

DIGITALIZATION AND INNOVATION OF UNIVERSITY EDUCATION IN THE POST-COVID ERA

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The year 2020 will be remembered as a tragic period for humankind. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2 or Covid-19 or Covid) spread all over the planet infecting tens of millions of people and killing a significant percentage of them. The pandemics induced many countries to enforce different levels of mobility restrictions until full lockdowns for several months in different countries, with dramatic socio-economic consequences.

The extraordinary push towards digitalization of education

Digitalization of education has been debated for a long time but the acceleration induced by Covid was amazing. Education at all levels, from kindergarten to tertiary education, was affected very significantly with most institutions completely closed or with reduced access for several months. After the initial shock, millions of teachers, professors and administrative and technical staff members around the world reacted in an extraordinary way, trying to perform online all the activities and learning, in just a few weeks, how to use digital platforms such as Zoom, Google Meet and Microsoft Teams which in most cases they did not know before the crisis. Most of them adapted surprisingly well to the new system, appreciating the new advantages and trying to overcome the shortcomings:

Pros

1. delivering and attending the lectures from home without the necessity to be physically present in a lecture room which can be problematic and time consuming for individuals living far away from the institution.
2. Easier student-teacher interactions by using the “chat function” of the online platform during the lecture.
3. A general improvement of the quality and quantity of the online resources.

Cons

1. Reduced social interaction with other students, a very critical factor especially for young people at the beginning of their tertiary education studies.
2. Difficulties in teaching disciplines with experimental or practical activities such as biology, pharmacy, medicine, archeology, performing arts, fine arts, architecture, engineering and many others.
3. Difficulties, especially for students and scholars in the humanities and social sciences, in accessing libraries with no fully digitalized resources.
4. Difficulties for teachers not familiar with digital tools.
5. Socio-economic divide, making the activities very difficult for teachers or students not having modern devices or access to high speed internet.
6. Difficulties for some students, especially the younger ones, to focus during long online lectures in the same way as in the in-person activities.
7. Psychological issues related to isolation or reduced-social interactions despite the strengthening of psychological support services implemented by many universities in 2020.

We all hope that the upcoming vaccination campaigns will finally solve soon all health issues. Afterwards we should make a wise use of the lessons learnt and, **whenever possible** or appropriate, to continue to:

1. Teach online applying **hybrid models** in which in person activities are performed when necessary or useful (experimental and practical activities, initial period of degree programmes, etc.)
2. **Organize online assessments of students.** In this regard, instead of focusing on practical requirements such as double camera in the room of the students to prevent “cheating”, it would be better to perform exams able to assess their capability of mastering the most important concepts of the discipline, and to reply to complex questions rather than demonstrating that they just memorized notions that can be easily found on the internet.
3. Organize **online the meetings of the university bodies** such as Administration Board, Senate, Department or Faculty Councils, etc.
4. Organize online **theses defenses** at all levels (bachelor, master or PhD)

5. Strengthen the **open access strategies of universities** making sure that knowledge in all disciplines would be available for free not only to teachers and students of the institution but to the society at large.

Universities from medieval to new digital models

Universities are among the most ancient institutions in the world (e.g. al-Qarawiyyin in Morocco, 859 A.D., Al-Azhar in Egypt, 970 A.D., Bologna in Italy, 1088 A.D.) and they survived many serious religious, political, financial and health crisis. They were created much before paper was easily available and books could be conveniently printed with metal movable-type printing presses. In the last 30 years, after the diffusion of the internet (since 1993), they adapted increasing the quantity and quality of the online resources. Innovative pedagogical techniques such the “flipped classroom” were introduced in many courses to respond to the wide availability of information, transforming the teacher from “sage on the stage” to “guide on the side”. Distance learning was introduced several years ago but was used only for a low number of courses, being the in-person learning considered of higher quality by most institutions. *Massive Online Open Courses* (MOOCs), with thousands of students following classes delivered by world class universities for free (fees are usually applied only for the assessments) started in 2007 but did not become as popular as initially foreseen for several reasons, including the limited social interaction and the very high dropout rate.

