



UNITED NATIONS  
UNIVERSITY

# Policy Brief

NUMBER 6, 2020

## Overview

The COVID-19 health crisis pushed the education sector into online education, challenging both students and teachers to work with technological devices and software instead of joining face-to-face meetings. However, providing education online does not mean actual learning will take place. This policy brief presents a framework to visualise the e-resilience of the educational system, including ICT-related factors within the educational systems that determine capacity of that system and actors in the system to deal with shocks. Policymakers and education providers should be mindful about the various levels or 'layers' within society, as inequality in each of the levels may increase because of lower e-resilience at that level.

Written by Mindel van de Laar.

© United Nations University 2020  
ISBN 978-92-808-5017-8

Licensed under the Creative Commons  
Deed 'Attribution-NonCommercial-  
NoDerivs 2.5'

The views expressed in this publication  
are those of the authors and do not  
necessarily reflect the views of United  
Nations University.



UNITED NATIONS  
UNIVERSITY

UNU-MERIT

## *E-resilience in education: A conceptual framework*

In 2020, countries have closed around the world, going from 'strict quarantine' to 'smart lockdown'. In education, not being allowed to enter a school building and not being allowed to convene with larger groups of people impacts students of all ages, but not at equal levels. In developed countries, we observe primary school children connecting with classmates through videoconferencing software. On their own or in virtual groups, children have tackled the list of activities that schools request them to do. While this works relatively well for cognitive knowledge and skills, other skills such as physical or handcraft skills, (e.g. music, theatre class, or gym), developed outside of books are quickly dropped from the curriculum. Also, social skills, developed while playing or cooperating and building social connection, are largely lost. These are essential skills that deserve attention because they are more difficult to deliver virtually.

The move to fully online schooling impacts the enjoyment of learning. In many developed country settings, secondary schools replaced face-to-face classes with online classes, requiring students to listen in a virtual classroom setting for several hours per day. Even though in online learning we know that the attention spans of people in the virtual space are about six minutes (Geri, Winer and Zaks, 2017), the move from face-to-face to a virtual classroom was often a relatively simple one, not taking retention into account. When teachers were asked to move all classes online in a period of a few days, time to develop online didactic skill, as well as the option to use or establish suitable online course materials, were lacking. It is possible to provide actual content virtually to students without much preparation. Yet, the enjoyment that teachers have in teaching, and students can have in learning is far more difficult to capture (Park and Choi, 2009). Children of secondary school age need lessons to be attractive and entertaining, yet the focus of self-directed learning tends to be related more to peer and teacher social support (Wang and Holcombe, 2010).



At the global level, for instance, when looking at higher education provided by universities, complexity arises because participants come from all over the world. When moving lessons online, teachers cannot assume

ties into an online environment. This move was not an easy one, as in recent decades only a few institutions had ventured into online education and, in most cases, only alongside face-to-face settings.

*“Considering the ICT system alone as the main factor shaping e-resilience in education will be necessary, yet not sufficient to understand educational system difficulties.”*

all students will have the required logistical conditions. Ordering books requires time and is not always possible. Livestreaming of lectures may not work when taking different time zones into account (van de Laar, 2020). And lastly, we need to consider the digital divide – poorer countries with unequal income distributions face more problematic situations in the move from face-to-face to virtual education (Bezuidenhout et al, 2017). Homeschooling requires space to learn, internet connectivity, devices for all users to connect and learn at the same time, and a manageable stress level – as after all we are dealing with a health shock that still impacts all of us either directly or indirectly.

#### *Tracking resilience in online education*

Amid the rapid unfolding of the COVID-19 crisis, children, students and adults in training found themselves unable to join classes, as they were requested not to leave their homes. As a direct result, almost all educational institutions had to move their educational activi-

Now, with education being such an essential element of all societies – with SDG 4 focusing on inclusive and equitable education for all – the sector became an immediate priority. Many stakeholders, national and institutional regulations and ICT requirements from both education supplier and receiver were involved in this move. Put simply, the world was dealing with the shock of COVID-19, so the concept of e-resilience – the ability of ICT systems to withstand, recover and change in the face of shocks (UNESCAP) suddenly became relevant when considering the move from face-to-face to online education. Considering the ICT system alone as the main factor shaping e-resilience in education will be necessary, yet not sufficient to understand educational system difficulties. Educational providers and users’ ability to manage digital platforms and transform the offered materials into actual learning are also essential elements. Ultimately, e-resilience in education is embedded in the educational system.

