DIGITAL LITERACY CURRICULUM

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LIST OF ABBREVIATIONS

CEDEFOP   European Center for Development of Vocational Training

EAfA   European Alliance for Apprenticeships

EAN   European Apprentices Network

EaSI   European Programme for Employment and Social Innovation

ESF   European Social Fund

ESF+   European Social Fund +

EURES   European Employment Services

FEAD   Fund for European Aid to the most Deprived

HPC   High Performance Computing

HR   Human Resources

ICT   Information Communications Technology

ILO   International Labour Organization

IT   Information Technology

NEET   Not in Education, Employment or Training

ROI   Return of Investment

YEI   Youth European Initiative
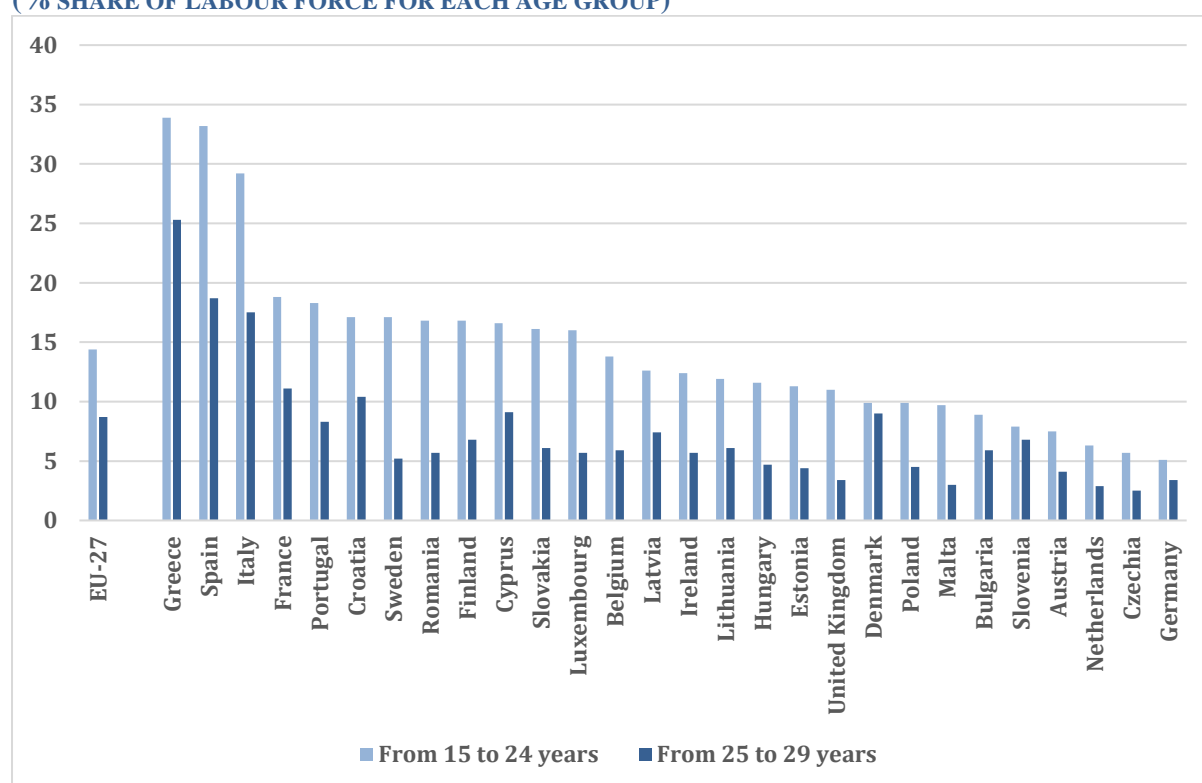
YGP   Youth Guarantee Plan

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1. Overview of unemployment among young people (18-31 y.o.) in the EU in recent years (2016 - 2021)

In 2019, the unemployment rate caped to 15.1% among young European people aged 15-24 years old and 9.1% for the 25-29 years old cohort in the EU-27's labor force[1]. The countries with the worst situation concerning the young unemployment rate for the 15-24 cohort were Greece, Spain and Italy, all Mediterranean countries. Conversely, Czechia (5.6%) and Germany (5.8%) had the lowest level and were on the front.

FIGURE 1 UNEMPLOYMENT RATE FOR YOUNG PEOPLE, BY AGE GROUP, 2019 (% SHARE OF LABOUR FORCE FOR EACH AGE GROUP)

