These should be age- and gender-sensitive; based on evidence generated directly with children; adapted to national and local contexts through multi-stakeholder cooperation (EU COM (2020) 607 final); and integrated within national child protection policies (Kardefelt-Winther & Maternowska, 2020). For example, the partnership between Havas Sports & Entertainment and l'Enfant Bleu<sup>8</sup>, gave children who felt in danger during lockdown a chance to discreetly reach out for help while playing the online video game Fortnite.

#### **4. INVEST IN DATA COLLECTION AND FURTHER RESEARCH**

Even pre-COVID-19, learning outcomes were not systematically measured and education policies lacked evidential backing – with or without digital technologies (World Bank, 2018; UNICEF, 2019).

Significant evidence gaps also exist on equity in access to digital learning; risks and opportunities children face online; and the effectiveness of different implementation modalities of digital learning platforms – especially for the most vulnerable children.

To address the evidence gaps:

1. **Measure learning more systematically** to spotlight disparities (including across gender, location and socioeconomic status), monitor progress and inform the design and implementation of evidence-based solutions and reforms. Make data open and translate it for the benefit of local communities and citizens (Save Our Future, 2020).
2. **Invest in implementation research – co-created from the onset with beneficiaries – to identify the most inclusive and effective digital learning solutions and inform action.** To continuously improve the digital (and blended) learning solutions, embed learning assessments and users' feedback into the digital platforms. Public-private partnerships can be explored to support and enable such research, provided all ethical safeguards are in place (see *point 4 below*).



3. **Consistently monitor the proportion of children able to meaningfully access the Internet.** Further **research on children's safety, security, privacy and risk of sexual exploitation and abuse** is also recommended by the United Nations Committee on the Rights of the Child, including regular baseline research with children, to understand the implications of the digital environment for their lives in general (UNHR, 2021).
  
4. **Invest in research on the ethical use of children's data in digital education,** especially in relation to access rights, privacy, data ownership and transparency. Marketing tools and predictive analytics, powered by AI systems, can have substantial ethical implications when it comes to the collection and use of children's data. Rather than pose risk, these should strive to align with children's fundamental rights (EU COM, 2021, 142 final; EU COM, 2020, FRA; Teräs et al., 2020).



## NOTES

<sup>1</sup> Post-Covid-19 scenario of no remediation and low mitigation effectiveness of the effects of school closures.

<sup>2</sup> General comment No. 25 (2021), para. 4.

<sup>3</sup> Côte d'Ivoire, Lesotho, Kiribati, Sudan, The Gambia, Guinea-Bissau and Mauritania.

<sup>4</sup> “The Broadband Commission for Sustainable Development was launched by ITU and UNESCO in 2010 to bridge the digital divide and bring the goal of universal broadband connectivity to the forefront of policy discussions.” <https://sustainabledevelopment.un.org/partnership/?p=12007>

<sup>5</sup> ‘Children on the move’ includes children who have migrated across borders or within their country of birth, either voluntarily or due to conflict and violence.

<sup>6</sup> United Nations Committee on the Rights of the Child.

<sup>7</sup> The European Framework for the Digital Competence of Educators (DigCompEdu) details how digital technologies can be used to enhance and innovate education and training.

<sup>8</sup> <https://www.dailymotion.com/video/x7uhmid>



## REFERENCES

Diogo Amaro, Lauren Pandolfelli, Ingrid Sanchez-Tapia, Matt Brossard, “COVID-19 and education: The digital gender divide among adolescents in sub-Saharan Africa”, UNICEF Blogs, 2020 <https://blogs.unicef.org/evidence-for-action/covid-19-and-education-the-digital-gender-divide-among-adolescents-in-sub-saharan-africa/>

Joao Pedro Azevedo, “Learning Poverty in the Time of COVID-19: A Crisis within a Crisis”, World Bank, Washington, DC, December 2020 <https://openknowledge.worldbank.org/handle/10986/34850>

