GUIDELINES ON THE ADOPTION OF DIGCOMP

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| 15/12/15 | Guidelines on the adoption of DigComp |

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SUMMARY

1   DigComp presentation

The importance of digital competence today

Digital technologies nowadays are key drivers of innovation, growth and job creation in the global economy. Their availability, in Europe at least, is not a problem anymore: over 100% of the population owns a mobile phone and 81% of families have Internet access at home.[1] Wider reach however is not a sign of ability to use these technologies. In 2015, 67% of the EU population aged between 16 and 74 was using the Internet every day. However, a study shows that almost half of this population had either "low" or "no" digital skills.[2] Many people are thus not considered to be functional in our digital society and ready for the 90% of jobs that in the near future are expected to require ICT skills of some level.[3] This is true also for younger people. EC (2103)[4] reports that only 30% of students in the EU can be considered as digitally competent. Data from the Skillage test of digital competence, run by Telecentre Europe, shows that the group of young people aged between 16 and 24 performs worse than the adults (25-54).[5]

Digital competence is one of the eight key competences for lifelong learning identified by the European Union.[6] It is a transversal key competence, which, as such, enables the acquisition of other key competences (e.g. mathematics, communication in mother tongue and foreign languages, learning to learn, cultural awareness etc.). In our society, the possibility to exploit the benefits of digital technologies (and avoid the risks) depends more on the knowledge, skills and attitudes to be able to use digital technologies in a critical, collaborative and creative way, than only on access to and use of ICTs. This digital competence is becoming necessary for a satisfactory and safe daily life, for active citizenship and employability.

A new, shared view of digital competence for all citizens

Until recently, there was no common understanding of what these skills, knowledge and attitudes are and no scientific ground to say which competences should be part of every citizen's digital competence. A multitude of learning opportunities of ICT skills for citizens, typically focused on enabling them to use specific computer applications and online services, exist in formal, non-formal and informal settings in Europe. Most of them however do not reflect a sound and shared view of digital competence.

To address this problem and create a common language between the worlds of education and labour market, the European Commission developed and published in 2013 what is now known as the **European Digital Competence Framework for Citizens**,[7] henceforth DigComp. DigComp identifies and describes 21 competences, grouped in 5 areas (see later), needed to use digital technologies in a confident, critical, collaborative and creative way to achieve goals related to work, employability, learning, leisure, inclusion and participation in our digital society.

Starting in 2010, the Institute for Prospective Technological Studies (JRC-IPTS) of the European Commission developed DigComp on request of the Directorate General for Education and Culture (DG EAC) and then of the Directorate General for Employment, Social Affairs and Inclusion. DigComp's development took two years of intensive collaboration and validation processes that involved more than 120 experts and stakeholders from all across Europe. Important sources of inspiration in the development of DigComp have been the

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[1] http://ec.europa.eu/eurostat/web/information-society/data/database

[2] EC (2014). Measuring Digital Skills across the EU: EU wide indicators of Digital Competence. https://ec.europa.eu/digital-agenda/en/news/measuring-digital-skills-across-eu-eu-wide-indicators-digital-competence

[3] EC (2013). Digital Agenda. ICT for Jobs. http://ec.europa.eu/europe2020/pdf/themes/12_digital_agenda_ict.pdf

[4] EC (2103). Opening up Education: Innovative teaching and learning for all through new Technologies and Open Educational Resources. COM/2013/0654 final. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52013DC0654

[5] http://www.telecentre-europe.org/resources/skillage-report-2012-2015/

[6] EC (2006). Key competences for lifelong learning. Recommendation of the European Parliament and of the Council of 18 December 2006. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:394:0010:0018:en:PDF

[7] Ferrari, A. (2013), DigComp: A Framework for Developing and Understanding Digital Competence in Europe, Seville: JRC-IPTS. http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=6359

Common European Framework of Reference for Languages (CEFR), the European Qualification Framework (EQF) and the eCompetence framework for ICT professionals, from which four of DigComp's five framework dimensions were drawn.[8]

The **eCompetence framework (eCF) for ICT professionals**[9] was also built on request of the European Commission (currently DG Growth) to define the competence of specialists working in the ICT industry and in ICT-related jobs in other sectors. Along with it, the **eCF for end users**[10] was developed, covering some aspects of citizens' digital competence[11] in a more granular way than in DigComp. For this reason, as stated in TE (2014), [12] this framework can be used to complement DigComp for those "specific competences that are still central to a large part of the labour market, and … to target specific competences that can be recognized and certified".

DigComp: 5 competence areas and 21 specific competences

DigComp is the European framework for digital competence for all citizens. Its aim is to create a common understanding of the digital competences that citizens need to participate fully in today's society: knowing how to look for, assess and use information; how to communicate through various channels; how to produce and share digital content; how to use digital technology safely and critically in everyday life, including work.

The DigComp conceptual reference model identifies 5 broad areas of digital competence, broken down into 21 competences as in the table below (titles in the table are already those adjusted for the upcoming version 2.0 of the framework. More on this below):

1 Information and data processing Identify, locate, retrieve, store, organise and analyse digital information, judging its relevance and purpose	2 Communication Communicate in digital environments, share resources through online tools, link with others and collaborate through digital tools, interact with and participate in communities and networks, cross-cultural awareness	3 Content creation Create and edit new content (from word processing to images and video); integrate and re-elaborate previous knowledge and content; produce creative expressions, media outputs and programming; deal with and apply intellectual property rights and licences	4 Safety Personal protection, data protection, digital identity protection, security measures, safe and sustainable use	5 Problem solving Identify digital needs and resources, make informed decisions on most appropriate digital tools according to the purpose or need, solve conceptual problems through digital means, creatively use technologies, solve technical problems, update own and other's competence
1.1 Browsing, searching and filtering information 1.2 Evaluating information and data 1.3 Storing and retrieving information and data	2.1 Interacting through digital technologies 2.2 Sharing information and content 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	3.1 Developing content 3.2 Integrating and re-elaborating 3.3 Copyright and licences 3.4 Programming	4.1 Protecting devices 4.2 Protecting personal data and privacy 4.3 Protecting health and well-being 4.4 Protecting the environment	5.1 Solving technical problems 5.2 Identifying needs and technological responses 5.3 Creatively using digital technologies 5.4 Identifying digital competence gaps

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[8] The four common dimensions are: 1 competence areas; 2 competences; 3 proficiency levels; 4 examples of knowledge, skills and attitudes. A fifth dimension (purposes) was added, as DigComp is meant to be applied to different contexts.
[9] http://www.ecompetences.eu/
[10] ftp://ftp.cen.eu/CEN/Sectors/list/ICT/CWAs/CWA%2016624_1.pdf
[11] The five areas of digital competence developed in the eCF for end users are Word Processing, Spreadsheets, Presentation, Communications, Web Browsing and Information Search.
[12] TE (2014). Telecentre Europe's Position Paper on Digital Competence and Employability. http://www.telecentre-europe.org/digital-competence-and-employability-tes-policy-position/

Areas 1, 2 and 3 deal with competences that can be re-traced in terms of specific activities and uses, whereas areas 4 and 5 are "transversal", as they apply to any type of activity carried out through digital means. Problem solving elements, in particular, are present in all competence areas, but a specific area was defined to highlight the importance of this aspect for the appropriation of technology and digital practices.

The version 1.0 of the DigComp framework provides for each competence a short description and the elements qualifying three proficiency levels (foundation/basic, intermediate, advanced[13]); a list of examples of the knowledge, skills and attitudes that can illustrate that competence (not an exhaustive list); and examples reflecting proficiency levels again, of how the specific competence can be applied for two selected purposes: learning and work.[14] The figure below shows competence 4.1 Protecting devices.

Dimension 1 Name of area	Safety		
Dimension 2 Competence title and description	4.1 Protecting devices To protect own devices and to understand online risks and threats, to know about safety and security measures		
Dimension 3 Proficiency levels	A - Foundation	B- Intermediate	C- Advanced
	I can use basic steps to protect my devices (for instance: using anti-viruses, passwords, etc.).	I know how to protect my digital devices, I update my security strategies.	I frequently update my security strategies. I can take action when the device is under threat.
Dimension 4 Knowledge examples	Knows that there are several risks associated with the use of technologies Knows about current and up-to-date strategies to avoid risks Understands the risks associated with online use		
Skills examples	Is able to install an anti-virus is able to take steps to mitigate risk of fraud by using a password Is able to protect different devices from threats of the digital world (malware, viruses etc.)		
Attitude examples	Has a positive but realistic attitude towards the benefits and risks associated with online technologies		
Dimension 5 Application to purpose			
Learning	I know school computers have to have good antivirus software, because many students use internet on the same computer.	If I use my device on school free WiFi, I always try to secure my access (using VPN).	I use different passwords for accessing the school computers and services and I often change my passwords.
Employment	I have a strong password set on my computer at the office, so only I can access it.	If I am installing a software from the internet on my work PC, I use services, which can scan the file online.	When I am using cloud storage services for sharing, I encrypt the files with the most confidential work information.

