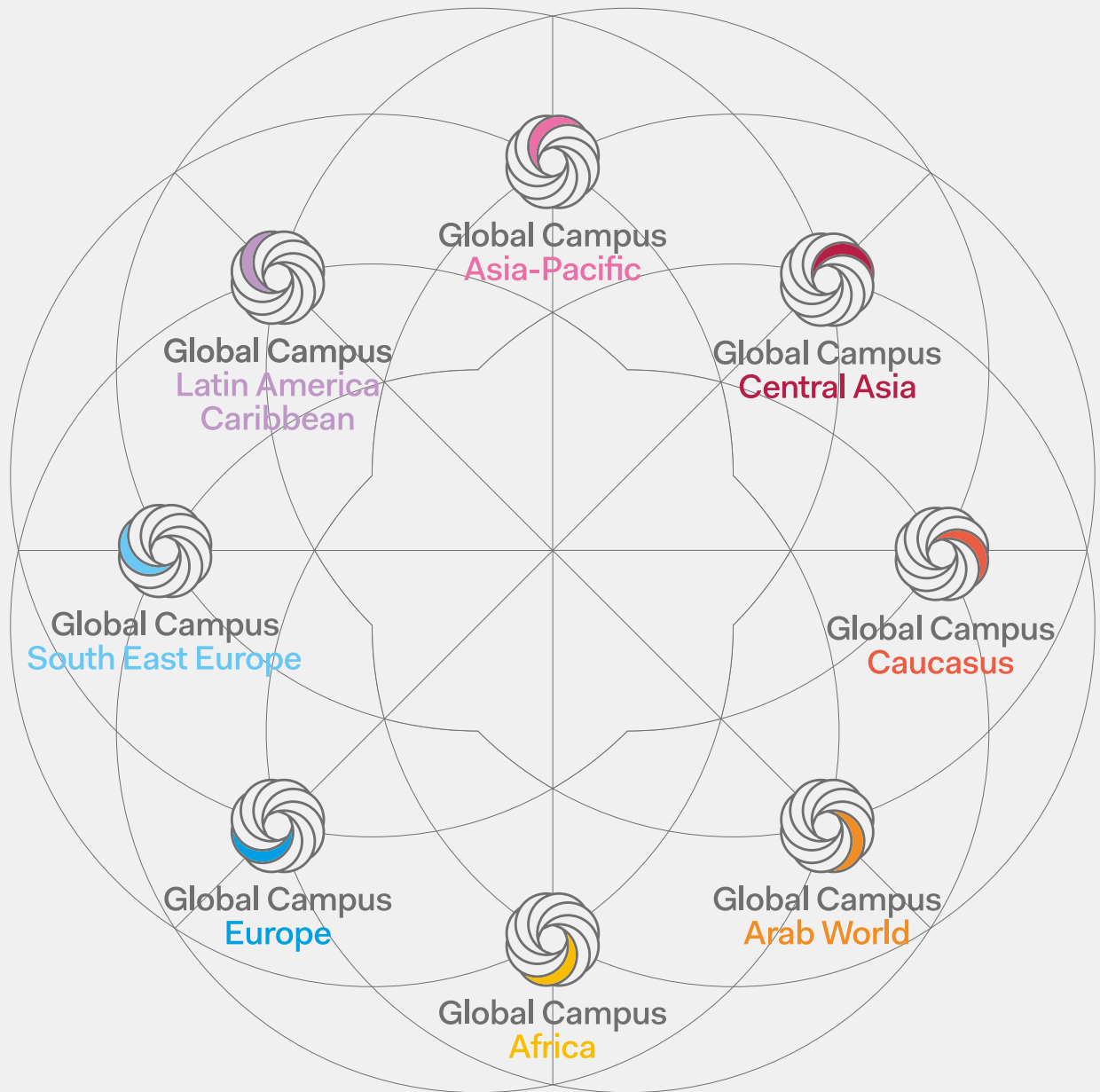

Goharik Tigranyan

Equity in Digital Education: Assessing the Impact of Remote and Online Learning on Low-Income Students in Armenia, Moldova and Ukraine and Effective Approaches







Global Campus of Human Rights

This policy brief is part of the **6th edition of the Global Campus Policy Observatory**, which revolves around the research project on **'The digitalisation of education systems and its impact on human rights, with particular attention to the right to education'**, which was conceptualized and is led by GC Research Manager Dr. Chiara Altafin and which involves a team of seven policy analysts selected among alumni of GC regional programmes, namely Reda Benkhadra (GC Africa), Olga Lucía Camacho Gutierrez (GC Latin America and the Caribbean), Dr. Desara Dushi (GC Europe), Dr. Jean Linis-Dinco (GC Asia-Pacific), Goharik Tigranyan (GC Caucasus), Aida Traidi (GC Arab World), and Dr. Gergana Tzvetkova (GC South East Europe). Research outputs include workshop presentations, policy briefs, advocacy plans, and digital tools (infographics, webinars) developed in cooperation with the GC E-Learning Department.

This policy brief is written by **Goharik Tigranyan**, who holds a Master's degree in International Development Policy with a focus on Social Policies and Child Poverty (2024) from Duke University Sanford School of Public Policy, and a MA in Human Rights and Democratisation in the Caucasus (CES) (2018) from Yerevan State University. She is currently Program Officer at Gender Inclusive Democracy (2024), and was Gender Equity and Inclusion Education Specialist Intern at UNICEF (2023). She researched on topics such as education in the times of armed conflicts, equity and fairness of classroom assessment, and equity of inclusive education funding. She is a coauthor of various toolkits and education manuals. Contact: goharik.tigranyan@gmail.com

This policy brief is produced with the financial assistance of the European Union and as part of the Global Campus of Human Rights. The contents of this document are the sole responsibility of the authors and can under no circumstances be regarded as reflecting the position of the European Union or of the Global Campus of Human Rights.

