DIGITAL COMPETENCES DEVELOPMENT SYSTEM

DCDM – Digital competence development methodology, v.1

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Introduction

This document contains deliverable D6, which is the first version of the Digital competence development methodology (DCDM) of the DCDS project.

The methodology and the choices based on it for the design and delivery of digital competence training to adult learners, following a blended learning approach, will be tested in pilot training activities in five DCDS partner countries (Greece, Italy, Latvia, Romania, and Spain). Based on the feedback and results of the training pilots, the DCDM will be revised and updated as deliverable D9, due in October 2019.

This document presents the following components of the methodology.

Chapter 1 illustrates the steps and results of the implementation process of the European Digital competence framework for all citizens (DigComp) for the purposes of the DCDS project. DCDS focuses exclusively on proficiency levels 1 and 2 (foundation level) across all 21 DigComp competences. The corresponding competence descriptors were specified into 95 learning outcomes (LOUTs) drawn from or inspired by various sources (Annex 1 lists the 95 LOUTs and Annex 5 all the sources used). These include the Digital Economy and Society Index produced by Eurostat, which measures amongst other aspects the level of digital skills in the whole European population.

Chapter 2 illustrates the principles of formal and non-formal adult education adopted in DCDS and the attention that will be paid to social learning aspects. The second part of the chapter clarifies how blended learning will occur in DCDS, by describing the facilitation, tutoring and teaching functions that will be performed and the Teacher Guide to support them, and by briefly presenting the technical tools that will be used. The blended learning will combine face-to-face training in the premises of the DCDS partners' digital competence centres with online learning via the Digital competence development environment (DCDE), based on a Moodle platform.

Chapter 3 is devoted to the training offer and instructional elements of DCDS. It first illustrates how participants will be profiled and asked to take a self-assessment test in order to customize their learning experience. Then the chapter presents the training offer structured into 4 learning paths (LPs), made of a total 64 learning units (LUs) organized into 19 thematic modules, which are designed to achieve all the 95 identified learning outcomes covering the 21 DigComp competence. In the DCDS pilots, individual participants will be able to take the base LP plus only one of the three complementary LPs, due to the project's time limitations (course duration in the pilots will be 60 hours: 40 hours of face-to-face training and 20 hours of online activity).

Chapter 4 presents the main notions and options of the game-like application the will be integrated into the DCDE primarily in order to enhance the participants' motivation to engage in the course.

Finally, chapter 5 presents the evaluation system in DCDS which addresses learning assessment (both formative and summative), competence validation with the issuing of badges and course quality evaluation.

1. The DCDS DigComp implementation: learning outcomes and related transversal competences

1.1 Basic digital competence in the DigComp framework

The DCDS project is setting up a system for skill assessment, learning offer and validation and recognition, to develop the **basic digital competence** of low digitally-skilled 25+ years old adults in Europe. Basic digital competence is identified in DCDS as that defined at proficiency **level 1 and 2, or foundation level**, of the European Digital competence framework for all citizens known as **DigComp**, v.2.0.

DigComp identifies 5 competence areas and 21 specific competences which outline the key components of the digital competence, as illustrated in Table 1 below.

Table 1 – DigComp 2.0 areas and specific competences

Area 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
Area 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
Area 3 – Digital content creation
3.1 Developing digital content
3.2 Integrating and re-elaborating digital content
3.3 Copyright and licenses
3.4 Programming
Area 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
Area 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

In DigComp, the competence areas 1, 2 and 3 deal with competences that can be retraced in terms of specific activities and uses. Essentially, they address the appropriation of common tools and methods to perform in a critical and correct way digital activities in the respective areas: information, communication and collaboration, and digital content production. Competence areas 4 and 5 are "transversal", as they concern safety issues and problem-solving elements that apply to any type of activity carried out through digital means. They are therefore present across digital competence domains, but two specific areas were defined to highlight the importance of these aspects for the appropriation of technology and safe digital practices.

The DigComp framework identifies also 4 overall and 8 granular proficiency levels of each competence, which reflect the interaction of three dimensions: the complexity of tasks, the autonomy in performing them and the key cognitive domain (according to Bloom's taxonomy) activated and prevailing at each level (see Figure 1).

Figure 1 - Main keywords that feature the proficiency levels

4 OVERALL LEVELS	Foundation		Intermediate		Advanced		Highly specialised	
8 GRANULAR LEVELS	1	2	3	4	5	6	7	8
COMPLEXITY OF TASKS	Simple task	Simple task	Well-defined and routine tasks, and straightforward problems	Tasks, and well-defined and non-routine problems	Different tasks and problems	Most appropriate tasks	Resolve complex problems with limited solutions	Resolve complex problems with many interacting factors
AUTONOMY	With guidance	Autonomy and with guidance when needed	On my own	Independent and according to my needs	Guiding others	Able to adapt to others in a complex context	Integrate to contribute to the professional practice and to guide others	Propose new ideas and processes to the field
COGNITIVE DOMAIN	Remembering	Remembering	Understanding	Understanding	Applying	Evaluating	Creating	Creating

Source: DigComp into Action. A user guide to the European Digital Competence Framework

Following the approach summarized in the above figure, DigComp 2.1 provides a description of all 168 competences by proficiency levels (21x8) in the framework and a pair of examples of use,

referring to the work and learning domains, for each of the 21 competences at one of the 8 proficiency levels.[1]

How is digital competence at foundation level -the target of the DCDS project- described in DigComp?

As an example, below we present the description in DigComp 2.1 of competence 1.1 at level 1 and 2 (foundation). We added the next (intermediate) levels to show how proficiency is seen to evolve in these first steps according to DigComp 2.1.

Table 2 - Description of competence 1.1 at foundation and intermediate levels

Information and data literacy			
1.1 Browsing, searching and filtering data, information and digital content			
To articulate information needs, to search for data, information and content in digital environments, to access them and to navigate between them. To create and update personal search strategies.			
Level 1	**Level 2**	**Level 3**	**Level 4**
At basic level and with guidance, I can:	*At basic level and with autonomy and appropriate guidance where needed, I can:*	*On my own and solving straightforward problems, I can:*	*Independently, according to my own needs, and solving well-defined and non-routine problems, I can:*
1.**identify** my information needs,	● **identify** my information needs,	● **explain** my information needs,	● **illustrate** information needs,
2.**find** data, information and content through a simple search in digital environments,	● **find** data, information and content through a simple search in digital environments,	● **perform well-defined and routine** searches to find data, information and content in digital environments	● **organise** the searches of data, information and content in digital environments,
3.**find** how to access these data, information and content and navigate between them.	● **find** how to access these data, information and content and navigate between them.	● **explain** how to access them and navigate between them.	● **describe** how to access to these data, information and content, and navigate between them.
4.**identify** simple personal search strategies.	● **identify** simple personal search strategies.	● **explain well-defined and routine** personal search strategies.	● **organise** personal search strategies.

[1] Only in one case, for explanatory purposes, DigComp 2.1 provides application examples for all 8 levels of competence 1.1 Browsing, searching and filtering data, information and digital content.

It can be seen that the distinction between level 1 and 2 has to do exclusively with the degree of **autonomy and guidance** needed to perform the tasks. Given that any trainer's goal and learner's desire is to enhance one's autonomy as much and as quickly as possible, we set as the **overarching aim of DCDS to lead learners to the condition where they can do whatever task is involved (see below) with autonomy or "*appropriate guidance where needed*".**[2]

Level 3 and 4 show that, besides greater autonomy, performance changes occur essentially in the complexity of the activity's content (in this case and at this stage from "simple" searches to "well-defined and routine" searches) and of the related cognitive processes and other abilities (identify -> explain, organise etc.).

The "I can …" part of DigComp competence descriptions is written in terms of learning outcomes, which tend to be quite general, often abstract. As explained in the DigComp into action guide, this was done on purpose, to allow users of the framework to adapt it to diverse needs and conditions, and to make it technology-neutral. Given that digital technology constantly changes, this aimed to protect the framework from rapid obsolescence. However, in order to use the framework for assessment and training purposes as in DCDS, we needed to translate/specify DigComp descriptors in more operational ways.

1.2 The identification of learning outcomes in DCDS

Given our understanding of competence, and specifically of digital competence, as knowledge in action, and the need to set it within an instructional framework, we adopted Robert Mager's view of performance-based learning objectives or learning outcomes, as made of three components:[3]

- **performance** is an observable behaviour which identifies specifically what the learner should be able to do after the instruction
- **conditions** under which the learning is to occur
- **criterion** that describes how well the learner must perform in order to be acceptable

The focus of our work for Digital Competence Development Methodology (DCDM) has been on the performance component, and the goal was to specify one or more LOUTs for each one of DigComp's 21 competences, as they are described at foundation level (level 1-2) in DigComp 2.1. Whenever possible, we referred to the LOUTs in bullet points, after the "… I can …" statements of competence description in the tables of section 3 (after p. 23) of DigComp 2.1 report.[4]

[2] We want to underline the fact that the guidance->autonomy dynamics is a recursive one for most people in the use of digital technology throughout their life. Even when we qualify ourselves as "advanced users", we may end up asking for help/guidance at least the first time that we face some technical novelty or challenge, especially if such help is easily available from a colleague, an IT department, a more experienced friend or relative etc. Learning is always somehow a social process.

[3] Mager, Robert F. (1997). Preparing instructional objectives, a critical tool in the development of effective instruction (3rd ed.). Atlanta, Ga.: Center for Effective Performance. ISBN 1879618036

[4] See Carretero, S., Vuorikari, R, and Punie, Y. (2017) "DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use".

As we have seen in the previous section, in DigComp 2.1 the LOUTs at level 1 and 2 are the same; what changes is the learner's degree of autonomy. For this reason, without distinguishing between the two levels, we looked for and/or defined LOUTs that meet four general criteria:

a. a performance that is/concerns what is "**basic**" and hopefully "**simple**" in each specific domain (a starting unavoidable point, key building block, such as addressing the basic functions of an application, device etc. Or in a context of multiple opportunities, aspects, dimensions selecting only a few (1-2-3) significant cases of e.g. safety management solutions, online services for navigation etc.);
b. for which a significant level of **autonomy** can be expected to be reached relatively easily (e.g. through a short training experience like that of the DCDS pilots);
c. whose attainment, in isolation or along with other LOUTs, entails an interesting, **meaningful learning experience and achievement for the learners**;
d. with positive **social inclusion** implications (whenever possible to ascertain them), given the target population and general aims of the DCDS project.

We used these criteria to guide our LOUTs identification/definition work, but not all of them could be applied to each item. Besides, it is evident that the above criteria are not objective and the resulting choices are inevitably contestable. In order to mitigate these limitations, the LOUTs identification/definition process has been performed as follows:

1. we started with an accurate analysis of official DigComp reports (in particular DigComp v.1 and 2.1) and related documents and identified a preliminary list of LOUTs. In particular, we looked at the Human capital component of DESI (see section 1.2 below);
2. we analysed and identified LOUTs (both convergent with those of step 1 and new ones perceived as interesting under the above criteria) from other initiatives which have addressed basic digital competence, by referring to DigComp or similar frameworks (see Annex 5). The result of these first two steps -a provisional long list of LOUTs- was presented and discussed in depth at a DCDS WP3 partners meeting in May 2018;
3. using the above criteria, we (AECA) "voted" (include/exclude) the finalised long list of LOUTs which emerged from the May meeting and submitted it again to the DCDS WP3 partners. Besides voting it, they were requested to motivate exclusions (or revisions) and any suggestion of additional items;
4. the short-listed LOUTs were used for the production of the D5 Content of self-assessment tool and for the definition of the training component of the D6 (this report). Both processes revealed a number of shortcomings in the temporary LOUTs list being used, which was then revised into the current version presented in this report (see Annex 1).

It is envisaged that the pilot tests of the Digital Competence Development Environment (the DCDS online platform based on Moodle called DCDE), in Spring 2019, will highlight the need for further adjustments of the LOUTs list (e.g. by showing that certain expected performances are above with the foundation level).

In the next section we illustrate the first step of analysis, which considered how digital competence is addressed in the DESI human capital indicator.

1.3 DCDS learning outcomes and the EU Digital Economy and Society Index (DESI)

1.3.1 BASIC DIGITAL COMPETENCE IN DESI

The DigComp official reports do not explain what is to be understood as an individual with "basic digital" competence or what developing basic digital competence really means. DigComp 1.0 clearly stated that no one is expected to develop all 21 DigComp specific competences at the highest level and that people ultimately should develop the digital competences that are relevant and needed for their work and everyday life.

A step towards answering to these questions has been made by DG CONNECT and Eurostat with the creation of the EU Digital Economy and Society Index, known as DESI. The level of citizen's digital competence/skills, which is one of DESI's components, is defined by referring to DigComp and is measured from the answers to the annual survey which monitors ICT use by households and individuals.[5] The survey is coordinated by Eurostat and run by national statistical offices of all Member States.

The survey uses as indicators of digital competence the respondent's answers about whether they have done or not given digital activities, in the recent past. The survey pre-dates the publication of DigComp, so existing questions had to be mapped onto the DigComp framework.

The Indicator column in **Table 3** below lists the digital activities mentioned in the survey questions, which were associated with DigComp competences, as highlighted by their number (1.1, 2.1 etc.). The table shows that 4 out 5 DigComp competence areas are covered by some survey questions, while the whole area 4 (Safety) and other specific competences (1.2, 2.3, 2.4, 2.5, 2.6, 3.3, 5.3, 5.4) are missing.[6] The right column shows the criteria used to assign the competence value at area level, based on the respondent's answers (yes/no) to the question: "Have you accomplished in the last three months…?"

[5] The tables in the text are based on EC DG CONNECT "Digital Skills Indicator – derived from Eurostat survey on ICT usage by Individuals. Methodological note – 2015".
[6] In reality, Eurostat has been addressing other issues, such as online safety, through additional survey modules in specific years. But the list of questions presented here is relatively constant, making it possible to assess the evolution of answers over time.

