DIGITAL SKILLS FOR WHOM?

REFLECTIONS ON THE IMPACT OF DIGITALIZATION ON EDUCATION IN THE GLOBAL SOUTH

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INTRODUCTION[1]

The current COVID-19 pandemic has considerably intensified discussions about the so-called digital revolution. In development discourse, digitalization is commonly referred to as a big opportunity to catch up with economic development and to overcome societal problems such as poverty, inequality and exclusion. Much lower is the attention paid to shortcomings and risks such as the digital divide as well as the knowledge and power asymmetries associated with it. Human capabilities, from basic digital literacy to high-level digital expert skills, rank as one of the key preconditions to reap the benefits of digitalization. Digitalization of education and training systems appears to be the order of the day. Yet, at a closer look, there is lack of consistent strategies to do so without deepening existing patterns of inequality and exclusion, in particular in developing countries.

This article will initially analyse the lessons of experience from the current COVID-19 pandemic and its impact on the education and Technical Vocational Education and Training (TVET) sector mainly with a view to developing countries. It will then reflect on the framing of the academic and policy debates on digitalization in education. The academic discussion will be summarised from two perspectives, first with regard to debate on the skills required for a digitalised economy and second analysing the impact of digitalization on education systems, mainly in the Global South. Conclusions will sum up.

WHAT COVID-19 HAS TAUGHT US

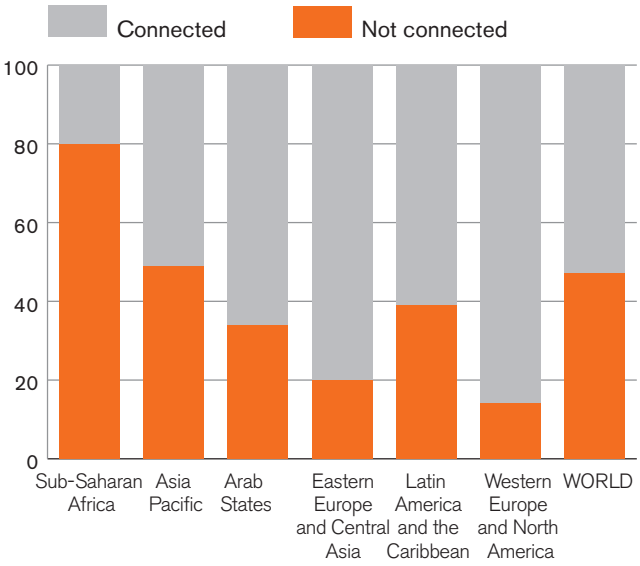
The first half-year of 2020 has seen the lockdown of public life and of a considerable share of the economy in many countries of the world. This has included schools, universities and TVET institutions. The necessity of minimising physical contact due to the COVID-19 pandemic has accelerated the utilisation of digital tools for work, studies and any kind of human interaction at unprecedented levels. In so doing, the COVID-19 pandemic might be considered as a kind of laboratory that anticipates, in a condensed form, societal dynamics associated with digitalization.

In the education and TVET sector, the impacts of the pandemic are estimated to cause lasting damages. In early April 2020, about 1.6 billion students globally (91 % of the total) were out of school. This disruption of schooling adds to an already existing education crisis with 258 million children out of school before the lockdown (Save the Children 2020: ii). Education experts estimate that the lockdown will reverse educational progress achieved throughout the last decades. In particular, it will further increase inequity in education to the detriment of the poor and disadvantaged, who are less resilient against deteriorating social circumstances such as poverty, malnutrition, ill health or domestic violence – factors that seriously hamper schooling and learning (Shaeffer 2020).

All over the world, albeit to a greater or lesser extent, the immediate response to school closures was the deployment of diverse forms of distance learning. While in some countries, education ministries set up off-line programmes based on TV or radio, most of the distance programmes relied on digital tools, mainly online platforms.