George Bulman, Robert W. Fairlie, “Technology and education: Computers, software, and the internet”, National Bureau of Economic Research, NBER, CESifo Working Paper 5570, 2016 [https://www.nber.org/system/files/working\\_papers/w22237/w22237.pdf](https://www.nber.org/system/files/working_papers/w22237/w22237.pdf)

Stephane Chaudron, Rosanna Di Gioia, Monica Gemo, “Young children (0-8) and digital technology, a qualitative study across Europe”, European Commission, Joint Research Centre, 2018 <https://op.europa.eu/en/publication-detail/-/publication/n/9c015955-b0c5-11e8-99ee-01aa75ed71a1/language-en>

Romina Cachia, Anca Velicu, Stephane Chaudron, Rosanna Di Gioia & Riina Vuorikari, “Remote schooling during Covid-19 spring 2020 lockdown. A closer look at European families.”, European Commission, Joint Research Centre, Publications Office of the European Union, Luxembourg. (Forthcoming)

Namita Datta, Danielle Robinson, “Jobs Interventions for Young Women in the Digital Economy”, Jobs Notes;No. 10. World Bank, Washington, DC., 2020 <https://openknowledge.worldbank.org/handle/10986/33691>

Giorgio Di Pietro, Federico Biagi, Patricia Costa, Zbigniew Karpinski & Jacopo Mazza. “The likely impact of COVID-19 on education: Reflections based on the existing literature and recent international datasets.” European Commission, Joint Research Centre, Publications Office of the European Union, Luxembourg, 2020. <https://ec.europa.eu/jrc/en/publication/likely-impact-covid-19-education-reflections-based-existing-literature-and-recent-international>

Thomas Dreesen, Spogmai Akseer, Mathieu Brossard, Pragya Dewan, Juan-Pablo Giraldo, Akito Kamei, Suguru Mizunoya, Javier Santiago Ortiz Correa,” Promising Practices for Equitable Remote Learning. Emerging lessons from COVID-19 education responses in 127 countries”, Innocenti Research Report, UNICEF Office of Research - Innocenti, Florence, 2020 <https://www.unicef-irc.org/publications/1090-promising-practices-for-equitable-remote-learning-emerging-lessons-from-covid.html>

EQUALS, 10 Lessons Learnt: Closing the Gender Gap in Internet Access and Use Insights from the EQUALS Access Coalition, 2019 [https://2b37021f-0f4a-4640-8352-0a3c1b-7c2aab.filesusr.com/ugd/04bfff\\_33ded-6f6855b4de5b7a09186e1c6add7.pdf](https://2b37021f-0f4a-4640-8352-0a3c1b-7c2aab.filesusr.com/ugd/04bfff_33ded-6f6855b4de5b7a09186e1c6add7.pdf)

European Commission, EU strategy on the rights of the child, Brussels, (COM(2021)

142 final), 24 March 2021 [https://ec.europa.eu/info/files/eu-strategy-rights-child\\_en](https://ec.europa.eu/info/files/eu-strategy-rights-child_en)

European Commission, European Strategy for a Better Internet for Children, EU COM(2012) 196 final, 2 May 2012 <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52012DC0196>

European Commission, EU Strategy for a more effective fight against child sexual abuse Brussels, COM (2020) 607 final, 24 July 2020 [https://ec.europa.eu/home-affairs/sites/default/files/what-we-do/policies/european-agenda-security/20200724\\_com-2020-607-commission-communication\\_en.pdf](https://ec.europa.eu/home-affairs/sites/default/files/what-we-do/policies/european-agenda-security/20200724_com-2020-607-commission-communication_en.pdf)

European Commission, Getting the future right – Artificial intelligence and fundamental rights, European Union Agency for Fundamental Rights (FRA), 18 November 2020 <https://fra.europa.eu/en/publication/2020/artificial-intelligence-and-fundamental-rights>