Table 3 - Indicators and aggregation method used in DESI for digital competence

Area	Indicator	Criteria to assign competence value for the area
Information	1.1 Finding information about goods or services 1.1 Obtaining information from public authorities services' websites 1.1 Seeking health-related information 1.3 Copying or moving files or folders 1.3 Saving files on Internet storage space	**Basic:** only one item **Above basic:** more than one item
Communication	2.1 Sending/receiving emails 2.1 Telephoning/video calls over the internet 2.1/2.2 Participating in social networks 2.2 Uploading self-created content to any website to be shared	**Basic:** only one item **Above basic:** more than one item
Software skills for content manipulation	**A – Basic** 3.1 Used word processing software 3.1 Used spreadsheet software 3.1 Used software to edit photos, video or audio files **B – Above basic** 3.2 Created presentation or document integrating text, pictures, tables or charts 3.1 Used advanced functions of spreadsheet to organise and analyse data (sorting, filtering, using formulas, creating charts) 3.4 Have written a code in a programming language	**Basic**: at least one item from A and none from B **Above basic**: at least one item from B
Problem solving	**A – Problem solving** 5.1 Transferring files between computers or other devices 5.1 Installing software and applications (apps) 5.1 Changing settings of any software, including operational system or security programs **B – Familiarity with online services** 5.2 Internet banking 5.2 Online purchases (in the last 12m) 5.2 Selling online 5.2 Used online learning resources	**Basic**: one or more items only from A or only from B **Above basic**: at least one item from A and from B

Source: see footnote 5

For the creation of the DESI aggregate indicator, four categories are defined for individuals' levels of skills:[7]

> "**above basic**" = "above basic" in all 4 domains
>
> "**basic**" = at least "basic" in all 4 domains
>
> "**low**" (missing some type of basic skills) = one or more "none" in one to three domains (accomplished an activity at least in one of the four domains)
>
> individuals with "**no skills**" = four "none" (no items ticked in all four domains, despite declaring having used the Internet at least once during last 3 months) + those persons who used the Internet more than 3 months ago or never used it.

One can see that the level and progress of digital competence, from the DESI perspective, reflects the number of digital activities that an individual can perform and the diversity of competence domains (number of areas) covered. Only within Area 3, dealing with digital content production (lately called "Software skills for content manipulation"), a distinction is explicitly made between simpler (basic) and more complex (above basic) activities.

In Annex 4, we provide the figures about the digital skills of the EU population according to DESI 2018.

1.3.2 DCDS LEARNING OUTCOMES MATCHING DESI ACTIVITIES

In the DigComp specification process that we carried out for DCDS, DESI human capital indicator was considered from the very beginning, as our project was designed by referring explicitly to the about 40% of the EU population that Eurostat found with no or low digital skills. DCDS set as its goal to improve the proficiency of its customers from the no-low skills level at least to the **basic digital skills** level. From the DESI indicator's perspective this entails accomplishing at least one activity in each of the four domains. With this goal in mind, and considering the criteria mentioned in section 1.1, we selected from the DESI list a number of activities to be included among the DCDS learning outcomes. These are highlighted by the DCDS LOUT number in the right column of **Table 4**.

Table 4 - DESI activities considered for DCDS learning outcomes

Area	Activity in the DESI indicator	DCDS LOUTs n°
Information	1.1 Finding information about goods or services	1.1.5
	1.1 Obtaining information from public authorities/services' websites	2.3.3
	1.1 Seeking health-related information	
	1.3 Copying or moving files or folders	1.3.1, 1.3.4

[7] See EC DG CONNECT "Digital Skills Indicator – derived from Eurostat survey on ICT usage by Individuals. Methodological note – 2015" available at http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=14342

	1.3 Saving files on Internet storage space	1.3.5
Communi-cation	2.1 Sending/receiving emails	2.1.6, 2.4.1
	2.1 Telephoning/video calls over the internet	2.1.3
	2.1/2.2 Participating in social networks	2.1.5, 2.2.3
	2.2 Uploading self-created content to any website to be shared	2.2.4
Software skills for content manipulation	**A – Basic**	
	3.1 Used word processing software	3.1.2
	3.1 Used spreadsheet software	3.1.3
	3.1 Used software to edit photos, video or audio files	
	B – Above basic	
	3.2 Created presentation or document integrating text, pictures, tables or charts	3.1.4
	3.1 Used advanced functions of spreadsheet to organise and analyse data (sorting, filtering, using formulas, creating charts)	
	3.4 Have written a code in a programming language	3.4.2
Problem solving	**A – Problem solving**	
	5.1 Transferring files between computers or other devices	1.3.5
	5.1 Installing software and applications (apps)	5.1.2
	5.1 Changing settings of any software, including operational system or security programs	5.2.3
	B – Familiarity with online services	
	5.2 Internet banking	
	5.2 Online purchases (in the last 12m)	
	5.2 Selling online	
	5.2 Used online learning resources	5.4.2

Table 4 shows that a few DESI activities were left out of the picture:

- "seeking health-related information" is not explicitly listed as a DCDS LOUT, because the choice of the online service areas/topics for the training is left to the project partners, as they should reflect the interests of their students and/or local inclusion policy priorities;
- the "use of software to edit photos, video or audio files" was deemed too complex as an activity for DigComp foundation level (but it may be tested during the DCDS pilot training and introduced in the later revision stage);
- the same considerations hold for the "Use of advanced functions of spreadsheet to organise and analyse data";
- the capabilities "to read a flow chart identifying the operations and the order of their execution" and "to create a basic program based on a simple flowchart or algorithm" have been included despite being acknowledged as above basic also in DESI, for two reasons. First, it was identified as the simplest way to address DigComp competence 3.4 Programming, given our project's promise to cover all DigComp competences. Second, it will

be taken as an opportunity to explore with low digitally-skilled adult learners the viability and usefulness of some simple training approaches to coding that are used with children and young people;

- "Internet banking", "online purchases" and "selling online" are three activities which entail quite complex abilities, typically associated with an intermediate competence level. The "use of online learning resources" may also be seen as quite complex (of course, depending on the type of resources). However, as DCDS is based on a blended learning approach, which entails by definition the use of online learning resources, it will obviously support the development of related competences. This ability is also considered very important to sustain digital inclusion.

The coverage of most DESI competence indicator activities and the presence of LOUTs 3.1.4, 3.4.2 and 5.4.2 will make it possible, in principle, for successful DCDS learners to achieve not only the "basic", but also the "above basic" skills level in a DESI perspective (which requires to score "above basic" in all four domains).

Before moving to the results of the DESI analysis and work on other sources, we want to underline that the DESI digital competence indicator itself has undergone an evolution in the past few years, showing the inevitable "instability" of any choice made about specific digital activities and performances. **Table 5** lists the activities that were removed and those added in 2017, compared to the 2014 survey.[8]

Table 5 - Activities removed and added to DESI 2017 for measuring digital skills

Activities removed in 2017	**Activities added in 2017**
Information	
Reading or downloading online news, newspapers, news magazines	Seeking health-related information Saving files on Internet storage space
Communication	
Posting messages to chat sites	Participating in social networks
Software skills for content manipulation	
Creating websites or blogs	Used software to edit photos, video or audio files Used advanced functions of spreadsheet to organise and analyse data (sorting, filtering, using formulas, creating charts)

[8] See EC DG CONNECT "Measuring Digital Skills across the EU: EU wide indicators of Digital Competence", May 2014.

Problem solving	
Connecting and installing new devices	Transferring files between computers or other devices
Familiarity with online services	
Making an appointment with a practitioner via a website	Used online learning resources

1.4 Overview of DCDS learning outcomes

After looking at the DESI human capital indicator, we explored several other sources of inspiration about the LOUTs for DCDS and the result of this process was a long list of about 150 LOUTs. Following the internal verification processes with WP3 partners described in section 1.2, a shorter list of 107 LOUTs was identified. Further streamlining activities produced the current "final" list of 95 LOUTs (see Annex 1), which is the basis for the design of training and evaluation activities in DCDS.

Table 6 below shows the number of LOUTs that we identified for each DigComp 21 competence and 5 areas. Competences have from only 2 up to 8-9 LOUTs each.

Competences with 2-3 LOUTs tend to be inherently more complex, because they call at play transversal competences (e.g. critical thinking, communication and social skills) and other specific cognitive abilities or content (e.g. computational thinking or understanding of intellectual property issues) which are demanding and often missing among "weak" learners. As we shall briefly explain in the next section, the development of several digital competences does not only depend on, but can indeed also contribute to the development of transversal competences. Nevertheless, it was difficult to identify meaningful LOUTs for these competences at foundation level.

On the other hand, competences with several LOUTs (6 to 9) are those which address foundation aspects in each area and often include LOUTs which are relevant across different competences and even areas (e.g. 1.1.5 I can find information on the web using well known search engines or 2.1.5 I can create an account to access and use digital services)

In any case, as the reader of Annex 1 will notice, some LOUTs address single, simpler abilities, whereas others have a more composite, articulate character. When several elements/options are mentioned within a LOUT (often following the words "such as…, or "e.g." and with an open end "…etc."), they are given as examples and the expectation is that teachers and learners will not necessarily deal with all of them.

A specific observation must be made about competence 2.3 Engaging in citizenship through digital technologies and its LOUTs. In our specification process, we decided to put most LOUTs concerning the use of public (and also private) online services under this competence, by referring to DigComp

2.1 descriptor that talks about “digital services that help to participate in society”.[9] We left the LOUTs under 2.3 intentionally open, i.e. we did not specify which services areas or specific services should be addressed, because …+ customization to reflect interest and policies.

Table 6 - Number of DCDS LOUTs by DigComp competences and areas

DigComp competence	LOUTs n°
1.1 Browsing, searching and filtering	8
1.2 Evaluating info and content	3
1.3 Managing info and content	6
sub-total Area 1	**17**
2.1 Interacting	9
2.2 Sharing	4
2.3 Engaging in citizenship	8
2.4 Collaborating	3
2.5 Netiquette	5
2.6 Managing digital identity	4
sub-total Area 2	**33**
3.1 Developing content	6
3.2 Integrating and re-elaborating	4
3.3 Copyright and licenses	3
3.4 Programming	2
sub-total Area 3	**15**
4.1 Protecting devices	7
4.2 Protecting personal data and privacy	6
4.3 Protecting health and well-being	4
4.4 Protecting the environment	2
sub-total Area 4	**19**
5.1 Solving technical problems	4
5.2 Identifying needs and responses	3
5.3 Creatively using	2
5.4 Identifying digital competence gaps	2
sub-total Area 5	**11**
Total LOUTs	**95**

[9] Other specifications put LOUTs concerning the use of online services under 5.2 Identifying needs and technological responses, as an ever-wider range of public and private services which address all kinds of people’s needs are being moved to digital delivery channels.

1.6 Transversal competences in DCDS

Concerning transversal skills, Annex IV "Glossary" of DCDS deliverable D20 refers that these skills "are those typically considered as not specifically related to a particular job, task, academic discipline or area of knowledge, but as skills that can be used in a wide variety of situations and work settings. These skills are increasingly in high demand for learners to successfully adapt to changes and to lead meaningful and productive lives.

Examples include:

- Critical and innovative thinking
- Inter-personal skills (e.g. presentation and communication skills, organizational skills, teamwork, etc.)
- Intra-personal skills (e.g. self-discipline, enthusiasm, perseverance, self-motivation, etc.)
- Global citizenship (e.g. tolerance, openness, respect for diversity, intercultural understanding, etc.)
- Media and information literacy such as the ability to locate and access information, as well as to analyse and evaluate media content (UNESCO 2014)"

In the context of DCDS, the following transversal skills will be addressed:

Transversal skill	How addressed in DCDS
Critical thinking Ability to evaluate a set of data, facts, observable phenomenon etc. (e.g. discriminate between useful and less useful details) in order to make reasoned judgments, solve a problem or make a decision.	Competence 1.2 concerns the ability to evaluate data, information and digital content. In particular, LOUT 1.2.1 addresses the ability to evaluate whether information or content that I find online is or is not reliable (including hoaxes and fake news).
Communication and presentation skills (inter-personal) Ability to transmit and share ideas and information in a clear and concise way with one's interlocutors, to listen to them and to confront them effectively	Area 2 Communication and collaboration competences concern the ability to communicate through digital technologies and some basic "rules" (netiquette) for such communication. LOUTs 4.2.1 and 4.2.3 address the protection of personal data and privacy in this context. LOUT 3.1.4 concerns the ability to use presentation software.
Team work (inter-personal) Willingness to work and collaborate with others, having the desire to build positive relationships aimed at achieving the task assigned.	The teaching approach of DCDS and the use of the DCDE learning environment will promote collaboration activities among the learners. Competence 2.4 concerns the ability to collaborate using digital technology.

Autonomy (intra-personal) Ability to carry out assigned tasks without the need for continuous supervision using one's own resources	The very aim of DCDS is to bring learners to DigComp level 2, which is essentially a matter of gaining greater autonomy in the simple use of digital tools and services.
Accuracy (intra-personal) It is the attitude to be accurate, diligent and attentive to what you do, taking care of the details towards the final result	Accuracy is encouraged by the use of digital tools and services, as lack of it can prevent the successful achievement of a desired result (when strict procedures are embedded into digital systems) or may cause great damages in highly interconnected environments.
Continuous learning (intra-personal) It is the ability to recognize one's own gaps and areas of improvement, acting to acquire and constantly improve one's own knowledge and skills.	Competence 5.4 addresses specifically the ability of identifying digital competence gaps and finding opportunities for self-improvement. Digital literacy training supported by the DCDE is itself an experience of continuous learning.
Problem Solving (intra-personal) It is an approach to work that, by identifying priorities and critical issues, makes it possible to identify the best possible solutions to problems.	Area 5 Problem solving competences concern the ability to solve simple technical problems with digital technology and to use it to meet personal needs.
Global citizenship Tolerance, openness, respect for diversity, intercultural understanding, etc.	LOUT 2.5.4 concerns the ability to recognise socially/ethically inappropriate online behaviour and communication such as hate speech, flaming, trolling, cyber-bullying, online stalking etc.
Manage information (media and information literacy) Ability to effectively acquire, organise and reformulate data and knowledge from different sources towards a defined goal	Area 1 Information and data literacy competences concern the ability to acquire, evaluate and organise digital data and information found on the Internet and produced in everyday life and work context.

