

EDU-GATE

Educational University GATeway to enhance innovative E-learning capabilities, resilience and new best practices

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Output 1

Impact and diffusion of digital education in Higher Education Institutions: a research on innovative solutions, methods, skills and best practices to enhance the EU Digital Education Action Plan

Research on National Policies and Practices

Italy

Disclaimer

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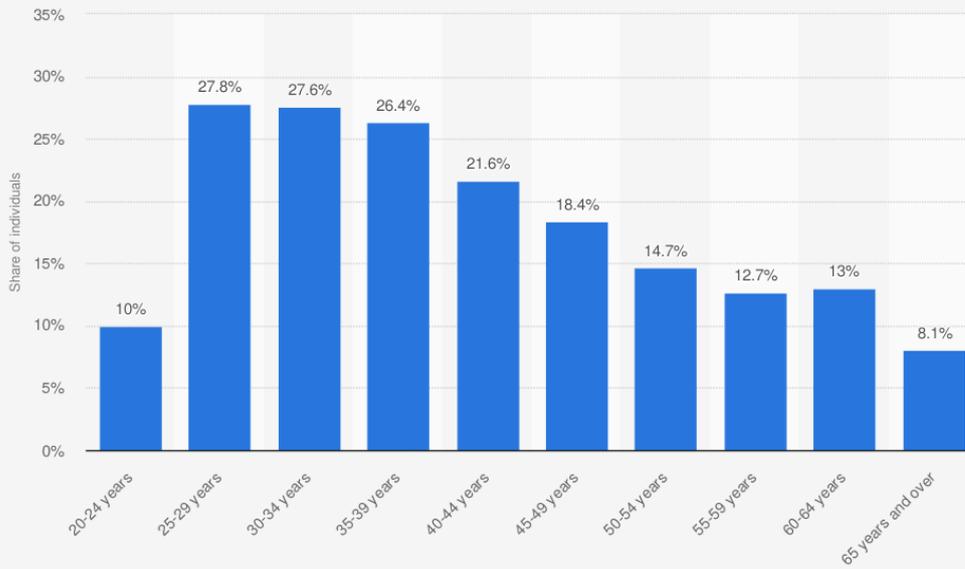
1. STATISTICS ABOUT THE COUNTRY

- Country and Population

Italy is a republic situated in southern Europe and bordering several countries and the Mediterranean Sea. Due to its unusual shape, it is often referred to as “The Boot”. Italy’s economy is well-off and boasts one of the largest GDPs worldwide. The country is a member of the euro area, the European Union and OECD, and has one of the highest living standards in the world. After a slight downturn in 2011, its population growth shot to its peak in 2013, but is now in the red, as population figures plateaued after a slight but steady increase. Another indicator underlining the high standard of living is the stable fertility rate and an unemployment rate which is predicted to decrease until the end of this decade. Follow some data:

- The current population of Italy is 60,338,607 as of Sunday, November 21, 2021, based on Worldometer elaboration of the latest United Nations data.
- Italy 2021 population is estimated at 60,461,826 people at mid-year according to UN data.
- Italy population is equivalent to 0.78% of the total world population.
- Italy ranks number 23 in the list of countries (and dependencies) by population.
- The population density in Italy is 206 per Km² (532 people per mi²).
- The total land area is 294,140 Km² (113,568 sq. miles)
- 69.5 % of the population is urban (42,006,701 people in 2021)
- The median age in Italy is 47.3 years.

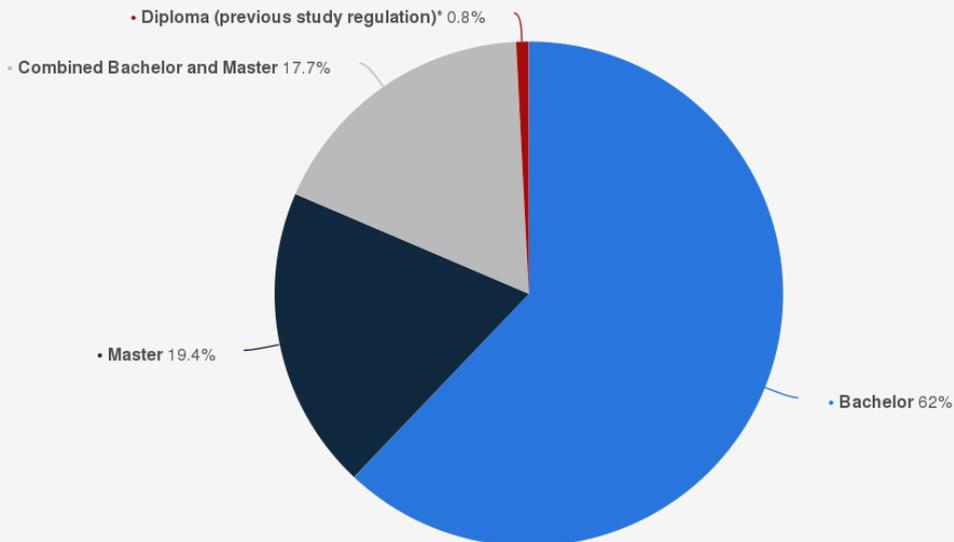
Share of people with a university degree in Italy in 2019, by age-group



Source
 Istat
 © Statista 2021

Additional Information:
 Italy; 2019

Distribution of university students in Italy in the academic year 2018/2019, by course

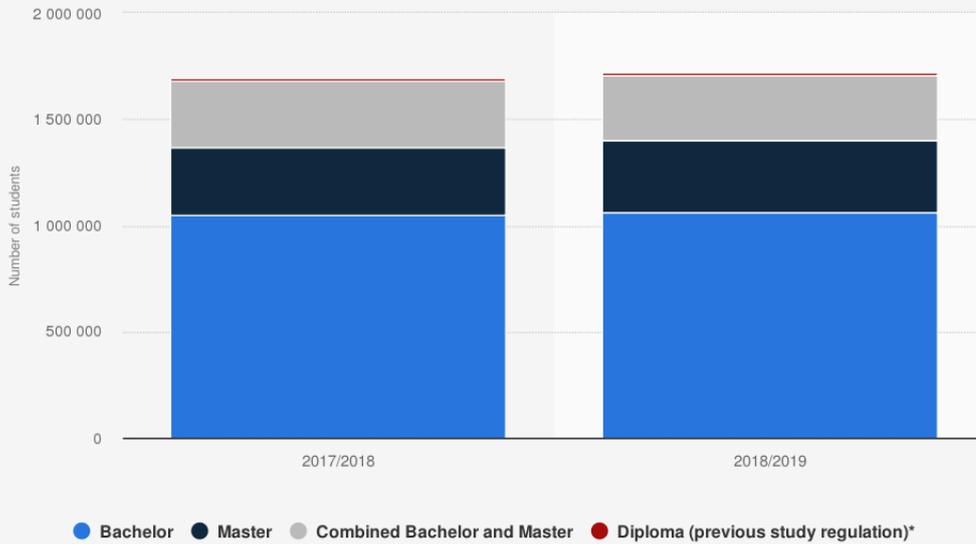


Source
 Istat
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Additional Information:
 Italy; 2018 to 2019



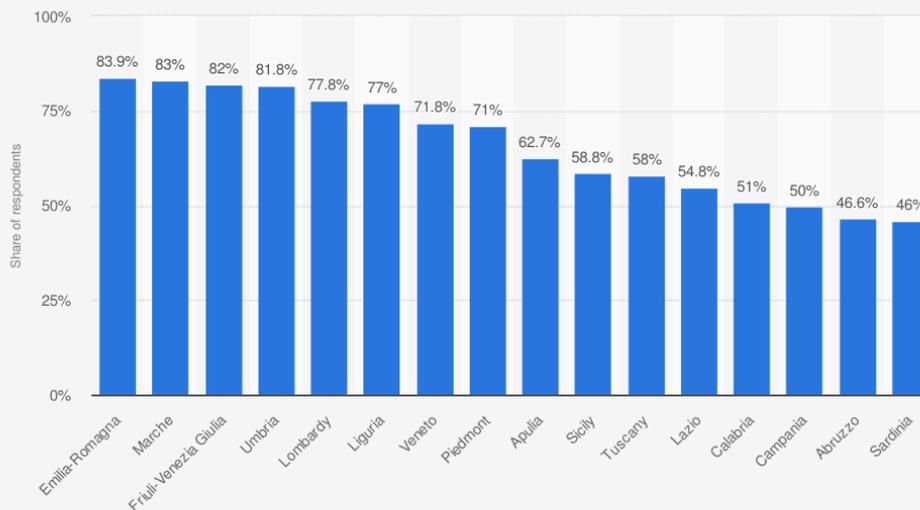
Number of university students in Italy in the academic years between 2017 and 2019, by course



Source
 Istat
 © Statista 2021

Additional Information:
 Italy; 2017 to 2019

Share of online school classes due to the outbreak of coronavirus (COVID-19) in Italy in 2020, by region



Source
 Mondadori Group
 © Statista 2020

Additional Information:
 Italy; 2020; 3,000 respondents; School students



- Higher Education Institutions

The Italian higher education system is a binary system, divided into two large sectors or compartments, institutionally and functionally different: the University sector and the Higher Education for Fine Arts, Music and Dance sector, known succinctly as the AFAM sector.

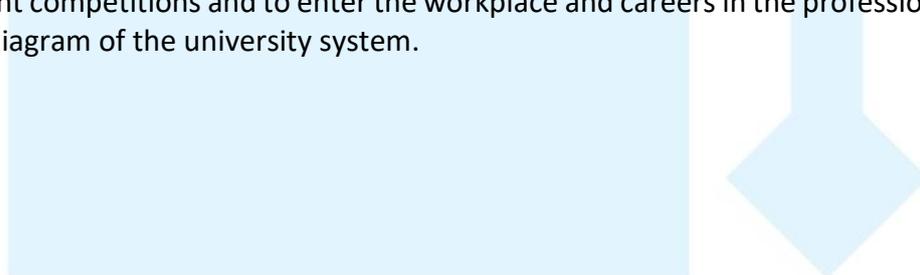
The Italian university sector comprises higher education institutions divided thus:

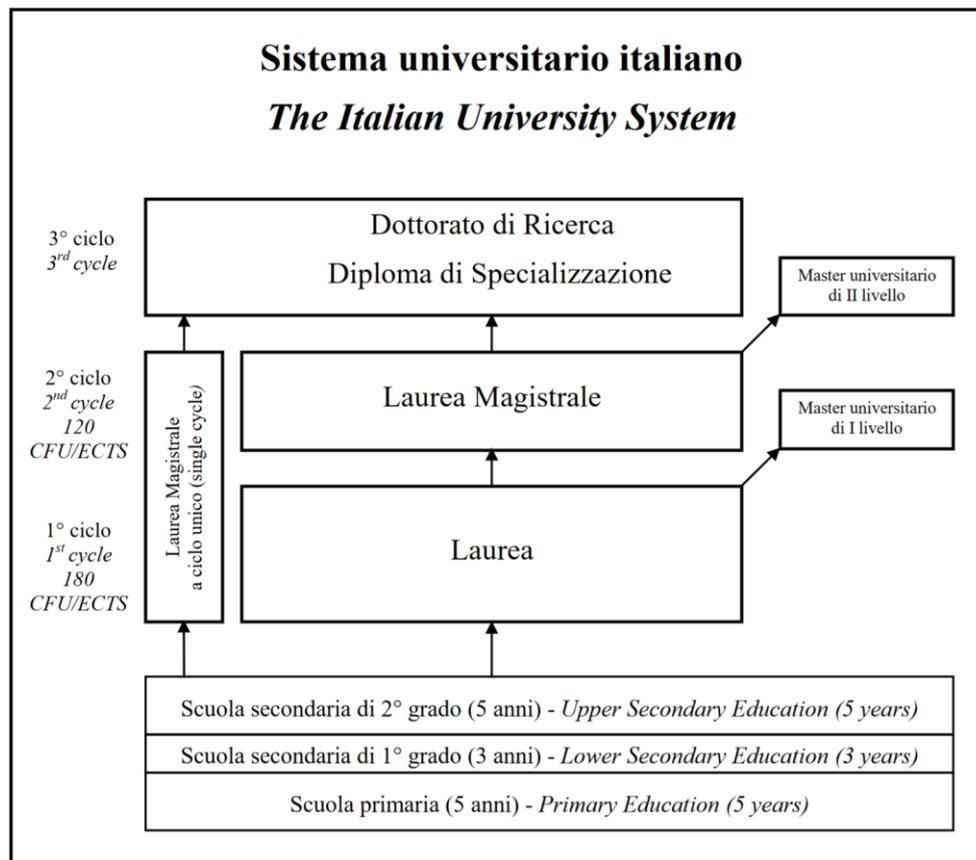
- public universities
- legally recognised non-public universities
- on-line universities
- higher schools and institutions with special charter

The list of university institutions can be viewed at the website: <http://cercauniversita.cineca.it>.

At the University site a further list of university institutions may be found: <http://www.university.it/index.php/maps/>.

The Italian University System is organised in three cycles defined academic qualifications are associated with each cycle which allow students to progress with their studies, to participate in public recruitment competitions and to enter the workplace and careers in the professions. See the following diagram of the university system.





University study courses are structured in credits. A university credit (CFU) is usually equivalent to 25 hours of study by a student, including individual study in the total. The average quantity of academic work performed by a full-time student in one year is by convention measured as 60 CFUs. The CFU system is equivalent to the ECTS system.

Degree and Master's Degree study courses that share goals and educational activities are gathered in "classes" (degree classes). The education contents of each degree course are determined autonomously by each single university: they are obliged to include certain educational activities (and the corresponding number of credits) fixed at a national level. These requisites are established in relation to each class. The qualifications in the same class all have the same legal value.

University qualifications confer on the holder different academic titles: a degree bestows the academic title of "Dottore", the Master's Degree is defined as "Dottore Magistrale"; the Research Doctorate bestows the title of "Dottore di Ricerca" or "PhD".

Italian universities can establish joint programmes in collaboration with other universities, both Italian and foreign, for which joint degrees or double/multiple degrees are awarded upon completion.

The organisation of the university system following the Bologna Process three cycles is as follows:

First cycle

It consists exclusively of **Laurea** courses. These have the objective of guaranteeing to students a sufficient command of general methods and scientific content and the acquisition of specific professional knowledge. The minimum requirement to accede is the "Diploma di Esame di Stato conclusivo dei corsi di istruzione secondaria superiore" ("State Exam Diploma upon the conclusion of the upper secondary school courses") - commonly known as "Diploma di Maturità" - or an equivalent foreign qualification. Laurea courses last three years.

Laurea

Classification: Bologna process first cycle qualification/EQF level 6

Access: by the upper secondary school leaving qualification, or a comparable foreign one

Workload: 180 ECTS

Duration: 3 years

Academic title: Dottore

Further studies: admission to "Laurea Magistrale" and to "Master universitario di primo livello"

Second cycle

a) The courses for a **Laurea magistrale** with the aim of offering an advanced level of education for the practice of highly qualified tasks in specific areas. Access to these courses is dependent on a Laurea or a comparable foreign qualification. Laurea magistrale courses last two years.

Certain courses (Medicine and Surgery, Veterinary medicine, Odontology and dental prosthetics, Pharmaceutical studies, Architecture, Law) are defined as "**single cycle**" **Laurea magistrale** courses. They do not envision the award of the intermediary Laurea qualification and the requirement to accede is the "Diploma di Esame di Stato conclusivo dei corsi di istruzione secondaria superiore" ("State Exam Diploma upon the conclusion of the upper secondary school courses") - commonly known as "Diploma di Maturità" - or an equivalent foreign qualification. "Single cycle" Master's Degree courses last five or six years.

The Laurea Magistrale qualification is the principal qualification of the Italian second cycle.

Laurea Magistrale

Classification: Bologna process second cycle qualification/EQF level 7

Access: by a Laurea, or a comparable foreign degree

Workload: 120 ECTS

Duration: 2 years

Academic title: Dottore Magistrale



Further studies: admission to Dottorato di ricerca, Diploma di Specializzazione and Master universitario di secondo livello

Single cycle Laurea Magistrale

Classification: Bologna process second cycle qualification/EQF level 7

Access: by the upper secondary school leaving qualification, or a comparable foreign one

Workload: 300 to 360 ECTS

Duration: 5 or 6 years

Academic title: Dottore Magistrale

Further studies: admission to Dottorato di ricerca, Diploma di Specializzazione and Master universitario di secondo livello

b) **Master universitario di primo livello** courses: are courses of scientific refinement or of permanent and continuing higher education that can be accessed with a Laurea or comparable foreign qualification. Master universitario di primo livello courses last a minimum of one year and do not allow access to further courses of the third cycle.

Master universitario di primo livello

Classification: Bologna process second cycle qualification/EQF level 7

Access: by a Laurea, or a comparable foreign degree

Workload: minimum 60 ECTS

Duration: minimum 1 year

Further studies: the qualification does not allow access to PhD and to 3rd cycle programmes, since this type of course does not belong to the general requirements established at national level, but it is offered under the autonomous responsibility of each university

Third cycle

a) **Dottorato di ricerca** (Research Doctorate) courses with the aim of imparting the correct methodology for advanced scientific research, adopting innovative methodologies and new technologies, with the expectation of internships abroad and activity in research laboratories. A Laurea magistrale (or comparable foreign qualification) and passing a public competition are necessary for admission. Dottorato di ricerca courses last a minimum of three years.

Dottorato di ricerca

Classification: Bologna process third cycle qualification/EQF level 8

Access: by Laurea magistrale, or a comparable foreign qualification; admission is dependent upon passing a public competition

Workload: n.a.

Duration: minimum 3 years

Academic title: Dottore di ricerca; PhD

b) **Diploma di specializzazione** courses with the aim of providing skills and knowledge for the practice of highly-qualified professional tasks, particularly in the sector of medical, clinical and surgical specialities. A Laurea magistrale (or comparable foreign qualification) and passing a public competition are necessary for admission. Other requirements and professional licenses can be necessary according to the field of study. Diploma di specializzazione courses are of varying duration, according to the academic discipline concerned, from a minimum of two to a maximum of six years. Furthermore, a final thesis must be presented.

Diploma di Specializzazione

Classification: Bologna process third cycle qualification/EQF level 8

Access: by Laurea magistrale, or a comparable foreign qualification; admission is dependent upon passing an entrance exam

Workload: from 120 to 360 ECTS

Duration: from 2 to 6 years

Academic title: Specialista

c) **Master universitario di secondo livello** courses: are courses of scientific refinement or of permanent and continuing higher education that can be accessed with a Laurea magistrale or comparable foreign qualification. Master universitario di secondo livello courses last a minimum of one year and do not allow access to further courses.

Master universitario di secondo livello

Classification: Bologna process third cycle qualification/EQF level 8

Access: by Laurea magistrale, or a comparable foreign qualification

Workload: minimum 60 ECTS

Duration: minimum 1 year

Further studies: the qualification does not allow access to PhD and to 3rd cycle programmes, since this type of course does not belong to the general requirements established at national level, but it is offered under the autonomous responsibility of each university

Other courses

Besides the qualifications listed above, Italian universities can institute other courses which come under the category of lifelong learning or continuous education. Known as Corsi di perfezionamento, they respond to cultural needs for follow-up in specific study areas or for update needs or professional requalification and permanent education. They are usually between two months and one year in duration and the structure of each course and admission qualification are decided autonomously by each university. The certificates relative

to higher education programmes do not allow admission to any course but are assessed in the workplace or to gain extra points for public competitions.

- Companies providing digital education services

In Italy the situation of companies providing digital education services for University and other educational institutions is very changeable.

In the half part of 2021 it was possible to identify almost 78 best Italy based education companies. These startups and companies are taking a variety of approaches to innovating the education industry, but are all exceptional companies well worth a follow.

Our analysis has been based on beststartup.eu classification and founded to pick companies across the size spectrum from cutting edge startups to established brands. The companies were selected for exceptional performance in one of these categories of indicators:

1. Innovation (Innovative ideas, Innovative route to market and Innovative product)
2. Growth (Exceptional growth and Exceptional growth strategy)
3. Management
4. Societal impact

Follow the list:

1. 20lines	21. Life Learning
2. 24 Ore Business School	22. Linfa Digital
3. Accademia Italiana	23. Lingostan
4. Allpolyglot.org	24. Ludwig
5. Anastasis	25. Marshmallow Games
6. AR Market	26. Marsilio Editori
7. Arca Holding	27. Melazeta srl
8. auLAB Srl	28. Mercurius Network
9. AWorld	29. Moku
10. Axios Italia Service	30. Naboomboo
11. BioXell	31. Oral3D
12. Costa Edutainment	32. Peekaboo
13. COZY	33. Pi School
14. CRS4	34. Planearth NET
15. DailyInternship	35. Planet
16. Debatelt	36. Polytechnic University of Milan
17. Desotech	37. Prometheus
18. devACADEMY.it	38. QIRIS
19. Digital Accademia	39. Related
20. Digital Tales	

	40. Rome International School
41. Docsity 42. Edutech 43. Entrepreneurship Club Polimi 44. Farman 45. Fidenia 46. Fight The Stroke 47. FisioScience 48. F-Lab 49. Glickon 50. Impactscool 51. Ingenium Education 52. International School of Treviso 53. iOsmosi 54. IRTAL 55. Istituto Clinico Humanitas 56. Istituto Europeo di Oncologia 57. Istituto Italiano di Tecnologia (IIT) 58. Italia Innovation 59. Kjuicer.com 60. Kunerango	61. ScuolaZoo 62. Skilla 63. Skuola.net 64. Startup Geeks 65. Surgery Academy 66. Talents Venture 67. TeachCorner 68. Teleskill 69. The Startup Training 70. Tutorando 71. Tutored 72. Usophy 73. WeSchool 74. Wibo 75. Wyscout 76. XNOOVA 77. YouInvest 78. Zick Learn

- Dimensions and background of online teaching experiences and digital educational programs in Italy

The Italian Ministry of Education launched in 2007 a National Plan for Digital Schools (Piano Nazionale Scuola Digitale) to mainstream Information Communication Technology (ICT) in Italian classrooms and use technology as a catalyser of innovation in Italian education, hopefully conducting to new teaching practices, new models of school organisation, new products and tools to support quality teaching. The Italian Ministry of Education, Universities and Research asked the OECD to review its Plan from an international perspective and to suggest improvements.

The small budget of the Plan has limited the effectiveness of its diverse initiatives. In its current design, a significant rise of the budget of the plan through public or private sources is a necessary condition for its success. Given current budgetary constraints, a significant budget increase may be difficult, and the report proposes to revise some features of the Plan in order to achieve two objectives: 1) speed up the uptake of

ICT in Italian schools and classrooms; 2) create an Innovation Laboratory Network of test bed schools' pilot-

ing and inventing new pedagogic and organisational practices to improve Italian education, by refocusing the innovation projects on the school 2.0 (scuol@ 2.0) initiative Italy's current policy framework for digital education is the National Plan for Digital Schools (Piano Nazionale Scuola Digitale – PNSD), adopted under the 2015 school reform. Before the plan's adoption in 2016, government action had been limited to funding specific activities¹ with support from European Structural Funds for a total expenditure of EUR 494 million. The PNSD's stated objective is to transform Italian education through innovation and the use of information and communication technologies (ICT) for teaching, learning and school management. The plan aims to coordinate the action of a variety of players (schools, municipalities, private foundations, regional governments) and different sources of funding, including structural funds. The plan lists 35 actions covering every aspect of schools' digitalisation, from infrastructure and IT equipment to redesigning classrooms and strengthening the digital competences of both teachers and pupils. The Ministry of Education monitors the plan's implementation, but no data has been made public so far.

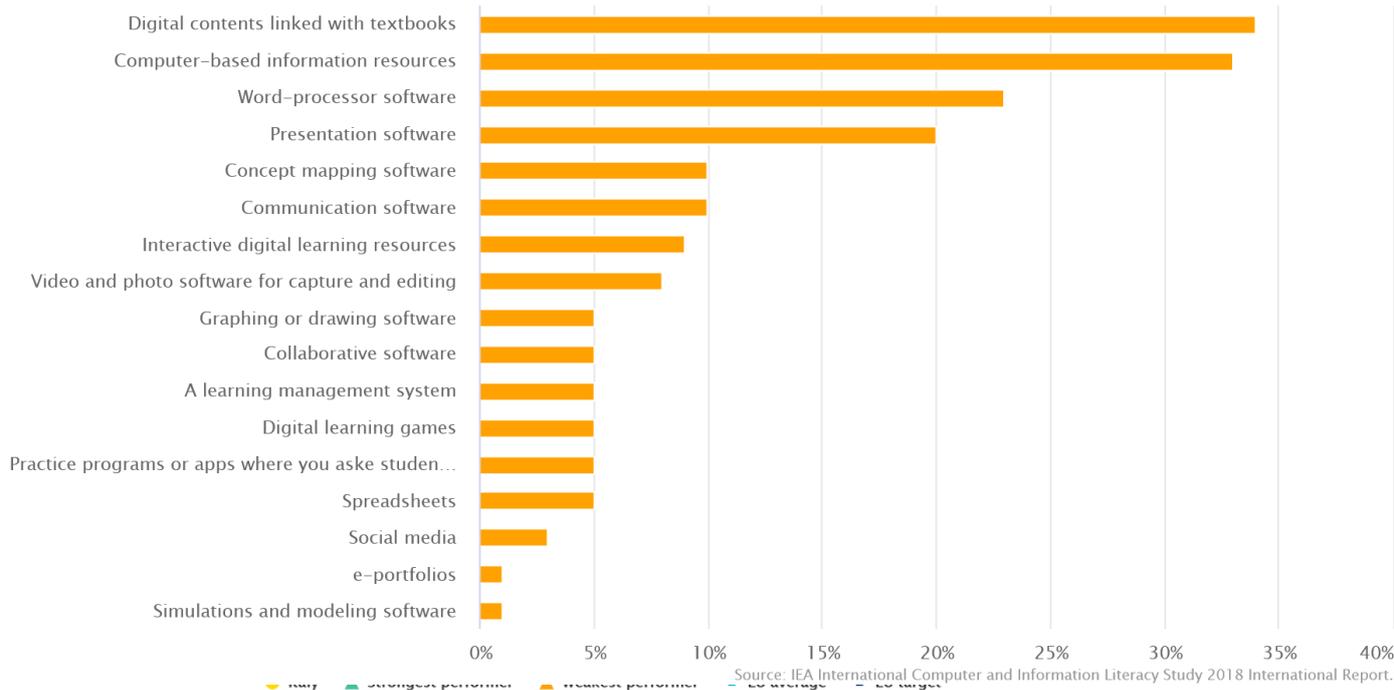
Italy's whole-of-government "Digital Agenda" identified digital solutions as a major source of government savings and pointed to the digital economy as a strategic sector to revitalize Italy's fragile growth. As a consequence, ICT is being introduced massively in school administration. An integration of ICT solutions for administrative and pedagogic purposes may be the next step for Italy's national plan for digital education. In the years to come, speeding up the pedagogic uptake of ICT in Italian classrooms and developing the next-generation pedagogies in clusters of test bed schools would constitute an important contribution of Italy's education system to its digital agenda. And a first step to equipping students with skills for the digital economy.