In the DigComp report (Ferrari, 2013, see footnote 7), there is also a self-assessment grid that could be used as a tool by citizens to describe their own level of digital competence to third parties and to understand how to improve their own digital competence. An adapted version of that grid was embedded in the EUROPASS CV in summer 2015, as illustrated later on.

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[13] Following the European Qualification Framework, the levels' meanings are: Foundation = "being aware and having an understanding of"; Intermediate = "being able to use"; Advanced = "being actively involved in as a practice".

[14] Other purposes have been identified –leisure, social, buying and selling, citizenship and well-being- but they are only defined, not developed, in Annex I of the DigComp's report (see footnote 7).

JRC-IPTS is currently working on updating the DigComp framework. The proposal with planned changes for the conceptual reference model is available online for consultation[15] and will be published by May 2016.

The 5 areas and 21 competences will remain more or less the same. As mentioned already, some titles have been adjusted (the table below shows added words in red and strikethrough text for deleted words) and some competence descriptions have been streamlined to reduce redundancy and have been brought up to date, to reflect new vocabulary (e.g. online -> digital environments) and conceptual updates following changes in the digital world (e.g. data protection and right to be forgotten). The biggest changes concern the content of competence "3.4 Programming", to account for the trend of including "computational thinking" and "coding" into the school curriculum and the priorities of the eSkills for job European campaign.

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1.1 Browsing, searching and filtering information 1.2 Evaluating information and data 1.3 Storing and retrieving information and data	2.1 Interacting through digital technologies 2.2 Sharing information and content through digital technologies 2.3 Engaging online in citizenship through digital technologies 2.4 Collaborating through digital channels technologies 2.5 Netiquette 2.6 Managing digital identity	3.1 Developing content 3.2 Integrating and re-elaborating 3.3 Copyright and licences 3.4 Programming	4.1 Protecting devices 4.2 Protecting personal data and privacy 4.3 Protecting health and well-being 4.4 Protecting the environment	5.1 Solving technical problems 5.2 Identifying needs and technological responses 5.3 Innovating and Creatively using digital technologies 5.4 Identifying digital competence gaps

An important evolution envisaged for the DigComp framework 2.0 is the articulation of digital competence proficiency at 8 levels rather than the previous 3. This aims to provide a more detailed description of what characterizes each level (one learning outcome is provided per level, combining knowledge, skills and attitudes) and what varies when moving on to the next. This change should overcome the lack of clear distinctions found in some competences before. The DigComp version 2.0 with 8 levels will be validated in the course of 2016.

JRC-IPTS is also working on two new adaptations of DigComp (so called "derivative frameworks" for specific contexts). In the course of 2016, The Digital Competence Framework for Consumers (DigCompConsumer) will be published in collaboration with DG Justice and Consumers. By mid-2017, in collaboration with DG Education and Culture, a framework for the teaching profession (DigCompTeach) will be finalised. The Carer+ case presented later is another existing example of a derivative framework.

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[15] http://www.slideshare.net/vuorikari/the-jrcipts-proposal-for-the-update-of-the-digcomp-conceptual-reference-framework-digcomp-20-55927941

2 Examples of use of the DigComp framework

DigComp was designed to support citizens to live and work in an increasingly digital society. It can be used in different contexts as an enabler, to empower users, not to restrict them.

DigComp can support multiple actors:

- *citizens* with no or low ICT abilities to identify the most essential skills to improve their personal and professional lives and to understand where they are making progress;
- *jobseekers* to identify and describe their digital competence in their CV, in particular by using self-assessment tools such as those illustrated in the sections below. They can also compare their skills against job vacancies to identify those they are lacking and search for further learning opportunities;
- *employers* to define the competences in their vacancies when they are developing a job description;
- *employment services* to exchange relevant labour market information (such as CVs and vacancies) by using a common "language" and to offer career guidance;
- *education and training institutions and lifelong learning organisations* to develop and innovate their delivery and assessment services and *policy makers* to design better policies e.g. for teacher training and professional development.[16]

Several organisations are already using DigComp in different ways at the local and national level and there are also various European wide implementations. JRC-IPTS regularly updates a Gallery of Implementations of DigComp in Europe, classified in four areas, as in the figure below.

Source: https://ec.europa.eu/jrc/en/digcomp/implementation

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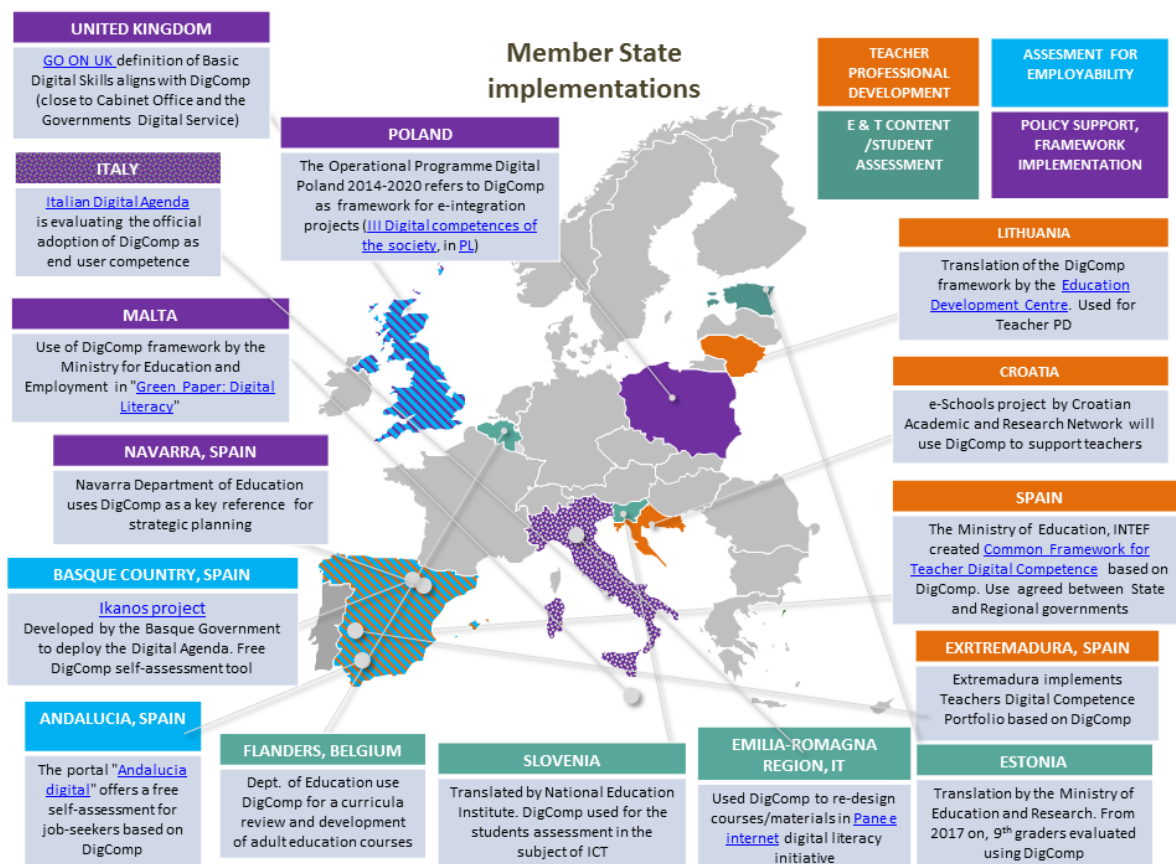
[16] For this reason, EU Member States' representatives in the Education and Training 2020 Programme Thematic Working group on "ICT and Education" have endorsed the DigComp framework.

In this section, we look at some experiences with the use of DigComp developed by members of Telecentre Europe (TE) and other actors at the regional, national and transnational levels. The first four cases are regional level experiences focused on the alignment of existing learning initiatives with DigComp. They occurred in the context of adult education in the Flanders, Belgium and of broader digital literacy and competence development programmes in the Basque country, Spain and in the Emilia Romagna region in Italy. We then look at other initiatives specifically aimed at enhancing employability developed at regional level (ACTIC in Catalonia), transnational level (Carer+) and European level (Skillage and Europass). We start with the Basque Country's IKANOS project, as this was the first and to this date the most developed implementation of DigComp at the local level.

The IKANOS project in the Basque Country

The Basque Country's Government launched the IKANOS project in 2012 to develop digital competence on a large scale within the Basque society, as part of its Agenda Digital de Euskadi 2015 (AD@15). The Economics and Competitiveness Dept. of the Directorate General Entrepreneurship, Innovation and Information society is in charge of the IKANOS project. IKANOS was from the very beginning inspired by and designed to implement the European DigComp framework, aiming to address the common and specific digital competence needs of citizens, enterprises, civil servants, teachers and other segments of the Basque society.

The project implements four main actions:

1. Development of the digital competence conceptual framework and profiles definition
2. Competence acquisition: self-assessment test, training resources and initiatives
3. Competence validation, evaluation, certification and accreditation
4. Dissemination and promotion of the IKANOS approach at national and European policy level

Here we briefly illustrate the following results: the self-assessment tool developed by IKANOS; the digital competence profiles designed for specific professions; the orientation guide for intermediaries, to support interested users after the test in the choice of learning paths; the impending revision of the digital competence certification system.