2. Adult education and blended learning in DCDS

2.1 Non-formal and formal learning

The DCDS training offer integrates both formal and non-formal learning. In the field of adult education there is no preferred option: depending on the target group and the context in which the training takes place, it may be useful to focus more on the first or second type. Therefore, on a case by case basis, the training activity may be characterized by a fully non-formal approach, by a variable combination of formal and non-formal parts, or it may be characterized by a fully formal approach.

For example, specific user needs may require a completely non-formal approach, in which the participant works alongside a facilitator who helps him/her in solving specific problems, by providing him/her with various resources to be used in presence and at a distance (exercises, advice, procedures, tasks, checks, readings, applications, etc..). The solution of specific problems will represent, in this case, the development of the underlying skills. Moving towards greater formality, we may have an alternation between individual support moments and learning activities structured by interest groups. Finally, there will be completely formal situations: a classroom group will be formed which will follow a blended course having as its object one or more learning paths and will see the intervention, in addition to the facilitator, also of the e-learning tutor and the teacher (see section 2.3). The latter solution is the one that will be developed in the DCDS pilot.

2.2 About adult education and social learning

The DCDS training offer is aimed at adults, generally older than 25 years. They are people with a low level of digital skills and in many contexts (albeit not all) this also reflects a low level of education.

The main aims to enhance digital skills in this segment of the population can be assumed to be:

1) avoiding social exclusion
2) avoiding professional exclusion
3) overcoming practical limitations caused by poor digital skills (access to services, exercise of rights...).

A further motivation may be a specific interest in the digital world, but this reason is likely to be less relevant than the previous ones. In these conditions, the motivation to undertake and continue the training will be mainly linked to the visibility of the final objective. Participants will be motivated by how close they see the solution of their personal problems.

Therefore, the DCDS training offer is inspired by the principles of adult education and in particular, by Malcolm Knowles' "Andragogy", whose principles are summarised in Figure 2.

Figure 2 - Knowles' 4 principles of andragogy

1 - Involved adult learners: adults remain motivated to learn if they are aware of the objectives set and the methods to achieve them. In our case, the participants, after the self-assessment, will negotiate the training path with the facilitators. In addition, the teachers, tutors and Learners Guides published on the e-learning platform will explain the details of the learning paths and the units that make them up. This first principle calls upon the role of the facilitator who should assess the skills of the participant, motivate him/her to the training and agree with him/her a training path.

2 – Adult learners' experience: as adults are attached to their life experiences, the learning process must consider the experience of the participants. This second principle is satisfied by the following factors. 1) The detailed profiling of the participants will allow teachers and tutors to customize learning activities and their interventions. 2) The blended course is sufficiently open to allow to link the classroom teaching and the possible e-activities at a distance with the experience of the participants. 3) The platform will systematically collect feedback from participants. Tutors and teachers can then review activities, methods and examples based on the feedback obtained. The second principle involves the roles of tutor and teacher, who are responsible for the educational quality of the activities and try to enhance the experience of the participants.

3 – Relevance and impact on the learners' lives: the training must have an impact on the participants' lives. Participants remain motivated to learn if they address personally significant issues in the training. The profiling of the participants (point 2) will help to map their main interests and orient the teaching towards exploiting and valuing them. The third principle involves the whole provider organisation, because all roles should contribute to make the training experience relevant for the life of the participants.

4 – Problem centred: adults learn better if the teaching is focused on problems to be solved rather than content to be memorised. The main task of the 40 hours of classroom teaching in the DCDS pilots will be to propose practical problems and ways to solve them to the participants. The fourth principle also involves the three main roles: the facilitator because he/she selects the learning path based on the priorities and problems that the participant wants to address; the tutor and the teacher as they activate teaching resources more or less directly aimed at addressing these priorities and problems.

This approach to adult education will be strengthened in a social learning key, by exploiting the exchange of ideas and resources within the learning community developed in the classroom.

To achieve this, at the beginning of the training the participants will be assigned to different, small working groups (no more than 4 participants per group). The groups will remain active throughout the course and will have the main purpose of stimulating peer tutoring and peer review processes.

The groups will be formed according to the following general criteria: different level of digital skills, different gender, different age, different education, similar (as far as possible) interests in digital technologies.

2.3 Blended learning in DCDS

The potential users of DCDS are people with low levels of digital skills and often also of education. With these users, it is advisable to take an approach that gradually exposes them to the use of digital tools and services, as their autonomy progresses. For this reason, the project has opted for a blended path, in which activities in presence and at a distance alternate, maintaining a strong integration between them. For these reasons, the training offer will be divided into units that will contain both presence and distance activities (see chapter 3).

The blended learning methodological option is general and invariant to any other choice. This means that each training path, formal or non-formal, individualized or personalized, will consist of an alternation of activities in presence and at a distance.

Blended learning paths are such, because presence and distant activities not only alternate in time, but also because these activities are integrated. For example, during a lesson in presence some exercises are presented to be done at a distance and their solutions are then discussed in a forum. The observations made in the forum are later presented in the classroom, where the next lesson takes its cue from the conclusions of the forum, etc. This sequence of activities is integrated, because it is not possible to extrapolate any single activity without losing its meaningfulness.

The order and alternation within the blended learning activities will be defined in the training programme agreed between the facilitator and the participant and can be modified by the teacher and the tutor, in agreement with the participant.

The Digital Competence Development Environment (DCDE) will provide teachers, tutors and participants with some pre-defined tools, which are better illustrated in chapter 3:

- **Teacher Guide** which will contain general and specific methodological and technical instructions for each Learning Unit (see below the Guide's table of content)
- **Student Guide** which will contain learning material and instructions for the activities of each Learning Unit.
- **Exercise section** of each Learning Unit. Here one finds scaffolded exercises and self-supporting formative and summative evaluation tests. Both the exercises and the tests are aimed at putting into practice the performance specified by the learning outcomes which are the objective of the Learning Unit.

FUNCTIONS TO BE PERFORMED IN INITIAL RECRUITMENT AND BLENDED LEARNING

Facilitation and tutoring

The users of DCDS resources must be supported in the initial assessment activities and in the choice of the training path. This entails the following 7 steps:

1) interviewing the participant by collecting a set of personal data, by clarifying his/her perception of missing digital skills (in particular, foundational digital skills[10] which are needed to make a basic use of the DCDS platform) and the problems that derive from that, and finally by describing what results he/she wants to obtain by improving his/her competences (see chapter 3);
2) explaining to the participant how the DCDS resources can help him/her to obtain the results he/she described in the previous step, starting from the use of the self-assessment system;
3) explaining to the participant the self-assessment tool and providing support in starting the self-assessment process;
4) helping the participant while he/she performs the self-diagnosis, if necessary. If the participant is digitally illiterate, he/she should be guided step by step;
5) examining with the participant the competence profile resulting from the self-assessment system, including by comparing it with the participant's own perception of the his/her capabilities (see step 1);
6) discussing with the participant the available/advisable training options, and comparing them with the results he/she wants to obtain;
7) helping the participant to choose explicitly and consciously the didactic solutions (learning paths) in which to engage, discussing his/her doubts and bringing him/her back to the available/advisable training options. This activity ends with the definition of the learning path that the participant will follow to develop the desired skills.

[10] Such skills, also known as "area zero skills" (e.g. in the Unesco Global digital competence framework) are the ability to switch on/off digital devices, use the mouse, touchscreen, keypad, connect to a wireless network and others. If such skills turn out to be missing during the initial interview, the potential trainee of the DCDS course will be requested to take a short introductory digital literacy course to acquire them.

Tutoring continues the facilitation activity within the learning path chosen by the participant. This is the reason why facilitation and tutoring can be effectively performed by the same person.

The most challenging tutoring goal in a blended learning path is the integration of activities performed in presence and at a distance, in order to obtain the desired results.

Tutoring should be done at three levels:

a) individual participants
b) groups of participants
c) the learning path

Working with **individual participants** should build upon the knowledge and relationship developed with them in the initial facilitation stage. The tutor supports the participant by facilitating the use of online resources and classroom activities; helps him/her to reflect on the experiences made; helps him/her to connect the new contents learned with his/her previous experience (this scaffolding action is crucial with adult learners); facilitates the participant's relations with the peer group; and finally, the tutor is the natural interface with the organisation that provides the training.

When working with **groups**, tutoring should accelerate the transformation of the group's participants into a learning community. In a social learning perspective, tutoring promotes collaboration among the participants and facilitates the development of peer consulting and peer review relationships among them. The tutor also controls and encourages participation in distance activities involving peer sharing and collaboration.

In the delivery of the **training course**, the tutor collaborates in the didactic planning; gives his/her opinion on contents and verification tests; guarantees the usability of the resources dedicated to distance learning, and manages the transition from presence to distance.

Teaching

Teaching is the didactic-specialist function of delivering technical disciplinary content.

In a blended learning context, teaching entails delivering lessons in presence and at a distance, but also preparing or overviewing the production of distance learning materials such as learning objects (LOs), conditional Moodle lessons, readings, exercises. Teachers also overview and adapt when needed the assessment tests, promote and monitor their delivery and assess their outcomes.

The two functions described above are contiguous and complementary. In short, facilitation starts the dialogue with and support of the participant and tutoring continues this and oversees the whole didactic process; teaching is devoted to content delivery and assessment. In the DCDS pilot trainings, also due to project constraints, the same person may act on both these functions.

TECHNICAL TOOLS FOR THE BLENDED LEARNING

The main technological resource in DCDS will be the DCDE Moodle platform that will allow to manage all the distant activities – at individual and group level, synchronous and asynchronous- of the blended course.

Participants will have to access the platform with rights that allow them, as they acquire the ability, to participate in educational activities, write on the forums, in chat and on the wiki, upload files in their personal folder and attach them in the activities that provide for or allow it. The platform will be used as much as possible as a “gym”, with exercises for learning digital skills in the classroom and not only at a distance. Obviously, participants will gradually be involved in online activities beyond the platform itself.

Facilitators, tutors and teachers will have to access with the rights that allow them to set up the course, add and edit activities and resources, register participants, compose and manage work groups, prepare and manage assessment tests and register.

THE TEACHER GUIDE

The totality of the methodological and informative instrumentation for facilitation, tutoring and teaching activities will be contained in the **Teacher Guide**. Its provisional table of content is the following:

A) General methodology

The DigComp framework

Learning Outcomes and the transition from the framework to indicative performance

The purpose of the DCDS

Users of DCDS

The self-assessment system

The blended approach

Facilitation, tutoring and teaching in DCDS

Involving participants in a blended process

B) The DCDE technological platform

Education on the MOODLE platform

The general MOODLE environment

MOODLE courses

The most common MOODLE activities of

The most common MOODLE resources

C) Learning paths and Learning Units (see chapter 3 for an explanation)

Learning Path Base and its Learning Units

Learning Path Communication and social media and its Learning Units

Learning Path Digital content creation and its Learning Units

Learning Path Exploring ICT and its Learning Units

3. Training offer and instructional elements

3.1 Profiling of DCDS participants

The potential users of the DCDE are adults (25+) with no or low digital skills. As illustrated in D5 "Contents of the self-assessment tool", we envisage two paths leading to their engagement in training:

- **people without any digital experience and skills** will skip the DCDS online preliminary self-assessment test, as they would not be able to take it and also because their need for training is self-evident. Absolute beginners will therefore have to take an initial face-to-face training designed to enable them to start using a computer, performing simple operations with keyboard and mouse and using the desktop interface, before accessing to the DCDS training offer and the DCDE
- **all other potential DCDE users**, will be offered to take the DCDS online preliminary self-assessment test, which aims to identify their digital competence weaknesses, so as to decide whether they really need to be trained by DCDS (which currently addresses only DigComp's foundation level), and which training offer they should start from.

In order to be registered to a DCDS training offer and access the DCDE, all potential participants will be asked a set of profiling questions which concern their personal data, their main interests and motivations and other aspects that can help facilitators in designing and supporting their learning process.

These questions will be partly included in the online self-assessment tool and partly asked in the interviews that candidate customers are expected to have with the facilitators of the DCDS training offer or other e-inclusion intermediaries collaborating with them.