Key indicators overview

		Italy		EU-27		
		2009	2019	2009	2019	
Education and training 2020 benchmarks						
Early leavers from education and training (age 18-24)		19.1%	13.5%	14.0%	10.2%	
Tertiary educational attainment (age 30-34)		19.0%	27.6%	31.1%	40.3%	
Early childhood education (from age 4 to starting age of compulsory primary education)		99.8%	94.9% ¹⁸	90.3%	94.8% ¹⁸	
Proportion of 15 year-olds underachieving in:	Reading	21.0%	23.3% ¹⁸	19.3%	22.5% ¹⁸	
	Maths	25.0%	23.8% ¹⁸	22.2%	22.9% ¹⁸	
	Science	20.6%	25.9% ¹⁸	17.8%	22.3% ¹⁸	
Employment rate of recent graduates by educational attainment (age 20-34 having left education 1-3 years before reference year)	ISCED 3-8 (total)	60.6%	58.7%	78.0%	80.9%	
Adult participation in learning (age 25-64)	ISCED 0-8 (total)	6.0%	8.1%	7.9%	10.8% ^b	
Learning mobility	Degree mobile graduates (ISCED 5-8)	:	4.8% ¹⁸	:	4.3% ¹⁸	
	Credit mobile graduates (ISCED 5-8)	:	8.9% ¹⁸	:	9.1% ¹⁸	
Other contextual indicators						
Education investment	Public expenditure on education as a percentage of GDP	4.5%	4.0% ¹⁸	5.1%	4.6% ¹⁸	
	Expenditure on public and private institutions per student in € PPS	ISCED 1-2	€6 141 ¹²	€6 622 ¹⁷	€6 072 ^{d, 12}	€6 240 ^{d, 16}
		ISCED 3-4	:	€7 579 ¹⁷	:	€7 757 ^{d, 16}
	ISCED 5-8	€7 771 ^{d, 12}	€8 514 ¹⁷	€9 679 ^{d, 12}	€9 977 ^{d, 16}	
Early leavers from education and training (age 18-24)	Native-born	16.6%	11.3%	12.6%	8.9%	
	Foreign-born	42.1%	32.3%	29.3%	22.2%	
Tertiary educational attainment (age 30-34)	Native-born	20.0%	31.2%	32.0%	41.3%	
	Foreign-born	12.9%	13.9%	25.1%	35.3%	
Employment rate of recent graduates by educational attainment (age 20-34 having left education 1-3 years before reference year)	ISCED 3-4	55.9%	52.9%	72.2%	75.9%	
	ISCED 5-8	66.1%	64.9%	83.7%	85.0%	

Sources: Eurostat; OECD (PISA); Learning mobility figures are calculated by DG EAC, based on UOE 2018 data. Further information can be found in Annex I and in Volume 1 (ec.europa.eu/education/monitor). Notes: The 2018 EU average on PISA reading performance does not include ES; b= break in time series; d = definition differs, := not available, 12 = 2012, 16 = 2016, 17 = 2017, 18 = 2018.

The COVID-19 crisis has led the government to step up investment in the digitalisation of universities and schools.



Source: DG EAC, based on data from Eurostat (LFS 2019, UOE 2018) and OECD (PISA 2018)

An ageing teaching workforce with insufficient ICT skills contributes to the slow progress of digital innovation in teaching. In 2018, 68% of teachers reported having participated in in-service training in ICT for teaching in that year, a marked increase over 2013 (15 pps), and only 16.6% felt a strong need for ICT training, below the EU-22 average of 18% (OECD, 2019). However, while the share of teachers who frequently or always let students use ICT for projects and class work grew from 30% in 2013 to 46.6% in 2018, only 35% of teachers reported using ICT when teaching in most or every lesson in 2018, compared to 72% in Finland and 49% in Portugal. In addition, teachers tend to use ICT mainly to consult information sources (33%) and content linked to textbooks (34%), in line with a frontal teaching approach, while only a minority uses interactive learning resources, practice programmes or learning games (Figure 3). The lack of familiarity with more innovative digital technologies for teaching may reflect the age composition of the teaching workforce², and the need to strengthen in-service training in ICT for older teachers.

The switch to distance learning caused by COVID-19 highlighted the need to ensure equal access to all learners, particularly those from disadvantaged backgrounds, already at risk of exclusion. A national survey by the Ministry of Education found that virtually all schools were able to put in place remote learning activities, and only 2.6% of students did not have access to any form of distance learning. However, according to the national statistical office, in 2019 over 12% of children aged between 6 and 17 lived in families with no PC or tablet (rising to almost one fifth in the south), and only 6% lived in families with at least one PC per person. In addition, 4 out of 10 children lived in overcrowded conditions (Istat 2020). The Council of the European Union adopted a country-specific recommendation for Italy under the 2020 European Semester to 'strengthen distance learning and skills, including digital ones' (Council of the European Union, 2020).

Between March and June 2020, the government allocated EUR 201.7 million to support distance learning. Measures include the acquisition of digital devices for schools to enable students to participate in distance learning.

2. REGULATORY, LEGAL FRAMEWORK AND MAIN ACTORS

- Legislation on digital education services - essential references

The first national plan for ICT in education dates back to 1985: the “National plan for Informatics” (1985) was mainly a professional development programme that targeted exclusively teachers of mathematics and sciences in upper secondary schools and sought to update their content knowledge to include elements of informatics¹. In the early 1990s, the “Programme for the Development of Educational Technologies” offered support to all schools to create computer labs and to invest in the professional development of all teachers. In 2000, a major professional development programme (“For TIC”) targeted 180 000 teachers of all disciplines (i.e. more than one in five teachers in Italy) (Schietroma, 2011). Starting in 2007, this programme was opened again to science and technology teachers of all school levels by the “National Agency for the Development of School Autonomy” (Agenzia Nazionale per lo Sviluppo dell’Autonomia Scolastica, ANSAS, renamed Istituto Nazionale di Documentazione, Innovazione e Ricerca Educativa, INDIRE, in 2012) (ANSAS, 2012).

Along with these national initiatives, local authorities (regions, provinces and communes) and sometimes single schools have led their own policies in the field of ICT for education. In Italy, school buildings are built and maintained under the responsibility of local governments (provinces for upper secondary schools, and municipalities for primary and lower secondary schools): some communes and provinces made broadband access and cabling a priority in the context of school renovation or building projects. Recent reforms have transferred much planning responsibility for education from the central government to regions. Moreover, schools are granted significant administrative autonomy, and can raise funds from private non-profit organisations or from local authorities to improve their infrastructure. Teachers value their pedagogical freedom, a constitutional principle in Italy. The central government clearly is not an isolated actor in this field.

This governance structure implies that by 2007, some schools, especially in the richer areas of the country, had already been equipped with ICT infrastructure beyond the standard computer labs, as survey data show (see statistical annex); and some teachers had started embedding ICT in their instruction tools. Starting in 2005, for instance, the regional school office (Ufficio Scolastico Regionale) of the Lombardy region (the local branch of the ministry of education) forged a partnership with vendors and raised funds to offer grants of EUR 1000 to schools to equip their classrooms with interactive whiteboards (IWBs). In 2006, the local school office in Bologna equipped 108 classrooms with IWBs and clickers (Parigi, 2010).

Starting in 2007, European regional structural funds became available in the four Southern regions with the lowest per capita income (Calabria, Campania, Puglia, Sicilia) for investments in teachers’ professional development and in school improvement projects. The implementation programme (Programma Operativo Nazionale) is



administered centrally and was therefore often used to pilot the actions of the National Plan for Digital Schools. The Digiscuola initiative, for instance, involved 3 500 teachers of mathematics and Italian at upper secondary level over one year in 2007; their classes were equipped with IWBs, and teachers participated in a blended learning programme administered by ANSAS, with a significant project-based component. In Digiscuola, in the absence of recommendations from the Ministry, many schools chose to install IWBs in computer labs or dedicated rooms. It clearly emerged, however, that placing IWBs inside the classroom was a key choice influencing its use (Parigi, 2010). In the “National Plan for Digital Schools”, therefore, it was strongly recommended that all technological equipment be placed in normal classrooms.

The National Plan for Digital Schools comprises one large-scale intervention (interactive whiteboards, Piano LIM) and three pilot projects (cl@sse 2.0, scuol@ 2.0, Editoria digitale).

The national plan aims at embedding ICT in everyday class activities by making ICT equipment available in classrooms rather than in separated computer labs (Schietroma, 2011). The plan encourages adoption of educational technology on a voluntary basis. Only voluntary schools participate, and, for the most intensive interventions, schools have to elaborate and submit a project specifying the intended uses and objectives of ICT to a call for tender. The interventions are rolled out gradually and progressively, partly in response to scarce funding, but also to facilitate the evaluation and overcome resistance, building a shared vision.

Objectives

The National Plan for Digital Schools has two strategic aims. The first set of objectives of the Italian plan is to introduce ICT as part of the daily tools of classroom activities, in order to bring schools closer to society and to enhance the Italian population’s ICT skills and digital literacy (Schietroma, 2011). In terms of student outcomes, the plan is expected to impact directly on student engagement and ICT skills.

At a different level, the plan is also seen as a catalyser for innovation in education and specifically for the renewal of teaching practices (this pedagogical change is sometimes framed as the move from teacher-centred to learner-centred instruction). By creating a technology shock in the school system, the government expects to change the teaching culture, encouraging more personalised educational paths and promoting more active learning, without interfering in any direct way with the constitutional “freedom of teaching” principle. In the end, this is expected to result in a more effective and equal education system, with improved learning outcomes for all students (Schietroma, 2011; Eurypedia, 2012).

Budget

The initial funding for the national plan was decided with the budget law for 2007 (Legge del 27 dicembre 2006 n. 296, art. 1 c. 6332). The budget law set apart EUR 30 million for

each of the three following years (2007, 2008, 2009) “to equip schools of all level and type with technological innovations to support teaching and learning activities”. This budget has since been extended and complemented with regional funds.

The centrally funded actions within the National Plan for Digital Schools amount to a budget of about EUR 120 million in total, or about EUR 30 million per year. This represents less than 0.1% of the yearly budget of the Ministry of Education for pre-primary, primary, lower- and upper-secondary education (EUR 42 billion for 2011: Ragioneria Generale dello Stato, www.rgs.mef.gov.it).

The detail of this investment is given in the table. Investments funded with resources administered and raised by schools directly from families, private non-profit organisations or local governments are not included.

Purchase of Hardware equipment	<i>Piano LIM (IWB)</i>	91 200 113
	<i>Classe 2.0</i>	8 820 000
	<i>Scuola 2.0</i>	1 598 704
Purchase of digital contents (not incl. <i>Editoria Digitale</i>)		5 442 381
Overheads: administration and communication activities		750 409
Formal training, tutoring and coaching of teachers		13 323 964
	Total	121 135 571

Source: MIUR, personal communication.

Table 1. Allocation of centrally administered funds for the National Plan for Digital Teaching Institutions (2007-2019, in euros)

Measures to start educational activities for the school and academic year 2021/2022

On 6 August 2021, the Government has approved the Law-Decree no. 111, which contains the urgent measures to be taken to contrast the Covid-19 pandemic for the academic year 2021/2022.

The Decree will be discussed in Parliament and must be approved by 9 October, otherwise its effects, already in force since 7 August, will cease. In case of approval by law, the measures will apply until the end of the Covid- 19 emergency, set at 31 December 2021.

On 10 September the Government has approved the Law-Decree no. 122 that widens the measures of the previous decree.

The measures apply to all institutions of the State and Regional education and training systems.

As for ECEC and academics settings, the Decrees establish that:

- distance learning activities will not be carried out unless otherwise decided at regional or municipal level exclusively for institutions located in the red or orange areas of risk according to the criteria established at national level;
- at all school levels, staff and students, with the exception of children under the age of 6 and those who are exempt from it for certified reasons, must wear a mask;
- all must be at least 1 meter away and access to those with a body temperature above 37.5° C is not allowed;
- teaching and non-teaching staff must have and show the green certification known as 'Green pass', that is the document that certifies either the vaccination against SARS-CoV-2, or the recovery from the infection or the negative response to a swab test;
- the dispositions on the green pass apply to all people who access premises as external visitors, including parents.

The Green pass is not mandatory for those who are exempted from the vaccination campaign for certified reasons.

The Plan for keeping educational institutions open

In April 2021, the Minister of Education announced a Plan called Piano scuola estate to keep schools open during the summer. The aim of the Plan is to provide schools with ad hoc financial resources to carry out extra-curricular activities that can help students to strengthen their competences, to regain the connection with the school and their peers lost during the last school year due to the pandemic and to accompany them to the next school year.

The total amount of financial resources is 510 million euros coming from national and European funds and that are allocated to schools through the submission of proposals.

Activities involve the teachers and the administrative staff of the schools as well as external experts. Pupils and students participate on a voluntary basis.

The Plan is organised in three phases:

Phase I (June) aims at strengthening pupils and students' subject-related and social competences through collaborative study, outdoor activities, laboratories and other activities that can involve external subjects.

Phase II (July-August) has the purpose of making pupils and students regain their social dimension, through activities linked to music, arts, sports, computing, sustainability and environment, creative writing, etc. This phase also can involve external spaces like theatres, cinemas, museum, libraries, parks and sport centres.

Phase III (September) introduces students to the new school year and, besides all the previous activities, includes guidance, psychological support, activities for inclusion.

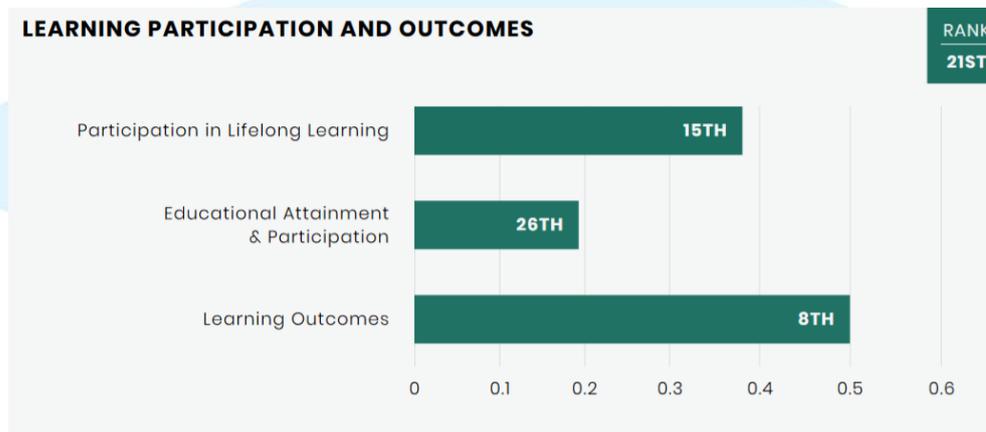
The Ministry has activated a website dedicated to the Plan where schools, families and students can find all information they need to carry out the activities.

- Legislation and national online education programmes - brief description and innovative aspects

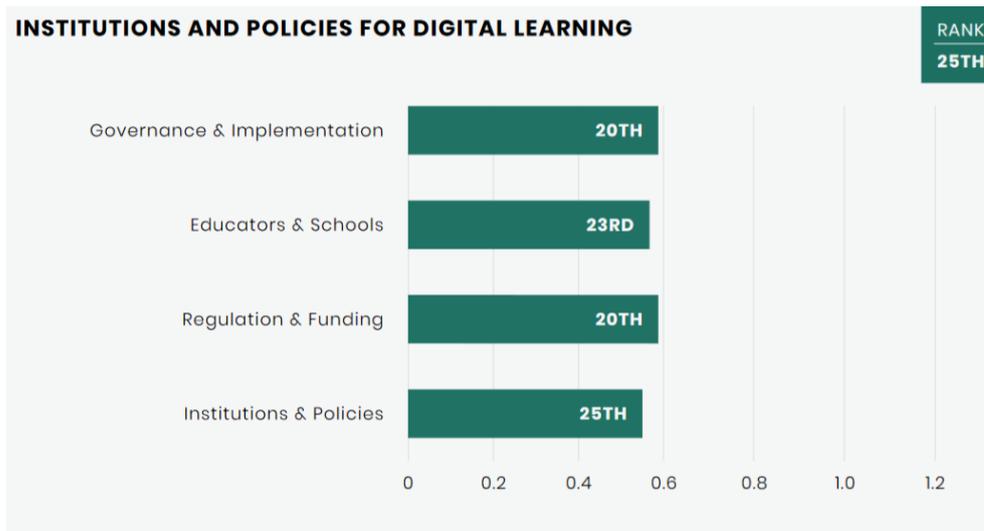
Focusing on a detailed report “Changing How Europeans Upgrade Their Skills” of CEPS – Centre for European Policy Studies, Italy’s score ranks it towards the bottom of the overall index, ranking 26th out of the EU-27.

In detail:

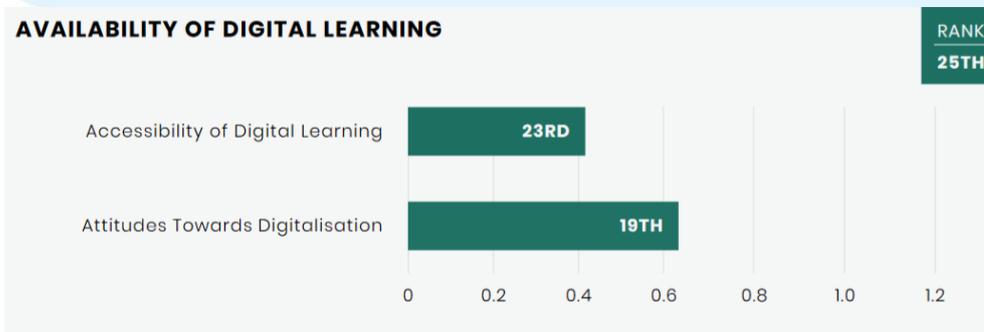
- It scores very poorly in all the dimensions of the index, but its worst performance is in Institutions and Policies for digital learning and Availability of digital learning (25th).
- Indeed, despite having set up a national plan for digital learning in schools, a dedicated ministry for innovation has been created only very recently and responsibilities for digitalisation of learning are not clearly allocated.



- Funding has not been consistently ensured across changes in government.
- The National Plan for Digital Schools (Piano Nazionale Scuola Digitale) and its co-funding mechanism with the European Social Fund have triggered several innovative and promising initiatives in digital learning, which could be scaled up through more regular funding at national level. Some universities also appear to be frontrunners in the development of MOOC platforms.



- The enhancement of digital infrastructure in schools has been a priority in recent years, with introduction of digital technologies in classrooms and improvement of internet connections, as a basic step for digital learning.
- Incentives to firms for continuous vocational training clearly applies to digital learning opportunities, which encourage the uptake of online courses for adult learning.



- Funding should be ensured consistently over time and through changes in government so as to stay focused on the priorities set by the National Plan on Digital Schools.
- A comprehensive strategy for digital learning in Italy should also include higher education and adult learning. At the moment there is no approved comprehensive policy for universities, for example.
- Only guidelines for development of MOOCs have been developed.
- Developing the digital skills of educators, especially, but not only in universities, is a key step to see digital learning happening throughout the country.

On the 4th of March 2021, the Minister of education has signed the two Ordinances that define the organisation of the final State exams held at the end of lower and upper secondary education. In 2021, as in 2020, the organisation of the exams has been defined taking into consideration the challenges schools and students had to face due to the Covid-19 pandemic. The Ministry has also provided schools with an assessment grid. The Ordinance and all the relevant documents are available on the [Ministry's website](#). Both exams will consist of an oral interview with a commission.

Lower secondary education: within the first week of May, the class teachers will assign a topic to each student taking into account his/her areas of interest and, on that topic, the student will produce an original work within one month. Teachers suggest each student the most suitable type of work, which can be a written report, as well as a multimedia, artistic or technical product and can cover more than one subject. Students will have the support of their class teachers for the production of their works. The interview aims at verifying the student's command in the Italian and in the foreign languages, the logic-mathematic competences, the competences in civic education.

Upper secondary education: at the end of April the class teachers will assign a topic to each student taking into consideration the previous student's study course and the two subjects specific for each path indicated by the Ministry of education (e.g. maths and physics at scientific general schools or Latin and Greek language and literature at humanistic general schools). Students have one month to produce their work that can have different forms according also to the type of school attended. The interview aims at making students demonstrate the acquisition of knowledge and competences in each subject and their ability to use them to argue in a critical and personal way, also using the foreign language. To this end, the interview will start from the discussion of the student's original work on the topic assigned by teachers and will then develop through the analysis of a text of Italian literature and of other types of documents chosen by the commission that will also assess the competences acquired through the compulsory traineeship activities and the study of civic education.

Modernising higher education

Italy's tertiary educational attainment rate declined slightly in 2019, and is one of the lowest in the EU. At 27.6% in 2019, the share of 30-34 year-olds with tertiary education is above the Europe 2020 national target of 26%-27%, but well below the EU average of 40.3%. At 13.9 % (EU average 35.3%), the attainment rate is particularly low among foreign-born people. Science, technology, engineering, and mathematics (STEM) graduates make up 24% of all graduates, only slightly below the EU average of 25.4%. At 19 pps, the STEM gender gap is significantly lower than the EU average of 25 pps. The share of female graduates is higher than the EU average across STEM disciplines, most notably in engineering, where women make up 32% of graduates (EU-28%).

Tertiary enrolments are projected to fall sharply following the COVID-19 pandemic. According to some estimates, shrinking household budgets and a lower willingness to move



for health reasons could result in 35 000 fewer university enrolments in the 2020/2021 academic year, an 11% decrease from the previous year, representing a loss of EUR 46 million in tuition fees (Osservatorio Talents Venture 2020). The Ministry of University and Research has therefore decided to allocate an additional EUR 290 million to students' financial support. The funds will be used to extend the system of fee exemptions (the *no tax area*) to students coming from households with an income up to EUR 20 000 (currently EUR 13 000), bringing the number of potential beneficiaries to 500 000 from the current 300 000. The state fund for student grants (*Fondo integrativo statale*) was increased by EUR 40 million, to be disbursed with a particular attention to eligible students who currently do not receive a grant due to lack of funds.

While a tertiary degree represents an advantage on the labour market, transition into employment remains difficult. The employment rate of recent tertiary graduates¹⁰ has been steadily recovering over the past 5 years, reaching 64.9% in 2019, up 8 pps compared to 2014. While it is considerably higher than the employment rates for VET and general upper school graduates¹¹, it remains well below the EU average of 85%. Low demand from a productive sector characterised by small and medium-sized firms is a factor in graduates' poor employment prospects.

An increasing number of university graduates are leaving the country. Of the 157 000 Italians who moved abroad in 2018, 27 000 had a tertiary degree, an increase of 6% on the previous year. In the same year, 13 000 Italian graduates moved back from abroad, resulting in a net loss of highly qualified people of 13 000 in 2018, and 101 000 over the past 10 years (ISTAT 2019). This appears to indicate that the system of fiscal incentives introduced in 2017 to encourage the return of highly qualified professionals is not succeeding in stemming the outflow of highly qualified people.

The government has allocated additional funding to recruit academic staff in state universities. EUR 96.5 million a year was allocated to recruit 1 600 assistant professors (*ricercatore universitario di tipo B*) from 2021, and EUR 15 million to promote 1 000 assistant professors to a tenured position (*professore di seconda fascia*) from 2022. The funds will be distributed among universities based on their size and, to a lesser extent, the quality of their research. After several postponements, the government has launched the fourth round of evaluation of the research results of universities and public research institutes (*Valutazione della Qualità dei prodotti della Ricerca, VQR*), whose results influence almost a third of the allocation of public research funding. The new exercise covers 2015-2019 and will take at least a year to complete, meaning that until 2021 funding allocation to universities and research centres will still be based on the assessment results for 2011-2014.

The budget law for 2020 provides for the establishment of a new public agency to promote and fund strategic research activities. The new agency (*ANR-Agenzia Nazionale per la Ricerca*) may help increase the effectiveness of public expenditure in research and development, but does not represent an increase in Italy's overall investment in research, which stood at 1.4% of GDP in 2018 (EU average 2.2%)¹². The agency's budget was set by the previous Education Minister at EUR 25 million for 2020, EUR 200 million for 2021, and EUR

300 million for 2022. However, almost half the new agency's budget has been subsequently diverted to funding the recruitment of new academic staff. With Ministerial Decree of 13 May 2020, n. 81, the Minister of University and Research has allocated 60 million euro as co-financing to universities for the enhancement of technological infrastructures, digital education and student services.

- Involved institutional subjects

The Italian Higher Education System is structured in a binary system, consisting of two main articulations:

- the university sector;
- the non-university sector.

At present (September 2021), the university sector is made up of 98 university institutions which are classified in:

- 67 State universities
- 31 non-State universities (legally recognised by the State)
- 9 higher schools specialised in postgraduate university studies
- 11 telematic universities.

The non-university sector includes 4 education typologies with their institutions:

- higher education in the arts and music: polytechnics for the arts, academies of fine arts, higher institutes for applied arts, music conservatories and recognised music institutes, higher institutes for musical and choreographic studies, national academies
- higher education in language mediation: higher schools for language mediators
- higher integrated education (FIS): programmes of higher technical education & training (IFTS)
- a few specific fields (e.g. archiving, diplomatics, restoration, military studies, etc.) which, along with their respective institutions, fall under the supervision of ministries other than that of Education.