SOURCE : *EUROSTAT[2] (YTH_EMPL_100)*

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[1] "Being young in Europe today – labour market – access and participation" [online]. Available : https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Being_young_in_Europe_today_-_labour_market_-_access_and_participation#Youth_unemployment [2022, February].
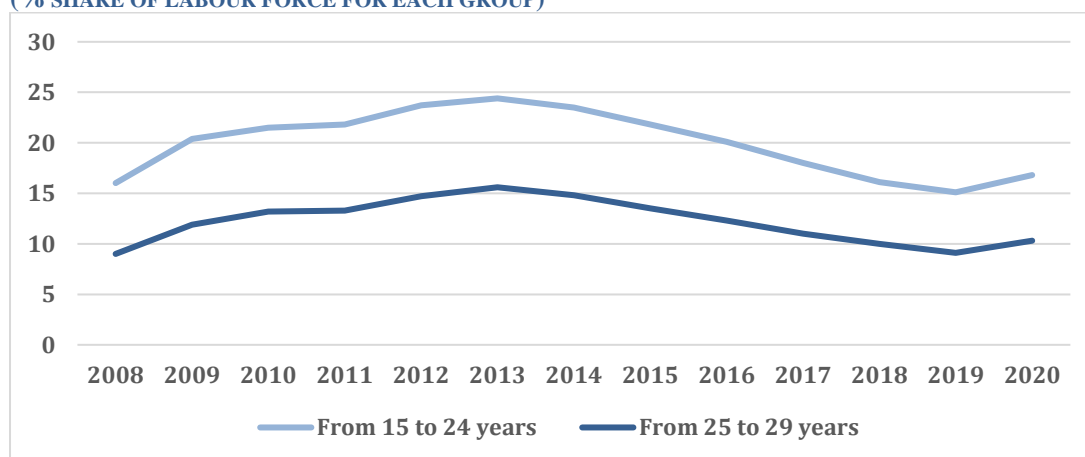
[2] " Youth unemployement rate by sex, age and country of birth" [online]. Available: https://ec.europa.eu/eurostat/databrowser/view/YTH_EMPL_100__custom_2143136/default/table?lang=en [2022, February].

Statistics of unemployment and employment rates don't consider a specific class and group of people who are not working: the people outside the labor force. To get a clear overview of vulnerability and inactivity in the European Union, it seems important to evoke it. According to the International Labor Organization definition, a person outside the labour force – called "inactive person" before – include pre-school children, school children, students, pensioners and housewives for instance that they are not working at all and not available to do it[3]. European women are more likely to be outside the labor force than man because of gender and family structures: they are compelled to care about family members and children. If men and women unemployment rates are relatively closed, an important gap can be noticed regarding the "outside the labor force" one: the cohort is three times more important than the unemployment one concerning women[4].

2. Challenges for young people in the labour market

Globally, the young people are mainly influenced by the world economic health and particularly vulnerable and hit when an economic crisis outbreaks. As explained on the Eurostat website[5] "the unemployment rates for young people increased in the aftermath of global financial and economic crisis".

FIGURE 2 UNEMPLOYMENT RATE FOR YOUNG PEOPLE, BY AGE GROUP, EU-27, 2008-2020 (% SHARE OF LABOUR FORCE FOR EACH GROUP)

SOURCE : *EUROSTAT[6] (YTH_EMPL_100)*

In Greece, the economic crisis in 2013-2014 has sturdily impacted young people and, nowadays, the country has still the worst record for youth unemployment in the entire European Union (around 44% in 2018) for people aged from 15 to 24 years old[7]. The Covid-19 pandemic seems to have the same impact. In Italy, for instance, the most important attend to confine and decrease the vulnerability of young people and involve them into the labour market was did with the Youth Guarantee Plan introduced in 2014: owing to it, millions of Italians from 15 to 29 years old were pulled out from

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[3] "Glossary: People outside the labour force" [online]. Available: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:People_outside_the_labour_force [2022, February].
[4] "Statistics on young people neither in employment nor in education or training" [online]. Available: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Statistics_on_young_people_neither_in_employment_nor_in_education_or_training (2022, February).
[5] Ibid.
[6] "Youth unemployment rate by sex, age and country of birth" [online]. Available: https://ec.europa.eu/eurostat/databrowser/view/YTH_EMPL_100__custom_2143136/default/table?lang=en [2022, February].
[7] María Antonia Sánchez-Vallejo, "How the Greek crisis has spawned a new generation of NEETS", *El País,* (2018, April).

poverty, inactivity and vulnerability to be taken into consideration. Unfortunately, it is considered that the Covid-19 has massively destroyed the effort that have been made in the last decade[8].

One of the main problem the European institutions and policies are trying to deal with, it's the mismatch between the competencies owned by the candidates and appliers and the needs from the employers sides. As defined by the International Labor Organization, the skills mismatch "is an encompassing term which refers to various types of imbalances skills offered and skills needed in the world of work. Mismatch at the individual level can manifest itself as undereducation or overeducation[9]". In 2014, for instance, in countries studied, between 10% and one-third of the employed are found to be overeducated and approximatively 20% or undereducated. The result is the following: a total mismatch of between 30% and 50% of the employed in European countries[10]. To explain differently, a high unemployment rate gets along with a vacancy one. In 2016, 40% of European employers faced issues to find people with the requested skills while a large amount of people work in jobs that do not comply with their aptitudes[11]. The skill mismatch trend relies on technological and organizational innovations, demographic changes and changes in the patterns of consumption. New sectors; jobs and goods emerge while others been vanished[12]. Regarding the context – such as the obligation of decarbonise uropean economy and the development of digital economy and practices among European citizens – the following decades will transform the economy, occupations and activities rapidly. Consequently, the European countries and their population will have to adapt themselves and reorganize their way to work. The European Commission has started to work on this specific topic and developed an European Skills Agenda to help individuals and businesses to develop their skills and practices toward sustainable competitiveness, social fairness and resilience[13].