European Commission, Educational inequalities in Europe and physical school closures during Covid-19, FAIRNESS POLICY BRIEF SERIES: 04/2020, European Union, 2020 - JRC12111 [https://ec.europa.eu/jrc/sites/jrcsh/files/fairness\\_pb2020\\_wave04\\_covid\\_education\\_jrc\\_i1\\_19jun2020.pdf](https://ec.europa.eu/jrc/sites/jrcsh/files/fairness_pb2020_wave04_covid_education_jrc_i1_19jun2020.pdf)

Europol, Exploiting isolation: offenders and victims of online child sexual abuse during the covid-19 pandemic, June 2020 <https://www.europol.europa.eu/publications-documents/exploiting-isolation-of-offenders-and-victims-of-online-child-sexual-abuse-during-covid-19-pandemic>

Thomas de Hoop, Hannah Ring, Andrea Coombes, Victoria Rothbard, Chinmaya

Holla, Kelsey Hunt, David Seidenfeld, Helen Connolly, “Scaling Education Innovations in Complex Emergencies: Evidence From the Humanitarian Education Accelerator”, American Institutes for Research, 2019 [https://static.globalinnovationexchange.org/s3fs-public/asset/document/HEA\\_MetaEvaluation\\_Final.pdf?NJA2oDGzgwHENLO8otzc9TJkqIPED3Hg](https://static.globalinnovationexchange.org/s3fs-public/asset/document/HEA_MetaEvaluation_Final.pdf?NJA2oDGzgwHENLO8otzc9TJkqIPED3Hg)

ITU, UNESCO, State of Broadband Report 2019: Geneva: International Telecommunication Union and United Nations Educational, Scientific and Cultural Organization, 2019 [https://www.itu.int/dms\\_pub/itu-s/opb/pol/S-POL-BROADBAND.20-2019-PDF-E.pdf](https://www.itu.int/dms_pub/itu-s/opb/pol/S-POL-BROADBAND.20-2019-PDF-E.pdf)

Despina Karamperidou, Nikoletta Theodorou, Thomas Dreesen, Mathieu Brosard, Akito Kamei, Javier Santiago Ortiz Correa, “Unlocking Learning: The co-creation and effectiveness of a digital language learning course for refugees and migrants in Greece”, Innocenti Research Report, UNICEF Office of Research - Innocenti, Florence, 2020 <https://www.unicef-irc.org/publications/pdf/AKELIUS.pdf>

Daniel Kardefelt Winther, Rogers Twesigye, Rostislav Zlámál, Mariam Saeed, David Smahel, Mariya Stoilova, Sonia Livingstone, “Digital Connectivity During COVID-19: Access to vital information for every child”, Innocenti Research Briefs, UNICEF Office of Research - Innocenti, Florence, 2020 <https://www.unicef-irc.org/publications/1099-digital-connectivity-during-covid-19-access-to-vital-information-for-every-child.html>

Daniel Kardefelt Winther, Sonia Livingstone, Mariam Saeed, “Growing up in a connected world”, Innocenti Research Report, UNICEF Office of Research - Innocenti, Florence, 2019 <https://www.>

[unicef-irc.org/publications/1060-growing-up-in-a-connected-world.html](https://www.unicef-irc.org/publications/1060-growing-up-in-a-connected-world.html)

Daniel Kardefelt Winther, Rogers Twesigye, Rostislav Zlámál, Marium Saeed, David Smahel, Mariya Stoilova, Sonia Livingstone, “Digital Connectivity During COVID-19: Access to vital information for every child”, Innocenti Research Briefs, UNICEF Office of Research - Innocenti, Florence, 2020 <https://www.unicef-irc.org/publications/1099-digital-connectivity-during-covid-19-access-to-vital-information-for-every-child.html>

Daniel Kardefelt Winther, Catherine Matternowska. “Addressing violence against children online and offline”, *Nature Human Behaviour*, vol. 4, pp. 227-230, 2020 <https://doi.org/10.1038/s41562-019-0791-3>

