
Digital skills in the EU labour market



IN-DEPTH ANALYSIS

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This publication aims to provide a general overview of digital (IT-related) skills, their subgroups, and the digital literacy of persons in the EU. Particular emphasis is given to the digital skills of vulnerable social groups and the state of the digital skills offered on the labour market. This presentation is followed by an overview of EU-level actions undertaken in this domain and an outline of possible solutions and best practices at Member State level aimed at improving the current situation.

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EXECUTIVE SUMMARY

Information and communications technologies (ICT) play an increasingly important role in our professional and private lives, and digital competence is of growing importance for every individual. In the future, nearly all jobs will require digital skills.

However, European Commission figures show that two fifths of the EU workforce have little or no digital skills. In addition, despite continued high levels of unemployment, there could be 756 000 unfilled jobs in the European ICT sector by 2020.

This situation is even more challenging in certain geographical areas (such as south-eastern Europe), among socially vulnerable groups (in particular, the unemployed and the disabled) and the elderly. Despite favourable developments in the digital literacy of citizens, the digital gap needs to be narrowed further.

Digitalisation has several impacts on the labour market. On the one hand, new business models, products and machines create new jobs, while on the other hand, automation contributes to the elimination of jobs or their relocation to countries with lower labour costs. To remedy this situation, developing the digital skills of the EU workforce is essential.

Reducing the mismatch between the skills available and those demanded for the digital transformation of the economy has been a key EU-level priority over the past decade. For instance, a 2008 communication entitled 'New skills for new jobs' emphasised the increasing need for digital skills in the shift to a low-carbon economy. Furthermore, the 2010 Digital Agenda recognised the need for indicators to measure the extent of digital competence in the EU. This was implemented through the development of the Digital Competence Framework ('Dig Comp'), enabling citizens to evaluate their digital skills, and the Digital Economy and Society Index ('DESI'), summarising relevant indicators on Europe's digital performance and tracking the evolution of EU Member States in the area of digital competitiveness.

The Grand Coalition for Digital Jobs, a multi-stakeholder partnership created in 2013, aims to facilitate collaboration between business and education providers, and between public and private actors, and has already created 60 functional pledges in 13 countries.

The 2016 New Skills Agenda aims to improve the quality of skills training and to make the skills acquired more visible and comparable from one country to another. Data on ICT skills should also be improved in order to better anticipate developments and help people make better career choices. Skills acquired in non-formal ways should also be assessed and validated.

Possible solutions developed in the EU Member States include encouraging and enabling people to acquire the skills needed, enhancing the labour mobility of digitally skilled people and promoting cross-border skills policies. Improving skills supply can be done by encouraging people to offer their skills on the labour market and by retaining skilled people in the labour market. Putting skills to effective use by creating better matches between skills offered and demanded, and by increasing the demand for high-level skills can also contribute to improving the situation.

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List of main acronyms used

DESI:	Digital Economy and Society Index
DigComp:	Digital Competence (Framework)
DSM:	Digital Single Market
EURES:	(network for) European Employment Services
ICT:	Information and communication technologies
IST:	Information society technology
JRC:	Joint Research Centre (of the European Commission)
MOOCs:	Massive open online courses
NEET:	(young people) Not in education, employment or training
OECD:	Organisation for Economic Co-operation and Development

1. Digital skills

1.1. Introduction

Digital technology is penetrating into almost every field of public, private and working life, leaving a strong transformative effect. Technological innovation forces people, in their capacity as individuals, workers, learners and citizens, to look for and develop new types of skills.

Moreover, digital technology complements almost all existing job tasks; consequently, digital skills are required for nearly every kind of job. In the near future, 90 % of jobs (especially engineering, medicine, art and architecture) will require some level of digital skills.¹ Thus, everybody will need to have at least basic digital skills in order to live, work, learn and participate in society, and a digitally skilled workforce will need to be present on the labour market to avoid skill gaps or skills mismatches. Figures in the information and communication technologies (ICT) sector show that despite continued high levels of unemployment, there will be 756 000 unfilled jobs for ICT professionals in Europe by 2020.²

Digital skills are also a major EU policy concern from the point of view of competitiveness. The gap between the demand for digital transformation of the economy on the one hand and the digital knowledge, skills and competences of the workforce on the other, has been broadly described and agreed upon by the public and academic sector, but its actual size is unknown.³ In the current economic situation, a successful policy to foster the skills needed for a digital transformation could secure Europe a technological advantage and resilience in global competition.

¹ [Digital Skills and Jobs Coalition](#), European Commission, 2013.

² *Ibid.*

³ [E-Skills in Europe. Trends and Forecasts for the European ICT Professional and Digital Leadership Labour Markets \(2015–2020\)](#), Empirica Working Paper 2015.

1.2. Definitions

There are various definitions for digital skills or competences. In addition, several terms, such as 'digital literacy',⁴ 'digital competence', 'ICT-related skills' and 'e-skills'⁵ are often used synonymously to describe digital skills.

1.2.1. Digital skills

In general, digital skills encompass a range of basic to highly advanced skills that enable the use of digital technologies (digital knowledge) on the one hand, and basic cognitive, emotional or social skills necessary for the use of digital technologies, on the other hand.

In its background report on skills for a digital world, the Organisation for Economic Cooperation and Development (OECD)⁶ distinguishes four types of ICT-related skills necessary at the workplace. These are:

- ICT generic skills (related to the use of digital technologies for professional purposes, such as accessing information online or using software);
- ICT specialist skills (skills needed for the production of information technology (IT) products and services (such as programming, developing applications, managing networks);
- ICT complementary skills (skills for performing tasks associated with the use of ICT, such as information-processing, self-direction, problem-solving and communication);
- foundation skills (digital literacy, emotional and social skills enabling the use of digital technologies).

1.2.2. Digital competence

Digital competence includes not just digital skills, but a set of skills, knowledge and attitudes concerning the nature and role of information technologies and the opportunities they offer in everyday contexts, as well as the related legal and ethical principles. It also includes critical and reflective attitudes towards the information available and its responsible use.

In a 2006 recommendation on key competences for lifelong learning,⁷ the European Parliament and the European Council defined digital competence as follows:⁸

'Digital competence involves the confident and critical use of information Society technology (IST) for work, leisure, learning and communication. It is underpinned by basic skills in ICT: the use of computers to retrieve, access, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet.'

⁴ [Cornell University](#) defines digital literacy as 'the ability to find, evaluate, utilize, share, and create content using information technologies and the Internet'.