As explained in a European Commission factsheet, "more than 50% of the potential female workforce (aged 25-49) in 2016 is inactive or incapacited adults in Cyprus, Ireland, Spain, Estonia, Malta[14]". Consequently, and regarding the gender, they are several challenges that idle women integration into the European labor market[15]. Firstly, social conventions, pressures or inequalities, tend to reduce women to a family role in order to let men occupy the workplaces. Indeed - official data from Eurostat and massive gap between men and women in the NEET (acronym for "Not in Education, Employment or Training) rates prove it - women are more concerned to care about illness, inactive relatives (more generally dependent family members) or children. Secondly, when women have the possibility to work, they are more concerned by part-time work than men are. Careers advice are also important and reinforce gender segregation: women rapidly face a "glass ceiling" when they try to occupy occupations with high pay rises or responsibilities. Lastly, labor market issues: employers preferring hire young men than women and these latter has also more problems and less easiness to get back into the labor market after a childbirth.

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[8] "The NEET emergency: too many young Italians are still not in education or employment" [online]. Available: https://www.morningfuture.com/en/2020/09/18/neet-emergency-italy/ [2022, February].

[9] Theo Sparreboom, Alexander Tarvid, David Hunter and Mustafa Ozel, "Skills mismatch in Europe: statistics brief" [online]. Available: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms_315623.pdf [2014], 6.

[10] Ibid., 8.

[11] "Tackling youth unemployment and the skills gap" [online]. Available: https://europeanmovement.eu/tackling-youth-unemployment-and-the-skills-gap/#_ftn3 [2022, February).

[12] Giorgio Brunello and Patricia Wruuck, "Skill Shortages and Skill Mismatch in Europe: A Review of the Literature", *Journal of Economic Surveys*, vol. 35 (4), (2019, May), 9.

[13] "European Skills Agenda" [online]. Available: https://ec.europa.eu/social/main.jsp?catId=1223&langId=en [2022, February].

[14] "European Semester Thematic Factsheet. Women in the labour market" [online]. Available: https://ec.europa.eu/info/sites/default/files/european-semester_thematic-factsheet_labour-force-participation-women_en_0.pdf [2017], 3.

[15] " Statistics on young people neither in employment nor in education or training" [online]. Available: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Statistics_on_young_people_neither_in_employment_nor_in_education_or_training#NEETs:_analysis_by_sex_and_age [2022, February].

3. The EU supporting programs for young people in order to promote labour activities

The notion of NEET emerged because of the 2008-2013 Great Recession. This term is used to refer to the situation of many young persons, aged between 15 and 29 y.o., in Europe[16]. Consequently, the European institutions have tried to tackle this problem of inactivity and vulnerability among young people. The first time the word "NEET" appeared in the policy discussions at the EU level was in the Europe 2010 flagship initiative "Youth on the move".

After different negotiations between European institutions and Member states – which took place essentially in 2012 – it has been decided to implement a **Youth Guarantee** in all Member States in 2013. The main purpose of this initiative was to ensure that all young people "under the age of 25 years receive a good quality offer of employment, continued education, apprenticeship or traineeship within a period of four months of becoming unemployed or leaving formal education or becoming unemployed[17]". At the beginning of 2013, the European Council agreed to create the **Youth European Initiative** (YEI) to support the implementation of the Youth Guarantee for the 2014-2016 period. The funds allocated caped to € 6.4 billion and were addressed to European regions where the rate of unemployment attained more than 25% in 2012. Also, Member States had to draft a national plan in order to establish a guideline in implementing the Youth Guarantee funds (define the involved institutions, the objectives to reach, the timeline etc.)[18]. Considering the positive results of the Youth Guarantee Initiative, the Commission proposed in September 2016 to increase the budget of this former by €2.2 billion for the period 2017-2020. The initial budget moved from €6.4 billion to €8.9 billion after three increases in a row in 2017, 2019 and 2020[19].

From 2014 to 2020, the Youth Guarantee consequences were mainly positives. Many cities used it to experiment new measures and also strengthen pre-exiting ones. Cities tailored measured to fight youth inactivity, reinforced the integrated approach among employment, education and social services, improve the cooperation between the different "social tiers" and stakeholders[20] (education providers, employment advisers, employers, NGO's, public institutions etc.). The scope of the project was large and the steps taken likewise. For instance, up to 350 young people in Miechow (Poland) have participated in the project before 2014. The participants have had appointments with their school coordinator and an employment advisor. In Tuscany, an overview of NEETs in the region has been established, including an analysis of their situation and appropriate methods for approaching them. In Vilnius, a model has been created to implement a "matching service" between young jobseekers and local companies. In Aragon, 10 companies from the logistic and metal sectors have been involved in providing trial 6 months apprenticeships. There is a bunch of other examples in the European Commission's website[21].For the period 2021-2027, the YEI has been integrated into the European **Social Fund Plus** (ESF+) which replace the previous ESF. As described, the ESF was "the European Union's main instrument for investing in people[22]". Nowadays, the ESF+ relies on four funding instruments that were separated before (2014-2020): the European Social Fund, the Fund for European Aid to the most Deprived (FEAD), the Youth Employment Initiative and the European Programme for Employment and Social Innovation (EaSI). The ESF+ is essentially managed by the European Member

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[16] "NEETs" [online]. Available: https://www.eurofound.europa.eu/topic/neets [2022, February].