IKANOS **self-assessment tool**[17] considers three "thematic blocks" that make up an individual's digital profile:

1. the potential to develop digital competence, which is assessed by looking at the available ICT equipment and devices, Internet access and connectivity and how they are used
2. the ICT background in terms of any past training and/or certification experiences
3. the level of digital competence according to the DigComp model
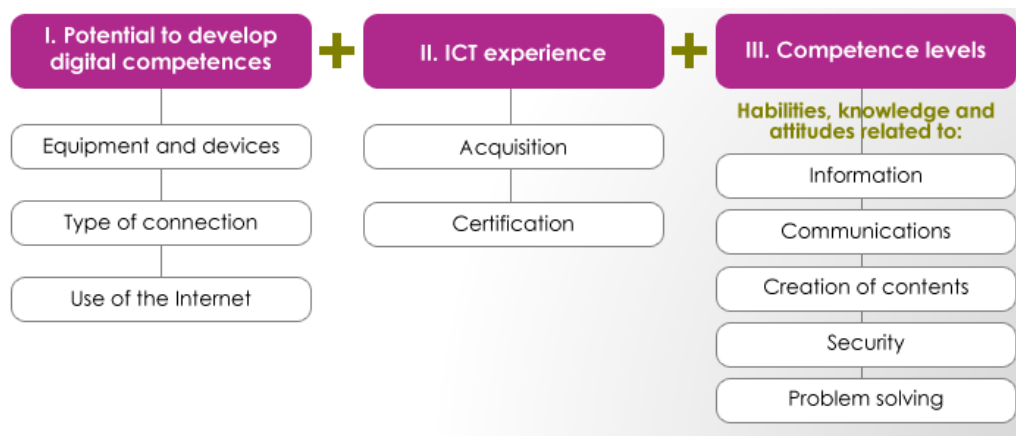
The test addresses the above thematic blocks by asking for each of them different types of questions (yes/no, single or multiple choice, scoring etc.), which are the same for all respondents, for about 30 questions. In some parts of the questionnaire, additional information about local resources and initiatives related to specific questions is given, depending on the respondent's answers. In the final part of the test, the user is asked to provide personal information about location, occupation and other aspects. In principle, going through the whole questionnaire should require 15 minutes; in practice, it usually takes longer.

The test produces a personalised "Digital profile report" with the following sections:

- section A gives the Overall assessment score (basic, intermediate, advanced with a related visualisation) and a short explanation about its meaning;
- section B visualizes the results w.r.t the three components of the competence development potential. Here, as in the other sections, results are graded according to DigComp's 3-level scale, but the visualisation offers also a more nuanced view of the actual scores;
- section C gives the aggregate result for each one of DigComp's 5 areas of competence, with a visualization and a description of each competence area's content;
- section D shows the results for each one of DigComp's 21 digital competences (the visualization is almost the same as in the BAIT certificate presented below).

The remaining pages of the Digital profile report contextualize the results and have a broader educational function. They explain that digital competence is one of the eight key competences defined by the European Commission for the curriculum vitae of a modern citizen. Additionally, DigComp and its underlying view of digital competence as made of knowledge, skills and attitudes is explained. Finally, an annex with the "Digital competences dictionary" is provided, which is the list and description of DigComp's 21 competences and 5 main areas.

Thanks to the anonymous information collected from the users and the large number of recorded tests,[18] the results can be collectively analysed to produce and compare competence profiles, specific strengths and weaknesses based on the respondents' profession, where they live and so on. This was used to identify the overall competence level and possible competence gaps of teachers and other staff in Basque Country schools and vocational training institutions, and to design training offers targeting specific groups and locations. Similar aggregate analyses have been developed also on students and on the staff of KZgunea, the Basque Country's network of free public telecentres for training and use of ICT in all municipalities. With vocational schools' students, the test will be repeated after a 2-year training program, to assess their digital competences' acquisition.

The IKANOS project also developed the so-called "**Professional Digital Profile**". Following the DigComp model, this profile identifies the mix of competences and proficiency levels that characterize a given profession. For this, DigComp's 21 competences are classified for any specific occupation as follows:

- <u>transversal</u>, i.e. competences which are in fact deemed necessary in any work activity
- <u>central/fundamental</u>, i.e. competences that are required to anyone in that occupation
- <u>complementary</u>, i.e. competences that are helpful and enhance the work performance, but are not strictly necessary for everyone to do the job

Professional Digital Profiles have been defined for five activities: administrative officers in the public administration, commercial employees, industrial tools operators, entrepreneurs, numerical control machines operators. The first three profiles are quite in demand in the local labour market. Self-employment and entrepreneurship have become an important option for young people and many people who lost their job in the current economic phase. The last profile has been selected as a starting point to develop digital profiles for highly qualified jobs in the manufacturing industry.

To define a Professional Digital Profile, IKANOS first identifies all the main activities performed in the selected job, also reflecting different levels of experience and proficiency. Then those activities that are or could be performed using digital tools and services are identified. These are eventually associated with specific competences and proficiency levels, according to DigComp and to the tripartite classification seen above. A profile can be designed both in its current reference version ("how things typically are at the moment") and
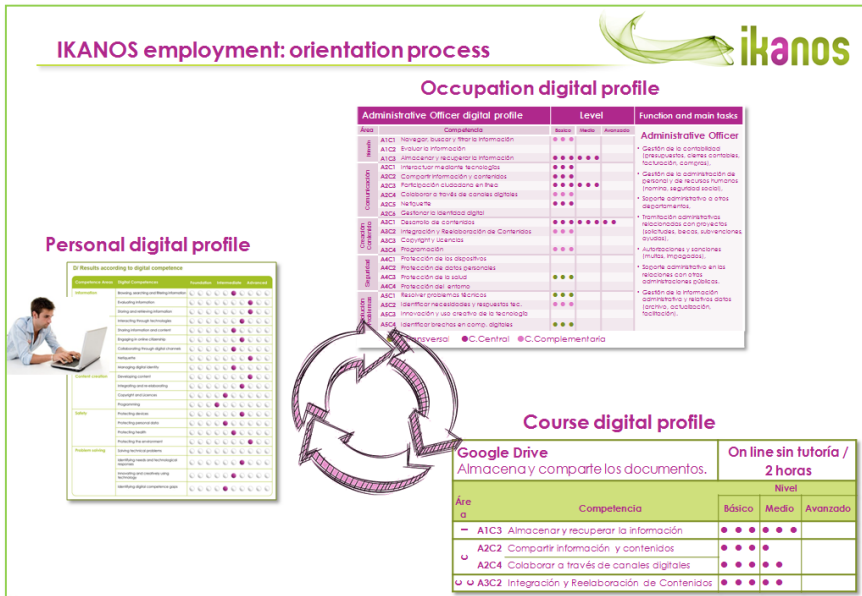
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[18] By October 2015, there were almost 16,800 records in the IKANOS test database. They concerned about 6,500 citizens, 4,500 teachers, 5,400 students from vocational schools, 230 e-facilitators from telecentres and others.

as an ideal, target profile: "how things might/should be in the future". The profession-specific knowledge needed for the above process is drawn from ad hoc surveys (for instance, in the case of administrative officers in the civil service), from human resources experts, vocational training specialists and other sources. The choice of profiles to develop is made by the 15 working groups set up by the Basque Country government's departments with the relevant stakeholders for the IKANOS project.[19]

The **Orientation Guide** developed by IKANOS comes at play at this stage. Thanks to the common use of the DigComp framework, it is possible to compare the Professional Digital Profile for a given occupation with the results from a user's IKANOS self-assessment test, in order to identify the main competence gaps faced by the user and to recommend training opportunities to fill those gaps.

The Orientation Guide explains how to perform this comparison, to ask a few additional questions and then make recommendations based on their results. IKANOS developed this tool for the career guidance professionals working at the Basque Country's Employment services (about 200 people) and in the KZgunea network (85 people). To support the use of the Guide and other IKANOS tools,[20] the DigComp taxonomy (the 21 competences at three proficiency levels) has been used to classify all the ICT-related courses and learning materials offered by KZgunea and the government's Industry Dept. For instance, an introductory course or module on Google Drive has been classified as leading to intermediate proficiency in the following competences: 1.3 Storing and retrieving information; 2.2 sharing information and content; 2.4
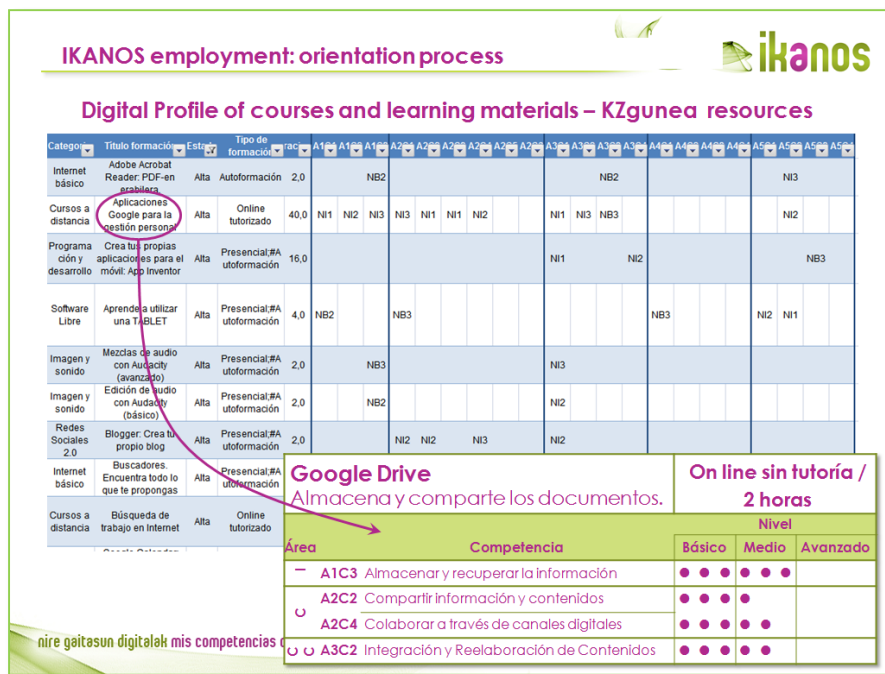
Collaborating through digital channels; 3.2 Integrating and re-elaborating content. A searchable list of learning resources has been produced accordingly, with information about targeted competences and levels, the duration of the course and its delivery mode (online, with a tutor etc.).