Mari-Ann Letnes, Nicole C. Veelo, Line I. Stånicke, Niamh Ní Bhroin, Rasmussen, Ingvill, “Kids’ Digital Lives During COVID-19 Times Digital practices, safety and well-being of 6- to 12-year-olds – a qualitative study”, 2021 <https://www.duo.uio.no/handle/10852/82259>

Bojana Lobe, Anca Velicu, Elisabeth Staksrud, Stephane Chaudron, Rosanna Di Gioia, “How children (10-18) experienced online risks during the Covid-19 lockdown: Spring 2020: key findings from surveying families in 11 European countries”, European Commission, Joint Research Centre, 2021 <http://op.europa.eu/en/publication-detail/-/publication/340e012e-6b54-11eb-aeb5-01aa75ed71a1/language-en>

Debora Marques de Miranda, Bruno da Silva Athanasio, Ana C. Sena Oliveira, Ana C. Simoes-e-Silva, “How is COVID-19 pandemic impacting mental health of

children and adolescents?”, Elsevier Enhanced Reader, December 2020 <https://doi.org/10.1016/j.ijdr.2020.101845>

Giovanna Mascheroni, Marium Saeed, Marco Valenza, Davide Cino, Thomas Dreessen, Lorenzo Zaffaroni, Daniel Kardefelt Winther, “ Learning at a Distance: Children’s remote learning experiences in Italy during the COVID-19 pandemic”, Innocenti Research Report, UNICEF Office of Research - Innocenti, Florence, 2021 <https://www.unicef-irc.org/publications/1182-learning-at-a-distance-childrens-remote-learning-experiences-in-italy-during-the-covid-19-pandemic.html>

Karthik Muralidharan, Abhijeet Singh, Alejandro Ganimian, “Disrupting education? Experimental Evidence on Technology-Aided Instruction in India”, National Bureau of Economic Research, NBER Working Paper 22923, 2019 <https://www.nber.org/papers/w22923>

Christine Redecker, Yves Punie, “European Framework for the Digital Competence of Educators: DigCompEdu”, Publications Office of the European Union, Luxembourg, 2017 <https://ec.europa.eu/jrc/en/digcompedu>

Save Our Future, Averting an Education Catastrophe for the World’s Children, White Paper, 2020 <https://saveourfuture.world/white-paper/>

David Smahel, Hana Machackova, Giovanna Mascheroni, Lenka Dedkova, Elisabeth Staksrud, Kjartan Ólafsson, Sonia Livingstone and Uwe Hasebrink, “EU Kids Online 2020: Survey results from 19 countries”, EU Kids Online, 2020 <https://www.lse.ac.uk/media-and-communications/assets/doc->

[uments/research/eu-kids-online/reports/EU-Kids-Online-2020-10Feb2020.pdf](https://www.unicef.org/research/eu-kids-online/reports/EU-Kids-Online-2020-10Feb2020.pdf)

Mariya Stoilova, Sonia Livingstone, Rana Khazbak, “Investigating Risks and Opportunities for Children in a Digital World: A rapid review of the evidence on children’s internet use and outcomes”, Innocenti Discussion Papers no. 2021-01, UNICEF Office of Research - Innocenti, Florence, 2021 <https://www.unicef-irc.org/publications/1183-investigating-risks-and-opportunities-for-children-in-a-digital-world.html>

Rana M. Tamim, Robert M. Bernard, Eugene Borokhovski, Philip C. Abrami, Richard F. Schmid “What Forty Years of Research Says About the Impact of Technology on Learning A Second-Order Meta-Analysis and Validation Study”, Review of Educational Research, vol 81, pp. 4-28, 2011 <https://doi.org/10.3102/0034654310393361>

Michaëlle Tauson, Luke Stannard, “EdTech for Learning in Emergencies and Displaced Settings: A Rigorous Review and Narrative Synthesis”, Save the Children, 2018 <https://resourcecentre.savethechildren.net/node/13238/pdf/edtech-learning.pdf>

