

**SKILLS
FOR LIFE**

Digital Skills



IDB Inter-American
Development Bank

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Introduction

Digital skills are becoming more relevant than ever, because of the digital revolution that we are experiencing in the labor market, but also due to the accelerated needs for them that COVID-19 lockdown measures brought about. There have been efforts to help develop and assess digital skills. Yet, despite these efforts, many people still face difficulties in developing an appropriate level of digital skills. In this brief, I will discuss why digital skills are relevant in the 21st century and what it means. Then, I will explain how we can develop, train, and measure digital skills. Lastly, I will discuss the implications of training and measurement of digital skills.

Why are digital skills relevant in the 21st century?

Digital skills have become more relevant in the last 20 years, as technological advancements have impacted different spheres of work and life. For example, the use of computers at work increased 64% across all sectors and occupations in fifteen countries of the European Union between 1995 and 2015 (Bisello et al., 2019). The COVID-19 lockdown measures have made digital skills even more relevant. The use of digital technologies has substantially increased, largely because many people now work and learn from home, and manage health, social life, and household chores (e.g., shopping) in a digital environment.

At the same time, the COVID-19 pandemic revealed gaps in digital skills as well as the existing risks and limited knowledge in using a range of digital technologies for different purposes. During lockdown in Spring 2020, teachers, parents, and students found remote schooling extremely challenging, partly due to their low level of digital skills (not to mention the inequalities in access to digital devices and infrastructure) (Carretero et al., 2021). According to the 2018 Teaching and Learning International Survey (TALIS), 18% of teachers in the OECD countries reported a high need for professional development in Information and Communications Technology (ICT) for teaching (OECD, 2020). Conversely, on average, 42% of 15-year-old students in Latin American and Caribbean (LAC) countries attended schools, whose principals considered that teachers did not have the necessary technical and pedagogical skills to integrate digital devices into their school curricula (OECD et al., 2020). In the European Union, the most recent ICT school survey¹ (European Commission, 2019) reported that 20% to 30% of primary and secondary school parents have either low or no confidence in teaching their children how to use the internet safely and responsibly.

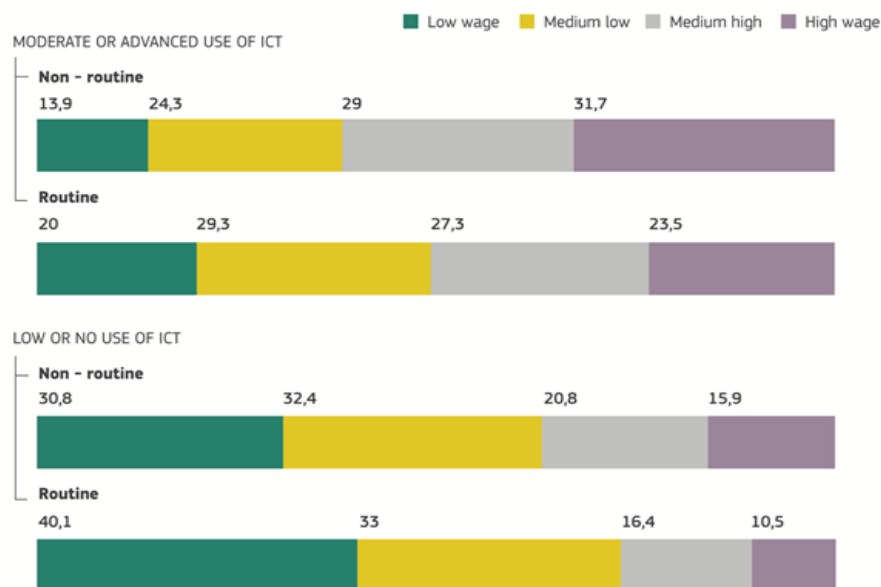
Different studies report that both citizens and workers struggle to properly use digital technologies. For example, 16% of the OECD population does not use the internet regularly, and the percentage doubles for those in LAC (OECD et al., 2020). Furthermore, in 2019, 42% of European citizens did not have basic digital skills (European Commission, 2020), while adults in LAC had very little or no computer experience; this ranged widely by countries—from 43.6% in Peru to 25.2% in Chile (OECD et al., 2020). Similarly, while over half of European workers use computers, smartphones, or other ICT tools at work once per week or more, only a third of Latin American and Caribbean workers do the same (OECD et al., 2020). In all regions, women, less-educated, and older people tended to have lower levels of digital skills and a higher chance of being digitally excluded.