Yet, according to recent UNESCO data, access to internet at home is very unevenly distributed. In Sub-Saharan Africa, 80 % of students do not have access to internet at home (see Figure C below). Overall, about 465 million students, or almost 47 % of all primary and secondary students being targeted exclusively by national online learning platforms, are not connected to the internet (Giannini 2020).

Figure C: Share of Students with Internet Connection at Home, in Countries that Mandated Countrywide School Closures



Source: Giannini (2020)

Besides internet connectivity, other obstacles hamper online learning such as lack of digital devices or parents and teachers lacking the appropriate skills to support learners. The latter has been singled out in a recent UNESCO survey as one of the most important barriers to effective remote learning (ibid.).

The disruption has been worse in the TVET subsector, due to the fact that TVET programmes are even more difficult to be carried out as remote or online programmes. Indeed, work-based components of TVET programmes have been the most affected by the pandemic as distance learning focuses on theoretical content and work place closures have interrupted all forms of training that take place in affected firms (ILO 2020).

ILO estimates that during the pandemic, 30 % of TVET institutions have ceased operations completely. Where distance learning has been proposed as an alternative solution, difficulties have proven to be similar to those in the general education sector, i.e. lack of devices, internet connectivity and appropriate skills. Regional inequities in these terms may possibly be even worse in the TVET subsector, which in many countries has suffered from under-investment since decades (ibid.).

Experts predict a major negative impact on both public and private as well as donor sources of funding for general education and TVET due to the looming economic crisis in the aftermath of the COVID-19 pandemic and possibly shifting priorities (GEM 2020). This threatens to considerably and sustainably deepen educational and social inequalities. At the same time, education and TVET will emerge as a policy priority to respond to massive job losses and major transformations of work.

Massive deployment of online tools during the COVID-19 pandemic has shed light on another phenomenon of concern to many education experts. Accelerated digitalization in education has greatly increased the influence of the private sector on national education systems boosting processes of privatisation and commercialisation. The necessity to come up with solutions to school closures within a very short period of time has left many governments without systematic plans for distance learning nor has it allowed to adequately test innovative digital tools offered by the private sector. This in turn has opened perfect opportunities for private providers to push forward their solutions and to gain considerable influence in the education sector (Patil 2020).

According to recent research (Williamson/Hogan 2020), the effects of these accelerated privatisation processes during the period of lockdown are likely to persist, initially as temporary blended models of distance schooling and in the longer term as hybrid models with educational technology (edtech) being embedded in curricula, pedagogy, assessment and school management. What is called a global education industry (ibid.) has thus gained considerable political influence during the COVID-19 pandemic, helped both by international organisations such as the World Bank or UNESCO and by philanthropic organisations such as the Gates Foundation that have donated millions of dollars to edtech solutions during school closures. At the economic level, while edtech investments were already high in some parts of the world (e.g. the USA and Southeast Asia) before the crisis, the pandemic has acted as a catalyst for private investments seeking profit from new disruptive models of public education. At the political level, the instantiation of the global education industry during the crisis has produced and circulated ideas about a “re-imagining of education” based on corporate edtech solutions, rather than on global agendas of socioecological transformations.

Calls for the dissolution of traditional education systems based on physical presence and human interaction in favour of reimagined systems of self-learning based on digital technologies have multiplied in the aftermath of the lockdown (e.g. Douse/Uys 2020). This brings us back to the fundamental debate of whether and to what extent education as a human practice can be digitalised at all without losing its inherent features. With education being traditionally conceived as processes of subjectivication based on communicative social interaction (Baum/Diefenbach 2018), the question arises to what extent the involved human actors can be replaced by machines. Fears that in reversing the human-machine relation, algorithms will end up subjugating the human being (Deller 2018: 4) might seem excessive. However, what does emerge as a concrete risk is that digitalised learning settings, especially when layered over contexts of social and educational inequities, tend to replace rather than complement social interaction in education. This might lead to poor cognitive learning results and notably reduced opportunities for social learning and personal development.

