European Commission

The Future of Digital and Online Learning in Higher Education

Reflection Paper Series

DG for
Education,
Youth, Sport
and Culture

Contents

1.0. Introduction

Before the COVID-19 pandemic, higher education was one of the least digitized and most people-intensive business sectors. However, in pre-pandemic times the higher education system started to come under increased pressure to orientate itself toward more digitally-driven and outcome-focused business models, as private capital has massively invested in digital and online learning. Today, the sector of online courses and degrees, in particular in post-graduate education for adult learners, is a multi-billion-dollar market, including 'Massively Open Online Courses' (MOOCs). As with commercial businesses, many universities had started to deploy blended and fully online formats by increasingly adopting to the growing post-graduate sector prior to the start of the pandemic (Gallagher/Palmer 2020).

The ongoing development of digital and online learning opportunities was suddenly disrupted in spring 2020, when the COVID-19-crisis impacted the entire higher education system. Students were forced to abruptly shift from face-to-face to remote instruction through the use of digital technologies and educators had to adapt their courses in record time to remote teaching, often with very little formal training before (Luthra/Mackenzie 2020).

The radical changes in higher education (HE) caused by the pandemic have already been described and characterized in different ways. For instance, it has been portrayed as a period of global experimentation with remote teaching (Govindarajan/Srivastava 2020) or emergency online education (Bozkurt/Sharma 2020). Certain circumstances and decisive aspects of higher education have been analysed, such as changes in practices, adaptations used, innovation experiences carried out, or challenges, obstacles, and benefits encountered (Bao 2020; Fanguy et al. 2021; Ferdig et al. 2020; Zhang et al. 2020).

This reflection paper offers a systematic overview of the current debate on how the impact of the pandemic has been valued for digital and online learning practices and adaptations. As the pandemic has forced the established understanding of education and learning towards rapid digitalization, this reflection focuses on the post-COVID-19 pandemic period and asks what kinds of propositions are indispensable, so that the deployed digital transformation of teaching and learning can endure in the future. In other words, will higher education return to known concepts and methods of primarily analogous teaching and learning in the post-pandemic period, or will the digital transformation last beyond the pandemic? Finally, who will benefit from continuing the digital transformation in higher education and who will be disadvantaged?

The paper is structured as follows:

- **Chapter 2** reviews, as a starting point of the reflection, the challenges in digital and online learning in higher education during the pandemic period before the post-Covid-19 pandemic period comes into focus.

- **Chapter 3** explores four basic propositions that are found to be indispensable in the literature review: (1) providing access to accessible digital technology; (2) developing digital skills and competences; (3) implementing a digital learning culture; and (4) providing financial support.

- **Chapter 4** highlights the role of University Business Cooperation (UBC) and its role in the movement from face-to-face to remote instruction, arguing that UBC can enable digital transformations in the post-COVID-19 pandemic period to last.

- **Chapter 5** presents the conclusion, the benefits and challenges of UBC in the context of digital and online learning in higher education are brought into focus.

2.0. Challenges in digital and online learning in higher education during the pandemic

In a very short period of time, educators and students around the world have had to adapt to remote teaching (Govindarajan and Srivastava 2020; Marinoni et al. 2020). The rapid changeover from in-person to digital and online learning formats posed unprecedented challenges for students, educators, and university administrators, who needed to cope with digital technologies as well as profound changes in teaching and assessment methods (Jensen 2019).

2.1. Students: Digital divides and digital literacy

Students can only participate in online courses if they have access to digital technology (apps, platforms, skills and competences, and software) and, in particular, those used for virtual communication in a course (such as Blackboard, Moodle or Microsoft Teams). This requirement creates new forms of disadvantage among students. For example, students from privileged socioeconomic backgrounds may have easier access to fast internet, as they often have the latest laptops, better bandwidth, more stable Wi-Fi connections, or more sophisticated audio-visual devices. There is a minority of students in the European Union (e.g. in Romania) who still lack access to good internet connections, making online learning inaccessible (European Commission 2021b).

Digital technologies in use

A recent empirical study conducted in a university context reports that the digital technologies most used to support teaching during the lockdown period were the university web platform; instant messaging tools (WhatsApp, Telegram); video-conferencing tools (Zoom, Skype, Google Hangouts, Google Meet); and educational apps (Google Classroom). These were combined with email and telephone conversations to maintain individualized contact with students. Other technologies were also generally useful (Cisco WebEx, GoToMeeting, Microsoft Teams, Monosnap, Loom, OBS) (Mishra et al. 2020).

The pandemic pushed students off campus, usually without any preparation or prior experience, into digital learning formats. Sitting in front of a computer screen at home during lockdown periods was a psychological challenge for many students, and especially for new students. Many of them felt emotional uncertainty, a sense of isolation, difficulty in maintaining attention in a solely online context, or had a lack of self-discipline or effective time management to succeed in digital and online learning (Liang et al. 2020; Mishra et al. 2020).

From this, it follows that students need sufficient digital literacy to find their way around a digital and online learning environment. However, digital literacy is often viewed as a 'given', in particular this applies to the student generation born between the years 1996 and 2010 described as 'Generation Z' or 'digital natives', i.e. the first generation that has never known a world without the Internet (Kirschner/De Bruyckere 2017).

> **Digital literacy**
>
> The term emerged at the end of the 20th century with the spread of Information and Communications Technology (ICT), referring to competencies in handling computers. Nowadays, due to the growth of the 'knowledge society', digital literacy is broadly understood as an interrelated set of competencies that are necessary to success in the digital age. Simply, this means that individuals have the technical competence to use ICT and the practical and intellectual capacities to navigate knowledge society. With regards to the latter, the development of digital literacy has inherently merged with the sphere of education (Sparks et al. 2016).