⁵ According to the European Commission, 'e-skills' refer rather to skills required by ICT professionals.

⁶ [Skills for a Digital World](#), OECD, 2016. Background report on the ministerial meeting on the digital economy.

⁷ Other key competences include: communication in the mother tongue; communication in a foreign language; mathematical competence and basic competences in science and technology; learning to learn; social and civic competences; a sense of initiative and entrepreneurship; and cultural awareness and expression.

⁸ [Recommendation of the European Parliament and the Council of 18 December 2006 on key competences for lifelong learning](#), 2006/962/EC, OJ L 394.

The Digital Competence (DigComp)⁹ Framework, created by the European Commission, defines digital competence as

'Skills needed include the ability to search, collect and process information and use it in a critical and systematic way, assessing relevance and distinguishing the real from the virtual while recognising the links. Individuals should have skills to use tools to produce, present and understand complex information and the ability to access, search and use internet-based services. Individuals should also be able to use IST to support critical thinking, creativity, and innovation.'

1.3. Measuring digital skills

1.3.1. The DigComp Framework

The Digital Competence (DigComp) Framework,¹⁰ launched in 2011 by the European Commission, was created for the purpose of producing a set of digital competence descriptors for all levels. Developed by the Joint Research Centre (JRC) and the Directorate-General for Education and Culture of the European Commission (DG EAC), the framework gave birth to a platform on the Europass website,¹¹ where people can compare their existing skills against a set of skills they need to have to be considered digitally competent. Some 21 such skills are distributed in five competence areas – information, communication, content creation, safety and problem-solving – and involve three levels of proficiency: none, basic (a single skill) and above basic (more than one skill).

⁹ The Digital Competence Framework, or [DigComp](#), was created by the Commission's Directorate-General for Education and Culture (DG EAC) and its Joint Research Centre, with the aim of: helping citizens evaluate themselves and set their learning goals; identifying training opportunities for them and facilitating their job search; and helping to monitor their digital skills and to support curricula development.

¹⁰ [DigComp: A Framework for Developing and Understanding Digital Competence in Europe](#), JRC, 2013.

¹¹ See [Europass self-assessment grid](#).

Table 1 – Available indicators for measuring digital competence

Competence area:	Indicator
1. Information	Finding information about goods and services Obtaining information from public authority websites Reading or downloading online news/newspapers/news magazines Copying or moving a file or folder Seeking health-related information
2. Communication	Sending/receiving emails Telephoning over the internet/video calls (via webcam) over the internet Participating in social networks Posting messages to chat sites Uploading self-created content to any website to be shared
3. Content creation	Creating websites or blogs Writing a computer programme using a specialised programming language Using copy and paste tools to duplicate or move information within a document Creating electronic presentations (such as slides) with presentation software, including images, sound, video or charts Using basic arithmetic formulae to add, subtract, multiply or divide figures in a spreadsheet
4. Safety	Using a security software or tool (such as anti-virus or anti-spam software or a firewall) in order to protect private computer and data Updating one or more such products at least occasionally
5. Problem-solving	Connecting and installing new devices Installing a new or replacing an old operating system Modifying or verifying the configuration parameters of software applications Doing an online course Buying or ordering goods or services for private use (last 12 months) over the internet Selling online Searching for a job or sending an application Internet banking Making an appointment with a practitioner via a website

Source: DigComp Framework, 2013.¹²

¹² See [Measuring Digital Skills across the EU: EU-wide indicators of Digital Competence](#), European Commission, 2014 and [DigComp: A Framework for Developing and Understanding Digital Competence in Europe](#), JRC Scientific and Policy Reports, 2013.

1.3.2. The Digital Skills Indicator

Following a May 2014 report,¹³ the Commission Directorate General for Communications Networks, Content and Technology (DG CONNECT) and the Eurostat Information Society Working Group agreed to create and publish a 'Digital Skills Indicator', based on DigComp.

The indicators used to fill the framework are taken from existing relevant data collection sources. One of the main among them is the Eurostat survey of internet usage¹⁴ in households and by individuals, which contains a range of questions on ICT skills and use/activity covering many of the competence areas and competences identified by DigComp.

The Commission uses the figures as part of the Digital Economy and Society Index (DESI)¹⁵ and presents them in the Digital Agenda Scoreboard visualisation tool.¹⁶

2. Distribution of digital skills

2.1. Geographical differences

According to the Digital Skills Indicator from 2015, 21 % of Europeans can be considered as having no digital skills, based on the criterion that they are not using the internet. This figure ranges from 3 % in Luxembourg to 44 % in Bulgaria and Romania. In eight countries (Portugal, Poland, Croatia, Cyprus, Italy, Greece, Bulgaria and Romania), 30 % or more of the population have no digital skills.¹⁷

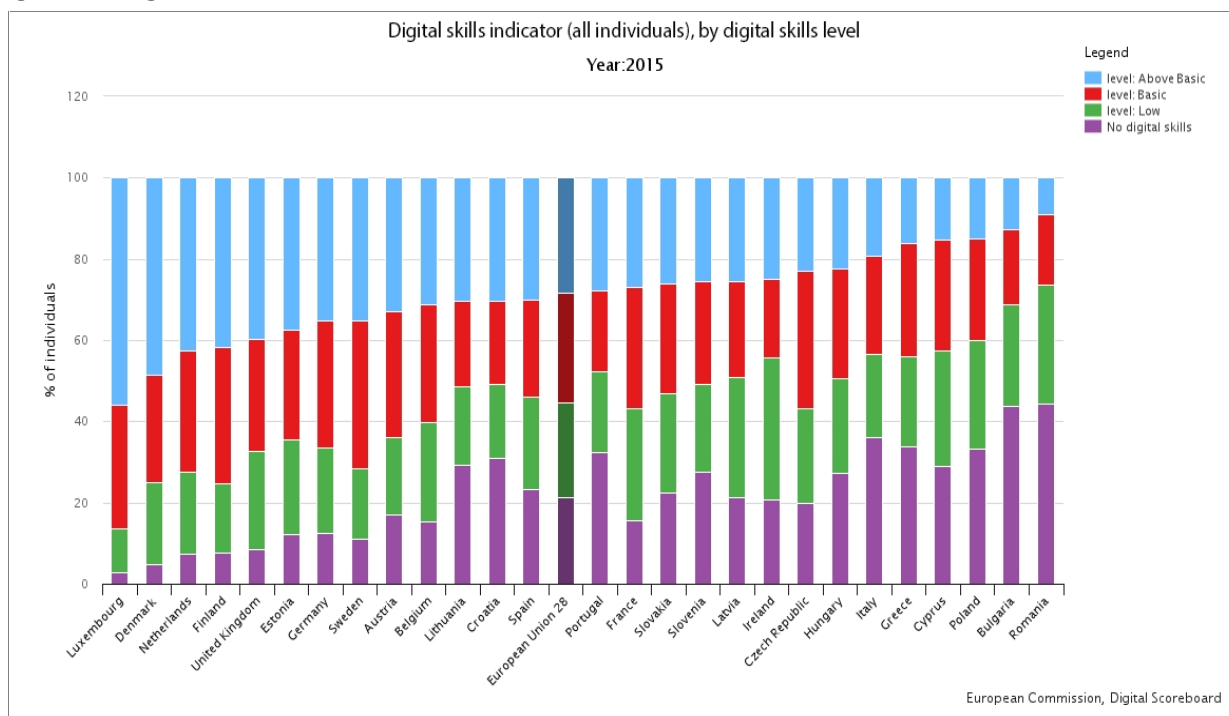
¹³ [Measuring Digital Skills across the EU: EU-wide indicators of Digital Competence](#), 2014.