This policy brief is realized with the support of the Unit for Analysis, Policy Planning, Statistics and Historical Documentation - Directorate General for Public and Cultural Diplomacy of the Italian Ministry of Foreign Affairs and International Cooperation, in accordance with Article 23 – bis of the Decree of the President of the Italian Republic 18/1967. The views expressed in this policy brief are solely those of the authors and do not necessarily reflect the views of the Ministry of Foreign Affairs and International Cooperation.

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Equity in Digital Education: Assessing the Impact of Remote and Online Learning on Low-Income Students in Armenia, Moldova and Ukraine and Effective Approaches

Goharik Tigranyan¹

Executive summary

This policy brief aims to examine the impact of remote and online learning choices on educational inequalities for low-income students in Armenia, Moldova and Ukraine. Digitalisation of education has become crucial since 2020, especially during the transition from offline to online learning amid the COVID-19 pandemic. While some countries adapted well, others, including the mentioned trio, struggled with issues such as the digital divide affecting access to information and communication technology (ICT) for low-income and rural families. This challenge has hindered the effective transition to online education and exacerbated educational disparities. To address this, it is vital to adopt a human rights-based approach that ensures equitable access to inclusive and quality education for all children, regardless of their socioeconomic status or location. Recognising the significance of education as a human right is essential in approaching the digital divide as a question of equity and justice rather than a technological challenge. States should prioritise reforms to bridge the digital divide through inclusive frameworks and hybrid learning strategies, potentially leveraging Public-Private Partnerships (PPPs) to sustainably improve educational outcomes.

¹ The author thanks Dr. Chiara Altafin, Research Manager at the Global Campus of Human Rights in Venice, Prof. Dr. Anja Mihr, DAAD long term Associate Professor (LZD) and MAHRS Programme Supervisor at the OSCE Academy in Bishkek, and Kristine Gevorgyan, CES Programme Coordinator at Centre for European Studies of Yerevan State University, for their valuable and constructive feedback as received in the context of the Global Campus Policy Observatory workshop ‘The digitalisation of education systems and its impact on human rights, with particular attention to the right to education’, held in Venice on 26 March 2024.

Introduction

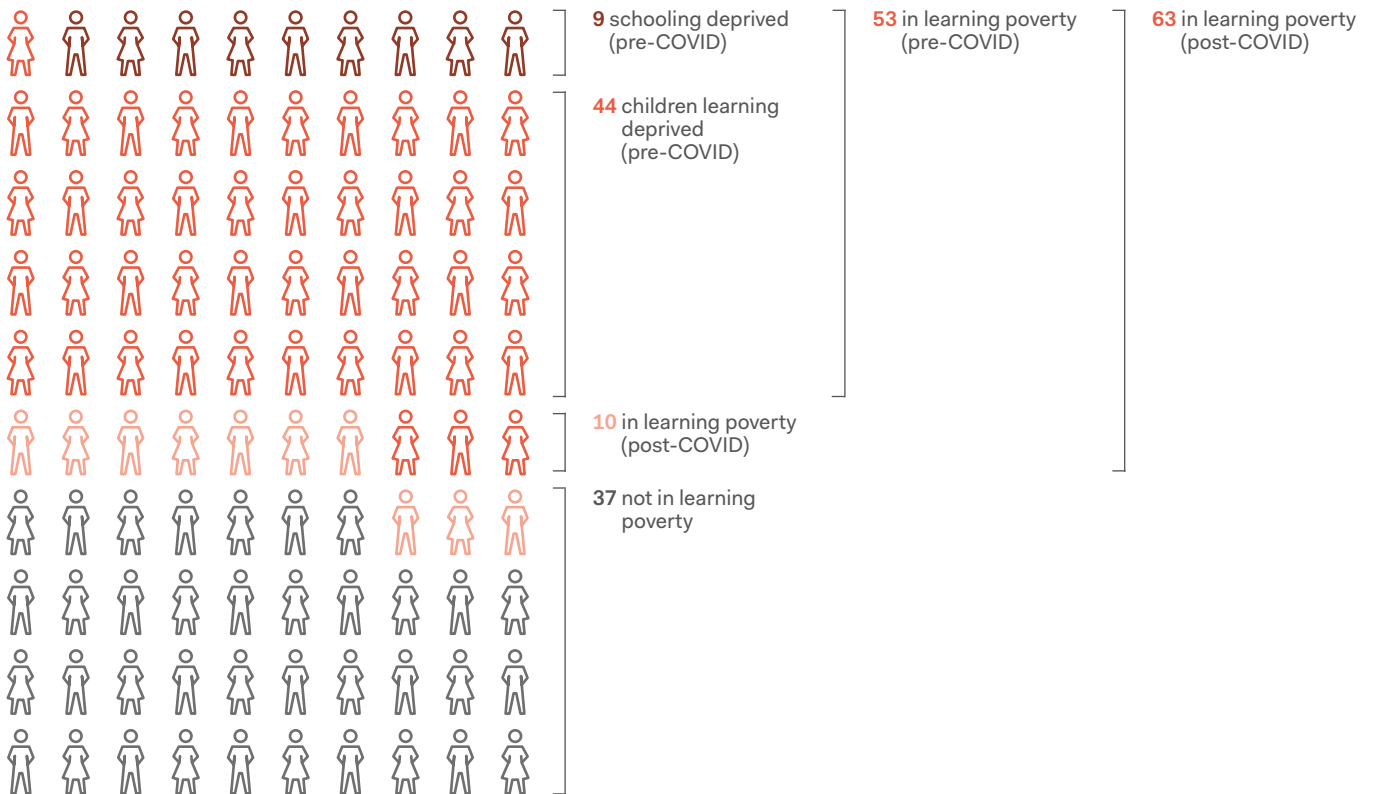
Before COVID-19, digital and online education models were already gaining traction as desirable alternatives to traditional classroom settings (West 2023). The pandemic accelerated this shift globally in March 2020, closing schools and moving classes online. This sudden transition marked a critical moment for the education technology (Ed-Tech) industry, as over a billion students worldwide had to adapt to home learning, many without adequate resources for remote learning², risking educational setbacks (West 2023).