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[19] The working groups were set up in the following departments: Education, Employment, Industry (small and medium enterprises), Civil Service, Certification, and International relationships.

[20] We refer here to the Personal Learning Environment and the ePortfolio that are currently under development.

Finally, a new assessment tool and certificate "BAIT, Validate your digital competences" has been created (see figure below) and is being launched in 2016. BAIT is the revision of the existing **ICT knowledge certification system** of the Basque country, which issues the *IT txartela* (IT card in the Basque language). Established almost 15 years ago, following the traditional approach to ICT skills development and certification, this system issued to about 200,000 people almost 500,000 certificates focused on operational and application-related skills.[21] IKANOS has revised the system towards a fully competence-based approach built on the DigComp framework.

New automatic validation methods have been designed (e.g. using simulations of real-life work processes and tools, storytelling and attitude assessment) with the aim to extend the scope of the certification process also to the digital competence development that people experience increasingly outside of formal learning environments. These changes will preserve the important asset represented by the established, well known by Basque people and appreciated processes leading to the certification,[22] including the use by the citizens of KZgunea telecentres' sites and assistance.

Always with the aim to stimulate and support citizens' understanding and willingness to undertake the continuous learning effort on digital competence, which rapid technological change makes necessary and that occurs as just said increasingly outside of formal learning settings, IKANOS has been developing a Personal Learning Environment (PLE) tool that will be presented and widely disseminated in 2016.

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[21] The only certificates available until recently concern: Operating Systems (Windows, Linux); Open Office; MS Office productivity tools (Word, Excel, Access, Powerpoint); Internet and e-mail (MS Outlook).
[22] Registration to the test; announcement of the test; assignment of location and time for taking the test; test execution and surveillance; transactions security; results publication and complaints management; issuing and delivery of the certificate.

DigComp in adult education in the Flemish Community

In the adult education system of the Flemish Community in Belgium, DigComp has been used as the reference framework for the actualisation of the ICT-courses offered by adult education centres (AECs).[23]

In the Flemish adult education system, the key element of the curriculum is the "education programme", which is made of a set of modules that are the same for all AECs. Each module in turn is made of a set of "learning outcomes", which are the basic competence components. In order to develop a new education programme or change an existing one, a cross-sectoral commission of education providers[24] proposes a set of basic competences/learning outcomes and their modular structure. The government then approves the proposal and makes it officially available and compulsory for all AECs. Basic competences and modules are typically inspired or drawn from professional qualification profiles in the case of vocational education programmes and from reference frameworks for general education programmes, such as CEFR for foreign languages and DigComp for non-ICT specialist digital competence.

Following the above procedure, a cross-sectoral commission of experts in ICT and adult education was set up to define new educational programmes based on DigComp. It met for about 20 full-day meetings between May 2014 and June 2015. Before this move, the ICT education programme offered by the AECs in the Flanders was not competence-based and was structured into 30 modules almost entirely devoted to learning common software applications for text processing, calculations and so on (MS Word, Excel, Access, Powerpoint, Photoshop etc.). The commission decided to move beyond an approach based on software applications and saw DigComp as creating new opportunities: to shift to a competence-oriented educational perspective; to adopt a clear framework for digital competence development of the citizens, distinct from and complementary to other frameworks for vocational and specialist ICT education; to modernize content and include new ICT developments such as the Internet 2.0, social media, tablets, smartphones etc.; and to design shorter education programmes (max. 14 modules) with the a new functional and competence-oriented perspective.

With these aims in mind, the commission first studied DigComp and translated into Dutch the 5 areas, 21 competences and related examples of knowledge, attitudes and skills, and re-formulated them, keeping in mind the three proficiency levels, to obtain a first draft version of the 'learning outcomes'. The main result of this process is a list (in Dutch) of about 500 potential learning outcomes, from very generic to very specific ones, all of them categorized according to DigComp's areas and competences. Most of them were also categorized by the three proficiency levels and by competence component type (knowledge, skills, and attitudes). However, the difference between proficiency levels for some competences in the DigComp framework (especially between intermediate and advanced levels) was found not always detailed and clear enough for such classification. So further work and revisions on this aspect are anticipated in the light of future teaching experience.

As a second step, the 500 competences were clustered into 54 modules, also keeping in mind the goal of having a maximum duration of 60 school-hours per module.[25] The first two modules - "Getting started with ICT" and "E-communication, Internet and online services"- have been designed as the common entry level for all learning paths. Each module is composed of a variable set of 'basic competences': 5 are 'generic'

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[23] There are 101 AECs in the Flanders Community, with about 350,000 people enrolled annually in adult secondary education, higher vocational adult education and specific teacher training. Another 50,000 people attend adult basic education courses in 13 Adult Basic Education Centres.

[24] Usually made of representatives from the AECs, the five School advisory services operating in the Flanders and other experts.

[25] Based on the 30-year long experience of the AECs in Flanders, 60 school-hours is the best average duration time for the organisation and delivery of modules. This corresponds to about 20 lessons of 3 hours, typically from 1st of September until 31th of January, or from 1st of February until 30th of June. In any case, the commission's proposal to the Flanders Education Dept. allows for fast learners to go through a module in 40 hours, 20 or even in 10.

competences assigned to all modules[26] and another 5 to 10 are 'specific' competences that only apply to one specific module. For instance, in the "Getting started with ICT" module the specific competences are:

- to find, save, organise and retrieve digital information & content
- to know different storage options and to select the most appropriate
- to know the difference between open source software and commercial software
- to apply basic settings to protect data
- to use basic tools to protect devices
- to install a pre-installed device
- to manipulate efficiently his own device
- to modify some simple function of software and applications
- is aware of the most relevant or popular digital technologies

Finally, the 54 modules were combined into 8 education programmes called: ICT and administration; ICT and social media; ICT in an educational context; ICT and creativity; Web content; App development; ICT systems and networks; and Programming. The number of modules per programme varies from 5 to 14, so programmes' overall duration is also much variable. As mentioned already, the two entry-level modules are included in all programmes and a few other modules (e.g. "Collaborative content development") are also shared by two programmes. Each programme not only defines which modules to address, but also how they can be clustered and their delivery sequence (see the example below for the "ICT and administration" programme).
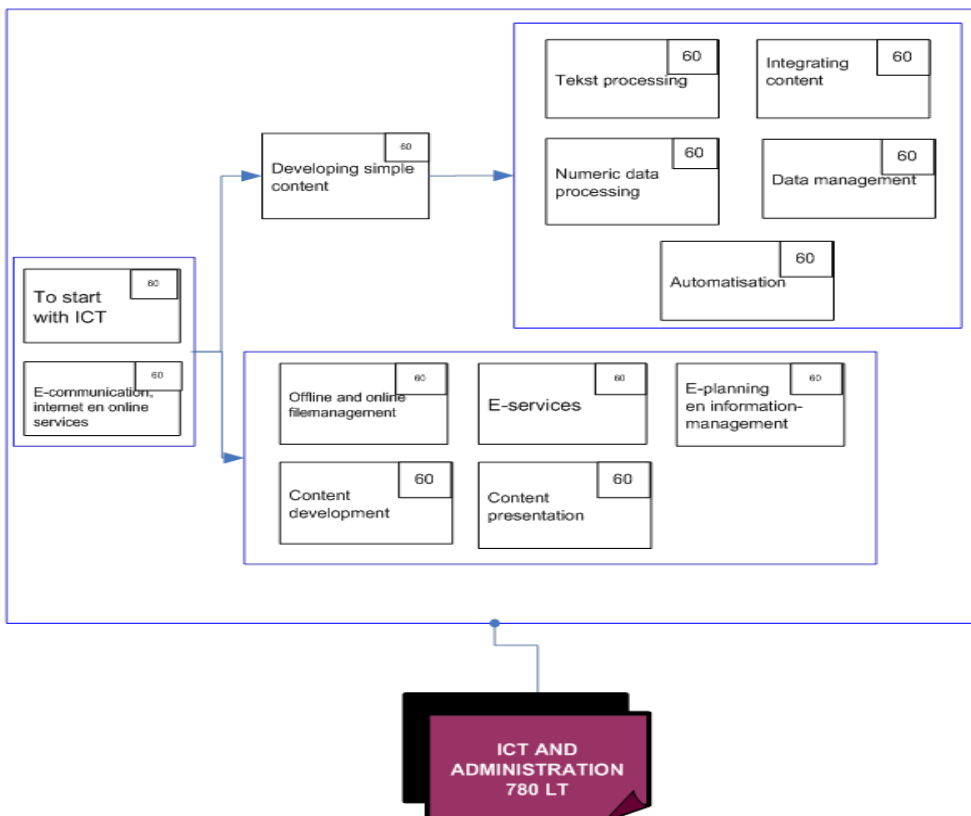
The sequencing of modules aims to orient the progression in competence development, both content-wise and in terms of growing proficiency. Sequencing has thus been used in the design of the modules and

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[26] These are: to solve conceptual problems through digital means; to solve technical problems; to update one's own competences; safe and sustainable use of ICT; to judge and critically evaluate information & media content.

education programmes to compensate for the uncertainties in proficiency progression found, as mentioned above, in some parts of DigComp framework.