So, what are the lessons of the COVID-19 pandemic that might help to deepen our understanding of the relations between digitalization and education? Perceptible phenomena are, first a deepening of educational inequities both of access and of further learning opportunities within and across countries; second an accelerated pace of privatisation and commercialisation processes of public education. What follows on from this is that digitalization in and of itself is not a panacea to solve societal problems, but rather that it needs proper public regulation and pedagogical embedding to reap and socialise the potential benefits of innovation associated with it. Otherwise, it even risks further deepening existing social patterns of inequality and exclusion.

THE FRAMING OF DIGITALIZATION AND EDUCATION DEBATES

Digitalization involving automation, advanced digital technology (e.g. internet of things) and artificial intelligence is often conceived of in terms of the Fourth Industrial Revolution (4IR) suggesting that it will bring about as deep a transformation of the global economic structures as the three industrial revolutions that preceded it.[2] While structural transformations are undeniable, the 4IR might also be viewed as a global narrative that carries many promises related to wealth and wellbeing, while lacking the empirical evidence to it, especially regarding the Global South (Körber 2018).

Part of this narrative is the depiction of technologies as inherently resulting in economic growth and widespread improvement of the standards of living. Yet, technologies, in and of themselves, do not disrupt modes of production. Without complementary policies, layering them over existing social structures, like inequality or exclusion, will only exacerbate these features (Gillwald 2019).

It is noteworthy that until date digitalization has failed to alter the existing patterns of economic growth, despite ever-growing technological possibilities. To the contrary, digitalization is a driver of the very growth model that is considered to push the planet to its edges. Indeed, also in the academic discussion there is very little overlapping of the digitalization and the sustainability debates (WBGU 2019). This is also noticeable with relation to education where digitalization research predominantly focuses on the skills needs induced by the 4IR, while sustainability research addresses the concept of transformative education required for a socioecological transformation. Rarely, these debates overlap.

The digital revolution narrative is projecting sustainable wealth and wellbeing based on highly increased economic productivity. The associated skills discourse is framed by the tenets of human capital theory using an employability approach to education, while human development and sustainability aspects are widely left aside. Yet, the narrative overlooks the key questions of whether benefits resulting from digitalization will be distributed to all, or just a few ones, and whether the 4IR will respect planetary boundaries or disrupt them. Now, what is the role of education and TVET in this story? Rather than being confined to a productivity-enhancing function, education's role is best conceptualised in terms of a tension between employability and transformational power. The key questions to ask here are whether education will be reduced to serve the skills needs of a digitalised economy. Or will it unleash transformational power to shape global digitalization processes to the benefit of all? Will education systems be "colonised" by the global edtech industry or will public policy harness the innovation potential of digitalization in education systems for public interests?

SKILLS FOR THE 4TH INDUSTRIAL REVOLUTION

Education and skills development rank among the most important tools to develop the workforce needed for the 4IR. But what skills will be needed for the digitalised economy? This debate is linked to the discussions about projected transformations of the labour market due to automation and digitalization processes.

While there is some consensus that the degree of automation potential varies significantly across economic sectors, there is much less consensus as to whether job destruction will outweigh the creation of new employments or vice versa. Likewise, opinions differ on which skills categories are most at risk of being displaced through digitalization.[3]

Aus dem Moore et al. (2018) estimate that automation is likely to affect mostly low to medium skilled employment. A different strand of literature highlights the risk of job polarization. In that view, the demand for higher skilled occupations comes mostly at the expense of middle-skilled jobs, while demand for low-skilled and routine jobs will keep growing as well (Brown/Lauder/Ashton 2011; Nübler 2016).

