E-learning and EdTech

2022

Ajuntament de **Barcelona**

Barcelona Activa

Sumari

# Technological change, pandemic and acceleration of the digitisation of education

The deep **digitalisation process** that society, the economy and culture are immersed in during the first decades of the 21st century has a significant impact on the way knowledge is learned and passed on. This is a key issue as it concerns the qualification of talent, a fundamental aspect of the knowledge society. Thus, the need for professional training and qualification, and also for life-long retraining, finds in digital technologies a factor in the **diversification of methodologies and learning resources**.

During the process of Internet popularisation, examples of the incorporation of digital technologies into education began to appear. One example is the creation of the **Open University of Catalonia** (UOC) in 1995, one of the first on a global scale to offer its education services exclusively online. Also relevant is the case of **MOOCs** (Massive Online Open Courses), which facilitate access to higher education and offer the ability to obtain a certificate through e-learning. Along these lines, we can find the example of **hybrid education** as an alternative teaching method that emerges with the advancement of educational technologies and that connects distance and face-to-face education.
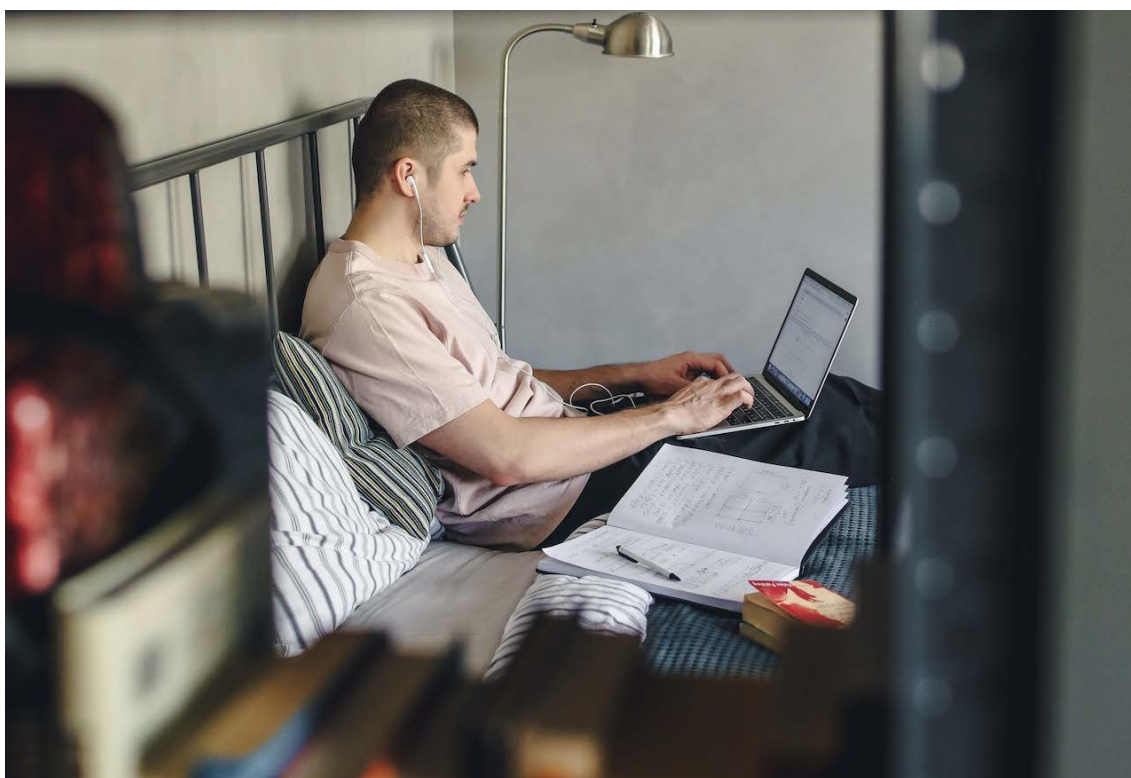
This entire process saw a more than notable **expansion following the COVID-19 pandemic** during the 2020-2021 period. In fact, the pandemic forced an accelerated implementation of remote training systems and caused an unprecedented disruption in the education sector, which had to be reinvented against the clock to respond to a crisis that threatened the schooling of millions of children and young people around the world. It is estimated that 94% of the countries affected by the pandemic implemented some kind of remote learning system to maintain teaching activity during closing periods, and **83% included e-learning** within these measures.