Italian education programme scheme

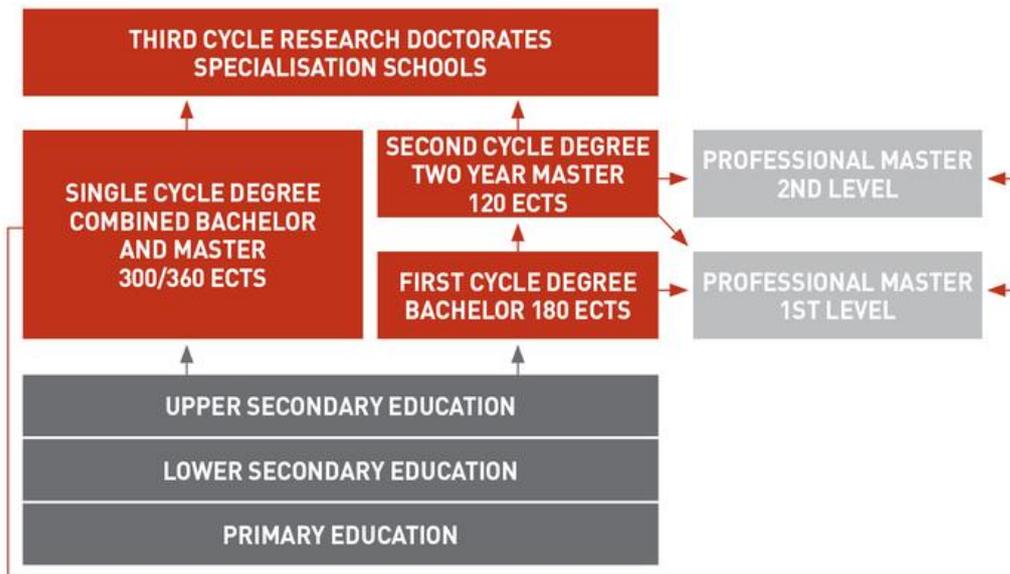


Figure: The Italian University system (MUR, 2021)

- Categories of subjects and end-beneficiaries (target groups)

As for the main legislation relevant as target groups are:

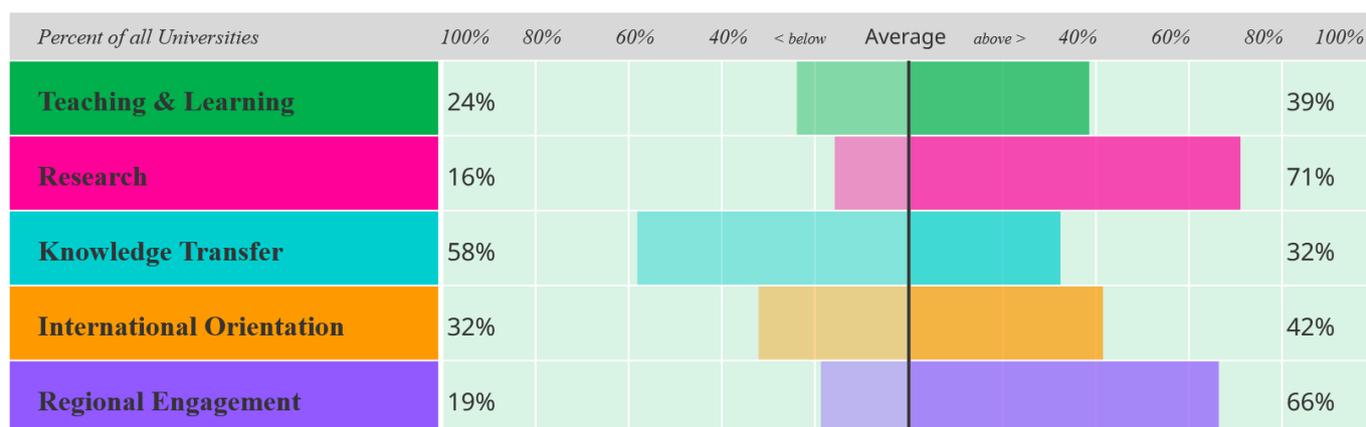
- Ministry of University and Research (MUR)
- National Agency for the evaluation of the university and research systems (ANVUR);
- Ministry of Education (MI)
- Ministry of Labour and Social Policies
- National Agency for the Development of the Education Organizations (INDIRE)
- National Agency for the development of professional training of workers (ISFOL)
- National Institute for the Evaluation of the Education and training System (Invalsi)

- Italian Higher Education System in International Comparison - Strengthens and Weakness

In this section, it is showed the overall performance of Italian universities on the institutional level per U-Multirank dimension. The below table shows the national breakdown of Italian universities and how they stand across the spectrum of above average (receiving a score of 'A' (very good) or 'B' (good)), or below average (receiving a score of 'D' (below average) or 'E' (weak)). In doing so, U-Multirank offers a clear picture on the strengths of Italy, and areas for improvement.

Particular strengths of the Italian higher education system are research and their regional engagement. For research 69 percent of the Italian universities are above the average, while more than the half (55 per cent) are above the average in the dimension regional engagement.

National performance: Italy



How much does it cost to study in Italy?

Tuition fees in Italy are determined on the kind of degree and subject/programme you wish to pursue as well as the private or public character of a higher education institution and are family-income dependent. Tuition fees range between 900 EUR to 4,000 EUR at public universities, while private universities charge 6,000 EUR up to 20,000 EUR per year.

Fees

In this section are showed the fees for studying in Italy. The fees are shown in the national currency and address all fee types: tuition, enrolment (part- or full-time, etc.), certification,

or other administrative costs. Students that are exempt from fees are also described, as well as information on international student fees if they differ.

- **First- and second-cycle:** higher education institutions (HEIs) set their fees at the beginning of the academic year, differentiating according to the students' socio-economic background, field of studies, cycle, study status – full-time or part-time – and year of registration (the amounts displayed on the diagram were calculated based on actual data for the academic year 2018/19). The minimum fee is EUR 200 in 2020/21. HEIs are obliged to exempt students benefiting from student support, and may also exempt on the basis of merit.
- Fees for **short-cycle** higher education programmes vary depending on the provider.
- **International students**, defined as students from outside EU/EFTA/EEA, pay the same fees as national students.

Source: Eurydice - National Student Fees and Support Systems in European Higher Education – 2020/21.

Financial Support

In this section it is showed the financial support system implemented in **Italy**. The types of support covered in this section include: **grants, loans, tax benefits** for students' parents (or students themselves) and **family allowances**. How these terms are defined, are outlined below:

- **Grants** are provided in the national currency and are differentiated between merit-based and need-based (or universal, where applicable). All main public financial support that does not need to be paid back is included, with the exception of grants for study abroad (i.e. mobility grants). Information is also presented on the proportion of students (in the short, first and second cycle) who receive grants.
- **Loans:** information focuses on the existence of a student publicly subsidised loan system and the percentage of students that take out a loan. Information on the interest rate and modalities for the repayment of loans may also be provided.
- **Tax benefit** is any tax relief that is granted to parents whose child is a higher education student or to students themselves. The information aims to cover the amount of the tax relief, how it can be claimed and who is eligible to apply.
- **Family allowances** for students' parents: this part provides information on their amount and the eligible population.
- Public **grants** are allocated on the basis of both economic need and academic merit. The amount depends on whether the student lives with her/his parents and is defined, within the range mentioned in the diagram above, by the regional authorities. The ministry sets the minimum and maximum amount of the grant for each new academic year. For 2020/21, the minimum amount of the grant is EUR 1,981.75 and the maximum amount EUR 5,257.74. Since Law 232/2016, the Fund for scholarships (FIS) of the Ministry of University and Research has increased every year and consequently



also the number of scholarships awarded to students. The decree law of 19. May 2020, n. 34 (art. 236, c. 4) has further increased the FIS by EUR 40 million.

- There are 'honour **loans**' available to students to undertake their university studies. Universities have agreements with banks and guarantee the loans. Fewer than 1% of first- and second-cycle full-time students take out a loan.
- **Tax benefits** are applicable only if the child is tax dependent on his/her parents. A deduction of 19% of the amount of expenses for attending higher education can be made. The same tax benefit applies to students with an income.
- No **family allowances** for students' parents are in place
- Data protection law in Italy

The new European Regulation EU 2016/679 of the European Parliament (Law 119) on the processing of personal data, as well as on the free circulation of these data, was published on 4 May 2016 and came into effect on 25 May 2018.

The English version is available from the EU Regulation page on the website of Italy's supervisory authority: www.garanteprivacy.it

The European Regulation, also known as the "GDPR", is directly applicable and binding in all EU Member States, with no legislation being required at national government level except in specific situations in which the GDPR allows for referrals, derogations or the introduction of additional laws by each Member State.

The shift toward distance learning (promptly labelled "Emergency Remote Teaching" or ERT) had the undoubted merit to make the provision of education possible when schools and universities were physically inaccessible. However, such a paradigmatic change was far from being a silver bullet and raised several issues in terms of pedagogy, digital divide and inequalities, students' and teachers' well-being. Major concerns also arose regarding the legal implications attached to the adoption of specific online instruments, tools, and platforms used for ERT, but not necessarily "educational native".

Few recent scandals had unveiled how the technological choices made for ERT can affect privacy, security, and creativity of the actors involved, thus leading scholars and policymakers to investigate these aspects further.

In Italy, the ERT phenomenon has been primarily scrutinised under the data protection lens. With the decision of the 26th of March 2020, the national Data Protection Authority (hereinafter "DPA") released the first set of instructions for the sector. Such act, issued on the basis of Article 57(1)(b) and (d) GDPR, aimed at enhancing the awareness of educational institutions and their members about the risks, principles, guarantees and rights involved in the processing of personal data commenced when teaching activities migrated online. The instructions were also addressed to the Ministries of Education, University and Research, and Family and Equal Opportunities, in order to foster a transparent and proactive collaboration with the concerned institutional actors.

From a comparative point of view, the Italian case is a relevant model to consider for two main reasons: the DPA has been the first supervisor in Europe to intervene on the matter; and, the instructions resolve some practical issues, which, given the harmonised framework provided by the GDPR, can represent a baseline for other national systems.

The DPA's decision titles "Distant teaching: preliminary instructions" and touches upon five core data protection aspects which universities and schools shall take into account before adopting an online service for ERT and during its use. These are:

- 1) the bases for the lawful processing;
- 2) the implementation of the principles of data protection by design and by default;
- 3) the data protection roles and the allocation of responsibilities among the actors involved;
- 4) the establishment of limitations to the processing;
- 5) the respect of the principles of lawfulness, fairness, and transparency in the processing by school and universities.

With reference to the lawful bases, i.e. the legal grounds enlisted in the GDPR to legitimise the processing of personal data, the DPA clarifies that, even if teaching is performed with new and innovative services, ERT falls within the institutional functions of schools and universities. As a consequence, ERT processing can be grounded on the necessity to perform a task carried out in the public interest (Article 6(1)(e) and, for the case of sensitive data, Article 9(2)(g) GDPR. See, also Articles 2-ter and 2-sexies of the Italian Data Protection Code). On the practical side, this means that there is no need to require the specific consent from the data subjects in the ERT context.

The primary organisational duties in ERT lie with schools and universities. By deciding the purpose and the means of the processing, educational institutions act as data controllers (Articles 4(7) and 24 GDPR). Therefore, the DPA recalls the importance for universities and schools to choose the most appropriate ERT service provider, taking into account not only the functionalities and pedagogical features of the tool but also its guarantees in terms of data protection. The principles of data protection must guide such a choice by design and by default (Article 25 GDPR). As controllers, universities and schools shall also verify whether the processing entails "high risks" for the rights and freedoms of individuals. High risk is likely to occur when the processing concerns vulnerable subjects, or a new technology is introduced (see, in particular, the WP29 Guidelines on DPIA). That might be the case for some innovative tools adopted for ERT (e.g. proctoring software), and this will oblige the controllers to perform a data protection impact assessment (Article 35 GDPR). In this regard, the DPA clarifies that educational institutions will not be subject to such obligation as long as the processing

does not entail additional risks for students and teachers. For example, the adoption of a videoconferencing tool that is not privacy-invasive (e.g. it does not allow the systematic monitoring of users) might not require an impact assessment.

The DPA underlines the relevance of clearly identifying roles and responsibilities of all the actors involved in an ERT processing. When schools and universities (controllers) rely on external online services to guarantee teaching at a distance, such a relationship – also in terms of data protection – shall be regulated by contract (see Article 28 GDPR). Considering the emergency scenario, the DPA suggests checking first the services which are already in the institutions’ portfolio (e.g. the electronic school record), as the online teaching features might be covered in the contract between the parties.



GDPR
General Data Protection Regulation

Is the European regulation for protection of personal data, taking effect starting from **25 May 2018**.

Your RIGHTS

- Correct your data
- Cancel them if they are no longer necessary
- Modify your initially given consent

WHAT are we asking for?
 Obligatory and necessary data sharing

- PERSONAL DATA
- EMAIL
- BACKGROUND and Job Title
- OTHER USEFUL DATA (for clients, suppliers, donors, and incubated startups)

WHY are we asking for it?

- EXECUTION OF CONTRACTS
- JOB PLACEMENT SERVICES
- EVENT PARTICIPATION
- MARKETING explicit consent necessary
- FUNDRAISING explicit consent necessary
- SECURITY AND INTERNAL ORGANIZATION

When appointing an online service or platform as a data processor, school and universities shall ensure that the provider will process the data only for the educational purposes. To this end, educational institutions will have to clearly instruct the platform about the processing, in particular regarding the storage and deletion policy.

The DPA contemplates however the possibility that in some cases it might be sufficient to use services available to the public which allow videoconferences restricted to a number of users. In this scenario, the appointment of the service as processor might not be necessary (or viable, we might add).

Furthermore, where it is not possible to use a service specifically designed for education, the processing of data shall be minimised activating by default only the services necessary to the provision of teaching (i.e. geolocation or social login systems shall be avoided).

In principle, when the ERT platform acts as a processor, it shall not carry out autonomous processing on the personal data received from schools and universities. Nevertheless, the DPA contemplates the hypothesis that the platform might legitimately pursue further purposes with those data in some circumstances. In such cases, however, the access to educational services shall not depend on the obtainment of the consent or the conclusion of a contract implying the processing of personal data unnecessary for distance learning. For instance, if the platform would oblige students to either consent to the processing (e.g. for advertising purposes) or interrupt the use of the service, this would have to be considered illegitimate.

Finally, universities and schools must fulfil their transparency obligations towards teachers, students, and parents. The principle of transparency (Article 12 GDPR) entails the duty to communicate the relevant information about the processing, the actors involved and corresponding responsibilities, in a clear and intelligible language, especially for minors (on this point, see the WP29 Guidelines on transparency). Particularly with reference to the processing of teachers' data, the DPA recalls the importance of applying the specific provisions in the employment context (see Articles 113 and 114 Italian Data Protection Code, and Article 4 Law of the 20th of May 1970, no. 300), warning against the surveillance risks potentially arising in ERT and their chilling effects on freedom of teaching.

Finally, the Authority reassured it will monitor the services offered by the leading distance learning platforms and their level of compliance with the data protection framework.

The first intervention of the Italian DPA on ERT is certainly welcome. Albeit succinct, it is a plain and reasoned application of data protection principles to a sector that, due to urgency dictated by the situation, had to find the means and solutions for a massive digital transition in a matter of days. The latter was an unprecedented challenge for the majority of institutions in Italy, which are not conceived for the provision of long-distance education. Hence, it is not surprising that, in the absence of tools and services developed internally, many schools and universities looked elsewhere, checking for what was available on the market. The DPA recognised the need to ensure the fundamental right to education, even recurring to less traditional methods (like "generic services" or platforms). Still, it had not envisaged exceptions to data protection rules nor limitations to data subjects' rights. On the contrary, the DPA's illustrated the way on how to apply data privacy principles during the hectic period of emergency.

In a recent audition before the Parliamentary Committee on Childhood and Adolescence, the DPA stressed the principles of its March's decision again. More interestingly, the Authority called for infrastructural, cultural, and regulatory interventions in the field and argued in favour of setting up a public cloud infrastructure, possibly within a context of European cooperation

- Consent and storing records

The GDPR alters the **rights of interested parties**. The right of access and deletion (referred to as the “right to be forgotten”) to your own data is expanded so the person has the right to receive **a full copy** of any personal data processed, rather than knowledge of the mode of processing. The right to cancel data means that data controllers must set up a procedure to ensure that third parties, which process the data on behalf of the data controller, also erase the information following the exercise of the “right to be forgotten”. The GDPR also introduces the right to **data portability**, which requires consent or a contract with the subject to allow portability.

GDPR definitions

Personal data: any information relating to an identified/identifiable natural person (i.e. name, location data, etc.)

Data controller: person (or company) that determines the purposes and means of processing personal data (also referred to as the owner)

Data processor: person (or company) that processes personal data on behalf of the controller

Data protection officer (DPO): person in charge of the data processing. This is the natural person in charge of the data processing on behalf of either the data controller or the data processor. The instrument appointing such a person and the instructions provided must be made in writing. This person (or company) must have specific knowledge and particular skills in IT, legal, risk assessment and process analysis. His/her tasks include: Observation, evaluation and management of processing personal data to ensure compliance with GDPR requirements; Educating the company and employees on requirements; Training staff involved in data processing; Conducting audits to ensure compliance; Monitoring performance and assessing the impact of data protection efforts; Maintaining comprehensive records of all data processing activities. They also serve as a contact between the company and GDPR Supervisory Authorities and an informant for data subjects about their right.

As for **defining the owner or processor in charge of processing data**, the GDPR governs **co-ownership**. The GDPR allows for the appointment of sub-controllers and distinguishes between the obligations of controllers and processors. Additionally, the GDPR specifies that all processors and owners of data treatment must **keep a written and electronic register of processing operations**.

The GDPR **empowers owners** to decide the guarantees and limits of processing and to assess security measures on an individual basis. The supervisory authority will intervene ex-post, empowering owners to be responsible for data security. Lastly, the notification duties of the processors expand to notify the control authority for the protection of data of any breaches, not only providers of electronic communications services.



Can data controllers store cookies or equivalent devices on the data subject's terminal equipment? A distinction must be made between technical cookies and profiling cookies. Technical cookies are used solely for the purposes of carrying out the transmission of a communication on an electronic communications network; they are strictly necessary for the provider of an information company service explicitly requested by the contracting party or user. Profiling cookies are aimed at profiling users' preferences or behavior. They are used to send advertising messages in line with the preferences revealed by users themselves while browsing the Internet. The use of profiling cookies requires the data subject's prior consent, while the use of technical cookies does not. **However, in both cases, data controllers must provide data subjects with an information notice that includes the following additional information: 1) indication of the use of technical cookies and profiling cookies; 2) right to select which specific cookies to authorize; 3) possibility to choose the use of cookies through user's browser settings (indicating the procedure to change these settings).** The GDPR does not change the flow of data, though transfers can begin without the guarantor's authorization. The GDPR allows for code of conduct or certification schemes to demonstrate adequate security guarantees and requires that data flows to a third country are only performed where international agreements are similar between states.

Failure to provide an information notice or providing an inadequate information notice to the data subject, or failure to adopt minimum security measures or unlawful data processing may result in extremely severe fines ranging from 10,000 to 300,000 euro and more, depending on the type of violation and the size of the university.

If the university requires you to collect your clients' information, you cannot wait any longer. That short disclaimer (generally mentioning "the information where managed according to Data Protection Law) that you have used at the end of your emails or websites may no longer be enough to comply with the new regulation. With the help of a privacy expert, now is the time to review your Data Protection Policy.

3. ORGANIZATIONAL ASPECTS

- **HEIs response to COVID-19**

Universities are among the first institution which has been affected by the pandemic of COVID-19. As outlined by Ministry of education, each university had to manage on its own the activities arrangement according to the autonomy principle distinguishing the academic sector.

According to CRUI – Italian public and private Universities association – research, the sample of 88 Italian Universities has shifted on average the 88% of the activities online, but only half of the sample has reached 96%. Very few HEIs have provided less than 50% of the courses remotely. These data date back to the end of March 2020.

The spread of COVID-19 has highlighted the need of starting to manage differently daily and established duties: education had to adapt itself to new emerging challenges creating new manner of teaching and studying as well as connections between universities and business world. These mutated and constantly in change conditions constitute both a threat and a challenge to our universities. Although the factual necessities have pulled for a disruption of the established way of managing education, universities have also discovered the bright sides of this situation. This change was necessary to renew the Italian educational system aligning it with European parameters and to foster the emergence and the in-dept analysis of some themes such as sustainability, social rights, digital skills.

However, some difficulties have emerged on the front of management of new tools showing a common lack of digital and communication skills as well as difficulty in dealing with students' problems. The same can be said for the opposite side: student's lack of digital skills as well as of digital tools have strongly slowed some educational paths.

One of the most challenging issue has been the fact that universities often, such as public institution, are used to reference to the classic bureaucratic model, which appears as a production line not guided by specific goals. This should be changed by strengthening cooperation among different work units and by moving closer to a work culture based on results.

Evidently another issue emerged during the pandemic situation has been that of digitalization: professors and students were not able to follow new work process because those ones were not computerized.

During the pandemic closure some HEIs succeeded to adapt themselves very quickly to the changed demanded by the hard situation. This could happen not only thanks to teacher and students' adaptive capacities, but also to the great work carried by the high and middle management, that is the HEIs employees at various levels. Their work of coordination has contributed to strengthen links within the organization in order to avoid weakening of the entire structure. Universities which succeeded in managing these changes are not only ones who already practiced the integrated model or were telematic, but also those that have previously invested in their staff and in organizational skills and community building.

- **Organizational advantages and issues of digital educational programs – Focus on Universities vs students' relationship**

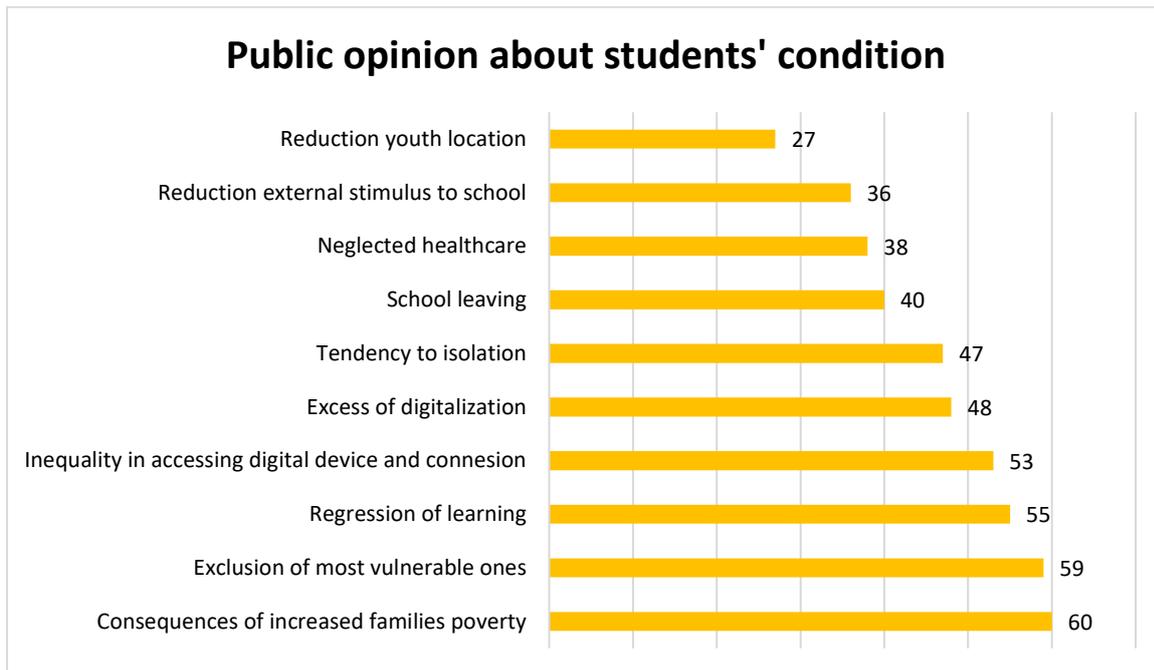
It is becoming very interesting to understand how innovative deep changes are affecting the way we learn and teach.

As many research has started to remark, it is evident that online lessons have permitted off-campus students both to enroll in far universities without further expenses due to a transfer and to attend more constantly lessons and exams. Moreover, this modality has also encouraged categories of students with specific needs: young workers, lone parents, and even disabled or severely ill people.

Statistically the balance seems to be more positive among university students. The most resilient of them have taken advantage of this period strengthening their organizational skills and creating freedom spaces to express themselves, starting precisely from daily difficulties and the boredom given by the social isolation. Distance learning also represents an educational opportunity to learn tolerance to frustration and to wait in order to reach a balance in self-evaluation and in social relationship.

However, not all the students succeed in benefiting or adapting themselves to new conditions, especially those who have not a strong socio-cultural and economical background (or inner personal capacities, indeed). AGCOM, the Italian Communication Community Authority, has revealed through its research that 25 students out of 100 had problems with digital connection, 19 out of 100 have notified that not the entire class has taken part to the online lessons, almost 10 out of 100 did not owned proper digital tools. 12,7% of Italian students had not benefits from distance learning. The main issue is that the pandemic situation has widened the inequalities (the so-called digital divide) among students for many reasons, such as the presence of learners with special educational needs or low performance, the lack of home digital devices and stable connections, and of free loans programs given by universities, and housing conditions (e.g. overcrowding).

Demopolis – National Research Institute – has investigated the public opinion about student's condition during pandemic.



Italians esteem education opportunities to be not enough guaranteed in an equal way expect from 9% of sample: 65% thinks there are different quality levels also within the same geographical context and 23% believes that opportunities are guaranteed to few.

However, risks related to psychological condition, especially cognitive and relation skills, do exist for all kind of students: in 2020 a 30% increase of eating disorders has occurred among students as well as two-thirds of them are experiencing anxiety, stress and self-harm. One of the most critical issue is the passivity condition that student have to face when attending daily lessons with few opportunities to interact with classmates and teachers. The critical point is therefore the impairment of living universities as a communitarian context for students.

The Italian universities situation has been also characterized by a further enlargement of the territorial gap between Northern and Southern universities due to the pre-existing infrastructural inadequacy, wealthy and investment levels on human capital and demographical stagnation. But even among singular university across the country the gap in offering services has widened. All this has an impact to end-users, that is the students.

