Digital technology in schools:
The pandemic opportunity
for fostering a "digital culture"

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Abstract:
On 16 March 2020, educators had to respond to the closing of schools in France on account of the pandemic, an exceptional event with an impact on 12 million pupils, more than 20 million parents, 800,000 teachers and 400,000 employees of the Ministry of National Education. The response to this emergency and to the expectations of these various parties was a massive shift toward digital technology and its resources, such as the educational material proposed by the ministry, its agents and partners (*e.g.*, the CNED's "Ma classe à la maison" or the ENT's "Espaces numériques de travail"). This articulation (specific to France) of public policies about digital technology with support from a multitude of actors proved to be relatively effective, as attested by the OECD, which cited France as one of the countries best organized for providing continuous schooling. This review of feedback from this experience during the pandemic identifies axes for the development of a digital culture shared by a system of education in movement.

All education systems are undergoing deep changes in their methods and organization, at all levels of schooling, that entail intensely and deliberately tapping digital technology's potential. This technology is a powerful means of change for state policies in all dimensions: the modernization of the state with a new toolkit for steering the educational system, the rollout of new digital services to teachers for the purpose of making them more professional, the deployment of new ways for conveying knowledge to pupils, etc. As we know however, it is complicated to put digital technology to use in our education systems. This issue must be tackled with ambition and discernment.[1]

Following the closing of all schools in France on 16 March 2020, the educational community had to react to an exceptional situation, which affected 12 million pupils, more than 20 million parents, 800,000 teachers and 400,000 employees of the Ministry of National Education. This reaction involved massive recourse to digital technology. The response to this emergency situation and to various parties' expectations was possible thanks to the educational tools proposed by the Ministry, its operatives and partners, (*e.g.*, the CNED's "Ma classe à la maison", the ENT digital workspaces, and so forth). This French response was based on the capacity for articulating public policies about digital technology with support from a multitude of actors. This specificity proved to be effective, as pointed out by the OECD, which mentioned France among the most successful countries in organizing to cope with the pandemic and ensuring the continuity of schooling.

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[1] This article, including any quotations from French sources, has been translated from French by Noal Mellott (Omaha Beach, France). All websites were consulted in June 2021.

This health crisis was a unique occasion for continuing the improvement of our schools. Education has never relied so massively on digital technology in such a short time, while making real-time adaptations for uninterrupted schooling. By speeding up uses of digital technology in the education system, this crisis clearly revealed this technology's advantages and limits. All of this calls for understanding and analysis. The general assembly (*États généraux du numérique pour l'éducation*) held on 4-5 November 2020 provides a windfall of results for helping us understand this period. The input for this meeting came from testimonies, feedback, the findings of national and international surveys, and analyses of the data used in educational services, in all, a set of material collected from April to November 2020 and shared with representatives of the educational community: teachers, pupils, parents and, too, the school system's partners (above all, the local authorities, who have an important role since they share responsibility in this field with the state).[2] The robustness of these results stems from the decentralized, participatory approach to organizing the *États généraux*,[3] since everyday experiences often carry force in matters related to digital technology. By analyzing concrete cases, problems and solutions, a list of proposals was made.

The axes presented have to be understood as a permanent invitation to improve our educational system. They cannot be frozen in time but, instead, must be integrated in a continual back-and-forth movement consisting of tests and iterations for perfecting what exists. To design public policies for an e-education, the basic bricks for building confidence in our educational system are exchanges, sharing and listening. As we know, confidence is fundamental to digital technology. This article provides an overview of this feedback from the health crisis.

The digital divide and equal access

As shown during the first period of what has been called "confinement" in France (from March to May 2020), the digital divide still exists. More than 500,000 young people, it was estimated, did not have the means for connecting or working on line. The digital resources and educational software available via the Web (ENT, the virtual classes proposed by the CNED, private resources, etc.) were sometimes a factor in this inequality, since they were not always accessible or could not be used by everyone everywhere. The arrangements made for "distance learning" might even have worsened the existing inequality. The health crisis was like a litmus test that revealed an inequality of access and appropriation that already existed. In the meantime, virtual and then mixed (virtual plus in-person) schooling shed light on the need to adapt tools and services to the whole educational community.

