ORGANIZATION AND MANAGEMENT OF ICT IN EDUCATION

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INDEX OF CONTENTS

This document is an educational guide of some contents and concepts of this subject (*Organization and management of ICT in education*), so I have not used APA style. You can access to the documents when possible using the links highlighted in blue and underlined. The majority of the documents are published in open access.

INTRODUCTION

In this course we are going to learn about the organization and management of digital technologies and this topic can be approached from three different levels.

The first, the **organizational** level of analysis, is how educational institutions can manage digitization and digital maturity as part of their organizational improvement. We focus on DigCompOrg model from the European Framework of Competences.
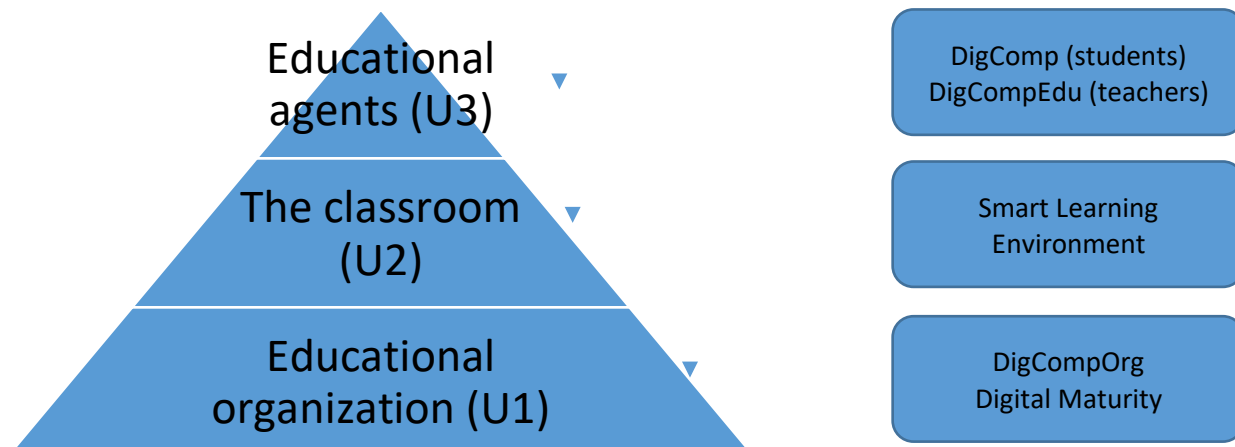
The second level is the **classroom**, so we will study how teaching and learning can be enriched by environmental factors such as a smart classroom. Digital technologies will be used as teaching and learning tools, but also to control the physical space to build a comfortable environment for teachers and students.

And finally, the third level is **personal** management of digital technologies: we will explore how ICT can be useful tools to enrich our learning ecologies or our learning environments. This unit will be around the personal organization of ICT and how everyone can improve personal skills to learn with digital technologies. We are citizens of the XXI century and we must assume that digital tools are essential for us as learners in the context of initial and lifelong learning. So we should develop our digital literacy to promote our digital citizenship. The base of this unit will be DigComp European model.

In this guide of the course you will find the most important concepts and some links to digital resources which are relevant to work on these topics and to read more about all of them.

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STRUCTURE OF CONTENTS

Schedule of contents and main concepts in this course

Educational agents (U3) ▾	DigComp (students) DigCompEdu (teachers)
The classroom (U2) ▾	Smart Learning Environment
Educational organization (U1) ▾	DigCompOrg Digital Maturity

The structure of units of contents in this course is:

UNIT 1: ICT management and organization in educational institutions.

UNIT 2: Spaces enriched with digital technologies.

UNIT 3: Personal organization of ICT for learning

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ICT MANAGEMENT AND ORGANIZATION IN EDUCATIONAL INSTITUTIONS

Educational agents (U3)

classroom (U2)

Educational organization (U1)
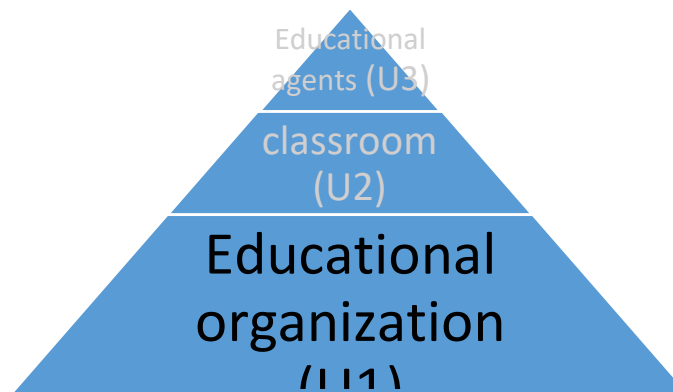
The starting point is the concept of a learning organization, the understanding that organizations have the capacity to improve and that leaders must promote the improvement of the organization, including personal professional development, but at the same time other corporate factors oriented to specific institutional goals. One of the dimensions to be considered is the digital maturity of the organization, which is related to organizational digital competence. To analyze the level of digitalization we can rely on some models like BECTA. Another interesting model is HEInnovate, which links digital competence with the entrepreneurship of organizations. And the best-known model is DigCompOrg from the European Framework of Competences. On the other hand, some interesting concepts around organizational digital competence include the digital identity of institutions and the use of repositories of open resources.

1.1. THE COMPETENCE OF ORGANIZATIONS: "LEARNING ORGANIZATION".

The concept of competence is generally used in relation to personal skills, knowledge, and abilities. However, it is also possible to use the concept of competence concerning organizations, that is, the movement that revolves around the idea of *learning organizations*.

What is a learning organization?

LEARNING ORGANIZATION

A learning organization can be defined as any organization that prioritizes personal and professional growth through knowledge transfer. These organizations encourage learning as part of their fundamental culture and overall vision for long-term success.

Peter Senge, author of *The Fifth Discipline:* The Art & Practice of The Learning Organization, popularized the term "learning organization" in the early 90s.

Source: https://elmlearning.com/blog/what-is-a-learning-organization/

The approach to learning organizations allows us to analyze how the organization improves, taking into account the strategies related to the organization, but at the same time, we consider the strategies to promote the professional development of the individual members of the organization.

One of the first contributions to this concept is by David A. Garvin ("Building a Learning Organization").

A learning organization is an organization skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights.

Source: https://hbr.org/1993/07/building-a-learning-organization

The author considers five main activities of learning organizations: "*systematic problem solving, experimentation with new approaches, learning from past experiences, learning from the best practices of others, and transferring knowledge quickly and efficiently throughout the organization*" (Garvin, 1993, p. 1).

Benefits of a learning organization

Shifting from the traditional top–down corporate learning structure has a lot of benefits beyond fostering a healthy learning environment:

- **Happy employees means less turn-over.** Employee buy–in and collaboration leads to happier employees, which leads to less turnover, and better news for the bottom line, as hiring then rehiring leads to higher training costs and more hours spent on training than performing the job.
- **A sense of community.** When companies show employees that they care about their opinions, employees care more about the company, making them more invested and willing to work hard toward the company's success.
- **New ideas and solutions.** As Senge says, "creating an environment where employees feel heard and are encouraged to take risks" to challenge the status quo creates openness to innovative ideas and creative solutions.
- **Success based on knowledge sharing.** With more people contributing to shared goals, there's a better chance of success: sometimes, less is not more. When executives, managers, and employees aren't working alone in their silos and instead depend upon each other, decisions are better–informed, as they are based on multiple opinions from the bottom to the top rungs of the corporate ladder.
- **Smarter employees!** Companies who invest in their employees—giving them the tools they need to do their jobs better—makes employees more efficient and confident, and leads to innovation, more productivity, and better customer service when they apply what they've learned.

Source: https://elmlearning.com/blog/what-is-a-learning-organization/

We are going to focus on the organization and management of ICT from the perspective of the institutions in this first unit and we are going to base this analysis on the European Framework of Competences.