Marko Teräs, Juha Suoranta, Hanna Teräs, Mark Curcher Teräs, “Post-Covid-19 Education and Education Technology ‘Solutionism’: A Seller’s Market”, Postdigital Science and Education, vol. 2, no. 3, pp. 863-878, 2020 <https://doi.org/10.1007/s42438-020-00164-x>

The Alliance for Child Protection in Humanitarian Action, End Violence Against Children, UNICEF, WHO, COVID-19: Protecting Children from Violence, Abuse and Neglect in the Home, 2020 <https://www.unicef.org/media/68711/file/COVID-19-Protecting-children-from-violence-abuse-and-neglect>

[unicef.org/media/68711/file/COVID-19-Protecting-children-from-violence-abuse-and-neglect](https://www.unicef.org/media/68711/file/COVID-19-Protecting-children-from-violence-abuse-and-neglect)

Michael Trucano, “10 principles to consider when introducing ICTs into remote, low-income educational environments”, World Bank Blogs, 2013 <https://blogs.worldbank.org/edutech/10-principles-consider-when-introducing-icts-remote-low-income-educational-environments>

Sascha Trültzsch-Wijnen, Christine Trültzsch-Wijnen, “Remote Schooling During the Covid-19 Lockdown in Austria (Spring 2020): KiDiCoTi National Report”, December 2020 <https://doi.org/10.25598/KiDiCoTi-AT-2020-1>

United Nation Population Fund (UNFPA), Adapting Comprehensive Sexuality Education Programming During the COVID-19 Pandemic, June 2020 <https://www.unfpa.org/resources/adapting-comprehensive-sexuality-education-programming-during-covid-19-pandemic>

UN, Policy Brief: Education during COVID-19 and beyond, August 2020 [https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/08/sg\\_policy\\_brief\\_covid-19\\_and\\_education\\_august\\_2020.pdf](https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf)

UNESCO, UNICEF, World Bank, What Have We Learnt?: Overview of Findings from a Survey of Ministries of Education on National Responses to COVID-19, Paris, New York, Washington DC, 2020 <https://data.unicef.org/resources/national-education-responses-to-covid19/>

UNHR, United Nation Committee on the Rights of the Child, General comment No.



25, March 2021 <https://www.ohchr.org/EN/HRBodies/CRC/Pages/GCChildrensRightsRelationDigitalEnvironment.aspx>

UNICEF, Every child learns: UNICEF education strategy 2019-2030, UNICEF, New York, 2019 <https://www.unicef.org/reports/UNICEF-education-strategy-2019-2030>

UNICEF, Data And Analytics, Every child learns: UNICEF education strategy 2019-2030, UNICEF, New York, 2019 <https://www.unicef.org/media/59921/file/UNICEF-education-strategy-2019-2030-data-analytics.pdf>

UNICEF, Policy Guidance on AI for Children, 2020 <https://www.unicef.org/globalinsight/reports/policy-guidance-ai-children>

UNICEF and ITU, How many children and young people have internet access at home? Estimating digital connectivity during the COVID-19 pandemic, UNICEF, New York, 2020 <https://data.unicef.org/resources/children-and-young-people-internet-access-at-home-during-covid19/>

Riina Vuorikari, Anca Velicu, Stephane Chaudron, Romina Cachia & Rosanna Di Gioia, "How families handled emergency remote schooling during the Covid-19 lockdown in spring 2020 - Summary of key findings from families with children in 11 European countries", EUR 30425 EN, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-24519-3, doi:10.2760/31977, JRC122303. <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/how-families-handled-emergency-remote-schooling-during-covid-19-lockdown-spring-2020>

World Bank, Ending Learning Poverty: What Will It Take?, Washington, DC, September 2019 <https://openknowledge.worldbank.org/handle/10986/32553>

World Bank, World Development Report 2018: Learning to Realize Education's Promise. Washington, DC, World Bank, 2018 <https://www.worldbank.org/en/publication/wdr2018>



## ABOUT THE AUTHORS



**Matt Brossard** UNICEF Office of Research – Innocenti

Chief of Education at Innocenti. He joined UNICEF in 2012 as Sr Education Advisor where he led the unit in charge of evidence, innovations and strategy, including the UNICEF Global Education Strategy 2019-2030. Matt also served at the World Bank as Senior Economist, at UNESCO/IIEP-Dakar as Education Policy Analyst and at the UNESCO Institute for Statistics as Statistician. Matt is a graduate of the French National School of Statistics and Economics and of Sciences-Po Paris (Sociology).