According to the World Bank, the pandemic worsened 'learning poverty', increasing it from 53 to 63 children per 100 in low- and middle-income countries post-pandemic (Wiggins 2020). Key challenges exacerbated by the pandemic include digital inequality affecting

over 1.5 billion children, limited access to technology and varied quality of remote learning depending on digital skills and home support (Kuhn et al. 2023; UNICEF 2021; Kennedy, Mejía-Rodríguez & Strello 2022). Additionally, systemic barriers and insufficient support in low-income areas hinder effective remote learning (Meyer 2020; Ciuffetelli Parker & Conversano 2021; Dreesen et al. 2020). In 2021, only 59% of children aged 3-17 in Europe and Central Asia had internet access, with disparities between rural (46%) and urban (66%) areas (UNICEF 2021).

The significant shift to online learning has posed unique challenges for Armenia, Moldova and Ukraine as well. This policy brief focuses on these three countries to assess how remote learning has impacted educational

Estimated Impacts of COVID-19 on learning poverty



For every 100 children in low- and middle-income countries

inequalities for low-income students. It examines the role of digital education in either worsening or alleviating these disparities by addressing the barriers faced by low-income families. The brief proposes policy recommendations to improve equitable access to digital education resources. The following questions are addressed:

- To what extent do remote and online learning options exacerbate or mitigate educational inequalities for low-income students, and what measures can be taken to make digital education more equitable in Armenia, Moldova and Ukraine?
- What are the primary barriers low-income families face in accessing digital education resources, and what policies can mitigate these barriers effectively?

- How can digital literacy programmes be leveraged to empower students from impoverished backgrounds, enabling them to take full advantage of digital education, and what is the role of governments and educational institutions in promoting digital literacy?

2 Remote learning refers to synchronous or asynchronous instruction provided in a place outside the classroom. Synchronous learning means that students are connected to learning experiences where a teacher's immediate feedback is possible. Asynchronous or self-directed learning means that students can learn at their own pace and chosen time. Remote learning takes an array of forms ranging from paper-based take-home packages to online platforms. Remote learning is also possible through a variety of different channels, such as mobile phones, television, radio and tutors (Muñoz-Najar et al. 2021).

Problem description

Armenia

Prior to the pandemic, Armenia already faced challenges to ensure the right to education for all children living therein, including those from low-income families. One of the core issues was the completion and drop-out rates tied to the child's socio-economic status and place of residence. According to the UNESCO Institute of Statistics' data from 2017, school completion rates decreased steadily with each grade level, from 94% at the primary level to 60% at the high school level; this reduction was most noticeable among students from lower-income houses, who had half completion rates in respect of

those from wealthier backgrounds (Gevorgyan 2022). When evaluating the students' residential areas, a similar pattern emerged, with those living in rural areas having greater dropout rates.

According to the World Bank's 2019 'Learning Poverty' report, 35% of Armenian primary school children lacked basic reading skills, unable to read and comprehend simple texts. This finding aligns with national assessments showing that ninth and twelfth graders scored an average of four or five out of ten in the Armenian language (Baghdasaryan & Atoyan 2019). These educational disparities, influenced by income and geographical location, continue to limit

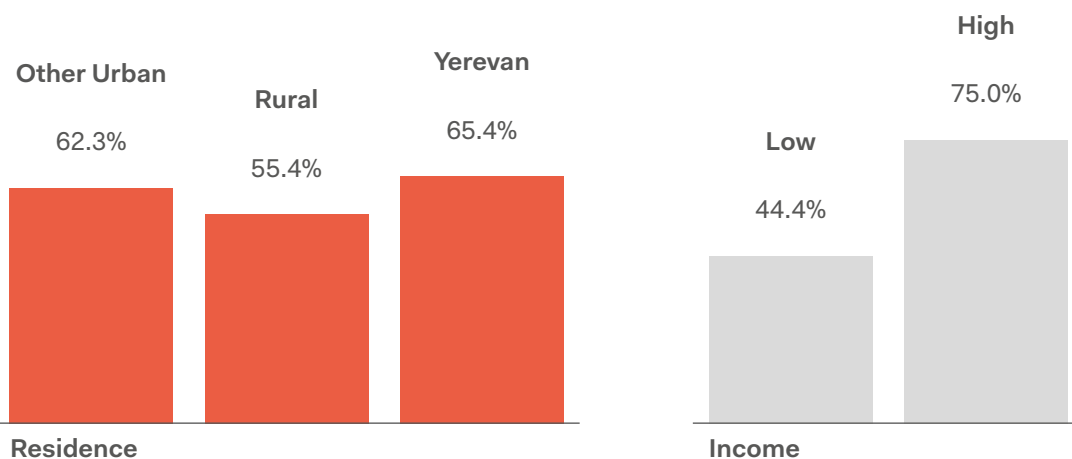


Figure 1: Percentage of HH where digital devices were used on a regular basis by their school-age children

future opportunities for Armenia’s youth. The COVID-19 pandemic intensified these challenges, closing schools for 12 weeks from March to June 2020 and impacting 390,512 students and 31,000 teachers in the 2019-2020 school year (UNICEF et al. n.d.).