Figure 1 visualises the framework of e-resilience in educa-

tion. The circles represent four levels that are nested and interact together and shape e-resilience of the educational systems after a shock.

At the central and macro level, we find the country ecosystem of digital education. Crucially, e-resilience of national education depends on the country's internet coverage. Connectivity displays a significant variation across countries. The world's average broadband subscriptions per 100 inhabitants is 14, yet many countries in sub-Saharan Africa and

Asia do not reach an average of 1 subscription per 100 inhabitants, while Latin American countries have on average around 10 subscriptions. Frontrunners like Germany and South Korea score over 40 subscriptions on average. (see <https://ourworldindata.org/internet>). That coverage variation across countries will be equally present across education providers and users – institutions in countries with less developed ICT systems at macro level will be less likely to have robust systems themselves.

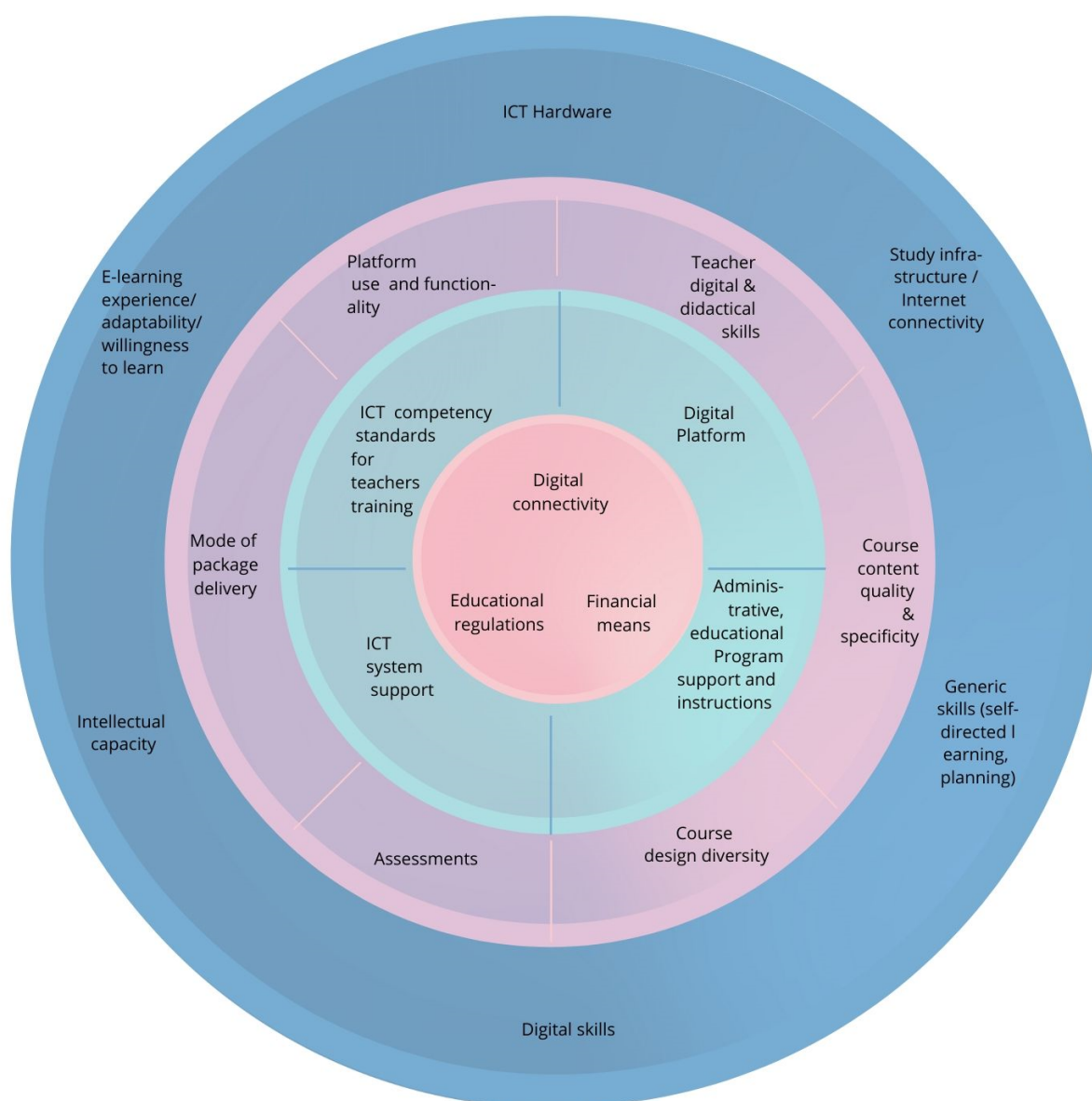


Figure 1: E-resilience in a higher education framework  
Dark Blue: Individual level  
Purple: Programme level  
Green: Institutional level  
Pink: Macro level



In addition to ICT infrastructure, the educational governance regulations that guide the educational sector are also set at the macro level. During COVID-19 we observe that the ability to adjust is smaller in less developed countries, with weaker digital coverage and lower budgets to accommodate change. But equally, rules and regulations will need to be adjusted to accommodate educational movement from face-to-face to online education, to allow for degrees to remain valid with changed modes of provision. Clearly, those regulations need to be adjusted at the national level.

At institutional level, the second highest nested within the country, educational institutes must be able to foster change and support users. Higher educational institutions, such as universities, likely have electronic learning platforms in place to support their students. At lower levels, for instance among primary education, those platforms are often absent. With educational provision using only a face-to-face mode and in-class educational activities there was hardly a need to have online learning platforms. Similarly, it is likely that vocational training institutes have weaker or no electronic platforms, as there is limited demand for such platforms.

Dependent on for instance the size of the institution and level of education offered, the capacity to adjust to changes in ICT systems varies. Again, we see that larger institutions, more likely universities based in major cities, have more capacity and more staff to assist in digital change. Smaller institutions like primary schools, more often