Dissenting views also prevail as to the specific impact of digitalization and automation on labour markets in developing countries (see also Schlogl in this volume). While some authors predict a heavier impact in high-income countries due to a higher level of technology use (World Bank 2016: 131), others hypothesize the opposite dynamics: Automation impact would be stronger as levels of GDP fall (UNIDO 2017). Busemayer et al. (2019) assume that in the Global South, despite some degree of automation, manufacturing industry will continue to be an important employer at least for some time.

With a focus on Sub-Saharan Africa, Banga and te Velde (2018) contend that the impact of digitalization and automation on labour markets will depend on how well African countries are prepared to harness digitalization for their industrialisation processes. Currently, African countries face a significant digital divide due to lack of infrastructure, low skills levels and high capital costs that hamper automation. In addition, they also benefit less from digitalization. If this digital divide will not be closed, African countries may face severe detrimental effects from a growing digitalised global economy in terms of massive job losses. Naudé (2017) estimates that the improvement of education and skills levels is the single most important key for African countries to capitalise on rather than to lose from the 4IR.

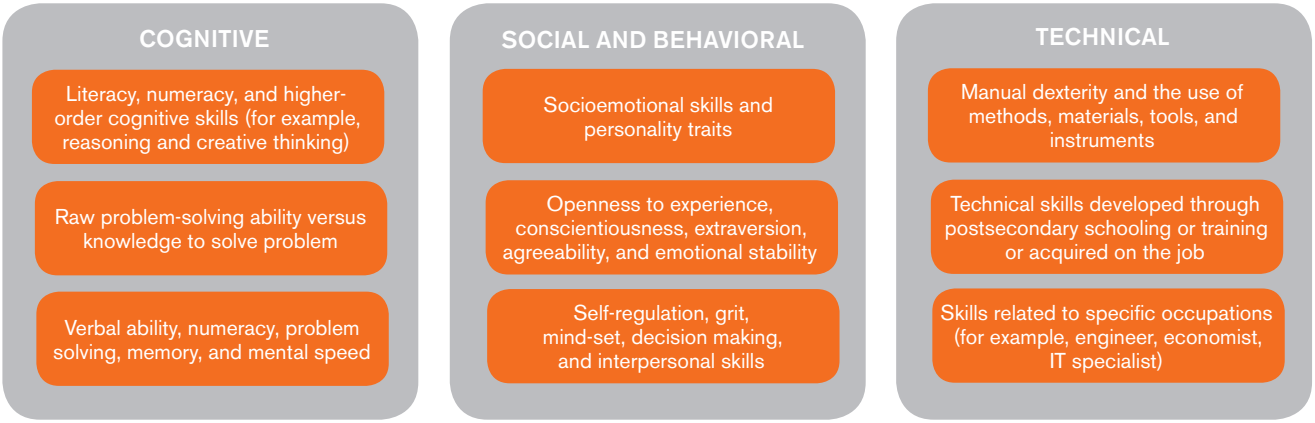
While debates over future employment trends are still ongoing, a metaphor for the future skilled worker has emerged. It is that of a person whose skills complement those tasks that robots and digital intelligence will not be able to perform. Hence, future "workers will need to be 'racing with the machines' rather than 'against them' " (UNCTAD 2017: 65).

The World Bank predicts two major dynamics that will determine future skills requirements: a fast-changing skill mix and rapid skill obsolescence. To be able to respond to these, the World Bank contends that individuals and institutions need stronger adaptability, education and training systems need to be better linked to the private sector and lifelong learning policies need to be prioritised (World Bank 2016: 259). This view is echoed in much of the economic and policy literature (e.g. Millington 2017; Banga/te Velde 2018; for Africa see Naudé 2017).

From a human capital perspective, the significance of transversal skills (often called "21st century skills") will undoubtedly rise in order to ensure employability (BRICS Skill Development Working Group 2016; World Bank 2016). Such skills are often summarised as creativity, reasoning, problem-solving, the capability to apply knowledge and a variety of socioemotional and behavioural skills. This might be even more valid for developing and emerging economies. ILO estimates that against the background of a growing young population in these countries, soft and interpersonal skills might become a decisive asset in these competitive labour markets (ILO 2018).