1.2. DIGITAL COMPETENCE OF EDUCATIONAL ORGANIZATIONS

According to Ochoa-Urrego and Peña (2022), digitalization is a revolution based nowadays in challenges such as Artificial Intelligence, Big Data or connectivity. Prendes y Cerdán (2021)[1] analyze some advances in digital technologies showing the impact on education: extended and virtual reality, robotics, AI, learning analytics, big data, the internet of things, cloud computing, apps, or serious games, among others.

Digitalization is one of the essential dimensions for understanding today's society from any point of view: culture, economy, social relations, communication, policies, or any other subject is impregnated by digital technologies. And education is not exempt from this reality.

Educational organizations are part of the system that fosters a better society with literate citizens. At every level of this system (from kindergartens to universities and non-formal education),

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[1] Prendes Espinosa, M. P. & Cerdán Cartagena, F. (2021). Tecnologías avanzadas para afrontar el reto de la innovación educativa. *RIED-Revista Iberoamericana De Educación a Distancia, 24*(1), 35–53. https://doi.org/10.5944/ried.24.1.28415. This article is only in Spanish version.

organizations must try to improve themselves in order to offer the best opportunities to their students.

This process of digitalization of organizations has numerous dimensions of analysis, so we need to use a theoretical model to describe and understand it. The model we are going to study is DigCompOrg, the model developed by the European Commission. This process can be understood as the ***digital maturity*** of organizations: "*The capacity of a college or learning institution to make strategic and effective use of technology to improve educational outcome*s" (British Educational Communications and Technology Agency-BECTA, 2008, p. 12).

<div style="float:left">
DIGITAL MATURITY
</div>

About digital maturity models we recommend reading the systematic review done by Ochoa-Urrego and Peña (2022), it is a current analysis of models and the authors highlight "*the importance of the digital transformation process for the organizations and the academy*" after reviewing1944 documents (p. 10). The main conclusions are the next:

> A remarkable advancement was the identified agreement in the literature that recognizes the digital transformation process as a multidimensional phenomenon that surpasses the exclusive inclusion of technologies in the organizational processes and activities. Consequently, there is an emphasis in the necessity to propose a clear and precise strategy capable to guide the organizational efforts intending to integrate the organization and its digital focus. Additionally, it is mandatory to adapt the business model of the organization to guarantee its accurate response to the particularities of the digital competitive environment.
>
> Furthermore, it is clear that the main tool to start and guide both the digital strategy and the transformation process is a maturity model; it is useful to support the organization in recognizing its technological capacities and the future status, which is expected to be achieved. These aspects help to design the specific actions that will guide the organization through its digital transformation process.

Source: https://www.researchgate.net/publication/351975241_Digital_Maturity_Models_A_Systematic_Literature_Review

1.2.1. BECTA model.

This proposal was designed in 2007 to evaluate work-based learning providers in England. The dimensions of their analysis were: management and planning; technology and learning resources; practitioners' skills (human resources); learning, assessment, and learner support; and the last one, impact and challenges. See Table 1 below.

Table 1.
BECTA dimensions about e-maturity

E-maturity framework for education Element	E-maturity framework for education Category	work-based learning E-maturity Attribute
Leadership and vision	Mission and vision Enabling the Vision Improving Self-Assessment	Management and planning
Contexts	Funding and sustainability Managing location Developing collaboration and partnership Promoting social inclusion and widening participation Supporting continuity of learning	Partnership working
Resources	Staffing and HR development Technology Content and learning resources	Human resources Technology Learning resources
Learner support	Supporting learners Personalising learning Building learning communities	Learner support
Learning and teaching	Curriculum Assessment and accreditation Learning and teaching strategies	Learning and teaching

Source: BECTA (2008, p. 13), in https://dera.ioe.ac.uk/1665/1/becta_2008_wblsurvey_report.pdf

1.2.2. One model of digital maturity plus entrepreneurship: HEInnovate

This model is interesting because it is not only a model but also a self-assessment tool. Moreover, it is specific to education, because it is oriented to higher education institutions. And finally, this model highlights the relevance of entrepreneurship and digitalization: both dimensions must be related if we want to build the pillars for the universities in the 21st century. The authors mainly focus on entrepreneurship, but in the end, we cannot analyze innovation in higher education if we do not consider digitalization, which makes this one a basic aspect in all the dimensions of the model.

Here you have the dimensions of the model (Figure 1): leadership and governance; organizational capacity for funding, people, and incentives; entrepreneurial teaching and learning; preparing and supporting entrepreneurs; digital transformation and capability; knowledge exchange and collaboration; internationalization; measuring impact.

Figure 1.
HEInnovate model

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Source: https://www.heinnovate.eu/en

1.2.3. European Framework: the model DigCompOrg

To analyze the digitalization of educational organizations, the European Commission has proposed its own model with the name DigCompOrg (European Framework for Digitally-competent Educational Organizations). And what is it?

DigCompOrg provides a comprehensive and generic conceptual framework that reflects all aspects of the process of systematically integrating digital learning in educational organisations from all education sectors. It is adaptable to the particular contexts within which educational organisations, intermediaries or project developers operate (e.g., sector-specific elements, sub-elements or descriptors may be added).

https://joint-research-centre.ec.europa.eu/european-framework-digitally-competent-educational-organisations-digcomporg/digcomporg-framework_en

The model includes seven key elements (see Figure 2):

- ▪ Leadership and governance practices
- ▪ Teaching and learning practices
- ▪ Professional development
- ▪ Assessment practices
- ▪ Content and curricula
- ▪ Collaboration and networking
- ▪ Infrastructure

DigCompOrg
EUROPEAN
MODEL

Figure 2.
DigCompOrg model for educational organizations

It is a theoretical proposal aimed at promoting the self-reflection about the digitalization of educational organizations, but added to this model -and based on it- the European Commission has designed a self-assessment tool: SELFIE. To read about the practical use of SELFIE, here you have a Spanish analysis (Fernández-Miravete and Prendes-Espinosa, 2022)[2].

1.3. OTHER INTERESTING ISSUES ABOUT THE ORGANIZATIONS AND THEIR USE OF DIGITAL TECHNOLOGIES.

This organizational level of analysis could bring us the opportunity to study during a longer course than this, but if you are interested in the digitalization of educational organizations I recommend you check some other documents about other issues such as digital identity and resources management to promote the public identity of an organization. It is not usual to take care of the digital identity in public institutions; on the contrary, it is very important for private institutions or educational institutions concerned about quality and innovation.

1.3.1. Digital identity of organizations.

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[2] Fernández-Miravete, A.D. and Prendes-Espinosa, M.P. (2022). Digitalization of Educational Organizations: Evaluation and Improvement Based on DigCompOrg Model. *Societies, 12*(6), 193, 1-18. https://doi.org/10.3390/soc12060193

CORPORATIVE DIGITAL IDENTITY

Van Es, Vanchaecht and Wyatt (2020) state that digital identity must be at the core of any business: *"Around the globe, digital identities are becoming increasingly indispensable for organizations of all kinds -private companies, government bodies and civil society organizations- and for the people and organizations they serve"* (p. 3). In the next diagram by Deloitte (Figure 3) it is possible to check questions about the digital identity of any business and it also explains how to approach any objective to promote any key challenge. You can use the interactive graph on the web.

Figure 3.
Digital identity for business by Deloitte

Source: https://www2.deloitte.com/cbc/en/pages/risk/articles/the-future-of-digital-identity.html

Interactive graphic: https://www2.deloitte.com/content/dam/Deloitte/bm/Documents/risk/Global-Digital-Identity_InteractivePlacemat_Final.pdf

1.3.2. Management of information and open resources in educational institutions.

To have a digital repository is not only a good strategy to promote the digital identity of educational organizations, but also a good way to contribute to sharing open access to information generated by people. In education, the movement around open access, open educational resources, and collaboration has been one of the most important challenges in these last years. Experiences such as Open Course Ware, Kahn Academy or even Wikipedia have meant a revolution: from the copyright to the openness, from the individual approach to contents design to the value of the virtual community of educators.