The continuance of schooling during this first lockdown heavily relied on teachers. But it also required that the (legally responsible) parents play a considerable part, more than usual, since they, along with teachers, had to teach and follow up on their children. As this period of distance learning proved, it was necessary for families to oversee their children's uses of digital technology. Tools and services had to be adapted to all groups: to the needs of teachers, staff-members, and pupils but also to the followup by parents, in particular when the latter's maternal tongue was not French.

In schools, the uses of digital technology (laptops, software, applications, platforms, websites, etc.) helped make up for some pupils' cognitive or sensorimotor problems on condition that the digital equipment and resources being used were adapted to their handicaps. This accessibility, useful for all pupils, facilitated the access to online learning.

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[2] Local authorities have a key role since, among other things, they purchase digital equipment. The 2013 Act for the Refoundation of Schools defines the public service of digital technology for education.

[3] https://www.education.gouv.fr/les-etats-generaux-du-numerique-pour-l-education-304117

A digital workplace culture: Working together but differently

According to the most recent studies from the OECD, teachers' ability to work together, to better collaborate and coordinate, is a decisive factor in the countries with a highly efficient educational model. This point also stands out in the analysis of the tools used elsewhere.[4] A "digital commons" is to be constructed for all parties in education.

While teachers were already using educational technology to work together, the possibilities of exchanges between pupils are less frequent. During the first lockdown, various work methods entailed cooperation on different scales. As research has shown, there was "*no global, monolithic opposition from teachers*" to collaborative practices; and these practices and the organization of groups went in hand with the "*societal changes related, in particular, to the digital transition*".[5] Distance learning and then mixed arrangements (distance plus in-person) raised questions about the choice and availability of the tools to be used, about how reliable and durable they were and how well they corresponded to the needs of groups of personnel in education.

Furthermore, it was necessary, during the first lockdown, to adapt the usual procedures for managing establishments. New procedures had to enable teachers and staff to acquire new skills thanks to a work environment that offered diversified contents (web conferences, online communities, etc.) for taking account of each party's needs and providing a considerate, coherent followup.

E-teaching and e-learning

Digital technology modifies educational practices and, too, teachers' professional development. It implies a change in "forms": in both the way of teaching and the organization of space and time. It is thus necessary to rethink forms of organization, places and spaces in order to respond to the new educational needs stemming from digital technology. Actions are to be conducted on the hybridization of course work. As research on the appropriation of professional practices has shown, the "*majority of technologies are a daily practice only for a minority of teachers and the use by pupils in the classroom of educative technologies is very limited.*"[5]

The first lockdown, by altering the space-time of education, required and enabled the use of new forms of distance learning based on digital technology. Teachers had to find out how to motivate pupils to become involved in their learning process by stimulating their interest and creativity on the continuum from in-person to distance learning, while taking account of their degree of autonomy. They set up new ways of working with pupils. Pupils used digital technology to follow courses, consolidate what they had learned and acquire new skills. Sometimes they transposed the practices developed in other contexts (in particular gaming); and they developed new forms of mutual aid. However some pupils "dropped out" because they lacked skills, connectivity, equipment or motivation.

Prior to the first lockdown, research studies had not yet established whether digital technology improved pupils' scholastic results. Furthermore, results about this were qualified since these studies pointed out that a multifactoral, ecosystemic approach instead of a deterministic one should be used when studying digital practices in the context of schooling.[6] Nonetheless, some forms of learning are more efficient with digital technology, which allows for varying and adapting the contents to pupils'

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[4] See the trends in the last British Education and Training Technology (BETT), the international market of educational services and resources.

[5] Source: DNE-TN2 & CREAD-M@rsouin, 2020.