located in suburbs and villages, will not have ICT departments trained to support the ICT systems -- and with the absence of those human resources and knowledge, also the ability to change in case of a shock from face-to-face to online activities changes.

Responses to shocks require investments in the hardware and software provisions of an institute. ICT competence standard of teaching and managing staff also play an essential role. If all teaching staff in non-shock periods was required to be ICT proficient by the institute, for instance due to inclusion of online learning didactical training in the teacher training packages, transition to online learning will be easier. Institutions that have ICT competent staff will be able to change more swiftly, as teaching staff will already be fully trained. Beyond that, administrative staff supporting the didactical changes is essential. Leadership, clear guidance, and directions on how to move educational programmes and content online greatly facilitate the process for the individual educational provider and user. If institutions can quickly identify what platforms to use, offer guidance how to move classes online, and what facilitation service to offer, this greatly unburdens individual staff members. (Marotta, 2020)

E-resilience in education is also determined at the course or programme level – the third level in the framework. In e-learning, course completion is relatively low (Geri, 2017, Park, 2009), so providing clear incentives to complete courses, keeping focus on the material covered, and self-directing learning

### About the Author

Dr. Mindel van de Laar is PhD Director of the dual career PhD programme in Governance and Policy Analysis (GPAC2) of UNU-MERIT / Maastricht Graduate School of Governance, Maastricht University. In addition, she manages a selection of research and training projects, including the Evidence-Based Policy Research Methods (EPRM) course and the Community of Learning for Africa project (COLA). Mindel holds a PhD in Economics and a MSc in International Economic Studies from Maastricht University. Her research focus is on professional and doctoral (e)learning.

depend on the attractiveness of the materials offered. The more interactive the classes are, with quizzes, peer activities, multiple small learning resources and smaller more frequent assignments, the more likely it is that participants will complete a course. This is important when we are faced with the situation that the mandatory school enrolled population of children in primary schools and secondary schools are asked to complete their curriculum online. They do not have the luxury to fail and drop out, as regulations require them to stay in school.