Here you have some links to relevant information to know a little bit more about repositories:

- ▪ https://jodi-ojs-tdl.tdl.org/jodi/index.php/jodi/article/view/197
- ▪ https://jodi-ojs-tdl.tdl.org/jodi/index.php/jodi/article/view/229

About OER (Open Educational Resources) and OER in higher education:

- https://www.jisc.ac.uk/guides/open-educational-resources
- https://www.webarchive.org.uk/wayback/archive/20140613220103/http://www.jisc.ac.uk/media/documents/programmes/elearning/oer/OERTheValueOfReuseInHigherEducation.pdf

And here you have a link to the global Directory of Open Access Repositories.

LEARNING SPACES
ENRICHED WITH DIGITAL TECHNOLOGIES

Educational
agents (U3)

The classroom
(U2)

Educational organization
(U1)
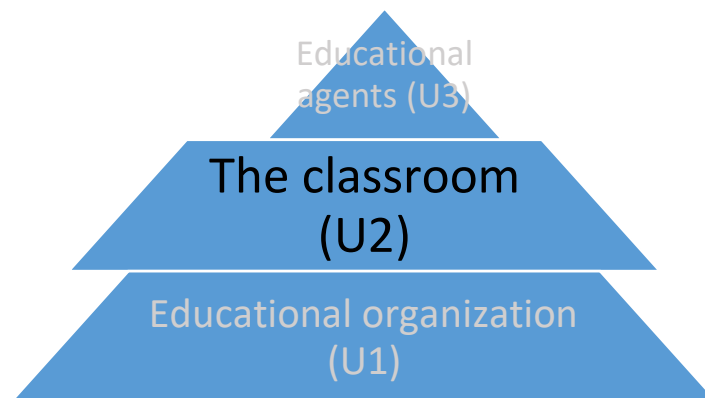
This unit of contents deals with the impact of digital technologies on the classroom, understood as a physical space where we develop face-to-face interactions among teachers and students and also between the students themselves. This physical space can change with the introduction of digital technologies; this way, we can imagine that most future classrooms will be equipped with interactive whiteboards or interactive tables. We can design new spaces with the help of Architecture and the introduction of innovative digital technologies, but the most relevant change will be caused by changes in teaching and learning methods, not only for changing the furniture or the room. This approach related to digital technologies plus the methods to improve learning will lead us to Smart Learning Environments.

And one example of this educational innovation in our classes is flipped classroom, a method to flip the classes changing the traditional way of organizing them. Another interesting movement linked to digital technologies is open education, a movement that breaks the classroom walls: open resources and open courses can be categorized within this trend for the future of education.

2.1. PHYSICAL ENVIRONMENTS FOR LEARNING ENRICHED WITH ICT

The study of physical environments has not attracted much attention from educational technology researchers, even though we all recognize their importance in learning. While other aspects have involved hundreds and hundreds of studies, mainly those linked to the teacher or the student, environments have not had sufficient repercussions in the field of educational research.

Technology will change faster than you imagine.
A redesign needs to reflect tomorrow's technologies rather than rely on today's.

Source: JISC Report (2014, p. 3by 1).

2.1.1. Architecture of new environments

Searching for documents about physical environments designed for educators, not for architecture, we have found this jewel from JISC e-Learning and Innovation: "Designing Spaces for Effective Learning. A guide to 21st-century learning space design". This document shows proposals and guides to design environments where we can transform our learning experiences, giving relevance to digital technologies usual in education such as interactive whiteboards, environments to promote personal learning, wireless networks, or mobile devices (Figure 4). Currently, we would need to consider other less frequent technologies like interactive tables or virtual reality. And let us not forget Artificial Intelligence and its applications to physical spaces which we will explore next years.

Another interesting contribution is Berman (2018), who explores the idea of a new campus with spaces for collaborating, social interaction, and promoting different types of learning inside and outside classrooms.

For those interested in the world of school architecture, we recommend this link about Architecture and Education. And here are some interesting examples of learning spaces designed by Rosan Bosch, very inspiring pictures, and projects.

Figure 4.
Transforming learning experidesigned by JISC Report

Embedding technology into learning and teaching spaces is likely to be
an evolutionary process rather than a revolutionary one.
Considering technological requirements at the early
stages of planning will ensure that maximum
benefit can be obtained from the investment.
Start by establishing your pedagogic aims,
then review the design and the technological
infrastructure in the whole institution, to ensure
that your aims can
be achieved.
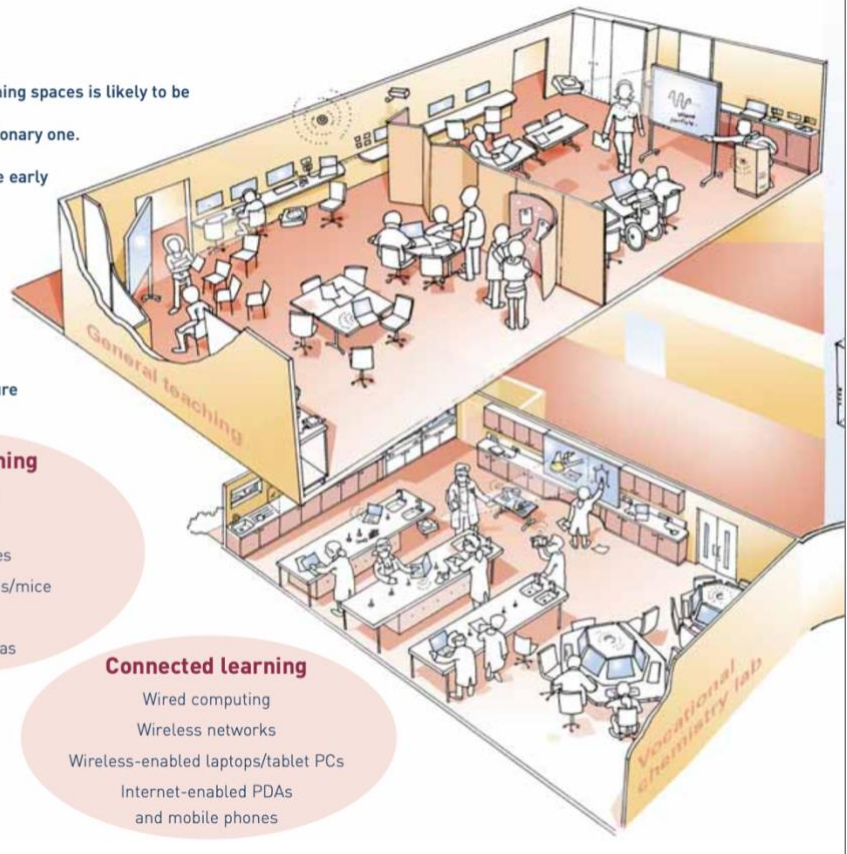
Mobile learning
Tablet PCs
Laptops
Mobile phones
Wireless keyboards/mice
PDAs
Digital cameras

Connected learning
Wired computing
Wireless networks
Wireless-enabled laptops/tablet PCs
Internet-enabled PDAs
and mobile phones

**Visual and
interactive learning**
Video conferencing
Video streaming
Image projection
Interactive whiteboards
Voting devices