Items of candidate trainees' profile

- personal **identity**: first and last name, phone number, email, age, country, occupation, education
- (general) **skills**: foreign languages, any past digital training and experiences, transversal skills and other non-digital personal assets gained from life/work experiences, other non-digital technical skills
- **interests & life plans** especially in the following areas:
  - entertainment, leisure, increase quality of life
  - communication, social relations, digital parenting, civic participation

- employability
- problems (in everyday life, on the job, in social and cultural life, in citizenship) that candidates perceive as related to their lack of digital competences
- opportunities that candidates perceive may come from developing the missing competences

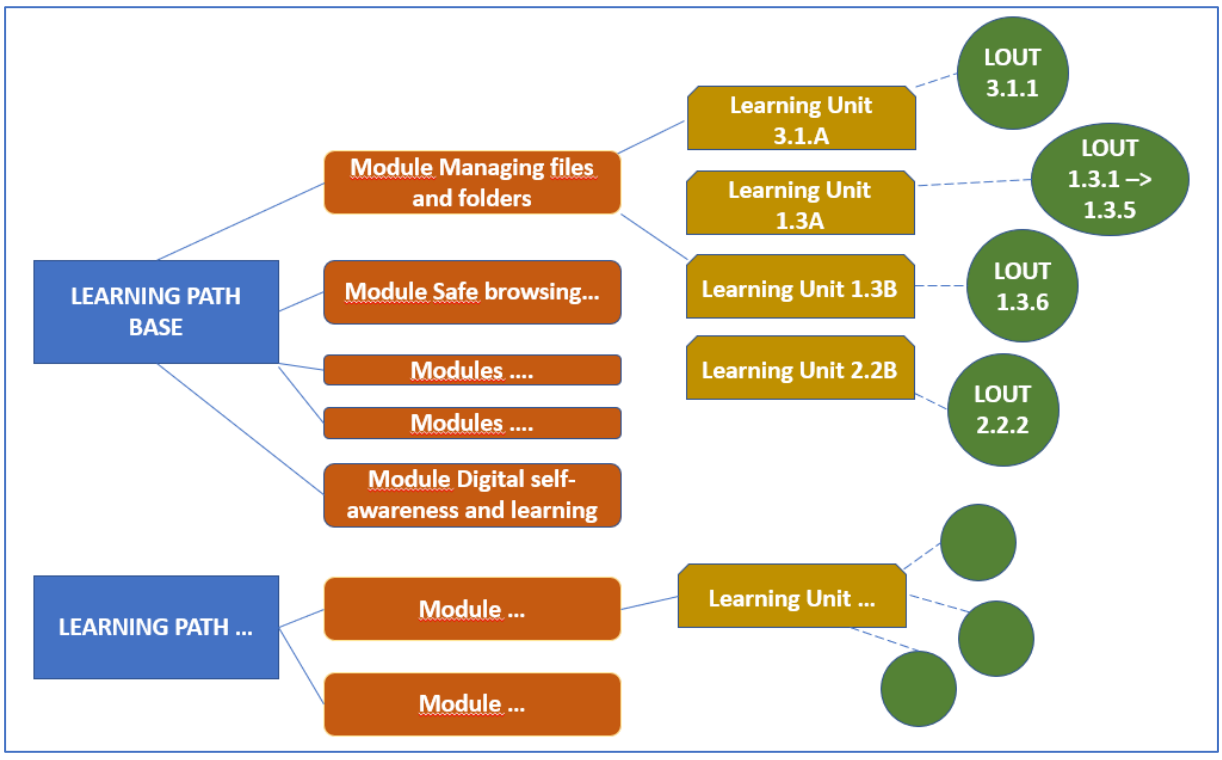
As illustrated in Chapter 2, the participants will choose, together with the facilitator-tutor, the learning path that best suits their profile. This choice will be guided by: a) the competence gaps revealed by the self-assessment, b) their overall profile and, in particular, their interests and objectives.

Following the choice made with the candidates, the facilitator-tutor will enroll them in one or more learning paths considered suitable. In the next section we illustrate what learning paths are, their didactic and structural characteristics and their proposed content for the DCDS pilots.

3.2 Learning paths, modules, units and outcomes

The architecture of the DCDS training offer is illustrated in **Figure 3** below which in the upper part refers to Learning Path Base and its first module.

Figure 3 - Structure of DCDS training offer



As we saw in Chapter 1, each of the DigComp 21 competences has been articulated in a sequence of **learning outcomes** (LOUTs) associated with DigComp's foundation level, for a total of 95 LOUTs (see Annex 1). LOUTs are the performance counterpart of competences: each competence is identified with the performances expressed by the set of LOUTs that derive from it. Therefore, the LOUTs guarantee the connection between the DigComp framework and the didactic activities intended to produce the competences: they are the didactic objectives of these activities.

The **learning unit** (LU) is the set of educational activities sufficient to generate the performance of one or several LOUTs connected and belonging to a given competence (see right column in Annex 1). It is the same to assert that one or more LOUTs are the didactic objective of their LU. According to this principle, all DigComp competences have one or more LUs designed to generate them (in DCDS, at foundation level). Annex 2 illustrates the 21 DigComp competences and 64 LUs designed to address them at foundation level.

In general, a LU in DCDS may comprise the following elements (those with an * are necessary components):

- Lessons and educational materials*
- Assignments and exercises for application and/or formative assessment*
- Simulations
- Synchronous and asynchronous discussions
- Summative assessment

LUs are organised for didactic purposes into 19 thematic **modules**, which are in turn put into 4 sequences called learning paths. Annex 3 illustrates the LUs, their modules and the LOUTs covered for each LP.

A **learning path** (LP) is a complete training offer whose purpose is to develop sufficient skills to manage a digital environment or scenario. To clarify this concept, we present below the learning paths proposed for the DCDS pilots:

- **Base**: at the end of this LP, participants will be able, at a basic level, to safely surf the Internet, receive and send emails, manage data and digital content, find and make a simple, initial use of online public and private services. This LP addresses basic skills which are crucial to begin taking advantage of the digital world and for digital inclusion. Participants who successfully complete this LP also meet the "DESI requirement" as they would be able to carry out at least one DESI activity (see Table 4) in each of the four areas considered.
- **Communication and social media**: this LP addresses a **leisure/social life scenario**, where participants can develop skills for online digital communication, collaboration and sharing, and the use of social networks.

- **Digital content creation**: in this LP participants can develop digital skills for the creation of digital content (text documents, spreadsheets and presentations) which are particularly relevant in an **employability scenario**.
- **Exploring ICT**: this LP addresses elements such as programming, environmental protection, creative use of ICT, the solution of technical problems which can be viewed as the first steps of an **ICT exploration scenario**.

The LPs identified often cross different DigComp competences in order to provide a meaningful learning experience for participants. They have been designed also by considering the time constraints of the DCDS pilots, whose maximum duration is 40 hours of face to face training + 20 hours of distant learning. Each of the four LPs contains and develops, or contributes to developing, only certain DigComp competences.

It is important to underline that by taking different LPs participants develop their digital competence by extending “horizontally” the range of digital skills that they can master and knowledge across a growing number of DigComp competences. However, as in the DigComp framework competences are “flat” (the 21 competences are not ranked according to any notion of complexity or other criteria), from DigComp’s vertical perspective of proficiency levels within each competence, the DCDS learning paths (even taken altogether) aim to develop digital competence at foundation level: in a few words, managing simple digital tasks and cognitive tasks stemming from the use of digital tools and services with substantial autonomy, and some guidance only where needed.

The tables in the next pages show, for each LP, the LUs which are included and which competences they allow to complete. The grey cells in Table 7 highlight that finishing LP Base allows participants to develop a rich range of skills and to complete 7 out of 21 DigComp competences. But in order to complete other competences, participants need to take some additional LPs. On the other hand, in the “scenario” LPs (Tables 8, 9 and 10), one can see how the completion of many competences requires also to finish LP Base.

Table 8 and Table 9 show that competence 3.3 Copyright and licences (at its corresponding module) is present in two LPs. This is because this competence is important both when sharing online digital content, especially when produced by others (LP Communication and social media), and when re-using somebody’s digital content within one’s own digital artefact, such as a citation in a text or an image in a presentation (LP Digital content creation).

Table 7 - Learning path: Base

Learning Units	DigComp competence completed
1.1A Browsing	1.1 Browsing, searching and filtering data, information and digital content
1.1B Searching	
1.1C Maps and localization services	
1.1D Download and save	
1.2A Evaluating data, information and digital content	1.2 Evaluating data, information and digital content
1.3A Managing data, information and digital content	1.3 Managing data, information and digital content
1.3B Compressed files/folders	
2.1B Creating and saving contacts	
2.1E Creating an account	
2.1F Sending receiving email	
2.2A Sharing files	
2.2B Sharing folders	
2.3A Public online services	2.3 Engaging in citizenship through digital technologies
2.3B Private online services	
2.3C Recognizing information and interactive online services	
2.3D Filling an online form	
2.3E Interacting with services	
2.4A Mails to multiple recipients	
2.5A Basic email netiquette	
2.5B Basic online writing netiquette	
3.1A Software overview	
3.1B Basic word processing	
3.1F Taking screenshots	
4.1A Hardware risk	4.1 Protecting devices
4.1B Software risks and protection	
4.1C Update and backup	
4.1D Password	
4.2A Protecting personal data	
4.2B Private navigation	
4.3A Preventing physical and psychological risk	
4.3C Entertainment	
5.1B Downloading and installing Apps	
5.1C Support	
5.2A Choosing digital tools	5.2 Identifying needs and technological responses
5.2B Customizing digital tools	
5.4A Identifying competence gaps	5.4 Identifying digital competence gaps
5.4B Learning solutions	

Table 8 - Learning path: Communication and social media

Learning Units	DigComp competence completed
2.1A Synchronous and asynchronous	2.1 Interacting through digital technologies *after completing LP Base*
2.1C Video calls	
2.1D Checking calls and messages	
2.1G Sending receiving SMS	
2.1H Instant messaging	
2.1I Forum and blog	
2.2C Sharing via social media	2.2 Sharing through digital technologies *after completing LP Base*
2.2D Uploading content	
2.4B Managing a videocall	2.4 Collaborating through digital technologies *after completing LP Base*
2.4C WhatsApp groups	
2.5C Social media netiquette	2.5 Netiquette *after completing LP Base*
2.5D Inappropriate behaviour	
2.5D Inappropriate behaviour	
2.6A Safe personal account management	2.6 Managing digital identity
2.6B Managing reputation	
3.3A Copyright and licenses	3.3 Copyright and licenses
4.2A Protecting personal data	4.2 Protecting personal data and privacy *after completing LP Base*
4.3B Protecting children	4.3 Protecting health and well-being *after completing LP Base*

Table 9 - Learning path: Digital content creation

Learning Units	DigComp competence completed
3.1C Basic spreadsheet	3.1 Developing digital content *after completing LP Base*
3.1D Basic presentation	
3.1E Taking videos and pictures	
3.2A Editable and uneditable files	3.2 Integrating and re-elaborating digital content
3.2B Text editing	
3.2C Spreadsheet editing	
3.2D Presentation editing	
3.3A Copyright and licenses	3.3 Copyright and licenses

Table 10 - Learning path: Exploring ICT

Learning Units	DigComp competence completed
3.4A Programming	3.4 Programming
4.4A Protecting the environment	4.4 Protecting the environment
5.1A Identifying technical problems	5.1 Solving technical problems *after completing LP Base*
5.3A Opportunities for creative digital use	5.3 Creatively using digital technology

Table 11 provides a synthetic view of the learning paths' contribution (either full or partial) to the achievement of each competence.

Table 11 - Contribution of learning paths to achieving DigComp competences

DigComp competence	LP Base	LP Comm. & social media	LP Digital content creation	LP Exploring ICT
1.1 Browsing, searching and filtering data, information and digital content	Full			
1.2 Evaluating data, information and digital content	Full			
1.3 Managing data, information and digital content	Full			
2.1 Interacting through digital technologies	Partial	Partial		
2.2 Sharing through digital technologies	Partial	Partial		
2.3 Engaging in citizenship through digital technologies	Full			
2.4 Collaborating through digital technologies	Partial	Partial		
2.5 Netiquette	Partial	Partial		
2.6 Managing digital identity		Full		
3.1 Developing digital content	Partial		Partial	
3.2 Integrating and re-elaborating digital content			Full	
3.3 Copyright and licenses		Full	Full	
3.4 Programming				Full
4.1 Protecting devices	Full			
4.2 Protecting personal data and privacy	Partial	Partial		
4.3 Protecting health and well-being	Partial	Partial		
4.4 Protecting the environment				Full
5.1 Solving technical problems	Partial			Partial
5.2 Identifying needs and technological responses	Full			
5.3 Creatively using digital technology				Full
5.4 Identifying digital competence gaps	Full			

As said before, the tables above (and Annex 2) show that no LP completes all the DigComp competences, each LP completes some of them and all LPs together complete all competences.

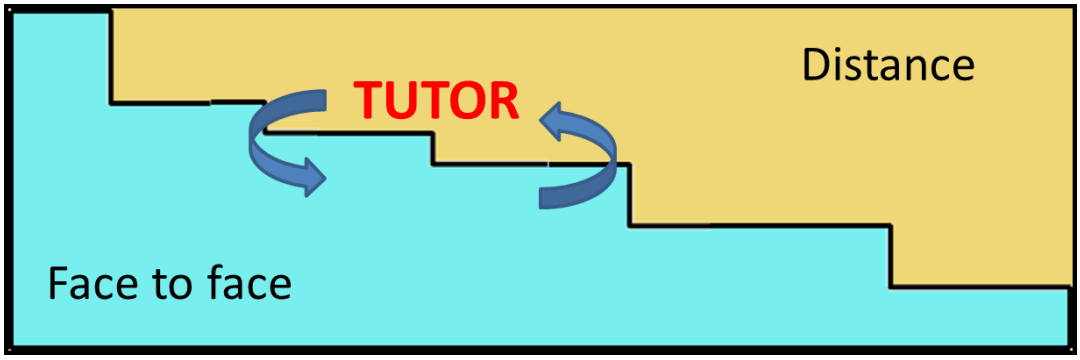
In the DCDS pilots, participants will be required to attend the LP Base (estimated duration 41 hours) and choose one of the three LP scenarios, that is: Communication and social media (14 hours), Digital content creation (16 hours), Exploring ICT (7 hours). In this way each participant will attend from a minimum of 48 to a maximum of 57 hours. The entire course to cover all 21 competences has an estimated duration of 76 hours, hence it will not be possible to attend it within the pilots' time constraints (maximum 60 hours).

3.3 The structure of a Learning Unit

The LUs listed in the tables in the previous section are all part of a blended training offer, so they will all be a combination in varying proportions of face-to-face (F2F) and remote activities.

