The Changing Role of Digital Learning Environments during/after the COVID-19 Pandemic

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The Changing Role of Digital Learning Environments during/after the COVID-19 Pandemic

CO:RE Short Report Series on Key Topics

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Contents

Key insights

- **Digital learning environments** (DLEs) make it possible to maintain the operability of schools while helping to extend the whole concept of schools from the physical to the sociotechnical sphere.
- Organisational and individual **resilience** lies, among other things, in the strategic ability to adapt to and use emerging technologies. The response to the COVID-19 pandemic was evidently about building the resilience of schools as organisations and of all individual actors – teachers, parents, and students.
- DLEs provide more flexible opportunities for learning, but only if sufficient infrastructure and support for students are provided. Under some circumstances, DLEs may have **a negative impact** on learning outcomes.
- The way to a flexible, inclusive, and sustainable school involves using **a hybrid model** of digital and physical learning environments. The digitalisation of schools is about taking the leverage of technology and adopting high-end solutions in parallel to those available in real life.

- **Parents and guardians** are key to the success of remote learning in many ways. Teachers should consider the limited time resources and increased stress parents experience and acknowledge that it may require extra effort for many parents to familiarise themselves with a situation that differs dramatically from their own experiences of attending school.
- **Children and young people** are the most important stakeholders in the school context. Students who do not have the skills to participate and lack the skills to understand the dynamics within digital learning environments can be easily excluded from learning.

Introduction

In spring 2020, education systems all over the world were in crisis, as schools were closed and teachers had to change their *modus operandi* almost overnight. In Finland, for example, schools were totally closed from the fourth grade up, and most preschool pupils and those attending grades 1–3 were advised to stay at home, if possible. Still, the situation was reasonably good in Finland in comparison to many other countries, as Finnish schools have a suitable digital infrastructure for remote teaching, there is high information and communication technology (ICT) penetration in households (Statistics Finland, 2020), and individuals are generally digitally literate (Kupiainen, 2010) and willing to adapt to the new situation. Guidance and support were provided on a variety of platforms that were managed mostly by the teachers. Similar agile action was evidenced around the world, as the need to keep schools functioning called for a wider application of ICTs and novel ways to teach and learn.

The findings of a recent EU Kids Online survey indicate how digitalised the lives of youth have become (Smahel et al., 2020). One can claim that the youth in many European countries are born digital. Digital environments have provided the young with several non-conventional ways for interaction, participation, as well as for producing or publishing content. Being equipped with online coping strategies is considered a civic virtue; therefore, first graders in Finland and several other countries are already taught how to be digitally literate and skilful. Considering the internet penetration rates among children (in Finland, 97% of Finnish teens have access to a smartphone, and most young have their own device), digital skills are crucial. The findings of the EU Kids Online survey (Smahel et al., 2020) indicate that on average 68% of 12–14-year-olds and 81% of 15–16-year-olds in 19 European countries were online several times each day or almost all the time. On average, 9–16-year-old children in Europe were online almost three hours. The period of distance learning in the time of COVID-19 has probably increased screen times at the expense of other activities.

The operational ability of schools during the COVID-19 pandemic also relied extensively on utilising sociotechnical environments. While the pandemic was spreading, all the organisations that could close their premises and carry on working remotely enabled their employees to work from home. A recent report by the Joint Research Centre of the European Commission states that during spring 2020, most of European children (about 75%) were able to continue attending school online (Vuorikari et al., 2020). The report, however, emphasises that switching to online schooling is multifaceted even in the European context.

Similarly, due to the forced or voluntary social distancing rules, schools in many countries all over the world had to find new ways to arrange their activities and create spatial dispersion using digital learning environments. At least to some extent, this effect of the pandemic will be permanent, and the digitalisation of school and work has taken a giant leap forward. Furthermore, we will see collateral effects as COVID-19 will change work habits and time-space management as an example of **organisational resilience**, defined here as the sum of the adaptiveness of personnel and sufficient infrastructure (cf. Cote & Nightingale, 2012).