Figure 1. Percentage of countries that implemented distance education measures during the closure of schools due to the COVID-19 pandemic, per educational level
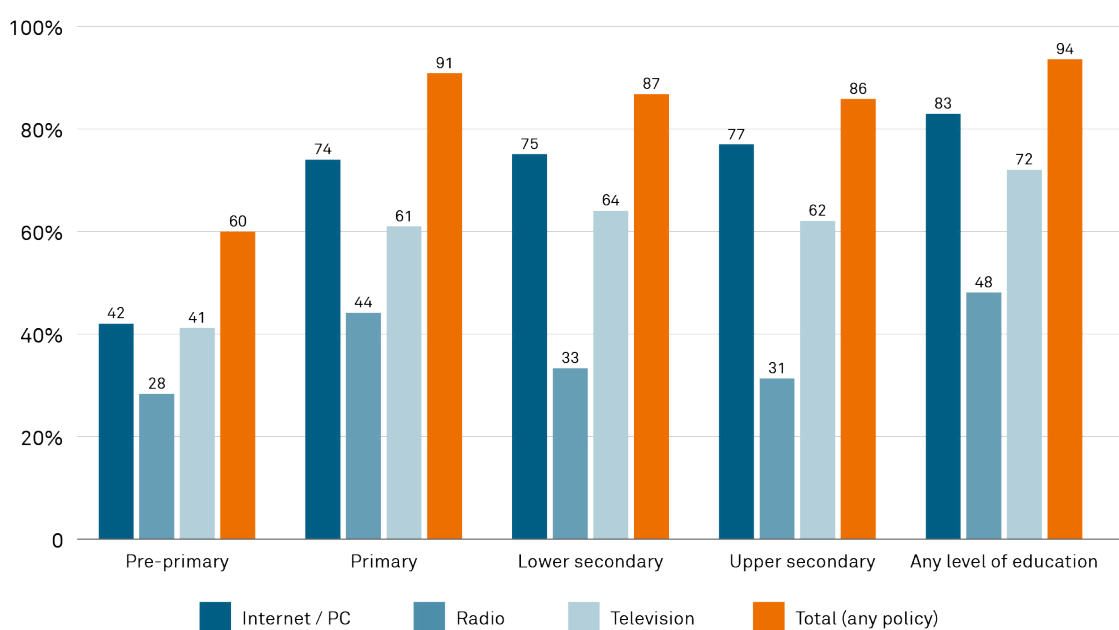
Source: Prepared by the authors based on the article «COVID-19: Are children able to continue learning during school closures?», by UNICEF

E-learning and EdTech: the parameters of new education

These are two fundamental concepts that must be differentiated. **EdTech** (educational technology) refers to the evolution of the new digital technologies applied in the classroom to facilitate the learning process. It therefore refers to the combined use of educational hardware, software, theory and practice to facilitate learning. In other words, EdTech explores how **technology can be used to improve education** and what skills the school should pass on to its students to ensure that they are prepared for a digital world. In contrast, **e-learning** is defined as the set of **training activities** that are developed through a device connected to the network, i.e. **via the Internet**. It is a learning format that is characterised by the possibility of transferring knowledge without students and teachers having to be in the same location and without the interaction having to take place at the same time. In short, EdTech is what makes e-learning possible through the use of technological resources, and its aim is to improve the quality of education and facilitate the learning process.

While the concept has become popular as a result of its use during the pandemic, e-learning has a **long trajectory**: the Open University of Catalonia was founded in 1995; YouTube was

created in 2005, and today it displays millions of tutorials produced by professionals and amateurs; and, in the 2010s, there was an expansion of the market for e-learning platforms (such as Udemy, SkillShare or Domestika), which offer paying courses taught by certified professionals. This evolution shows that, apart from the effects of COVID-19, there are other factors that promote the expansion of e-learning.