Yet, when there is an external shock that requires a move to online education at all levels within the short run, the first priority is to keep education going. The attractiveness of the educational material offering may be less of a priority, but then actual learning may decrease as well. Factors to consider when dealing with e-resilience at the programme level are included in the educational programme layer of Figure 1. Perhaps most essential is the user-friendliness of the platform. The first critical question is obviously if there is an online platform to use. Once that is available, it is important to monitor that all participants are able to find their way to the materials without too much trouble. Once availability and access to platforms is secured, the quality of the platform becomes important. Given bandwidth and local context, are the platforms stable and fast enough for participants to stay engaged?

Programme directors also need to consider if the mode of provision of the materials is attractive? There are numerous options:

from simply providing a hub of all kinds of resources, to course material provision only, to tutor or peer supported learning with interaction moments and activities attached to each of these interactions. The choices of how to deliver the materials also impacts how programmes or courses are designed. If courses are built around an interaction structure, potentially with self-assessments or small assignments or discussions or short lectures, they become more attractive than for instance if there is only a reading list and long livestreams of lectures. Yet, in times of crisis, the ability of teachers and programmes to design coherent online formats may be limited, due to time constraints. Equally, some content topics lend themselves more easily to online education, while others will always be more difficult to translate. While it is relatively easy to offer mathematics online, it is harder to offer instructions on how to cook or cut your hair. The latter require a practical skill that transfers better face-to-face. Lastly, a lot depends on the teacher's digital skills. E-competent teachers will more easily find their way on to platforms and communicate more fluently than teachers that face difficulties simply logging on. Clearly there is an age advantage for younger students and teachers that grew up using digital devices and will only need to apply their already available skills to new purposes.

The last layer in Figure 1, the micro level, represents the end user. The e-resilience of the end user relates to their ease in being able to shift from the classroom to e-learning. Inequality plays a major role at this level as well – as availability of hardware (computers or mobile



phones) and internet provision not only varies per country but also per household. Wealthier families will more likely have access to internet and devices to connect. In addition, space to study quietly is more often available in the houses or living environments of relatively well-off families and in general also better more developed countries.

Beyond infrastructure, social support, and individual willingness to adjust play a role. The skillset of the student to move from teacher-instructed learning to self-directed learning will not be equal for all students. Individual characteristics, skills and motivation will be a great determining factor to make online learning work. It requires willingness to accept online learning and intellectual capacity to understand the offered materials with less instruction.

#### *E-resilience in education – an unequal playing field*

The strength of e-resilience in education is, put simply, an interplay of the abovementioned factors. The framework is nested, meaning that individual resilience depends on the individual itself, but will also be impacted by the programme that the individual participates in, the institutional resilience, and even the country's e-resilience. Equally, you can have very e-resilient and less e-resilient programmes within the same institutional setting. Yet, at the individual level we cannot make up for incapacity at any higher level of the framework.

Primary education institutions are, at the institutional level, less well prepared for a move to

online education than university education. Take my own institute, a university in the Netherlands, which announced a move to online education on a Friday – and then offered all classes online on the following Monday. The first courses were literally moved online, with lectures and tutorial sessions livestreamed. With robust infrastructure in place and good guidance by the ICT team and programme director, all teachers were able to continue their classes. In the same country, COVID-19 pushed our primary schools into online learning. For many that means they first needed to explore the options available, based on human capacity. Once a platform was selected and set up, teachers needed to be trained, translating classes to online provisions and instructing students and parents how to use the chosen platforms well.