[17] Council of the European Union, "Council recommendation of 22 April 2013 on establishing a Youth Guarantee", *Official Journal of the European Union*, 2013. See paragraph (18).

[18] Verónica Escudero and Elva López Mourelo, "The European Youth Guarantee: A systematic review of its implementation across countries", *Travail et Emploi*, vol. 153, (2017), 3-4.

[19] "Youth Employment Initiative" [online]. Available: https://ec.europa.eu/social/main.jsp?catId=1176 [2022, February].

[20] "Reinforcing Youth Guarantee: Lessons learnt by cities in implementing the Youth Guarantee 2014-2020" [online]. Available: https://eurocities.eu/latest/reinforcing-youth-guarantee-lessons-learnt-by-cities-in-implementing-the-youth-guarantee-2014-2020/ [2022, February].

[21] "Youth Guarantee progress and achievement of 18 pilot projects" [online]. Available: https://ec.europa.eu/commission/presscorner/detail/es/MEMO_14_521 [2022, February].

[22] "European Social Fund Plus (ESF+)" [online]. Available: https://ec.europa.eu/social/main.jsp?catId=325 [2021, December].

States and the European Commission only plays a supervisory role. For the period 2021-2027, the total budget of the ESF+ is slightly over €99 billion.

Presented as a "bridge to jobs for the next generation", the Commission has launched the **Youth Employment Support**[23] in 2020. This program relies on four main elements. Firstly, the Youth Employment Support reinforces the Youth Guarantee in order to reach out the most vulnerable people among the 15-29 aged in focusing on any forms of discrimination and stand against racial practices toward European minorities. Secondly, the YES is about to improve the vocational education and training system more modern. The main purpose is to prepare young people to dive into their first jobs and help them to develop opportunities. Thirdly, a new impetus for apprenticeships will be given in both sides: from employers and young people. Social partners, SMEs and national stakeholders will be promoted to develop apprenticeship offers. Finally, further measures to support youth employment will served to improve capacity building, young entrepreneur networks and inter-company centers. Regarding apprenticeships and the possibility for young people to get involved for a short time in a company, the European Commission has enforced a set of tools and projects. The **European Alliance for Apprenticeships**[24] (EAfA) assemble stakeholders and members of European governments to implement voluntary pledges, national commitments and projects. A new EAfA has emerged in 2020 and focused more on transition and climate-neutral sectors. EAfA members can reach the Apprenticeship Support Services to check online resources and networking opportunities. The **European Apprentices Network**[25] (EAN) was established in 2017. It's a network or apprentices at European level. The EAN's main purpose implemented a network of discussions to exchange about good practices, experiences and provide advice for young people on apprenticeships, served as an informal consultative body for the European Commission and more generally, facilitated contact between all persons concerned by such activities. The European Commission has also took into consideration traineeships, considered as a "limited period of work practice, whether paid or not, which included a learning and/or a training component[26]". From employers, this practice permits to meet up young people and sometimes include them in the company for a long time thanks to long-term contract. Internationally, the European Youth Portal is an internet platform to get information about free positions and traineeships in EU and international organizations. The European Commission has its own website to apply for a traineeship position. Linked to the Erasmus + program, the Digital Opportunity Traineeships initiative was launched in 2018 and directly target youth unemployment in providing digital formation to improve digital competencies. This initiative gives students a chance to find occupations in the tech sector. Finally, the EURES portal conceived as a "targeted mobility scheme" lists traineeships for young people in EU countries, Liechtenstein, Norway or Iceland.

4. Most required non digital skills for young employees (list with description)

European society have always been characterized by a plurality of nationalities and languages, notably also EU institutions' official languages are several, Brussels, the European Capital has three official languages. From a more global point of view the internet has also made it easier for companies to expand internationally, therefore with enhanced cooperation between countries and in a globalized world, in the labour market languages have become a fundamental asset in the job market. Given this situation in Europe is highly common to require to job's candidates to speak another language, overall, the knowledge of languages is a really useful asset to have on the Curriculum.

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[23] Marta Wieczorek (2014), "Commission launches Youth Employment Support: a bridge to jobs for the next generation" [online]. Available: https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1193 [2022, February].
[24] "European Alliance for Apprenticeships" [online]. Available: https://ec.europa.eu/social/main.jsp?catId=1147&langId=en [2022, February].
[25] "European Apprentices Network. By apprentices, for apprentices" [online]. Available: https://apprenticesnetwork.eu/ (2022, February).
[26] "Traineeships" [online]. Available: https://ec.europa.eu/social/main.jsp?catId=1045&langId=en (2022, February).

According to studies from the European Commission speaking another language or being bilingual has many advantages[27]. It allows the candidates to stand out in a very competitive job market, it can also guarantee a higher salary and in general more job opportunities[28]. A study suggests that speaking a second language can add between 11% and 35% to your salary, depending on the language and the country you are based in. For example, there are more speakers of Spanish as a second language in France than there are in Latvia, so the demand for this language would differ between these two countries[29].