When it comes to e-learning and EdTech, their advantages are often emphasised in relation to traditional educational methods. They are **flexible and more exciting** formats, which allow students to learn at their own pace, go back to a certain topic, reread, skip parts or accelerate during lessons as needed. However, they also entail a number of challenges to overcome with regard to the **training of the professionals involved** and the need **to ensure equal access** for students to these new forms of learning.

In short, e-learning and Edtech encourage greater interaction and participation in the learning process, which encourages more significant learning than the more traditional methods supported by masterclasses. Therefore, both concepts involve a more **active effort** and **participation** of students, as well as the incorporation of digital-based technologies that improve the way students learn. At the same time, they do so more interactively and take more responsibility for their own learning process.

Equity and professional skills in digital education

E-learning and EdTech have the potential to transform teaching more than any other changes the sector has experienced before. In fact, some studies already claim that it has **favourable effects on learning**. For example, data suggests that e-learning increases the content that students retain by 25-60% compared to the traditional class format, and learning time is reduced by 40-60%. In addition, it reduces costs related to traditional learning (e.g. transport) and facilitates assistance in complex situations.

However, in order for these results to be generalised, it is essential that the application of these technologies be accompanied by measures that will enable us to overcome **two intrinsic problems** of digital education:

- Firstly, **there are significant inequalities in the degree of connectivity and in the level of digitisation of schools worldwide**, which makes it difficult for the population to have equal access to educational technologies. According to UNICEF, 67% of under-25s have no Internet connection at home. Furthermore, the lack of internet connection disproportionately affects people living in rural areas and on low incomes. Similar inequalities also exist in Europe, where the number of students per computer in schools ranges from 21 (Italy) to 1 (Denmark) in primary schools, and between 9 (Greece and Bulgaria) and 3 (Sweden) in secondary schools. In Spain, 21.9% of households do not have any computers or laptops.

Figure 2. Percentage of children and youth with Internet at home, per level of income
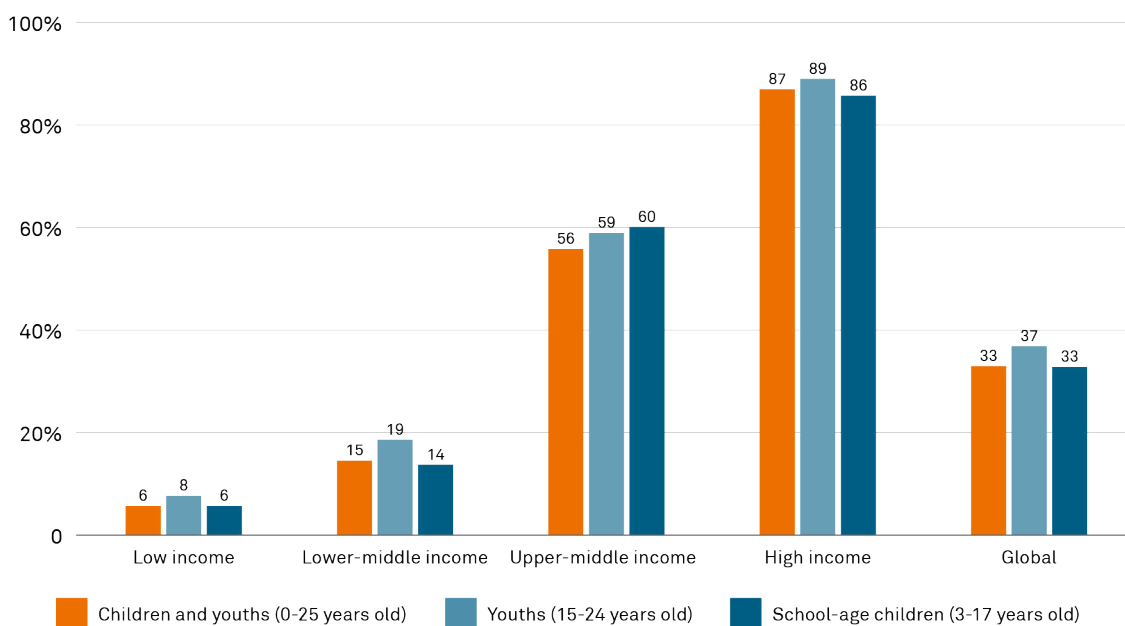
Source: Prepared by the authors based on the report «How many children and young people have Internet access at home?» by UNICEF.