[6] FLUCKIGER C. (2017) "Les technologies numériques à l'école, quel bilan?" available at http://hal.univ-lille3.fr/hal-01613680. See, too, the work done by the DNE's thematic digital groups (2020) DNE-TN2, 3 July & "Éducation, numérique et recherche" available: at https://edunumrech.hypotheses.org/1948.

needs, offering immediate feedback about successes or difficulties, and making recommendations. Internationally, "*in the countries with the best results, professional exchanges and training in peer groups are preponderant and allow for a scaling of educational systems.*"[7]

To be able to use the tools and services that are proposed in an efficient, responsible and safe way, pupils must acquire a shared digital culture. The new skills in cooperation and collaboration that have been developed between peers must be put to use.

International surveys[8] have pointed to the strong need of training in educational software for French teachers, both during university and on the job. The first lockdown and distance learning, which relied on all sorts of digital services, created a need and demand for training. As the initial research studies shown, this lockdown pushed or even forced teachers to adopt digital tools (and learn how to use them) within an extremely short time without the benefit of standing clear and taking stock, as is necessary, in order to assess their sometimes disparate practices. Training during the teaching career is necessary to consolidate what has been learned and improve skills. These conclusions point to the need to reinforce the appropriation of new forms of training (self-learning, open access to training software, etc.).

Farther ahead, the goal is to change how teachers teach the uses of digital technology and how pupils learn them, and thus change both teaching and learning by using this technology. According to findings from research, it is necessary to emphasize the "*importance of designing training programs about the educational integration [of these tools] in teaching and learning situations*" instead of being satisfied with just "*learning the technological tools*".[5]

A responsible, sovereign digital technology

To ensure the continuance of educational and administrative services during the pandemic, digital equipment, services and resources were increasingly put to use. This had an environmental impact. In addition, it raised questions about data processing in education and about the quality and availability of digital tools and services. This increased use of digital technology for the continuance of schooling also bred questions about the "digital sovereignty" of schools. This sovereignty for guaranteeing continuity in education leads, for example, to asking questions about how long these tools, services and contents will be available to pupils and teachers. It also means guaranteeing the conditions for processing and storing data and setting the conditions for the Ministry of National Education to reuse them for educational purposes.

As seen during the period of the first lockdown and distance learning, several parties, alongside state and local authorities, played an essential role in setting up the solutions for the continuance of education, in particular the firms specialized in education technology (EdTech), which heavily contribute to the ecosystem of digital technology for education.

The state's digital strategy must foster the emergence of a sustainable and economically viable approach, both public (operators' offers) and private (offers from EdTech and publishers specialized in education), by addressing the questions of interoperability, data reversibility (toward pupils and their parents), transfers with research, and a strategy for procuring digital resources and services by all actors in the educational community.

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[7] Gibert (2018) quoted in DNE-TN2 & CREAD-M@rsouin, 2020, see note 5.

[8] Such as TALIS by the OECD (http://www.oecd.org/education/talis/TALIS2018_CN_FRA.pdf).

Setting up new forms of governance and tools for prediction and planning

State and local authorities share responsibility for digital technology in public education. Exchanges between these partners must be deepened and facilitated for them to draft together more efficient and better coordinated policies. Procedures for coordination and cooperation must be reinforced and adapted so as to anticipate coming crises with the help of plans for digital continuity (the schedule for distance learning, telework, etc.).

The governance of digital technology for education, now distributed between ministries and academic regions, must be reviewed, including in schools and establishments. The model of a partnership around schools must be expanded to include all parties active in digital technology (local authorities, associations, cultural actors, industry, etc.). Initiatives and proposals, national and local, mst be pooled to analyze their potential for generalization, anticipate adaptations, and make plans for launching and accelerating underway programs, all this in order to prepare for, and build, the future for everyone.

Confronted with a world where the landmarks set by the Republic are under attack and noise from the social media is scorning science, it is more than ever worthwhile enabling the parties in education to consolidate the foundation for core knowledge and a digital culture that are needed to develop critical thinking and defend our rights and freedoms. This is what is at stake in seizing the opportunity offered by the pandemic and being able to draw benefits from the rollout of digital technology in our schools.