In Europe English is, by far, the most popular foreign language to be studied and in general European countries show a higher rate of students foreign languages compared to anglophone countries. They also tend to learn more languages throughout their education due to national mandates[30]. Nearly 98% of pupils learned English in lower secondary education in 2017. English was followed by French (33.4%), German (23.3%) and Spanish (16.9%)[31]. However, in some Member States foreign languages other than English were also commonly studied. For example, more than 50% studied French in lower secondary general education in Ireland, Italy, Cyprus, the Netherlands, Portugal and Romania. German was studied by more than a half of pupils in Denmark and Poland, while Spanish was taken by slightly more than half of pupils in this education level in France[32]. Moreover, the study of languages is also essential for international mobility and integration, and it reflects cultural competencies.

Another set of skills that are not bound to the digital world but nonetheless important in the job market nowadays is the vast set of skills referred to as soft skills. Soft skills are defined as "the interpersonal, human, people, or behavioral skills needed to apply technical skills and knowledge in the workplace" these pertain more to personality, attitude, and behaviour rather than to formal or technical knowledge, therefore they are largely intangible, not associated with a deliverable or a real output, and they are employed without the use of tools or templates[33].
Soft skills have become increasingly important in job market or in job offers the more asked for are:
- Communication: professionals at all levels need to develop the way they communicate in a blended setting, both in person and remotely.
- Adaptability: A person's adaptability can be developed over the course of a career as they overcome different challenges.
- Problem-Solving: Problem-solving usually requires lateral thinking, as well as an innovative approach to challenging scenarios.
- Proactivity: thinking ahead of the problem
- Creativity: is consistently one of the most in-demand skills that a candidate or employee can show. It must be a crucial skill, given that 94% of hiring managers agree that it is important to factor in creativity when considering a candidate[34].

According to Forbes and Michael Page, other often required soft skills in job offers are: Managing and Motivating Staff Remotely, Resilience, Collaboration, Leadership, Contingency Planning, Prioritization, Emotional Intelligence, Empathy, Innovation, Project Management, Intrapreneurship,

[27] European Commission, Five reasons why learning a language can boost your employability
https://ec.europa.eu/eures/public/five-reasons-why-learning-language-can-boost-your-employability-2021-06-22_en
[28] Ibidem
[29] Liwiński, J. The wage premium from foreign language skills. *Empirica* 46, 691–711 (2019). https://doi.org/10.1007/s10663-019-09459-0
https://link.springer.com/article/10.1007/s10663-019-09459-0
[30] Kat Devlin, "Learning a foreign language a 'must' in Europe, not so in America", Pew Research Center, 13 July 2015.
https://www.pewresearch.org/fact-tank/2015/07/13/learning-a-foreign-language-a-must-in-europe-not-so-in-america/
[31] Eurostat, What languages are studied the most in the EU?, 25 September 2019.
https://ec.europa.eu/eurostat/web/products-eurostat-news/-/edn-20190925-1#:~:text=English%20is%2C%20by%20far%2C%20the,%25
[32] Ibidem
[33] Hendarman, A.F., Cantner, U. Soft skills, hard skills, and individual innovativeness. *Eurasian Bus Rev* 8, 139–169 (2018). https://doi.org/10.1007/s40821-017-0076-6
[34] Ashley Stahl, 5 Skills Job-Seekers Must Learn To Thrive In 2021, Forbes, 18 January 2021. https://www.forbes.com/sites/ashleystahl/2021/01/18/5-skills-job-seekers-must-learn-to-thrive-in-2021/?sh=ab8c67c781bc

Attention to Detail, Fast Learning, Commercial Acumen (Including Demonstrating ROI), Analytical Skills, Presentation Skills[35].

It could be possible also to take into account among the non-digital skills required for a job all the set of hard skills, which are generally a set of skills related to technical aspects to do some tasks in the job and frequently take account of the acquisition of knowledge. These are subject-based skills and they normally varies from one field to another and represent skills special to a certain technology[36].

5. Most required digital skills in different sectors

According to CEDEFOP, the European Center for Development of Vocational Training, it is possible to divide the most required Digital Skills into five main Competence Areas.
The first main group is related to Information and Data Literacy and is divided into three main areas which are: Browsing, searching, filtering data, information and digital content, Evaluating data, information and digital content, Managing data, information and digital content[37]. The process of searching data can be divided into several steps of proficiency that go from basic identification to explanation and understanding of the processes to application and finally proficiency and solutions' creation in case of problems. In evaluating data, information and digital content the process goes from the detection of data and its analysis to critically assess the credibility and reliability of sources of data to finally create solutions to solve complex problems with many interacting factors that are related to analysing and evaluating credible and reliable sources of data. As far as it concerns managing data and digital content the knowledge foundation is represented by organise, store and retrieve data, information and content in digital environments, its intermediate level by manipulating such information and content and finally to create solutions to solve problems with many interacting factors that are related to managing data, information, and content for their organization, storage and retrieval in a structured digital environment.

The second main group of digital skills, Communication and Collaboration, is represented by areas which are: interacting via Information Communication Technology (ICT), sharing via ICT, engaging in citizenship via ICT, Netiquette, Managing digital identity[38]. This area is focused on interaction through internet platforms, using the most appropriate communication means for a given context and adapting to a variety of digital technologies for the most appropriate interaction. Another side of the skill consist in knowing how to behave online applying different cultural and generational diversity aspects in digital environments and to learn how to use digital identities.