In a comparative study of higher education institutions (HEIs) in Spain, Italy, and Ecuador, the development of digital literacy in the pandemic lockdown situation was analysed empirically (Tejedor et al. 2020). The study results show that the students participating in the survey felt confident about their own digital skills and competences to face online distance learning. Concerning transversal skills needed for deep and critical thinking, the results indicate mature student behaviour receiving and evaluating fake news, as they mostly declared receiving fake news, but not sharing it.

This study also provides evidence that students perceive the digital skills and competences of educators much more critically than their own. They described online lessons as being too similar to face-to-face classes and not adapting properly to an online philosophy. Asked for the competences and skills of their teachers managing digital tools in remote teaching, only a quarter of the students in Spain evaluated their teachers positively. Accordingly, the study concludes that educators' digital skills are the main concern in digital literacy development.

2.2. Educators: Digital and online skills

Due to the lockdown situation, educators had to adapt quickly to online techniques, even if they had little or no experience. At the beginning of the pandemic, teachers could be divided into those who have relied on classical methods, never having used technology tools before, and those (in most cases younger) faculty who were already familiar with online technologies.

In Europe, a study of the Organization for Economic Cooperation and Development (OECD 2018) found that on average about 40% of educators across the EU felt well prepared to use digital technologies in teaching, with significant divergences between EU Member States. Educators who had to deal with online technologies for the first time highlighted their lack of technological skills such as proficient computer knowledge, specific communication abilities for an online setting, proper handling of various teaching-learning tools, and the need to solve specific problems quickly during learning sessions (Dwivedi et al. 2020).

A Europe-wide stakeholder consultation conducted by the European Commission before launching the Digital Education Action Plan 2021-2027 confirmed that the pandemic created a sense of urgency about digital education. 95% of stakeholders considered the COVID-19 crisis to be a 'turning point' for how technology is used in education and training. In addition, the respondents rated teachers' digital skills and competences as the most important key point for digital education (European Commission 2021a).

Digital Education Action Plan (2021-2027)

In 2021, the European Commission launched an overarching policy initiative to support the sustainable and effective adaptation of the education and training systems of EU Member States to the digital age. Beforehand, a wide range of stakeholder consultations was organized to inform and gather evidence for this initiative. More than 2,700 responses to the survey from 60 countries and 127 position papers were submitted.

The consultation reached public- and private-sector organizations, education and training organizations and a wide variety of additional stakeholders, including research institutions and civil society. Experiences of learning during the COVID-19 crisis, and visions for digital education in Europe were at the centre of the consultation (European Commission 2021a).

The short-time transition to remote teaching forced the HEIs to come into action. Today, nearly 90% of the institutions in the European Higher Education Area have a strategy for digitally enhanced learning and teaching. However, a lack of staff resources and external funding opportunities were seen in a recent European survey on perceptions of higher education leaders as the major challenges to realize their strategic plans (Gaebel et al. 2021).

3.0. The established understanding of teaching and learning under scrutiny: Return or transformation in the post-pandemic-period?

During the COVID-19 crisis, digital and online learning formats became the 'new normal' in daily university life within a few weeks (Schroeder 2021). Despite the unexpected situation, HEIs still have to provide quality education while implementing and adapting to the technological resources available and involving and educating educators who lack digital skills and competences for remote teaching. As a result, the pandemic has triggered not only a change of location but established models of teaching and learning have been questioned, replaced or displaced. Many authors therefore describe the change from face-to-face to remote teaching and learning as a disruption.

> **Disruption**: "*By definition, a disruption implies a sudden break or interruption. When applied to education, disruption involves a break from traditional, established educational models of knowledge transmission (Carolan et al. 2020; Mishra et al. 2020). Innovations that change the direction of education replace or displace existing models. They interrupt the functioning of established educational models in unexpected ways, first improving the model and then affording new ways of understanding its ongoing development. Disruptive educational innovation replaces existing methodologies and modes of knowledge transmission by opening new alternatives for learning.*" (Garcia-Morales et al. 2021, 2)

The shift towards digital and online learning has transformed the way educational knowledge is imparted and absorbed, as well as the role and meaning of higher education and the institutions responsible for how it is perceived. Therefore, the digital transformation of teaching and learning can only be sustainable in the future, if shifts and transformations within the higher education system refer to each other and continue to merge.

The next section looks at requirements for such an overarching transformation process that would be able to last sustainably in the post-COVID-19 period.

3.1. Proposition 1: Digital and online learning needs accessible digital technology

The disruptive effects and challenges of the pandemic imply a radical technological transformation of the higher education system. There are hardware and software issues that must be addressed before digital and online learning can really take off on a regular basis.

First, digital education requires appropriate infrastructure and stable technological platforms for virtual communication. However, the digital expansion of universities was continuously neglected before the COVID-19 pandemic period. For instance, fewer than 5% of college budgets in the U.S. were dedicated to IT spending (Gallagher/Palmer 2020). In addition, a digital divide exists among HEIs with well-funded institutions having more financial resources and consequently well-developed IT infrastructures and learning system platforms than under-financed ones.

In Europe, the European Commission (2021a) aims to foster the development of a high-performance digital education ecosystem in the EU through supporting the improvement and expansion of digital infrastructure, connectivity, and equipment. For instance, EU funding, such as the Recovery and Resilience Facility programme, is available for the expansion of broadband and high-speed internet access of educational institutions in EU Member States.

However, access to digital technology also depends on the digital equipment of individual students. Online education therefore widens the digital divide among students, as digital equipment (such as laptop, bandwidth, and WIFI-connection) depends on student personal budgets. Providing financial support to overcome digital divides is therefore an issue not only at the institutional, but also at the individual, level. To safeguard that the incipient digital

transformation last, HEIs should mobilize resources to ensure that all students have equal access to the technological resources needed, in particular to a proper IT infrastructure and bandwidth connection (Carolan et al. 2020).