This report will focus on tackling the recent changes in schools that resulted from the need to augment distance learning during the COVID-19 pandemic. The report is based on recent research evidence and argues for the applicability of digital learning environments as a measure for organisational resilience, and to demonstrate that learning in digital environments can be both inclusive and exclusive, and have positive as well as negative outcomes.

How can we understand 'resilience' in the context of digital learning environments?

Digital learning environments (DLEs) are sociotechnical environments that provide asynchronous and spatially dispersed learning opportunities (Peters, 2000). Similarly, as argued by Okkonen (2021) in the context of work, DLEs make it possible to maintain the operability of schools and help extend the whole concept of school from the physical to the sociotechnical sphere. Teachers also profit from the utilisation of DLEs, as these platforms provide various teaching opportunities as well as an opportunity to work in a more flexible way (Okkonen et al., 2018).

The recent EU Kids Online survey findings provide evidence that children in the 19 participating European countries have almost unlimited access to the internet; however, digital environments are not that extensively used for studying (Smahel et al., 2020). Camilleri and Camilleri (2017) argue that educators and learners do not engage in DLEs for several reasons, including the mindsets of users and policymakers.

On the one hand, DLEs make it possible to create rich content; there are several information management features to support the learning process, and their digital *modus operandi* is not dependent upon physical restrictions (cf. Okkonen, 2021). On the other hand, many issues might hinder or even block the utilisation of DLEs – lack of access to the internet, insufficient infrastructure (digital devices and software), or poor digital literacy skills. It should be noted that even European countries differ regarding their abilities and willingness to use DLEs (Schmid & Petko, 2019); therefore, the situation is even more versatile on the global scale.

During a crisis, organisations and individuals need the capacity to act swiftly in response to unexpected threats as well as emerging opportunities (Tsiapa & Batsiolas, 2019). Organisational and individual resilience lies, among other things, in the strategic ability to adapt to and use emerging technologies and, by this, in disrupting the status quo in operational areas. Survival during the COVID-19 pandemic was evidently about building resilience, yet also about forced changes initiated by the crisis.

Resilience as a concept originates from the field of ecology, where it refers to the capability of an individual, a group or even a system to deal and cope with change and setbacks, or to continuously reconstruct (Mannen et al., 2012). The application of the concept has expanded into the social and behavioural sciences (Folke et al., 2010). More recently, as a logical extension, the concept is also applied in economics and organisation studies (cf. Haase & Eberl, 2019; Herbane, 2019; Sabahi et al., 2020). **Personal resilience** refers to the capacity to maintain or regain psychological wellbeing in the face of challenges (Ryff et al., 2012). **Organisational resilience** is concerned with how organisations structure their activities to anticipate and circumvent threats and opportunities to their continued existence.

As stated by Hillman (2020), the concept of resilience is widely adapted, yet sometimes shallowly interpreted. Major characteristics of resilient organisations include (i) sensitivity to changes in the organisation's operating environment; (ii) a flexible, adaptive decision-making process; (iii) willingness to openly confront difficult issues such as power and control; and (iv) an organisational culture that is supportive of change (Freeman & Carson, 2006; Välikangas, 2010). Consequently, organisational resilience should be understood as the capability to react, adapt and act according to internal or external signals or pressure (Borekci et al., 2015).

Resilience in the school context is a positive developmental trajectory characterised by demonstrated competence in the face of, and professional growth after, experiences of adversity in the workplace (Caza & Milton, 2012). As stated in Vuorikari et al. (2020) the majority of parents reported that during the spring 2020 lockdown, their child had acquired and gained new digital skills in using digital technologies for online school activities; the latter, thus, actually promote digital literacy. Vuorikari et al. also state that such *modus operandi* promotes autonomy as digitally literate children can participate in schooling individually, thus being resilient.