1. The survey covered 28 Member States of the European Union in 2019, and Norway, Iceland, and Turkey.

Digital skills are changing the way we work, revealing opportunities and risks. Millions of jobs are at risk of being replaced with automation, especially those that involve repetitive, routine tasks (Gonzalez-Vazquez et al., 2019). OECD et al. (2020) estimated that 14% of jobs in the OECD countries could be replaced through automation, while about 25% of jobs in LAC are at high risk of being replaced. Still, studies showed that digital skills could increase employability and earnings. A considerable number of companies, particularly large companies with more than 250 employees, need digitally competent workers. Curtarelli et al. (2017) illustrated that almost 60% of employers in large firms believed some of their staff were not fully proficient in digital tasks, while less than a quarter of employers at small firms (10 to 249 employees) expressed the same concern.

Moreover, workers with moderate or advanced use of ICT have a higher probability of having high-paid jobs, compared to those with little or no use of ICT. Figure 1 compares the level of wages of workers in jobs with moderate or advanced ICT use with those who have jobs with little or no ICT use, analyzing the non-routine and routine jobs. We can argue that workers with moderate or advanced use of ICT earn higher wages than those with little or no use of ICT, independently of their level of routine and repetitiveness (Gonzalez-Vazquez et al., 2019).

Figure 1. Jobs combining non-routine tasks with ICT use are most likely to be highly paid (% of workers by wage quartile and type of jobs)



Note: To identify workers in (non-) routine jobs, the following question from the European Skills and Jobs Survey (ESJ) was used: “How often, if at all, does your job involve responding to non-routine situations during your daily work?” Workers responding “Always” or “Usually” were considered to be in non-routine jobs, and those responding “Sometimes” or “Never” in routine jobs. Based on the question “Which of the following best describes the highest level of ICT knowledge required to do your job?” workers were divided into two groups: those who reported a “Moderate or Advanced” use of ICT, and those who reported “Low or No” use of ICT. High-(low-) wage individuals are those in the top (bottom) quartile of the income distribution.

Source: Joint Research Centre of the European Commission based on the European Skills and Jobs Survey Microdata by the European Center for the Development of Vocational Training (CEDEFOP) in 2016, extracted from Gonzalez-Vazquez et al., 2019

Equipping ourselves with relevant digital skills is crucial in the 21st century. Yet, it is equally as important to protect us from digital threats due to the wider access and use of digital technologies, particularly among youth. Between 2012 and 2015, 73% of 15-year-old students in OECD countries reported participating in social networks daily, 61% reported chatting online every day, and 34% reported playing online games every day or almost every day (Hooft & Graafland, 2018). However, media and internet content, when not curated carefully, can pose more risks than opportunities to children and adolescents, potentially exposing them to pornography and cyberbullying (Livingstone et al., 2011). Thus, it is critical to help equip with digital literacy and safety skills to navigate the digital content safely and ethically.



What does it mean to be digitally skilled?

UNESCO, in line with reaching the Sustainable Development Goal, defines digital literacy as “the ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital technologies for employment, decent jobs and entrepreneurship. It includes competences that are variously referred to as computer literacy, ICT literacy, information literacy and media literacy” (Law et al., 2018, p. 6). UNESCO took the European Digital Competence Framework (DigComp) (Carretero et al., 2017; Vuorikari et al., 2016) as the reference point to establish its own. DigComp goes beyond employment and job areas, covering all areas of the lives of citizens.