The third digital skill according to collected data is the one related to digital content creation and programming. These skills are more technical and related to knowledge and they range from creating support videos to drafting complex presentations and editing content in different formats. It comprises ways to modify, refine, improve and integrate specific new items of content and information to create new and original ones. In this field of digital expertise, it is also useful to have some knowledge on copyright, on what is allowed to be used and where to find it. Finally, as shown by several job surveys, expertise in programming and using IT programs has become more and more requested. Programs like R, Python and Ruby are at the core of many jobs related to engineering and data analysis [39].

[35] Top 21 Skills for 2021, Michael Page. https://www.michaelpage.com/advice/career-advice/growing-your-career/top-21-skills-2021

[36] Hendarman, A.F., Cantner, U. Soft skills, hard skills, and individual innovativeness. *Eurasian Bus Rev* 8, 139–169 (2018). https://doi.org/10.1007/s40821-017-0076-6

[37] Carretero, Stephanie, Riina Vuorikari, and Yves Punie. "DigComp 2.1: The digital competence framework for citizens." (2017).

[38] Ibidem

[39] Ibidem

Another digital skill, which has become exceptionally relevant in these last years is the one bound to security. The fourth main area of digital skills is in fact related to protecting devices, protecting personal data and privacy, protecting health and well-being and protecting the environment. Protection of devices, data and accounts as well as information is particularly necessary, especially for corporates but also for average workers. This set of digital skills allows adapting the most appropriate ways to protect from dangers in digital environments.

Finally, the last set of digital skills is the one regarding problem-solving, specifically solving technical problems, identifying needs and technological responses, creatively using digital technologies and identifying digital competence gaps. These skills comprehend the basic ability to identify an IT problem and apply different solutions to them as well as the ability to use a digital learning platform[40].

According to a 2017 European Commission Survey[41] most jobs require basic digital skills which include being able to communicate via email or social media, to create and edit documents digital documents and to search for information, or to protect personal information online. Basic digital skills are required in 98% of workplaces and the same skills are needed for 90% of professionals (e.g. engineers, doctors and nurses, teachers, accountants, software developers, lawyers and journalists), technicians, clerical workers or skilled agricultural workers, whereas 80% of workplaces require basic digital skills for sales workers. Workplaces also often require basic digital skills for building workers (50% of workplaces), plant machine operators (34%) and even employees in elementary occupations (27%). However, there are still some workplaces that do not consider digital skills to be important for some occupations e.g. craft workers, waiters and cooks.

6. Online training accessible for young people

According to the European Digital Skills Survey 15 % of workplaces in the EU had digital skill gaps in their workforce. The gaps related to basic skills were more concentrated among technicians (22 %), elementary occupations (21 %), sales workers (20 %) and clerical workers (17 %), illustrating the importance of basic digital skills for a wide range of occupations[42]. The level of digital skills in the last decade increased gradually. However, it became necessary to improve digital skills in all ages as it is shown that unemployed people have lower digital skills.
Especially in the job market and particularly for whom enters the job market the knowledge of digital skills is mandatory, therefore, in order to tackle this issue, there are available several online and often free courses that young people can access.
As before mentioned, the European Union is strongly focusing its policies towards enhancing digital skills, especially in younger job seekers and its policies go back to 2009 and have been growing since then. Especially since 2016 key actions of the New Skills Agenda targeting basic digital skills were the Up-Skilling Pathways initiative, and the Digital Skills and Jobs Coalition. In particular, the Digital Skills and Job Coalition aims to tackle the lack of digital skills in four areas: digital skills for all, digital skills for the labour force, digital skills for ICT professionals, and digital skills in education. Its platform[43] offers options both for people who desire to strengthen their digital skills and for enterprises and associations. The platform is divided into six main fields which are Artificial Intelligence, Programming and Development, Cybersecurity, Cloud and Data, HPC and Quantum and Basic Digital Skills. Other platforms, for example, DigitalSkillUp Europe[44] , offer basic courses on fields ranging from cybersecurity to Artificial Intelligence. The courses are free and divided into macro section which are: Internet of Things, Augmented Reality/Virtual Reality, Cybersecurity, Robotics, Blockchain and Artificial Intelligence.

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[40] Ibidem
[41] ICT for work: Digital skills in the workplace, European Commission, https://digital-strategy.ec.europa.eu/en/news/new-report-shows-digital-skills-are-required-all-types-jobs
[42] EU actions to address loss digital skills, European Court of Auditors, Review n. 02, 2021.
[43] https://digital-skills-jobs.europa.eu/en
[44] https://www.digitalskillup.eu/catalog/#search

These types of courses are also particularly common on popular education platforms like Coursera[45] and Udemy[46]. For instance among the Most Required Digital Skills Courses on Coursera there is a plethora of courses offered by universities and companies such as Google, its content varies from specific courses such as "Digital Technologies and the Future of Manufacturing[47]" or "Digital Fashion Innovation[48]" to more beginner level like "Digital Marketing Strategy and Planning[49]" or "Digital Transformation Using AI/ML with Google Cloud[50]". The platform Udemy instead appears more focused on digital products and strategies with shorter courses like "Digital Food Marketing"[51], "Visual Tech Retail"[52] and "Create and Sell a Digital Product"[53], however there are also broader courses for beginners that aim to explain the present situation of the digital world while forecasting trends like "Digital Transformation and Industry"[54].