3.2. Proposition 2: Digital and online learning needs digital skills and competences

During the COVID-19 pandemic period, 95% of European universities switched to distance learning at some point (Gaebel et al. 2021). From that time onwards, educators had to rely on digital technologies, such as giving lectures by videoconference, sharing teaching material via digital and online learning systems, interacting with students through chats, creating debate forums or workgroups, recording explanations and making them available to students, or evaluating and tutoring students from a distance. Furthermore, all these digital tools can be used synchronously or asynchronously and integrated (Hunter/Sparnon 2020).

Despite the variety of options, a study conducted in the UK demonstrated that live video lessons at 74% of digital and online learning activities remain the main tool used for teaching, followed by website links (Irien 2021). These findings suggest that live video lessons were particularly suited to replacing pre-pandemic university teaching in an online mode (Hodges et al. 2020). However, a study conducted by Aix-En-Provence-University shows that nearly 70% of the surveyed students found it difficult to remain focused for more than 2 hours during online classes (Irien 2021). Therefore, attending several live video lessons in a row does not seem to be appropriate to hold students' attention.

To maintain attention in a course, it is therefore necessary to carefully choose the right tools for different course activities such as tutoring, videoconferencing activities, or student assessment. For each course activity, educators should introduce methods for interaction with students that keep students involved (Garcia-Morales et al. 2021).

However, educators can only cope with digital and online learning formats on a permanent basis if digital education is embedded in their professional development, including initial teacher education. In particular, educators need to learn how to tailor digital technology to specific subjects, objectives and activities. Therefore, their professional learning prospects need to move from acquiring skills to mastering certain tools or technological competencies.

In addition, the emergence of new digital technologies such as artificial intelligence or virtual and augmented reality continuously challenges educators as they require a more active role in the design of learning units and the implementation of these tools to ensure their effective, desirable, and inclusive use in the future (Vuorikari et al. 2020). The European Digital Education Action Plan therefore aims to launch a framework of practical guidelines on how to implement effective and inclusive distance, online and blended learning (European Commission 2021a).

Developing basic digital skills for digital and online learning formats is also an issue among students. Students report in a recent survey that the major challenge in adapting to online learning during the COVID-19 pandemic period was technical problems (Mishra et al. 2020). When the pandemic pushed students off campus into the digital learning format, some lacked not only of technical knowledge, but also of self-discipline or effective time management to succeed in an online learning environment.

Furthermore, students expressed a need for more interaction and guidance from teachers, greater communication with peers, and more support for mental health and well-being. Therefore, additional offers for a structured orientation in online learning as well as training and consulting opportunities for digital and online problems (e.g. individually supporting helpdesks)

are needed so that students can independently navigate through the digital learning environment (Nworie 2021).

As with educators, students need to develop digital skills and digital literacy, which includes a sound understanding of digital information. Accordingly, the Digital Education Action Plan calls for the implementation of a 'European Digital Skills Certificate' that may be recognized and accepted in the future by governments, employers, and other stakeholders across Europe (European Commission 2021a).

3.3. Proposition 3: Digital and online learning needs a digital learning culture

Promoting the digital transformation of teaching and learning in higher education requires the development and use of innovative digital learning tools and formats. However, it does not guarantee sustainable success. An important factor for sustainability is the development of a digital learning culture that requires the cultivation of new forms of participation. Therefore, students, educators, and administrators need to work together to examine the emerging challenges and to support implemented changes due to digitalization. Such a participatory culture can be described as a general shift from training to learning with distributed leadership, engaged participants, shared decision making, and transparent assessment of outcomes (Carolan et al. 2020).

Building a digital learning culture starts with the appropriate election and effective integration of digital technology into teaching. The use of digital tools pushes educators to adapt their teaching habits and methods, as they provide a variety of new options and resources for learning experiences. In particular, digital technology provides students with the opportunity to build their own authentic learning through self-exploration of problems and development of their own self-perceptions (Lynch et al. 2021).

Consequently, educators can become facilitators supporting students to develop skillsets that include creative and adaptive learning experiences through the appropriate application of the available digital tools. In this context, students are able to dictate the learning process, which often results in non-linear learning where students not only reflect on outcomes but also on the learning process itself (Naravan et al. 2019).

Student-oriented learning approaches call for alterations in the design of student assignments. Students can, for example, be evaluated via teacher-designed real-world activities that mirror future vocational work or they can create digital media content for an assignment such as a podcast, infographic, or video. In the latter, students produce digital material for an authentic, public audience, rather than the artificial teacher-only audience. Authentic audiences are usually interested in the subject matter produced by the student, which enhances student engagement and performance (Herrington et al. 2014).

Heutagogy's principles for assessing student-centred learning assignments:

1. Principle 1: Knowing how to learn;
2. Principle 2: Focus on the process rather than content;
3. Principle 3: Learning is multi-disciplinary; and
4. Principle 4: Learning is self-directed

Source: Lynch et al. 2021

As a result, students develop the competences and capabilities to build and adopt their own independent learning habits, which is also applicable to a lifelong learning process. Competency refers to a student's ability to gain knowledge and skills, their confidence in their ability to solve problems and how they apply acquired knowledge and skills in new and unfamiliar contexts. In this context, the use of digital technologies is increasingly recognized as basic proposition for lifelong learning processes. According to the European Digital Education Action Plan, digital technologies should be harnessed to facilitate the provision of flexible, accessible learning opportunities, including for adult learners and professionals to support them in re-skilling, upskilling, or changing careers (European Commission 2021a).

3.4. Proposition 4: Digital and online learning needs financial support

During the pandemic, all HEI business models (public or private financing) faced tremendous economic and financial uncertainties. Universities, for instance, expect diminishing budgets due to reduced government funds and some universities are already experiencing a decrease in student enrolment due to their current uncertain economic situation (European University Association 2020).