¹⁴ See [Digital economy and society statistics – households and individuals](#), 2015.

¹⁵ The [Digital Economy and Society Index](#) (DESI) 'is a composite index that summarises relevant indicators on Europe's digital performance and tracks the evolution of EU member states in digital competitiveness'. It is structured around five principal dimensions: connectivity, human capital, use of internet, integration of digital technology and digital public services. Data are collected every year for every Member State.

¹⁶ The [Digital Scoreboard](#) uses more than 100 indicators of the Commission services, divided into thematic groups illustrating some key dimensions of the European information society (telecom sector, broadband, mobile, internet usage, internet services, e-government, e-commerce, e-business, ICT skills and research and development). These indicators allow a comparison of progress across Member States as well as over time.

¹⁷ Because of the differences in population numbers, this equates to almost 18 million Italians and to around 12 million Poles who are lacking in digital skills.

Figure 1 – Digital skills level of individuals in the EU

Source: European Commission Digital Scoreboard, 2015.

Compared to similar statistics from 2012,¹⁸ this means an overall increase of 2 % of digitally skilled persons in the EU as a whole and even more in lagging Member States (for instance, 6 % in Romania). This shows that Europeans are acquiring digital skills, albeit at a gentle pace.

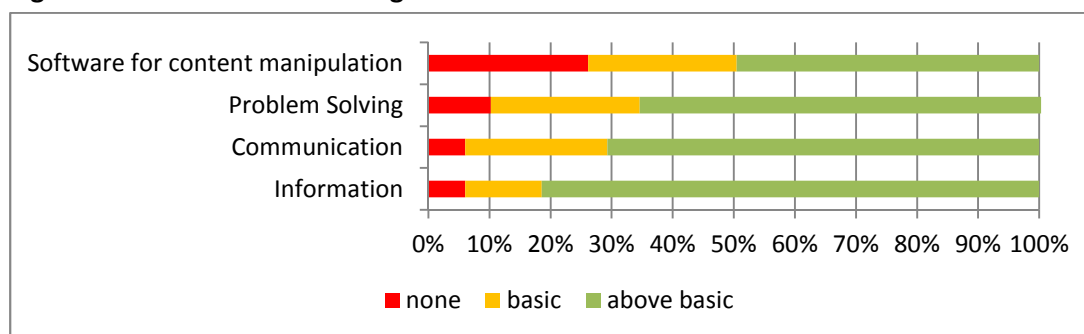
Considering that in order to function efficiently in a digital society, an individual needs more than low-level skills¹⁹ (such as the ability to send emails), 45 % of Europeans can be considered as having either low or no digital skills, even though 17 Member States have higher rates. Some 74 % of Romanians do not have the skills needed to function effectively in the digital world. However, compared to the situation in 2012, there has been an overall increase of 2 % in the number of sufficiently skilled persons in the EU as a whole and 11 % in Romania.

Comparing the individual sub-dimensions of digital skills,²⁰ it becomes clear that the share of persons having ICT skills is higher than the share of those with content-creation and problem-solving skills. Accordingly, only 25 % of EU citizens have no information skills and 30 % have no communication skills, while 36 % have no content-creation and problem-solving skills. Amongst those who have skills, these are generally above average for information, communication-and content-creation skills. For problem-solving, however, this is not the case.

¹⁸ [Measuring Digital Skills across the EU: EU-wide indicators of Digital Competence](#), 2014.

¹⁹ A 'low skilled' individual is someone who has carried out activities from only one of the four digital competence domains included in the index (information, communication, content creation and problem-solving). To qualify as having 'basic skills', an individual has to have 'basic skills' in at least one domain from the digital competences table, and 'no use' in none. To be classified 'above basic', the individual has to score above basic in each of the four domains.

²⁰ See footnote 18.

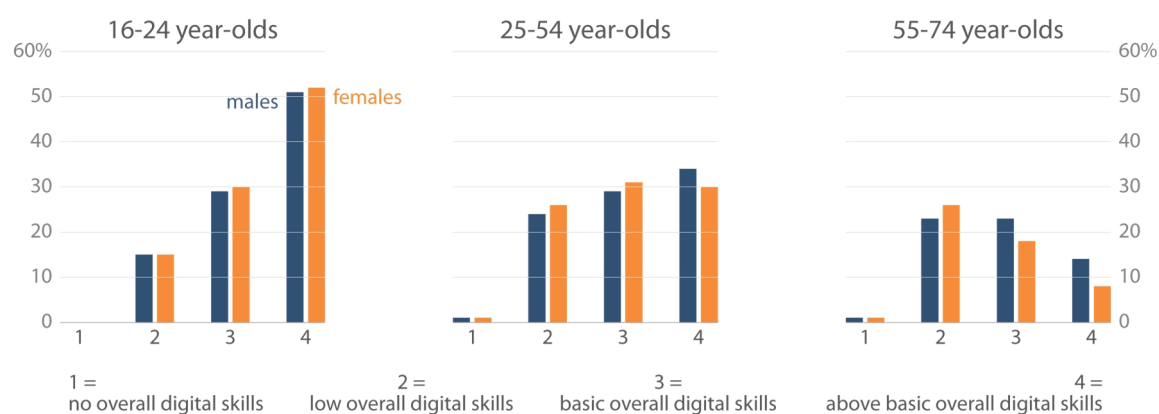
Figure 2 – Sub-dimensions of digital skills in the EU

Source: European Commission [data](#), 2015.