The World Bank (2016) summarised the skills required in a digital economy in three different sets.

Figure D: Skills Required in a Digital Economy



Source: World Bank 2016: 259

The World Bank (2016) suggests different patterns of priority setting in skills policies for different groups of countries according to their degree of digitalization. While emerging countries in terms of digitalization should focus on foundational cognitive and socioemotional skills as well as basic digital literacy, transition countries should prioritise advanced cognitive and socioemotional skills putting increased emphasis on critical thinking and problem solving. More advanced countries ("transforming countries") are advised to focus on advanced technical skills and lifelong learning digital skills as well as training in computational thinking. The World Bank (2016) itself, however, admits that such patterns for skills policies have to be contextualised and that even countries with very low levels of digitalization will also need highly specialised digital skills (see also Albadalejo/Weiss 2017).

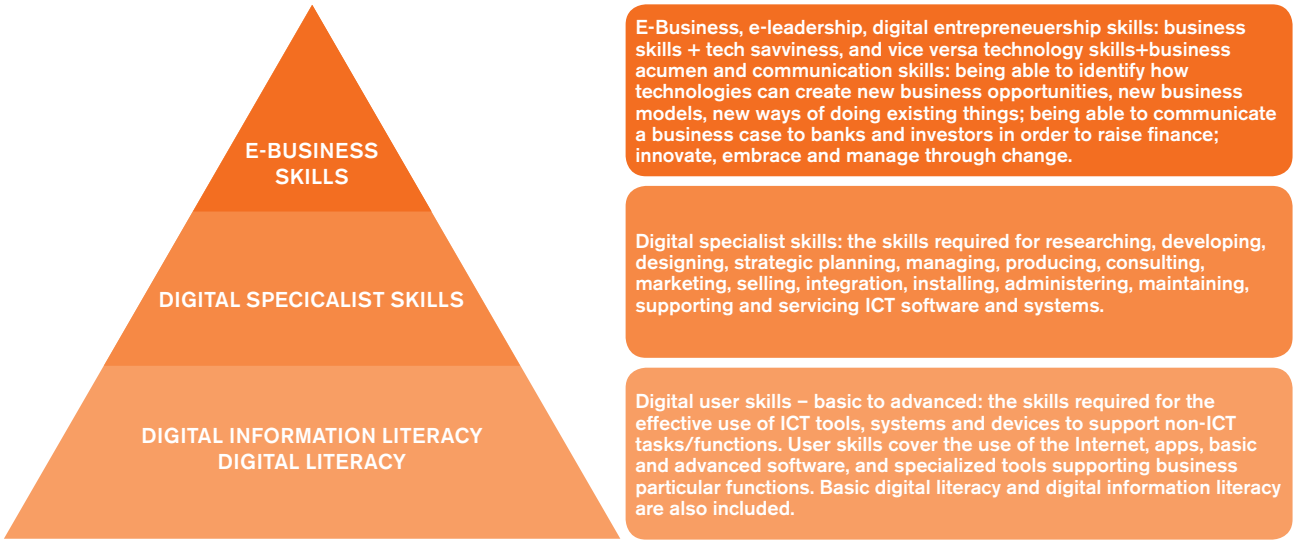
The focus on rapid skills acquisition tends to erode the traditional centrality of theoretical and specialist knowledge. There is some discussion as to whether their transmission should be replaced by more competency-oriented approaches, in particular in the realm of TVET and skills formation (Brockmann/Clarke/Winch 2011; Young 2009). Critics (e.g. Allais 2012; Wheelahan 2007) highlight that solid theoretical knowledge is indispensable for the development of long-term professional capacities and should be complemented rather than replaced by transversal skills. However, there is consensus that basic education remains the foundation for future employability and further learning. Hence, strong foundational skills will be required at the cognitive (literacy, numeracy), but also at the technical level (use of instruments, methods, technical knowledge).