Since the envisaged participants have a low level of digital skills, a gradual approach will be adopted that will initially see presence activities prevail over distance activities and distance activities grow over time, as in the following scheme.

Figure 4 - Evolution of face-to face vs. distant learning activities during the course



The main task of the tutor will be to monitor the development of the activities, so that the part of learning in presence and the remote part proceed in an integrated and harmonious way.

For each LU a course will be available on the Moodle platform with the following structure:

Section 1 – Introduction

This section contains:

- Learning Outcome(s) addressed by the LU
- List of other LUs (if any) that are a prerequisite for the current LU
- the Student Guide's section dedicated to the current LU
- the Teacher Guide's section dedicated to the current LU.

Section 2 – Training delivery activities proposed by the teacher

This section will be reserved for the teacher of the training course. In this section, the teacher can publish learning materials both related to the activities held in the classroom and others that participants can use at a distance. Such materials might be presentations used in the lessons, tutorials, reading materials, audio-video screen captures, podcasts and so on.

Section 3 – Exercises

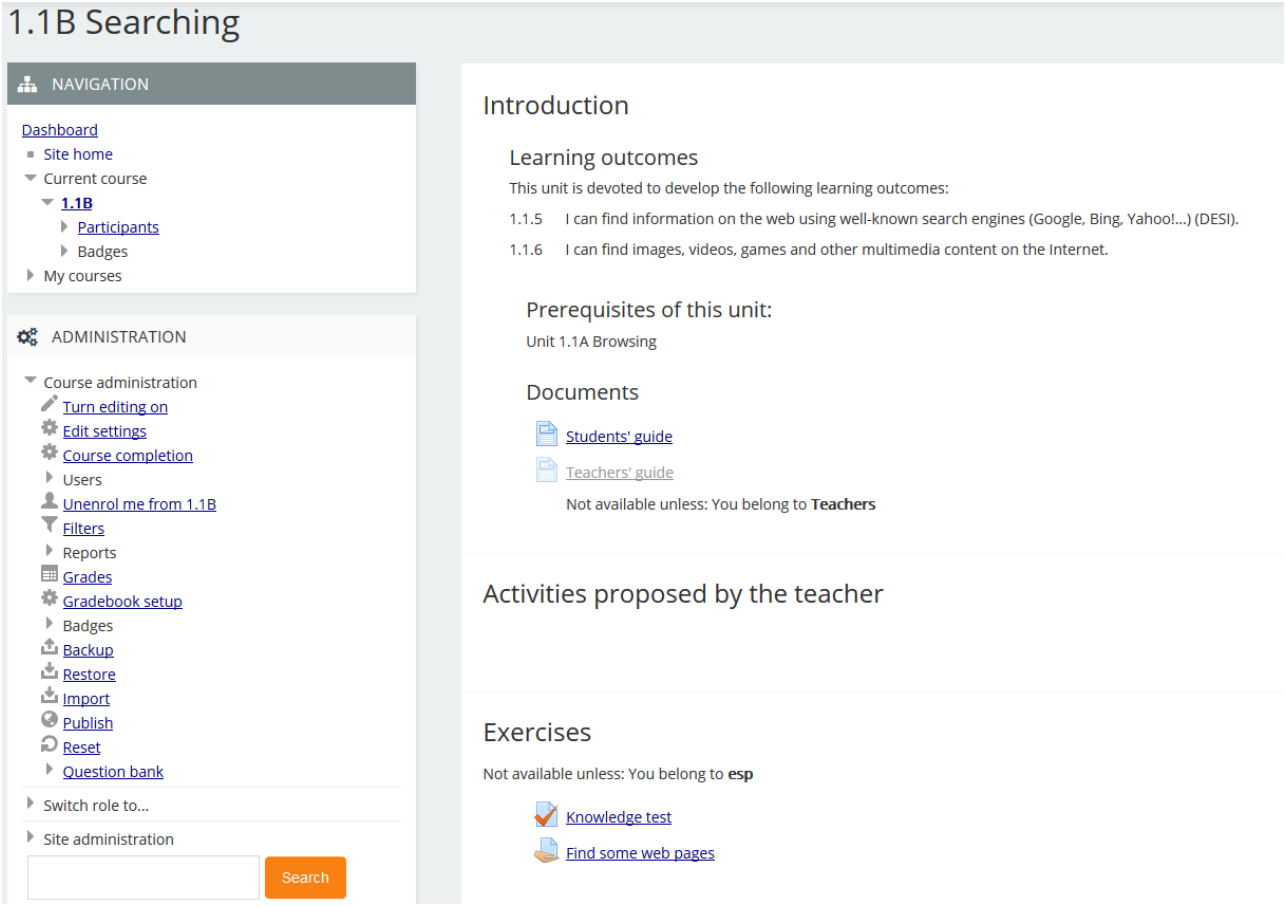
This section will contain the interactive content to be used at a distance, which will include:

- knowledge quizzes
- tasks assigned by the teacher or the platform
- other types of exercises that require interaction with the platform (e.g. work cases prepared with the Moodle lesson etc.).

Depending on the specific position of the LU within the LP, the Exercises section may contain summative evaluation tasks, conditioning the continuation of the learning activity (more on this in chapter 5).

Figure 5 below shows an example of a LU on the Moodle platform.

Figure 5 - Screenshot on an exemplary LU on Moodle



4. Gamification in DCDS

4.1 Gamification in the user experience ecosystem

Historically, the concept of usability, widely understood as ensuring that interactive systems are efficient and intuitive to use, has been a predominant force in interaction design. However, usability has been subsumed by the broader concept of the user experience (UX), of which it is an important facet. UX places particular emphasis on the emotional quality (or "overtones") of the interaction, having as a key tenet the need to provide the user with emotionally meaningful experiences.

Since it incorporates the more traditional view of usability, UX has a strong pragmatic component. The term "pragmatic" refers to the predominantly productively-oriented component of interactive system use, i.e. utility and efficiency. In addition to the pragmatic aspect, one can distinguish the aspect of emotional value generated through the product being used. This aspect has been termed hedonic in the literature.[11] It should be noted that it is not necessarily at odds with the pragmatic aspect. In an ideal situation, a product would score highly on both these aspects, and this should be the goal of the designer – to provide seamless utility and functionality while inciting pleasant emotions as a result of using the product. This seemingly simple rationale lies at the heart of gamification – especially, the question "how can we make users feel motivated enough to willingly undertake a task that is … boring / intimidating / difficult / etc.?"[12].

Hedonic aspect			
	+	SELF-EXPRESSION	Desirable outcome
	-	Undesirable outcome	PRACTICALITY
		-	+
		Pragmatic aspect	

USER EXPERIENCE AND "FUN"

Any experientially-oriented application has the goal of eliciting positive emotional responses from the users, both moment-to-moment as the interaction unfolds, and over greater time intervals (e.g. inducing an appropriately pleasant mood). In everyday, layman's terms, one plays games in order

[11] See for instance, van Schaik, P., Hassenzahl, M., Ling, J. (2012). User-Experience from an Inference Perspective. ACM Transactions on Computer – Human Interaction, vol. 19, no. 2, article 11

[12] Computer games are the best representatives of a quintessential experientially-oriented application; as the main reason for playing a game is precisely its ability to provide an overall positive emotional experience. Gamification follows this trend by attempting to incorporate game design elements to typically non-game-oriented contexts, such as productivity apps. Such a category of applications does not have a game-related stated goal, but could benefit from methods and practices that aim to increase learner motivation and engagement.

to have fun. The concept of fun incorporates various psychological constructs related to emotional experience. Lazzaro[13] has identified four types of fun that are pertinent in any discussion on games and gamification:

- **Hard fun:** pleasure derived from overcoming **challenges** (and the frustration they bring about). Hard fun showcases the player's superiority over in-game adversaries and requires the player to invest energy. It gives rise to satisfaction at the player's personal performance, an emotional state referred to by Lazzaro as *fiero* (Italian for being proud or triumphant over adversity). Once a challenge has been overcome, new challenges need to be set in order to sustain the player's interest (we generally like to prove ourselves superior). Showcasing a learner's achievements and rewarding him/her for them (in whatever form, be it points, badges, or any tangible reward) is the most widely used gamification technique in educational platforms.
- **Easy fun:** pleasure derived from opportunities for interaction, exploration, and imagination. **Curiosity** is the driving force here. Humans are, for the most part, stimulus seekers. While the degree of desired stimulation varies from person to person (e.g. personality traits), it is always there. In purely easy fun scenarios, the existence of clearly defined goals is unnecessary. Easy fun relies on exploration and immersion, a desire to witness the entire game content. In gamified applications, it revolves around variety and sensory / intellectual stimulation. Curiosity and pleasant surprise can function as a means of sustained attention with a reduced cognitive "overhead" (*effortless attention / fascination*, as per Kaplan & Kaplan[14]) and act as an intrinsic motivator.
- **Serious fun:** using emotions and game elements in order to help players change the way they think, feel, and behave or to fulfil **real-world goals**. This type of fun is apparently the one that is most closely related to educational contexts, as there is a clearly defined extrinsic goal (namely, learning). It is important to leverage the advantages of inducing both positive and negative emotional states, preferably in an alternating pattern in which mild negative states (e.g. mild stress) focus attention to the learning material and mildly positive ones

[13] Lazzaro, N. (2008). Why We Play: Affect and the Fun of Games: Designing Emotions for Games. In Sears, A. & Jacko, J.A. (eds.), The Human – Computer Interaction Handbook (2nd edition), New York and London: Lawrence Erlbaum Associates, pp. 679-700.
[14] Kaplan, R. & Kaplan, S. (1989). The Experience of Nature: A Psychological Perspective. Cambridge: Cambridge University Press

function as rewards[15]. As such, serious fun can be thought of as a combination of hard and easy fun elements.

- **People fun:** pleasure as a result of the **interpersonal** aspect of gameplay. Many players enjoy gaming in the presence of friends, either live or remotely, and either in cooperation or in competition mode. People fun often intersects with aspects of hard fun – e.g. demonstrating one's superiority over others by means of gamification elements such as leaderboards – when it comes to proving oneself superior to others or simply receiving acknowledgements for efforts made so far[16].

MOTIVATION

A widely accepted conceptualization of motivation suggests two types of motives, intrinsic and extrinsic ones. Intrinsically motivated activities are pleasant and desirable in themselves; in contrast, extrinsically motivated activities rely on tangible real-life rewards. In gamified contexts, extrinsic motivation is an important determinant in the users' commitment, but the potential for intrinsic motivation should also be explored. In general, internal and external motivation form a continuum.

External ↑	Extrinsic	External motivation	For payment
		Introjected motivation	Because I said I would
		Identified motivation	Because I think it's important
		Integrated motivation	Because I'm that kind of person
Internal ↓	Intrinsic	Intrinsic motivation	Because I feel like doing it for its own sake

A complementary distinction is pain avoidance vs. pleasure seeking – in other words, whether individuals primarily adopt a risk reduction strategy as opposed to actively seeking pleasurable stimuli. Both are valid kinds of motivation and can actually work well in combination. However, it should be kept in mind that the motivational value of pain avoidance tends to diminish over time.

Combining the two aforementioned distinctions leads to the following two-dimensional conceptual space, whose quadrants form four different motive 'archetypes':

	Pain avoiding	***Pleasure seeking***
External	Avoiding punishment	Rewards
Internal	Avoiding shame	Fun

[15] This creates a positive reinforcement loop according to which learners go through the negative state intentionally, with the aim of reaping the intrinsic and extrinsic benefits of their efforts (in-game rewards and learning itself).

[16] It is noteworthy, however, that even in purely single-player games, a strong para-social aspect (perceived social relationship with in-game characters) is often reported.

All four of these motive 'archetypes' have been used in the process of education at one time or another, but gamification proposes a shift to the right side of the spectrum (pleasure seeking, whether the pleasure derives from rewards or the activity itself).

4.2 Types of game and play

The distinction between game and play is often overlooked, but it is fundamental to our understanding of gamification, as it showcases the duality of rigid and fluid structures. According to Roger Caillois,[17] a game (which he calls *ludus*) is a goal-directed activity with specific rules set in a specified context. In contrast, play (called *paidia*) is much more subjectively defined, less rigid, and relies more on sensory elements; being much less formal than a game, it does not require a clearly demarcated or precisely defined context. With that distinction in mind, Caillois defined the four fundamental types of games and play[18]:

1. ***Agôn:*** competition is the main motive (need to prove skill and superiority over opponents)
2. ***Alea:*** based on chance – largely unrelated to skill
3. ***Mimesis:*** the main interest lies in acting out / role-playing
4. ***Ilinx:*** relies on sensory stimulation, especially the kinaesthetic and proprioceptive aspects (bodily / physical dimension of playfulness)

In the context of a gamified educational app, it would be prudent to de-emphasize #2 (*alea*), since it has no direct relation to the learners' skills and abilities. Type #1 (*agôn*) is at the forefront of such a design, since learning is a methodical process through which the learner improves in tangible and less tangible ways, proving his/her mastery over the learning material. But even elements belonging to types #3 (*mimesis*) and #4 (*ilinx*) can be incorporated. Mimetic paradigms fit in well with narrative structures and the control of fictional characters. Ilinx is arguably more difficult to incorporate in its original form, which is greatly dependent on bodily activity as a means of playfulness, but it can be abstracted away as sensory stimulation in general.