2.2. Social differences

2.2.1. Gender- and age-specific differences

An OECD survey of adult skills carried out in 2016 shows that the proportion of the digitally skilled population has increased in the large majority of OECD countries. However, women tend to use ICT skills at work slightly less than men.²¹

Figure 3 – Digital skills of women and men in different age groups

Source: Eurostat, 2014.²²

The 2014 Eurostat survey (see figure 3) shows slight differences between the 16-24 and the 25-55-year-olds. However, within the 55-74 age group, women tend to have rather low or basic digital skills, while men have more advanced such skills. Age-specific differences are much more noticeable. In general, students have a high level of digital skills; within the generation currently on the labour market, the proportion of people with low, basic and above-basic levels of digital skills is very similar. The 55-74 age group is characterised by low or basic digital competences.

2.2.2. Digital skills of disadvantaged people

The digital skills of disadvantaged people²³ are generally lower than those of the average population. According to DG CONNECT statistics, 38 % of the disadvantaged in the EU-28 have

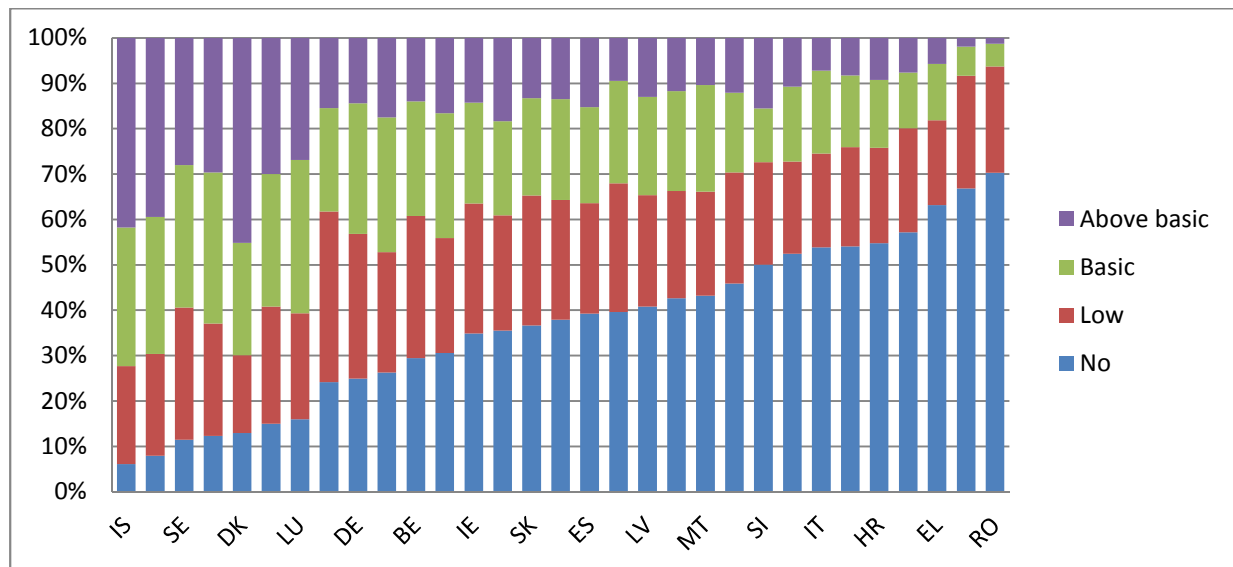
²¹ [Skills for a digital world](#), OECD, 2016. Background report on the ministerial meeting on the digital economy.

²² See [Eurostat data](#).

²³ According to the [Merriam-Webster Dictionary](#), a disadvantaged person is 'lacking in the basic resources or conditions (as standard housing, medical and educational facilities, and civil rights) believed to be necessary for an equal position in society'.

no digital skills. Sweden (11 %), the Netherlands (12 %) and Denmark (13 %) have the lowest rates of disadvantaged people with no skills, while Romania (70 %), Bulgaria (67 %) and Greece (63 %) have the highest such rates. Based on the descriptions defining the 'basic' level of skills as necessary for working and living, 64 % of the EU's disadvantaged are below this level.²⁴

Figure 4 – Digital skills of disadvantaged people



Source: European Commission, [DG CONNECT](#), 2014.²⁵

3. Digital skills on the labour market

3.1. Digitalisation and the labour market

Digitalisation²⁶ has a significant impact on the labour market by modifying job dynamics, working conditions and skills requirements. On average, the level of digital skills among the labour force is higher than that among the EU population as a whole. According to Eurostat data, just 13 % of the EU labour force has no digital skills, although some Member States' individual rates are relatively high. Rates are at or above 20 % in seven Member States: Greece, Cyprus, Poland, Portugal, Italy, Bulgaria and Romania. In the latter two, more than a third of the labour force has no digital skills. Some 37 % of the EU labour force can be considered as having insufficient (that is, low-level or altogether missing) digital skills. In 15 Member States (France, Slovenia, Spain, Croatia, Hungary, Latvia, Lithuania, Greece, Portugal, Italy, Ireland, Poland, Cyprus, Bulgaria and Romania) this percentage is higher. In Bulgaria (64 %) and Romania (70 %), most of the labour force has low or no digital skills. Compared to the results from 2012, there has been a 1 % increase in the number of digitally skilled people on the labour market for the EU as a whole. Adding the number of persons with