Notably, the Ministry of Education, Science, Culture, and Sports (MOESCS) had already begun digitalisation reforms, including the launch of the Education Management Information System (EMIS), which digitalised various school administrative processes³ but were mostly limited to bureaucracy and documentation, rather than advancing online learning opportunities (Gevorgyan 2022).

Thus, COVID-19 became the main incentive to create online learning platforms and to develop digital or a mix of digital tools for and in education. Remote online learning became the primary way to receive instruction, highlighting students’ and teachers’ lack of computer access and connectivity: Google Classroom and Microsoft Teams became the main platforms for distance learning. It was estimated that 12-20% of them required approximately 24,000 pieces of equipment to be able to participate in online learning (Gevorgyan 2022).

From 2015 to 2019, most desktop computers in Armenian public schools were outdated, with 62.8% being Pentium 4 or older. However, by 2019, about 75% of the 5,474 notebooks were considered modern (Armenian Statistical Committee 2020). In 2021, access to technology for children from low-income families was significantly lower than for their wealthier peers. Rural children had limited internet access and fewer personal devices compared to urban students, with 39% of households with school-aged children lacking a personal computer and only 61.6% having internet access. The challenge of sharing

devices among family members further complicates access. Teachers faced similar issues, struggling with the availability of ICT devices and adapting to online teaching methods (Gevorgyan 2022).

In such a setting, international donors, commercial enterprises, non-governmental organisations (NGOs) and other non-state actors have started providing gadgets to vulnerable and hard-to-reach children and teachers. To reach people with ICT device issues, non-digital alternatives were used.⁴ MOESCS and the Asian Development Bank created a K-12 digital learning platform that met a variety of needs and capacities after the pandemic. They also evaluated schools without specialised teachers with the World Bank and selected 101 for remote learning development and modernisation. The National Center for Educational Technologies (NCET) has used technology and online learning to address teacher shortages with UNICEF’s assistance.

Overall, COVID-19 exacerbated educational gaps, especially for low-income and rural children with lower learning outcomes. Due to student and teacher digital literacy gaps, the rapid shift to online schooling presented considerable challenges. Despite these obstacles, governments, NGOs and international donors used the pandemic to provide technology, teacher training and non-digital options to close the digital divide. However, providing quality and inclusive education for all Armenian children requires continual investment.

Moldova

Moldova has faced a twin hit of economic difficulties and demographic decline in recent decades. Its GDP per capita remains the lowest in Southeast Europe,

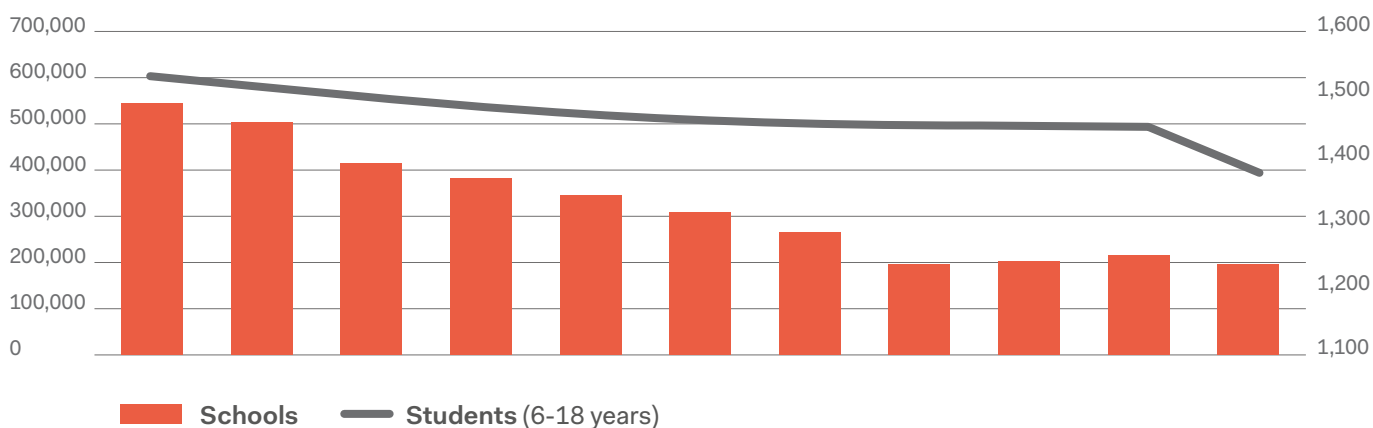


Figure 2: Decline in Student Enrollment and Number of Schools (2010-2020)

with the country relying mainly on remittances rather than long-term investments. This, combined with dropping birth rates, high mortality and significant youth exodus, has reduced the population by 60,000 in just a decade, with further decrease expected until 2050. Education bears the brunt of the diminishing labour force, notably in terms of student enrolment (Government of the Republic of Moldova 2014).