PLAYER CATEGORIES AND TYPOLOGIES

A very basic distinction of player types revolves around commitment. Hard-core or dedicated players commit much more time and resources (e.g. money) to gaming compared to casual players (for whom a casual game on their smartphone during a bus ride is usually enough). As evidenced by the multitude of game genres (e.g. role-playing, strategy, simulation, arcade, adventure, first-person shooters, etc.), not all games appeal to all players. Consequently, not all gamification mechanisms

[17] Caillois, R. (1958/2001). Man, Play, and Games. Urbana and Chicago: University of Illinois Press
[18] Of course, quite often playful activity incorporates elements from all these types – but these may be regarded as the "archetypes" – or (if a quasi-mathematical approach is desired) a basis of the space defined by the game vs. play continuum.

and techniques will be equally appealing and/or effective to all types of learners. This is where player typologies come into play. Bateman and Boon[19] have proposed four fundamental player types:

- **Conqueror:** highly competitive, seeks to dominate opponents in every way possible; enjoys feeling of domination and the "bragging rights" that come along with it
- **Manager:** mainly interested in personal efficiency, seeks to know every single aspect of the game
- **Wanderer:** seeks out new experiences, enjoys exploration of the game world, is less competitive than the previous gamer types
- **Participant:** mostly interested in the social aspects of gaming.

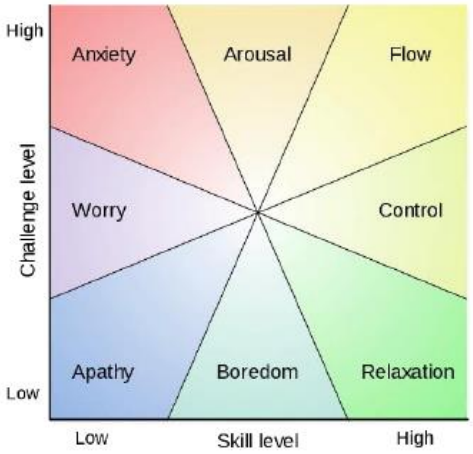
Combining these categories with the different types of playful activity as proposed by Caillois, one may arrive at a potential cross-tabulation of these constructs with the aim of highlighting which types of playful activity would be appreciated the most by each player type.

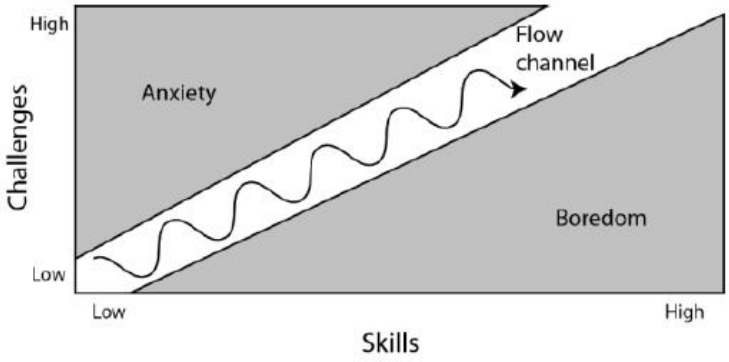
	Agôn	***Alea***	***Mimesis***	***Ilinx***
CONQUEROR	+			
MANAGER	+	–	+	–
WANDERER	No particular preference – possibly ilinx, in the form of sensory / intellectual stimulation			
PARTICIPANT			+	+

THE CONCEPT OF FLOW

An important question when designing both games and educational material is the mapping between learner skills and task difficulty. Whether a task is difficult or easy is largely dependent on the learner's existing abilities and skills. If he/she is not challenged adequately, he/she will feel bored with the task and he/she will lose interest quickly. If, on the other hand, the task is too difficult, it will be perceived as a stumbling block and lead to frustration and, ultimately, withdrawal from the activity. However, if the task is slightly more difficult than the users' skills would warrant, it can lead to a contest of mastery and to a deeply immersive state termed *flow* by Csikszentmihalyi.[20] This ideal challenge level is not constant; it changes over time as the players' skills evolve. It is important, therefore, to ensure that the learning material's difficulty scales appropriately so that the learner is kept within the desired zone termed "flow channel". Personalization of the material is required for this to occur, and it should be flexible; in other words, it needs to be a constant adaptive process, not simply a checklist to be completed prior to the learner starting to use the educational platform.

[19] Bateman, C. & Boon, R. (2005). 21st Century Game Design. Rockland, MA: Charles River Media, Inc.
[20] Csikszentmihalyi, M. (1991). Flow: The Psychology of Ultimate Experience – Steps Toward Enhancing the Quality of Life. New York: HarperPerennial.





4.3 Widely used gamification mechanisms

The triad of points, badges, and leaderboards is probably the most widely used gamification technique.

Points are the basic 'currency' in a game, and their appeal is directly tied to their usefulness – in other words, "what can you do with the accumulated points?". Thus, it is important to tie points to other gamification mechanisms. When awarding points, the amount awarded should match the difficulty of the task. Extra points can be awarded upon reaching predetermined milestones (e.g. completing one learning step).

Badges represent "honour patches" commemorating particular achievements (whether these are onetime events or recurrent) and are often seen as more tangible and specific than points. Thus, players tend to be more motivated to gather badges than points (unless, of course, points can be utilized to greater effect, e.g. as tokens or currency). Regardless, badges are more conducive to the social aspects of gaming – they are easier to showcase and carry more 'weight', akin to virtual 'graffiti' or 'medals'. The desirability of badges can be improved by proper aesthetics.

Planned challenges usually form the evaluation of the learner's command over the material. Also, they are a source of rewards (e.g. the learner's grade can be converted to points, so that the greater the grade, the greater the reward, thus benefiting the learner who does not simply aim for a simple "pass"). **Impromptu challenges** occurring at somewhat irregular intervals give learners the opportunity to test their skills and gain extra rewards that had not been planned for. These can be associated with special badges or other rewards, which the learner could showcase (e.g. in leaderboards, see below). Challenges of any kind can be part of a narrative structure. In a gamified application, story elements could be woven in, equating the learner's journey to the journey of a fictional character the learner could identify with (→ avatar personalization). Such challenges are often called *quests*, and form subplots which lead into the main plot, their goals acting as stepping stones towards the completion of the main story goals. In the context of a gamified educational application, assuming a persona (fictional character) and exploring a fictional environment can be

expected to appeal to those learners who are stimulus-seeking and favour exploratory behaviour. Ideally, storylines will be meaningful to the learners and intimately linked to the learning material (as a type of formative assessment).

As alluded to earlier, **leaderboards** are a prime vehicle for socially-inspired motivation, showcasing the learner's achievements for all to see. They can be expected to appeal to more competitively-oriented learners. They can incorporate quantifiable rewards – e.g. points, badges, achievements, number of lessons completed, etc. Also, leaderboards can be applied irrespective of linguistic issues, provided that the material to be covered is consistently presented in all of the languages involved (in case it will be decided not to separate learners according to their language / origin).

Levels can complement points in providing an overall categorization of learners that, being a single number, is concise and easy to communicate. A learner's level can act as a 'filter' in determining the tasks he/she can engage in; as is often implemented, the greater the task difficulty, the greater the level required. Level progression can be related to points (for maintaining consistency). Additionally, levels can be tied to avatar personalization in an attempt to lend some intrinsic value (by means of reinforcing learner self-image, as projected outward to the community).

Redeemable rewards may be seen as a natural extension of points and badges. The term refers to an in-game economy where players use in-game currency to purchase goods. In an educational context, these rewards may be access to bonus (e.g. additional) learning material. Any badge can be assigned a monetary value and converted by the player to "currency". Such a system based on redeemable rewards is usually optional and must be justified by the complexity of the design (i.e. for a simple implementation, an extra layer of economy-related mechanics may not be warranted).

Skill trees provide possible pathways towards the completion of overall learning goals / activities. They are an effective way to display the interdependencies and prerequisites for each module; thus, they provide end-goal visibility (i.e. learners know the terminal node in the tree and the choices they will have to make in order to get there eventually). Usually, dependent modules are locked unless the prerequisite modules have been successfully completed. Skill trees can extend to several levels – e.g. each node in a higher-level tree can include several lower-level nodes. Usually, two or three levels (if any at all) will be more than sufficient (especially for older learners). In any case, shortcuts (ladders) can be implemented as a way of bypassing certain nodes (after successful trials / tests). This way, more advanced learners can bypass material they expect to find quite easy and/or boring. It should be noted that skill trees may not be strictly hierarchical, so as to allow for a personalized learning experience, whenever possible.

Skill trees can be useful in ensuring the concept of parallelism: puzzles and challenges force the player to stop and think; there is the possibility of getting stuck, and if there is no other possible way forward, the player may abandon the game. Thus, it is in the game designer's best interest to provide alternative ways of moving the plot forward. Likewise, in a gamified educational application, the learner may get stuck when the difficulty of the learning material does not scale well (in other words, it is more difficult than what could reasonably be expected). Skill trees with multiple paths can mitigate this risk by providing ways to – at least temporarily – bypass problematic or exceedingly complex subjects (of course, care needs to be exercised so that necessary, foundational skills crucial to the understanding of the sections that follow cannot be bypassed in this manner).

Skill trees bring to the foreground the question of the intended rate of progression and the desired segmentation of the learning material. It is important to break up the learning material sufficiently so as to allow for casual learning interactions – e.g. during a 15-minute break, a learner could maybe complete one “chunk” of the learning material and gain one “reward” (points, badge). Generally, it may be better to segment the material into many smaller chunks than fewer but bigger chunks[21]. In such a situation, the benefit for the learner is threefold: (i) better time management, as even “dead” time intervals could potentially be filled with meaningful activities, (ii) more frequent rewards – albeit of smaller “magnitude”, and (iii) greater motivation to continue, as the next possible reward is sufficiently close (but, at the same time, sufficiently far away). Proper segmentation is vital when it comes to implementing a streak mechanics, i.e. encouraging the learner to engage in repeated interactions with the educational platform. The mechanics relies on rewarding the user on a daily basis, provided he/she has completed at least some part of the learning activities (the desired amount could also be set by the users themselves). The longer a streak is sustained, meaning that the learner has been engaging with the platform for several days on end, the more committed the learner typically is; thus, long streaks should be encouraged and appropriately rewarded.

Avatar personalization is often employed so as to allow players to shape their in-game representation (the avatar) according to their desired projected self-image; in other words, players shape their avatars in order to project to others the image of themselves they would like to project. Additionally, avatars could evolve over time according to the level / progression of the learner along a learning path. From a wider perspective, personalization is a key component of appropriation (e.g. when entering a new space, people tend to slowly change it to fit their needs, both in terms of functionality and in terms of aesthetics). Similarly, in an interactive environment that supports social interaction, personalization is an act of nonverbal communication and can create one more attachment between the user and the system – the user invests time and is therefore less likely to ‘drop out’. IF a more game-like turn is desired, avatars could be tied to specific game-like mechanics (e.g. it could function like a “character class” – where avatars will have unique advantages and disadvantages in terms of their in-game function).

Self-contained games are small-scale games interspersed within the normal workflow of the educational platform. They can act as diversions/distractions, and even as 'experiential' rewards (e.g. "well done, you made it this far, so now you get to play this little game for extra points if you'd like"). They can be deliberately incorporated in a gamified educational app to provide a break from the usual format. Additionally, such games can be an effective way to provide narrative structure (e.g. characters, story arcs, a plausible universe, etc.) or advance the storyline. Thus, self-contained games can effectively frame the actual learning activity. It should also be noted that such games can appeal to most player types (depending on the genre of the games in question); they could be particularly oriented towards “conquerors” (who aim to prove their superiority) or “wanderers” (who appreciate variety of content and media forms). Participation in a narrative structure is an intrinsic motivator; thus, it is less likely to wear off after a while.

[21] If each chunk requires one hour, this has implications on the context of use – one needs to use the platform from a suitable location for an extended amount of time. In contrast, if each chunk can be completed in 10-15 minutes, one does not necessarily have to be situated in an enclosed environment (e.g. office, home); accessing the platform from one’s smartphone while on the go could be enough.

5. Evaluation of learning and participation, and competence validation

5.1 The evaluation system in DCDS

The entire training process in DCDS is subject to evaluation. The evaluation has four main purposes:

1) to ensure that the results of the training process are in line with the objectives set
2) to ensure that those delivering training receive regular feedback on the motivation of the participants
3) to allow those delivering training to validate the competences acquired by the participants
4) to document the results achieved by the participants

These aims of the evaluation system are achieved by specific functions and activities that are:

a) the **assessment of learning**, which pursues aims 1 and 3
b) **quality evaluation**, which pursues goal 2
c) the issuance of **badges**, which pursues aim 4

5.2 Learning assessment

Learning assessment determines whether and how much learning has taken place, and also gives the result a quality judgment. Learning assessment is formative if its aim is to help students in difficulty, it is summative if its aim is to recognize and validate the final result.

FORMATIVE ASSESSMENT

Formative assessment can be formal or non-formal. The questions a teacher asks the students, randomly, during a frontal lesson are an example of non-formal formative assessment. On the other hand, a knowledge test given to the whole group of students followed by personalised feedback on how to fill in gaps and continue the activity is an example of a formal formative assessment (as long as the outcome of the test does not condition the continuation of the training activity).

On the Moodle platform (see 3.3 The structure of a learning Unit) the Exercises section of each LU may contain:

a) one or more self-supporting knowledge quizzes with formative feedback

b) one or more scaffolded exercises, i.e. with a complete work track or one to be completed by the teacher and a rubric containing evaluation criteria and parameters.