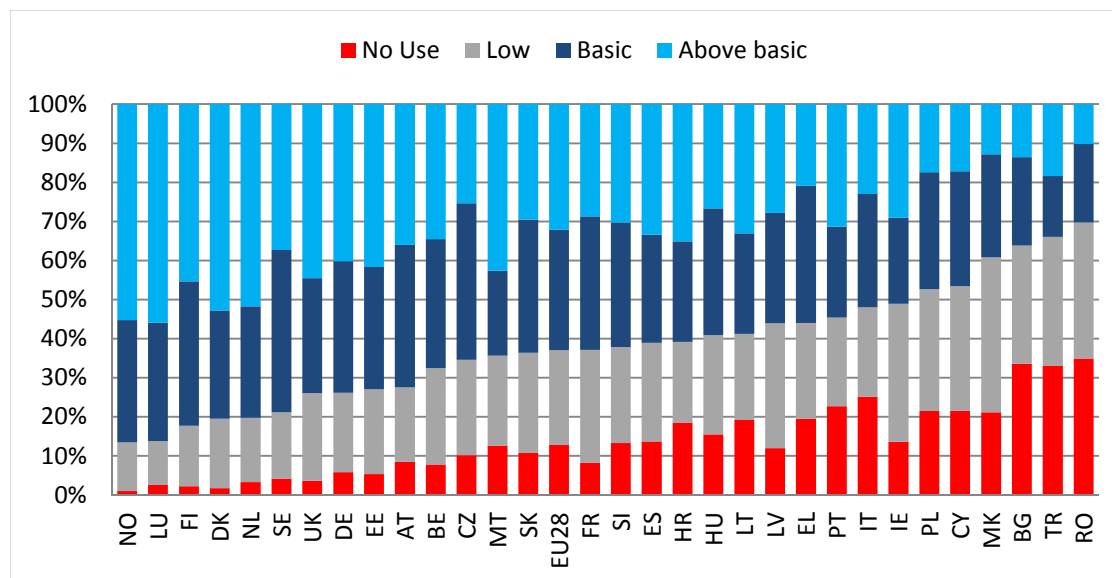
²⁴ [Measuring Digital Skills Across the EU: EU-wide Indicators of Digital Competence](#), European Commission, 2014.

²⁵ Data from 16 countries: Belgium, Croatia, Denmark, Germany, Greece, Ireland, Island, Italy, Luxemburg, Slovakia, Spain, Latvia, Malta, Romania, Slovenia and Sweden.

²⁶ According to the [Oxford English Dictionary](#), digitalisation is 'the adoption or increase in use of digital or computer technology by an organisation, industry, country, etc.'

a 'basic' level to this group, this increase amounts to 2 %. In Romania and Bulgaria, this increase amounts to 13 % in both countries. The divide across the EU with regard to digitalisation (that is, Scandinavian Member States and the Netherlands performing much better in terms of digitalisation than new and south European Member States) characterises digital skills as well.²⁷

Figure 5 – Digital skills on the labour market, EU-28



Source: Commission services based on Eurostat data, 2015.²⁸

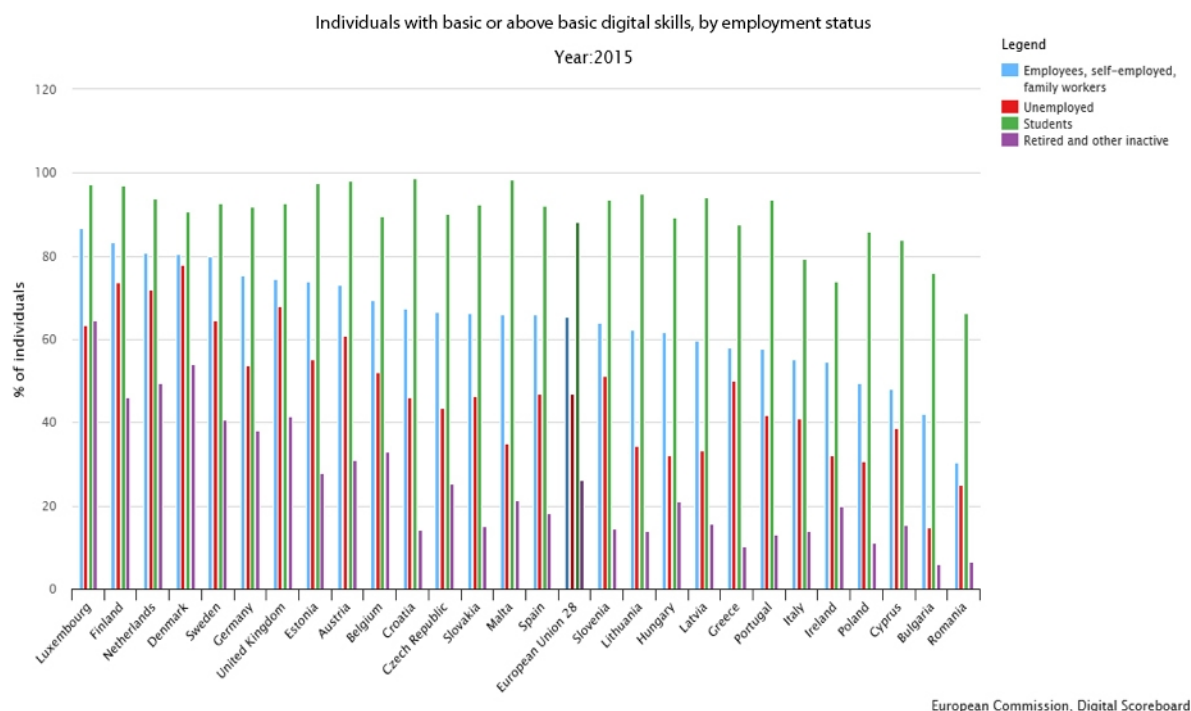
Digitalisation has multiple, opposing effects on the labour market. On the one hand, it creates jobs by generating new business models, products and machines, as well as by reducing production costs.²⁹ On the other hand, it also has the potential to destroy jobs or tasks by eliminating or relocating them to countries with low labour costs. The most strongly affected are medium-skilled jobs, such as administrative support work, manufacturing or transportation. The overall balance, though, seems to be positive.³⁰ Digitalisation also causes a shift in skills needs; workers increasingly need general and specialised digital skills to function in their new working environment.

²⁷ [Employment and Skills Aspects of the Digital Single Market Strategy](#), study commissioned by Policy Department A, Directorate-General for Internal Policies, European Parliament, 2015.

²⁸ Europe's Digital Progress Report 2016, Commission Staff Working Document, SWD(2016) 187 final.

²⁹ See also: [Les effets de la mondialisation: Gagnants et perdants en Europe et aux États-Unis](#), EPRS, 2016.

³⁰ [Employment and Skills Aspects of the Digital Single Market Strategy](#), study commissioned by Policy Department A, Directorate-General for Internal Policies, European Parliament, 2015.

Figure 6 – Digital skills by employment status, EU-28

Source: European Commission, [Digital Scoreboard](#), 2015.

Digital skills are entering all areas of work and have become essential in fields such as medicine, entertainment, communication and trade. However, they have grown in importance not only because they transform existing jobs, but also because they also give rise to entirely new ones. There is a genuine fear of a digital skills gap created by the boom in the digital economy contrasted to the number of people trained to work in it. Unemployed people are particularly at risk as their re-entrance into the labour market is largely dependent on their digital skills and their capacity to acquire them.