Another issue for students has been the impossibility to take part to laboratory activities and internships: the former point has been especially critical for STEM students, while the latter has been replaced only in part with internship arranged remotely. The same applies to students who were about moving abroad to study or to participate in an internship within exchange programme such as Erasmus+. In this regard it seems according to data that pandemic has invalidated also the employment condition along with students' knowledge: according to ISTAT – national institute of statistic – in 2020 the youth unemployment rate has reached 29,7% and the employment rate in 25-34 age group has decreased by -1,8 points despite of several recruitment incentives provided by the government (only 67.731 young

could take advantage of them). Although 58,7% of graduate students are women (which also tend to be better at studying and to collect several internship experiences during their studies), one year after getting degree they have -17,8% of possibility to find employment and they earn 89 euros less than their male colleagues. Also, Italy presents among the most negative rate in Europe about youth employment also because the university and business relationship, which has always been weak, has worsened during the pandemic for many reasons.

Generally, a research about university students' life during pandemic carried out by University of Molise, shows that the student sample is divided in to opposite sides: 44,2% of them desire to attend only face-to-face lessons, 41,2% want a blended didactics and only 14,6% declare to prefer fully distance learning. However, Almalaurea president – an Interuniversity Consortium – has stated that those students willing to come back to classroom (four fifths of a sample of 110 thousand) are the graduating ones or those who have been enrolled from several years. The new academic year has shown that newcomers tend to prefer attending lessons remotely because they have never attempted lessons in presence. However, the opportunity to attend lessons remotely has improved the enrollment rate of university (+14 thousand of new students compared to 2019/2020). Although 27,5% of Southern students moves to Northern universities, universities in Central and Southern Italy have increased significantly more than those in the North of the country (North +2,5%, Center +7,7% and South and Islands +5,0%). Another significant statistic is the growing rate of certain study fields such as STEM (up to 15% more compared to 2003/04, which is the most affected academic year for enrollment rates), healthcare, agriculture and veterinary areas (up to 2%), whereas artistic, humanistic, pedagogical, and especially economics, law and sociology, are below 2003/04 average rate (respectively -4% and -15%). However, some rates have improved significantly: 58,4% of students complete their studies on time (in 2010 39%) and only 7,6% outside the prescribed time.

• **Organizational advantages and issues of digital educational programs – Focus on Universities vs professors' relationship**

The acceleration given by the pandemic situation has made emerge the critical potential that a conscious utilization of digital devices can activate to increase teaching effectiveness. Teaching staff often had to undertake digital skills pathways on their own because of the lack of pre-existing skills and, also, infrastructure. Actually, according to FLC CGIL- one of the Italian trade union of knowledge workers - only 22,9% of professors could attend digital improvement classes (11,3% in the past and 11,6% during emergency) and 32,2% received assistance from a help desk (survey carried out on a sample of 991 Italian universities).

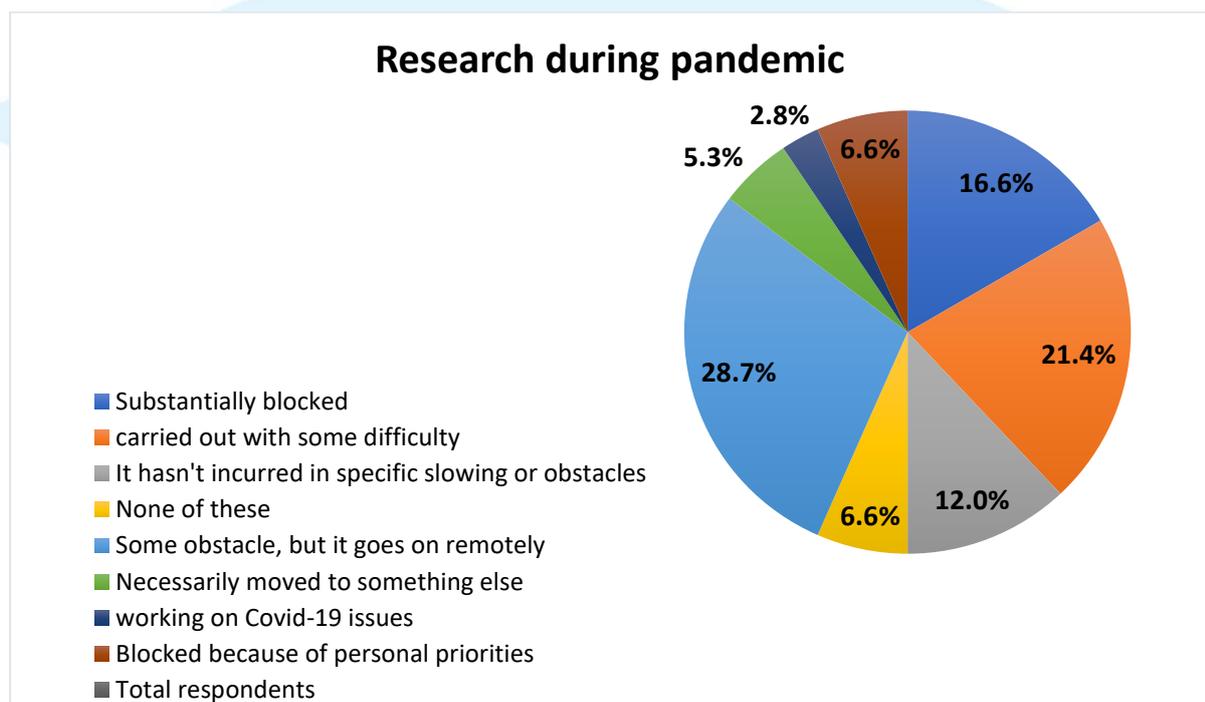
Academic staff has occurred in logistical and infrastructural inadequacies, and they had to rethink at their teaching and assessment methods. Nevertheless, two thirds of professor have immediately moved the lessons online with the few tools they had at their disposal (63,1% by their choice, 25,4% under universities pressure). Conversely, a quarter of professors has been put under pressure by their Universities to shift courses online. Most of professors declare to prefer conducting lessons in asynchronous mode. Only a minimum percentage (1 out of 10 units) of professors has decided not to transfer classes to an online environment stopping their

academic activities, or to shorten courses programme (about 11% of professors has taught less than 80% of the established hours and only 3,5% less than 50%).

Several universities have established that online courses could be reduced by a half or even by one third compared to conventional courses.

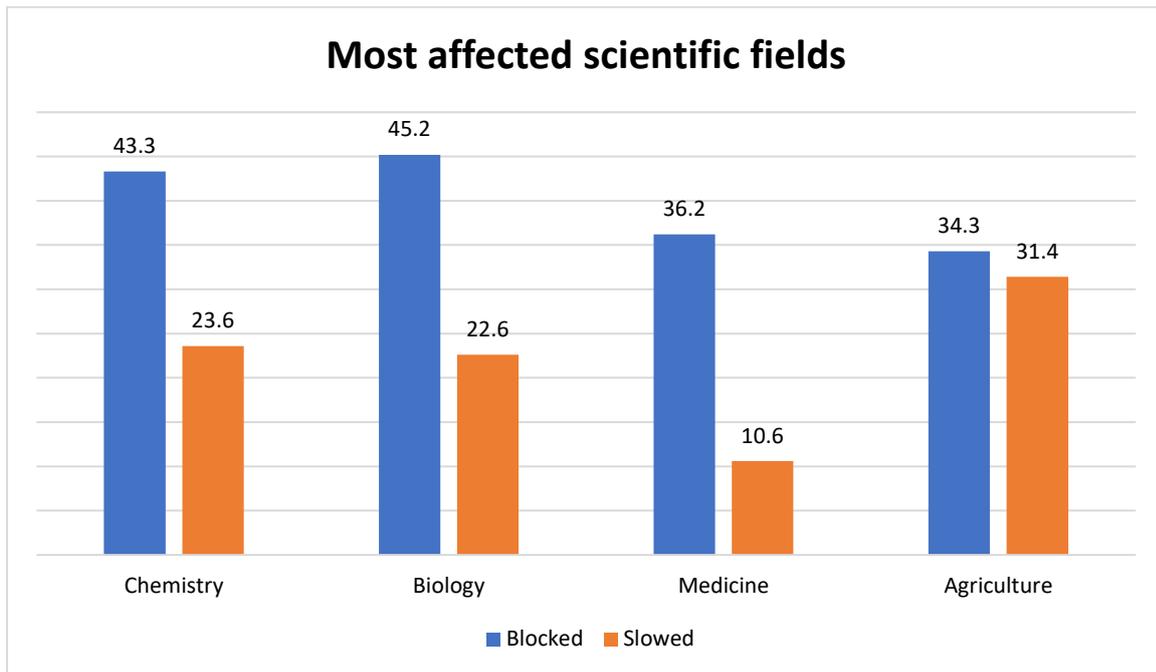
Several difficulties have affected all teachers when conducting remote exams, lab-activities, meeting with thesis-writers and dissertation of thesis, not only for didactics issue, but often for the lack of structured technology staff. A geographical divide has occurred between Northern and Southern universities about switching to distance learning: the majority of the Italian territory has reached 63,9%, whereas South and islands only 55,4%.

A significant stall has slowed even the research, which is perhaps the main component of professor's daily work: more than 45% of FLC CGIL sample had to stop research, the 18% had sever difficulties and the 7% had to give up because directly involved in pandemic consequences.



Some differences have also been related to the scientific fields in terms of research conduction (regardless the geographic variable or the university dimension). The most affected universities seem to be some of the scientific area such as Chemistry, Biology, Medicine and Agriculture:





Other departments are less hampered in keeping on conducting research: Mathematics, Engineering and Architecture, Humanistic studies, Economics, Law, Political Sciences and Sociology have been blocked only for 10%.

More specifically:

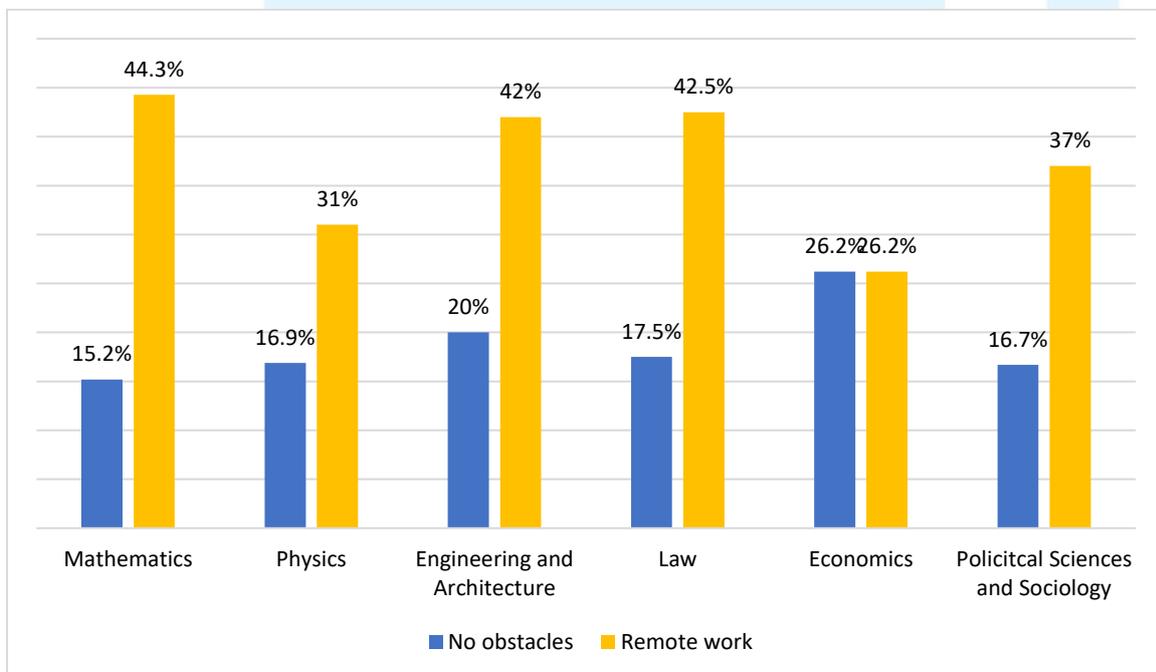


Figure 1 less hampered scientific fields part. 2

Mostly the scientific areas forced to switch research are Engineering and Medicine and related (10%). The fields most engaged in Covid-19 research are Medicine (12,6%) and Social sciences (about 5%).

Moreover, there have been more obstacles for those who conduct group research (37,6% totally blocked and 21,7% with difficulties) and/or work at research structure (47,2% totally blocked and 27% with difficulties). The latter ones have succeeded in switching their research to digital environment about 40%. Conversely, researchers who work individually are more facilitated (only 14,3% totally blocked and 22,9% with no obstacles).

Psychologically speaking, academic staff, regardless its hierarchical position, has often denounced the so-called *online fatigue*, that is the presence of psychosomatic symptoms and disproportionate workload to the detriment of their private balance due to pervasive digital connection.

However, this situation let them the opportunity to capitalize a professional heritage which should be valorised henceforth in order to experiment more attractive and motivating didactics. Professors had also the opportunity to reach more off-campus students and to teach in wider classes. The digital innovation is closely related to contents, methodology and class management innovation. The majority of the new skills required in teaching deals with creating new learning environment, customizing teaching-learning processes, sustaining both individual and cooperative learning among students. It is a matter of renewing didactics methodology in the sense that it could flexibly and collectively adapt itself to constantly emerging requests.

- **Changes in the organizational structure and in the logistic as consequence of digital education programs**

Distance education is widely recognized as a way for higher education institutions to increase their student enrolment and graduation levels, and to provide flexibility for non-traditional students, whose employment, health, family, or other circumstances are not conducive to a traditional academic schedule.

It is becoming very important assessing organizational readiness and capacity in university structure. Educational advisors seeking to establish or expand the institution's online education must look beyond simply adopting a learning management system (e.g. Moodle, Blackboard, Canvas, Desire2Learn, etc.) and have the big responsibility to create and teach innovative online courses. Online education is systemic and involves strategic planning and the involvement of multiple areas of the institution. Successful online programs require systematic organizational development and change, beginning with an assessment of the organization's internal capacity and readiness to establish or expand is online education program.

A widely referenced model for assessing organizations is the "Comprehensive Model for Diagnosing Organizational Systems". The model is based on principles and theories of organizational development and change and considers organizations in terms of their inputs (i.e. external environment); transformations or design components (i.e. internal

environment) and outputs (i.e. organizational results) (Cummings and Worley, 2015). The Comprehensive Model for Diagnosing Organizational Systems is suggested to be utilized as a framework for assessing higher education institutional capacity and readiness for establishing or expanding online education.

Successful online learning programs do not just occur, they are established, developed, grown and, at some point, are institutionalized. At most colleges and universities, online courses are initiated by faculty seeking to meet the needs of their particular learners. These innovators gain the attention of other faculty, who also begin to offer their own online courses. At some point the program captures the attention of administration, which codifies the online program with policies, procedures, resources and operations. This follows the diffusion of innovations model promoted by Everett Rogers (Rogers, 2003). In Roger’s model, illustrated in figure below, innovations are formulated by innovators, who persuade early adopters to join in the innovation. Formal and informal communication channels, time and social systems (including opinion leaders, organizational mandates, media, and government regulations) help the innovation to spread until it becomes widely accepted by the early majority, late majority and, ultimately those most resistant to the innovation (laggards).

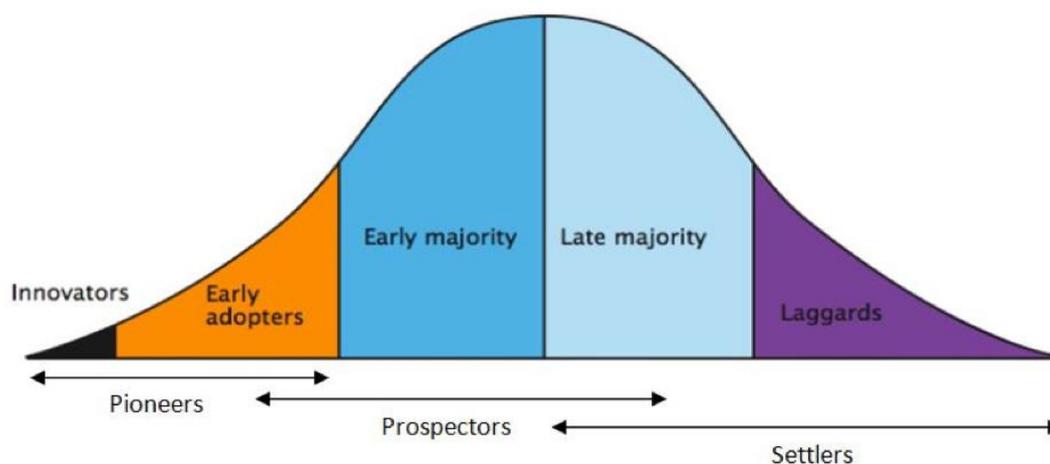


Figure: Diffusion of Innovations Model in educational organizations (Rogers, 2003).

For institutions seeking to establish their initial online programs or seeking to expand their current online programs, it is necessary to determine whether the institution has the capacity and readiness for online learning success. The field of organizational development can provide a solution to meet this need.

Topic Area	Factor	Application	Factor	Application
PLANNING	Institutional mission	Distance learning is compatible with institution mission/vision statements	Master plan	There is a specific master plan for distance learning
	Policies and procedures	Formal policies and procedures for distance learning have been adopted	Marketing	There is an aggressive marketing plan to promote distance learning
	Needs assessment	There is periodic assessment of faculty, student and institutional needs	Evaluation	There is a formal plan for ongoing evaluation of distance learning
ORGANIZATION	Campus-wide function	Distance learning is a campus-wide function, not a dependent unit of a particular school, department or discipline	Centralized	Distance learning is coordinated by a single central entity, rather than run from many different departments.
	Collaboration	Distance learning staff collaborates regularly with other entities on campus to insure broad base support.	DL leadership authority	Distance learning director/coordinator has decision making authority
	Visibility	Distance learning is visibly recognized on the institution's web site, catalogue, bulletins or organizational chart	Communication	There is a formal mechanism for informing the campus community about distance learning activities
RESOURCES	Instructional design support	Instructional design help to assist faculty to develop online courses is available	Faculty tech support	The institution provides technical support for distance learning faculty
	Staff development	Comprehensive and on-going staff development in distance education is provided	Funding	Distance learning program and staff are permanent budget items funded by hard money
	Infrastructure	The campus hardware and software infrastructure can support distance learning	Course Management System	Distance learning utilizes a course management system such as Blackboard
PERSONNEL	DL director	There is a director/coordinator whose primary responsibility is distance learning	Permanent staffing	Distance learning staff consists of permanent, rather than temporary, employees
	Full-time staff	Distance learning staff are assigned full-time to distance learning	Faculty participation	Faculty leaders are actively recruited to teach distance learning courses
	Professional incentives	Professional incentives for teaching distance learning courses (e.g. positive evaluation for promotion/tenure) available	Financial incentives	Financial incentives for teaching distance learning courses (e.g. course development fees, royalties) are available
STUDENT SERVICES	Online registration	Students can register for, add and drop courses on line	Online Library/research	Students can access a full range of library/research services online
	Advising & counseling	Students have access to counselors and advisors online	Student tech support	The institution provides technical support for distance learning students
	Online degree	Students can complete an entire degree program via distance learning	Multiple disciplines	Distance learning courses are available in multiple disciplines

Table 2: Topic Areas, Institutionalization Factors and Application Items (Piña, 2016)

- **Changes that Covid-19 pandemic is producing together some valuable issues and**

Innovations

One of the most important changes activated is the whole re-design of the educational pathways; in other terms, it seems that some often-postponed changes are strongly emerged to be finally addressed. Given that many governments are trying to bring students back in presence to educational institution, hybrid modality seem to have become not only an almost established form of teaching and learning, but also a sort of answer to several growing need. For example, many people wish to pursue university study remotely for many different reasons, and others would abandon their studies if online courses stopped to exist. Proof of this could be the high level of courses attendance (even 110%) and the enrolment boom in undergraduate courses according to data of the Italian Ministry of Education. According to guidelines developed by universities and feedback collected from students the blend or dual learning seems to be the most satisfying choice to meet specific needs.

According to a Turin University research, many professors and researchers have stated that distance learning has saved the university work throughout the 2020. They strongly believe that it would be necessary to integrate this new modality, that has been unexpectedly accurate, to more innovative and technological lessons in presence.

Since the pandemic outbreak universities have deeply dealt with crisis management: they have worked on digital learning methods, researching, funding and social engagement.

It appears enough clear that a change in organizational behaviour is needed: not only in internal processes, but above all in long-term strategy planning more than the immediate crisis management. This rapid adaptation in which universities have incurred must become a stable strategy. For this reason, universities are working for strengthening digital infrastructures and making them more related with social inclusion and cooperation, and not only within the academic environment. Many of them have permanently established online or blended courses to attract more students from the entire country. At the same time, this dynamic has encouraged less well-known (and less funds-provided) universities to increase their appeal either by broadening their online presence and introducing some benefit for attracting new students such as fee reduction and other facilities. Moreover, if we make a comparison between telematic and on-site universities costs, there is not a real difference: the point is to strengthen the digital services without burdening on students, but on the contrary trying to create a more inclusive system.

This forced exit from comfort zone is also the occasion to think about renewing and adding value to classic face to face learning, which will probably not disappear given that the best strategy seems to be the integration of two dimensions (online and face to face). Some lessons learned from distance learning are applicable the same as for learning in presence such as the review of didactics method and the fully integration of digital tools into academic life (also for reducing costs).

Since many countries are experiencing these change processes trying to fill their digital and educational gaps, also a more comprehensive institutional legislation on this field would be strongly required to have a common framework where institution and individuals are able to effectively operate. The same applies in terms of funding and digital infrastructure given to universities, which, however, are responsible for amplifying the investment impact through their know-how and human capital quality. The choice which will be made are going to strongly impact on universities competitiveness.

Last, but not least, universities have also acquired the growing awareness of the importance of academic research and their role in constructing a safer and more competent society in the face of actual challenges, not only the technological ones. Universities should concretely also apply this awareness to their organizational schemes. As also stated by Italian Ministry of University and Research, universities must play a strategic role nowadays because crisis has fastened changes, especially in job world. They have to transfer science, knowledge and competencies taking into account these changes and being aware of the importance of the new profession linked to the digital and ecological transition (which are the core of our PNRR – the Italian plan under NextGenerationEU).

- **Re-engineering of learning systems: processes and organizational aspects**

E-learning has evolved in the past years. With the emergence of more and more advanced technologies such as web services, development of light weight, flexible, and inclusive e-learning systems becomes a reality. So it is needed to propose a new architecture for e-learning systems based on for example web services and two way interactive agents.

Possible outcomes of the assessment of institutional capacity and readiness for online learning are:

- The institution has the internal capacity to develop or expand its online learning program and is ready to do so.
- The institution has substantial internal capacity but is lacking one or more essential components or functions which need to be added or enhanced before it is ready to fully develop or expand its online learning.
- The institution lacks the internal capacity to develop or expand its online learning program and is not ready to do so at the present time.

Implementation of the assessment findings will be determined according to the institutional mission, the goals and priorities of the institution's leadership and whether the overall culture of the institution will support the development or expansion of online learning (Miller, Benke, Chaloux, Ragan, Schroeder, Smutz & Swan, 2014). For institutions whose assessment concludes that they do not have the internal capacity to develop a new online education program or effectively scale their existing programs, alternative solutions do exist. One solution is to enhance the internal capacity through investments in personnel, infrastructure or technology. If, for example, the decision is made to venture anew into online learning, there will be a need to establish a process for the design and development of online courses,

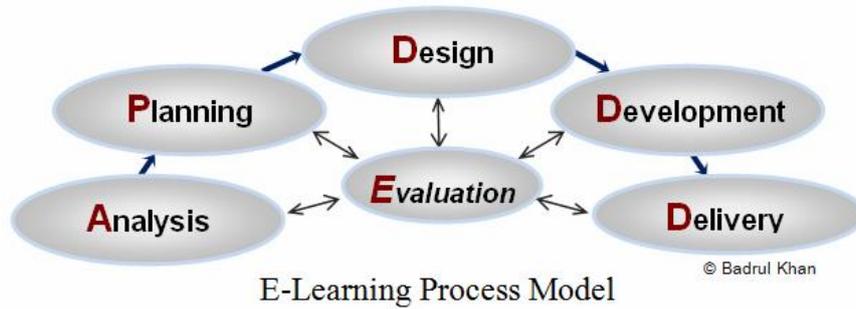
which will include hiring instructional designers skilled in online course development and delivery. A college or university that wishes to expand its operations and offerings to include fully online programs for students outside its geographical area will need to invest in an infrastructure of student services and technical support to accommodate the unique needs of learners who may never set foot on campus.

An alternative to performing all operations, services and support completely in-house, is to outsource one or more functions to a third-party e-learning vendor, such as Learning House or Pearson Embanet, or to a local consulting or solutions firm, such as an instructional design group or I.T. solutions provider. Several colleges and universities use third-party vendors to, in essence, run their online education programs, as the vendors handle program and course development, marketing, student recruiting, technical support and reporting. The typical model for this type of arrangement involves revenue sharing, with the vendor receiving a percentage of tuition and/or fees paid by the students. An advantage of this approach is a relatively quick start-up time, as the vendor supplies the personnel, courses, materials and expertise needed to establish and operate the program.

Leaders and faculty at a higher education institution may be wary of turning over so much control (and revenue) to third-party vendors and may have concerns that their online programs might be merely copies of programs that the vendors are providing for other colleges and universities (Riter, 2017). There may also be the fear that if the partnership with the full-service vendor were ever to be discontinued, the vendor could “pack up the program and go,” leaving the institution and its learners without any program at all.

A less invasive alternative is to use a third-party vendor to provide a more limited number of services in areas for which the institution does not have sufficient capacity, such as providing instructional design support for course development, after-hours helpdesk/technical support, admission and retention services or data analytics reporting. This hybrid approach (i.e. mostly in-house with outsourcing only in areas that the institution lacks capacity) has the advantage of giving the institution the time to build up its internal capacity, while it can still offer its own online programs—rather than someone else’s—to its learners.