- Secondly, **an update of the skills of the teaching staff is required**, which continues to be in charge of providing the training content. In this regard, the European Union has created a framework called DigCompEdu, which details six groups of digital skills that educators need. This framework has been taken as a reference in one of the axes of the Digital Education Plan of Catalonia 2020-2023, which is dedicated to the **digital training and empowerment** of teachers. The idea behind this type of action is that teaching staff must know and master learning technologies in order to successfully train students in the acquisition of digital skills and to participate in processes of improvement and innovation in teaching.

Figure 3. The six areas of DigCompEdu
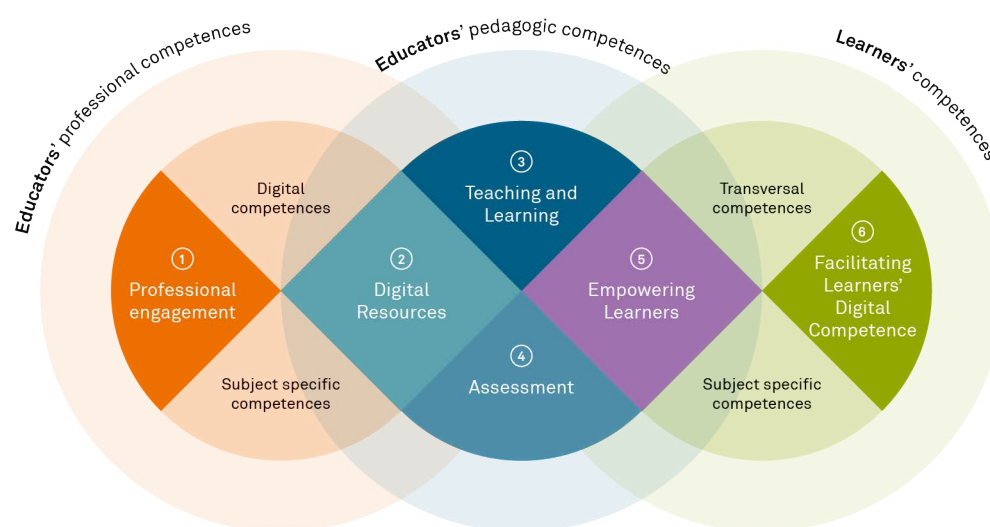
Source: Prepared by the authors based on the report «European Framework for the Digital Competence of Educators» by the European Commission

The **digital technologies applied to the classroom** reinforce and accompany innovative teaching methodologies that seek to overcome the traditional teaching class model. Thus, some of these techniques would be:

- **Forum:** it consists of proposing a topic of learning to students, who must work on it, discuss it and obtain conclusions. Using digital technologies allows teamwork outside the classroom. The purpose of this technique is for students to form a criterion of their own from personal work based on technical or scientific knowledge.

- **Instruction in pairs:** with this methodology, the teacher raises a conceptual question about the subject being taught and each student has one or two minutes to think about the answer. Next, a brief time is left for students to discuss their ideas in groups of three or four, with the aim of reaching a consensus on the correct response. This process forces students to reflect on their arguments and makes it possible to assess the degree of understanding of the concepts presented. The act of explaining and defending their agreed answer against alternative explanations from others helps students, who become deeply involved in learning.

- **Flipped classroom:** it consists of giving the pupils the lead, reversing the traditional masterclass model focused on the teacher's explanations. Here, however, students prepare the content of the lesson at home and in the classroom they solve their questions about the subject or participate in activities in which the teacher acts as a guide, supported by new technologies.