The development of a resilient school is not possible without reorganising work practices, re-engineering operating modes and utilising the adaptiveness of people. It might even require executing unconventional steps, for example, switching to DLEs suddenly. This demand manifests itself in redesigning the contractual and accountability structures between individuals, organisations, and diverse clusters of key stakeholders (such as parents and others) at school and at home. As stated by Burnard and Bhamra (2011), changing the organisational mode enhances the ability to adapt. For example, outsourcing, cloud-sourcing, decentralisation, individual contracting, job crafting, company-internal markets, and hyper-specialisation are concrete examples of the ways in which various organisations have recently attempted to meet such requirements (Bernstein et al., 2012; Malone et al., 2010; Oldham & Hackman, 2010; Wageman et al., 2012).

Since task performance has increasingly become dependent on seeking, using, and sharing information via ICTs, many organisations can mostly work in socio-technical environments. The demands for the reorganisation of learning and schooling, thus, mainly focus on the (re)organising of knowledge-related practices and modes of interaction at school. Such **knowledge practices** can be defined as a set of activities focused on seeking, acquiring, using, and sharing information, as well as environmental scanning and personal information management (Jones & Teevan, 2007; Savolainen, 2008).

A major characteristic of such knowledge practices is that they are proactive – anticipatory, self-initiated and future-oriented, placing emphasis on agile action that introduces constructive changes (cf. Savolainen, 2008). The above demands are also reflected in the ways in which resilient organisations focus on knowledge management serving the ends of achieving internal and external intelligence. For example, an approach of weak signal analysis detecting

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a sign of coming changes has become an integral part of knowledge management (Kaivo-oja, 2012). Such change in the operating mode implicitly promotes resilience as agility increases.

Digital learning environments as a double-edged sword

DLEs provide more flexible opportunities for learning (Sirkemaa & Varpelaide, 2018), but only if sufficient infrastructure and support for students are provided. However, under some circumstances, DLEs may have a negative impact on learning outcomes. For example, participating without paying attention to the content may result in a negative outcome (Schmid & Petko, 2019). Learning through DLEs can also exclude a group of students, if not enough hardware is provided by the school or parents. Participating in remote school sessions also includes several aspects of digital literacy – understanding technological limits, how sociotechnical environments function and an advanced knowledge of digital presence.

In regard to changing sociotechnical environments, the most critical issues to be solved are a lack of hardware and broadband access and poor supporting (digital) infrastructure. It is essential that educators as well as students and their parents be willing to engage in the process of learning. As the experience of the first six months of the COVID-19 pandemic has shown, applying digital learning environments as a measure for resilience requires adaptivity to a new situation and courage to take quick action to keep educational institutions running and opportunities open.

The digitalisation of school enables a better use of knowledge and information due to enhanced access, management, and dissemination (Parida et al., 2015). It is expected to result in enhanced outcomes (Shujahat et al., 2019; Michaelis et al., 2015; Chou et al. 2014; Ferreira & du Plessis, 2009; Tuomi, 2004). Sociotechnical work environments provide sufficient infrastructure for continuing operations and suitable means for internal and external collaboration (Okkonen et al., 2018). Digitalisation also affects efficiency through a better information flow and more productive work (Vuori et al., 2018).

The higher expectations regarding digitalisation are not easily fulfilled from the stakeholders' viewpoint. In fact, the effects of digitalisation seem to be twofold. Vuorikari et al. (2020) discuss the fear of missing tuition or dropping out, and other negative effects on learning; also increased workload and time spent online. By

bringing about ever more information systems, applications, user interfaces and operating systems to provide content and enable learning, digitalisation has also resulted in information overload, a hectic pace of work, multitasking and interruptions (Franssila et al., 2015). Studies confirm that users can experience ICTs as demanding and stressful (Bordi et al., 2017; Salanova et al., 2013). For example, Tarafdar et al. (2011) discuss the features of **"technostress"** caused by the overload of technology. Another worrying issue lies in the potential weakening of social ties and reduced social inclusion: by increasing the use of ICTs people tend to have less face-to-face contact (Chen, 2013). In the school context, this may lead to weakening the sense of community, and consequently to lower trust and motivation, which is the least wanted outcome during the crisis.