The Covid crisis made, for the first time in the history of higher education, distance learning the new standard method for almost one full academic year. As mentioned above, the quality of learning and teaching was not always the same as before for all students but the overall results are certainly remarkable. The introduction of a high number of distance learning courses in traditional universities is an opportunity for the “new normal” after the Covid crisis but poses several challenges, including:

1. Traditional universities entering the “territory” of online learning will face the “**competition**” of other “**providers of education**” such as Coursera, edX and more recently even Google. Employers may be more and more interested in “non formal education” obtained outside the traditional universities as long as they will manage to recruit employees with the requested hard and soft skills.
2. In some countries (e.g. US, Australia, etc) **tuition fees** skyrocketed in the last decades and during the Covid crisis there was a strong debate on whether they could be justified **in the new “online only” setting**”. Should fees be reduced in case of total or partial online delivery of the courses?

Virtual and blended international mobility

The Covid crisis had a very negative impact on the mobility of international students, both degree seeking and exchange.

The Erasmus scheme, one of the flagship programmes of the European Union, started in the academic year 1987-1988 with only about 3000 students and in over three decades allowed several million students to study abroad within and beyond the borders of the European Union.

Immediately after the onset of the Covid crisis, many students decided to interrupt their Erasmus experience or canceled their plans to start it and complicated operations of repatriation began. In the current academic year 2020-2021 the number of Erasmus Students will be certainly much lower compared to the year 2018-2019 (before Covid). Even after the defeat of this terrible virus in 2021 (hopefully), we cannot expect the number of international students to go back to the pre-Covid levels.

The social and political impact of such reduced physical mobility in the European Union is expected to be significant considering the very positive effect of student exchanges on the creation of a common identity in a population of more than 400 million people who speak more than 20 languages and have in many cases a completely different history behind.

This very negative picture is a bit enlightened by the new opportunities available. The exchange of students between universities will be probably very different in the post-Covid era. The Erasmus+ Study programme (2014-2020) was allowing students to visit other institutions for 3-12 months in each cycle of education (bachelor, master or Ph.D) but for each period only one institution could be selected. **Virtual mobility** offers the amazing opportunity of attending courses at the different institutions all over the world at the same time, choosing the best ones for each discipline. However, to make virtual mobility really effective and fully operational we should:

1. establish new inter-universities agreements (memoranda of understanding or **MoU**) **allowing virtual exchanges of students** and not only physical ones.
2. define the **percentage of credits that a student can obtain attending online courses delivered by foreign universities**. Such percentage cannot be too high unless the degree will be finally issued by more institutions (double or multiple or joint degrees).
3. The recognition of the credits obtained abroad has been strictly regulated for many years by procedures which include the signature of *learning agreements*, *transcript of records*, etc. New procedures for virtual mobility agreements should be established and the **minimum number of credits obtained online from each institution should be defined**. In this direction, the current very active debate on **microcredentials** will be very useful.

4. **financially support virtual mobility like physical mobility?** Since no additional travel and lodging expenses are foreseen, the answer could be negative. However, students could claim the reimbursement of certain related expenses such as technical devices, high speed internet and online resources.
5. **motivate students to take courses online from partner institutions** (which signed with the home institution appropriate MoUs). We know that from the logistical point of view that would require additional efforts by the student, in order to:
 - a. **search and select the online courses** delivered by partner universities and include them in a learning agreement which should be pre-approved by the home institution.
 - b. **attend** the courses (which might have a schedule conflicting with other courses delivered by the home institution), **be assessed** (with modalities usually different from those of the home institution), **obtain the relative transcripts of record**, and go through the **recognition** procedure.

Why should a student do all that? The motivation of international physical mobility has been very much related to social, cultural and personal reason such as knowing different countries, languages, cities and people and of course virtual mobility is much less interesting in this respect. However, virtual mobility would allow to select individual courses from a large number of partner universities which can be attended during the same semester if the schedules would allow. Thus, students could integrate and improve their curriculum, based on their interests. As additional incentives, grants for **short physical mobilities (summer and winter schools, conferences, etc)** at partner universities could be offered to students who attended online courses by the same institutions, allowing them to know in person the teachers and the colleagues they interacted with for several months online. Besides, to make this blended model really successful, it is essential to improve the visibility of the offer of online courses (programmes, profile of the teachers, feedback from previous participants, etc.) because at the moment students get easily confused when they try to navigate in the websites of partner universities.

New opportunities for Teaching, Administrative and Technical Staff mobility

It is well known that staff mobility is key to strengthen the relationship between academic institutions, improve the quality of student exchanges and increase their visibility and international reputation. As it happened for student mobility, Covid strongly reduced or abolished physical staff mobility but many **webinars** were organized allowing students to be exposed to teaching online by

foreign scholars. The quality of online teaching can be very high and has the advantage of not requiring travelling which is time consuming and was a limiting factor for very busy scholars. In the post-Covid era, it would be positive to keep the very convenient webinar modality, having also the advantage of making possible to better know colleagues before inviting them to deliver a cycle of physical lectures, a very serious engagement for all parties involved (visiting scholars, their hosts and the students exposed to the teaching).