Professional profiles of education technologies

The nature of the products and services marketed by e-learning and EdTech companies makes their **teams highly multidisciplinary**. As in any company, they it carry out tasks linked to the **normal operation of a business**, such as finance, strategy, human resources, sales or marketing, etc. They also have ICT and creative profiles working on **product development**, specialising in areas such as web programming, UI/UX design, 2D/3D animation, among others. Finally, they have **professionals from the world of education** who are involved in the business process -from the preparation of training content to the relationship with the clientele.

Digital technologies applied to education have undergone a great expansion in the field of post-compulsory learning. As it has been pointed out, these technologies make it possible to increase the flexibility of the learning process and make it possible to combine the hours dedicated to training with other aspects of personal life (work, family care, leisure, among others) without having to fit into a rigid timetable. It is therefore in the fields of **adult education** and **lifelong learning** that e-learning and EdTech have the most potential, and where a labour market has been created that employs professionals in this economic sector.

Regarding the professional opportunities in the field of education, it should be noted that many of the jobs linked to educational technology are not new. In general, these are existing profiles in the traditional education sector, with the distinctive feature that they require an **additional degree of specialisation** in the application of ICT to education. It is also common to find opportunities for remote work in this field.

Below are some of the **most common professional profiles** in the field of e-learning and EdTech:

E-learning tools designer: Their mission is to provide **expert knowledge about technologies and digital environments** that allow the combination of formal learning content, to then distribute it to and to online education students and manage the degree of participation and learning. Some of their tasks include investigating the application of new software in academic environments, identifying which technologies best respond to the needs of different training environments, advising educational institutions on their technological infrastructure and defining the objectives and indicators for measuring the impact of the introduced tools.

E-learning actions manager: They coordinate the creation of an online course with the aim that recipients acquire skills from a particular professional or occupational area. Their functions include **planning, coordination, stimulation, accompaniment and evaluation of training action** in virtual training platforms. They are often people who have higher education degrees in the field of knowledge about which they produce content -and it is desirable that they have prior experience as educators. It is also essential that they are well aware of the educational technology that will be used to teach the designed curriculum, in order to make the most of its functionality.

Educational consultant: They are professionals of EdTech companies that handle **customer relations**. Their functions are varied, as they accompany educational institutions throughout the process of implementing and monitoring specific educational technology. They train teachers in the use of the tool, respond to teaching doubts and are in permanent contact with the school staff to ensure their satisfaction and the correct use of resources. To occupy this position, candidates are assessed for empathy, good communication skills and previous teaching experience.
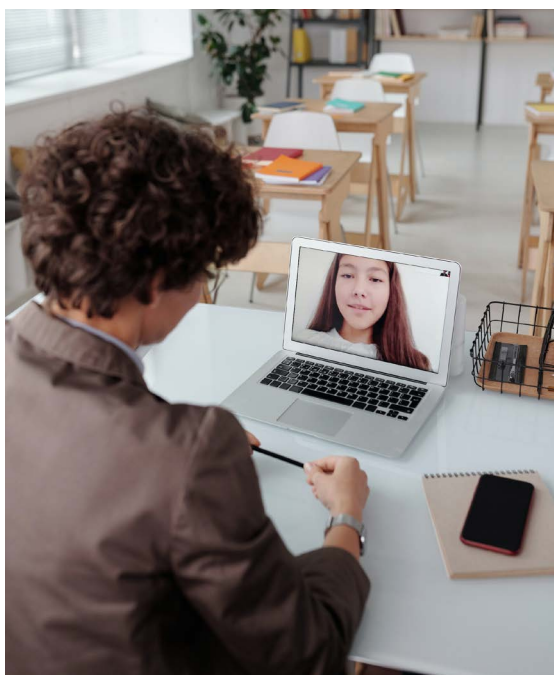
Digital mentor: This is a specific profile created within the framework of the Catalonia Digital Education Plan 2020-2023, which is responsible for **accompanying, implementing and evaluating the digital strategy in the schools**. Specifically, their mission is to accompany the school's management in the elaboration of its digital strategy and to train teachers in digital skills through internal training.

Online training tutor: They are the person responsible for the execution of the teaching action for an online course. Depending on the format of the training, they can **coordinate live or recorded virtual class sessions**, or **enable the virtual classroom**, discussion forums and other content of the program. They are also responsible for monitoring students through individual and group tutorial sessions, solving questions and assessing the final result of the teaching action.