Indeed, being digitally skilled, according to DigComp, entails being able to use digital technologies in a critical, collaborative, and creative way. It includes the following five domains: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving. As seen in Table 1, 21 digital competences fall under five categories. Figure 2 illustrates how these competences could be developed across eight proficiency levels that are defined by the complexity of the task, an individual’s level of autonomy, and the cognitive domain, following a metaphor on how we learn to swim in a digital ocean.

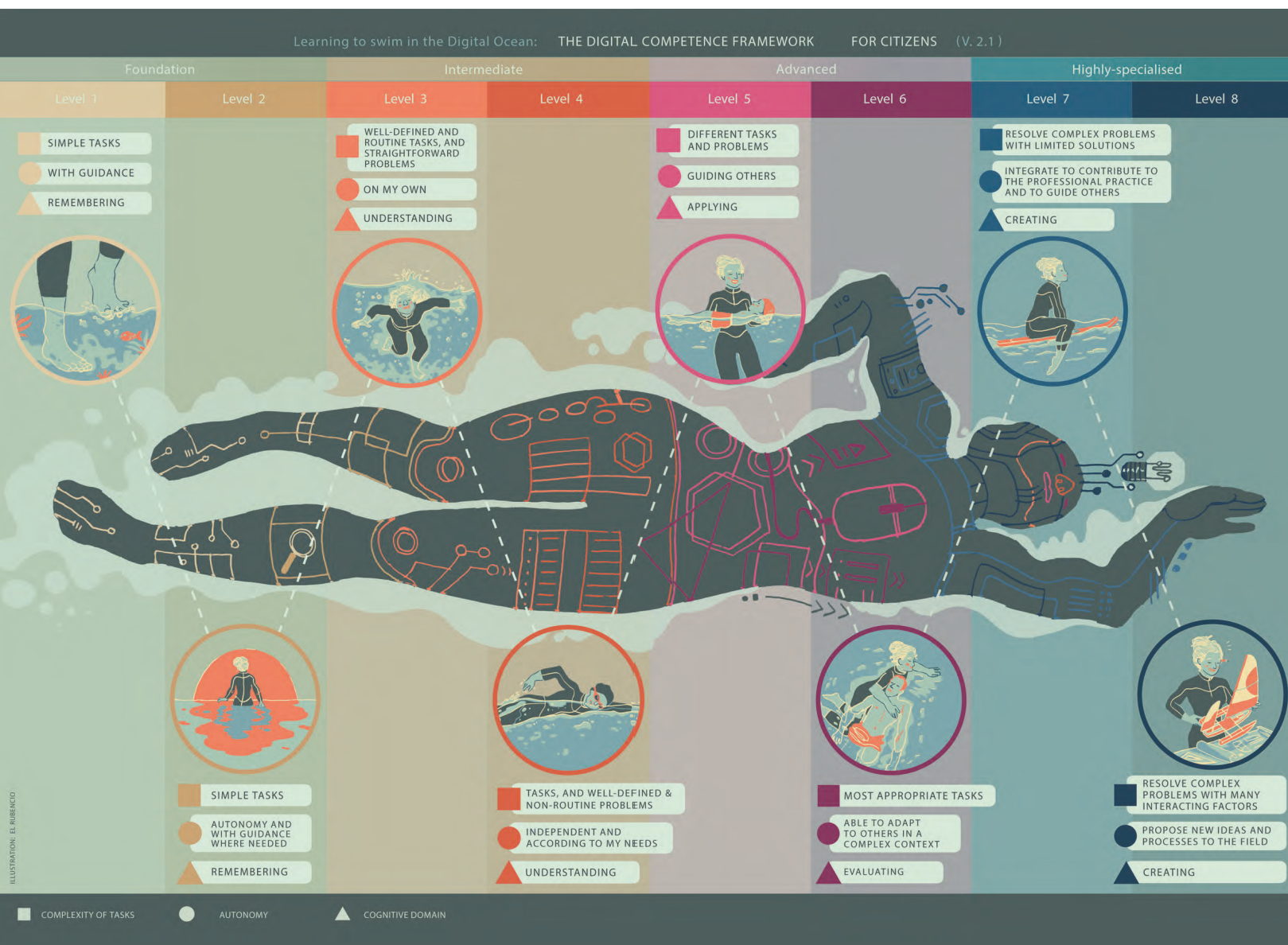


Table 1. Areas and competences of the European Digital Competence Framework 2.0 (DigComp 2.0)

