PREFACE

to *Learning and Learning Ecosystems in the Time of Covid-19*

The Year of Living Dangerously

We consider the issue N. 46 particularly significant because it comes at the end of 2020, a year that marked the recent history of humanity. On one side, the pandemic reminded us how fragile mankind is and that it can succumb to a small and invisible enemy; on the other side, the Covid-19 challenged and stimulated the potential of our intelligence and creativity that, when driven by collaboration and solidarity, can be very high. The effects of the pandemic inevitably put under stress all learning ecosystems of the world that had to switch suddenly to the on-line modality and remained confined to this virtual dimension for a long time. It was a leap into the shadow, if not into darkness, the consequences of which are still to be fully understood; at present they are still, and will remain for a long time, under investigation. Up to now hundreds of papers are already available in various forms: a great deal of grey literature and countless instant papers, a few reports [1-5], special issues [6], a first review attempt [7], an initial modelling attempt [12], etc.; however, they represent only the first step toward a long way to a sedimented analysis of the events, which will almost certainly take a few years to put together all the various aspects, all the pieces of a mosaic that seems to expand beyond any imaginable limit. This special issue, for some aspects, is no exception to the panorama described, and bearing no particular claims of universality, it will contribute with its tiles to add traits, shades of colours to the storytelling of the adventure that we have all lived and are still experiencing. Nonetheless, this issue represents an opportunity to highlight a few aspects, as a contribution to a journey in progress.

At the moment we can state, with a reasonable degree of reliability, that few chapters on the journey undertaken by all learning ecosystems a few months ago have been drafted: i) the first reaction of the institutions followed by the testing of the infrastructural component of their e-maturity [8] and of their smartness [9]; ii) the setting up of an emergency teaching program which within few weeks, at most a couple of months, has become routine [2,10]; iii) the forced coexistence of the physical and virtual dimensions. The number of next chapters and their titles are not yet known, perhaps it will just be a single chapter entitled the "new normal", perhaps the story will evolve through multiple phases, with its characteristics taking shape at this juncture.

For the time being, let us consider only the first three chapters that have been drafted and try to ask ourselves: what are the significant elements that emerged during their unraveling?

First chapter. During the evolution of the first chapter we realized how unprepared we were, from an organizational point of view, to face a severe pandemic like the one we have experienced up to now: we noticed, at any level, the absolute lack of specific risk analysis and recovery plans, despite the recommendations that in the past, following previous epidemics, have been expressed by many important international organizations. At the same time we have also been able to test and realize: a) the

robustness of web infrastructures currently in use, at least in the industrialized countries; b) how significant were the skills already available in network management; c) how mature were the applications made available by major corporations like Google, Microsoft, Zoom, etc. (ready to help, but also to build the basis for customer loyalty and for future returns). All learning ecosystems switched from the physical to the virtual dimension in a sufficiently short period of time, thus avoiding the interruption of educational processes: within a few days in the case of universities in industrialized countries; within a few weeks in the case of schools in civilized countries or universities in countries where the network infrastructures were not yet very developed. In this phase, it was realized how important it is to have plans to counteract severe crisis determined by events like a pandemic, and a well-organized and centralized decision-making chain with the ability to rapidly disseminate clear instructions. It was also realized how important it is to support all actors involved in the transition of educational processes from f2f to fully on-line. In fact, the weakness of the educators' digital culture emerged already in this phase - among both university and school teachers -. Basic digital literacy to use devices and web applications in an educational context was not diffused as we would have expected. Moreover, it was also realized how extended the digital divide is, originating in the difficulties of many individuals to have a good access to the web (lack of a suitable device or, even more, inadequate connection bandwidth). Surprisingly, even in industrialized countries, peaks of 10% of people unable to connect to the Internet were detected. Such difficulties reached peaks well above 50% in less developed countries and in less infrastructured areas, such as rural ones. All governments tried to run for cover, but apparently still a lot of work is needed to provide access to the Internet recognized as an individual right; as such, constant actions that should go far beyond the contingency of the pandemic will be required in the next future. Massive investments for this purpose have already been planned under the Next Generation EU funding scheme.

Second chapter. During the development of the second chapter of our story, we witnessed the deployment of what has been defined by many as emergency teaching. Actually, such teaching has become a routine within a few weeks, maximum two months. In any case, because of a routine emergency, the performed didactic activities were not able to generate a profound reflection on the didactic significance of the technology mediated educational processes and contexts. We assisted to a continuous adjustment of objectives dictated by contingency.