Supported learning
Assistive technologies
Accessible USB ports
Audio-visual prompts
Video recording facilities
Plasma screen information
points
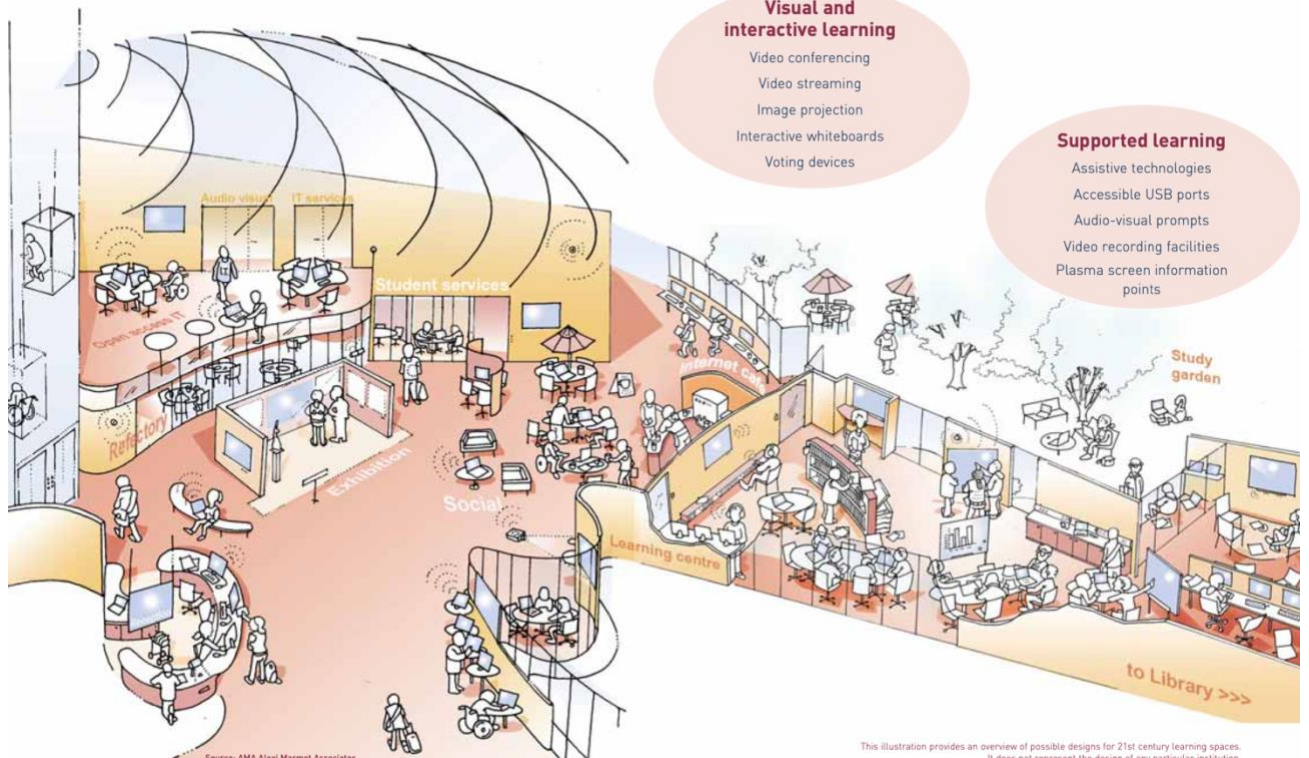
Source: AMA Alexi Marmot Associates

This illustration provides an overview of possible designs for 21st century learning spaces.
It does not represent the design of any particular institution.

Source: JISC Report (2014, p. 6-7).

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One line of educational research has emerged in recent years to get back the attention of experts about spaces and the impact of technologies: the digital technology-enriched spaces, that is, the Smart Learning Environments (SLE in advance) or the Future Classroom.

2.1.2. Smart Learning Environments

We can find a good definition of SLE in Koper (2014): "*learning environments that are considerably improved to promote better and faster learning*" with the use of ICT (p. 4). In other words, SLE are (p. 14):

SMART LEARNING ENVIRONMENT

"physical environments that are improved to promote better and faster learning by enriching the environment with context-aware and adaptive digital devices that, together with the existing constituents of the physical environment, provide the situations, events interventions and observations needed to stimulate a person to learn to know and deal with situations (identification), to socialize with the group, to create artifacts, and to practice and reflect".

For the author, the set of requirements is the next:

1. one or more digital devices are added to the physical locations of the learner;
2. the digital devices are aware of the learners location, context and culture;
3. the digital devices add learning functions to the locations, context and culture, such as the provision of (augmented) information, assessments, remote collaboration, feedforward, feedback, etc.;
4. a digital devices are monitoring the progress of learners and provides appropriate information to relevant stakeholders.

Source: Koper (2014, p. 4).

Koper emphasizes that this context enriched with ICT must be adaptive to the learner and the individual needs. In the same sense, in another work[3] related to SLE, one of the definitions collected describes SLE as "*spaces where technology becomes relevant as it contributes to creating learning experiences which are personalized and inclusive for every individual, anytime and anywhere*" (García-Tudela et al., 2020, p. 247). Here you can find some interesting links:

- The Future Classroom Lab (FCL), by European Schoolnet
- "Aula del Futuro" Spanish project
- Toolkit for the future classrooms (in Spanish)

Figure 5
The Future Classroom Lab learning zones

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[3] García-Tudela, P.A., Prendes-Espinosa, M.P. and Solano-Fernández, I.M. (2020). Smart Learning Environments and Ergonomics: an approach to the state of the question. *Journal of New Approaches in Educational Research, 9*(2), 245-258. doi: 10.7821/naer.2020.7.562

The Future Classroom Lab is formed by six different learning zones. Each space highlights a specific area of learning and teaching and helps to rethink important aspects related to them: physical space and layout, resources, and tools, changing roles of student and teacher, and how to support different learning styles. The learning zones reflect the many ways in which flexible space design and educational technology can facilitate active learning pedagogy and contribute to the development of 21st century key competences.

Interact
This is the area where the teacher faces all the learners and leads them through all the steps of the learning scenario. However, that does not automatically imply that the role of the students is limited to being a passive audience as technology can enable each and every pupil to actively contribute.

Exchange
In the Exchange zone, collaboration with others is highlighted as a key aspect of learning. The quality of collaboration is composed of ownership, shared responsibility, and decision-making process within groups. Technology can foster richer communication and more dynamic collaboration both online and in asynchronous environments.

Investigate
In the Investigate zone, students are encouraged to discover for themselves. They are given the opportunity to be active researchers, learning by doing rather than by listening. In this zone, teachers can promote inquiry- and project-based learning to enhance students' analytical and critical thinking skills.

Create
This area provides materials and equipment for students to create their own products as a way of showcasing their learning. Instead of just being content consumers, learners get the opportunity to be content creators. In this zone, students transfer the acquired knowledge to a new piece of content or artifact as a result of analysis, synthesis and evaluation.

Present
In the Present zone, students get the opportunity to share what they have created. The process goes beyond a simple presentation of the finished product to include also delivering and obtaining feedback. Online publication and sharing are also encouraged to familiarise students with the use of online resources and the principles of e-safety.

Develop
The Develop zone is a space for informal learning and self-reflection. Learning must not be limited to the time spent under the direct supervision of a teacher and here students can carry out schoolwork independently at their own pace, learn informally, and focus on their own interests. They can engage in self-directed learning, self-reflection, and meta-cognition skills development.
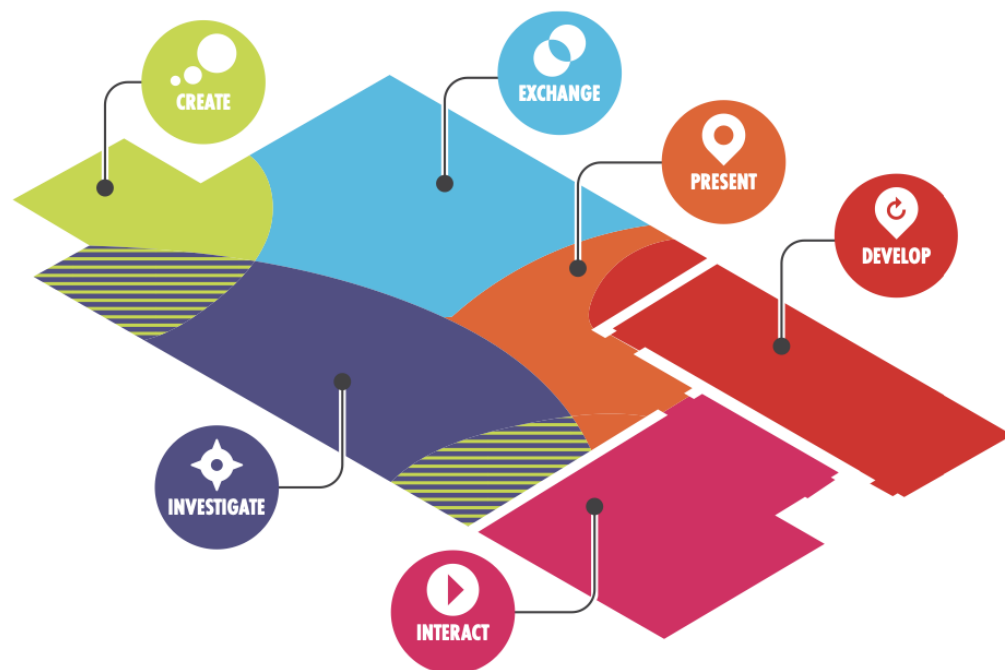
Source: Brochure by Future Classroom Lab