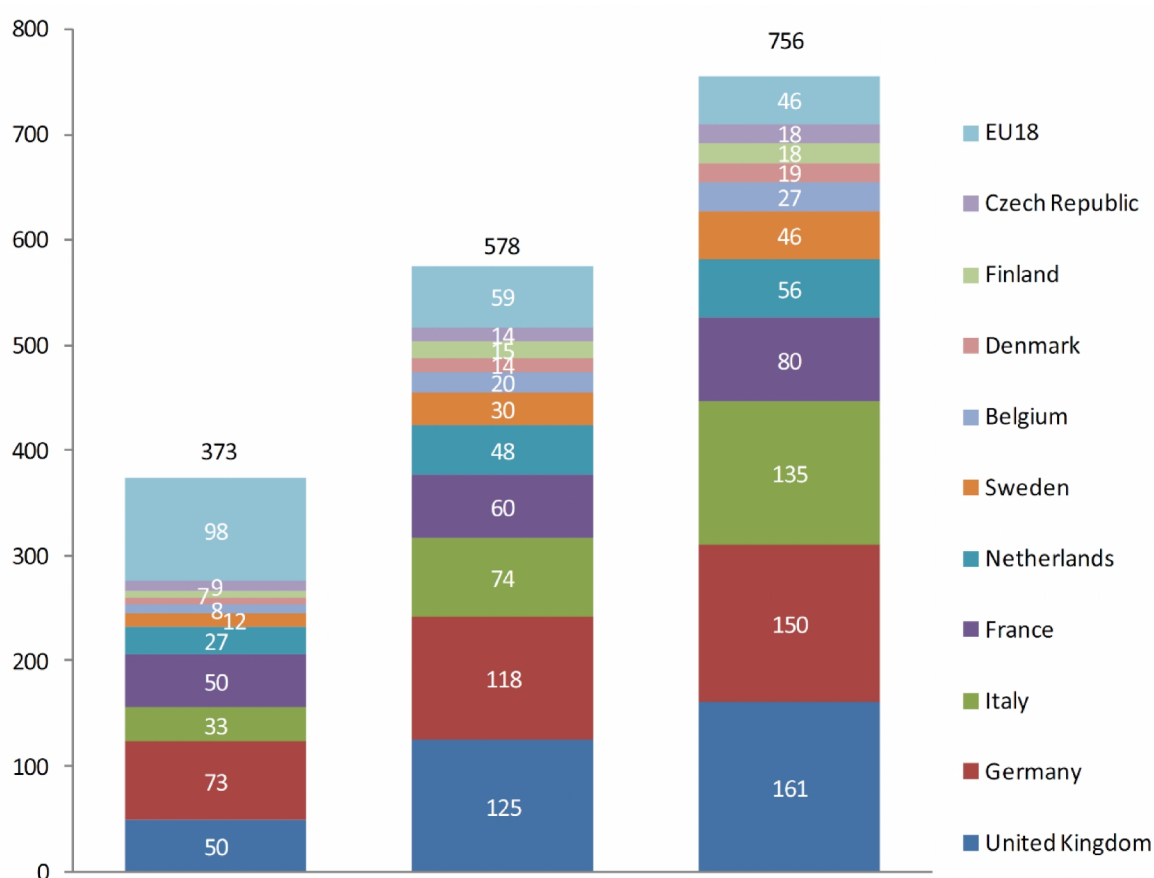
An Oxford University study³¹ highlighted two major effects that digital development has had on the labour market. First, there have been growing wage inequalities between skilled and unskilled workers ever since computerisation began in the 1980s. This is explained by the fact that computer use and ICT skills are much more prevalent among workers in skilled occupations, particularly those performing analytical or interactive tasks. Using a computer on the job raises a worker's wage as they contribute more to company productivity.

Second, nearly all European labour markets have experienced a job polarisation, reflecting the disappearance of middle-skill routine work. As new computer technologies have emerged, routine tasks performed by assembly workers, office clerks and machine operators have gradually been 'automated' away. At the bottom end of the income distribution scale, employment growth has mainly been maintained in low- and middle skill jobs that require physical flexibility or social interaction, such as a wide range of sales and services jobs.

³¹ [Digitalisation, jobs, and convergence in Europe: strategies for closing the skills gap](#), Oxford Martin School, University of Oxford, prepared for DG Market, Industry, Entrepreneurship and SMEs, European Commission, 2016.

3.2. Digital skills of ICT specialists

Figure 7 – E-skills vacancies estimate, main forecast scenario: Distribution of vacancies by Member State



Source: [Empirica](#), 2015.³²

One labour market segment where digital skills are of paramount importance is that of ICT specialists. Between 2004 and 2014, the number of employed ICT specialists in the EU-28 rose by 2.9 million (from 5.1 million in 2004 to 8 million in 2014).³³ As a percentage of the total workforce, this constitutes a 1.2 % growth, from 2.5 % to 3.7 %. Over the same period, ICT employment grew by over 4 % a year on average (with a slowing down in 2010-2011). In comparison, total employment grew by 0.4 % a year on average and fell consistently during the 2008–2014 economic and financial crisis. This considerable increase in ICT specialist employment was registered in all Member States. According to Commission data, the largest numbers in terms of employed ICT specialists are in the larger Member States: Germany (765 000), France (417 000), Spain (269 000), Poland (182 000) and the United Kingdom (162 000).

In spite of the significant increase in the employment of ICT professionals in the EU over the past decade, there is a growing gap between the demand for and supply of ICT specialists. According to forecasts, this gap could double over the next five years: from 373 000 in 2015,

³² [E-skills in Europe, Trends and forecasts for the European ICT Professional and Digital Leadership Labour Markets \(2015-2020\)](#), Empirica Working Paper, 2015.

³³ [Europe's Digital Progress Report 2016](#), European Commission.

to 756 000 by 2020³⁴. For the time being, the largest ICT professional skills gaps are present in Germany, the United Kingdom and France. They are expected to grow significantly by 2020, especially in these three countries, mainly due to the insufficient number of ICT graduates compared to the exponentially increasing demand for ICT professionals. A possible solution to remedy the shortage of ICT professionals is working mobility. According to an analysis based on LinkedIn data, around 70 000 ICT professionals move yearly from one country to another, mostly from eastern and southern European to western European Member States.³⁵

4. Actions at the EU level

Skills, labour mobility and information technology all rank high on the European policy agenda. Decreasing the mismatch between the skills available and those demanded for the digital transformation of the economy has been a key EU-level priority over the last decade.