Rapid skills obsolescence will increase the significance of lifelong learning opportunities to prepare learners and workers for frequent transitions (from one stage of the education system to the other, from school to work, from one sector to the other etc.). The requirements of employability also tend to strengthen links between education and work. Future TVET systems will have to address the challenge of enhanced flexibility and shorter learning pathways while maintaining high quality (ILO 2018).

As for digital skills, UNCTAD (2017) identifies three distinct, but complementary sets of skills that are needed in advanced and developing countries alike to allow them to capitalise on digital technologies. This digital skills pyramid is set out in the Figure E.

Basic digital skills will be crucial in the future labour markets. Universal access to these skills is therefore indispensable if countries want to avoid a digital divide leading to even further exclusion of substantial parts of the population from formal employment. Increasingly, the literature points out that basic digital skills should not be confined to digital user skills, but include digital information skills (search for information and evaluation of sources) (World Bank 2016). Some literature stresses that basic digital skills should go beyond user and information skills to include analytical skills like coding (Chryssou 2017).

Figure E: The Digital Skills Pyramid



Source: UNCTAD 2017: 66

While in principle digital technologies bear the potential of strengthening creative and analytical skills it is worth noting that the prevailing human capital perspective on future skills needs emphasises their economic employability to the detriment of reference to broader human development and wellbeing.

Such an employability-oriented education, however, might fail to sufficiently equip the learners with the skills, knowledge and attitudes they need to gain social and political agency and to act as responsible citizens in a digitalised world (Brown-Martin 2017).

In addition, an employability-focused 4IR skills scenario is at odds with the much-cited agenda of socioecological transformation. While there is indeed some debate on how digital tools (and the skills required to run them) might serve ecological goals, the prevailing human capital perspective tends to confine these debates to the existing socioeconomic model rather than spurring reflections on what digital skills are needed for its transformation (WBGU 2019).

THE IMPACT OF DIGITALIZATION ON EDUCATION AND TVET SYSTEMS

Given the need for an appropriately skilled workforce for economies to thrive in the digital age, expectations are high on schools and TVET institutions to deliver. Governments all over the world are making an effort to push the digitalization of the education sector and to further align schooling with the requirements of the private sector (e.g. "The Digital Transformation Strategy for Africa") (African Union 2020). Public discourse commonly refers to digitalization as an opportunity to improve the quality of education and to offer solutions to long-standing problems such as educational inequalities and restricted access. Digital innovations are supposed to support a shift from teacher to learner centred practices thereby fostering creativity, communication and problem-solving skills. Likewise, distance and online learning shall offer educational opportunities to remote populations and widen access considerably where lack of resources does not allow expanding educational institutions.

However, digitalization as an ongoing process of transforming the education sector shows very uneven patterns at the global level. Digital tools have been introduced both as mediums of learning (digital devices such as computers, tablets or mobile phones) and as part of the curriculum (from digital user skills, to programming, coding and highly specialised digital skills), they are used as pedagogical, management, communication and assessment tools and as mode of delivery (e.g. online-learning platforms). Education data has become part of the Big Data business and is being commercialised in these terms (Salajan/Jules 2019).

Across educational subsectors, digital penetration is unevenly distributed. Those subsectors that are less regulated

and show a higher variety of education providers, such as non-formal, adult and higher education, tend to be more digitalised both in terms of pedagogical processes and modes of delivery. By contrast, public provision being still the main pattern in the formal primary and partially the secondary school system, these sub-sectors tend to revert to digitalization mainly as pedagogical and administrative tools and curriculum subjects rather than as a mode of delivery.

Naturally, these general trends vary substantially across countries according to the mode of educational governance, the extent of privatisation in the education sector and the availability of infrastructure as well as resources.

Recent UNESCO data highlight the global disparities in Information and Communication Technology (ICT) readiness and utilisation in schools (see Table B).