2.2. TEACHING AND LEARNING WITH TECHNOLOGIES IN AND OUTSIDE THE CLASSROOM

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Digital technologies can be a good reason to promote a change in teaching methodologies and students' learning. The use of digital technologies can promote more interactivity or the design of different learning scenarios combining face-to-face and virtual learning. In this sense, we can talk about blended-learning methods where we use the educational power of face-to-face scenarios and all the possibilities of virtual connections.

Some new models have arisen in recent years regarding the use of technologies. We are going to briefly outline some of them: flipped classroom as an example of how to change the traditional method of teaching based on the teacher explaining and presenting contents; open learning as a construct to understand the different possibilities of technologies as tools to access to information to promote the building of knowledge; and the massive online open courses (MOOC) as an example of educational possibilities of digital technologies for all people, making digital learning available to everyone.

2.2.1. Flipped Classroom

Flipped learning is a methodology that helps teachers to prioritize active learning during class time by assigning students lecture materials and presentations to be viewed at home or outside of class.

Source: https://lesley.edu/article/an-introduction-to-flipped-learning

Flipped learning (or flipped classroom, flipped teaching, or inverted classroom) is an innovative method to change the traditional structure of the instructional design. In case you are interested in looking into its history and key points, you can read Gopalan et al. (2022). The definition of Nouri (2016, p. 2) is simple and clear:

> "*is based on the idea that traditional teaching is inverted in the sense that what is normally done in class is flipped or switched with that which is normally done by the students out of class. Thus, instead of students listening to a lecture in class and then going home to work on a set of assigned problems, they read course literature and assimilate lecture material through video at home and engage in teacher-guided problem-solving, analysis, and discussions in class*".

FLIPPED CLASSROOM

It follows that technologies have a central role in this method because teachers can provide access to digital resources (mainly videos, but also any other type of content); students themselves can search for information; teachers and students can communicate by using digital tools in the previous phase of work at home; teachers can use digital tools to produce videos or contents to facilitate the work at home in the initial phase of the method; it is possible to use LMS to facilitate the work; digital technologies can be used, either in the classroom or as an assessment tool.

One guide of Educause about "things you should know about flipped classroom". See the next Figure 6 to better understand the sequence of phases in this method and the change in the activity in the classroom, so we must flip it.

Figure 6
The Flipped Classroom
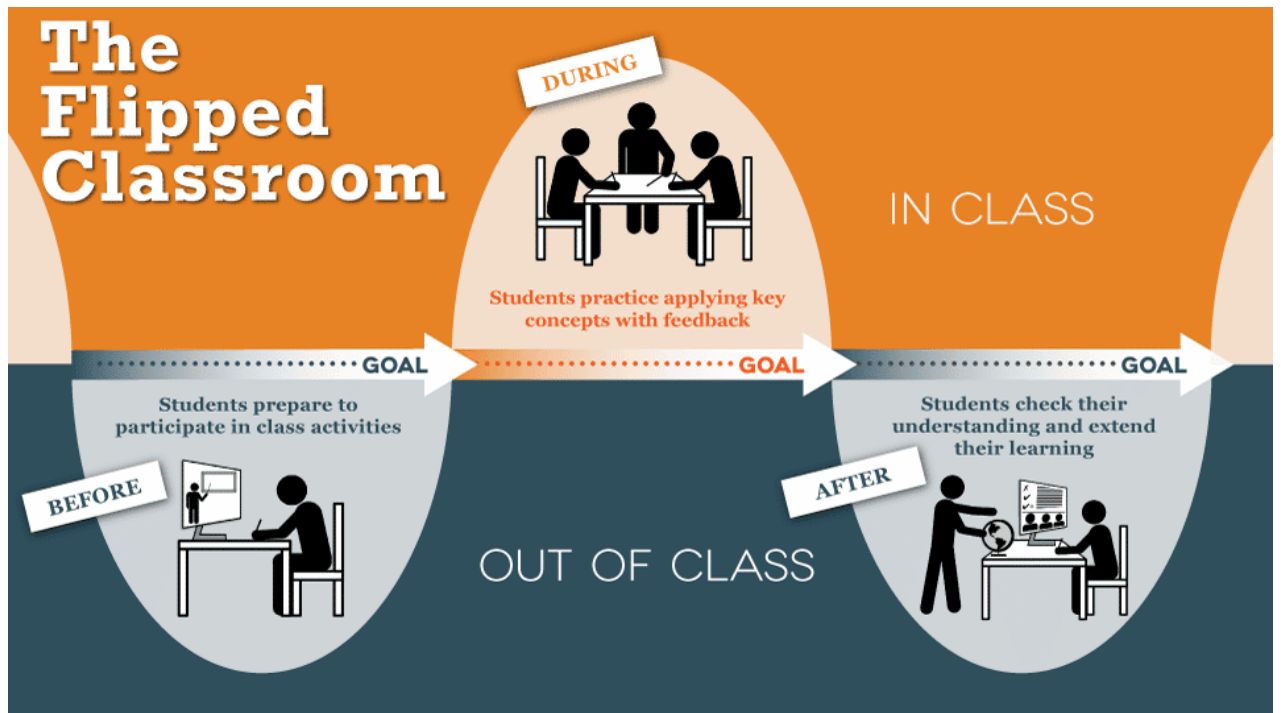
2.2.2.   Open Learning, open educational resources, and open courses.

What is "open education"? It can be understood as a set of experiences like open resources, open courses, open access to information, and to educational experiences. It is a current trend in Europe and around the world and it is defined as:

> "a way of carrying out education, often using digital technologies. Its aim is to widen access and participation to everyone by removing barriers and making learning accessible, abundant, and customisable for all. It offers multiple ways of teaching and learning, building and sharing knowledge. It also provides a variety of access routes to formal and non-formal education, and connects" (Opening up Education: A Support Framework for Higher Education Institutions, 2016)

Source: https://joint-research-centre.ec.europa.eu/what-open-education_en

For school education it is very relevant to share information and resources in open access and with reusability permission, but this movement of open education has the biggest impact when we talk about adult education and lifelong learning. In this sense, it is the approach of Castaño et al. (2014), which explains four scenarios to build learning in adults (see Figure 7).