We witnessed an unstructured deployment of webinars, continuous phone calls and meetings with more experienced colleagues, "desperate" efforts to recreate the teaching comfort zone; many educators tried to reproduce (i.e., mimic) the class dynamics to which they were used, thus generating the need for a massive use of videoconferencing.

In this period, as confirmed by many surveys, everyone became aware of the efforts required to design, prepare, and deliver high quality online teaching, and that also a "simple" online teaching session requires a much greater commitment than a standard teaching process conducted in presence. The majority of students and teachers have also realized that online education allows for a better organization of individual time, for economic savings and, in addition, contributes to environment preservation. All this, however, is counterbalanced by social and economic criticalities that emerged dramatically in the third phase, and will be discussed in detail later on in this preface.

This second phase also highlighted family and individual psychological problems. For example, doubts about the adequacy of domestic spaces and family schedules were raised, and inevitably a reflection on how physical spaces could be transformed and made more functional was launched by several designers and architects. Many considerations were dedicated to the limitations imposed by distance on individual expressiveness, social interaction and inclusiveness. All these have been assumed by many as reasons to justify the request to return as quickly as possible to face-to-face learning activities for students of all ages, even in the absence of a thorough investigation of students' opinions. In this regard, it is interesting to note what happened to most of the teachers that had to interact with high/vocational school students, or university students, who preferred to deactivate their camera to the advantage of a vocal interaction, maybe because in such a way it was easier to preserve privacy, and make people feel free and more relaxed in their environments and behaviours.

Third chapter. The third chapter introduced the problem of the sobbing reactivation of the f2f learning activities in different forms and with different intensities, a problem faced by all learning ecosystems. To restore such activities, governments concentrated almost exclusively on measures needed to ensure the safety of physical places of the learning ecosystems, without considering interactions that a physical place generates with other systems (i.e. transportations). On-line activities, in particular for schools, have been initially confined within the contingency plans for the future, but they had to be resumed with different intensities, from case to case, each time the number of infections increased. This process resulted in schizophrenic planning and delivery of learning activities.

During the third phase, a strong contrast emerged between virtuality and physicality, digital and non-digital, distance and presence, integration of new modalities and complete restoration. Very soon, however, such contrapositions appeared as a false problem, facade discussions needed to cover more relevant criticalities of social and economic nature (beside the abstinence from the stage of few individuals). Not by chance debates on the role of technologies in supporting educational processes and on the effect of the “digital” on the effectiveness of such processes (together with many related issues) disappeared from the media, and were pushed into the background, often relegated to academic discussions. In this phase, in fact, the main goal has been to foster school reopening as, what we may define, a "not-monetary intervention to contain the spread of the economic crisis" (i.e., to use learning ecosystems as social dampers). Not all families, in fact, can afford to pay for a babysitter, or have grandparents to be employed as child carers. Concurrently, work activities could not be stopped. The goal of the rulers has been to make schools appear as safe places, so that children can get in and leave their parents free to be productive.

Due to that, many people started to wonder, what is the role society attributes to learning ecosystems and to educational processes? A serious reflection is needed, and answers are determinant to design the future of learning ecosystems, and to decide if the primacy of economics is such that any consideration on the harmonious growth of the youth, as individuals and citizens, should be sacrificed to it.

In a similar manner, universities are drivers of territorial economics; this is especially true for small towns. Thus, in an attempt to reconcile health safeguarding and economic activity, the university staff started to develop new blended teaching and

learning, characterized by the simultaneous delivery of distance and face-to-face lectures, even though the latter was attended by groups of limited dimension, subject to rotation.

Attempts of this kind are also underway in schools, but this endeavour highlighted even more the urgency of infrastructural criticalities caused by the absence of broadband connections and the obsolescence of devices, therefore limiting access to advanced cloud applications (videoconferencing included). Paradoxically, it was discovered that it is easier to organize online teaching and learning processes with individual home resources of both teachers and students, rather than using school resources.

To conclude, we must realize that we are living in a phase - the third one - that has made clear that economic and social problems have the upper hand over education, and that smart learning ecosystems are not (yet?) at the center of the project of a new and better society, despite the commitment of thousands of teachers who believe that learning ecosystems can contribute to social innovation, individual growth and the achievement of the 2030 SDGs.

As previously stated, we do not know how many chapters of the adventure are still ahead, nor what the "new normal" will be, but we will not stop promoting, as ASLERD [11], reflections on how to foster and support the growth of the smartness of people and community-centered learning ecosystems. For these latter, economics should be a tool and not a goal, and the increase in smartness should be supported by a fruitful and meaningful integration of technologies. This is why we continue to believe that it is important to foster constructive debates on a possible better future well beyond the academic sphere.