Figure 6 - Example of knowledge quiz with formative feedback (type a) in text)

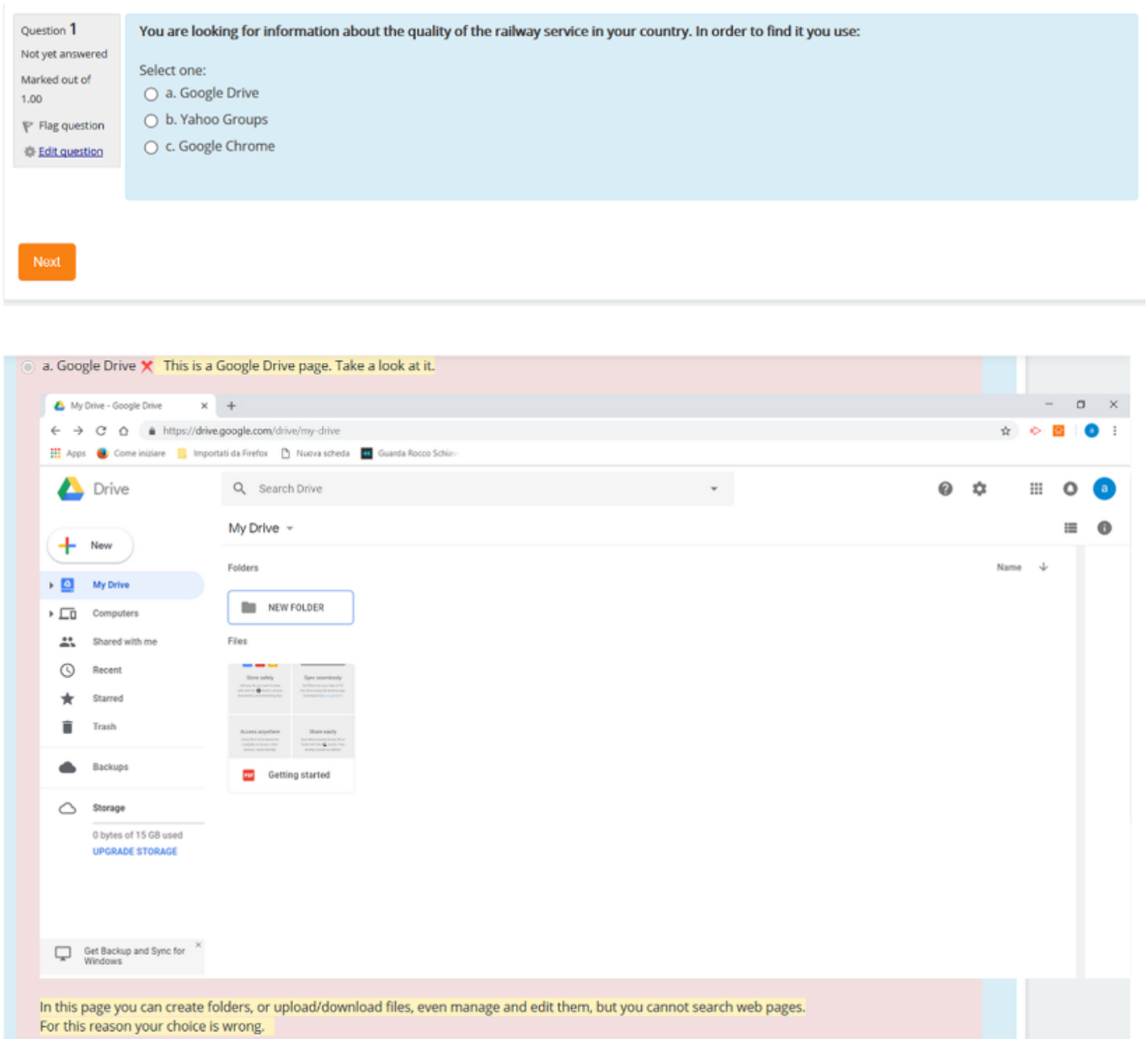
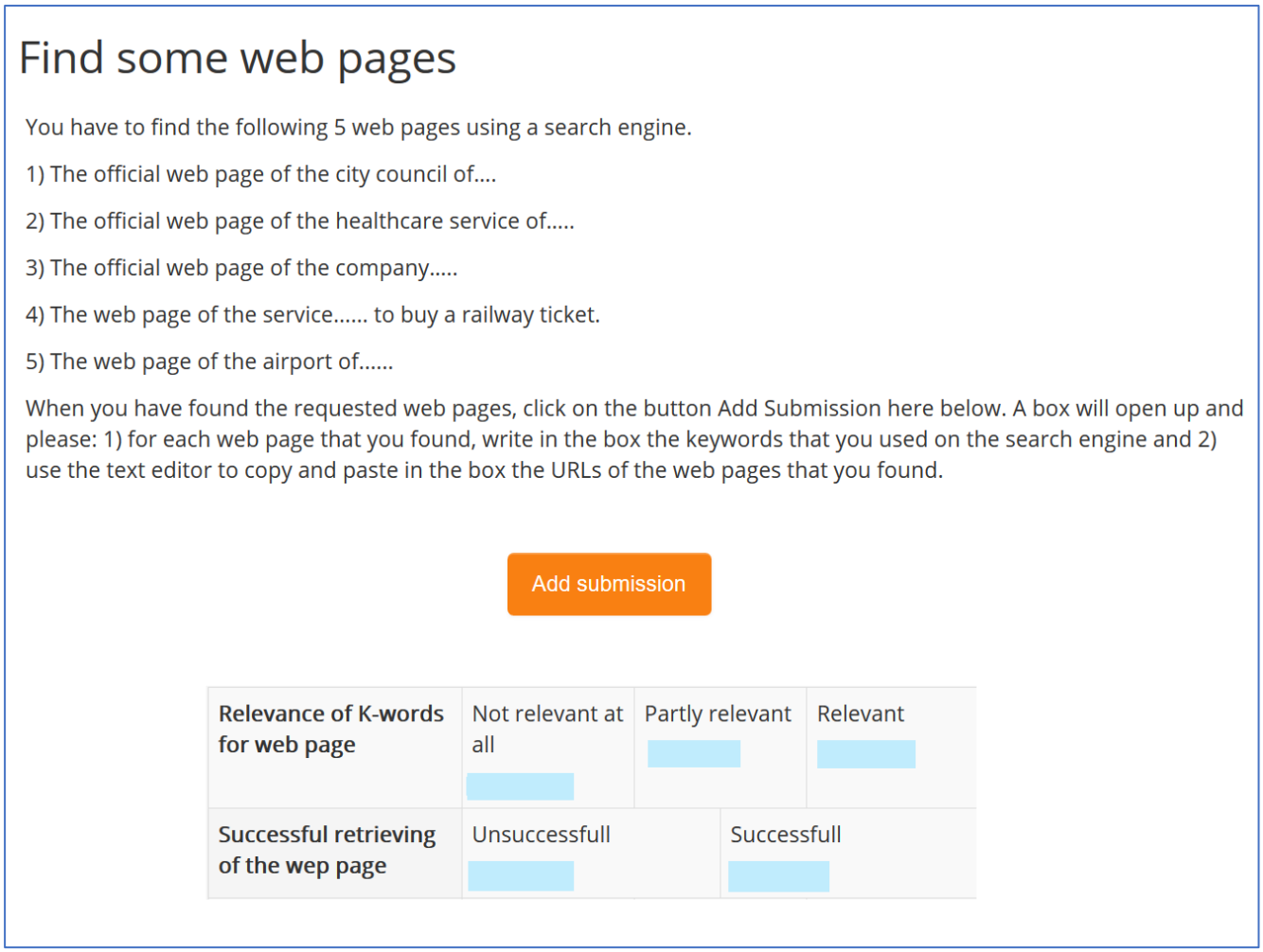


Figure 7 - Example of scaffolded exercise with assessment rubric (type b) in text)



Each LU will have at least one activity of type a) or type b). The more complex LUs will have several activities of both types.

SUMMATIVE ASSESSMENT

Summative assessment is formal and establishes the achievement of a didactic objective. The outcome of a summative assessment test conditions the continuation of the course: the student continues only if he/she passes the test.

Students who attend the DCDS training offer must pass summative assessment tests in the following moments:

a) when completing the LUs that produce a DigComp competence
b) when completing an LP Module, i.e. a significant and enabling part of a learning path

Therefore, the summative assessment subsystem will follow the scheme described below.

Intermediate or module assessment

Summative assessment tests will be available for each of the following modules:

For the BASIC Learning Path

- Managing files and folders
- Safe browsing and aware info search
- Creating an account and using e-mail safely and correctly
- Learning about public and private online service
- Protecting health and well-being
- Basic ICT operations
- Digital self-awareness and learning

For Learning Path Communication and social media

- Communication services
- Social Media
- Copyright and licences

For Learning Path Digital content creation

- Documents
- Spreadsheets
- Presentations
- Photos and videos
- Copyright and licences

For ICT Learning Path Explore

- Programming
- Environment
- Technical problems
- ICT tools

The summative assessment test will be published on the platform in a specific section within the last Unit of each the module, entitled MODULE ASSESSMENT (or possibly in some other way to be defined).

Final assessment of competence

When the student has completed the LUs that obtain all the Learning Outcomes of a given competence, he/she can obtain their validation by passing a summative assessment test summarizing the performance of all the LOUTs of the competence to be validated. The content of this test is specified below.

5.3 Competence validation and badges

VALIDATION OF DIGCOMP COMPETENCES

At the end of the Learning Path attended, participants will be able to ask for the validation of the competences completed within that specific LP.

In order to obtain the required validation, participants will undergo a summative assessment test composed of all the questions and exercises that are part of the intermediate tests previously passed, subtracting from the latter those related to LOUTs that do not concern the specific competence to be validated. The final competence assessment test will be located in a separate Unit from those making up the LP. Access to this Unit will be possible for participants who are entitled to take part in the final competence proficiency test and who are interested in taking the test.

For example, at the end of the LP BASE, participants will have completed the following competencies:

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

2.3 Engaging in citizenship through digital technologies

4.1 Protecting devices

5.2 Identifying needs and technological responses

5.4 Identifying digital competence gaps

In the intermediate tests (module tests) the participants also addressed the LOUTs related to the competences 2.1 Interacting through digital technologies, 2.2 Sharing through digital technologies, 2.4 Collaborating through digital technologies, 2.5 Netiquette, 3.1 Developing content, 4.2 Protecting personal data and privacy, 4.3 Protecting health and well-being, 5.1 Solving technical problems (to have a picture of the progress in the completion of the competences see Tables 6 – 10 in section

3.2). The questions and exercises related to these competences (which have only been partially addressed in LP BASE) will have to be subtracted from the validation test, which therefore will contain only questions and exercises related to the competences already listed above (1.1, 1.2, 1.3, 2.3, 4.1, 5.2, 5.4).

ISSUING BADGES

DCDS will issue three types of badges:

- **Module badge,** this badge will be issued subject to the outcome of the summative evaluation test of the specific module attended
- **Learning Path badge**, this badge will be issued after all the intermediate evaluation tests of each of the modules belonging to the LP have been passed
- **Competence badge**, this badge will be issued after the validation of the specific competence, i.e. after passing the final competence assessment test.

The release of the badges will be managed by the MOODLE platform and programmed using the "Course Completion" and "Badge" commands of the course administration menu.

The release of all three types of badges will be automatic, after passing successfully the required tests.

5.4 Course quality evaluation

The quality evaluation of the courses consists of two distinct actions:

a) regular and systematic collection of feedback from participants describing their perception of the didactics and organisation each time that they are interviewed
b) regular monitoring of participants' attendance to the didactic activities, both in presence and at a distance.

Actions type a) will be carried out through the delivery of a questionnaire on the MOODLE platform. The questionnaire will be published in a special section, created in the last LU of each module, entitled FEEDBACK.

Actions type b) will be conducted by the tutor and based on two indicators: 1) presence of the course participants in the classroom during face-to-face activities and 2) tracking of activities performed remotely by the participants, through the commands of the "Reports" submenu of the administration of MOODLE courses. The activity will be conducted for each Unit and it will allow the tutor to intervene if participants start skipping classes or do not carry out the remote activities they are expected to.

Annex 1 - Learning outcomes (LOUTs) for basic digital competence

DigComp 2.1 competence	**DigComp 2.1 – FOUNDATION LEVEL** *At basic level and with guidance -> At basic level and with autonomy and appropriate guidance where needed,*	**LOUT n°**	**Proposed LEARNING OUTCOMES (LOUTs) - expected performance at foundation level and in an inclusion perspective**	**Learning Unit Code** (see Annex 2 for titles)
1.1 Browsing, searching and filtering data, information and digital content	I can: ● identify my information needs, ● find data, information and content through a simple search in digital environments, ● find how to access these data, information and content and navigate between them ● identify simple personal search strategies	1.1.1	I can locate the browser icon on my device, open the browser and use the toolbar buttons (e.g. back, forward, refresh, home, close)	1.1A
		1.1.2	I can navigate web pages (inside a website or across websites) using hyperlinks and menus	1.1A
		1.1.3	I can save web addresses in my browser favourites/bookmarks	1.1A
		1.1.4	I can retrieve a previously visited web page from my browser's history or from the bookmarks	1.1A
		1.1.5	I can find information on the web using well-known search engines (Google, Bing, Yahoo!...)	1.1B
		1.1.6	I can find images, videos, games and other multimedia content on the Internet	1.1B
		1.1.7	I can use online maps and localization services (implications for privacy!)	1.1C
		1.1.8	I can download and save files from the internet	1.1D