OPEN LEARNING

Figure 7
Four scenarios for open adult learning
by Castaño, Redecker, Vourikari and Punie (2014)
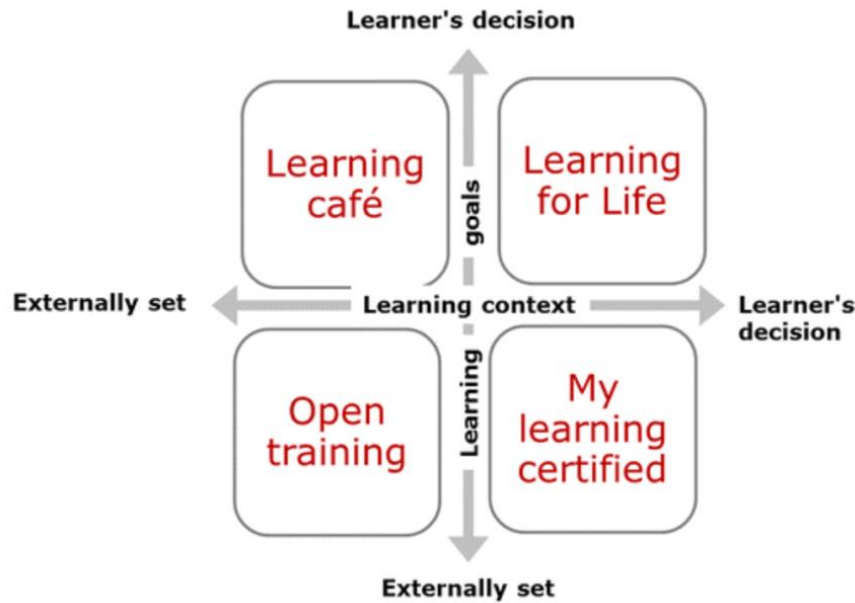
In Europe we also have a framework of open education elaborated by Inamorato et al. (2016). In this document, they focus on higher education institutions, but the approach can be useful for other educational organizations. Figure 8 on the right shows the dimensions of this model OpenEdu. These dimensions can be helpful to reflect on open practices and to analyze institutional policies.

OPENEDU EUROPEAN MODEL

Source: Inamorato et al. (2016, p. 8)
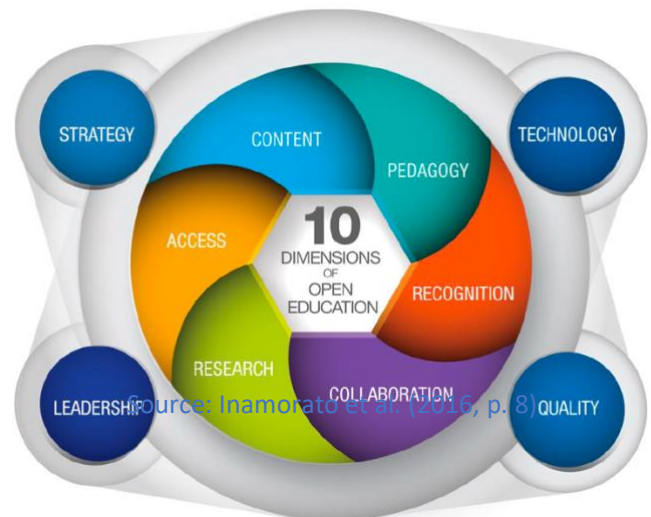
Another interesting movement in the field of open education is the repositories of Open Educational Resources (OER). According to UNESCO, they are:

OPEN EDUCATIONAL RESOURCES

Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others.

Open license refers to a license that respects the intellectual property rights of the copyright owner and provides permissions granting the public the rights to access, re-use, re-purpose, adapt and redistribute educational materials.

Source: https://www.unesco.org/en/open-educational-resources

It is possible to find some open educational practices on the web of Open Education Global. And some interesting links about OER are the next:

- UNESCO Recommendation on OER (2019)

- UNESCO OER in action
- OER Commons repository

MOOC

And, finally, we have to include as another example of open education the MOOC learning modality, since it was very relevant during some years, although in recent years its relevance has declined. MOOC is the acronym for Massive Open Online Course, which is an online course offered free of charge in open access. In Figure 9 you can see the history of MOOCs until 2013, the year when they began to decrease. And use this link to see a video about the importance of MOOCs.

Figure 9
History of MOOCs
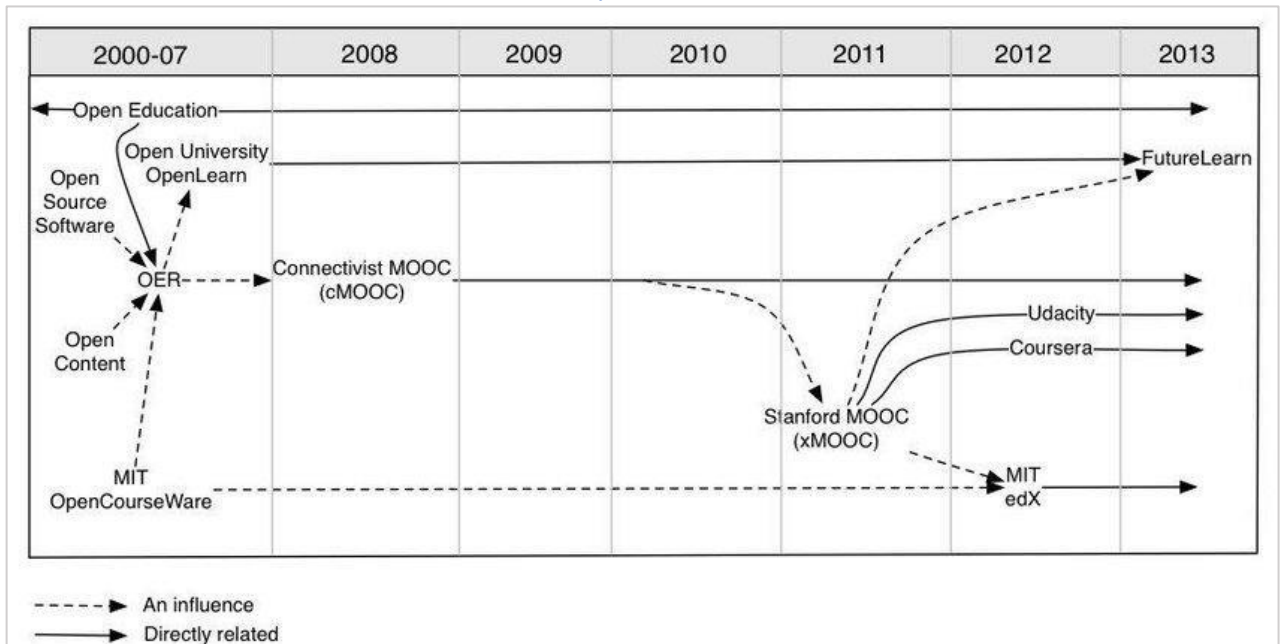
Source: Lee et al. (2018).

PERSONAL ORGANIZATION OF ICT
FOR LEARNING

Educational
agents (U3)

The classroom (U2)

Educational organization
(U1)
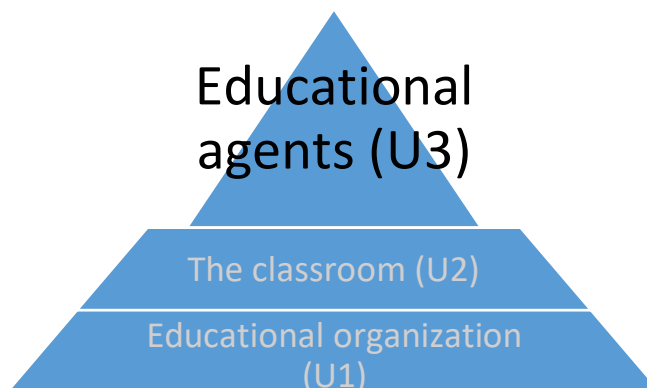
We have talked about the Digital Competence of organizations and how to promote the digitalization of the classroom, but here we are going to describe Digital Competence as an individual skill in people. We will explore the European framework (DigComp model, with five areas) and you can evaluate yourself using the Digital Competence Wheel. Make sure you try it! Moreover, in this unit, we will analyze the personal Digital Identity because it is one of the dimensions of Digital Literacy. These are the main concepts of this lesson, so all the resources revolve around them. And they are all part of digital citizenship in this century. Finally, we must note that digital citizenship is a skill to be cultivated throughout our lives, so it will be necessary to promote strategies for lifelong learning as adults. The use of different resources and digital tools to learn is dealt with in the concepts of learning ecologies or personal learning environments, which similarly, describe the personal use of tools (not only digital) for learning.

3.1.   LIFELONG LEARNING

From the Council of the European Union, the proposal for "Key competences for lifelong learning" (2018) emerges. This document shows the list of key competences as a combination of knowledge, skills, and attitudes, presenting a list of eight key competences:

KEY COMPETENCES

- Literacy
- Multilingual
- Mathematics, science, technology and engineering
- **Digital**
- Personal, social and learning to learn
- Citizenship
- Entrepreneurship
- Cultural awareness and expression.