In Finland, for example, public funding covers roughly 92% of institutional expenditure, with no charge for local and EU students. In the UK, however, about half of funding for universities has come from private sources in recent years. For the academic year 2020/2021, British universities calculated a £2.5 billion reduction in private funds, which are mainly comprised of international student fees. To fill the financial gap, HEIs charged full tuition fees for local and international students during the lockdown. As a consequence, students protested and claimed back fees. Furthermore, around one fifth of potential university applicants were reconsidering their plans to enter higher education in the UK (Arnhold et al. 2020).

Compared to privately funded HEIs, publicly funded ones do not have to face cutbacks yet. In some EU countries, such as Germany, HEIs have received additional funding for digitalization recently. However, public budgets are running into enormous deficits due to the COVID-19 crisis and cutbacks for publicly funded HEIs may eventually come. For example, it will be very simple to close public funding for education or research programmes, as these funding schemes almost always have limited timeframes that require regular renewal.

To develop and deliver high-quality online courses on a regular basis is not necessarily cheaper than face-to-face courses; it requires faculty members to be trained in online teaching. And they need to spend sufficient upfront time to design and develop online courses in collaboration with a team of instructional designers, production specialists, multimedia specialists, and other support staff (Ortagus 2020).

Therefore, HEIs need significant investments in the expansion of the digital infrastructure, as well as in the expansion of online training and consulting opportunities. In addition, online students, similar to face-to-face students, benefit from interactive support, such as tutoring or financial aid assistance, that also require substantial additional investments in staff.

As both current higher education business models are seriously challenged and the traditional classroom is supplemented or even replaced by digital and online learning, the sector needs to learn from the risk-diversification strategies of the business sector so that the sector can become more innovative in its use of funding instruments to institutional budgets.

One example is Sweden, where 6,000 short-term teaching units ('summer schools') have taken place at universities in 2020 with additional government funding, to stimulate lifelong learning and employability for Swedish workers who were put at risk during the pandemic. In the Netherlands, small and medium-sized enterprises can pay for knowledge transfers they

receive from HEIs using publicly funded vouchers. Innovations from such university business cooperation will be highly relevant to recovery from the crisis (ibid.).

4.0. The impact of UBC on digital and online learning

Even though the rapid shift to remote education came as a shock during spring semester 2020, a previous European survey conducted in 2013 showed that almost all HEIs practiced some kind of digitally enhanced learning, and more than half offered, or at least had planned, online degree programs (Gaebel et al. 2014). Hence, before the COVID-19 crisis, the overall acceptance of digitally enhanced learning and teaching in higher education had grown over recent years, but many HEIs – at least in Europe – were still planning to develop a more systematic and strategic approach to digital transformation of higher education, at the time when the pandemic forced them to come into action.

At the same time, while HEIs were still in the planning phase, the private sector drove digital and online learning opportunities forward, and the Covid-19 crisis has pushed the development of digital and online programmes further. Currently, the sector of digital and online learning in secondary higher education is a multi-billion-dollar market for fully online courses and degrees, including MOOCs, industry-driven certification programmes, and coding bootcamps. MOOC-platforms such as 'Coursera' and 'EdX' leverage data from tens of millions of learners and billions of course data points, using machine learning to automatically grade assignments and deliver adaptive content and assessments (Gallagher/Palmer 2020).

4.1. The rise of Massively Open Online Courses (MOOCs)

In 2013, MOOC-providers started partnerships with universities to release online degree programmes. Since then, there have been a large range of non-formal job-related learning opportunities and more than 70 MOOC-based degrees worldwide (Ledwon 2021). The aggregation of multiple universities and their courses and programs on single MOOC-platforms also facilitates new business-to-business cooperation through direct partnerships with employers. Online education providers like 'StraighterLine' and 'Udemy' are taking this trend even further, offering options for students to earn transferrable college credits or other credentials for a monthly subscription.

Regarding the HEIs currently offering MOOCs in the EU, the *British Coventry University* serves 206 courses, followed by the *Italian University of Naples Federico II* with 191 courses, the *École Polytechnique Fédérale de Lausanne* (Switzerland) and *Universitat Politècnica de València* (Spain) with 140 courses each (Shah 2020).

The MOOC Master degree: The first MOOC-based degree, the Online Master of Science in Computer Science from Georgia Tech via Udacity, was announced in 2013. Two years later, the iMBA from the University of Illinois via Coursera started. By early 2017, at least 9 master's degrees were available through MOOC-platforms. From 2018, MOOCs have taken off. In 2021, there are more than 70 fully online-degrees that can be completed via a MOOC-platform.

Most MOOC-based degrees are master's degrees in the fields of computer sciences, business, data science, cybersecurity and public health. As well as master's programmes, there are now 7 MOOC-based bachelor degrees. 27 universities accounting for the degrees are primarily in the U.S. (11), Australia (5), and the UK (5), followed by France, Columbia, Argentina, Brazil, India, and Russia (1/each). Coventry University in the UK offers the most degrees (15), the University of Illinois in the U.S. and Deakin University in Australia offer the second most degrees, with 5 master's degree programs each. (Ledwon 2021).

MOOC-based degrees provide a number of advantages compared to on-campus degrees, including lower cost and flexibility during studies. Another benefit is that many courses that are part of the degree are free to take. That means interested persons can preview parts of the content before committing to the full program. Furthermore, MOOC-based degrees are usually fully accredited and recognized. In most cases, the final degree does not indicate that the credential was earned online.

However, the completion rates of MOOCs are very low, the rates are given with about 10% (Murray 2019). In addition to basic digital skills, online learning requires a high level of autonomy and self-motivation which is not easy to manage, particularly in an extra-occupational setting.

Furthermore, MOOCs were originally valued as easy access to learning opportunities. They were supposed to open up education to everyone regardless of personal limitations, distance to the chosen HEI, or individual financial resources. But studies have shown that not all individuals benefit in the same way (Lambert 2020). According to OECD, only about 40% of adults on average in OECD countries participate in formal and non-formal job-related training annually and they are disproportionately high-skilled (Figure 1).