Competence areas	Competences
1. Information and data literacy	1.1 Browsing, searching and filtering data, information and digital content 1.2 Evaluating data, information and digital content 1.3 Managing data, information and digital content
2. Communication and collaboration	2.1 Interacting through digital technologies 2.2 Sharing through digital technologies 2.3 Engaging in citizenship through digital technologies 2.4 Collaborating through digital technologies 2.5 Netiquette 2.6 Managing digital identity
3. Digital content creation	3.1 Developing digital content 3.2 Integrating and re-elaborating digital content 3.3 Copyright and licences 3.4 Programming
4. Safety	4.1 Protecting devices 4.2 Protecting personal data and privacy 4.3 Protecting health and well-being 4.4 Protecting the environment
5. Problem solving	5.1 Solving technical problems 5.2 Identifying needs and technological responses 5.3 Creatively using digital technologies 5.4 Identifying digital competence gaps

Source: Vuorikari et al. 2016

Figure 2. Development of the proficiency levels of the European Digital Competence Framework 2.1



Source: Carretero et al., 2017

How can we measure and develop digital skills?

Being exposed to digital technology is not enough to equip oneself with digital skills (Fraillon et al., 2019; Kirschner & De Bruyckere, 2017; Margaryan et al., 2011). In developing countries, several surveys have indicated that many do not use the internet simply because they are not aware of it (James, 2019). Training is needed to develop digital skills (see Box 1).

Box 1. How to train digital skills: an example

The initiative “Pane e Internet” (“Bread and the Internet”) was established in the Italian region of Emilia Romagna in 2009 to develop digital competence of citizens, especially those who do not use the internet or those who do, but lack awareness of issues, such as cybersecurity and privacy. This initiative adopted DigComp in 2014 to offer citizens the ability to actively participate in the digital society and avoid potential exclusion. The initiative focused on three main activities: digital literacy of the three first levels of proficiency, digital facilitation promoting self-learning, and a digital culture program with different workshops and events to learn digital competence in informal environments (see Kluzer & Pujol Priego, 2018 for more details).

Besides understanding the concept of digital competence (see the previous section), a relevant element for training is to evaluate digital competence. This could help identify the starting point of the learners and subsequently to guide them in training, as well as to measure achievements both in proficiency level and in the knowledge of diverse digital competences. For the same purpose, different kinds of assessments have been developed, and they can be grouped as the following (Carretero et al., 2016; Laanpere, 2019):

- **Computer-based performance or observation measures**, in which participants perform a set of tasks monitored and assessed by human observers or software. Examples of these tests are the module of problem-solving in technology-rich environments of the Education & Skills Online Assessment from the OECD (OECD, n.d.) and the European Commission. The test is available in several languages and different versions (e.g., Spanish versions in Spain, the USA, and Chile).
- **Knowledge-based assessment**, where individuals are faced with realistic problems in a variety of authentic situations. They have to indicate what they would do in the given situation, or what would happen in reality. These items could measure both declarative and procedural knowledge. An example is the Guadalinfo self-diagnosis tool (in Spanish) (Andalucía es Digital, n.d.).

- **Self-assessment**, where participants respond to a set of questions. Their answers indicate their skill levels and how they would perform on digital tasks (Siddiq et al., 2016). Examples are the recently published DigCompSAT (Clifford et al., 2020), or the IKANOS self-assessment instrument (IKANOS, n.d.) developed by the Basque Country in Spain in 2012, based on DigComp. The latter entails 30 questions that assess the potential to develop digital competence (digital access and connectivity), past training, and level of digital competence. The tool is available in Spanish and English.