4.1. The 2008 New skills for new jobs communication

In its 2008 communication entitled 'New skills for new jobs',³⁶ the Commission emphasised the increasing need for digital skills. Several linked factors, such as globalisation, the transition towards a low-carbon economy, the application of technologies, especially ICT, and changes in work organisation will stimulate the demand for better and more adapted skills. In the service sector, there is a clear need for broadening the required skills portfolio and for acquiring transversal skills. For example, according to the communication, ICT professionals need to develop marketing or management skills, while services workers need to develop customer orientation skills and digital literacy. In addition, across Europe, the shift to a low-carbon economy and the growing importance of the knowledge economy, in particular the diffusion of ICTs and nano-technologies, might hold great potential for the creation of sustainable jobs, which in turn require more digital skills. Skills upgrading is not just a luxury for the highly qualified high-tech professionals, but a necessity for everyone, points out the communication.

4.2. The 2010 Digital Agenda

The Commission's 2010 Digital Agenda for Europe,³⁷ one of the seven flagship initiatives laid out in the Europe 2020 strategy for smart, sustainable and inclusive growth, was created with the aim of establishing a well-functioning digital economy by 2020. The agenda includes policies and actions aiming to extend the benefit of the digital era to all sections of society and the economy. The agenda focuses on seven priority areas for action: creating a digital single market, increasing interoperability, boosting internet trust and security, providing faster internet access, encouraging investment in research and development, enhancing digital literacy skills and inclusion, and applying ICT to address societal challenges such as climate change and an ageing population.

³⁴ [E-skills in Europe, Trends and Forecasts for the European ICT Professional and Digital Leadership Labour Markets \(2015-2020\)](#), Empirica Paper, 2015.

³⁵ [Mobility of IT professionals: Evidence from LinkedIn](#), CEPS 2015.

³⁶ [New skills for new jobs](#), COM(2008) 868.

³⁷ [A Digital Agenda for Europe](#), COM (2010) 245.

In addition, recognising the need for indicators to measure the extent of digital competence in Europe, one of the actions envisaged under the Digital Agenda was to 'propose by 2013 EU-wide indicators of digital competence and media literacy'.³⁸ Following a review of the initiative carried out in December 2012, seven new key actions were flagged. These mainly concern fostering digital infrastructure, improving the regulatory environment, promoting digital skills and jobs and implementing focused strategies in the areas of cyber-security, cloud computing and microelectronics. In January 2014, more than 90 % of the actions foreseen in the flagship initiative were completed or are on track.³⁹

4.3. The Grand Coalition for Digital Jobs

In March 2013, the Commission initiated the Grand Coalition for Digital Jobs,⁴⁰ a multi-stakeholder partnership that aims to facilitate collaboration among business and education providers, and public and private actors. It has two goals: (i) to tackle the shortage of digital skills in Europe, and (ii) to fill the numerous ICT-related vacancies (estimated, depending on the scenario, to grow across all industry sectors between now and 2020,⁴¹ reaching a number between 700 000 and 900 000).

For the time being, the Grand Coalition is the largest collaborative effort in Europe, which aims to offer more ICT training in collaboration with the industry, implement job placement programmes, provide more digitally aligned degrees and curricula at all levels and in all types of training and education, and motivate young people to study ICT and pursue related careers.

To date, the Grand Coalition has made approximately 60 pledges by over 100 stakeholders. National coalitions have been set up in 13 countries and their number is increasing. The Grand Coalition, together with the 13 national coalitions⁴², has trained over 2 million people since its launch. It has helped break down silos in the area of digital skills development and has contributed to collaboration between governments, education and industry.

4.4. The Digital Single Market strategy

In his opening statement in the European Parliament on 15 July 2014, Commission President Jean-Claude Juncker claimed that by creating a connected digital single market, hundreds of thousands of new jobs can be created, notably for younger job seekers. The digital single market can have an enormous impact on the labour market and society in general. In its communication on a Digital single market strategy for Europe,⁴³ the Commission states its intention to create a European Digital Economy and society with growth potential. An inclusive digital society where citizens have the right skills to seize the opportunities of the Internet and boost their chances of getting a job is an important aspect.

³⁸ Action 62.

³⁹ [Taking stock of the Europe 2020 strategy for smart, sustainable and inclusive growth](#), COM(2014) 130, ANNEXES 1 to 3.

⁴⁰ See the [Grand Coalition for Digital Jobs](#), European Commission.

⁴¹ [E-skills for jobs in Europe – Measuring progress and moving ahead, 2014](#).

⁴² [National coalitions](#) have been set up in Belgium, Bulgaria, Cyprus, Greece, Italy, Latvia, Lithuania, Malta, the Netherlands, Poland, Portugal, Romania and the United Kingdom.

⁴³ [A Digital Single Market Strategy for Europe](#), COM(2015)192.

4.5. The 2016 New Skills Agenda

In June 2016, the Commission adopted a new and comprehensive skills agenda⁴⁴ for Europe. Its aim is to improve the quality and importance of skills training, from primary education to lifelong learning, and to prevent people from falling behind, which in turn will eventually boost employability, competitiveness and growth in Europe. It also aims to make the skills acquired by people more visible and comparable from one country to another, and to improve data concerning skills in order to make it easier to anticipate developments and help people make better career choices. This focus runs through the Skills Guarantee,⁴⁵ presented in the New Skills Agenda, as well as in the review of the European Qualifications Framework.⁴⁶

As mentioned above, the Skills Guarantee was launched to help low-skilled adults acquire a minimum level of literacy, numeracy and digital skills and progress towards an upper secondary level of education. Also related to the New Skills Agenda was a review of the European Qualifications Framework, to ensure a better understanding of qualifications across the EU, and a blueprint for sectorial cooperation on skills, to improve skills intelligence and anticipation in specific economic sectors. Other related actions include creating a tool to help identify the skills and qualifications of migrants, including asylum-seekers and refugees; making a Digital Skills and Job Coalition that would build upon the existing Grand Coalition for Digital Jobs; revising the Europass framework to help people present their skills and obtain real-time information on needs and trends throughout the EU; an initiative to make vocational education and training (VET) a first choice; making a review of the 2006 Key Competences Recommendation aimed at deepening a common understanding of what is currently required to work and live, and to at facilitating ways of developing, assessing and validating skills that have been acquired in non-formal and informal ways (for instance, through volunteering, industry courses, or on the internet); and launching an initiative to improve information on how graduates progress in the labour market.