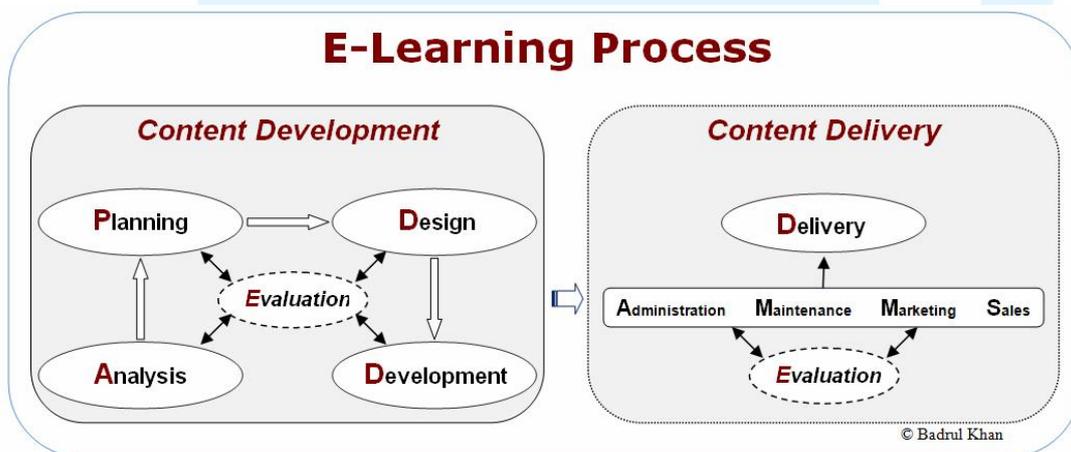
All indications are that online learning will continue to increase in ubiquity across higher education. Colleges and universities that do not currently offer online courses will likely do so in the not-too-distance future. Institutions that now offer only online courses will undoubtedly expand to online diploma, certificate and degrees later. In an era of declining higher education enrolments and long-established colleges having to shut their doors, most colleges and universities are looking for strategies to increase the size of their student bodies. By using one of the models presented in this report to perform a systematic assessment of its internal capacity and readiness to establish or expand online learning, institutions may be able to avoid costly mistakes.



E-Learning Process Model

Obviously, most standardization efforts focus on data integration but not on application integration. Complying with these standards, the interchange of educational content between servers or peers is still a problem which has not been solved satisfactorily. It is necessary to develop a new e-learning system architecture which can integrate both data and applications. The next generation systems should have the following characteristics:

- open architecture and interfaces;
- integration;
- loose coupling;
- flexibility;
- reusability;
- maintainability;
- compatibility;
- effective personalization.



E-Learning Content Development and Delivery Phases

Generally, there are several groups of people involved in an e-learning system, namely authors, learners, administrators and trainers. Authors and learners are main players, in a traditional e-learning system, all the functional modules needed by users are resided in the server. In our proposed architecture, only a set of key functional modules will reside in the learning management server. Other assisting functional modules will be distributed on the Internet and can be invoked on demand via standard interfaces. All the functional modules are implemented as Web services that can be easily integrated and reused.

In detail as identified in the E-Learning Process Model of Khanb Badrul (2012) it is fundamental to distinguish two phases:

1. Phase I related the **Content Development**

This process means that e-learning materials designed and produced or developed following a plan that has to incorporate instructional design principles for meaningful learning. It consists of the following stages: 1. Planning 2. Analysis 3. Design 4. Development 5. Evaluation

2. Phase II related the **Content Delivery**

This process means that e-learning materials are made available to the users. It consists of the following stages: 6. Delivery of Learning Environment 7. Administration of Learning Environment 8. Promotion of Learning Offerings 9. Maintenance of Learning Environment

Therefore, the e-learning systems with this architecture are highly interoperable, flexible and light weight, and can be extended by choosing required functionality from e-learning related web services remotely residing on the Internet according to the user's requirements.

- **Certification processes for the quality of digital education programs**

In Italy a recognized certification scheme does not exist so far, but already since the pre-Covid era some universities were working on digital learning experimentation. Some examples: the EduOpen project, founded by Ministry of Education or the Federica Web Learning, managed by Università di Napoli Federico II. Not to mention the numerous telematic universities whose market has increased since 2003. These platforms let the universities upload their courses (the so-called Mooc - massive open online course), which are available for all users for free or by sort of subscription.



Figura 2. Homepage EduOpen platform

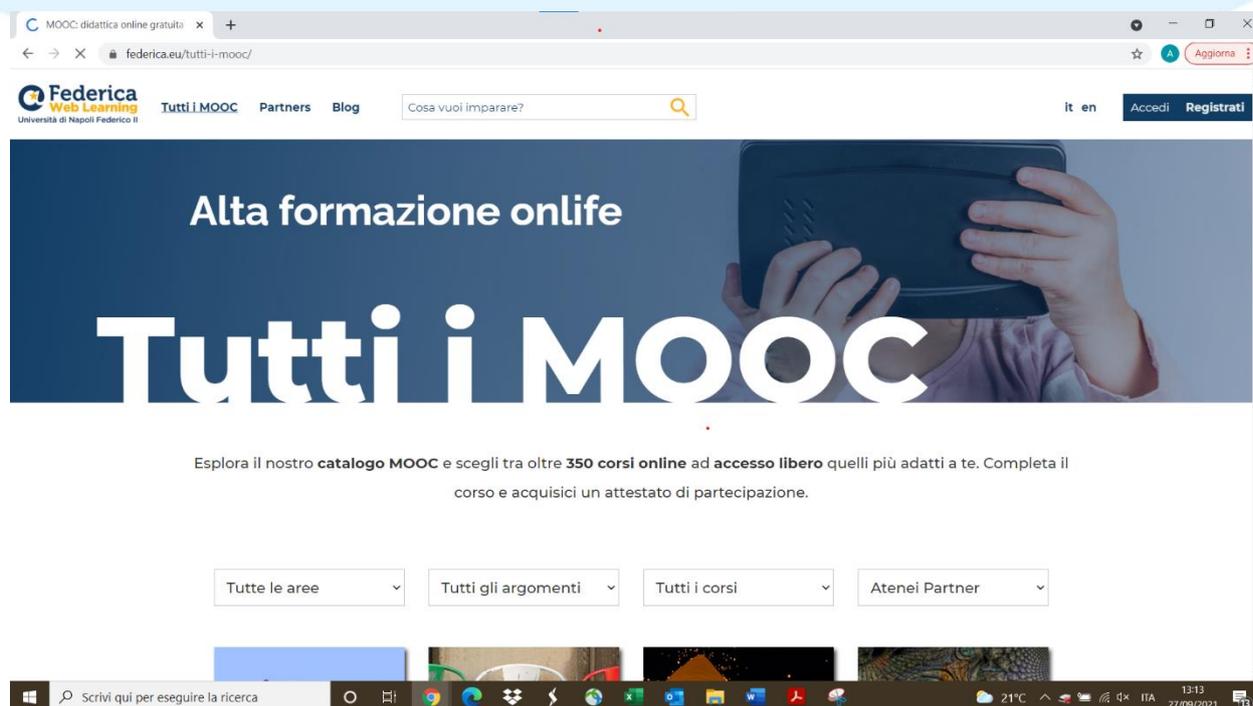


Figura 3. Homepage Federica Web Learning platform

One of the main goals of these projects was to make simpler the lessons attendance for off-campus students or workers. Evidently, it becomes a strong showcase for universities involved in, which can attract new students and establish connections with other institution.

A sort of standardization of digital programme – both within each university and nationally – would be important to improve quality and to take advantage of new digital opportunities.

- **Current needs in national digital education in terms of needed skills and competencies**

When speaking about competencies, the digital skills seem to be the most important, sometimes the only one, required in distance learning. But, however, in Italy the digital skills are the lowest at European level across the generations: only 22% 16-74 aged people state to own good skills compared to an European average of 31% and even 24% declares to not have used internet in the last three months.

However, the idea that distance learning can promote learning processes is increasingly emerging among experts and those who have undertaken these paths. Since the economic growth is often correlated to an active inclusion in global digital networks, also universities should reinvent themselves by using Internet to boost innovation, creativity, dissemination, and cooperation of educational models. Universities are required to overcome their national or local-centered model, as other sectors have done, also by establishing blended courses linked to foreign partners. One of the most crucial aspect is then that distance learning could be a very promising means to close academic community to the rest of the world because it encourages cultural exchange and acquisition of currently demanded skills.

Although academical sector has more experience in digital learning compared to school (eg telematic universities and blended courses), during pandemic it has managed situation as an emergency didactics. According to ANVUR- the national agency for university system evaluation – guidelines and some universities regulations it would be necessary to consider not only the offered didactics, but also its interactivity (faqs, mailing list, web forum, report, exercises, web quest, test and in itinere surveys). Universities have to add to distance learning also supportive didactics which should be and integral part of the course (at least 20%). Some institution has even decided to establish a ratio of 2 hours to 1 of distance lessons.

So, universities should work in this direction by focusing on their skills heritage and developing other ones. They should also work on helping co-workers and students by implementing prevention measures. Many professors deem that distance learning during lockdown has functioned as psychological support, because universities continued to be a firm point of reference regardless the difficulties. Starting from this discover, more attention should be paid on mental health issue through awareness programme both for teachers and students, for example focusing on online fatigue issue or youth depression.

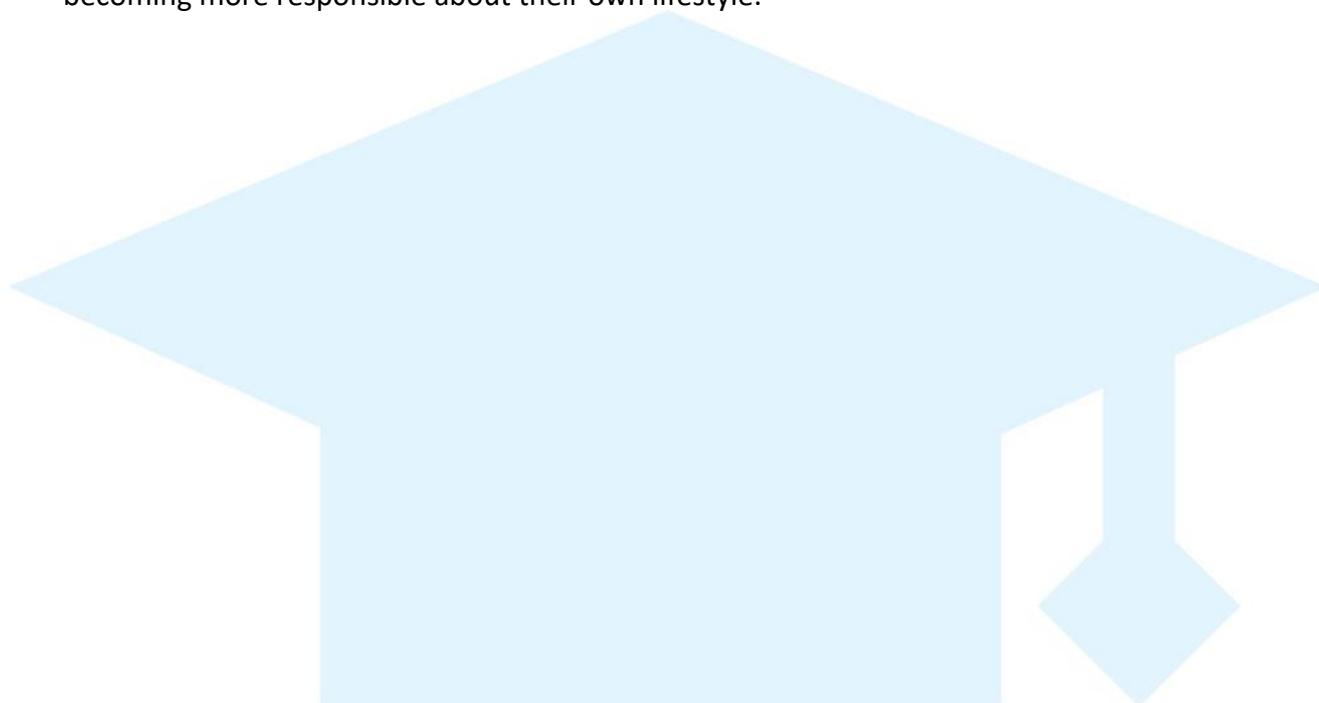
University should first strengthen their hard skills both by working on the reliability and potentiality of digital infrastructure (even better if developed from them) and by boosting workers' capacities in a structured and effective way regardless hierarchical position or digital awareness level.

The improvement of certain soft skills required from new conditions is not less important. Working and studying remotely requires more autonomy, therefore it results really important to strengthen also self-motivation. Also, skills such as adaptability to digital scenario,



resilience, critical thinking, collaborative problem solving, networking, information synthesis techniques, time management are also required. In particular some essential tools concretely appears the choice of the platform (accessibility and design-content; AGID – Agency for Digital Italy – provides specific guidelines), project management activities, clarification of goals, didactics modalities (erogative or supportive, synchronous or asynchronous), communication instrument, evaluation and feedback systems.

Also, the question of lifelong learning and the way to implement it must be discussed and established as a continuous practice. An important issue is the importance to apply cognitive flexibility to old organizational models in order to make institution more adaptable to the changing context and let them catch more opportunities. People should learn to manage private and working life not only acquiring the abovementioned skills, but especially becoming more responsible about their own lifestyle.



4. TECHNOLOGICAL ASPECTS

- **Effective teaching and interaction**

Professors must promote community in their online courses one way to encourage that is modelling the behaviour they would like to see in their students. One of the concerns that it is frequently hear from instructors considering teaching online is that they will lose the interaction and sense of community they have with their students when they teach face-to-face. For effectiveness of online model certain attributes of online learning like design principles of digital learning, goals, and student's preferences should be taken into consideration.

If instructors are wanting to promote community in their online courses one way to encourage that is modelling the behaviour, they would like to see in their students. For example, as suggest Brian Udermann (2020) this can start with a warm and enthusiastic welcome message. It can include responding to student questions promptly and respectfully. And it can include the instructor sharing personal information about themselves so students have the chance to go beyond seeing their instructor as a content expert teaching the class and view them as a real person they can get to know and relate to. Additionally, if developing a sense of community is a goal for instructors, it is helpful if they let students know that it is. Sometimes instructors get frustrated that students aren't meeting their expectations, when in reality, students might not be clear on what those expectations are.

Another aspect is, as specify Udermann, let students get to know you and each other. One-way instructors can start to develop community early in a course is to use introduction or icebreaker activities. Having an introduction or icebreaker can set the tone for students engaging and interacting with one another and encourage social interactions right out of the gate. Many instructors use introductions, but they are sometimes repetitive and mundane, asking students to share things like their name, year in school, and their major. Consider jazzing up these early interactions by having students share their previous experience (or lack thereof) with course content, what they are looking forward to learning in the class, or a bit of personal information. I've used icebreakers for courses in the past where I would have students search out misconceptions or mistruths about content that would be covered in the class. That was a nice way to expose students to topics they would be delving into over the upcoming months.

Fundamental can be to build in opportunities for student to share their knowledge and experiences. The idea of building opportunities into courses for students to share their past experiences is greatly underutilized. Idem to create social opportunities for students. In addition to having an introduction or icebreaker activity building in opportunities for online students to interact socially can help promote a sense of community in class. One-way instructors do this is to have a discussion forum dedicated to personal interactions. Sometimes these forums or spaces are titled "Student Lounge" or "Student Cafe" where

students can interact and discuss non-course related topics. Topics could range from the weather to who won the big game the night before to interesting current local, state, national, or global events. Some online instructors use social media groups such as Facebook, Twitter, or LinkedIn in their courses to encourage social interactions among students. Some online programs even go so far as to add all program alumni to these groups so current students can interact with prior students who are often out working in the discipline.

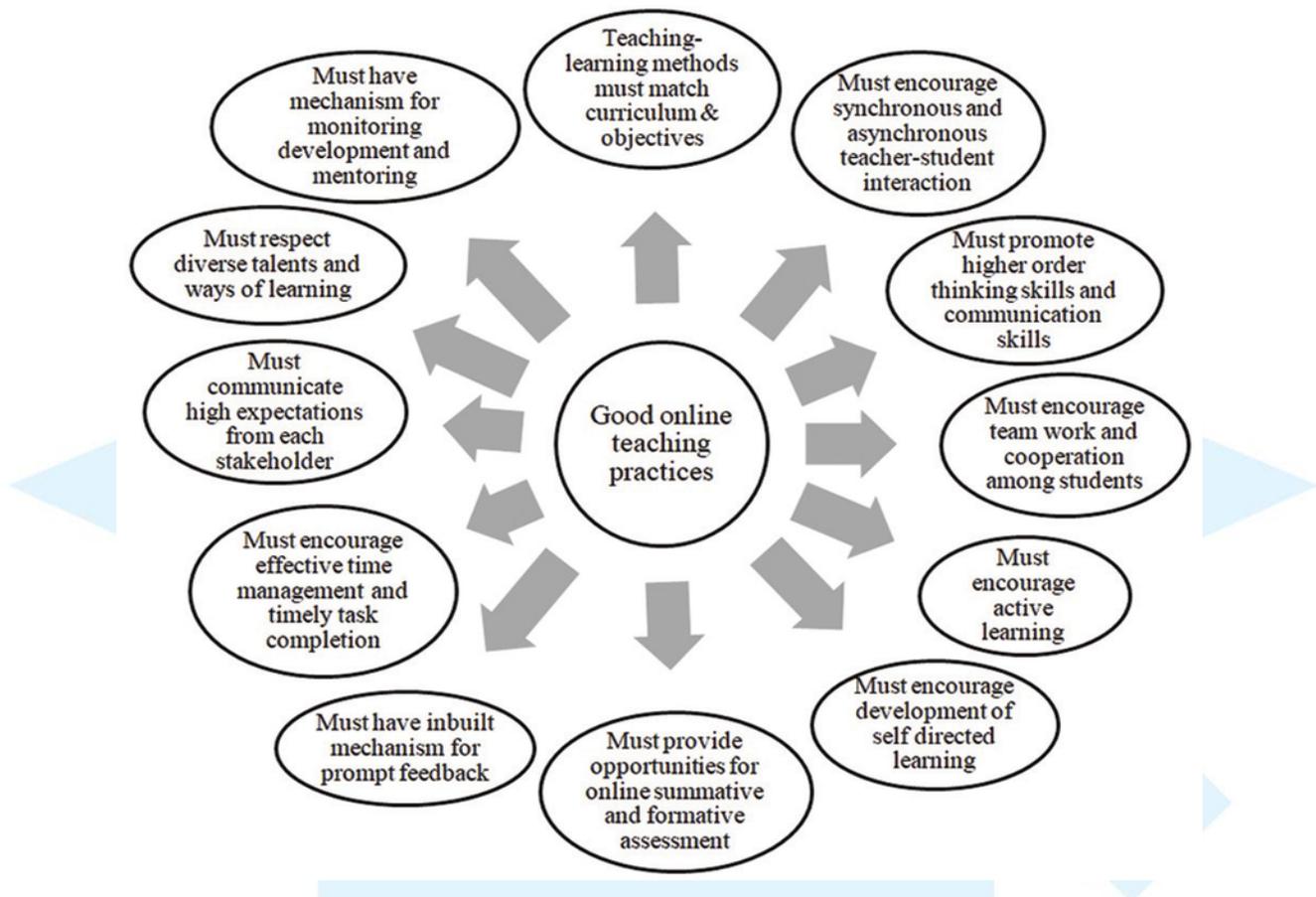


Fig. Recommended Principles of good online teaching practices (Saiyad, 2020)

Finally, it is great to encourage to build in multiple avenues for interaction and engagement. If an instructor wishes to develop a sense of community in an online course, they will likely be more successful if they create a variety of opportunities for this to occur. These opportunities can be purposefully designed and integrated into the curriculum as an instructor is developing a class. In addition to some of the things already mentioned in this article (e.g., having an introduction or icebreaker activity, creating social spaces for students) other ways instructors can build in student-to-student interaction in a class might include online discussion forums, peer-review activities, collaborative work, and video conferencing. Also, these interactive opportunities could be spaced evenly throughout a course, so for example, if a student is taking a 15-week online course there is some interaction occurring every couple of weeks instead of all happening in the first 2-3 weeks of class.

- **Evolution of digital interaction and new identified methodological approaches**

The COVID-19 emergency has created several issues for professors and students, forcing them to quickly learn the various methods for carrying out distance learning, a skill that is not obvious especially for professors with difficulties in using new multimedia technologies. Considering the current global health situation, it is needed for European and USA Universities to discuss, learn and exchange experiences on adapting teaching activities to new learning situations in order to recover and thrive in a post COVID-19 educational world. To tackle these challenges, only a few meetings between expert groups on virtual and student mobilities was held to explore the opportunities of blended learning for the coming academic year. As continuously required in the last months several people in the academic environment are asking a support to manage and reduce the adverse effects of COVID-19 on the University lessons, exams, thesis dissertations, live laboratories, etc. We would like to focus on some opportunities that this global shock is leaving us trying to find a light at the end of the tunnel, but also to the fact that there is already a wide debate going on precisely the lack of adequate perception of the risks determined by COVID-19 in terms of teaching and digital innovation.

E-learning is a fundamental technology that is playing a great role in universities. The e-learning contents can be stored, searched, retrieved and assembled in order to provide learning just in time. E-learning is now an integral part in academic education and training as the learning materials are now available in internet and it can be accessed from anywhere and anytime across the globe. Initially the idea of e-learning was to offer online courses but ultimately it was felt that it is too costly and also not flexible. The solution to this problem is given by learning object (LO) technology. The learning objects (LO) are basically small learning material content that can be stored, searched, retrieved and assembled to provide learning as and when it is required. The e-learning platform brings brand new concept, and it is a kind of network information learning mode. E-learning may be considered as an assist learning forms to traditional education and self-learning mode of continuing education system. The e-learning methods can be used for traditional content and internal trainings for universities, and it may be used much more efficiently in technology and engineering education also. The present paper examines a range of issues covering technology, teaching, learning and organizational issues and makes general recommendations for priorities that will promote the successful use of Information and Communication Technologies (ICT). The objective of this paper is to discuss the different methodologies adopted in e-learning and how we can construct Learning objects and this can be applied to develop e-learning material in a better way.

In future, learning solutions and services will be integrated into mobile technologies as mobile phones, digital pen and paper. In the long term, learning solutions and services are also likely to be integrated into electronic appliances, machines and information interfaces. For mobile learning there are two distinct potential markets which are evolving:

(1) The first one is the market of learning services for people those who are without infrastructure (accessibility to internet and e-learning may not be as widespread in rural or remote areas) and learners in developing economies.

(2) The second one is the market of learning services for people whose jobs require them to continuously move, people learning and receiving information while visiting various sites and locations, certain type of students who need individual learning education, on the move and while on external projects. In Europe, mobile learning is beginning to develop, and telecommunications companies such as Nokia and Vodafone have already integrated these technologies into their training and development systems. However, the real growth across this sector remains to be seen. Any growth in this market is likely to happen in near future.

Simulations in e-learning processes for a number of years have played an important role in the training activities of certain sectors like the defence, aviation and aeronautical industries in several countries. They were not adopted on a large scale in academics environments until now, due to the lack of tools for developing high-quality simulations and high cost of development.

In the recent days the simulations are being adopted in other industries for a broad range of skills and competence development. Today the IT tools such as Macromedia Flash have become ubiquitous and e-learning vendors with simulation-development expertise are trying to offer more industry and topic specific simulation templates. The market for these kinds of learning services will perhaps continue to grow as simulation technologies become more sophisticated and more effective to build.

In the recent years there is a tremendous growth in awareness of the potential benefits of adapting learning in e-learning methodology. This is happening because the idea of individualized learning cannot be achieved especially at a massive scale using traditional approaches. A learning environment is considered adaptive if it is capable of monitoring the activities of its users such as interpreting these on the basis of domain specific models, inferring user requirements and preferences out of the interpreted activities.

More than three months after the closure of the Universities and the compulsory (and almost total) transition to distance learning, 2 out of 3 students promote the experience behind us with reserve and, looking at the reopening of September, ask to mix the lessons in classroom with those online.

At almost all HEIs, COVID-19 affected teaching and learning, only 2% of HEIs reported that teaching and learning is not affected. It is important to mention that 4 of the 7 HEIs that reported no effect on teaching and learning are virtual universities and 1 replied that the campus is open as usual, while the other 2 are traditional brick and mortar universities and replied that their campuses were closed. The fact that these two HEIs replied that teaching and learning is not affected, despite their campuses being closed, is surprising. Two-thirds reported that classroom teaching has been replaced by distance teaching and learning and one quarter that most activities are currently suspended but the institution is working on developing solutions to continue teaching and learning, through digital or self-study means. Only 7% reported that teaching has been cancelled as indicated below (Figure).

How has COVID-19 affected teaching and learning?

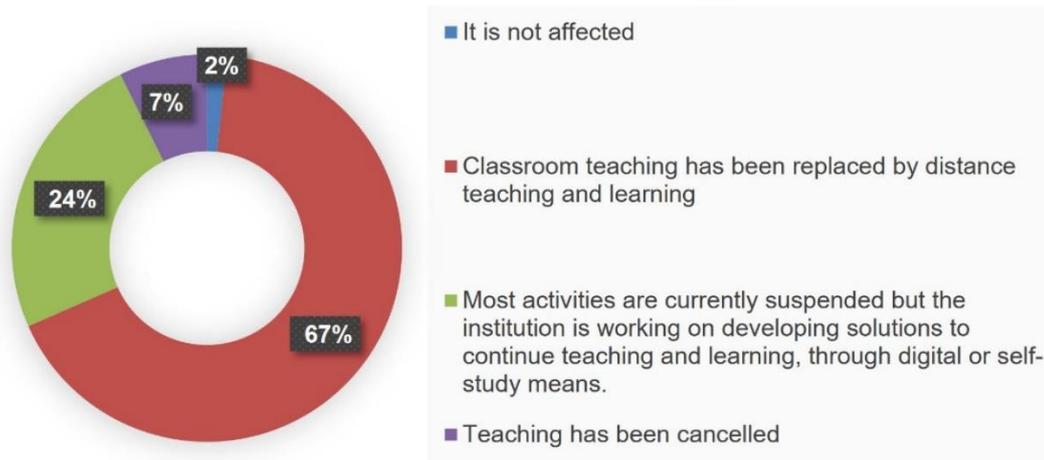


Figure. COVID-19 affected teaching and learning (IAU – COVID-19 Global Impact Survey, 2020)

These results show that two-thirds of HEIs were able to move teaching online while one third was not. However, the majority of these HEIs are working on developing solutions to continue teaching online.