Each evaluation has its pros and cons (see Table 2). Thus, to select the appropriate tool, we must carefully consider and define the objectives of the assessment and available resources. Some instruments have already mixed two categories of the assessment. For example, PISA Digital Reading (DRA) and the use of information and communication technologies (ICTQ) from OECD is a mixture of performance and self-assessment tools (OECD, 2011). The Student Tool for Technology Literacy (ST2L) of the Florida Department of Education mixes performance and knowledge-based tests (Florida Department of Education, n.d.).



Table 2. Areas and competences of the European Digital Competence Framework 2.0 (DigComp 2.0)

	PERFORMANCE MEASURE	SELF-ASSESSMENT	KNOWLEDGE MEASURE
Pros	<ul style="list-style-type: none">• Best way to assess digital competence	<ul style="list-style-type: none">• Need less resource• Applicable to a large sample	<ul style="list-style-type: none">• Rich data if combined with self-assessment
	<ul style="list-style-type: none">• Automatic recording of indicators (response times, click sequence, etc.)	<ul style="list-style-type: none">• Efficient• Useful to assess learning and its progress (e.g., internal training)	<ul style="list-style-type: none">• Quick and cheap
	<ul style="list-style-type: none">• Robust results	<ul style="list-style-type: none">• Inform on attributes	
Cons	<ul style="list-style-type: none">• Time-consuming in their development		
	<ul style="list-style-type: none">• Expensive (human resources and digital equipment)		
	<ul style="list-style-type: none">• Difficult to compare and replicate	<ul style="list-style-type: none">• Leniency bias* (limited use as a single measure) – Data are richer combined with other assessment instruments	<ul style="list-style-type: none">• In need of basic digital skills. The online test is difficult to be administered to those with little or no digital competence.
	<ul style="list-style-type: none">• Applicable only to small samples		
	<ul style="list-style-type: none">• Technical problems while assessing		
	<ul style="list-style-type: none">• Need appropriate digital equipment (investment)		

Note: *People tend to over or underestimate their level of digital skills.
Source: Author’s elaboration, based on Carretero et al., 2016

In some cases, the evaluation could lead to a certification that can be used for employment and career promotion. A few organizations have already linked digital skills assessment to their external job profiles and internal training courses to increase the employability of potential hires or abilities of current workers in need of upskilling or reskilling, particularly in digital competence (see Kluzer et al. (2020) for more information).

Implications for training and measurement of digital skills

Digital skills are becoming more relevant than ever—not only because of the digital revolution we are experiencing in the labor market, but also due to the accelerated need for them that COVID-19 lockdown measures brought about. Thus far, digital skills have been identified and defined through several digital literacy frameworks, and a wide range of non-formal training and assessments are also available to develop and measure digital skills. Moreover, at the policy level, different strategies are in place to guide and ensure the digital skills development of citizens. Digital literacy is a key component of the Sustainable Development Goals (SDGs). In particular, SDG indicator 4.4.1 calls for countries to track and indicate the proportion of youth and adults with information and communications technology (ICT) skills.

Despite these efforts, many people still face difficulties in developing an appropriate level of digital skills, including those different sub-competencies introduced in Section 2. Granting equal and quality access to digital devices and infrastructure is merely the first step—that is, the basis of digital skills development. It does not imply or guarantee that citizens can develop skills to the level that allows them to make the most of digital technologies, enrich their personal and professional lives, and protect themselves from existing threats in the digital world. To achieve a successful transition to a digital society, governments must define strategies that motivate both intermediaries and individuals to take advantage of the already existing resources for digital competence and offer new ones tailored to different needs. Indeed, social and emotional skills such as motivation, resilience, and flexibility, must accompany learning new skills. This is another challenge that governments must undertake (Napierala et al., 2020).



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SKILLS FOR LIFE

21st Century Skills is an initiative led by the InterAmerican Development Bank (IDB) that brings together public and private sector stakeholders. The initiative strengthens learning ecosystems to equip Latin American and Caribbean citizens with transversal skills.

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