5. Possible improvements

5.1. Strategic methods to boost digital skills and employment

Several initiatives at European and national level support the evolution towards a digital economy and society, for instance by supporting digital entrepreneurship. Across the EU-28, although with considerable differences, there are also more than 100 national policies dealing broadly with developing e-skills and putting them to effective use.⁴⁷

⁴⁴ [New Skills Agenda for Europe](#), COM(2016) 381.

⁴⁵ The [Skills Guarantee](#) aims to help low-skilled adults acquire a minimum level of literacy, numeracy and digital skills and/or progress towards an upper secondary qualification or equivalent.

⁴⁶ [The European Qualifications Framework](#) (EQF) is a translation tool that helps communication and comparison between qualifications systems in Europe. Its eight common European reference levels are described in terms of learning outcomes: knowledge, skills and competences. This allows any national qualifications systems, national qualifications frameworks (NQFs) and qualifications in Europe to relate to the EQF levels.

⁴⁷ See [Employment and Skills Aspects of the Digital Single Market Strategy](#), study commissioned by Policy Department A, Directorate-for Internal Policies, European Parliament, 2015.

According to the OECD Skills Strategy Framework⁴⁸ (which offers a strategic method to boost employment and growth, while promoting inclusion and participation), economic prosperity and social cohesion can be improved by strengthening skills systems in three dimensions:

- developing relevant skills by 1) encouraging and enabling people to acquire the right skills throughout life, 2) fostering international mobility of skilled people to fill skills gaps, and 3) promoting cross-border skills policies;
- activating skills supply by 1) encouraging people to offer their skills to the labour market, and 2) retaining skilled people in the labour market;
- putting skills to effective use by 1) creating a better match between people's skills and the requirements of their job, and 2) increasing the demand for high-level skills.

Developing relevant skills means adapting scholastic curricula and ITC infrastructure to the digital changes, but also promoting ITC skills among disadvantaged groups, such as young NEETS, women or unemployed people. A good example in this domain is the Fast Track for Information Technology programme for long-term unemployed (FIT) in Ireland.⁴⁹

What is FIT?

FIT (the Fast Track for Information Technology programme for long-term unemployed) is a non-profit industry initiative which works together with government departments and national education and training providers in order to bring new talent into the technical sector. It develops and promotes technology-based programmes and career-development opportunities for job-seekers in Ireland. To date, over 18 000 job-seekers have completed FIT skills development programmes; more than 13 500 of them have progressed into quality employment.

International mobility of workers with (high) ITC skills is aided by international networks such as the EURES European job mobility portal.⁵⁰ This is a cooperation network aimed at enhancing the free movement of workers within the EU-28, as well as Switzerland, Iceland, Liechtenstein and Norway. EURES provides its services through an internet portal and a network of around 1 000 advisers across Europe, maintaining contact with job-seekers and employers.

Activating skills supply can be enhanced by innovative workplaces: working organisations leave their employees greater room to innovate, for instance, through creative project teams. An example in this domain is the Technology Pact 2020 in the Netherlands, which intends to retain technology workers in the ICT sector by up-skilling and re-skilling them.⁵¹

⁴⁸ [Skills for a Digital World](#), OECD, 2016. Background report on the ministerial meeting on the digital economy, p. 14.

⁴⁹ See [Fast Track for Information Technology programme for long-term unemployed](#).

⁵⁰ See [EURES, the European job mobility portal](#).

⁵¹ See [Dutch Technology Pact 2020](#).

Technology Pact 2020

The Technology Pact 2020 aims to respond to the need to produce 30 000 additional technology graduates a year to meet the growing demand for skilled technologists in the Netherlands. Based on the common efforts of education providers, employers, workers, the top sectors and the regional and central levels of government, the Technology Pact focuses on three lines of action with a horizon of 2020. It aims to convince more pupils to choose technical studies, to ensure that more students with technical qualification progress to a job in technology and to retain workers in the technology sector for instance, by finding alternative jobs for technology specialists whose jobs are under threat.

Putting skills to effective use in the workplace and avoiding their depreciation happens through lifelong learning, workplace training and continuous professional development. A good example is the COMPETIC project in the Belgian-French border region.⁵²

COMPETIC

COMPETIC aims to match training and educational curricula more closely to labour demand. Programme partners seek to identify and anticipate the jobs and skills that are essential to the development of the digital industry in the region along the Belgian-French border. Based on this picture, they strive to support training organisations and to keep adapting their offer to sectoral needs. They also try to promote the digital sectors among young people and job-seekers through awareness-raising initiatives and information campaigns.

5.2. The role of digital technologies

Digital technologies can create new opportunities for individuals, workers or job-seekers, to acquire better digital skills and consequently to get better job opportunities in the digital sector. By removing the constraints of space and time, these technologies can open numerous new opportunities for self-directed learning and continuous professional development.⁵³ Massive open online courses (MOOCs), for instance, are well-suited to respond to the need of updating competencies in a lifelong learning perspective. MOOCs can be provided by academic or platform providers (such as Coursera⁵⁴ and EdX⁵⁵), corporate courseware providers (such as Udemy⁵⁶ or Skillsoft⁵⁷), continuous professional development providers (such as Udacity⁵⁸ and FutureLearn⁵⁹), or public employment services (such as Pôle Emploi in France⁶⁰). They have the potential to address labour market shortcomings and skills gaps, especially in areas that are changing rapidly, such as digital skills.

⁵² See [COMPETIC](#).

⁵³ OECD: [Skills for a Digital World](#), 2016. Background report on the ministerial meeting on the digital economy.

⁵⁴ See [Coursera](#), online courses from top universities.

⁵⁵ See [EdX](#), free online courses from the world's best universities.

⁵⁶ See [Udemy](#) online learning platform.

⁵⁷ See [Skillsoft](#), the global leader in e-learning.

⁵⁸ See [Udacity](#), free online classes and nanodegrees.

⁵⁹ See [FutureLearn](#), free online courses.

⁶⁰ See [Pôle emploi](#).

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Digital technology is more and more interwoven into every field of public, private and working life. Consequently, digital skills have a growing importance for everybody.

How can society and its citizens, in particular vulnerable groups, such as the disabled or the long-term unemployed, get onto the digital train and stay abreast of new technologies and methods? How can digital skills at the workplace be developed and used more efficiently? What has already been done at Member State and EU level and what are the challenges ahead?

This publication seeks to answer these questions through by describing the characteristics and types of digital skills, and exploring their presence in society and on the labour market. It further analyses the digital literacy of workers, gives an overview of EU-level actions undertaken in this domain, and points to some best practices aimed at improving the current situation.

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