Before the COVID-19 outbreak, Moldova's education system already faced significant challenges, which were exacerbated when approximately 434,000 students were forced to switch to remote learning. Schools adapted by utilising various technologies such as computers, tablets, phones and television. The Ministry of Education and Research (MoER) implemented an Action Plan to ensure continuity, detailing activities, responsible units and funding allocations. Additionally, the NOVATECA initiative aimed to bridge the digital divide by providing computers and internet access to disadvantaged groups, including students from low-income families. Despite these efforts, Moldova's internet penetration rate of 79.9% in 2019 was below the EU's 90%, leaving about 16,000 students (4.8%) and 3,000 teachers (10.6%) without access to remote learning due to the lack of necessary ICT technology.

In such a context, the most affected families with children were (UN Coordinated Education Task Force for COVID-19 2020):

- families living in areas with weak internet connectivity – most particularly rural areas (74.5% household internet connection in rural areas versus 86.1% in urban areas);
- families with lower levels of education (64.7% internet connection rate among people with secondary incomplete education, compared to 94% among those with higher education);
- households with a low-income level (56.7% internet connectivity among those with an income under 3,000 lei, compared to 96.5% in households with over 6,000 lei/month).

In rural areas, households with only one IT device faced challenges as multiple children could not attend classes, do homework or interact with teachers simultaneously, affecting communities like the Roma. Despite Moldovan schools being equipped with 32,501 computers, including 28,500 designated for teaching (UNICEF, 2020b) the majority were outdated as 24,000 did not meet the ministry standards and were mostly confined to classroom rather than individual use.

Such infrastructure inadequacies for broad internet access do persist. The need for strategic investment in modern technology to enhance educational outcomes was evident.

Additionally, the 2018 PISA assessment revealed gaps in Moldova's digital education transformation: only 41% of principals felt they had effective online learning platforms, 42% believed they had sufficient digital devices, 22% thought the available software was adequate and 79% felt teachers were well-prepared to use digital tools in teaching — figures generally lower than regional averages (UNESCO et al. 2021).

A memorandum signed in July 2020 outlined the development of digital teaching aids and technologies aimed at enhancing digital education across all levels (EU4Digital 2020), also emphasising teacher training in IT adoption and ensuring the relevance of ICT skills to meet labour market demands. In 2021, the Moldovan government acknowledged inefficiencies in the application of ICT in education and the provision of educational software.

The Digital Education Readiness Assessment conducted in 2021-22 by Moldova, with World Bank support, led to a 2022 Education Strategy focused on financing education digitalisation. This strategy emphasises significant investment from the government and partners to integrate innovative tools into national educational financing mechanisms (Andronic 2023).

A digital transformation strategy was launched in early 2023 to build a dynamic and inclusive digital society, equipped with advanced infrastructure, digitally skilled citizens, a digital-first government and a business sector focused on digital innovation for human development (EU4Digital 2023). However, among these policies, only one project specifically addresses the needs of low-income families by ensuring that they have access to essential ICT

³ Armenia's digitalisation reforms began in 2017 with the 'Armenia Digital Agenda - 2030 Long-Term Strategy', focusing on six key areas (Ghazanchyan 2021). A two-stage implementation plan was announced in 2020, and the government approved the Digitalisation Strategy in February 2021 (Government of RA 2020). This strategy aims to improve public services, administration efficiency, infrastructure, private sector competitiveness and digital skills development (Government of RA 2020). In January 2022, a Digital Council was established to coordinate the reforms, chaired by the Deputy Prime Minister (Ghazanchyan 2021).

⁴ TV-based courses were televised by national public television, Boon and others, and were funded by public-private partnerships, including as telecom providers UCOM and Rostelecom, to ensure that the lessons were free of charge (Gevorgyan 2022).

technologies, helping integrate them into the ongoing digital transition rather than leaving them behind due to lack of resources.

Overall, the digital divide in Moldova's education system is still present and COVID-19 has made it worse. While the government has plans for digitalising education, equipping teachers and increasing their digital abilities, one of the most pressing challenges is the unavailability of ICT devices and services among low-income families. Without bridging this divide, the digital transformation risks falling behind disadvantaged children and teachers, exacerbating existing disparities.

Ukraine

Children in Ukraine are displaying signs of severe learning loss as a result of Russia's invasion in 2022, which came after COVID-19, leaving them facing four years of educational setbacks. Over the last few decades, the Ukrainian education system has begun to integrate ICT tools into learning processes. It started with education strategies, the digitalisation of schools, new online teaching methods and tools, and the use of digital technologies in learning processes.

However, when the government issued resolutions and regulations aimed at protecting the people from COVID-19 as well as transitioning education and protecting students (Іванюк & Овчарук 2020). Ukraine confronted difficulties in planning and executing distance education. Remote and online education was provided through social media platforms like Viber, WhatsApp, YouTube etc. andv separate platforms like EdEra and Prometheus designed by the Ministry of Education and Science, TV broadcasting, etc.

In this transition, all the stakeholders engaged in education faced some challenges. Teachers mentioned problems in implementing distance learning, such as a lack of clear instructions on the use of online tools, a low level of readiness of teachers and educational institutions, limited internet and ICT device access, insufficient experience, etc. (Іванюк & Овчарук 2020). Data shows that 55.53% of schools faced challenges with a digitally based learning environment due to lack of experience, 47.5% of teachers reported not using EdTech in their pedagogical activities before and during the pandemic, and they did not receive guidance on distance learning or ICT tools usage in the classroom, while 67.35% of teachers lacked ICT devices at home and 46.9% had a low-quality internet connection (Mospan & Sysoieva 2022).