Table B: Percentage of Schools with ICT for Pedagogical Purposes, 2018

	Electricity	Internet	Computers
Sub-Saharan Africa	29	6	14
Northern Africa & Western Asia	100	90	95
Central and Southern Asia	100	46	42
Eastern & South-eastern Asia	99	97	99
Oceania	100	63	33
Latin America & Caribbean	100	61	83
Europe & Northern America	100	100	100

Source: UNESCO 2020: 390-391 (some of the indicated percentages are UNESCO estimates)

In Sub-Saharan Africa, the region with the lowest digital penetration in the education sector, disparities are wide themselves both between and within countries. For instance, internet connection in schools is reported to cover 78 % of primary and 100 % of secondary schools in Botswana, whereas coverage extends to only 5 % and 15 % respectively in Zambia.[4]

Many schools in the region lack readiness for the age of digitalization in terms of insufficient infrastructure, general underfinance and lack of skills as well as readiness among teachers (UNESCO Institute for Statistics 2015). At the same time, Africa is also a continent of notable digitalization dynamics including in education. Different actors, including civil society and the private sector, carry out a variety of activities. However, upscaling, coordination and systematisation as well as sustainability of these initiatives remain a challenge (Tilya 2018).

Given limited electricity supply in Sub-Saharan Africa, the mobile phone is considered a viable alternative to computers. Tilya (2018) notes that utilisation of mobile phones has increased exponentially throughout the last years substantially affecting some sectors such as finance, health and agriculture. However, impact on the education sector appears to be the weakest. Yet, while research on educational utilisation is scarce, Samarakoon et al. (2017) describe that mobile phones do play a role in the learning processes of African children and youth, albeit mostly in informal and spontaneous ways (e.g. peer support with homework, information research etc.). There appear to be positive effects in terms of opportunities for marginalised youth to exercise personal agency, to build up networks and gain social capital. On the other hand, there are also risks such as a gender gap in access to mobile phones, newly emerging forms of bullying and harassment and excessive gaming resulting in addictive behaviour. There is some evidence, also from the Global North, that expectations in the generation of "digital natives", i.e. young people growing up with digital devices and therefore learning their utilisation almost spontaneously, have not paid off. What has been observed is that these "natural digital learning processes" reflect similar patterns as analogue learning processes in terms of disadvantaged youth making less utilisation of digital devices for educational purposes than their more advantaged peers (OECD 2015).

To sum up, digitalization of the education sector is ongoing, but has it been delivering in terms of quality improvement and expansion of access?

To date, there is limited evidence to support these claims (Burch 2016). A 2015 OECD assessment of digital skills concludes that despite heavy investment in ICTs in some countries, there was no noticeable improvement in student performance in the PISA assessment. In addition, the report found the performance gap between advantaged and disadvantaged students reproduced in digital skills, suggesting that digitalization in and of itself does not reduce educational inequities. Rather, equity in education has to be improved first to reduce inequalities in digital skills (OECD 2015).

As for the expansion of access, the Massive Open Online Courses (MOOCs) experience is a case in point. About a decade ago, MOOCs were praised as the solution to the lack of access to post-secondary education, especially in developing countries (World Bank 2016; ETF 2018). MOOCs can be interpreted as the culmination of the open educational resources approach. Produced at low cost mostly by Western academics and widely accessible in the internet (Weiland 2015), MOOCs were also expected to democratise access to higher education and to innovate conservative forms of teaching and lecturing. Yet, results are mixed. While well-designed MOOCs that offer a variety of interactive tools have proven to be more engaging and instructional than classroom courses, in average quality appears to be poor. For disadvantaged students, the lack of tutoring associated with MOOCs and their uncontextualised contents often represent pedagogical challenges (McCowan 2016). In addition, while offered free of charge at the beginning, commercial MOOCs are starting to predominate (McCowan 2017).