Finally, with regard to the professional profiles linked to the digital technologies applied to education, it is worth saying that this is an area in which many work opportunities are opened up in a cross-cutting way. For example, new methods of digital support offer new career opportunities and encourage employment among professionals from the **audiovisual** sector. They also open up new perspectives to education professionals from **pedagogy**, **psychology** or **social education**, as they may be competent profiles in the adaptation and transformation of knowledge through virtual educational resources, which entail a different level of learning from what occurs in the physical classroom.

A focus on e-Learning and EdTech

Over the past decade, the **digitisation of education** has been on the rise. This trend was intensified by the need to ensure learning during the periods of closure of educational establishments caused by the COVID-19 pandemic. This crisis was proof for students and educators that the technology-teaching binomial is not only possible, but **also desirable**.

E-learning and the application of advanced technologies to education (EdTech) have **important advantages** in terms of flexibility, accessibility, optimisation and training cost. However, there are differences in the degree of connectivity and access to computer devices among the population. The introduction of these technologies must therefore be accompanied by **measures that guarantee equal access to education for all citizens.**

This process also has an impact on employment in the sector. On the one hand, teachers must develop a set of **new skills** to train trained people in a digital context. On the other hand, EdTech companies generate new jobs that require knowledge about the **application of ICT to education** or specialisation in particular technologies.

Finally, this is a very dynamic field that will continue to develop in the coming years. It seems clear that **Virtual Reality (VR)** and **Augmented Reality (AR)** will be popular technologies in this area. VR refers to fully digital environments, in which we can interact (or not), while the AR relies on the physical world and allows us to interact with elements of our real environment through the screen of a mobile device. Technologies such as these will facilitate much more significant learning by students, driving a **paradigm shift in the world of education.**
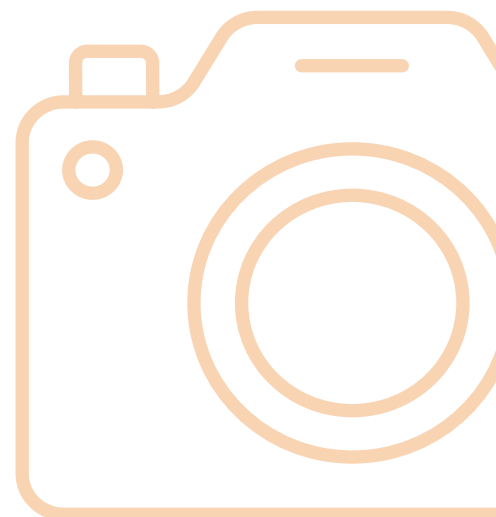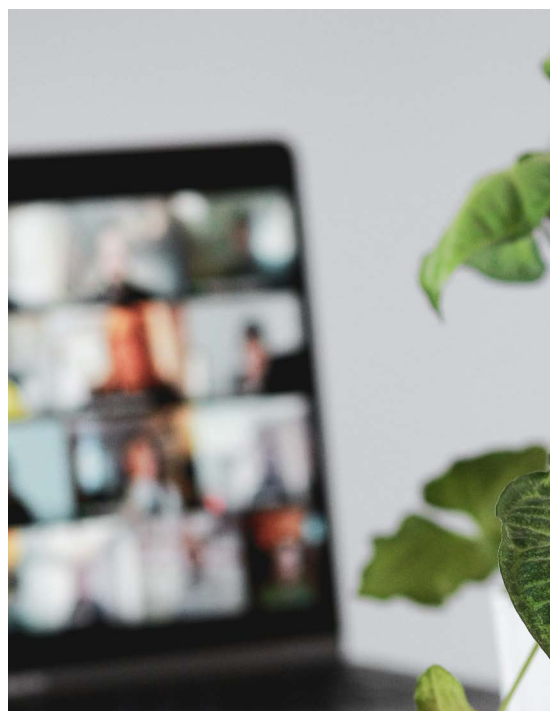
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