On the other hand, UNESCO has an Institute for Lifelong Learning and it is working on this topic, too. In its recent report "Embracing a culture of lifelong learning" (2020), they present a future outlook of education by 2050, considering the challenges that humanity can face in the next years to come. The key points are the next:

- Recognize the holistic character of lifelong learning
- Promote transdisciplinary research and inter-sectorial collaboration
- Place vulnerable groups at the core of the lifelong learning policy agenda
- Establish lifelong learning as a common good
- Ensure **greater and equitable access to learning technology**
- Transform schools and universities into lifelong learning institutions
- Recognize and promote the collective dimension of learning
- Encourage and support local lifelong learning initiatives
- Reengineer and revitalize workplace learning
- Recognize lifelong learning as a human right

It is clear that our skills to use digital technologies in our adult life will be fundamental to guarantee that we remain active as we age, and to ensure a well-rounded life. The competence to use digital technologies will mark a big difference between people in the future. And it is our responsibility to teach our current students as future citizens: teach the students today to learn for tomorrow.

3.2.   DIGITAL CITIZENSHIP

In this century, it is not possible to understand our life and our society without considering digitalization. The impact of digital technologies is evident to anyone and from any perspective, so all citizens must develop their skills to learn to live in this digitalized world, which is the meaning of digital citizenship:

DIGITAL CITIZENSHIP

> "*Digital citizenship competences define how we act and interact online. They comprise the values, attitudes, skills and knowledge and critical understanding necessary to responsibly navigate the constantly evolving digital world, and to shape technology to meet our own needs rather than to be shaped by it*".

(European Commission, 2019, in https://ec.europa.eu/newsroom/just/items/672450/en)

It is recommended to download the "Digital Citizenship Education Handbook" (2019) by the European Commission about "*Being online, well-being online and rights online*". You can also visit the Council of Europe's website on digital citizenship education. Here you'll find advice for policymakers, educators, parents, and carers.

3.3.   DIGITAL COMPETENCE

We have studied the organization and management of ICT from the perspective of the institutions in the previous model DigCompOrg. Now, we are going to study the management and uses of ICT on the personal level, that is, every user of digital technologies.

DIGITAL COMPETENCE

Digital competence is understood as the skills and knowledge necessary to use digital technologies. According to European Commission, digital competence involves the use of digital technologies for learning, working, or for your personal life (family, social relationships, and leisure).

The European Framework of Competences also includes a model to analyze digitalization from this individual perception: it is DigComp (Figure X). They have made different versions, but all of them have the same five areas of competence: 1) information and data literacy, 2) communication and collaboration, 3) digital content creation, 4) safety, and 5) problem-solving. See Figure 10.

Definition of Digital Competence

In DigComp, digital competence involves the "confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It is defined as a combination of knowledge, skills and attitudes." (Council Recommendation on Key Competences for Life- long Learning, 2018).

Figure 10
DigComp European model of digital competence

DigComp EUROPEAN MODEL

Figure 11
Digital Competence Wheel. A tool for self-assessment.

To self-assess your digital competence, you can check the Digital Competence Wheel. It is based on dimensions of the DigComp model and the final result is shown in relation to every dimension.

It is also interesting to mention the model DigCompEdu (Digital Competence Framework for Educators). This model has six areas of competence for educators regarding skills to use digital technologies in education: professional engagement, digital resources, teaching and learning, assessment, learners' empowerment, and the facilitation of the learners' digital competence (this last area is based on the DigComp model). These three areas are included in three big dimensions: educator's professional competences, educators' pedagogic competences and learners' competences. See the figure below:

Figure 12
DigCompEdu model from the European Framework of Competences.

DigCompEdu EUROPEAN MODEL

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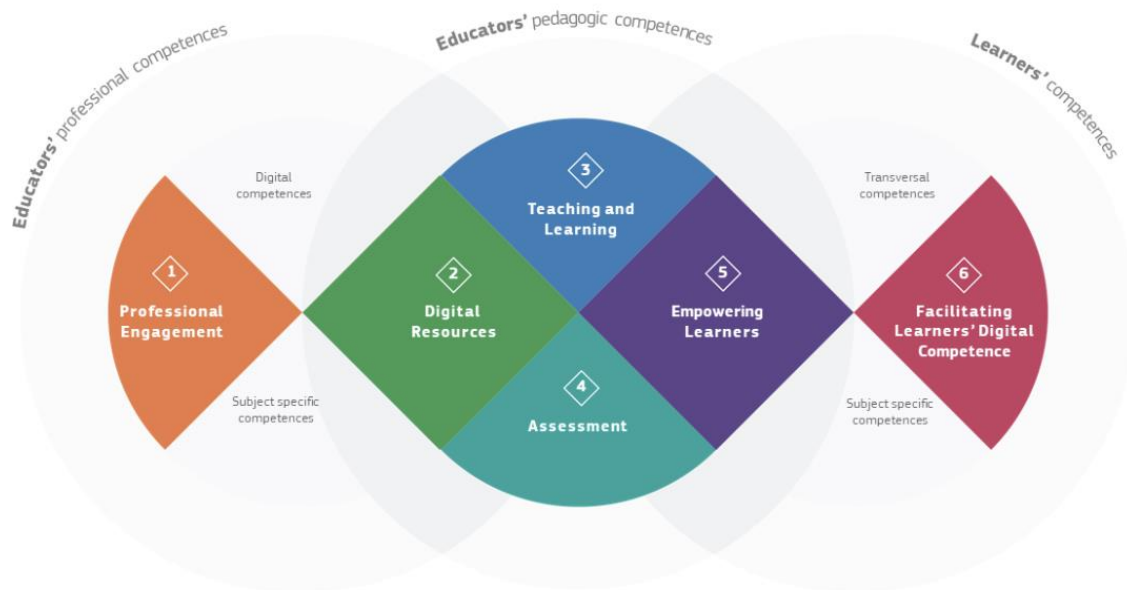
3.4.   DIGITAL SCHOLARSHIP

One of the categories included in digital citizenship is digital identity. We have explored the digital identity of educational institutions, but this concept can be applied to people: everyone can take care of their identity on the net using all the different digital tools (web page, blog, social media...).

We can have one single identity, or have different identities instead: it is possible to have a personal digital identity that is different from our professional digital identity, while on the other hand, these two can be the same. It is very important to understand that it would not be advisable to share aspects of our personal lives with the world; we do need to take care of our professional identity, because it is part of who we are and who people will see us.

So here you have some links to read about professional digital identity and some bits of advice to protect you.

- ▪ Digital scholarship: https://journal.alt.ac.uk/index.php/rlt/article/view/1426
- ▪ Digital identity of researchers:
  https://revistas.usal.es/tres/index.php/eks/article/view/eks2018192728/18980
- ▪ Some advices to protect your digital identity: https://blog.signaturit.com/en/what-is-digital-identity

To contribute to your professional digital identity, you can also be the content curator. Here you have some information about it:

- ▪ Seven ideas about social content curation:

  https://library.educause.edu/resources/2012/10/7-things-you-should-know-about-social-content-curation

- ▪ Digital Research Tools: https://help.commons.gc.cuny.edu/dirt/

3.5. DIGITAL LEARNER

We can use several concepts to describe your personal learning process: PLE (Personal Learning Environment), the PLN (Personal Learning Network), and Learning Ecologies. They are similar, although they are certain differences between them. And all of them are linked to digital literacy or, in other words, they are related to the use of ICT as learning tools.

3.5.1. Learning Ecologies

An individual's learning ecology comprises their process and set of contexts and interactions that provides them with opportunities and resources for learning, development and achievement. Each context comprises a unique configuration of purposes, activities, material resources, relationships and the interactions and mediated learning that emerge from them.

Jackson, N. (2013). The concept of Learning Ecologies. In *Lifewide, Learning, Education and Personal Development e-book*, chapter 5.