This is the spirit by which ASLERD has supported the realization of this special issue of IxD&A journal.

Selected papers. The papers selected for this special issue are paradigmatic of the pandemic experience and contribute to the narration of how learning ecosystems and actors involved in the educational process reacted all around the world, how they are reflecting and analysing what happened and, finally, how started designing a possible future.

The first two papers are devoted to the reactions in schools. Chuah and Mohamad provide a description of a case study conducted in Malaysia during the second phase, that of emergency teaching. They confirm once more the relevance of guidance to be provided by the institutions and of access to the Internet, while pointing out also different speeds between public and private schools in terms of switching time to on-line. They conclude, in fact, that the interviewed teachers, although considering themselves well equipped with pedagogical knowledge in integrating technology, were unable to fully utilise what they learned in their teacher training programme due to lack of administrative support from the school and of poor infrastructure accessibility. From the paper it is clear that the interviewed teachers were mainly attempting to reproduce the standard f2f dynamics during the emergency. They also underline the relevance of the synergy between school teachers and parents to support the students learning during emergency remote education.

Simpson describes another case study, carried on in the United States, also during the early stage of the pandemic. The paper reports perspectives of K12 students and

parents. After an introduction on general benefits and challenges of on-line learning and teaching, the author focused on critical aspects that emerged during the pandemic. Simpson confirms the relevance of the digital divide that apparently affects many millions of Americans, in particular the inhabitants of rural areas and families with many children. In regard to this issue, the USA is not an exception. Simpson also highlighted the challenges faced by parents in assisting their children, which in return uncovers the role of social dumper played by schools. Similar to other countries, an increase in teachers' workload is reported, partially due to their unpreparedness. A situation that prevented teachers from implementing more advanced and collaborative practices, and points out the need for pre- and in-service teacher trainings more inspired by digital pedagogy. The body of the paper focused mainly on the effectiveness of the strategic approaches to on-line teaching. The outcomes confirm the data collected by multiple scholars during the recent past. We would like just to stress out the perceived increase of workload by students which, as in other cases, seems to derive from the inability of teachers to calibrate the student workload and to coordinate with their colleagues. A well known problem and a feature observed in environments characterized by competitive rather than collaborative relationships among teachers.

With the next two papers the focus moves to higher education. Väljataga et al. present a case study of transformation challenges faced by a learning ecosystem during COVID-19 from the perspective of teachers. While the level of e-matury corresponding to the investigated learning ecosystem seems quite high, the survey confirms the need of a more efficient crisis management and a particularly diffused tendency among university teaching staff to remain in their comfort zone and reproduce the usual teaching dynamics. This contribution once more points out, as for the case of the school teachers, the need of training courses aimed at increasing the literacy in digital pedagogy. An objective that we believe is quite difficult to achieve in any HE learning ecosystem, mainly due to the mechanisms usually adopted to select university staff. Such mechanisms, in fact, are largely influenced by the capability of the candidates to find financial resources and publish research papers. The teaching ability of candidates and, thus the focus on students, are always put in the background with respect to the image of the Higher Education Institutions. This is another aspect that should contribute to the reflection on the role that society attributes to learning ecosystems and on the primacy of economy. Overall, the basic descriptive analysis of the outcomes of the survey carried on in Estonia is perfectly aligned with other findings [10], including an increase in technological skills that would have not been learned in normal circumstances, as well as a positive attitude of the teaching staff towards blended learning; these latter arguments can be considered, anyway, beneficial outcomes of the pandemic.

The paper by Tsai et al. reports on another case study on higher education based on a more qualitative approach carried out at the Pennsylvania State University. Their study adds also a student perspective to the staff one. Once more we find many commonalities with other investigations, thus highlighting similarities between learning ecosystems, rather than differences. Nevertheless, we wish to underline some peculiarities of this case study, like the interruption of the college habits - e.g., studying and living in the campus area, taking advantage of WIFI facilities. - and the consideration about teaching/learning quality of on-line processes in relation with the tuition fees. The latter is a deeply felt issue in countries like the USA, where university

courses are very expensive and where the HE system is deeply oriented by economy. Another issue that emerges from this case study, not mentioned before, is the one related to assessment of the student performances. A huge amount of debates took place all over the world around this issue and, in particular, on proctoring and anti-cheating softwares. Despite the habits of the "copy-and-paste" generation, we do believe that this is partially a false problem, relevant mainly for learning processes relying on traditional transmissive approaches, or for cases in which the teaching staff attempts to reproduce in-presence dynamics. In other situations this issue is not so relevant - e.g. in project-based learning or in the case of on-line collaborative activities. This issue can be easily overcome also in many other standard assessment procedures by an adequate reformulation of the tests and by orienting them towards individual skills and competences, rather than knowledge. Of course, such reformulation will require not only an adequate level of digital pedagogy, but also a deep understanding of the course topics … and it is time consuming.