Once the Flanders' Education Minister approves the proposal, AECs are expected to start organizing the new modules and education programmes, and to deliver them from 1st of September 2016. To achieve this, information sessions will be arranged with collaboration and support from the Education Dept., to present the new modules to the teachers and help them acquire the concept of DigComp. Given that ICT teachers are used to focus almost exclusively on the technical abilities promoted by the previous ICT education programme, the commission acknowledges that it will be a major challenge for them to address the other competence components along with new topics, and to develop appropriate teaching methods for it. Support to teachers' training, also through peer collaboration, will likely be needed.

In parallel with these actions, entry tests for the first two modules will also be developed, so that learners already possessing those competences do not have to start from the very beginning and can skip one or both modules.

Guadalinfo: self-assessment tool and training actions

In 2014, Consorcio Fernando de los Ríos, in charge of the Guadalinfo telecenters network[27] in Andalusia (Spain), decided to establish a new system for digital competence development based on DigComp. Before this move, a common reference framework on digital competence was missing in the Guadalinfo system. The assessment of users' support and training needs and the choice of how to meet them was mostly left to Guadalinfo's local actors' autonomous judgment. The digital competence of these actors –known in Andalusia as *Agentes de Innovación Local* and *Dinamizadores Territoriales*- was varied and needed a general upgrade, but lacked a clear evolution path. Although Guadalinfo mostly caters for basic digital literacy and inclusion demands, a growing share of its customers also need more advanced training and other Guadalinfo activities (e.g. the support of social innovation projects) would benefit from it too. The need for a common framework to enable a broader digital competence development process was thus identified.

With the new strategy, Consorcio has been working on developing three mid-term results: a self-assessment tool based on DigComp that anyone can use to assess his/her digital competence; a training offer for anyone wishing to fill his/her digital competence gaps; and a certification model for the evaluation and accreditation of the acquired competence (this is still under development and is not considered here).

The starting step to develop these tools and services has been the translation of all DigComp's 21 competences, at the three proficiency levels, into concrete "indicators", [28] whenever possible. This has been done, after an analysis of Guadalinfo's customers' and e-facilitators' requirements, by identifying the abilities (= capability of doing this or that …) required for specific tasks (e.g. sending a file, sharing a video …) to be performed with given tools and services (e.g. sending a file using e-mail or using Skype; sharing a video on Youtube or a presentation on Slideshare etc.). Of course, for some competencies with a more transversal and abstract character, the association with specific tasks and tools could not be performed. This operation produced a full set of indicators used to build the self-assessment tool and to match competence development with the training offer.

The digital competence **self-assessment tool** is available on the *Andalucía es digital* portal.[29] The tool requires the user to go through different types of questions and simple tests about his/her knowledge or behaviour

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[27] The Consorcio's members are the 8 provincial administrations of Andalusia and the regional Economics, Innovation, Science and Employment Council. Guadalinfo comprises about 800 centres in the municipalities of Andalusia, providing digital and Internet access, training and assistance services to about 850.000 citizens.

[28] Starting from DigComp's Annex IV "Indicators for the development of digital competence".

[29] http://www.andaluciaesdigital.es/web/formacion/conoce-tu-nivel-competencia

concerning all 21 DigComp competencies, mostly as translated into the above indicators. Due to its nature (an online questionnaire) and the questions asked, the tool requires the user to have already some digital skills and knowledge of the digital world. As a result, the user gets a final assessment report (*diagnóstico*) of his/her proficiency for each of the 5 DigComp areas and 21 competencies, measured as basic, intermediate or advanced. The user can then download the report as a pdf file and ask for training itinerary proposals to

enhance his/her proficiency. Training itineraries are designed following two available options for the user: to deepen knowledge in one of the 5 DigComp areas and/or to gain higher proficiency across all areas.

In the first case, the service lists the user's proficiency level measured by the self-assessment tool in each of the competencies belonging to the selected area. The service then suggests training actions (see below) that can improve proficiency in that area. These actions are categorized by broad "application" domains -digital literacy, entrepreneurship, employability, citizen participation, e-government etc.- to help the user understand how they may relate to his/her personal needs and goals.

If the user rather chooses to improve his/her proficiency across all areas, the system lists the competencies in all 5 areas where he/she scored below the desired proficiency level and suggests the training actions that may help reach that level. Training actions are categorized as above by broad application domains.

The renewed **training offer/catalogue** is being developed by putting together some existing and mostly newly created Guadalinfo courses and learning resources. At the time of writing, the following resources were available, covering all 21 competencies and proficiency levels:[30]

- 8 step-by-step instruction sheets (typically, for specific, operational topics such as sending/receiving emails) and 28 teaching sheets (for more transversal topics such as Internet risks). These resources are designed mostly for face-to-face training at basic competence level;
- e-learning platform for the delivery of 24 multimedia courses mostly at intermediate competence level;
- 15 "learning pills" offering focused knowledge and in-depth guidance on specific topics and tools, for autonomous learning at more advanced competence level.

On average, the time for completion of the above individual training actions ranges from 1-3 hours at basic level; 12-30 hours at intermediate level and from 20 minutes to 2 hours at advanced level.

Besides making available the self-assessment tool and the new training offer to all citizens, Guadalinfo has undertaken two actions targeting its own local staff (*Agentes de Innovación Local* and *Dinamizadores Territoriales*). Fist, awareness and training workshops have been held across Andalusia to present the new DigComp inspired tools, resources and their benefits for end-users. Along with this, local agents were offered an e-learning course to enhance their digital competence to intermediate level, possibly across all DigComp main areas.

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[30] A training action can contribute to different specific competencies. For instance, the teaching sheet on "Internet risks" contributes to competencies 2.6 Managing digital identity, 4.2 Protecting data and digital identity and 4.3 Protecting health.

DigComp and Pane e Internet[31] project in Emilia Romagna

Pane e Internet[32] (henceforth PeI) is the digital literacy and inclusion project carried out since 2009 by the Regional government of Emilia Romagna (RER) in Northern Italy. For the first few years, RER organised and delivered directly PeI courses with the collaboration of provincial and municipal administrations. In the new project phase 2014-2017, RER decided to promote the creation throughout the region of so called "PeI Points". These are local networks being set up by the Municipalities with libraries, schools, associations and any stakeholder involved in the development of citizens' digital competence and inclusion. RER contributes also financially to the PeI Points' launch and start-up phase and later offers to them a range of free services through a newly setup regional PeI service centre.

With this shift, RER aimed to decentralise and make more sustainable (thanks to stakeholders' direct engagement) the development of PeI activities: digital literacy training, e-facilitation services, digital culture events and other initiatives. A risk however was perceived by relinquishing the centralised management of the project: that the standardised character and quality of PeI services (training in particular) and their relatively balanced territorial diffusion might be endangered. In order to prevent this and to guarantee a balanced territorial growth of PeI services, RER looked for a common framework that would support a shared understanding and establish a common language to manage the digital competence development of PeI's customers and of its own local agents (trainers, e-facilitators, PeI Point coordinators etc.). DigComp thus came at a perfect time for PeI's new project phase.

RER used DigComp in the PeI project for four purposes:
- to map the existing PeI courses onto the DigComp framework and then redesign their content;
- to produce accordingly the educational materials for the digital literacy courses level 1 and 2;
- to develop a common view of digital competence for all citizens within the PeI e-facilitators community;
- to identify meaningful themes for digital culture development initiatives.

Until recently, PeI's main training offer was the entry-level, 20-hour digital literacy course, mostly targeting absolute beginners, i.e. people with no previous experience of computers and the Internet. The course started with the use of keyboard and mouse; moved on to the explanation and creation of directories, folders and files; some text-writing; creation and use of an e-mail account; Internet searches and navigation; some notions of social media and online public services. A few variants of the course were developed over time, reflecting pilot projects (e.g. using tablets rather than PCs in training) and specific initiatives, such as the course for workers and self-employees of the area hit by the May-June 2012 earthquake and the course for unemployed people, developed as part of the Mireia project.[33]

RER redesigned its training offer with the idea of developing two courses, following DigComp's proficiency levels notion, called Digital literacy for citizens – level 1 and 2. This was done also in order to meet a common request of past trainees for a follow-up course to consolidate and deepen what they had learned with the initial 20 hours.