How different will this process be in for instance in a primary school in rural Nigeria? With limited ICT equipment in schools and connectivity, offering materials in an online platform setting is a challenge. Not all schools will have internet connectivity, teachers will need to share equipment, and hope electricity networks are stable. Also the students in those schools will be disadvantaged from the start. With limited computer or mobile phone availability in households, limited internet access, and often limited electricity, reviewing the school materials may well be impossible. With smaller houses and larger extended households, quiet space to study or complete assignments will be challenging at best. That by default makes a child in Nigeria far less e-resilient, irrespective of their individual skills and intellectual capacity.

Even if materials are provided well, and students are able to review them well, actual learning remains a different thing altogether. Teacher capacity to guide the learning, availability of study materials, and study space at home to spend sufficient study time are necessary elements. But as we are still in a crisis situation, additional stressors such as fear, loneliness, job insecurity of household members or illness or death of close relatives may prevent people from learning. While those elements may be less related to e-resilience, they are certainly connected to the shock. It remains to be seen therefore to what extent the impact of the shock (mediated

through the e-resilience of institutions, teachers, students, and household coping strategies) has on actual learning.

### *Acknowledgements*

I thank the participants of the webinar series organised by UNESCAP on “Building Digital Resilience to Support COVID-19 Pandemic Response and Recovery” organized 14-16 April 2020, for their input in this discussion. I also thank Jule Meyer for her assistance compiling Figure 1.

### *References*

Bezuidenhout, Louise M. et al, (2017), Beyond the digital divide: Towards a situated approach to open data

Science and Public Policy, Volume 44, Issue 4, August 2017, Pages 464–475, <https://doi.org/10.1093/scipol/scw036>

Geri, Nitza et al (2017), “Challenging the six-minute myth of online video lectures: Can interactivity expand the attention span of learners?”, Online Journal of Applied Knowledge Management Volume 5, 2017: Issue 1, [https://doi.org/10.36965/OJAKM.2017.5\(1\)101-111](https://doi.org/10.36965/OJAKM.2017.5(1)101-111)

Laar, van de Mindel, (2020), Teaching online: A steep learning curve with some success – but missing the personal passion, UNU-MERIT Blog series, <https://www.merit.unu.edu/teaching-online-a-steep-learning-curve-with-some-success-but-missing-the-personal-passion/>

Marotta, Julieta (2020), On the virtual frontline, UNU-MERIT Blog series <https://www.merit.unu.edu/on-the-virtual-frontline-ensuring-education-while-protecting-the-well-being-of-everyone/>

Okuda and Karazhanova (2020), Digital Resilience Against COVID-19, <https://www.unescap.org/blog/digital-resilience-against-covid-19>

UNESCAP, <https://www.unescap.org/our-work/ict-disaster-risk-reduction/e-resilience/about>, taken on 23 July 2020.

Park, J.-H., & Choi, H. J. (2009). Factors Influencing Adult Learners’ Decision to Drop Out or Persist in Online Learning. Educational Technology & Society, 12 (4), 207–217.

Wang, Ming-Te and Rebecca Holcombe (2010), “Adolescents’ Perceptions of School Environment, Engagement, and Academic Achievement in Middle School”. American Educational Research Journal, Vol. 47, No. 3, pp. 633–662 DOI: 10.3102/0002831209361209 2010 AERA. <http://aerj.aera.net>



UNITED NATIONS  
UNIVERSITY

UNU-MERIT

The United Nations University – Maastricht Economic and Social Research Institute on Innovation and Technology (UNU-MERIT) is a research and training institute of United Nations University based in Maastricht in the south of the Netherlands. The institute, which collaborates closely with Maastricht University, carries out research and training on a range of social, political and economic factors that drive economic development in a global perspective. Overall the institute functions as a unique research centre and graduate school for around 100 PhD fellows and 140 Master's students. It is also a UN think tank addressing a broad range of policy questions on science, innovation and democratic governance.

## INSIDE: Policy Brief

### *E-resilience in education: A conceptual framework*

In response to a shock, it is essential to consider the e-resilience of the integral educational system to understand the impact of the shock on actual learning.

United Nations University -  
Maastricht Economic and  
Social Research Institute on  
Innovation and Technology  
Boschstraat 24  
6211 AX Maastricht  
The Netherlands

UNU-MERIT

UNITED NATIONS  
UNIVERSITY