Globally, commercialisation and privatisation processes have accompanied digitalization in the education sector, often re-enforcing each other (Burch 2016). Through the provision of digital tools, applications and platforms, private edtech corporations have gained significant influence on school curriculums (Brown-Martin 2017). Another phenomenon is the rapid rise in private edtech companies that increasingly dislocate educational data collection, storage and processing out of the realm of public policy for commercial exploitation (Salajan/Jules 2019). Besides raising serious questions in terms of learners' data security, Big Data business in education also tends to deepen North-South knowledge asymmetries in that edtech companies are concentrated in the Global North.

International education providers, such as Bridge International Academy, use digitalization to marketize their business model of education in developing countries, in particular in Africa. Digital technology allows companies to access remote communities, while managing systems (e.g. teaching instructions, on-line tutoring) from a centralised location (Burch 2016). As Riep and Machacek (2016) point out, for-profit education providers often apply approaches similar to the automation of other sectors. The goal is to replace costly professionals and to reduce the cost of infrastructure. In the corporate model of education, qualified teachers tend to be substituted with human operators that are being instructed from a low cost tablet. The implicit risk of this corporate model of education is over-standardisation of education (Brown-Martin 2017). This applies to various levels, from standardised training for low-skills operators instead of qualified teachers, standardised core curriculums instead of locally contextualised ones, to standardised assessments that do not allow for teacher assessment based on the personal relation with the student.

While it is true that digitalization bears the potential to foster innovative, creative, self-organised learning, what emerges here is that for this potential to deliver, digital schooling needs to be accompanied by high-quality tutoring based on personal interaction between teachers and students. Digital tools need to be of good quality themselves. Yet, as Burch (2016) observes for the USA, many digital products offered by technology companies to schools hosting poor, non-white children tend to reproduce the flaws of a poor analogous education based on rote learning and monotonous teaching material.

CONCLUSIONS AND WAY FORWARD

Digitalization has set out to transform education systems and as we have seen, it has been doing so all over the world in different forms and to different extents. What digitalization has not transformed about education is the social dynamics associated with it, and this is particularly true for the Global South. Indeed, the risks related with digitalization of education are evident: a further widening of the digital divide (along North-South, rural/urban, affluent/poor, powerful/marginalised and gender lines), increasing educational and social inequities, fragmentation of public education systems to the benefit of the private sector and a further erosion of the very idea of education, where the employability aspect increasingly outweighs social and cultural features.

Hence, from a development perspective the key questions are: How to confront these risks and how to harness digitalization's educational potential to the benefit of all? What emerges as a possible response is the defence of public education as a core concept. This implies strong regulatory policies for digitalization processes in the education sector, public investments in infrastructure and teacher training as well as compensatory policies for disadvantaged students. At the conceptual level, the core concept of education as a public good needs to replace or at least complement the prevailing employability

approach with a rights-based approach. The acquisition of digital skills and the participation in digital education, much more than a requirement of the future digital economy, has to be viewed as a basic human right. Without such a change in perspective, it will not be possible to redress the highly uneven distribution of economic and social benefits stemming from digitalization.

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1 This article draws on the ÖFSE Briefing Paper 28 (Langthaler/Bazafkan 2020).

2 The First Industrial Revolution (IR) is commonly referred to as the introduction of coal-fired and railway based industry in the 18th century; the 2IR at the end of the 19th century is marked by the widespread application of machinery for labour and subsequent mass production of goods; the 3IR (from mid 20th century onwards) involves the development of global industries spearheaded by digital technologies (computer, internet) (Kim 2019: 179).

3 See McKinsey Global Institute 2017; Nübler 2016; UNCTAD 2017; see Balliester/Elsheiki (2018) for a literature review; Heimerl/Raza (2018); Melia (2019) for a literature review with a focus on developing countries and Africa respectively.

4 UNESCO Institute for Statistics database: http://data.uis.unesco.org/