Figure 1: Reasons for non-participation in formal and non-formal adult learning in the average of OECD countries
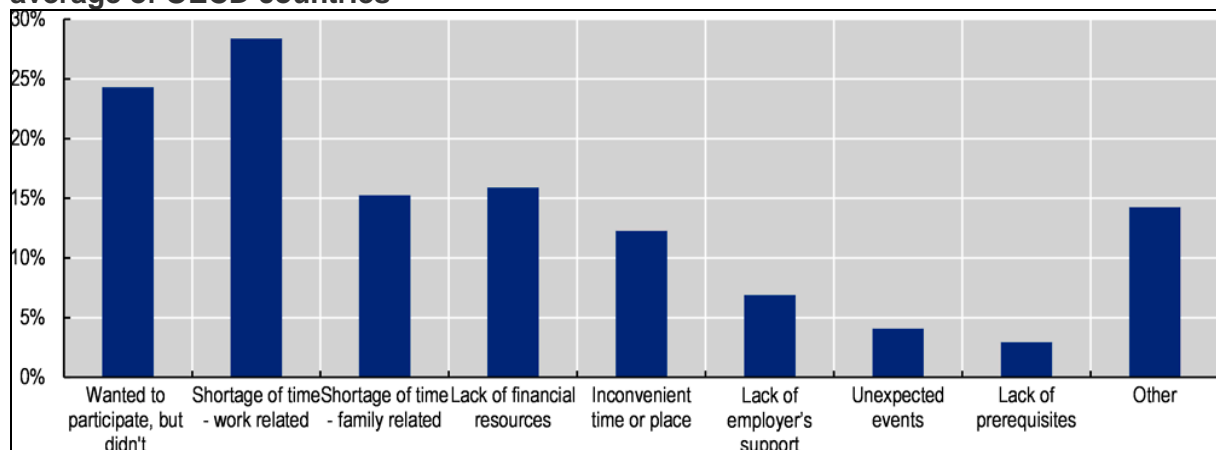

Source: OECD 2019b

Among the low-skilled, the incidence of adult learning is just over 20% on average (OECD 2019b). Up to now, MOOCs have reached adult learners with more qualifications and higher levels of self-organization and digital skills. In order to make MOOCs more inclusive and useful for everyone's career planning, the European Commission (2021b, 38) has called for MOOCs to become more diverse in terms of content and language and have uniform quality instructional designs and pedagogical approaches.

4.2. Future developments and trends in digital and online learning

Despite criticisms, the post-graduate training market focusing on higher education and its intersection with the workplace has grown over the past decade. In addition to private companies, evermore HEIs have discovered post-graduate training as a continuous source of income during the pandemic period and have increasingly entered this competitive market for lifelong learning. In the U.S., for example, a number of elite universities, such as Princeton

University, or Williams College, have reduced their tuition fees for postgraduate digital and online learning programmes permanently to reach more customers (Gallagher/Palmer 2020).

Figure 2: MOOCs worldwide in 2020
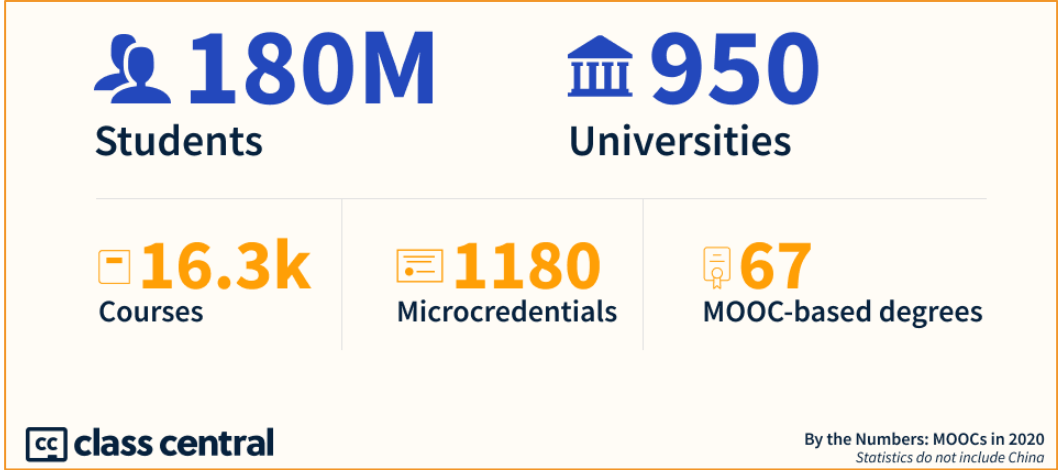
Source: Shah, 2020

Looking at the numbers of currently offered MOOCs worldwide (Figure 2), countries with a strong amount of private universities are dominating the MOOC market. The number of most MOOCs are currently offered by the *Indian Institute of Technology* (429 courses), followed by the U.S. institutions *University of Michigan* (388 courses) and *MIT* (368 courses).

In Europe, data from a survey carried out with European HEI leaders provides evidence that HEIs are also placing greater attention to widening access and lifelong learning in their digital provision during the COVID-19 crisis than previously. Adult and mature students are now the main target of online learning at 65% of the surveyed institutions, with 81% of the interviewed institution leaders stating that they are considering widening access through digitalization as a basic strategic development (Gaebel et al. 2021). Regarding the HEIs currently offering MOOCs in the EU, the *British Coventry University* (206 courses), the *Italian University of Naples Federico II* (191 courses)*,* the *École Polytechnique Fédérale de Lausanne* (Switzerland) and *Universitat Politècnica de València* (Spain) (140 courses/each) are currently leading (Shah 2020).

Concerning university's traditional clientele of students in primary higher education, it was feared that students who were not comfortable with online learning would drop out of higher education. However, it seems to be the other way around as a large number of students are returning to universities and colleges after having dropped out because of the expanding range of digital and online opportunities. One third of students who already gained experience with digital and online learning stated in a recent survey of U.S. students that they would consider a move to fully online learning.