7. Future most required skills (up to 20 years ahead), brief overview

The changing economy and the advancing of technologies bring with them the question of what will be the skills required in future jobs. The major factor of change in the job market will probably be the impact of AI and robotics that will drastically change some jobs and make obsolete others, especially professionals and technicians in the rapidly changing ICT, health, electronics and professional and scientific services sectors will probably see more changes compared to profiles which are less bound to technologies in the workplace[55]. For instance, according to EU forecasts the request of specific skills in some areas is going to remain stable, for instance in the sector of personal care, food preparation whereas the field of engineering and in general all the job related to offices and content creation will see some changes in the required skills.

According to the World Economic Forum discussions[56] 50% of all employees will need reskilling by 2025 in particular will have to be able to become more resilient and flexible and it will be important to develop proactivity and creativity and a problem-solving attitude. All these soft skills can be applied also to digital skills, in fact soft skills necessary in the workplace are encouraged to be associated with digital skills like technology use and design, monitoring and control and data analysis and interpretation. Reskilling has been accelerated with the pandemic and above 40% of workers will need to learn new skills in the future, training will be provided both from the intern and from online platforms and it will take up to five months for more complex skills like programming[57].

Digital skills are a top priority in the job market and their importance has increased drastically, however it is important to highlight that even though all digital skills are pivotal some of them are more valuable than others and in addition not all digital skills will be equally important in the future. There are occupations that are currently not digitally intensive but are expected to grow in the next 10-15 years, as varied as teachers and chefs[58]. According to surveys, certain digital skills are much more prominent in occupations with a low probability of growth, in fact the analysis shows that skills related to using

[45] https://www.coursera.org/courses?query=digital
[46] https://www.udemy.com/topic/digital-product/
[47] https://www.coursera.org/specializations/digital-technologies-future-of-manufacturing
[48] https://www.coursera.org/specializations/digitalfashioninnovation
[49] https://www.coursera.org/specializations/digital-marketing-strategy-planning
[50] https://www.coursera.org/specializations/digital-transformation-using-ai-ml-with-google-cloud
[51] https://www.udemy.com/course/digital-food-marketing-corso-per-food-maker-intraprendenti/
[52] https://www.udemy.com/course/visual-tech-retail/
[53] https://www.udemy.com/course/concept-to-cash-publish-your-own-successful-digital-product/
[54] https://www.udemy.com/course/digital-transformation-masterclass/
[55]CEDEFOP, "What are the skills of the future", https://www.cedefop.europa.eu/en/blog-articles/what-are-skills-future
[56] Kate Withing, These are the top 10 job skills of tomorrow – and how long it takes to learn them, World Economic Forum, 21 October 2020.
https://www.weforum.org/agenda/2020/10/top-10-work-skills-of-tomorrow-how-long-it-takes-to-learn-them/
[57] *Ibidem*
[58] Jyldyz Djumalieva and Cath Sleeman, Which digital skill do you really need?, NESTA. https://media.nesta.org.uk/documents/Which_digital_skills_do_you_really_need.pdf

software for administrative purposes (e.g. payroll, accounting, supply chain, sales, etc.) are more prevalent in occupations that are predicted to decline, on the other hand skills related to programs for animation, engineering, education and programming are instead predicted to grow. The demand for those digital skills which involve non-routine tasks, problem-solving and creation of digital content (e.g. graphic and engineering designs, software products/services, analytical outputs, etc.) is positively correlated with occupations that have brighter outlooks[59]. Furthermore, also roles which are typically well paid, for instance in the sector of HR, supply chain management and procurement are likely to shrink, and this will have an effect also on digital skills typical of these roles.

Another perspective on the future of digital skills and in general the future of jobs in the next 20 years or so is offered by the emergence of Green jobs. After the European Green Deal job growth is expected in greening sectors, such as electricity and water supply, waste management and construction, while a decline will accelerate in mining and quarrying[60]. Naturally, this will have consequences in many sectors including services. The green transition drives skills and training needs in all sectors and the objectives of the Green Deal do not rely only on high-skilled workers. In Addition, the employment fall set in motion by the shift towards renewables is more than four times higher in the coke and refined petroleum sector and almost double in the gas, steam, and air-conditioning sector. Employment in the electricity sector is forecast to increase by 197 000 jobs by the end of the decade[61]. The growth in these fields will naturally increment the relevance of digital skills bound to the application of programming, engineering and data analysis on areas such as biology, renewable energies and engineering.

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[59] *Ibidem*

[60] Cedefop (2022). Championing the skills revolution. *Cedefop briefing note*, January 2022. https://www.cedefop.europa.eu/en/publications/9164

[61] Cedefop, *The green employment and skills transformation : insights from a European Green Deal skills forecast scenario*, 2022, https://data.europa.eu/doi/10.2801/112540