While "translating" and mapping PeI's existing course and learning materials with the DigComp framework, it became apparent that DigComp does not consider the basic instrumental abilities and knowledge that are typically addressed at the start of PeI's entry-level course and are a prerequisite to further learning. Following DigComp's approach, RER therefore defined a new competence area number zero, called "First Access", whose content is illustrated below (for its nature, this area is not articulated into proficiency levels):

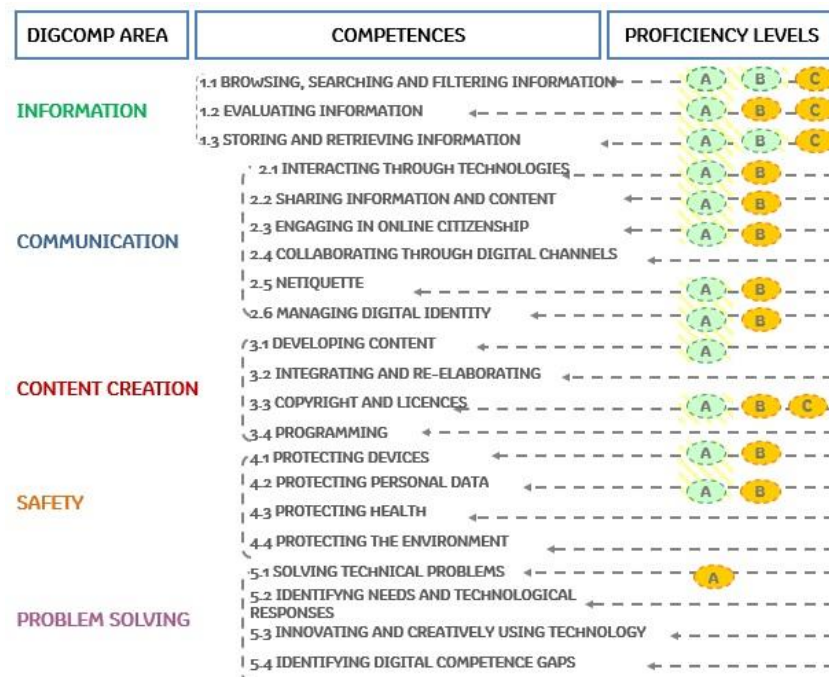[31] *Pane e Internet* literally means Bread and Internet in Italian.

[32] http://www.paneeinternet.it/index.php

[33] http://is.jrc.ec.europa.eu/pages/EAP/eInclusion/MIREIA.html

Competence area	Competence title	Competence description
0. The computer and the Internet network	About the computer	What is a computer; internal hardware; external devices; software – operating system and applications
	Giving input to the computer	The mouse; left click, right click, double click; drag and drop; cursor shapes; the keyboard –main keys and combinations
	Using the operative system	Switching on; the desktop; icons, menus and selections; start button and applications bar; windows – menus and selections; closing, opening, moving around windows; exiting from and switching off the computer
	About the Internet	What is the Internet and how does it work
	Connecting to the Internet	Alternative means and ways to connect to the Internet and how to do it

On the other hand, the translation-mapping exercise revealed that PeI's entry-level course was missing entirely some DigComp competences and with other competences it actually covered DigComp's intermediate proficiency level. Given the goal of redesigning the level-1 course and creating a level-2 course, DigComp was used to decide which competences, at which proficiency levels should be addressed in each of the two PeI courses.

The Level 1 course is similar to the previous entry-level one (it now has two versions, one for PCs and one for tablets). Its main aim remains to break the digital exclusion condition, by enabling citizens to use a PC or tablet (the goal of the "First Access" module) in order to start exploring the Internet using browsers, search engines and e-mail.

The Level 2 course targets people who have gone through the level 1 or, in any case, who already have some digital experience (it will be assessed through an entry test). It is the course to gain autonomy over the use of applications, to develop a critical view of the information found on the Internet and learn about other risks. It encourages citizens to exploit the potential of social networks for purposes related to their everyday life needs (leisure, work, interests, etc.) and to continue learning by using the web and its communities.

The figure below illustrates how the new PeI courses match with DigComp. A, B, C correspond to DigComp's three proficiency levels. Green bubbles show DigComp's competences-levels which are addressed by PeI's level-1 course and orange bubbles those belonging to PeI's level-2 course. The "First Access" PeI module does not show in the figure, because it is not part of the DigComp framework.

The choices illustrated in the figure reflect duration constraints, as well as assumptions and the experience about desirable and feasible results to aim at, given that PeI' most common customers are people in the 55-74 years old range, with no or very limited digital experience.

By clearly mapping which competences-levels the two PeI courses will address, RER expects that other actors

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will complement its training offer, always by referring to the DigComp framework. For instance, some entities within the local PeI Points will be encouraged to do this. In fact, in the new PeI portal RER is developing a catalogue of online learning resources produced by other entities, which are classified according to DigComp's competences and levels, so that interested citizens can use them to develop additional competences beyond PeI own courses.

RER presented the above proposal to about 70 people, first in a workshop in February 2015 with PeI teachers and tutors and again in October 2015 in a workshop with training experts, institutions and other stakeholders. The aim was to gain their opinion about the resulting topics mix and check if anything relevant was missing, and to have their views on the feasibility of the re-organised courses. This was also the first opportunity to start promoting DigComp among the actors of the PeI system.

The proposal met with a wide consensus and the next step was to reorganize accordingly PeI's learning materials. Reflecting DigComp's view of digital competence as made of knowledge, skills and attitudes, and the emphasis to move beyond technical functions, RER decided to develop two types of learning materials for the digital literacy courses:

- so called "**Books**", which have an introductory function to a new topic, with a more abstract approach, presenting the key words to talk about it, offering an overview of it with contextual information and reflections;
- so called "**Guided practices**", which have an operational function, explaining "how things work", "what can be done" and "how to do it", giving step-by step guidance on specific activities, providing warnings on potential pitfalls and suggesting solutions and helpful tricks.

Both types of learning materials have been designed for autonomous learning (with digital and printable versions), but of course they can also be used to support teachers in classroom-based delivery and e-facilitators.

For level-1 course, RER produced 10 Books and 10 Guided practices (in two versions, for PCs and tablets) roughly corresponding to the standard 10 lessons of the entry-level course.

For level-2 course, RER is preparing four new Books[34], two video tutorials on useful web tools (one on Skype and Hangout, the other on Google Drive and Dropbox) and three webinars on cyber bullying and online stalking, online reputation and the digital footprint, privacy in the online world and the protection of minors. The tutorials and webinars make use of existing resources found online and will be available from RER's e-learning Moodle platform called SELF.[35]

RER also prepared guidelines for teachers and other subjects wishing to produce additional learning materials. One of the recommendations is to use DigComp's taxonomy for describing the skills and other objectives of new training activities and for producing the new didactic resources.

In order to develop a common understanding of digital competence for citizens within the community of PeI e-facilitators, RER added DigComp's presentation to the training content for new e-facilitators (80 people trained during 2015) and to e-facilitators' refreshment courses. Local PeI Point's coordinators and other stakeholders are also informed about DigComp during training sessions and meetings.

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[34] Level-2 Books address the following topics: Advanced online information searches; Cloud services; Aware Facebook usage; How to use the Internet for get support on solving technical problems.
[35] http://self-pa.net/

Other employability-oriented DigComp implementations

In this last section, we briefly present four additional DigComp implementation cases, which complement and enrich the previous experiences in an employability-oriented perspective. Skillage and the new digital competence component in the EUROPASS-CV service address the need especially of young people to assess and make visible their digital competence in the search for a job, in non-ICT specialist domains. The revision of the ACTIC certification system in Catalonia is important, because empirical evidence shows that Europeans obtain ICT skills primarily through informal learning (77%), and in similar proportions through formal school education (28%) and training courses and adult education (27%).[36] There is therefore a need of formal validation and recognition of competences acquired in non-formal and informal ways, in order for jobseekers (whether unemployed or already active in the labour market) to be able to demonstrate to prospective employers their digital competence portfolio. Finally, Carer+ is the first example of a DigComp "derivative framework" created to support the development of digital competence for a specific sector of activity, i.e. care work.

Skillage – online test by Telecentre Europe on using ICT at the workplace

Skillage[37] is an online test developed and made available since 2012 by Telecentre Europe for young people. It assesses their understanding of and readiness for ICT skills at the workplace, but it was not designed for ICT specialists and jobs. The Skillage test is available in over 20 European languages and consists of 15 questions randomly chosen from a set of 100. It uses a youth-friendly language and each question has a number of possible answers that explore from different perspectives a particular IT skill. The system provides an immediate feedback to any answer, telling whether it is the correct one and giving informative explanations about that and the other options. Taking the test thus becomes an interesting learning experience about both specific aspects and how digital technologies are used today in the workplace. At the end of the test, the user receives an overall score on their broad level of ICT skills and (when available) advice on where to find training and support services offered locally by TE members to improve these skills.