More than 60% of online learners who recently graduated from their programmes reported they would likely enrol in an online programme again. Those students who value digital and online learning have clear expectations of what an overarching online programme should contain: They should include faster paths to earn credentials*,* flexibility, and cost assistance (Capranos et al. 2021).

Postgraduate online programmes are able to fulfil these expectations. Digital credentials, for example, earned in such programmes can be acquired fast and used flexibly, as they usually focus on achievement, skills, or competences. This trend is being driven by employers and industry certification programmes that emphasize shorter forms of credentials ('micro-credentials') that can be 'stacked' into a larger lifelong curriculum. 50% of surveyed U.S.-students said they were open to pursuing a non-academic degree alternative, such as a micro-

credential or badge in an online programme. The student acknowledgement of lifelong learning and upskilling instead of one-off qualifications is central to achieving better matching between education with the workforce (Gallagher/Palmer 2020).

5.0. Conclusions

5.1. Reflections

Since the beginning of the COVID-19 outbreak in Spring 2020, HEIs suspended classroom training to prevent the rapid spread of the virus among students and staff. Driven by the need to digitalize education and training in record time, the disruption to face-to-face education reshaped established educational practices fundamentally (Hodges et al. 2020).

In the course of the pandemic period, HEIs have coped with a variety of challenges, in particular technological, educational, cultural, and economic. Nevertheless, HEIs are quite positive about this ongoing transformation process towards establishing digital and online learning. In a recent survey in the European Higher Education Area, most HEIs have confirmed that they have plans to enhance digital capacity (75%) and explore new ways of teaching (92%) beyond the crisis (Gaebel et al. 2021).

As a result, digital and online learning does not primarily appear as an emergency experiment for coping with the COVID-19 crisis (Bozkurt/Sharma 2020). Instead, it is noticeable that the digitalization of the higher education study programmes, even though faster in some institutions and slower in others, had already begun before the pandemic and can be expected to last beyond it.

However, HEIs currently face economic and financial uncertainties. Diminishing budgets are likely a consequence of the financial response to the pandemic. HEIs have begun looking for new sources of income and are now expanding their online programs towards lifelong learners and are therefore starting to compete with private providers and extant business models in the digital education market.

Postgraduate training focusing on higher education and employability has grown in the past decade. Today, it is a profitable market offering new business models in higher education such as MOOCs. On the one hand, these business models are grounded in UBC, as the private providers' platforms need universities to be account for teaching and certifying degrees. On the other hand, the aggregation of multiple universities and their courses and programmes on single MOOC-platforms also facilitates new business-to-business cooperation through direct partnerships with employers.

Some private platforms have taken this trend even further, offering options for students to earn transferrable college credits or other credentials for a monthly subscription. Consequently, the classic model in which universities are responsible for teaching, learning, and assessment has come under increasing pressure as new business models have entered the post-graduate market.

However, there is empirical evidence that the COVID-19 pandemic has cultivated a new cohort of students who were not interested in fully online learning previously, representing a sizable new source of online learners (Capranos et al. 2021). Therefore, HEIs interested in expanding their online programmes have the opportunity right now to initiate additional online courses and programmes and expand existing UBC business models, reaching students and learners who were not considering learning online previously.

However, the expansion of online offers needs further monetary investments, in particular in digital infrastructure and personnel. To provide high-quality online education on a regular basis, it is essential that faculty members are continuously trained and supported in online teaching activities. Without additional specialists, this is impossible. Instructional designers, production specialists, multimedia specialists, and other support staff should be available to design and produce online materials and to give support in class.

Up to now, these consequences of a digital learning culture do not seem to have been sufficiently addressed. For example, many HEIs have little guidance regarding how to develop

and deliver high-quality online courses at all (Ortagus 2020). It is to be feared that the educators have to rely more or less on their own resources, coping with the transformation through their own commitment and overtime – or that students do not accept online offers or drop out from the chosen course, because they made negative experiences. As the currently low completion rates of MOOCs show, students can be easily frustrated from online learning and need training and support opportunities as well.

The rise of digitally-driven education alternatives and degree substitutes means that there will be many more options and challenges for higher educational institutions, lifelong learners, and employers to sort through. Lifelong learning throughout each person's working life seems to be crucial to navigating changing labour markets in an increasingly digitalized economy, as it helps individuals maintaining existing work-related skills and acquiring new in-demand ones (OECD 2019a). However, these innovative forms and formats of lifelong learning will only attract potentially interested people permanently if an online certification is recognized and/or valued in the labour market later on.

Concerning effective online testing methods and acknowledged certificates, an innovative solution is the adoption of digital badges. These can contain information on the individual, the acquired skills, and the badge issuer. However, to enhance and ensure quality in online education, new digital learning standards as well as regulation are indispensable to ensure quality assurance and that online courses provide value for money and time for participants.

Quality assurance may also be a competitive advantage for HEIs in the expanding online education market. To give an example, the European Association of Distance Teaching Universities, one of the largest MOOC providers for higher education in Europe, has already identified eight features to which supported courses need to adhere: learner-centred, openness to learners, digital openness, independent learning, media-supported interaction, recognition options, quality focus, and spectrum of diversity (Rosevell 2014).

This catalogue of features illustrates that ensuring quality in digital and online learning requires a complex framework that has to consider a number of factors such as the students' conditions, the curriculum, educational methods and the technological tools used as well as other organizational and further context factors (Shraim 2020). In addition, digital and online learning also leads to new ethical questions regarding online security and data protection. HEIs need to address these issues as well by developing codes of conduct to ensure a safe, trustworthy environment for digital and online learning (Jensen 2019).