Technostress may also lead to a decrease in organisational commitment, as Ragu-Nathan et al. (2008) claim. Other possible negative implications may include working conditions in schools, teachers' work quality and performance (Franssila et al., 2015). Further-more, self-inflicted interruptions, excessive communication and an 'always on' lifestyle are side-effects of digitalisation, yet resilient individuals and organisations can see new possibilities and cope with challenges.

As the COVID-19 pandemic caused un-expected, and unwanted, massive social experience, which required switching from face-to-face to remote communication, such a change could lead to several unanticipated consequences. From children's perspective, for example, the issue of inclusion and/or exclusion is critical. For instance, one of the unwanted results of using DLE's is the marginalisation of children by *modus operandi*. As stated above, technology helps to include all users who feel they are competent with devices; however, for those with more modest digital literacy skills, remote teaching could pose new challenges.

On the practical level, the problem could be handled, but are there lessons learned for further critical research? During the spring of 2020, the issue of digital literacy and sociotechnical skills underlined the ease and burden of finding sustainable solutions for tackling the effects of the pandemic. The second evident issue was the effect of augmenting school with DLEs. It became evident that changing from one *modus operandi* to another is not the most wanted solution; instead, schools should become more flexible in building resilient practices. The way to a flexible, inclusive, and sustainable school is the result of a hybrid model of digital and physical learning environments.

Practical implications for stakeholders

For key stakeholders, such as educators, parents, students, the community, and policy-makers, augmented school is about changing conservative thinking and conventions. This leads to major implications for different realms:

- **Schools** are in constant flux and should therefore be viewed as a hybrid service provided by various channels. As the role of schools is far more significant than just a platform providing information for students, the meaning of social aspects and the role of interaction should be reconsidered. Digital learning environments can be viewed as democratic in nature, enabling inclusion for all. Remote learning does not only lead to changes in the content but also changes in conventions. The people responsible should be challenged to invest more effort in the process rather than just digitalising schools. The digitalisation of schools should be viewed as much more than just putting things online: it is about taking the leverage of the technology and adopting high-end solutions in parallel to those already tested in practice.

- **Parents and guardians** are key to the success of remote learning in many ways, as they are the closest adults to children while the schools are functioning in hybrid mode. On the one hand, it is no longer possible for parents to rely on teachers to do all the work – parents should also guide and monitor. This calls for more extensive dialogue between schools and homes. On the other hand, teachers should consider the limited time resources and increased stress parents experience (especially during the pandemic) and acknowledge that it may require extra effort for many parents to familiarise themselves with the current situation that differs dramatically from their own experiences of attending school.

- **Children and young people** are the most important stakeholders in the school context. Being digitally resilient evidently underlines the role of school in developing the respective mental state of mind. Taking this as a central idea, attention should focus on digital literacy as a key skill even before attending school. Students who do not have the skills to participate and lack the skills to understand the dynamics within digital learning environments can easily be excluded from learning. Being present online is not enough, as digital learning environments do not capture one's attention the same as being present in the classroom does. For students, this means greater responsibility for oneself as well as for their peers. Digital learning environments are not digital extensions of a classroom, but more complicated environments with different social rules and expectations, and different social dynamics. Spatially dispersed, yet synchronous environments can almost be equal to settings for a digital classroom; however, asynchronicity challenges almost all conventions, habits and rules. To maintain operability, the rules of social action should also be included within the concept of digital literacy along with more practical skills of being able to cope technically in digital learning environments.

- **Policy implications** are straight-forward – building resilience capacity in schools by establishing DLEs should be a continuous goal. At the same time, the municipality or school district should critically assess the status of implementing a hybrid model based on DLEs. The concept of school should also be reconsidered at the policy level. Is school a physical place that is almost separated from the surrounding society? Or is school rather a service provided by society? A digitally capable school providing new sociotechnical possibilities should be constantly open to new developments, reflecting the present state of the art in the everyday lives of children and youth.

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