Similarly, Covid had a very negative impact on **administrative and technical international staff physical mobility**, a very important activity of the Erasmus programme. International relations, research, IT and finance officers, librarians, etc. were able to share good practices related to their work during conferences/workshops called “staff weeks” (e.g. www.staffmobility.eu). After the onset of the Covid crisis most staff weeks were canceled or postponed. However, the interaction between staff members of partner universities remained very intense thanks to online meetings by Zoom or similar platforms. In the post-Covid era, we wish these interactions will continue, allowing **online “job shadowings”** that will give administrative and technical staff from different institutions the opportunity to work together especially when facing difficult endeavors such as international projects, audits, etc.

Challenges and new opportunities for interdisciplinary education

Until 19th century education has been intrinsically interdisciplinary. For example, philosophy (“love for knowledge and wisdom”) was not separated from mathematics, history, literature and natural sciences like today. The separation started for different reasons including the increasing complexity and the quantity of information of each discipline. Indeed, that is still today one of the main obstacles for inter-disciplinary education. Of course, everyone would love to know the most beautiful literature and philosophy created by humankind together with the fascinating mechanisms of life sciences or astronomy, but is that possible nowadays?

The “digital push” given by Covid can help in that direction because the access to information is more and more open to all. The role of educational institutions at all levels should not be anymore to provide information but concepts or “frames” to understand it and elaborate new ideas, “linking the dots” in a creative way. We should have the courage to update the curricula, removing some technical information which is hard to learn and easily forgotten and focusing on the main concepts in all disciplines, which once understood are often remembered forever.

Employability, intersectoral education and artificial intelligence

Tertiary education is an enormous investment of time and resources by students, their families and the all society and the high employability of their graduates is a fundamental responsibility of universities. However, the very fast development of all sectors makes very difficult to predict the type of jobs available in the future. Digitalization and artificial intelligence are making unnecessary humans in many activities and on the other end are creating new needs which sometimes are difficult to fulfill. Thus, universities must continuously update their strategies and some of the following elements are useful to consider:

1. education should make our students **good learners** because they will have to acquire new knowledge and skills during all their life.
2. students should be exposed to different learning environments including nonacademic organizations in a very **intersectoral education**
3. Graduates should not be only job seekers but they should be encouraged to become also **job creators** looking at the new needs of the society and creating companies or other organizations capable of fulfilling them. Elective courses on **entrepreneurial skills** should be offered in all disciplines with interdisciplinary approaches whenever possible (e.g. linking the humanities and social sciences with engineering or architecture in projects related to the protection of cultural heritage or the environment).
4. Universities should be in close contact with **non-academic organizations** to better understand their vision and needs and keep them in mind during the design and update of the curricula without of course neglecting the teaching of fundamental knowledge in all disciplines.

Covid strongly accelerated the digital transformation of our societies and these processes are expected to proceed in a faster way.

The important role of the new European universities

Following the proposal by the President of the French Republic Emmanuel Macron in September 2017 to create new European Universities, the European Commission launched two pilot calls to fund (until now) 41 alliances of European Higher Education Institutions (https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_en). The leadership of many universities accepted with enthusiasm this challenge and started strong strategic cooperations involving not only education but also research and innovation. One of the key element of these projects, launched before the Covid crisis, was high physical

mobility of the students (up to 50 per cent!) to allow them to benefit from learning experiences in different universities in different countries.

Covid had a very significant impact on the *modus operandi* of these new European universities (international mobility, project meetings, etc.) and they are now be very useful “gyms” in Europe to practice and develop some of activities mentioned above (student and staff virtual and hybrid mobility, high quality online teaching, recognition of microcredentials, virtual job shadowings, remote research labs, etc.)

Conclusions

Covid had a dramatic impact on the world but, as for all crises, it can bring also something useful to our societies. Education, and in particular tertiary education, can benefit from the amazing digital push we recently observed. High quality online learning can be very useful not only for formal education but also for non formal learning and life-long learning and for potential learners around the world who cannot afford to attend physically university courses. We understood that home office can be very effective for several categories of workers and for most of the employees of higher education institutions. However, we need to be careful to face properly the challenges and the risks of such a strong digital transformation, like social isolation and reduced human interactions especially for young people and psychologically vulnerable individuals.