From this, it follows that a consistent set of quality standards and guidelines is one of the basic propositions to integrate digital and online learning sustainably into the education and training systems of tomorrow. The effects of the COVID-19 pandemic period have already shown that HEIs will be significantly different from the ones the students left for remote learning in 2020. However, the 'new normal', in which digital and online learning has a permanent place, should be digitally enhanced, accessibility committed, student-centred, and quality assured. In this regard, the COVID-19 crisis has been a period of 'global experimentation' (Govindarajan/Srivastava 2020) on the value of digital and online learning compared to face-to-face instruction for adult learners, educators, HEIs, and UBC.

To join the University-Business Cooperation (UBC) network, join the Microsoft Teams Group, stay updated and get involved in future activities of the UBC network, please contact the European Commission:

Mr Paul Tzimas (DG EAC, Unit C1, Innovation and EIT), Paul.Tzimas@ec.europa.eu

6.0. References

Arnhold, N., Ziegele, and F., Kivistö, J. (2020): Under pressure: COVID-19 and the funding of European higher education. Worldbankblogs, June 02, 2020. Available at: https://blogs.worldbank.org/education/under-pressure-covid-19-and-funding-european-higher-education [Accessed October 15, 2021]

Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. Human Behavior and Emerging Technologies 2(2), 113–115. Doi: https://doi.org/10.1002/hbe2.191

Bozkurt, A., and R. C. Sharma (2020): Emergency remote teaching in a time of global crisis due to Coronavirus pandemic. Asian Journal of Distance Education 15(1): i–vi

Capranos, D., Dyers, L., and A. J. Magda (2021): Voice of the online learner 2021: Amplifying student voices in extraordinary times. Louisville: Wiley Education Services. Available at: https://edservices.wiley.com/wp-content/uploads/2021/09/202108-VOL-report-WES-digital-FINAL-Revised.pdf [Accessed October 21, 2021]

Carolan, C., Davies, C. L., Crookes, P., McGhee, S., and M. Rox-Burgh (2020): COVID 19: Disruptive impacts and transformative opportunities in undergraduate nurse education. Nurse Educ. Pract. 46:102807. Doi: 10.1016/j.nepr.2020.102807

Dwivedi, Y., Hughes, L., Coombs, C., Constantiou, I., Duan, Y., Edwards, J., et al. (2020): Impact of COVID-19 pandemic on information management research and practice: Transforming education, work and life. Int. J. Inf. Manag. 55:102211. Doi: 10.1016/j.ijinfomgt.2020.102211

European Commission (2021a): Digital Education Action Plan 2021-2027. Resetting education and training for the digital age. Available at: https://ec.europa.eu/education/sites/default/files/document-library-docs/deap-communication-sept2020_en.pdf [Accessed October 15, 2021]

European Commission (2021b): Digital Education Action Plan 2021-2027. Resetting education and training for the digital age. Accompanying the document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Available at: https://ec.europa.eu/education/sites/default/files/document-library-docs/deap-swd-sept2020_en.pdf [Accessed October 15, 2021]

European University Association (2020): European higher education in the Covid-19 crisis. Available at: https://eua.eu/downloads/publications/briefing_european%20higher%20education%20in%20the%20covid-19%20crisis.pdf [Accessed October 31, 2021]

Fanguy, M., Lee, S. Y., and D. G. Churchill (2021): Adapting educational experiences for the chemists of tomorrow. Nature Reviews Chemistry 5(3), 141–142. Doi: https://doi.org/10.1038/s41570-021-00258-5

Ferdig, R. E., Baumgartner, E., Hartshorne, R., Kaplan-Rakowski, R., and C. Mouza (Eds.) (2020): Teaching, technology, and teacher education during the COVID-19 pandemic: Stories from the field. Association for the Advancement of Computing in Education (AACE). Available at: https://www.learntechlib.org/p/216903 [Accessed October 25, 2021]

Gaebel, M., Kupriyanova, V., Morais, R., and E. Colucci (2014): E-Learning in European HEIs. Results of a mapping survey conducted in October – December 2013. Available at: https://eua.eu/resources/publications/368:e-learning-in-european-higher-education-institutions.html   [Accessed October 20, 2021]

Gaebel, M., Zhang, T., Stoeber, H., and A. Morrisroe (2021): Digitally enhanced learning and teaching in European HEIs. European University Association. Available at:

https://eua.eu/downloads/publications/digihe%20new%20version.pdf [Accessed October 15, 2021]

Gallagher, S., and J. Palmer (2020): The pandemic pushed universities online. The change was long overdue. Harvard Business Review, September 29, 2020. Available at: https://hbr.org/2020/09/the-pandemic-pushed-universities-online-the-change-was-long-overdue [Accessed November 1, 2021]

García-Morales, V.J., Garrido-Moreno, A., and R. Martín-Rojas (2021): The transformation of higher education after the COVID disruption: Emerging challenges in an online learning scenario. Front. Psychol. 12: 616059. Doi: 10.3389/fpsyg.2021.616059

Govindarajan, V., and A. Srivastava (2020): What the shift to virtual learning could mean for the future of higher education. Harvard Business Review, March 31, 2020. Available online at: https://hbr.org/2020/03/what-the-shift-to-virtual-learning-could-mean-for-the-future-of-higher-ed [Accessed October 15, 2021]

Herrington, J., Reeves, T. C., and R. Oliver (2014): Authentic learning environments. Handbook of research on educational communications and technology, by J. M. Spector, M. D. Merrill, J. Elen, and M. J. Bishop (eds.). New York: Springer, pp. 401–412. Doi: https://doi.org/10.1007/978-1-4614-3185-5_32

Hodges, C., Moore, S., Lockee, B., Trust, T., and A. Bond (2020): The difference between emergency remote teaching and online learning. Educause, March 27, 2020. Available at: https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning [Accessed November 2, 2021]

Hunter, F., and N. Sparnon (2020): There is opportunity in crisis: Will Italian universities seize it? International Higher Education 102, 38–39

Irien, L. (2021): Online education in times of Covid-19 – A challenging transition for European countries. Eyes on Europe – The Student Magazine, 22 July 2021. Available at: https://www.eyes-on-europe.eu/online-education-in-times-of-covid-19-a-challenging-transition-for-european-countries/ [Accessed November 2, 2021]