REFERENCES

- "Being Young in Europe- labour market - access and participation", *European Commission*, 2020. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Being_young_in_Europe_today_-_labour_market_-_access_and_participation#Youth_unemployment
- "Employment Social Affairs and Inclusion - Traineeships", *European Commission*, date unknown. https://ec.europa.eu/social/main.jsp?catId=1045&langId=en
- "European Skills Agenda", *European Commission*, date unknown. https://ec.europa.eu/social/main.jsp?catId=1223&langId=en
- "European Social Fund Plus (ESF+)", *European Commission*, date unknown. https://ec.europa.eu/social/main.jsp?catId=325
- "Five reasons why learning a language can boost your employability", *European Commission*, 2021. https://ec.europa.eu/eures/public/five-reasons-why-learning-language-can-boost-your-employability-2021-06-22_en
- "NEETs", *Eurofound*, 2021. https://www.eurofound.europa.eu/topic/neets
- "Statistics on young people neither in employment nor in education or training", *European Commission*, 2021. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Statistics_on_young_people_neither_in_employment_nor_in_education_or_training#NEETs:_analysis_by_sex_and_age
- "Tackling youth unemployment and the skills gap", *European Movement*, date unknown. https://europeanmovement.eu/tackling-youth-unemployment-and-the-skills-gap/#_ftn3
- "What languages are studied the most in the EU?", *European Commission*, 2019. https://ec.europa.eu/eurostat/web/products-eurostat-news/-/edn-20190925-1#:~:text=English%20is%2C%20by%20far%2C%20the,%25)%20and%20Spanish%20(16.9%25).
- "Youth Employment Initiative", *European Commission*, date unknown. https://ec.europa.eu/social/main.jsp?catId=1176
- "Youth Guarantee: progress and achievements of 18 pilot projects", *European Commission*, 2014. https://ec.europa.eu/commission/presscorner/detail/es/MEMO_14_521
- Brunello, G., and Wruuck, P., "Skill shortages and skill mismatch in Europe: A review of the literature", *IZA – Institute of Labor Economics*, Bonn, 2019.
- Carretero, S., Vuorikari, R., and Punie, Y., "DigComp 2.1: The digital competence framework for citizens. With eight proficiency levels and examples of use", *European Commission*, EUR 28558 EN, Publications Office of the European Union, Luxembourg, 2017.
- Couti P., "Reinforcing Youth Guarantee: Lessons learnt by cities in implementing the Youth Guarantee 2014-2020", *Eurocities*, 2020. https://eurocities.eu/latest/reinforcing-youth-guarantee-lessons-learnt-by-cities-in-implementing-the-youth-guarantee-2014-2020/
- Council of the European Union, "Council recommendation of 22 April 2013 on establishing a Youth Guarantee", *Official Journal of the European Union*, 2013.
- Devlin, K., "Learning a foreign language a 'must' in Europe, not so in America", *Pew Research Center*, 13 July 2015, https://www.pewresearch.org/fact-tank/2015/07/13/learning-a-foreign-language-a-must-in-europe-not-so-in-america/
- DIGIBYTE, "ICT for work: Digital skills in the workplace", *European Commission*, 2017. https://digital-strategy.ec.europa.eu/en/news/new-report-shows-digital-skills-are-required-all-types-jobs
- Djumalieva, J., and Sleeman, C, "Which digital skill do you really need? Exploring employer demand for digitial skills and occupation growth prospects", *NESTA – Innovation policy*, 2018. https://media.nesta.org.uk/documents/Which_digital_skills_do_you_really_need.pdf
- Escudero, V., and López Mourelo, E., "The European Youth Guarantee: A systematic review of its implementation across countries", *International Labour Office – Research Department*, working paper no. 21, 2017.

- European Commission, "European semesyer thematic factsheet. Women in the labour market", 2017.
- European Court of Auditors, "EU actions to address los digital skills", Review n. 02, 2021.
- Hendarman, A.F., Cantner, U. "Soft skills, hard skills, and individual innovativeness", *Eurasian Bus Rev* 8, 2018, p. 136-169. https://doi.org/10.1007/s40821-017-0076-6 https://ec.europa.eu/eurostat/web/products-eurostat-news/-/edn-20190925-1#:~:text=English%20is%2C%20by%20far%2C%20the,%25.
- Liwiński, J., "The wage premium from foreign language skills", *Empirica,* n° 46, 2019, p. 691-711. https://doi.org/10.1007/s10663-019-09459-0
- Millbright S., Wieczorek M., "Commission launches Youth Employment Support: a bridge to jobs for the next generation", *European Commission*, 2020. https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1193
- Page, M., "Top 21 Skills for 2021", *Michael Page*, (date unknown), https://www.michaelpage.com/advice/career-advice/growing-your-career/top-21-skills-2021.
- Pouliakas, K., "What are the skills of the future", *CEDEFOP*, 2016. https://www.cedefop.europa.eu/en/blog-articles/what-are-skills-future.
- Redaction, "The NEET emergency: too many young Italians are still not in education or employment", *Morning Future*, 2020. https://www.morningfuture.com/en/2020/09/18/neet-emergency-italy/
- Sánchez-Vallejo, M.A., "How the Greek crisis has spawned a new generation of NEETS", *El País,* 2018.
- Sparreboom, T., and Tarvid, A., "Skills Mismatch in Europe: statistics brief." *International Labour Office*, Geneva, 2014.
- Stahl, A., "5 Skills Job-Seekers Must Learn To Thrive In 2021", *Forbes*, 2021.
- Withing, K., "These are the top 10 job skills of tomorrow – and how long it takes to learn them", *World Economic Forum*, 2020. https://www.weforum.org/agenda/2020/10/top-10-work-skills-of-tomorrow-how-long-it-takes-to-learn-them/