**Marta Carnelli** UNICEF Office of Research – Innocenti

Consultant at the UNICEF Office of Research – Innocenti, with focus on digital learning and the Learning Passport education platform. Before joining UNICEF, Marta was a Project Manager in the Education Global Practice at the World Bank and a Research Manager at Innovations for Poverty Action (IPA) in Bangladesh, Colombia, and the Dominican Republic. Marta holds a MSc in Economic Development and Growth from Universidad Carlos III de Madrid and a BA in Economics from Bocconi University.



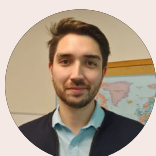
**Stephane Chaudron** European Commission – Joint Research Centre

Works on research projects dedicated to (Young) Digital Citizens' Security and Safety at the Joint Research Centre of the European Commission. She has coordinated the large European Research Networks and the research project 'Young Children (0-8) and Digital Technology'. She also undertook ground-breaking research on security and safety of the Internet of Toys and explored the effect of the digital transformation on the use of personal data. Stephane has a background in Social Geography and Science Pedagogy.



**Rosanna Di-Gioia** European Commission – Joint Research Centre

Researcher in the Cyber and Digital Citizens' Security Unit of the Joint Research Centre of the European Commission. In the past seven years she worked on cyber-security, cyber-bullying and citizens' rights in emerging ICT. Her research interests include Privacy and Personal Data Protection practices together with Digital Play. Currently, Rosanna is focusing on projects fighting against organised crime and prevention policies in Child Sexual Abuse and Exploitation. Her background is in Social Psychology and in Cognitive Processes and Technology.



**Thomas Dreesen** UNICEF Office of Research – Innocenti

Education Manager at the UNICEF Office of Research – Innocenti, with specific focus on building implementation research into large scale innovation in education programmes. Prior to his current role, he worked on the education team at UNICEF Headquarters where he supported multiple country offices and their partners improve M&E systems and develop evidence to inform education programmes. Thomas holds an M.S. in International and Development Economics from the University of San Francisco, and a B.A. in International Economics and Finance from Ryerson University.



**Daniel Kardefelt-Winther** UNICEF Office of Research – Innocenti

Leads UNICEF's research programme on Children and Digital Technologies, at the Office of Research. He works at the intersection of child rights and digital technology and has many years of experience in designing, implementing and managing cross-national comparative evidence generation projects involving children and adults. Daniel holds degrees in Computer Science (BSc) and Psychology (BSc) from Stockholm University, as well as in Management (MSc) and Media & Communications (PhD) from the London School of Economics



**Céline Little** UNICEF Office of Research – Innocenti

Editor at the UNICEF Office of Research – Innocenti. She joined UNICEF in 2008 as part of The State of the World's Children report team in New York. In this role, she conceptualized, developed and managed preparation of the flagship report, which closely examines key issues affecting children and provides policy recommendations. Her experience outside of the United Nations was in book publishing and as an editor for works of fiction, memoir and photography. Céline holds an MA in French literature from Bryn Mawr College.



**Jean Luc Yameogo** UNICEF Programme Division

Education Specialist in UNICEF, member of the Sector Planning, Innovation, Data and Evidence for Results team. He has 15 years' experience in Statistics, Education Sector Planning and development. Prior to joining UNICEF, he worked at IIEP-UNESCO Pôle de Dakar at the Ministry of Education of Burkina Faso. Jean Luc holds a degree in statistical engineering from the Ecole Nationale d'Economie Appliquée of Dakar, Senegal and a master's degree in education science from the University of Boulogne, France.