COVID-19 and distance learning have widened the existing educational gap, affecting students' performance across Ukraine. Out of 792,952 enrolled primary and secondary students, 45,473 aged 6 to 17 did not attend school, with 37.2% lacking essential skills for future learning (UNICEF & ITU 2021). Surveys show a decline in student competencies: 57% of teachers report reduced Ukrainian language skills, 45% note a dip in maths skills and 52% observe a drop in foreign language proficiency (UNICEF 2023). Recently, only a third of students receive full in-person education; another third combines in-person and online learning, and the rest are fully remote (UNICEF 2023).

Notably, surveyed parents in rural areas claimed a lack of necessary devices for participation in online classes: 53% cited this issue, compared to 20% in large cities (over 500,000 population) (Kyiv International Institute of Sociology 2021). Similarly, parents in villages complained more frequently about poor internet connection quality (60% versus 29% in urban areas) and the difficulty in communicating via various messengers and online platforms (51% versus 33% in urban regions) (Kyiv International Institute of Sociology 2021). According to the Ukrainian government, over 65% of Ukrainian villages lacked access to high-quality internet, which equates to approximately 5.75 million residents, implying that a large proportion of students did not have adequate connectivity at home (UNICEF & ITU 2021). It was also highlighted that 7.3 million households did not have a PC, locating Ukraine below the EU-27 minimum in 2021.

Contextualizing the Gaps

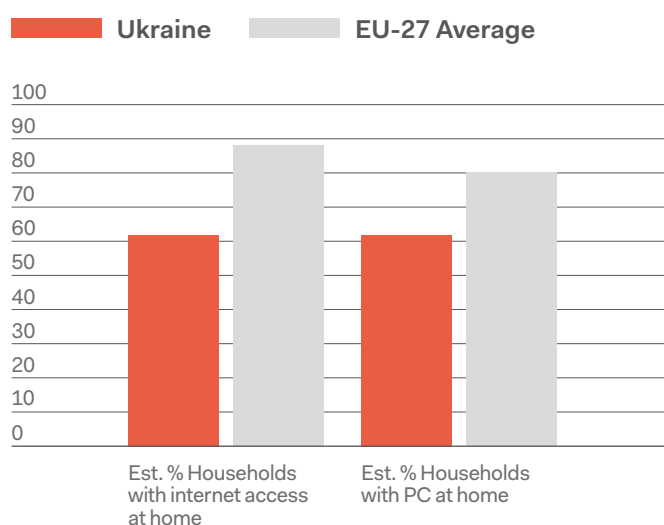


Figure 3: Internet and PC Access in Ukraine vs. EU-27 Average

The Russian invasion of Ukraine has exacerbated educational challenges, with less than 25% of schools able to provide in-person education at the start of the 2023 school year (The Borgen Project 2023). Consequently, over half of Ukrainian students are now reliant on online schooling, but frequent electrical outages severely impede their learning. These challenges have intensified pre-existing issues like digital inequalities and gaps in teacher preparedness, further widening learning disparities and limiting access to online education.

Overall, despite ongoing digitalisation and teacher training efforts, achieving equitable access to technology and resources remains a critical need amidst limited internet connectivity and ongoing power disruptions.

Comparison of cases

As post-communist republics, Armenia, Moldova and Ukraine share the challenge of providing equitable access to quality digital education for all, despite having unique economic, infrastructural and historical contexts. **Common issues**

include pre-existing educational disparities that disproportionately affect low-income and rural areas and a pandemic-induced acceleration of digital education reforms, which highlighted significant digital gaps and learning losses. Key challenges include limited internet access, outdated technologies and a lack of teacher preparedness for online and blended learning methods.

Differences among the countries include varying levels of internet penetration, with Moldova having the lowest and Armenia making notable progress in integrating ICT into education. The ongoing armed conflict in Ukraine has further complicated its digital education efforts. Economic challenges are prominent in Armenia and Ukraine, while Moldova faces demographic declines despite benefits from remittances.

All three countries have received international support to facilitate the rapid transition to digital education, yet their approaches to mitigating the digital divide differ and are sometimes incompletely implemented. As they move past the pandemic, the **shared goal** remains to leverage technology to close educational gaps and foster long-term resilience.

Rationale for action

The relationship between the right to education as enshrined in international human rights law (Article 26 UDHR 1948; Article 13 ICESCR 1966; Articles 28 and 29 UNCRC 1989) and digital education is intricate, reflecting the challenges of integrating technology into learning environments. The shift to digital education also raises critical concerns about guaranteeing inclusive and quality education. Effective online teaching methods, engaging digital content and comprehensive teacher training are essential aspects to uphold quality education. Moreover, consistent access to high-speed internet and adequate technological resources are vital for digital education (Special Rapporteur on the Right to Education 2022: paras 3 & 4 of section IV). Robust policies and investments are crucial to ensure universal access to necessary technologies and digital literacy skills.

At the international level, it is emphasised that digital education should not exacerbate inequalities or infringe on other human rights, such as the right to privacy. UNESCO's RewirEd Global Declaration on Connectivity for Education aims to guide the digital

transformation of education through principles that promote justice, equity and respect for human rights, ensuring that connected technologies support inclusive educational goals (UNESCO 2023).