The Skillage test's questions are grouped into five competence areas,[38] which were originally identified according to Skillage's main employability orientation. In 2014, the questions were increased from 40 to 100 and were aligned to DigComp, but the five original competence areas were left unchanged, in order to save the longitudinal comparability of the collected data. Since 2012, about 10,000 tests have been gathered each year, mostly during the Get Online Week organized by Telecentre Europe and now part of the eSkills for Jobs campaign of the European Commission. Telecentre Europe published an interesting analysis of the Skillage test results over the years (see footnote 5). Worryingly, it shows a trend towards lower scores with each passing year and that the youth sample presents the lowest average scores. This suggests that youngsters' ICT skills are not sufficiently aligned with the labor market.

Digital competence in the EUROPASS CV

EUROPASS is a set of five documents designed by Cedefop (the European Centre for the Development of Vocational Training) to make the skills and qualifications of jobseekers clearly and easily understood across Europe. The two documents freely accessible that can be completed online by European citizens are the Curriculum Vitae (CV) and the Language Passport.[39] In the Personal Skills section of the EUROPASS CV[40] there

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[36] Eurostat (2011), Way of obtaining e-skills (isoc_sk_how_i).
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_sk_how_i&lang=en
[37] http://www.skillage.eu/
[38] They are Employability, Productivity, Communications, Social Media, Content Management and Safety (previously known as "Files and Filing").
[39] The other three documents are issued by education and training authorities: the Europass Mobility, which records the knowledge and skills acquired in another European country; the Certificate Supplement, which describes the knowledge and skills acquired by holders of vocational education and training certificates; and the Diploma Supplement, which describes the knowledge and skills acquired by holders of higher education degrees.
[40] https://europass.cedefop.europa.eu/editors/en/cv/compose

is a Digital Competence area where a self-assessment tool based on DigComp has been embedded and made available from summer 2015.

For each one of the five DigComp areas, statements and descriptors of digital competence are provided according to three -"basic", "independent" and "proficient"- user profiles using the same vocabulary as the Language Passport. For the self-assessment, the users are invited to select the statements and descriptors which are closest to their perceived proficiency level. The results are then summarized automatically into the CV. In the same area, users can also add any acquired certificate and the free description of "Other competences".

DigComp and ACTIC certification in Catalonia

ACTIC - Acreditación de Competencias en TIC (ICT competences accreditation) [41] is the digital competence certification system for citizens 16 years old and above, developed from 2005 by Generalitat de Catalunya (regional government). ACTIC has been evolving to adapt to both new technologies and their ever changing use at work and in daily life. Currently it comprises eight competences[42] and provides three certification levels (basic, intermediate, advanced). ACTIC became operational for the first two levels in 2009 and for level 3 at the end of 2011.[43] The Catalan telecentres network of Punt TICs, member of Telecentre Europe, is involved in delivering ACTIC certification.

ACTIC's general aim -similar to DigComp's- is to promote the development of all citizens' digital competence for an inclusive, dynamic and competitive society and to qualify the ICT training offer in Catalonia towards this goal. ACTIC however was developed before DigComp (in fact, it was one of the cases studied in DigComp's preparation process) and in 2015 Generalitat de Catalunya commissioned an assessment to identify the differences from DigComp and to have suggestions about how to achieve a better convergence with the European framework. The comparison showed that ACTIC focused mostly on DigComp's competence "3.1 Content development" and a more diversified approach was thus suggested, with specific recommendations following each of DigComp's five main areas.

Carer+ - a digital competence framework for care workers

Carer+ [44] supports the professional development of care workers facing new challenges in the digital age. Carer+ started in 2012 as a project run by an interdisciplinary and international team of 14 partners,[45] partially funded under the ICT Policy Support Programme (ICT PSP) of the Competitiveness and Innovation Framework Programme of the European Commission.

Carer+ has created a competence framework with DigComp as one of its basic components, using 4 of the 5 DigComp areas and adding 7 new areas. It is thus an interesting example of derivative framework, i.e. a selective implementation of DigComp in a specific sector. The Carer+ Digital Competence Framework (DCF) is designed around three competence domains:

- Domain A: General digital competence (based on an adapted version of DigComp)
  - Competences relevant for the development of general ICT literacy
- Domain B: Enabling digital competence in social care work
  - Competences to make the application of digital technology possible, sustainable and accepted by both care workers and care recipients

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[41] http://acticweb.gencat.cat/es/index.html

[42] These are: C1 Culture, participation and digital civism; C2 Digital technology, computer and operating system usage; C3 Browsing and communication in the digital world; C4 Written information management; C5 Graphics, audio and video management; C6 Digital information management; C7 Data management; C8 Content presentation.

[43] The "advanced" level-3 certificate is issued only after achieving the intermediate certificate in all 8 competences and advanced-level proficiency in at least two of competences C4 to C8.

[44] http://www.carerplus.eu/

[45] Telecentre Europe and the association's members EOS (Romania) and LIKTA (Latvia) were in the Carer+ partnership.

- Domain C: Care-specific digital competence
  - Competences focused on care sector-specific applications, and on enhancing the employability of carers through organisational digital competence and skill management.

The diagram on the left shows the structure of the Carer+ DCF, illustrating the dimensions of Domains (central circle) and Competence Areas (square objects). The number of competences in each Domain is given in the numeric circles.

As mentioned already, Domain A: General digital competence builds on, and adapts, the DigComp framework: 4 out of 5 DigComp competence areas were used including all their specific competences, plus two additional ones.[46] Corresponding examples of learning outcomes defined by DigComp were also adopted and complemented with new examples defined in particular for mentoring and guidance functions. The resulting set of competences refers to the ability to use digital technologies in general, and to mediate this ability to others.

The Carer+ DCF is an important achievement, because few initiatives have explored and analysed systematically the digital skills requirements of different job categories. The need for certain types and extent of digital skills varies considerably depending upon the job a person performs: at one end of the spectrum, are the jobs that still do not require any digital skills, at the other end are ICT professional jobs. As stated in EC (2014),[47] "*while the skills requirements of ICT professionals are well mapped through the e-Competence Framework, the digital skills requirements of other jobs is somewhat of a black box*". (p.23) Knowing more about these requirements, as Carer+ started doing for the domain of care work, is essential for informing better education and training policies and curricula.

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[46] The added competences are "Expressing information needs" in the Information area and "Producing multimedia and creative outputs" in the Content creation area.
[47] See footnote 2.

3 Lessons learned and recommendations

Based on the experiences illustrated in the previous section, it becomes evident that the DigComp framework is a very versatile and flexible tool that can be used for various purposes. In order to make an effective use of the framework in real life situations, in this last part we draw lessons and suggestions from previous implementation experiences. First, we present the key operational steps for the development and/or adaptation of a training offer for digital competence aligned with the DigComp framework. Then we mention some important aspects when creating a self-assessment tool for digital competence. Finally, we make a few considerations about communication and other general aspects of the implementation process.

The key initial steps towards a training offer aligned with DigComp

The implementation of DigComp typically entails at least three steps that are needed in most cases.

Step 1: Identifying target users' needs and goals

Before even looking at the DigComp framework, it is important to define as clearly as possible:

- who are the target users of the initiative for which a DIGCOM implementation is being planned;
- what are the needs of these users, and which of those needs the initiative intends to meet. The needs analysis should of course shed light on the digital competence component of the identified/targeted needs;
- what level of digital competence proficiency can be realistically expected/aimed at in general terms, given the target users' characteristics (e.g. education background, age, employment conditions and perspectives etc.) and the broader context and goals of the initiative (e.g. retraining people who lost their job and want to re-enter into the labour market; overcoming condition of total digital exclusion, and so on).

The product of this step is a list of targeted digital competences and levels. A similar list may also be drawn from the analysis of existing ICT skills courses and materials for aligning them to the DigComp framework.

Step 2: Mapping users' targeted competences onto DigComp

The list of targeted digital competences (and levels) should then be compared and/or mapped onto the DigComp framework's descriptions and examples. A good way of doing this is clustering the results from the needs analysis according to DigComp's competences, or in some cases, mapping them to a competence area might be sufficient. Then, proceed with checking how much the two sets of descriptions match with one another. Once this is done by area or competence, the levels can also be mapped.

The comparison may reveal that some competences (and levels) in DigComp have been overlooked in the step 1 analysis and therefore should be added to the list of targeted digital competences, in order to aim at a fuller digital competence development. The comparison may also reveal that some desired/targeted competences or components are not included in DigComp, and therefore need to be addressed through complementary approaches.

This part of the exercise may turn out to be somewhat complex to perform. In some cases, the precise meaning of DigComp's descriptions and examples might not seem straightforward, in some other cases the level of abstraction and details of the descriptions being compared will likely be different. This is the step where a process of interpretation/specification of DigComp's content is necessary.