In the next two papers, the authors push the analysis of the collected data a step forward, also with the aim to understand how the pandemic may determine future behaviours.

In particular, Kabir et al. try to identify the factors that could influence the adoption of on-line educational processes by the use of a Structural Equation Model applied to data collected during a survey which involved university students in Bangladesh. Their study confirms that the most interesting and viable approach for future courses is a blended setup, although governmental intervention would be needed to implement it. A consideration that applies worldwide, with the only exception of private and on-line universities/schools. The authors defined a conceptual model based on few factors deemed relevant, while considering the outcomes of previous investigations. The level of a learning ecosystem's e-maturity (including infrastructural and human readiness) and its economic solvency (strongly related with factors that determine the digital divide, namely availability of adequate devices and connectivity, and possibility to cover the tuition fee) seem to influence positively students' intentions. On the other hand on-line assessment, which also includes a decrease in the meaningfulness of teacher feedback, has a negative effect, also due to the reasons described in details by Tsai et al..

Giovannella and Passarelli, due to the absolute novelty of the situation and the abrupt changes caused world-wide by the pandemic on the learning ecosystems, preferred to pursue an explorative approach and tried to extract bottom-up the relevance of a large set of variables, followed by the identification of their causal network. Their approach, previously adopted to study the Italian school ecosystem [10], is applied to investigate the Italian higher education ecosystems, and to compare the two ecosystems through the lens of the teaching staff. The outcomes of their descriptive analysis is fully in line with the general considerations, previously presented in this preface. We underline here only two aspects: a) the discovery of the causal network represents a step without which it is very difficult to compare on quantitative basis different ecosystems affected by a so abrupt change; a follow up study of this work [12] allowed, indeed, to compare different national ecosystems and to identify blocks of variables that may contribute to the overall acceptance of blended and/or on-line learning *(the technological setting and, more generally, the e-maturity of the ecosystem, the educational process and activities, the "individual forces", the fight between*

preservation and innovation in classroom dynamics, the perception on significance and sustainability of technologies); b) the comparison between school and university learning ecosystems shows that school teachers, despite well known difficulties, seem more open minded and capable to modify their perception on the basis of the experience, while university professors show a more structured mind that tends to associate future intentions of blended and on-line learning to preconceptions and to the possibility of remaining in their comfort zone.

Finally, we make a transition with the last two papers from the analysis of the events to practical reactions, to the design and implementation of aids to sustain the adoption of blended processes throughout the pandemic and in post-pandemic scenarios.

Manciaracina focused on the lack of tools that may help teaching staff of higher education to design and manage hybrid learning contexts. The pandemic created a continuous space between on-site and on-line activities, conditions that at present are carried out in parallel. The design of educational paths in this continuous space and of applications optimized for digital pedagogy may require a tool to design and/or co-design processes and, as well, manage resources. The tool proposed by the author and prototyped within the environment Mirò [13] is intended to help teachers get more aware and explore new ways to interact, teach, and communicate, where the physical and digital settings, in which students perform their work, coexist and generate phygital (physical & digital) learning environments.

To conclude, Faggiano and Mennuni describe an experience conducted during the pandemic aimed at using digital tools to mediate the construction of mathematical meanings. In particular, the authors focused on the concept of "rotation" as proof of concept and explored the application of the Theory of Semiotic Mediation based on a loop that connects practical activities conducted by using artifacts to individual productions of signs and, finally, to collective productions of signs and learning. The experience presented in their study points out the effectiveness of teaching activities to support collective discussion, besides the positive role of digital tools (DGE GeoGebra and Zoom) in the construction and appropriation of mathematical meanings during on-line activities.

Overall the papers selected for this special issue provide an overview of the most relevant findings detected in learning ecosystems spread throughout the world, during the pandemic. This special issue introduces similarities and differences among schools and HEIs, helps in uncovering the relation among different factors, provides guidelines, and shows a couple of examples of how we could determine the "renaissance" of the learning ecosystems by translating analyses in practice.

IxD&A issue N.46 is well representative of the mosaic and of the storytelling that report on the learning ecosystems dynamics during the pandemic, and that are still under (re)construction with the contribution of many scholars. This issue can be considered a secure reference for comparison in further studies on the already experienced phases, as well as a background for future studies and practical actions related to the current and future phases.

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