At the regional level, the Council of Europe (CoE) is committed to enhancing digital education across its member states through its Digital Education Plan (2021-2027) which focuses on promoting high-quality, inclusive and accessible digital education by enhancing digital skills, improving connectivity and digital equipment, and boosting digital literacy to counter misinformation (CoE 2020). Similarly, the European Commission issued recommendations to improve digital skills in education and training, emphasising the need to address the digital divide and enhance digital education infrastructure (European Commission 2023).

However, international and regional frameworks highlight a persistent gap at the national level, where a lack of concrete strategies and tools hampers the effective implementation of these initiatives. This gap risks perpetuating educational inequalities,

particularly affecting marginalised groups, by failing to translate policy ambitions into practical outcomes on the ground.

In particular, Armenia's National Digital Strategy, though signalling a commitment to integrate digital tools in education, lacks specific targets or clear plans to address the digital divide, especially for low-income students (Udovyk et al. 2020). The strategy lacks a defined model for digital education and primarily focuses teacher training on ICT usage rather than online teaching methods. There is also no contingency plan for transitioning to online schooling in crises.

Similarly, Moldova's Digital Education Strategy 2023-2030 outlines initiatives like 'Tekwill in Every School' to establish ICT labs and enhance digital literacy, yet the success of these programmes hinges on their accessibility to all students, particularly those from low-income families (Republic of Moldova Digital Transformation Strategy 2023-2030). Further efforts like 'Future Classroom' and teacher digital literacy programmes are steps in the right direction but need robust policy support to ensure no student is left behind due to affordability issues. Online platforms such as studii.md and invat.online provide valuable

resources, but their impact is limited if low-income families cannot access them without assistance.

Regarding Ukraine, it is advancing its digital education through the National Digital Literacy Platform and projects like E-School that digitalises school curricula (European Training Foundation 2022). Nonetheless, ensuring these initiatives benefit all students, including those from low-income backgrounds, requires specific programmes that provide necessary digital devices and internet access to prevent widening the digital divide.

Importantly, international and regional frameworks promote digital education as part of the right to education, emphasising the need to bridge the digital divide, enhance digital literacy and protect privacy within digital education environments. However, implementing these frameworks nationally often encounters challenges, particularly in fully integrating digital tools in a way that benefits all students, including those from low-income backgrounds. While Armenia, Moldova and Ukraine have initiated certain strategies to incorporate digital education, their effectiveness in promoting inclusivity and equity largely depends on their alignment with international human rights principles and standards.

Policy options

Scenario 1: PPP model for digital education

The case of Peru

Peru's PPP strategy for digital education, involving NGOs such as World Vision and Care along with technology companies grouped under the 'One Laptop per Student' foundation (including Microsoft for producing low-cost XO laptops), serves as a benchmark in developing countries. This initiative, known locally as 'Huayruru', aimed to narrow the digital divide by providing affordable computers to primary school students in underprivileged areas and offering training for teachers to integrate digital tools into their curricula (USAID 2022). Reviews noted improvements in student engagement, digital literacy and learning outcomes, but the sustainability of such programmes, long-term funding, consistent support and internet accessibility in remote locations have been points of concern (USAID 2022).

Implementing a PPP model for digital education

Leveraging collaborations between the government,

private sector and NGOs to offer digital education can provide comprehensive solutions, particularly in the following aspects:

- a. **ICT device needs assessment:** conduct national IT equipment needs assessment to determine the scope of the problem and implement targeted support.
- b. **Funds for ICT devices:** establish a public-private fund to purchase and distribute laptops/tablets to disadvantaged students, leveraging sponsorships and tax incentives.
- c. **Community Broadband Initiative:** collaborate with telecom companies to provide subsidised internet packages for low-income families.
- d. **Community learning centres/hubs:** partner with schools, libraries and NGOs to establish well-equipped spaces in underserved communities to provide internet connectivity, technology and learning support.

Benefits:

- **Estimated cost:** a moderate initial investment for fund launches and collaborations, followed by recurring operational costs for internet subsidies and upkeep.
- **Sustainability:** create a long-term funding mechanism for the PPP model, employing new finance options such as corporate social responsibility initiatives and tax breaks.
- **Impact on low-income children:** direct access to technology, subsidised internet and a local support network all contribute to bridging the digital divide.

Challenges:

- Effective PPPs require thorough cost-benefit analysis and strong regional leadership to establish the necessary infrastructure.

Scenario 2: Hybrid learning model

The cases of Uruguay and Estonia

The World Economic Forum noted that Estonia and Uruguay successfully implemented hybrid education models well before the COVID-19 pandemic (UNESCO et al. 2021). Recognising internet access as a human right since 2001, Estonia developed a participatory and synchronous hybrid learning model, incorporating digital education materials, platforms like Opiq and management systems such as eKool (Barron et al. 2021). This infrastructure enabled continuous digital learning integration across schools (Weale 2020).

Through its 'Plan Ceibal' initiative started in 2007, Uruguay provided every student and teacher in public primary and lower secondary education with personal computers and internet access, alongside comprehensive educational and training programmes. This groundwork allowed the swift deployment of 'Ceibal en Casa' during the pandemic, offering extensive resources, platforms and support to minimise educational disruptions. It was also provided with learning management system support and was equipped with more than 173,000 educational resources, including adaptive solutions and gamification (Ripani 2020).