Jensen, T. (2019): Higher education in the digital era: The current state of transformation around the world. International Association of Universities (IAU). Available at: https://www.iau-aiu.net/IMG/pdf/technology_report_2019.pdf [Accessed October 10, 2021]

Kirschner, P. A., and P. De Bruyckere (2017): The myths of the digital native and the multitasker. Teach. Teach. Educ. 67, 135–142

Lambert, S. R. (2020): Do MOOCs contribute to student equity and social inclusion? A systematic review 2014-2018. Computers & Education 145. Doi: https://doi.org/10.1016/j.compedu.2019.103693

Ledwon, H. (2021): 70+ Legit master's degrees you can now earn completely online. The Report, May 25th, 2021. Available at: https://www.classcentral.com/report/mooc-based-masters-degree/ [Accessed November 7, 2021]

Liang, S. W., Chen, R. N., Liu, L. L., Li, X. G., Chen, J. B., Tang, S. Y., et al. (2020): The psychological impact of the COVID-19 epidemic on Guangdong College students: the difference between seeking and not seeking psychological help. Front. Psychol. 11: 2231. Doi: 10.3389/fpsyg.2020.02231

Luthra, P., and S. Mackenzie (2020): 4 ways COVID-19 could change how we educate future generations. World Economic Forum, March 30, 2020. Available at: https://www.weforum.org/agenda/2020/03/4-ways-covid-19-education-future-generations/ [Accessed November 1, 2021]

Lynch, M., Sage, T., Hitchcock, L.I. et al. (2021): A heutagogical approach for the assessment of Internet Communication Technology (ICT) assignments in higher education. Int J Educ Technol High Educ 18: 55. Doi: https://doi.org/10.1186/s41239-021-00290-x

Marinoni, G., van't Land, H., and T. Jensen (2020): The impact of COVID-19 on higher education around the world. IAU Global Survey Report. Available at: https://www.iau-aiu.net/IMG/pdf/iau_covid19_and_he_survey_report_final_may_2020.pdf [Accessed October 20, 2021]

Mishra, L., Gupta, T., and A. Shree (2020): Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. Int. J. Educ. Res. 1: 100012. Doi: 10.1016/j.ijedro.2020.100012

Murray, S. (2019): MOOCs struggle to lift rock-bottom completion rates. Financial Times, https://www.ft.com/content/60e90be2-1a77-11e9-b191-175523b59d1d [Accessed November 3, 2021]

Narayan, V., Herrington, J., and C. Cochrane (2019): Design principles for heutagogical learning: Implementing student-determined learning with mobile and social media tools. Australian Journal of Educational Technology 35(3): 86–101. Doi: https://doi.org/10.14742/ajet.3941

Nworie, J. (2021): Beyond COVID-19: What's next for online teaching and learning in higher education? Educause Review, May 19, 2021. Available at: https://er.educause.edu/articles/2021/5/beyond-covid-19-whats-next-for-online-teaching-and-learning-in-higher-education [Accessed October 8, 2021]

Organisation for Economic Co-operation and Development (OECD) (2018): TALIS 2018 results (Volume I). Teachers and school leaders as lifelong learners. Paris: OECD Publishing. Available at: https://www.oecd-ilibrary.org/education/talis-2018-results-volume-i_1d0bc92a-en [Accessed October 2, 2021]

OECD (2019a): *Getting skills right: Future-ready adult learning systems*. Paris: OECD Publishing. Doi: https://dx.doi.org/10.1787/9789264311756-en

OECD (2019b): *OECD employment outlook 2019: The future of work.* Paris: OECD Publishing. Doi: https://dx.doi.org/10.1787/9ee00155-en

Ortagus, J. (2020): What we know about the cost and quality of online education. The third way, September 2, 2020. Available at: https://www.thirdway.org/report/what-we-know-about-the-cost-and-quality-of-online-education [Accessed November 16, 2021]

Rosewell, J. (2014): OpenupEd label, quality benchmarks for MOOCs. Available at: http://e-xcellencelabel.eadtu.eu/. [Accessed November 3, 2021]

Sparks, J.R., Katz, I.R., and P. M. Beile (2016): Assessing digital information literacy in higher education: A review of existing frameworks and assessments with recommendations for next-generation assessment. ETS Res. Rep. Ser. 2016, 1–33

Schroeder, R. (2021): No return to 'normal'. Inside higher ed, October 6, 2021. Available at: https://www.insidehighered.com/digital-learning/blogs/online-trending-now/no-return-%E2%80%98normal%E2%80%99 [Accessed October 12, 2021]

Shah, D. (2020): By the Numbers: MOOCs in 2020. The Report by class central, November 30, 2020. Available at: https://www.classcentral.com/report/mooc-stats-2020/ [Accessed November 16, 2021]

Shraim, K. (2020): Quality standards in online education. The ISO/IEC 40180 framework. International journal of emerging technologies in learning, October 2020. Available at: https://doi.org/10.3991/ijet.v15i19.15065 [Accessed October 22, 2021]

Tejedor, S., Cervi, L., Pérez-Escoda, A., and F. Tusa Jumbo (2020): Digital literacy and higher education during COVID-19 lockdown: Spain, Italy, and Ecuador. Publications 2020, 8, 48. Doi:10.3390/publications8040048

Vuorikari, R., Punie, Y., and M. Cabrera Giraldez (2020): Emerging technologies and the teaching profession. Luxembourg: Publications Office of the European Union. https://publications.jrc.ec.europa.eu/repository/handle/JRC120183

Zhang, W., Y. Wang, L. Yang, and C. Wang (2020): Suspending classes without stopping learning: China's education emergency management policy in the COVID-19 outbreak. Journal of Risk and Financial Management 13(3): 1–6. Doi:10.3390/jrfm13030055