One of the authors most recognized about learning ecologies has been Barrow. Barrow (2006)[4] explains this concept understood as an approach to what type of resources have an influence on learning, resources from the environment of every student: distributed resources, work, school, home, community and peers (see Figure 13). This author analyzes that schools need to offer a wide catalogue of resources to their students for equity reasons: resources have a great influence on the final learning outcomes.

LEARNING ECOLOGY

Their research showed that *"more experienced students accessed a greater number of resources both in and out of school [...] even when physical access to computers and the Internet was the same"* (p. 195). In short, these data evidence that access to information does not guarantee the construction of knowledge. Learning is an individual process. Equity must be based on equal opportunities offered by educational systems, but not all students will benefit in the same way from the opportunities provided by the system. There are many variables that influence the final learning outcomes, some of which are personal and some of which are family, social, cultural, or economic. But every student is different. We must provide the same resources to everyone, and be aware that the results will be different in each case.

Figure 13
Learning Ecologies by Barrow (2006)

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[4] Barrow, B. (2006). Interest and Self-Sustained Learning as Catalysts of Development: A Learning Ecology Perspective. *Human Development*, (49), 193-224. This article is not open access.

Work
Web design
Teaching assistant
Video editor

Distributed resources
Books
Tutorials
On-line groups

School
Computer science classes
Discipline-based classes
Technology classes
After-school clubs

Fluency development
Programming, web design, image creation, digital video production, publication preparation, database authoring and design, robotics

Peers
Games
Projects
Homework collaboration

Community
Libraries
Community Technology Centers
Club and contests

Home
Family hobbies
Projects
Games

Source: Barrow, B. (2006, p.195).

Other relevant work on learning ecologies comes from Jackson (2013), who explains that ecologies are useful to describe relations between humans and their environment, so all human interactions. The model by Jackson is shown in Figures 14 and 15.

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Figure 14

Key components of an individual's learning ecology by Jackson (2013, p. 14).

MY CONTEXTS
home and family, educational, work, travel, hobbies and interests - everyday situations in my world

MY RELATIONSHIPS
with people - both existing and newly developed, and with things, objects and tools in my physical or virtual environment

MY LEARNING ECOLOGY

MY RESOURCES
that I find or create that I am able to utilise. Including knowledge, expertise and tools I use to help me learn

MY PROCESS
created for a particular **purpose.** *May be learning or task oriented and includes the dimensions of time and purposeful action.*

MY WILL & CAPABILITY
motivate me and enable me to create my process which is the means through which I develop new knowledge, understandings and capability.

Figure 15

Learning ecologies in relation to educational contexts (formal or informal).

GOALS, PROCESS, RESOURCES & RELATIONSHIPS

Partly determined by learner   Completely determined by learner

CONTEXTS: FORMAL WORLD OF ORGANISED LEARNING-CONSCIOUS LEARNING e.g. school, college, university and corporate training

B) ENQUIRY, PROBLEM & PROJECT-BASED LEARNING ECOLOGIES
Pedagogic processes encourage learners to create their own processes for learning, to define and explore problems, and discover resources and solutions for themselves.

D) SELF-DIRECTED & SELF-MANAGED LEARNING ECOLOGIES
Purpose, goals, contexts, content, process, resources and relationships entirely determined by the learner. However, learners may choose to incorporate OER and OEP (eg reflective processes) into their learning process.

A) TRADITIONAL FORMAL EDUCATIONAL LEARNING ECOLOGY
The context, purpose, goals and objectives, together with content (resources), process, and relationships are all determined by the provider.

C) SELF-DIRECTED BUT SUPPORTED LEARNING ECOLOGIES
Content, goals and the learning process are largely determined by the contexts the learner chooses or generates for themselves but support in the form of advice and guidance is given to facilitate learning and achievement. OER might also be used to supplement the learners own resources.

CONTEXTS: INFORMAL WORLD OF TASK-CONSCIOUS LEARNING eg work, family, solving everyday problems

Completely determined by provider   Partly determined by learner
GOALS, PROCESS, RESOURCES, & RELATIONSHIPS

Source: Jackson (2013, p. 12).

3.5.2. Personal Learning Environment

We recommend watching this video by Graham Attwell, one of the "founding fathers" of this construct. We recommend as well reading his article about the concept of "Personal Learning Environment – the future of eLearning?". This approach to learning helps us understand that the process of learning must be understood as a continuum adding up to our formal, non-formal, and informal learning, plus our all lifelong learning situations. We have different styles of learning and different spaces to learn, but all of them together configure our final learning outcomes. So our Personal Learning Environment "*is comprised of all the different tools we use in our everyday life for learning*" (Attwell, 2007, p. 4), it is an "*approach to the use of new technologies for learning*" (p. 7).
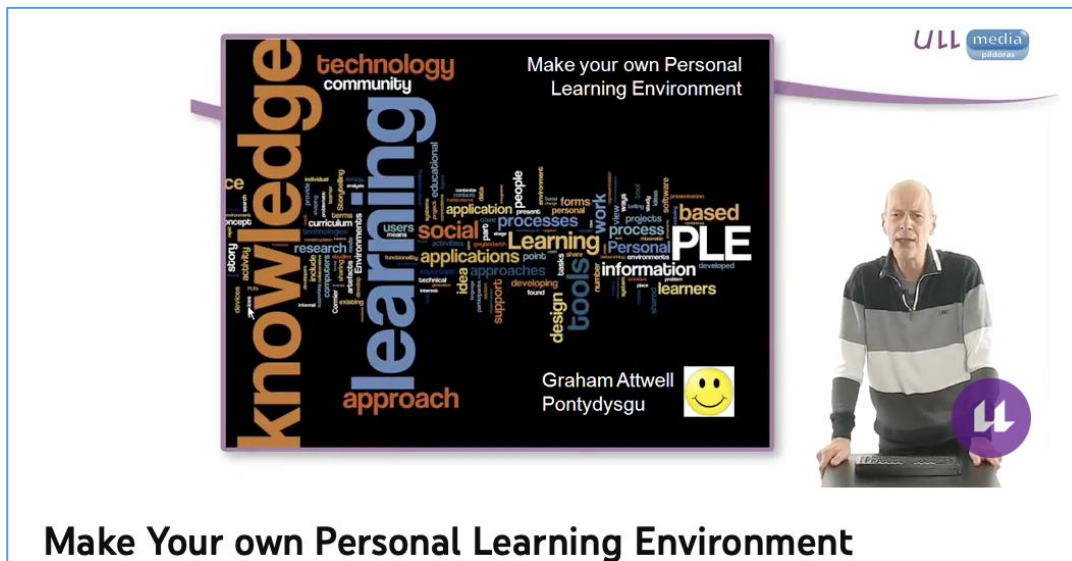
Source: G. Attwell available on https://youtu.be/zj2veAmL2Nc

For more information on this concept and in case you are curious to know what the PLE of university students was like before the pandemic, this research study analyzed data from more than 2000 students at Spanish universities: Prendes et al. (2016)[5] and Prendes et al. (2017)[6]. In our approach to PLE, we understand the concept including not only digital tools, but also the strategies to use them as learning tools and, at the same time, the network of peers and interesting people to learn with. We understand learning as a personal process, but also a social process and not always supported by digital technologies. In our opinion, PLE is a pedagogical approach aimed at understanding how our learning occurs in the 21st century, when digital

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[5] Prendes et al. (2016). Still far from personal learning: key aspects and emergent topics about how future professionals' PLEs are. *Digital Education Review*, (29), 15-30.

[6] Prendes et al. (2017). "Personal Learning Environments in Future Professionals: Nor Natives or Residents, Just Survivors". *International Journal of Information and Education Technology, 7*(3), 172-178. doi: 10.18178/ijiet.2017.7.3.861

technologies have probably become one of the most important tools for building our learning at all stages of life, either as part of our involvement in formal education (from school to secondary, VET or university) or throughout our lives, to build our lifelong learning.

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