Implementing a hybrid education approach

Creating comprehensive hybrid learning models that include online and offline teaching approaches and methods can provide appropriate solutions, in particular in the following aspects:

- a. Policy design:** develop policies supporting blended learning to transform education systems into flexible models that can withstand crises.
- b. Teacher training:** regularly train teachers on blended learning methodologies and both digital and physical content development.
- c. Transformation of learning and teaching materials:** in addition to developing online platforms for remote/online learning, invest in offline learning materials such as printed modules, e-readers with pre-loaded content and radio-based educational programmes for locations with restricted internet access.
- d. Community Wi-Fi hotspots:** increase the number of public Wi-Fi hotspots and community internet access points in rural areas.
- e. Partnership with local media outlets and NGOs:** collaborate with NGOs and media to broadcast educational content and offer online tutoring, for example with 'Teach for Armenia' in Armenia, 'NOVOTEC' in Moldova and 'EdEra' in Ukraine.

Benefits:

- **Education system diversification:** different learning tools, making them more flexible and resilient.
- **Cost-effective:** utilising existing resources cost-effectively and fostering collaborations with various stakeholders.
- **Effectiveness:** provides alternative learning pathways even with limited internet access, reaching rural children and communities.
- **Impact on low-income children:** Ensures learning continuity and provides alternate engagement even when full online access is not available.

Challenges:

- Properly balancing online and offline approaches and tailoring teacher training to support the integration of hybrid models are critical.

Policy recommendations

The following country-specific recommendations are based on the challenges and hardships that Armenia, Moldova and Ukraine are experiencing while attempting to make digital education accessible to children from low-income households, as well as taking into account the considered policy scenarios.

For the national governments:

- Clearly define the goals, strategies, targeted communities and groups, in particular establishing SMART goals to close the digital gap and enhance educational outcomes.
- Invest and allocate reasonable resources for enhancing the capacity of digital infrastructure, ensuring that schools located both in rural and urban areas have access to high-speed internet connectivity.
- Develop or update curricula to include digital literacy from an early age.
- Invest in comprehensive professional development and training for teachers in digital literacy, blended learning methods and online content creation, also committing funds to ongoing training programmes in this regard.
- Expand existing cooperation with media outlets, NGOs and community centres to increase internet access points, broadcast educational programmes and provide localised online tutoring and support.
- Incentivise the private sector engagement, developing a comprehensive package of cooperation with tax incentives, subsidies, etc. to encourage companies to invest in education, most particularly in digital education initiatives.
- Explore innovative PPP models for rural infrastructure development or tax breaks available for companies donating technology or internet connectivity services directly into these communities.
- Establish community learning hubs, in cooperation with schools, libraries, community centres and local organisations (including NGOs), in underserved areas with internet, technology and support.

- Develop and integrate crisis resilience strategies into education policies to create education systems capable of adapting to and functioning effectively during times of disaster, armed conflict or other crises.

For civil society and the private sector:

- Encourage the formation of volunteer networks to provide online tutoring and homework assistance to students from low-income households.
- Establish and/or support PPPs between governments, businesses and international donors in Armenia, Moldova and Ukraine to procure ICT devices, develop infrastructure and train teachers, ensuring sustainability through long-term funding mechanisms like revolving funds and social impact bonds.
- Facilitate the donation of used but functional ICT equipment to schools and community centres.

For regional actors:

- The EU and CoE should facilitate regional funding for digital education equity, establishing programmes to provide grants for ICT equipment, digital infrastructure and affordable internet access to schools and community centres serving low- and middle-income students in Armenia, Moldova and Ukraine.
- The EU and CoE should promote standardised digital literacy and teacher training, supporting the development and implementation of standardised digital literacy curricula and comprehensive teacher training programmes in schools and community centres, ensuring equitable access to digital education for low- and middle-income groups.

For Italian institutions, particularly the Italian Ministry of Foreign Affairs and International Cooperation:

- Establish partnerships between Italy and Armenia, Moldova and Ukraine to share experiences and good practices and develop digital education solutions tailored to local needs.
- Offer support for training programmes for teachers and administrations with a focus on integrating ICT in education.
- Provide advisory services to assist Armenia, Moldova and Ukraine in developing policies that promote the long-term incorporation and sustainable integration of digital technology in education.
- Organise a forum for digital education policymakers and stakeholders to share best practices, collaborate on policy development and coordinate regional initiatives.

Conclusion

The impact of remote and online learning on educational inequalities for low-income students in Armenia, Moldova and Ukraine has been profound, particularly following the COVID-19 pandemic. The sudden shift to digital education exposed significant gaps in access to technology and internet connectivity, worsening existing disparities, especially for students from low-income households and rural areas. Despite efforts to digitalise education and international support, challenges persist, underscoring the need for comprehensive solutions to bridge the digital divide. Essential measures include investing in digital infrastructure, forming PPPs to provide ICT devices and affordable internet access, and establishing community learning hubs. Additionally, promoting digital literacy from an early age and providing ongoing professional development for teachers

are critical to ensuring equitable access to quality education.

Addressing these challenges requires a multifaceted approach involving governments, civil society and the private sector. Clear policies prioritising digital literacy, targeted investments in technology and infrastructure, and collaborative efforts between various stakeholders are essential. By adopting hybrid learning models that combine online and offline teaching methods, these countries can create more resilient and inclusive education systems. Ultimately, bridging the digital divide is not just a technological challenge but a matter of equity and justice, essential for upholding the right to education for all children, regardless of their socioeconomic status or location.

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GC Headquarters

Monastery of San Nicolò,
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