The student population now sees online teaching as its own acquired right. Of course, I am a minority - fortunately - those who think we can do without classrooms altogether. Although it is a substantial minority, it will be the hunting ground of private telematic universities. Endangering the finances of many public universities, with the drop in enrolments that is now expected. Because the incontrovertible fact is that young people, after having experienced the advantages of studying at home using the devices that are now their bionic prosthesis, are not willing to go back. And, at this point, the ball returns to the professors' field.

The university world had to resort to distance learning, entrusting to these medium lessons, exams and even graduation discussions with students who found themselves obliged to celebrate one of the most important days of their life in front of a computer.

There are quite a number of providers those who can provide learning management system (LMS). Most of these products have extensive developer communities and present strong arguments for considering open-source applications like an alternative to commercial products. Open-source software applications are cost saving and stable. On the other hand, for ensuring that users in the near future will have access to the best available applications. These open-source software applications should be built on open standards. Time is coming when open-source Software will play a big role for preparing e-learning tools.

E-learning has moved through several distinct phases - from Computer Based Training to Learning Management Systems and Courseware Management Systems, to now include an increasingly broader scope of applications and activities. There are quite several points to be noted here, which are as follows:

- a. Ongoing development in dedicated e-learning software applications, commonly known as learning management systems (LMS) or managed learning environments (MLE) has evolved

where many of the early LMS vendors now offer their LMS as one application within a suite of products

b. E-learning is now facilitated by an increasing range of specialized e-learning applications within the wider infrastructure and is not necessarily delivered by managed learning environment such LMS. Much of this learning happens in context, for example just in time in the workplace.

In active learning process the students must perform great effort in analysis, synthesis and evaluation. It means only listening is not enough on the other hand the students must take active role in discussing, writing, playing roles in simulation games and problem solving.

Inquiry-based learning based on recognition that science topics are question-driven, open-ended process and to understand this fundamental aspect of service, learners have to learn how to pose and refine questions and perform investigation and present the results. Furthermore, inquiry activities provide a valuable context for learners to acquire, clarify and clarify and apply an understanding of science concepts. Service learning is a form of experimental learning involving community-oriented service to enrich learning experience and further understand learning content. Thus, learners are more interested in learning materials with introduced elements of community education.

The laboratory instruction gives students to perform an experiment at the same time. Several Institutions have implemented this strategy. In subject's tutorial learners do much of the works, role of the learners is to make rich tasks, challenge students work with misconceptions and make active working atmosphere. Degree's tutorial included meeting sessions to provide constant challenges and opportunities for both instructors and students. Several sessions were conducted to deal about students' major concerns regarding the whole organization aspects.

5.THE DIGITAL TRANSFORMATION OF LEARNING PROCESSES: NEEDS AND REQUIREMENTS

Amongst one of the objectives stated in the action plan of the **Digital Education Plan** (2021-2027), the following is framed as a priority:

[...] presents opportunities, including improved quality and quantity of teaching concerning digital technologies, support for the digitalisation of teaching methods and pedagogies and the provision of infrastructure required for inclusive and resilient remote learning [Find more: <https://ec.europa.eu/education/node/66>].

This section will be therefore focused on specific **digital skills** and **competencies** needed for the digital transformation of learning processes. It will be related to identifying **essential** educational and **multimedia** skills and **competencies** (digital literacy; computing education; good knowledge and understanding of multimedia technologies and data treatment) and **advanced** digital skills that could produce better digital specialists and ensure that effective digital learning programs are in place.

Analysis of digital skills and competencies needed for professors

Skills are the specific learned abilities needed to perform a given job well. **Competencies**, on the other hand, are the person's knowledge and behaviours that lead them to be successful in a job. According to the **Future of Jobs Survey 2020**, from the **World Economic Forum** the top fifteen skills for any job for 2025 are the following, and in the order:

- Analytical thinking and innovation
- Active learning and learning strategies
- Complex problem-solving
- Critical thinking and analysis
- Creativity, originality and initiative
- Leadership and social influence
- Technology use, monitoring and control
- Technology design and programming
- Resilience, stress tolerance and flexibility
- Reasoning, problem-solving and ideation
- Emotional intelligence
- Troubleshooting and user experience
- Service orientation
- Systems analysis and evaluation
- Persuasion and negotiation

All technology-related skills seem to rank lower than softer skills, and specific items such as technology use, monitoring and control, or technology design and programming get listed after analytical thinking or active learning strategies. Of course, troubleshooting and user experience, service orientation, or systems analysis and evaluation are essential to train and reskill the future workforce, but complex problem solving is still a top high order mental activity worth developing and sharpening.

This **framework** will inspire this section for defining the key **competencies** and **skills** to develop digital education programs aimed at HEI professors and staff. The WEF defines as fundamentals the ability to develop active learning strategies and to reflect on enacted learning strategies; these two abilities enable any lifelong learning effort. Adult learners and learners, in general, need to become autonomous in reflecting on how they learn to get better at it.

Learning how to learn

The degree of evolution and renewal of didactic technologies is unpredictable; future educators must develop the competence to **learn-to-learn** and become aware of the constant development of digital supports. The awareness of new methodological and technological possibilities allows them to be flexible and effectively put the learner at the centre of any discipline's teaching and learning process.

Learning how to be strategic

Critical competencies are **strategic**, as the crucial aspect of the role of educators focuses on the ability to support, stimulate and guide the learner in autonomous cognitive paths and at the same time in environments constantly exposed to a technologically driven evolution.

Learning how to know

Another valuable know-how for the future educator: **knowing how to manage** those dynamics of meaning negotiation and strategic transfer of knowledge. As part of the training of trainers, it is necessary to provide virtual synchronous and asynchronous communication environments that allow to actively build a specific competence in the management of **knowledge sharing dynamics** through the negotiation of new meaning. The mental models involved in such complex activities combine cognitive representations with a process of manipulating digital information. Therefore, solving a learning problem requires having the appropriate representations of knowledge and having those algorithms and those heuristic skills for the manipulation of knowledge and the consequent resolution of the learning task.

Learning how to solve problems

Complex problem solving ranks third in the WEF list. PBL might be the curricular answer to this need both in digital and real learning contexts. The acronym PBL lends itself to an exciting ambiguity: *project-based learning* is abbreviated as *problem-based learning*, and the same acronym indicates different working methods; the first adopts a model based on production and, even if the product seems to be the driving force, the dominant idea ends up being that of acquiring content, knowledge and skills from the implementation process. Instead, the second uses a heuristic model that considers the problem the driving force of the entire process, even if it always concentrates on searching for a concrete solution.

Project-based learning is an effective teaching and learning strategy that allows the entire process to be organised around specific projects, i.e. complex tasks triggered by stimulating questions, which engage students in planning, solving problems, making decisions in investigative and research activities. In the training of future trainers, project-based learning is closely connected to task-based education. In the context of collaborative projects intended

to train educators, such as tutors and teachers, they must be made aware of the mechanisms for redistribution of jobs within the synchronous and asynchronous working groups, for the assumption of responsibility and for sharing in the efforts and results of the entire team. These collaborative dynamics work wonders for developing and strengthening *teaming and team working abilities*.

Learning how to collaborate

The pandemic proved that among the fundamental **competencies**, there are **social** and **collaborative** ones. Indeed, a sociality experienced in digital environments requires a reconsideration of the sharing and negotiation mechanisms. The trainer needs to become an expert in those conversational and social dynamics that allow these learning communities to maintain themselves and generate a fruitful exchange of interventions and reflections in the context of synchronous and asynchronous education.

Learning how to search

It is helpful to refine a complex ability such as **learning how to search** for digital resources on the net. These can vary from simple video to strings of code, from image or audio files to forums, from biographical information to websites; it does not matter, the essential thing is to develop in any type of user, professional, recreational or didactic, rational information search strategies on the net. Before identifying and re-using resources already prepared for educational use by professional educational designers experienced in multimedia, the teachers should actively dominate those strategies of research of didactic resources to be included in their curricular planning.

Again from the WEF list, the **critical thinking** and **analysis skills** can be here nurtured by a *Resource-based learning (RBL)* approach. In digital learning contexts, it is necessary to consider aspects such as the interaction between the learner and the resources available. It is useful to actively engage the student in seeking information to solve problems, individually or by collaborating with other students, insisting above all on the social and negotiated nature of learning and enhanced by networking technologies, which support and optimise peer interaction. In this way, a teaching practice focused on the conscious and cooperative transfer of search strategies and skills in the context of teamwork is obtained.

Self-access increases learners' autonomy by providing them with more opportunities and new stimuli to guide their self-learning path. However, an increase in opportunities does not necessarily correspond to greater autonomy and an actual improvement in learning. Given Resource-Based Learning presupposes the prior possession of autonomous strategies, especially in distance learning contexts, it might help to guide the student explicitly through interface suggestions and timely feedback from the educator.

Learning how to facilitate

It becomes helpful to deepen capabilities pertaining to the professional role of a **facilitator** in contexts of a didactic practice mediated by digital. In fact, in the context of a natural or virtual learning community, which may or may not coincide with the classroom environment, the trainers often find themselves taking on the role of a facilitator in real apprenticeship training

contexts. The teacher becomes an expert facilitator who supports the student as a model to be imitated in situated and project-oriented contexts.

The facilitator assists the learner to become autonomous in learning-by-doing paths, scaffolding, offering suggestions and operational tools until finally disappearing when the learners become de facto autonomous in their training path. The teacher must blend methods and content to alternate frontal moments of supplying knowledge with collaborative moments of experiential learning. The facilitator negotiates its authority through transversal dynamics of asymmetrical redistribution of expertise, while leading debrief dynamics to scaffold learning.

The trainer as a facilitator should be transitory; in fact, it would be necessary for the learners to implement peer-tutoring mechanisms such as determining the progressive fading and the professional tutors. Even if AI can provide most of the supportive feedback related to quantitative corrections, it is always the trainer who must intervene, stimulate questions, generate investigative mental habits, and support a discussion aimed at an effective change in learner values and beliefs.

Learning how to design

The trainers must not replace the didactic designers in e-learning or blended contexts, nor should they demean themselves as simple tutors or facilitators; they have a vital role as experts in their domains and as specialists in learning strategies. However, their role must be mediated and negotiated in technologically oriented contexts. Their pedagogical and educational values remain in providing learners with tools and strategies, expert behaviours to emulate and heuristic stimuli to support.

The major challenge in developing blended courses is presenting the information in an interactive, multimedia and navigational form for individual learners to engage. In training the trainer in the multimedia design of didactic material, it is essential to insist on **modularity**. At the level of didactic planning, it is necessary to outline the flow for the **micro-units conceived** in a curricular and modular way within overarching macro-structures, which must also consider disciplinary variables such as didactic, pedagogical, and psychological aspects.

A good designer should be trained to ensure the correct sequence in which the modules should be presented to the learners. In the design field instructional modules should:

- Be self-contained, coherent in their content and learnable at different times.
- Have the flexibility to be (re-) combined and varied in their chronological order to fulfil individual requirements and prerequisites of different learners.
- Support the acquisition of a well-defined set of testable and measurable qualifications.
- Embed suggestions regarding the relationships of mutual dependence between the various modular units.

The problem in the design phase is to weave in the plots of a learning objects sequence all the information that makes it meaningful, but at the same time not redundant and

tendentially relocatable in autonomous paths of students, for example, who will be able to access these resources only at a later time and perhaps without an expert guide or tutor.

Learning how to re-use

Before designing or creating any teaching and learning activity, it is worth stopping and learning how to re-use. To understand if it is appropriate to activate research strategies and select existing digital material or create resources conceived and developed from scratch for new training needs. To define, in this regard, proper professional guidelines for the future trainer, it is necessary to further deepen the centrality of the concept of **re-use**, especially in the context of a multimedia project to be redefined within a general framework of modular type. The dominant idea behind learning objects is to promote ever-greater re-use of these resources within new development systems and didactic design. A **learning object** is defined as any digital resource that can be re-used to support learning, its defining traits are the following:

- reusability;
- repurposability: the ability to use the same object for different purposes;
- granularity;
- intrinsic value for the learning process;
- existence and quality of metadata;
- adaptability to the needs of the context in which it is used.

Indeed, one of the primary reasons why **learning objects** attract interest is, above all, the concept of reusability. If achieved, it facilitates the creation of generative, adaptive and scalable systems. By adaptive, we mean learning systems that provide for the possibility of identifying individual and personalised paths; the term generative describes those architectures that provide for the possibility of combining primitive elements instead of accumulating in a prepackaged way based on predefined interaction logics.

Systems are adaptive when independent objects are assembled and implemented in response to the current states of the learner. Finally, the concept of scalability implies the quantitative production of digital resources for learning, carried out at specific qualitative levels and within given time and resource limits. Furthermore, they should be dynamically recalled to adapt to the personalised path of each learner, so that each object should be the bearer in itself of semantic connections with other things, thus allowing different users to create, always within the same e-learning, a personalised network of semantic interconnections between the same objects, even following different paths. In such adaptive systems, the learning path would be built progressively based on a sequence of objects presented to each learner in a dynamic way adhering to the user's needs and profile. Of course, the contribution of AI driven solutions in this will be massive.

Learning how to reflect

Learning how to **reflect** on expert theories and practices in highly fluid and dynamic contexts becomes crucial in training educators. For instance, variables such as the differences in the **learning styles** of each student and consequently in the types of activities to be proposed to ensure effective adaptive and generative paths tailored to everyone's needs is key for the

success of any initiative. Also, the process of reflection is fuelled by **data** and the ability to look at them to improve learning experiences.

From competencies to skills

After having detailed some of the overarching educational **competencies** needed for the digital transformation of learning processes, let us better detail the **multimedia** skills (digital literacy; computing education; good knowledge and understanding of multimedia technologies and data treatment).

Given the multidimensional levels engaged, such as technological, pedagogical, and content ones, **rubrics** can help frame useful descriptors into a **matrix** according to these relevant dimensions. A **rubric** is a clear set of criteria used for assessing a particular type of **performance**; in the following example, a simple **rubrics** can help capture different stages and levels of development and ICT integration:

- **Entry-level:** The teacher begins to use technology tools to deliver curriculum content to students.
- **Adoption Level:** The teacher instructs students in the use of technology tools.
- **Adaptation Level:** The teacher facilitates the students' exploration and independent use of technology tools.
- **Infusion Level:** The teacher provides the learning context, students choose the technology tools.
- **Transformation Level:** The teacher encourages the innovative use of technology tools to promote higher-order learning activities that could not be possible without technology.

There are a more complex models used for shapening **rubrics** and assessing the quality of learning integration involving digital technology; and the two following can be very useful:

- **TPACK**, which stands for Technological, Pedagogical and Content Knowledge;
- **SAMR** which stands for Substitute, Augment, Modify, and Redefine;

Both models look at the overlap of technology and how technology gets integrated with pedagogy in learning programmes. **TPACK** helps educators and institutions acknowledge their strengths and weaknesses in their knowledge of content, pedagogy, and technology and how these work together for innovative teaching and learning programs. **SAMR** provides a **framework** to support institutions, educators and instructional designers in creating optimal learning experiences using digital. The progressive levels specified are the following:

- **Substitution:** digital is used to perform the same task as was done before the use of computers.
- **Augmentation:** digital offers practical support to perform everyday tasks.
- **Modification:** digital enhances the traditional classroom and transforms it in depth. Typical activities are carried out through the use of computer technology.
- **Redefinition:** computer technology allows for new tasks that were previously inconceivable.



Of course, the modification and redefinition levels are the aspirational ones for any learning programs, as optimal for an advanced use, but the *continuum* helps identifying clearly the stage of development and assessing the learning needs for the HEI - faculty and tech staff.

Digital literacy

Given the small sample of rubrics and reference models examined, the broad concept of **digital literacy** can evolve into something more complex than what is generally understood, outside the world of HEI. **Digital literacy** is the ability to use information and communication technologies to **find, evaluate, create, and communicate** information, requiring **cognitive** and **technical** skills. In educational settings, some practical examples can be the following **how-to**:

- use web browsers, search engines, email, text, wiki, blogs, image editors, slideshare tools, video creation/editing software to illustrate learning objectives and outcomes;
- evaluate online resources for accuracy and trustworthiness of information;
- extend the traditional classroom into hybrid, online or blended ones to improve the learning process;
- choose appropriate media to prove learning objectives and outcomes;
- understand what digital platforms can best illustrate learning outcomes to peers and educators;
- use an interactive whiteboard in the classroom for lessons, allowing students to use it as well;
- encourage students to use technology to showcase their learning process and outcomes;
- use actively web resources, new formats (i.e. web sites, video, podcasts) to enhance learning;
- co-create online content to be utilized both in and out of the classroom.

Computing education

Digital literacy relies on grounding foundations from computing education which goes beyond computer science, computing and computational thinking, and encompasses closely related areas of study such as science, technology, engineering and mathematics (STEM). It can be about learning to code and programming as much as data privacy, cybersecurity, information ethics, software engineering. Nowadays, also foundations of Artificial Intelligence (AI) should be part of educators **train-the-trainer curriculum** covering the following areas:

- **Personalisation**: task automation for student support, student performance data analysis.
- **Answering questions**: knowledge base query, chatbots.
- **Task automation**: for administrative work, grading papers, assessing learning patterns, replying to general questions, and manual processes.

AI driven solutions can enhance specific areas as much as broader adaptive learning systems and learning management systems. Faculty and staff should be trained to experiment with new AI tools available even if they are not yet fully integrated in the LMS in use, in order to become early adopters.

Multimedia technologies



Multimedia technology for teaching and learning refers to the technology that uses text, graphic, animation, sound, and animation to deliver information, and learning experiences in educational settings. Following are some functional examples of platforms and tools that deliver multimedia for the learning process segmented per areas:

Video conferencing

- **Teams** (Microsoft 365 for Education). It brings together conversations, meetings, files and apps in a single environment, allowing teachers to switch between content creation, class discussion, lesson planning and delivery. Videoconferencing for up to 250 participants, chat, screen sharing and single document exchange; integrations with functions to manage assignments to work in groups.
- **Meet** (Gsuite for Education). Teleconferencing application. Unlike other virtual meeting platforms, it does not require any client installed. An app can be used for mobile devices. Anyone with a Google account can initiate a Meet call from Gmail. Videoconference up to 250 (soon 100) participants, chat, screen sharing and exchange of individual documents.

Sharing documents

- **Google Drive** (Gsuite for Education). Online storage and synchronization web service. It includes file hosting, file sharing and collaborative editing of documents. 2TB are available for the **student** account. It can be used through the web browser or through the application installed on the computer, which automatically synchronizes a local folder in the file system with the shared one. In Google Drive, there are also documents created with Google Docs.
- **Microsoft OneDrive**, (Microsoft 365 for Education). Online storage and synchronization web service. It includes file hosting, file sharing and collaborative editing of documents. 2TB are available for the student account. It can be used through the web browser or through the application installed on the computer, which automatically synchronizes a local folder on the file system with the shared one.

Management of tasks, materials and lessons

- **Google Classroom** (Gsuite for Education). Web service for the creation and distribution of educational material, the assignment and evaluation of online tasks. It combines with Google Drive for the creation and distribution of tasks. Integrate Google Calendar for assignment due dates.
- **Moodle** (Moodle LMS). IT environment for managing online courses. More complex to organize than Classroom, it allows you to develop activities of various kinds integrated with many external functions.

Virtual whiteboard

- **Jamboard** (Gsuite for Education). Interactive digital whiteboard for word processing. It can be used by anyone with a Google account. Drawing with virtual pens, annotation, pasting shared images etc. It has various additional features; for example, it allows to save documents even on multiple pages and find them ready on your account via browser. Can be integrated with Gsuite for Education.



- **Microsoft Whiteboard** (Microsoft App). Digital interactive whiteboard. Drawing with virtual pens, annotation, pasting shared images etc. It allows to work together live or remotely on multiple devices. Can be integrated with Teams.

Virtual board-blackboard

- **Mirò** - Collaboration platform and digital interactive whiteboard. On a single shared surface, it allows to insert post-its, images, links and connections to documents of various types. Simple graphics functions. Export in img or pdf form.
- **The Padlet App** - Digital canvas. On a single shared surface, it allows to insert videos, images, texts and documents of various types.

Drawing annotation

- **Acrobat** - Among the various features of Acrobat (both Editor and Reader), there is also the possibility to annotate pages (comments) with essential tools: pen, shapes, post-it. Annotations can be used during an online presentation to display and store observations from the teacher and the students.

Online video sharing

- **Youtube** (Google) - A platform for sharing and viewing multimedia content on the network (video sharing) allows uploading videos and broadcast in live streaming.
- **Vimeo** (Vimeo) - A platform for sharing and viewing multimedia content on the network (video sharing) allows uploading videos and broadcast in live streaming.

Video recording for asynchronous lesson

If using video recordings in lesson management, there are different levels of processing and quality of the recording. The quality varies concerning tools and skills and according to the intended destination of the video. The **first level** consists of the recording of the lessons made during the live streaming. For this reason, both Teams and Meet have recording functions that support the files in their respective archives. A **second level** concerns the videos that are specially designed, edited and post edited. One can start from a recording made with the video conferencing software or from a camera working "in the studio" to add slides and other contents and cut the less significant parts. The result - a video file - can then be uploaded to the same platform used for the lessons (GSuite or Microsoft Teams Stream) or to sharing platforms dedicated explicitly to broadcasting (see section on Online video sharing). To record and process the lesson's video, one can use editing features available online (such as the Youtube editor) or dedicated apps such as FlashBack and Filmora Scrn. **Finally**, PowerPoint (Office 365) has functions to record slides by associating the teacher's comment and transforming everything into a video file.

Create a website

For specific educational projects or to work with students, it is advisable to encourage to create a website with:

- **Google Sites** (GSuite) - It allows building websites in a relatively intuitive way. The sites are responsive (visible on different platforms, from desktop computers to smartphones). It integrates well with other applications of the Google suite.



Beware that different multimedia tools and digital platforms can serve multiple learning objectives and purposes. Let us take a tool like **Canvas** that is known for **creative** and **drawing** annotation activities and let us understand how to boost **social activities** instead through it, and in conjunction with other tools like **Google Docs, Miro, Mural**:

- *Social learning with video*
 - o In **Canvas** questions can be posted throughout videos. Students then interact, and their answers are automatically graded. Many schools are using **Articulate Storyline** to accomplish this goal.
- *Peer review tools within activities*
 - o In **Canvas** students can submit known or anonymously videos and text; they can **pair up** and rate using a **rubric** for quick grading and provide commented feedback. Rubric grading speed up the process and allow for consistent peer grading to occur.
- *New social learning activity types to enable faculty to improve social learning*
 - o In **Google Docs** each learning team (groups can change per activity) can contribute to a table or document at once. Faculty can watch what the students worked on during and after they submitted their responses. Similar objectives can be achieved with an individual **Miro** activity or on **Google Docs**.
 - o In **Canvas** - using **Groups** allow students to share files and communicate effectively with their team members; it ensures all team members are aware of any communication, all files are shared with everyone, and all information can be tracked for the final assignment, creating an all-in-one experience.
- *Social learning in synchronous online environments*
 - o In both **Miro** and **Mural**, which are natural-born virtual boards or blackboards, one can organize events or social activities through the platform chat functionality or include breakout room activities and group presentations, both synchronously and asynchronously.

A **lifelong learning platform** should provide tutorials on using tools and multimedia technologies to enhance learning experiences; however, it is essential to provide **case studies** and **success stories** from teachers and trainers from their daily teaching practices. **Templates** can be provided to structure consistent learning paths across the HEI curriculum, but the creativity often lies in the personalised use made by each professor for different disciplines and contents.

Indeed, there are two opposite needs when it comes to **modular** and **reusable** learning objects. On the one hand, each discipline has a specific way of delivering content and learning experiences, activating different abilities in students. While on the other hand, the HEI needs to guarantee a coherent **overarching learning framework** for all students, specifically with transversal skills and capabilities. Bespoke learning experiences for targeted cohorts must integrate according to general rules of system interoperability.

Data treatment

Faculty and **staff** should be aware of the GDPR data protection and privacy implications of online and remote learning. The **European GDPR** has created a lot of changes in data

protection and privacy law across the world. These laws regulate how HEIs - amongst others - collect, process, store and transfer personal data. Schools and universities collect personal data in an educational setting, including sensitive category data that require careful security. All organizations' employees need to be mindful of data protection and comply with local laws. Following are some **online learning related aspects** that should feature in the programs for faculty and staff in HEI:

- Online learning platforms require, as a minimum, the name and e-mail addresses of students, teachers and faculty members using the facility to manage identification, accounts and log-ins. Online platform providers are *third-party processors* from a legal standpoint.
- There are risks to be aware of such as live-streaming a session that can lead to inadvertent disclosure of confidential or inappropriate personal information. For this purpose, guidelines must be actively shared as
 - use a blind background to meetings so that no information can be collected about the location;
 - ensure there is non sensitive personal data visible during the meeting;
 - make sure that cameras (and audio) are disabled when the meeting has finished;
 - record sessions only if necessary for specific learning objectives to be achieved;
 - always inform and ask for consent before recording a session, and ask parents for consent as well with under legal age students;
 - update privacy notices, so that faculty, staff and students understand the privacy implications of online learning.

Data gathered by the learners' nurture adaptive systems and artificial intelligence algorithms; these data go beyond personal data and have been generally harvested through **cookies**. Data are essential to understand the learning experience, and the GDPR needs to define a clear purpose for gathering personal data. Therefore, defining clear learning objectives is helpful for pedagogical needs as much as for legal ones. They help to scaffold a modular learning experience that AI can boost in a safe and informative way.