Step 3: "Translating" DigComp: necessary, not easy, but rewarding

DigComp is a framework that suggests a way of looking at and developing the digital competence of citizens, without providing a standardized, detailed and compulsory solution for it. As illustrated previously, to facilitate the application of DigComp for different purposes or contexts, one must "translate" and specify the framework's descriptions and examples to fit the specific target groups and needs addressed by those running the implementation. DigComp's value is precisely in giving structure and direction while maintaining

openness and flexibility to digital competence development initiatives. Openness and flexibility offer the opportunity to explore and address the needs of specific target groups and their context, rather than imposing pre-defined solutions.

A significant and still evolving aspect for the "translation/specification" process concerns proficiency levels in competence development. This is an important issue in the design of assessment tools and of the very learning paths and teaching materials. In DigComp version 1.0, distinctions between proficiency levels for some competences have been criticised as unclear, especially when moving from intermediate to advanced levels. Sometimes differences from one level to the next are small, other times they are big. As we have seen, the future DigComp 2.0 version will have 8 proficiency levels and the changes being made also aim to solve many of the existing shortcomings. As this evolution will not occur immediately, those wishing to implement DigComp in the near future should pay a special attention to this aspect.

The last part of the "translation/specification" exercise consists of making concrete choices about the digital applications, services and devices, the pieces of knowledge, the examples of attitudes etc. that can best substantiate the selected DigComp competences and levels for the implementation with the end users.

Taking the example seen before of competence "4.1 Protecting devices", depending on the target end users and the competence development initiative's aims, the skills example provided by DigComp "Is able to install an anti-virus" may be substantiated in various ways. It could be turned simply into the suggestion of a specific software and the step-by-step guidance to the installation of its free version. Alternatively, it may include learning how to purchase online the licence for the professional version of that software, and possibly knowing about the availability of several anti-virus software products on the market, and learning which criteria to follow in order to compare them and make a choice. DigComp drives the attention to the device protection issue and recommends that users should be able to install an anti-virus software: all the other aspects just mentioned have to be addressed and decided in the implementation process.

At this stage of the process, "content" experts (possibly with some direct teaching experience) have a crucial role to play along with training designers. Detailed choices have to be made about learning activities, their duration, and the materials to use and so on, in view of each targeted competence and proficiency level. Unfortunately, there is no established system to guarantee ex-ante that given choices will produce the expected learning outcome. Therefore, detailed design choices have to be made and shared possibly within a larger group of experts and teachers, to improve the likelihood that they will effectively contribute to digital competence development, and to achieve wider consensus among those who will have to implement them. Feedback and adaptation mechanisms must also be envisaged in order to benefit from the subsequent learning/teaching practice.

Designing assessment tools from the end user's perspective

Self-assessment tools play a very important role in making citizens and anyone who takes the test develop an understanding of digital competence, of its components (skills, knowledge, attitudes) and of the DigComp framework's very structure. If the test is well designed, while taking it end users become aware of the wide scope of digital competence even for non ICT-specialists, of areas of digital competence that they previously ignored, knew little about or deemed not important, and of the need to develop those competences. Therefore, beyond other more direct aims, self-assessment tools should be seen also as a component of DigComp's broader communication strategy (see below).

Under this light, the above considerations about paying due attention to end users' characteristics and needs apply fully also when designing digital competence (self-) assessment tools. DigComp was intentionally thought for all citizens, not for a specific category of people. Citizens, however, have much diverse educational background, mastery of the local language, and experience with the digital world and so on.

With competence assessment, therefore, it is important that DigComp's descriptions and related examples are "translated" into questions as concrete as possible, using plain language, referring to everyday circumstances, popular examples and so on. If assessment tools are designed for specific target groups, the questions' wording, the examples made etc. should be adapted accordingly.

An additional consideration is that a questionnaire addressing all 21 DigComp competences will inevitably be long, increasing the chances that it is left unfinished. It is thus important to present some initial questions that can immediately filter low-competence respondents and allow them to end quickly the questionnaire. This leaves the longer and deeper assessment process for those with a more articulate digital competence. For this latter group, the questionnaire could also be made entertaining and engaging, and possibly also a source of useful information and learning (the Skillage test offers a good example of this).

General considerations

DigComp's novelty needs clear communication
DigComp's intuition and proposal –that digital competence today entails more than the ability to use given tools and must develop beyond operational functions- may look at first sight obvious to everyone, but it is not. It is actually far from most typical ICT skills training offers, from what most employers ask when recruiting new staff, and may even raise doubts or disappointment among total new comers to the digital world and in general among people eager to learn quickly "how to go at it". It is therefore important to promote and explain DigComp's specific vision in the first place to teachers, trainers and e-facilitators, but also to employers, whose demand will be crucial, for instance, to drive the evolution of digital competence certification. The DigComp framework should also be promoted among policy-makers and other stakeholders who rule over digital competence development, and of course to the very learners involved in it. For this, it is recommended to produce, illustrate and disseminate effective communication materials about DigComp, starting from simple ones with clear examples and explanations about its novelty and why its view of digital competence is important in today's world.

Making visible the "compliance" with DigComp of learning resources and programmes
DigComp was born out of the study of many ongoing initiatives for the development of ICT skills in Europe, and to encourage their evolution. At the same time, DigComp aims to help citizens understand what digital competence can mean today for them, by providing an articulate and well-structured framework that describes this domain. It is therefore important that when existing learning resources are reused or adapted to match with the DigComp framework, or when new ones are developed in line with it, this correspondence is clearly highlighted. Courses, individual lessons, learning materials, self-assessment tests and so on should be clearly "tagged" according to the DigComp framework and to its specification in a given context.

Adopting DigComp's holistic view of digital competence
The distinguishing feature of DigComp's view of digital competence is to look beyond the technical ability needed to use specific digital tools and services to include the critical and reflexive capabilities that are crucial to grasp fully the opportunities and risks of today's digital world. For instance, knowing how to use a search engine is important, but in DigComp's perspective, it is as, or even more important to know why search results are ranked/listed in a certain way, that they may reflect users' profiling by search services suppliers and so on.

Learning to use specific applications is usually an inevitable part of the development of digital competence, and as mentioned before teachers and learners tend to focus almost exclusively on this. For this reason, the other dimensions of digital competence highlighted by DigComp (which are usually transversal to and/or independent of specific technical solutions) need to be fully acknowledged and dealt with in appropriate ways. This concerns both learning content and method. For instance, practical guidance (e.g. through step-by-step instructions) should be enriched whenever possible with contextual and critical reflections and with

exercises producing supportive and clarifying evidence for them. In line with DigComp's concept, the learning approach itself should promote critical thinking, creativity, autonomy, confidence and safety of the learners, and this can be done across any delivery mode (face-to-face, distance learning etc.).

Developing new learning resources and methods in line with the DigComp concept
Convincing educators to adopt the DigComp perspective is not enough. Whereas abundant learning materials and teaching methods exist for the traditional approach to ICT skills development, less learning materials and methods are readily available to support educators and learners address the critical and reflexive components of the DigComp framework. This entails that DigComp's implementation efforts must envisage and allocate resources for the development of such materials, testing appropriate teaching methods and finding effective and sustainable ways to do both things. Besides the communication activity mentioned before, ad hoc refreshment initiatives and introductory training, continuous support and supervision efforts, and the encouragement of peer collaboration are likely to be all necessary and useful measures to help educators face this new challenge/opportunity and to overcome the resistance to change that will likely occur.

Certification
The adaptation of existing certification systems to account for the DigComp's perspective or the establishment of new ones in line with it would be an important step that is still uncommon. This step could contribute to the qualification of digital competence training; it could help to create much needed bridges between the world of education and the business sector; and it would give a clear signal to both learners and educators alike that digital competence in DigComp's perspective can also be accurately assessed and is an important achievement for fuller participation in our society.

USEFUL LINKS and CONTACTS

DigComp framework v 1.0
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=6359

DigComp section on JRC-IPTS website
https://ec.europa.eu/jrc/digcomp

Gallery of DigComp implementations in Europe on JRC-IPTS website
https://ec.europa.eu/jrc/en/digcomp/implementation

e-Competence Framework (e-CF) for ICT professionals in all sectors
http://www.ecompetences.eu/

e-CF for end-users
ftp://ftp.cen.eu/CEN/Sectors/list/ICT/CWAs/CWA%2016624_1.pdf

Skillage – online test by Telecentre Europe on ICT use at the workplace
http://www.skillage.eu/

Digital competence in the EUROPASS CV
https://europass.cedefop.europa.eu/editors/en/cv/compose

Anyone interested in becoming involved or learning more about how to develop DigComp can contact Directorate General Employment, Social Affairs and Inclusion of the European Commission: EMPL C4 UNIT EMPL-C4-UNIT@ec.europa.eu

ACKNOWLEDGMENTS

About Telecentre Europe

Telecentre Europe is a European non-for-profit organisation (NGO) and a member based association with a central office in Brussels, Belgium.

We represent publicly funded telecentres/telecentre networks, ICT learning centres, adult education centres and libraries across Europe where children and adults can access the Internet, learn the latest digital skills and keep up to date with technology and community developments.

We coordinate a number of projects, programmes and campaigns that empower people through ICT by finding new paths to employment, community life, relevant information and staying in touch with friends and family. All our members and partners believe that Information and Communication technology has an enormous potential to combat social exclusion and poverty.

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