General Guidelines

The following **areas of support** should be made available on an external website with technical and methodological guidelines for professors and teachers in their daily professional practice; some aspects are to be relevant both for face-to-face classes and blended or hybrid learning digital contexts:

- **Foundations of Teaching & Learning**
 - *How Students Learn*
 - Cognitive overload
 - Learning Chunks
 - *How to Design a Course*
 - Course Design, Development, and Organization
 - *How to Teach and Facilitate Learning*

- Teaching Strategies
- Facilitating
- Lecturing
- Leading Effective Discussions
- *How People Learn*
 - Metacognition
 - Self-regulation
 - NLP Foundations
 - Adult Learning Foundations
 - Experiential Learning
 - Debrief
 - Facilitating
 - Scaffolding
 - Autonomous Learning
 - Heuristics
 - Learning strategies
 - Active Learning
 - Problem Based Learning
 - Inquiry Based Learning
 - Resource Based Learning
 - Project Based Learning
- **Tips and Tricks**
 - *Classroom Management*
 - Instructor Led
 - Blended
 - Hybrid
 - *The Role of the Course Assistant*
 - Daily Tasks in Teaching
 - Classroom Policies
 - *Discussion Strategies and Trouble-Shooting*
 - Asking Effective Questions
 - Characteristics of Effective Listening
 - *Planning for Small Groups*
 - Small Group Work
 - *Media & Technology*
 - *Teaching and Learning during Tense Moments*
 - *Assignments*
 - Designing Effective Writing Assignments
 - Designing Problem Sets
 - *Mentoring*
 - Teaching and Your Career
 - Professional Development
- **Create an Inclusive Classroom**
 - *Inclusive Teaching and Diversity*
 - *Academic Belonging*



- *Discussion Guidelines*
- *Implicit Bias*
- *Growth Mindset*
- *Navigating Politics*
- *Accommodating Students with Disabilities*
- *Religious Accommodations in Teaching*
- **Design a learner-centered syllabus**
 - *Learning Contract*
 - *Learning Objectives*
 - *Learning Outcomes*
- **Assess Student Learning**
 - *How to Use Rubrics*
 - Create Rubrics
 - Share Rubrics
 - Use Rubrics to evaluate ICT
 - TPACK
 - SAMR
 - *Evaluating Student Learning*
 - Self-evaluation learning
 - How to support students in self-monitoring
 - How to design self-evaluation grids
 - Peer-evaluation
 - How to guide students to give feedback to peers
 - How to design peer evaluation grids
 - Assess for Learning
 - Giving Formative Feedback to Students
 - *Formative Assessment - A learning guide: a continuous and frequent opportunity for students to monitor their progress towards learning goals:*
 - Learning logs
 - Discussions
 - Reflections
 - Group Presentations
 - Practice Quizzes (Kahoot!, Mentimeter, etc.)
 - *Summative Assessment - Implemented at the end of the course to measure to what extent students acquired knowledge and skills, hence summing up their learning:*
 - Final Exam
 - Business or Specific Challenge
 - Final Pitch
 - Creation of Product or Artefact (i.e. prototypes)
 - Portfolio (i.e., showreel, webfolio)
 - Group Project
 - *Assessment Methodologies - Find the right combination of summative and formative assessment*
- **Grading**
 - *Grading as a tool to evaluate, communicate and motivate*

- *Tips and Guidelines*
 - Assessing team performance provides incentive for student groups to work together.
 - Assessing individual contributions to the team allows students to indicate the relative contributions of their teammates.
- **Assess & Improve Teaching**
 - *How to Give Feedback*
 - *Acquiring and Using Student Feedback*
 - Getting Feedback from Students
 - How to re-design your course according to feedback and datapoints

Analysis of digital skills and competencies needed for technical staff

Digital Learning specialists and **technical staff** are experienced in Instructional Design and Instructional Technology: designing, developing, and implementing educational technology in the classroom, specifying learning objectives, and developing and delivering training materials and assessments aligned to those objectives, also experienced in current effective pedagogies for learner-centred teaching while facilitating formal and informal professional development.

Digital Learning Specialists assist teachers in planning for using technology in the instructional program in synchronous and asynchronous learning environments while working closely with **technical staff** to develop innovative technology solutions for instructional delivery. They both serve as a liaison with any **Technology Department** and **Teaching and Learning Department** regarding instructional technology. They promote digital literacy programs and skills with staff and the community, guiding students and staff in independently resolving computer and digital device issues.

Both **Digital Learning Specialists** and **Technical Staff** conduct training sessions for faculty through coaching or online self-paced instruction with deep dives on online learning tools and resources, including the LMS (Learning Management System). They troubleshoot pedagogy-associated issues with online learning tools. Serving as a point of contact for the online learning tools. They support and model effective technology integration ensuring its use as an essential instructional tool. They assist in planning and implementing professional learning opportunities which focus on the innovative use of technology. They assist faculty and administration in overseeing, evaluating, and refining educational technology professional learning. They assess and refine technology integration based on formative and summative assessments, and assessment data to provide implementation and training support.

Tech Staff generally provides technical services for teaching and learning, and it sits in the **IT Systems and Services Area**, which should design, implement, manage and oversee the HEI IT services, constituting a reference point and transversal link to the plurality of structures and services regarding network and systems infrastructure, applications and support services. Also, it should oversee the IT support services of the campus structures and manage the University document flows, the IT protocol and the archive. Main activities:

- Manage and develop the university geographical network and integration, including the stipulation of agreements for defining the operational and technical methods of collaboration.
- Design and implement local networks (LAN) and University wireless networks.
- Manage central server systems (primary site, secondary site for business continuity, disaster recovery service).
- Purchase and manage, also through outsourcing, the workstations of the General Administration.
- Manage fixed and mobile telephony services.
- Manage video conferencing and web conferencing services and create multimedia products.
- Manage and develop the Single Authentication System (University Directory Service) and Identity Management services.
- Manage the institutional e-mail system for staff and students.
- Analyse, design and maintain all software applications to support teaching, research, human resource management and processes in the purchasing and accounting area and related databases.
- Integrate information systems.
- Manage the technological platform and software development of the University Portal system.
- Manage the University e-learning infrastructure with a view to integration with information systems.
- Manage the technological platform and applications of the University Language Center to integrate with information systems.
- Manage the technological platforms of the library systems.
- Support the dematerialization of processes and use of the digital signature.
- Provide support about the issues of privacy and the processing of personal data.
- Oversee the Business Process Reengineering.
- Deliver the project management for computerization projects of University activities.
- Oversee computer security of the University, also through specific projects in the individual structures.
- Provide IT assistance services to the Campus facilities by extending the direct management of technical and IT personnel with general skills related to the reorganization processes of services for logistic complexes.
- Assist with services provided.
- Assist students, teachers and offices on teaching support software applications.
- Manage document flows, IT protocol and archives, also through the use of information and communication technologies.

Analysis of digital skills and competencies needed for administrative staff

As a reference starting point, the overarching framework - designed by the UK Government to support providers, organisations and employers across the country who offer training for adults to secure their essential digital skills - sets out five areas of crucial digital skills for life and work:

- Communicating
- Handling information and content
- Transacting
- Problem-solving
- Being safe and legal online

Each area gets conveniently detailed according to a guiding **rubric** with specific content and technical suggestions around the following dimensions:

- **Use devices and handling information:** use devices, find and evaluate information, manage and store information, identify and solve technical problems, develop digital skills.
- **Create and edit:** create and edit documents, create and edit digital media, process numerical data.
- **Communicate:** communicate and share, manage traceable online activities.
- **Transact:** use online services, buy securely online.
- **Be safe and responsible online:** protect privacy, protect data, be responsible online, digital wellbeing.

These dimensions get detailed across two levels:

- **Entry** – designed for adults with no or little prior experience of using digital devices or the internet.
- **Level 1** – designed for adults with some experience of using digital devices and the internet but lacking secure basic digital skills. [Find more: <https://www.gov.uk/government/publications/essential-digital-skills-framework>].

Requirements to ensure effective digital learning programs.

Effective digital learning programs should be part of an overarching **learning strategy** for any organisation, be it HEI or private institutions. There are **foundational steps** more than requirements that need to be taken into action to deliver effective programs.

Following a high-level overview:

- **Define** a digital learning strategy and the overarching learning framework of reference.
- **Benchmark** maturity level in tech adoption across the organisation, and outside.
- **Map** the stakeholders' instances.
 - o Governance
 - o Teachers
 - o Staff
 - o Parents
 - o Students
- **Gather** needs analysis to be met.
- **Define** the SMART objectives of the broader digital learning plan and the **priority** for the implementation of specific programs.
- **Identify** operational steps to deliver the plan, and the resources needed.
- **Plan** resources to deliver on the plan:

- *Digital Learning Team*
 - Teaching staff: professors, tutors and teaching assistants.
 - Learning specialists: instructional designers, video and content makers.
 - Tech staff: tech support, operators, IT department.
 - Administrative: registration staff, marketing staff.
 - Professionals: external consultants and vendors for specific needs.
- *Digital Infrastructures*
 - *Platforms*: learning and content management systems, AI learning solutions, cloud-based tools and applications, fast and reliable broadband to connect with cloud-based applications, mobile computing devices for teachers and students to support active learning contexts, suitable Wi-Fi networks within schools to support mobile learning contexts, tools to improve how information is presented in the classroom.
 - *Software*: video conferencing; sharing documents; management of tasks, materials and lessons; virtual whiteboards; virtual boards and blackboards; drawing annotation tools; online video sharing; video recording for asynchronous lesson; tools for the creation of a website; tools to network speed test.
- *External suppliers for tech, content and courses*
 - *Content*: identify web repositories, MOOCs, content networks, available learning objects, databases, libraries.
 - *Services*: external instructional designers, gamification experts, data analytics support.
- **Design** the digital learning programs in line with the priority defined in the plan:
 - **Co-create** with technical staff and teachers the draft of the *curriculum* and the *syllabus*.
 - **Identify** existing resources to be **reused** or **repurposed** in the context of the new learning program.
 - **Design** pilot programs: define the learning objectives, the methodology used, the technological support needed, the content needed (i.e., video, audio, drills)
 - **Define** the success metrics to evaluate learning impact and assurance of learning processes.
- **Deliver** the digital learning program pilots ensuring the following aspects get covered before going live with the courses:
 - Provide **training** sessions for staff and teachers on tools and methodologies.
 - Provide *General Guidelines* online for self-access study and reference, as the one here suggested.
 - Provide **tutorship, coaching** and support for students and teachers during the experience.
- **Monitor** the learning outcomes in a traceable way (i.e., portfolio, prototypes), as much the interaction within synchronous and asynchronous learning platforms with data reports on actual usage of the digital materials for self-study, collaborative and group tasks.
- **Improve** the learning experience through the program with the insights coming from the qualitative feedback and quantitative data from system navigation.

New required multimedia technologies

Some educational **trends** in **multimedia** learning technologies were growing fast since **pre-pandemic** times: the data-driven practices, the personalization of the learning experience, the focus on soft skills, the digitization of instructor lead teaching, learning through social and mobile platforms, microlearning, video and podcast. The **post-pandemic** has confirmed some and made others emerge, such as the rebalancing of learning models, the humanization of online learning, the use of AI and chatbot technologies to follow the learner, data tracking and analysis, the new trends of immersive content, the emphasis on STEM subjects, the experiential approach.

In addition, there is a greater emphasis on **Train-The-Trainer** programs for trainers, helping them transition to new ways of design and delivery. When referring to the need for **multimedia technologies**, it is helpful to open to digital integrated learning, advanced multimedia, interactive 3D environments, virtual reality, augmented reality, 2D holographic projections, live streaming 3D holograms. Also, it is essential to create inclusive learning environments for all students, including participants with fewer opportunities: physically impaired (i.e., deaf, blind, paralytic), cognitive impaired and low-income students.

The **Web Content Accessibility Guidelines** (WCAG) are developed together with the **W3C** to provide a global standard for web content accessibility; these guidelines are also helpful as reference in educational settings to apply the same standards for making digital learning content more accessible for people with disabilities. [Find More: <https://www.w3.org/WAI/standards-guidelines/wcag/>].

Always for the inclusivity purpose, it comes in handy the **Universal Design for Learning** (UDL). UDL is a **framework** developed by CAST that guides the design of learning experiences to meet the needs of all learners. UDL grounds on brain science and evidence-based educational practices. It is a framework to improve and optimise teaching and learning based on scientific insights into how humans learn. UDL framework guides instructional goals, assessments, methods, and materials that can be customized and adjusted to meet individual needs while leveraging the power of digital technology. The goal of UDL is for all learners to become expert learners who are purposeful and motivated, resourceful and knowledgeable, and strategic and goal-directed about learning. [Find More: <https://www.cast.org/impact/universal-design-for-learning-udl>].

Suggestions for effective digital learning programs

When it comes to design **effective digital learning programs** for teachers and educators of private and public higher and post-graduate schools, one must consider their need for updating their approach to teaching and learning design, in the context of the transformation the world of education is going through, for developing their skills to apply them to new contexts, digital or blended.

Best practices are available in the Italian university ecosystem; these will be further investigated in the next chapter; here, the **LUISS Business School Flex Executive Program in Digital Teaching for Learning** is openly presented, with some suggestions being it targeted at

the internal faculty as much as to an external target. [Find More: <https://businessschool.luiss.it/landing/flex-digital-teaching-for-learning/>].

This program aims to encourage the acquisition of methods and tools to develop and integrate one's educational approach in blended contexts and intervene innovatively and effectively in managing one's teaching activity. The flex formula means a mix of face-to-face teaching labs, blended with asynchronous digital material and interspersed with regular synchronous webinars facilitated by field experts, both from academia and business. The autonomous participant is guided in the learning activities through the hybrid methodology to get involved in cognitive processes ranging from the most superficial (knowing, understanding) to the most complex (applying, analysing, synthesising, evaluating). The course aims at achieving the following learning objectives, which can be achieved thanks to specific didactic tools and activities:

- **Know** and **apply** effective practical/theoretical models of didactic integration and ICT platforms.
- **Provide** and **experiment** practical/theoretical tools to facilitate autonomous and experiential learning dynamics in presence and at a distance.
- **Acquire** and **apply** debrief techniques in peer sharing in *Teaching Labs*.
- **Confront** highly topical issues and challenges in organizational contexts related to the evolution of technology and digital transformation.
- **Stimulate** the comparison of one's teaching practice among peers through active learning laboratories.
- **Develop** a new approach to didactic design in blended digital teaching and learning contexts, face-to-face and at a distance, creating a network of professionals in the world of innovation in the field of training.

The Flex Executive Program in **Digital Teaching for Learning** is structured in four modules and is organized around two distinct and complementary themes: *Teaching* (Modules 1 and 2) and *Design and Innovation* (Modules 3 and 4). The four modules, to be delivered in two months, are detailed as follows:

- **Module 1: Teaching Lab 1.0**
 - Introduction and sharing of the learning contract.
 - Statement of expectations.
 - Presentation of the *learning journey*.
 - Creation of real and virtual *group dynamics*.
 - Teaching-focus on updating the teaching approach in digital and blended contexts.
 - Design and Innovation-focus on learning design and the use of innovative teaching tools.
 - Teaching to Learn and Facilitate in real contexts.
 - Teaching Lab 1.0 with experts and feedback and debrief.
 - *Tools*: case teaching, flipped learning, fish-bowl technique and observations, inductive teaching, learning styles, tips and tricks, distant learning.
 - *Professional role*: giving and receiving feedback, peer and expert coaching.

- *Soft skills*: stress and resilience, conflict management.
- *In-depth study*: the secrets of the *great masters*, expert and peer knowledge, presence and communicative impact.
- **Module 2: Teaching Lab 2.0**
 - Teaching to Learn and Facilitate in digital contexts.
 - Teaching Lab 2.0 outside the *comfort zone*.
 - *Tools*: virtual classroom, VR case teaching, live case teaching, flipped classroom or inverted classroom, synchronous and asynchronous environments.
 - *Professional role*: giving and receiving feedback, learning how-to experiment, take risks.
 - *Soft Skills*: innovation and management of the ambiguous.
 - *In-depth study*: context, network, environment, professional network, applied research and teaching.
- **Module 3: Design Lab**
 - How to respond to user needs: plan, prepare, present, evaluate the *learning journey*, *learning objectives* and *learning outcomes*. Bloom taxonomy, ADDIE model, Kirkpatrick model.
 - Attention curve and cognitive load: micro-learning and the Chunks Theory.
 - Reusable Learning Objects.
 - Role and responsibility of Subject Matter Experts in course design and content layering.
 - How to use practical/theoretical teaching design tools in blended digital teaching and learning contexts, face to face and at a distance.
 - How to make a storyboard.
 - How to make an effective script.
 - How to make a shooting.
 - Design as teamwork: tasks, roles and actors involved.
 - How to respond to the needs of organizations in difficult times of digital transformation - from learning design to strategic, operational implementation.
 - Benchmark and business case studies from public and private companies.
 - Evolution and trends in the world of education.
 - Panel with experts and entrepreneurs.
- **Module 4: Innovation Lab**
 - How to experiment with some tools (Mural, Kahoot! Mind Meister, Prezi, Thing, Link, Articulate 360, Vyond, Canva, Moodle).
 - How to use practical tools and digital teaching and learning tools aimed at facilitating autonomous and experiential distance learning dynamics.
 - How to make a successful podcast.
 - Innovation in the world of education.
 - Panel with experts and entrepreneurs on social platforms for the creation of effective Digital Academies

The Flex Executive Program in **Digital Teaching for Learning** resulted from an academic benchmark concerning other leading players in the higher education market. For the design

of this course, we looked at the training programs offered by the best Italian and foreign Universities and Business Schools. The sample observed delivers training courses focused on learning design and facilitation in digital teaching and learning environments, synchronous and asynchronous for the faculty and staff. Below is the list of programs analysed in order to design and deliver an unprecedented training offer:

- **Online Teaching Academy. Mastering Online Teaching in Business Education - EFMD.** This program is intended for business school and corporate universities. The 2020 edition was equivalent to a five-day (40-hour) face-to-face program. The learning experience is as flexible as in blended and online learning. This course is highly practical and concludes with an applied project based on the learning during the course [Find more: <https://events.efmdglobal.org/events/online-teaching-academy/>].
- **Harvard's Derek Bok Center for Teaching and Learning.** Focused on effective postsecondary education teaching methods, both online and in-person seminar program currently offered. [Find more: <https://bokcenter.harvard.edu/>].
- **ITP - International Teachers Program, INSEAD** See the 2020-2021 brochure at https://www.itp-schools.com/wp-content/uploads/2020/02/Brochure_ITP@INSEAD_2021.pdf. The ITP program - facilitated by world-class teachers and dedicated to teachers - is dedicated to faculty members of business and management schools. ITP was initially developed by Harvard Business School in the 1960s, before moving to Europe. The ITP program has been running annually since 1971, rotating among ISBM schools. Most recently, the program was held at the Kellogg School of Management, China Europe International Business School, IAE Aix-Marseille Graduate School of Management and London Business School.
- **Metid, Polytechnic of Milan.** Metid catalyses all faculty development efforts, sponsors innovative teaching activities within curricular courses and organises confrontation with the outside world through international seminars and dedicated training moments set with an active class dimension. Metid creates and shares MOOCs dedicated to didactic innovation [Find More: <https://beep.metid.polimi.it/it/web/progetto-innovazione-didattica/moocs4teachers>].
- **BUILT, Bocconi.** The BUILT team focuses on designing synchronous and asynchronous open experiences and teaching staff training. Worth mention BEAT, Bocconi Excellence in Advanced Teaching - Faculty Program. [Find More: <https://built.unibocconi.eu/wps/wcm/connect/site/built/home>]. LTCC (Learning Technology Competence Center) is the technological research and services structure established by ICT in 1999 to support and disseminate the use of e-learning platforms. LTCC also contributes to the realization of multimedia teaching projects of general interest for the University. LTCC makes its skills and technological knowledge available both in the faculty courses and in SDA Bocconi initiatives. It also supports continuous staff training activities organized by the Human Resources function. This structure, to complete the specific activities, provides support services to students and participants via email. It assists teachers with personalized training on the technological potential of the platforms. Finally, it oversees the activities relating to the scheduling and management of access to online courses.



6. BEST PRACTICES IN THE COUNTRY

The health emergency caused by the Coronavirus pandemic forced universities worldwide to deliver their training courses online, both under-graduate and post-graduate. Some institutions were better prepared to meet this challenge; others are still experimenting with new approaches to online training in these weeks.

Context

During the academic year 2020/21, the lessons generally restarted following the indications of the Ministry, guaranteeing **face-to-face** activities. The rules of coexistence were subject to new constraints and changes. The rules of **social distancing** and protection through masks were applied, and the use of spaces was redefined to welcome people safely, ensuring the necessary sanitation of the environments - in particular, the capacity of the classrooms was redefined. Therefore, the times and methods of teaching required a different organization and modulation through hybrid forms of teaching. In general, the teaching hours during the first semester of the academic year 2020/21 provided:

- for project **laboratories**, face-to-face teaching up to 70% of the hours, with dedicated classrooms.
- for **theoretical** courses, distance learning, online, with a percentage of hours in attendance (max 20%), upon reservation of the classroom by the teacher.

The different degree courses and individual teachers interpreted flexibly this situation and blended teaching, considering the limitations due to the health emergency and according to the specific educational objectives of the courses. Without prejudice to the variety of possible solutions, by way of example only, the teaching activity revolved around methods like the following:

- **remote activities**: use of videoconferencing platforms (i.e., Teams, Meet) for lectures, conferences with guests, discussion on assigned topics and materials; use of digital platforms for organization, communication and sharing (i.e., Classroom) for assigning tasks, questionnaires, forums, deliveries of practical jobs, and artefacts.
- **face-to-face activities**: use of the face-to-face classroom for lectures and interaction and sharing activities, such as reviews, workshops, seminars, verifications, possibly with shifts of students divided into groups (especially in a classroom with a capacity lower than the number of members).

The activity could also be carried out in **hybrid mode**, i.e., addressing students in presence and students connected remotely simultaneously. All teaching and teaching activities, both face-to-face and remotely, took place following the timetable of the lessons.

Classroom teaching activity

Concerning the Covid-19 emergency, for the first semester of the academic year 2020/21, the capacity of the classrooms was redefined and reduced based on the prevention, sanitation

and logistics measures envisaged for the safe resumption of teaching. Guidelines were provided as following:

- The teachers of the **laboratories** organized **on-site activities** based on the assigned classroom capacity and the number of students enrolled in the course.
- The teachers of the **theoretical** courses - which took place mainly online - could organize limited activities in the presence, after checking the availability of the classrooms.
- Students, based on the indications on classroom activities received from teachers, booked their presence in the classroom following the instructions given.

Distance and hybrid teaching activity

The distance learning activity is based on digital tools and devices and can occur in **synchronous** or **asynchronous** mode. The **hybrid** teaching activity takes place simultaneously in the presence and at a distance; it is aimed at students present in the classroom and students connected at a distance. These methods are adopted based on the availability of software and technological equipment and the choices teachers make concerning the specific training needs of their teaching.

Having examined the **national rankings** of **state** and **private** universities of **different dimensions**, the following **best practices** were identified to outline a comprehensive view of the speed of reaction to the pandemic impact for online education, as much as previous ongoing efforts:

- **Politecnico di Milano**, which is one of the top Italian universities in global and national rankings at the forefront for new technologies applied to teaching and learning [Find more: <https://www.polimi.it/>];
- **Università Degli Studi di Padova**, which consistently rates high in national rankings of state universities with more than 40.000 students [Find more: <https://www.unipd.it/>];
- **Università di Pavia**, which steadfastly grew in national rankings of state universities with 20.000 to 40.000 students [Find more: <https://web.unipv.it/>];

The choice of case studies was influenced by the **availability** of data and resources from the named institution's **official web properties**. Some institutions are more transparent with their approach and the resources made available for professors, students and staff. Also, the variety of approaches and platforms were an **indicator of creativity** in reacting to the pandemic urgency, as much descriptive of digitisation initiatives that were already taking place.

The **TPACK pedagogical model** for ICT integration in education will guide the analysis of HEIs taken into consideration across the following three dimensions: 1) **Technology** 2) **Pedagogy** 3) **Content**. Different institutions used a variety of digital platforms that were already in use and integrated them with specific tools to enhance the hybrid learning experiences initiated in pandemic times.

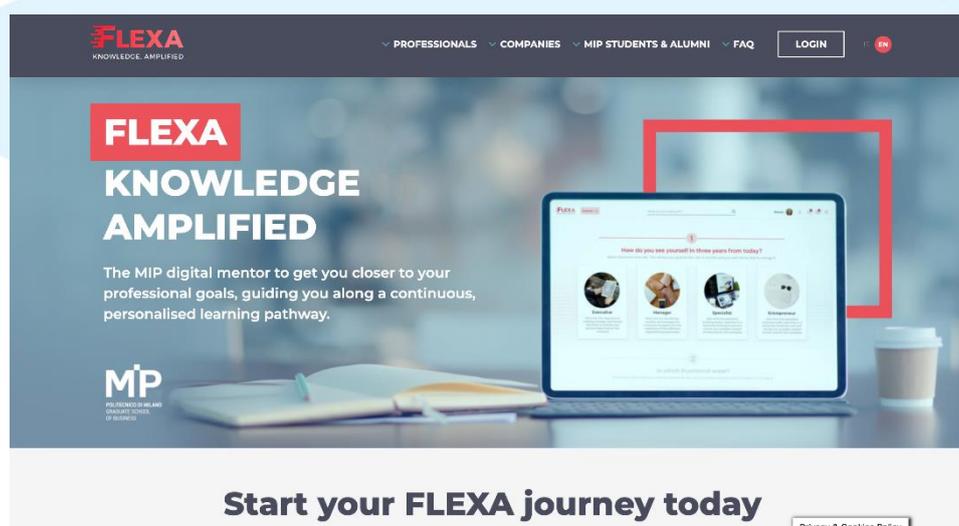
Case study / Best practice #1

Politecnico di Milano consistently rates top in global and national rankings of universities. **MIP** is the Graduate School while **Metid** is the internal centre of technology applied to teaching and learning.

Technology

FLEXA - from **Politecnico di Milano** - was launched in collaboration with **Microsoft** and made accessible to everyone free of charge:

“FLEXA is based on the **Azure cloud platform** and Microsoft’s artificial intelligence and analytics capabilities. It acts as a digital mentor with access to an ecosystem of some 800,000 pieces of content, including self-guided digital courses, webinars, podcasts, articles and case studies, some of which remain restricted to MIP students and alumni. The platform creates and suggests customised training paths for each user, starting with an assessment phase that evaluates the skills gaps to be filled in order to achieve professional goals. The method of use is based on a “smart” approach, i.e., it can be adapted to the time available to each individual for professional development”. [Find more: <https://www.flexa.polimi.it/en/professionals/>].



Pedagogy

In Italy, the **CRUI** is the association of state and non-state Italian universities. The CRUI Foundation oversees developing interface actions between the university system and society with a view to the cultural and economic development of the country. The **CRUI Foundation** built on the experience of **MIP - the Graduate School of Business of the Politecnico di Milano** to react promptly to the emergency. They launched an online course that involved some professors from the most prestigious universities in the world (University College London, University City London, UC Berkeley, Open University and **Politecnico di Milano**). These partners had gained significant experience in online university training over the years and made themselves available to share their experiences and approaches with all Italian professors. [Find more: <https://www.som.polimi.it/course/corsi-mip-fondazione-crui/>].

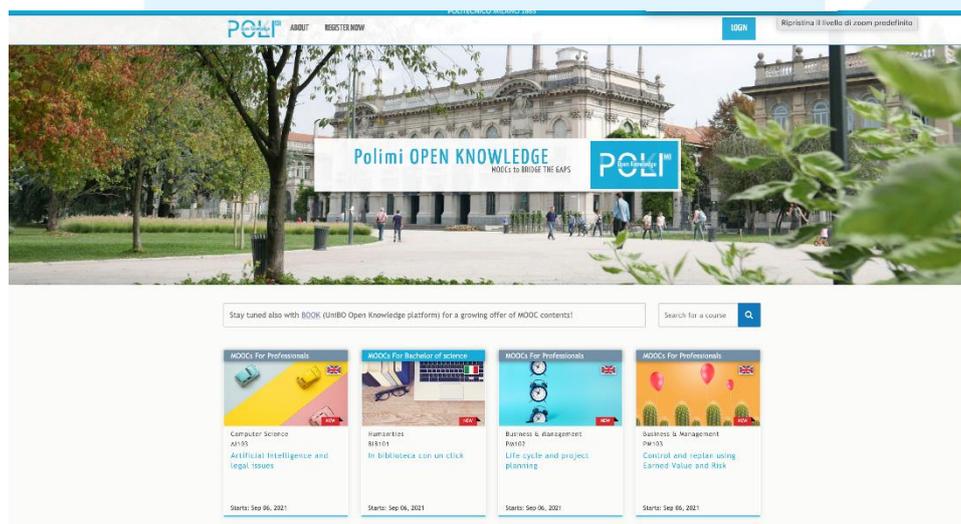
As a context to that, and as already mentioned it is worth stressing that **Politecnico di Milano** could count on the support of **Metid** <https://www.Metid.polimi.it/>, which is the internal centre of excellence that supports professors in educational innovation processes through an ecosystem of formal and informal resources [Find more: <https://www.Metid.polimi.it/Faculty-development/>].

The [PIDENG101 - Designing Learning Innovation](#) playlist is available on Youtube Channel to support methodologically professors and learning designers. The centre aims to promote and develop activities that actively involve teachers, recipients of training processes, and students whose training path increasingly requires a range of skills that integrate the traditional disciplines specific to the individual courses of study. The centre and the related projects are part of the University strategy for the continuous improvement of the quality of teaching. It features laboratories for didactic innovation, and laboratories for the training of teachers in didactic innovation.

The laboratories are designed as training courses aimed at constructing - participatory and active - theoretical knowledge and methodological skills capable of encouraging continuous innovation in teaching. The proposed initiatives intend to address the priority of innovating teaching, supporting and managing the classrooms in online or mixed mode. Furthermore, the modular structure of the plan made it possible to define learning objectives limited to the single training intervention to favour a concrete and targeted response to the knowledge needs of the individual. Some activities are delivered in person, others online and still others in mixed mode.

Content

Content and platform wise, **Metid** is also backing up the MOOC programs for POK <https://www.pok.polimi.it/> the **Polimi Open Knowledge of Politecnico di Milano**.

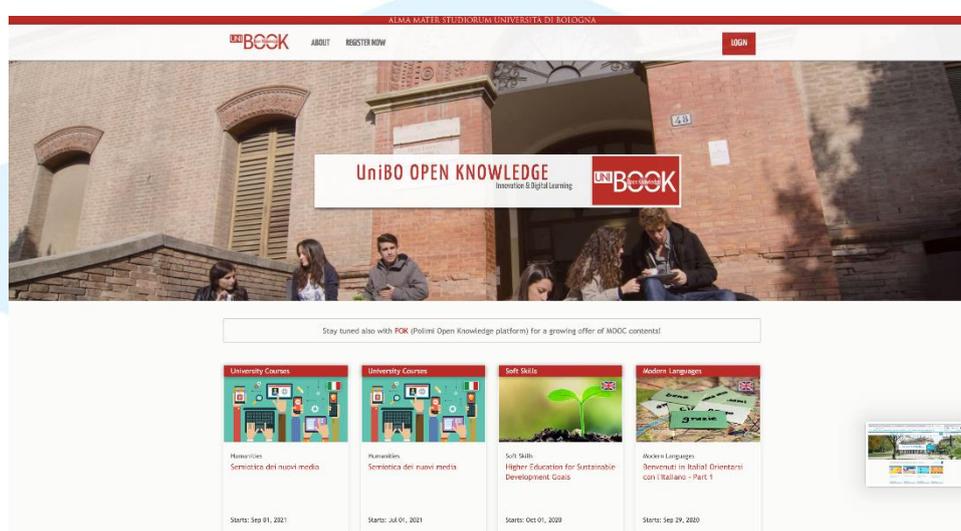


Also **Università di Bologna** works in cooperation with **Metid** from Polimi and **Open EdX** <https://open.edx.org/> for MOOCs initiatives. In fact, content and platform wise, **Metid** is

backing BOOK <https://book.unibo.it/>, the UniBO Open Knowledge of the **Università di Bologna** designed to develop and deliver MOOCs (Massive Open Online Courses).

"edX and Open edX: Two strong brands, one shared vision. edX is the online learning destination co-founded by Harvard and MIT. The Open edX platform provides the learner-centric, massively scalable learning technology behind it. Originally envisioned for MOOCs, Open edX platform has evolved into one of the leading learning solutions catering to Higher Ed, enterprise, and government organizations alike".

On BOOK all the courses are delivered several times a year: some of them right after the conclusion of the previous edition, others after a few weeks. If the student gets into a course that is already closed, he/she can consult videos and other materials, but he/she cannot get the Certificate of Accomplishment.



Case study / Best practice #2

Università degli Studi di Padova consistently rates high in national rankings of state universities with more than 40.000 student.

Technology

The website lists the tools available to the staff of the **Università degli Studi di Padova** to integrate their teaching and activities with educational technologies, it provides guides and tutorials to use them, and it lists the services supporting the University staff. [Find more: <https://elearning.unipd.it/dlm/course/view.php?id=56>].

Moodle is the e-learning platform chosen by the **Università degli Studi di Padova**. In Padua, there are 50 instances, including the Schools and Services departments and all Unipd teachers, staff and students can access with the SSO (Single Sign On). The website provides details on the new Moodle theme and version updates, the Moodle tutorial for teachers, a more general Moodle Video Tutorial, and Moodle and University Representatives list. The labelled **MOT - Massive Online Teaching** platforms are used by professors and staff:

- **Moodle** is the platform that everyone has to use to make available to students all the materials (slides, pdf, audio or video) helpful in improving, supplementing, or replacing the frontal lesson. All teachers must create their courses in Moodle. Tutorials are provided.
- **Zoom** is the platform to use if the professor wants to communicate in real-time with students. It is a sort of evolution of Skype, permanently integrated with Moodle. Graduation sessions and even live lessons can be held relying on up to 300 simultaneously connected devices. Tutorials are provided.
- **Kaltura** is the platform for professors to record and makes available to students the integral lessons, additions to the lessons themselves through audio with slides or video with slides. It is permanently integrated into Moodle so all content can be visible to all those enrolled in the courses. One can record activities in either online or offline mode. In the latter case, the contents can be uploaded later. Tutorials are provided.
- **Tools** are provided with tips on using them in the learning design with clear tutorials:
 - o **Top Hat, Powtoon, Camtasia, BigBlueButton** – supporting learning design with animations and engaging formats.
 - o **Compilatio** - The anti-plagiarism project, active on an experimental basis in agreement with the Vice-Rector for Teaching, aims to support teachers in the correction of degree theses, term papers and papers, in order to guarantee the originality of the documents produced by the students of the **Università degli Studi di Padova**. The control carried out has non punitive purpose but of accompanying students in the preparation of quality papers and acquiring skills that can be spent even after graduation. The plagiarism check is carried out by using the software available online at <https://epoq.compilatio.net/shibboleth>, to access which teachers can use the credentials already in their possession access the area reserved with Single Sign On (SSO).
 - o **Various software**: all licenses and tools in use are listed, and clear guidelines on how to access them are provided <https://www.ict.unipd.it/servizi/servizi-utenti-istituzionali/contratti-software-e-licenze>.

Pedagogy

The website provides a list of links to workshops offered to teachers and tutorials on the tools available [Find more: <https://elearning.unipd.it/dlm/course/view.php?id=56>]:

- **The Digital Week**: a program targeted at the staff of the University, which offers rotating workshops on Moodle and other technologies to support teaching and research. From 2017 the *Digital Learning and Multimedia Office* organized the *Digital Week* twice a year, before the start of each semester (September and end of January), and intensified in 2020.
- **Workshops On Demand**: The *Digital Learning and Multimedia Office* organizes laboratories for groups of up to 20 people on the use of Moodle and other technologies available in the University. The request for activation of a workshop can be made directly by the teachers.
- **Best Practice Sharing**: the website provides a link to a *video channel* where teachers present their experiences of integrating technologies into teaching activities.



- **Special projects:** The *Teaching4Learning @ Unipd* (T4L) project, in harmony with the development lines promoted by the European Union, the European University Association and the MIUR, aims to contribute to the improvement and innovation of the teaching of the study courses offered by the **Università degli Studi di Padova**. It is divided into:
 - Professional development training courses for teachers.
 - Sharing and training actions for female students.
 - Projects for the innovation of teaching practices and strategies with the support and integration of the most innovative technologies.
 - Promoting the development of an educational culture inspired by Active Learning.
 - The construction of the Faculty Learning Community (FLC).
 - [Find more: <https://www.unipd.it/teaching4learning/>].
- **Tools for the classroom:** guidelines on how to use in the classroom technologies to support the lesson and student participation are provided (i.e., Digital Ink, WOOCAP, Padlet), together with survey tools to create research questionnaires and advanced survey form (i.e., Lime Survey, Moodle: questionnaire and feedback forms).

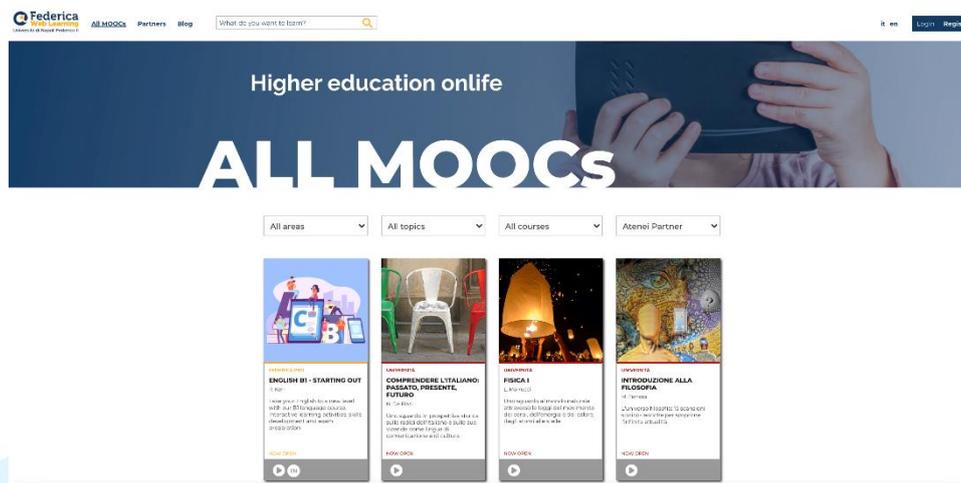
Content

The **MOOCs** created by the **Università degli Studi di Padova** are published on one of the following platforms with which Unipd has an agreement. All allow free access to anyone (not just Unipd students).

- **MOOCs in Italian non-curricular with EduOpen** - EduOpen is a national university consortium to which the **Università degli Studi di Padova** adheres together with about 20 other universities. To its credit, it has about 80 thousand members and provides courses for orientation to university courses or to fill training gaps, for teacher training, for continuous training aimed at different categories of professionals and advanced or master courses.
- **MOOCs in English with the Futurelearn platform** - Futurelearn is one of the best platforms in the world with around 10 million subscribers and delivers courses in English, with a high standard and quality control. FutureLearn provides a series of guidelines that define design, implementation and delivery standards that ensure the high quality of its offer. Also, on the front of the specific professional figures required and the organization of work, the indications are detailed and structured, always intending to ensure the quality of the courses published therein. The duration of the courses varies from 3 to 5 weeks, with an average of 5 hours of study per week. The contents and level of study required are comparable to the standard of the **Università degli Studi di Padova**. With direct access from Futurelearn for Campus Unipd, the entire @unipd community, staff, teachers and students can access the MOOCs of the FutureLearn platform with the single sign-on account and access the upgrade version of the courses of the participating institutions for free. Professors can then invite Unipd students to their courses and monitor their progress, for example, by using the courses as part of the teaching program.
- **Curricular MOOCs in Federica Web Learning** - Federica Web Learning is the largest Italian MOOC platform. Unlike the other platforms, curricular MOOCs are mainly published (entire university courses in MOOC version). Such a type of MOOC is beneficial for working



students or students with attendance difficulties and provides quality material in parallel with frontal teaching (i.e., blended and flipped classroom teaching). The agreement provides that teachers are assisted entirely by a project manager of the platform. The MOOCs on Federica are based on Moodle and have a structure of 9-12 Lessons, each of which has about 3-5 Units, with a video for each Unit.



Initiated by **Università di Napoli Federico II**, the MOOC platform **Federica** <https://www.federica.eu/tutti-i-mooc/> gathers few universities and technology partners around a network of excellence that encourages the sharing of research and experimentation — innovating the learning process together. In the **Federica** pool of partners, and from a methodological perspective, the **Università Degli Studi di Firenze** stands out as it is best renowned for its scientific commitment to teaching and learning methodologies, and it consistently rates high in national rankings of state universities with more than 40.000 students. The official website of **Università Degli Studi di Firenze** has a section aimed at all staff with functions related to teaching: teachers, researchers, linguistic expert collaborators, and fellows. It features the individual course for teachers, as well as all the training initiatives of the **DIDeL** Project – Didactics in eLearning, aimed at professional development in the field of technologies in education, namely:

- Support desk for the planning of eLearning teaching.
- Methodological seminars to introduce teaching supported by e-learning.
- Technical workshops on the use of the Moodle platform.
- Online self-learning course on e-learning methodologies.
- [Find more: <https://formperselearning.unifi.it/course/index.php?categoryid=9>].

Case System Case study / Best practice #3

Università di Pavia steadfastly grew in national rankings of state universities with 20.000 to 40.000 students. The **Didactic Innovation and Digital Communication Service (IDCD)** deals with developing methodologies, technologies and tools useful for increasing and innovating the quality, efficiency and effectiveness of the training processes of the **Università di Pavia** [Find more: <https://idcd.unipv.it/>].

Technology

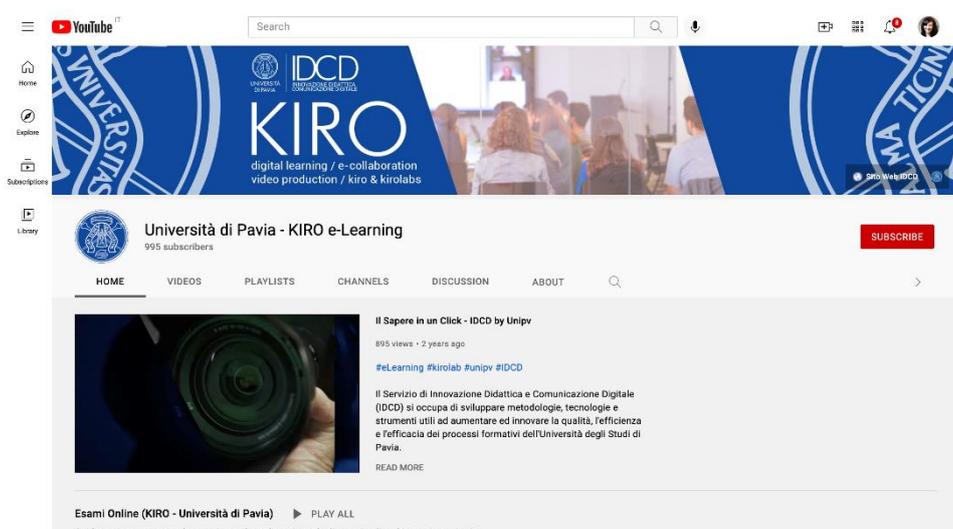
The external website lists the available tools for the staff of the **Università di Pavia** with tips and tutorials on how to use them:

- **KIRO** is a Moodle based digital environment where it is possible to share teaching materials, manage communication and find in-depth exercises, exams, verification tests and many other activities to support teaching. KIRO consists of the set of platforms of the various Departments and Structures of the **Università di Pavia**. In compliance with the ministerial provisions (AgiD1 regulations), in the second semester of 2021, the **IDCD** Service is migrating and updating the KIRO educational platforms in **Cloud AWS**. Before, the platforms resided on the internal WebFarm hosted at the Information Systems Area. Two peculiar aspects characterize this migration: only ONE platform will be created in the many departmental ones that still exist. It will reproduce the taxonomy of the Degree Courses as per Orienta (<https://orienta.unipv.it/>) under the Didactic and Student Services Area. In a second step (still to be planned), the platforms dedicated to Training, Pre and Post Graduate Exams will also pass to the Cloud. In order to facilitate user interaction, the new platform will use the same graphical interface used for KiroTesting.
- **KIROTESTING** is the University of Pavia platform that hosts online written exams (not for didactic courses, only exams) [Find more: <https://kirotesting.unipv.it/>].
- **KIROLIVE** - The Kirolive platform allows professors to deliver online, synchronous lessons and webinars with the ability to record the lessons, which will be saved on G-drive, allowing students to enjoy them later [Find more: <https://idcd.unipv.it/supporto-didattica-a-distanza/>].
- **Integrated tools**: Zoom, Meet, Skype for Business for communication, GDrive to upload materials and video recording via the Kiro platform, Audacity and Quicktime for generating and editing podcasts.

Pedagogy

The use of a **Youtube** channel is exciting and engaging as it is rich in content, and it supports teachers, students and staff in interacting with the technology in use [Find more: <https://www.youtube.com/channel/UCe5FCRFTcJitjfrKchNkQQA>]. It features **how-to tutorials** for accessing educational platforms as much as content. In pre pandemic times the **IDCD** service was already active [Find more: <https://idcd.unipv.it/presentazione2020/>].





The **IDCD** Service supported already the construction of masters and advanced courses online at the request of teachers and training institutions by creating dedicated platforms, recording video clips in the studio, or online post-production lessons held through Zoom or other videoconference software.

The **IDCD** counts **1,994,070** accesses, **2,248** active courses, **7,618** certificates issued. The basic course of General Mathematics of the Common Bachelor's Degree Course in Economics has reached **21,000** views. The service, in addition, deals with the University's *Digital Corporate Training* by providing the entire community: teachers, students, and staff with mandatory training courses such as Privacy Legislation, Protocol, Titulus Organs, Security, and many others, saving hours and sessions in presence.

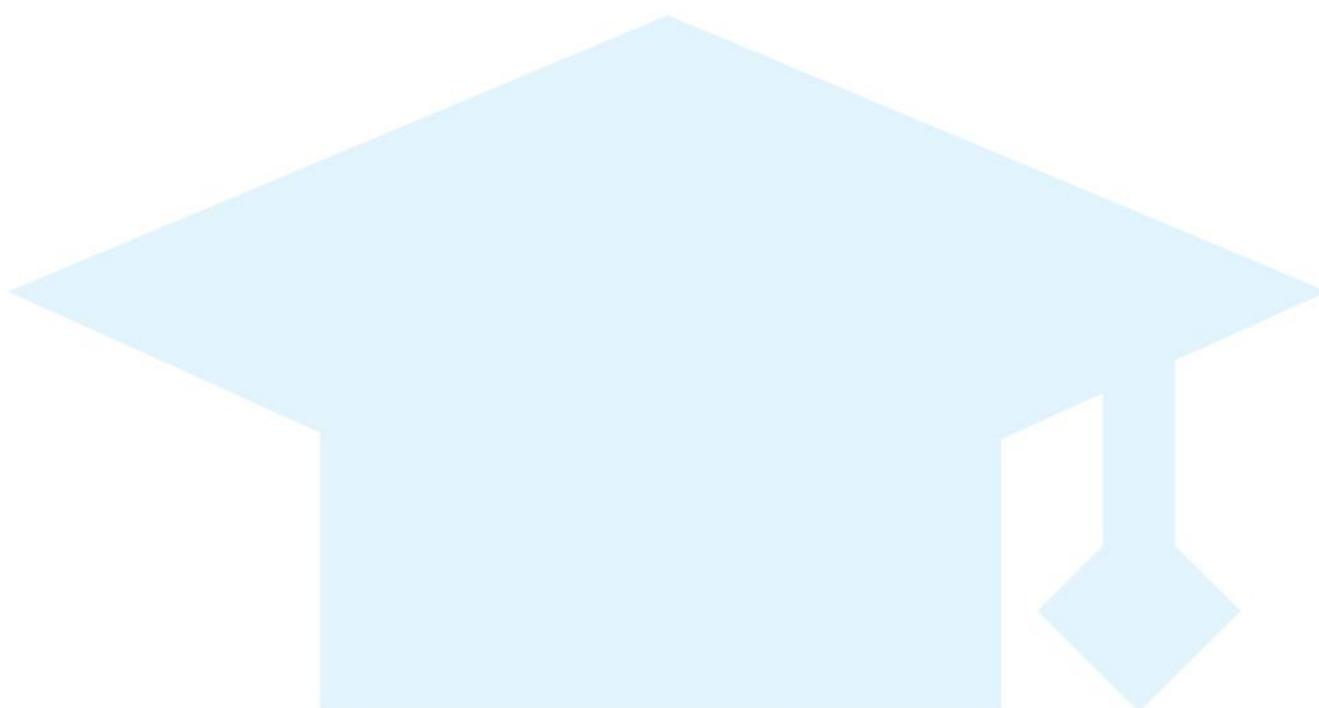
Content

The University has also chosen **MOOCs**: accepting the invitation of the **CRUI** (Conference of Rectors of Italian Universities) and adhering to the principles of the **European Digital Agenda 2020**, the **Università di Pavia** was among the first universities in Italy to provide free online courses open to everyone. The first three courses, completed between 2016 and 2017, are delivered on **iversity** <https://iversity.org/>.

Founded in 2011, with headquarters in Berlin, **iversity** has become a platform for delivering MOOCs of international importance, aimed at both the development of university courses and continuing education. Starting from 2018, the University began a collaboration with **Federica**, the e-learning created to make academic knowledge accessible online, with the free offer of the teaching materials of the individual teaching courses and a structured guide to teaching and learning resources available on the net. In addition to being available on the site, the study material is also available in podcast format, that is, usable through the latest generation of multimedia players, to consult and read the material at any time and place. Soon, the **Università di Pavia** will also open to collaborations with **Eduopen** <https://learn.eduopen.org/> a project funded by the Ministry of Education, University and Research to create a platform for the provision of MOOCs by a network of Italian universities of a set of selected partners (including **MIUR** and **CINECA**). The established network is open



to the membership of other universities and entities such as associations, and networks of scientific and cultural importance. The aim and philosophy of the project are part of the Open and Digital Education movement.



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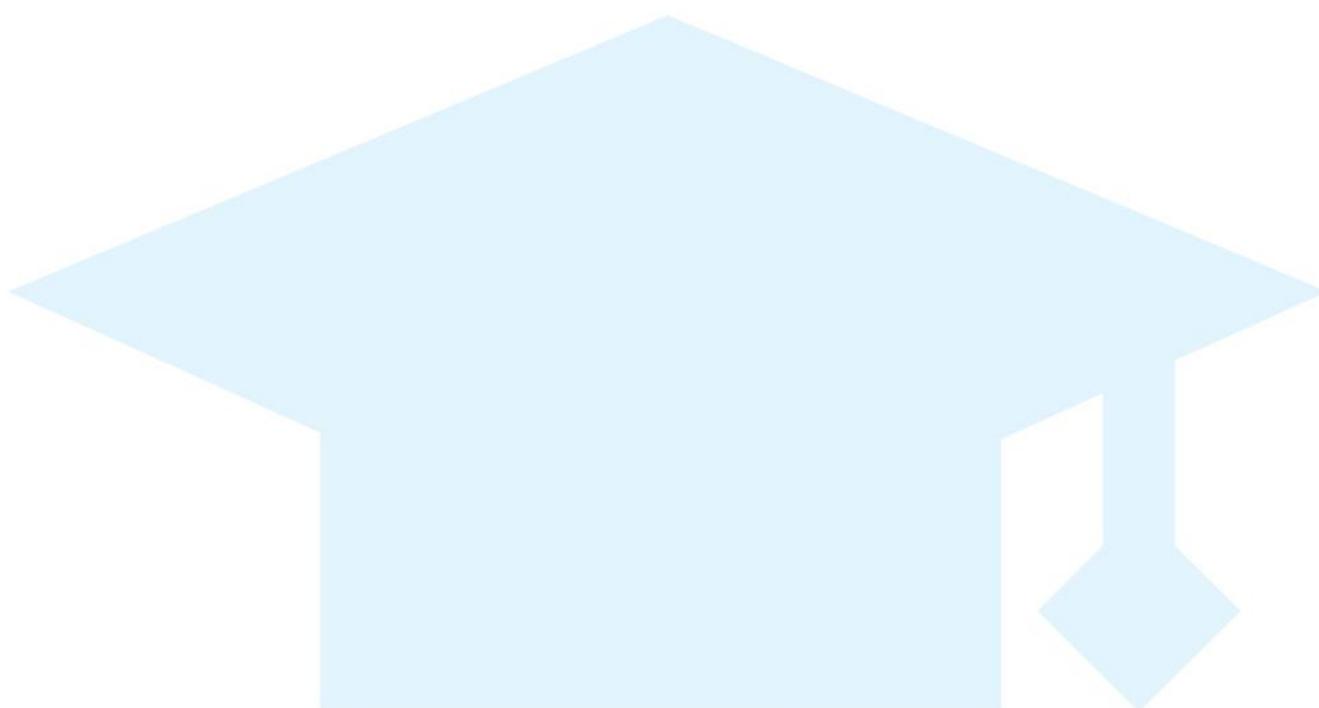
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