1.2 Evaluating data, information and digital content	I can: ● detect the credibility and reliability of common sources of data, information and their digital content.	1.2.1	I can evaluate whether information or content that I find online is or is not reliable (including hoaxes and fake news), by looking at author and references, date of production/publishing and other evaluation criteria	1.2A
		1.2.2	I can differentiate the official website of a service or product provider from other non-official websites, by checking URL, website owner and other aspects	1.2A
		1.2.3	I can differentiate promoted/advertised digital content and non-advertised content on the Internet	1.2
1.3 Managing data, information and digital content	I can: ● identify how to organise, store and retrieve data, information and content in a simple way in digital environments ● recognise where to organise them in a simple way in a structured environment	1.3.1	I can organise (create, delete, copy, name) folders to store files on my digital device	1.3A
		1.3.2	I can identify file types based on their extension	1.3A
		1.3.3	I can view and sort files inside a folder in different ways	1.3A
		1.3.4	I can create, locate, open, copy, move, rename and delete files in my digital device	1.3A
		1.3.5	I can create, open, copy, move, delete files and folders on a) external/portable storage device (hard disk, USB memory, memory card, CD), b) cloud storage service	1.3A
		1.3.6	I can compress or extract on my PC compressed files/folders (zip, rar …)	1.3B
2.1 Interacting through digital technologies	I can: ● select simple digital technologies to interact, and ● identify appropriate simple communication means for a given context	2.1.1	I can distinguish between synchronous and asynchronous communication media and choose between them the most appropriate to the communication I want to make	2.1A
		2.1.2	I can create and save contacts in my digital devices	2.1B
		2.1.3	I can make video calls over the Internet	2.1C
		2.1.4	I can find and view the latest calls and messages made and received	2.1Ds
		2.1.5	I can create an account to access and use online digital services (e-mail, social media, other interactive public and private services … beware privacy!)	2.1E
		2.1.6	I can send and receive e-mails (send, reply, forward)	2.1F

		2.1.7	I can send and receive SMS through my phone	2.1G
		2.1.8	I can send text messages via instant messaging applications (WhatsApp, Messenger, Skype ...).	2.1H
		2.1.9	I can post messages on a forum and/or a blog	2.1I
2.2 Sharing through digital technologies	I can: ● recognise simple appropriate digital technologies to share data, information and digital content ● identify simple referencing and attribution practices	2.2.1	I can share files as attachments by email and other asynchronous communication services	2.2A
		2.2.2	I can share folders on the cloud	2.2B
		2.2.3	I can share files, videos, audio, photos, locations, and contacts via social media and instant messaging software (WhatsApp, Messenger, Skype and others), also by using the "share" function	2.2C
		2.2.4	I can upload self-created content (e.g. a photo) to be shared on websites that request it and/or that give this possibility (social media)	2.2D
2.3 Engaging in citizenship through digital technologies	I can: ● identify simple digital services in order to participate in society ● I can recognise simple appropriate digital technologies to empower myself and to participate in society as a citizen	2.3.1	I can find the official websites and Apps of government bodies and other public organizations in my country at national and local level in areas of my interest (employment, health, education, taxes, etc.)	2.3A
		2.3.2	I can find the official websites and Apps of private service providers of my interest (transport & travel, utilities, etc.)	2.3B
		2.3.3	I can get information from (public/private) services websites or Apps to carry out procedures in person (health, employment, social security, transport ...)	2.3C
		2.3.4	I can identify the interactive services offered by (public/private) services websites or Apps	2.3C
		2.3.5	I can fill an online form also using a dropdown list, check box, radio button, calendar and other functions	2.3D
		2.3.6	I can respond to authentication requests, if that is needed to access (public/private) services websites	2.3E

		2.3.7	I can explain what "strong authentication" is, and why it is needed in order to use a range of online services	2.3E
		2.3.8	I can upload documents and photographs when this is required to complete an online transaction	2.3E
2.4 Collaborating through digital technologies	I can: ● choose simple digital tools and technologies for collaborative processes	2.4.1	I can send and receive e-mails with multiple recipients (and "answer to all") to support group communication	2.4A
		2.4.2	I can add a participant to or join a videocall	2.4B
		2.4.3	I can create a WhatsApp group and add members to it	2.4C
2.5 Netiquette	I can: ● differentiate simple behavioural norms and know-how while using digital technologies and interacting in digital environments ● choose simple communication modes and strategies adapted to an audience and ● differentiate simple cultural and generational diversity aspects to consider in digital environments	2.5.1	I can apply the basics of email etiquette (e.g. use of BCC, forwarding etc.)	2.5A
		2.5.2	I can apply the basic online writing rules (not to use capital letters, to take care of spelling, to refer to others through their nicks or nicknames....) and I can use appropriately emoticons when communicating via the Internet	2.5B
		2.5.3	I can recognize appropriate behaviours to adopt on social media ... such as asking permission before publishing/sharing photos of other people (especially when children are concerned); avoiding spamming (e.g. by sending invitations or other messages to everyone); using carefully sarcasm, irony or words that may be misunderstood by others	2.5C
		2.5.4	I can recognise socially/ethically inappropriate online behaviour and communication such as hate speech, flaming, trolling, cyber-bullying, online stalking etc.	2.5D
		2.5.5	I use basic ways to contrast negative interactions online (signalling posts to service owners, postal police etc.)	2.5D

2.6 Managing digital identity	I can: ● identify a digital identity, ● describe simple ways to protect my reputation online, ● recognise simple data I produce through digital tools, environments or services	2.6.1	I can create an online account and related personal profile and log in and out of it safely (including changing and protecting passwords to prevent identity theft). I can delete my account if I want to quit.	2.6A
		2.6.2	I can give examples of footprints that I willingly leave online using different communication applications (e.g. posts in forums, blogs, "likes", published/shared photos and video etc.) and identify those that may damage my reputation	2.6B
		2.6.3	I can look up and view information about myself and others online	2.6B
		2.6.4	I can adjust my online profile depending on the potential audience (formal-informal, professional, official, thematic etc.)	2.6B
3.1 Developing digital content	I can: ● identify ways to create and edit simple content in simple formats, ● choose how I express myself through the creation of simple digital means	3.1.1	I can identify (through their icons) and describe the purpose/basic functionality of commonly used software applications	3.1A
		3.1.2	I can use basic features of word processing software (using desktop or cloud computing software) to write simple text and apply formats	3.1B
		3.1.3	I can use basic features of spreadsheet software (using desktop or cloud computing software) to organize data and use simple formulas	3.1C
		3.1.4	I can use basic features of presentation software (using desktop or cloud computing software) to prepare a simple presentation	3.1D
		3.1.5	I can take pictures and videos with mobile devices	3.1E
		3.1.6	I can take a screenshot on my devices (computer, mobile phone …)	3.1F
3.2 Integrating and re-elaborating digital content	I can: ● select ways to modify, refine, improve and integrate simple items of new content and information to create new and	3.2.1	I can distinguish between editable documents and non-editable ones due to PDF format and file protection	3.2A
		3.2.2	I can make simple changes (add text, make spelling corrections, change formats) to a document produced by another person using desktop or cloud computing software	3.2B

	original ones	3.2.3	I can make simple changes (change/add numbers, change rows sequence by a new ordering criterium) to a spreadsheet created by another person using desktop or cloud computing software	3.2C
		3.2.4	I can make simple changes to a presentation created by another person using desktop or cloud computing software	3.2D
3.3 Copyright and licenses	I can: ● identify simple rules of copyright and licenses that apply to data, digital information and content	3.3.1	I can recognise the kind of copyright protection associated with online digital content	3.3A
		3.3.2	I can adapt my use of online digital content depending on its copyright status and licences	3.3A
		3.3.3	I can find and quote the source and/or author of online digital content before sharing it online	3.3A
3.4 Programming	I can: ● list simple instructions for a computing system to solve a simple problem or perform a simple task	3.4.1	I can read a flow chart identifying the operations and the order of their execution	3.4A
		3.4.2	I can create a basic program based on a simple flowchart or algorithm	3.4A
4.1 Protecting devices	I can: ● identify simple ways to protect my devices and digital content, and ● differentiate simple risks and threats in digital environments, ● choose simple safety and	4.1.1	I can describe risks and threats for my digital device (hardware breakdown, physical impacts, human error etc.) and their potential consequences	4.1A
		4.1.2	I can recognise suspicious emails, messages, pop ups that can cause data loss or misuse on my digital device (by clicking on them or downloading unfamiliar attachments)	4.1B
		4.1.3	I can install/activate on my devices protection software and functions (antivirus, malware detectors, antispam, pop-up blockers on the web browser, protection from theft, locking the screen etc.) and I know how to scan a device (USB, hard disk, etc.)	4.1B

	security measures, and ● identify simple ways to have due regard to reliability and privacy	4.1.4	I update regularly my computer's operating system, security software and other applications (when prompted or by setting up automatic updates), to prevent security issues	4.1C
		4.1.5	I make frequent backups of information or content I care for, by making a copy and storing it separately either in the cloud or on an external storage device	4.1C
		4.1.6	I can create and use strong passwords according to existing guidelines (e.g. using three random words or with at least 8 characters, using lower- and upper-case letters, numbers and symbols)	4.1D
		4.1.7	I keep the information I use to access my devices and online accounts secure (including passwords), using different and secure passwords for websites and accounts (e.g. to prevent identity theft and its consequences)	4.1D
4.2 Protecting personal data and privacy	I can: ● select simple ways to protect my personal data and privacy in digital environments, and ● identify simple ways to use and share personally identifiable information while protecting myself and others from damages. ● identify simple privacy policy statements of how personal data is used in digital services.	4.2.1	I can provide a list of personal data, indicating those that should not be shared/ made visible on the Internet	4.2A
		4.2.2	I can mention the citizens' rights defined in the new European General Data Protection Regulation (GDPR)	4.2A
		4.2.3	I can adapt the personal information that I provide depending on the context and its security features (social networks, forums...)	4.2A
		4.2.4	I can set privacy settings on my devices and on the applications I use (social media and others) -> e.g. apply privacy settings to Facebook to ensure only friends can see posts and shared content	4.2A
		4.2.5	I can view, modify and delete the cookies and navigation history in the browser	4.2B
		4.2.6	I can use the "incognito" (anonymous) surfing function offered by most browsers	4.2B

4.3 Protecting health and well-being	I can: ● differentiate simple ways to avoid health -risks and threats to physical and psychological well-being while using digital technologies, ● select simple ways to protect myself from possible dangers in digital environments, ● identify simple digital technologies for social well-being and social inclusion.	4.3.1	I can identify ergonomic and physical risks resulting from prolonged and inappropriate use of digital devices (backache, visual impairment, traffic hazards when using mobile phones, risks of using headphones while walking, bicycling, driving etc.) and take measures to minimize / alleviate these negative effects	4.3A
		4.3.2	I can identify the main symptoms of Internet/digital addiction (tiredness, being unable to stop an activity, less sleep, decline of social connections, losing the sense of reality etc.) and take measures to protect myself and/or my children.	4.3A
		4.3.3	I can take measures to protect myself and my children against cyberbullying, grooming and sexting	4.3B
		4.3.4	I can find useful/entertaining games, music, concerts, museum-visiting, arts, films, interesting articles, news, travelling, cultures, languages, friends, colleagues etc. in the digital environment	4.3C
4.4 Protecting the environment	I can: ● recognise simple environmental impacts of digital technologies and their use.	4.4.1	I can identify the basic measures to save energy and environmental resources (e.g. avoid unnecessary printing on paper, turn off equipment/devices after use, do not leave chargers connected without a mobile phone, etc.)	4.4A
		4.4.2	I can identify where to deposit obsolete and/or worn out ICT elements (electronic or computer components, batteries, toners, etc.) to minimise their wasting impact	4.4A
5.1 Solving technical problems	I can: ● identify simple technical problems when operating devices and using digital environments, and ● identify simple solutions to solve them.	5.1.1	I can identify simple technical problems when operating devices and using digital environments	5.1A
		5.1.2	I can find, install, update and remove software and applications (apps), downloaded from safe sources	5.1B
		5.1.3	I can use common problem-solving support tools which are available in my device and applications (e.g. configuration guide, help function, set-up commands, etc.)	5.1C
		5.1.4	I can search for support online using community forums, blogs, video other types of tutorials	5.1C

5.2 Identifying needs and technological responses	I can: ● identify needs, and ● recognise simple digital tools and possible technological responses to solve those needs. ● choose simple ways to adjust and customise digital environments to personal needs.	5.2.1	I can list the most common digital devices (computer, printer, scanner, tablet, smartphone, ebook reader). I can differentiate them by their function (what they can be used for)	5.2A
		5.2.2	I can choose the most appropriate digital devices and Apps for my activities, personal needs and habits.	5.2A
		5.2.3	I can customize some basic display and other features of my device (font size, screen background, power management etc.)	5.2B
5.3 Creatively using digital technology	I can: ● identify simple digital tools and technologies that can be used to create knowledge and to innovate processes & products. ● show interest individually and collectively in simple cognitive processing to understand and resolve simple conceptual problems and problem situations in digital environments.	5.3.1	I can explain what are simple tools such as: calendars, maps & navigators and Wikipedia	5.3A
		5.3.2	I can simply explain what are new tools and services such as: online collaboration environments, augmented/virtual reality, robots, voice commands, intelligent assistants, drones, 3D printing, internet of things	5.3A
5.4 Identifying digital competence gaps	I can: ● recognise where my own digital competence needs to be improved or updated. ● identify where to seek opportunities for self-developments and to keep up-to-date with the digital evolution	5.4.1	I can find and use tools to identify my digital competence gaps	5.4A
		5.4.2	I can identify available solutions for learning online: video tutorials, e-learning courses, online guides and other educational materials	5.4B

Annex 2 - Digital competence, learning units and paths

DigComp Competence	Learning Unit	Learning Path
1.1 Browsing, searching and filtering data, information and digital content	1.1A Browsing	Base
	1.1B Searching	Base
	1.1C Maps and localization services	Base
	1.1D Download and save	Base
1.2 Evaluating data, information and digital content	1.2A Evaluating data, information and digital content	Base
1.3 Managing data, information and digital content	1.3A Managing data, information and digital content	Base
	1.3B Compressed files/folders	Base
2.1 Interacting through digital technologies	2.1A Synchronous and asynchronous	COM_general
	2.1B Creating and saving contacts	Base
	2.1C Video calls	COM_general
	2.1D Checking calls and messages	COM_general
	2.1E Creating an account	Base
	2.1F Sending receiving email	Base
	2.1G Sending receiving SMS	COM_general
	2.1H Instant messaging	COM_general
	2.1I Forum and blog	COM_general
2.2 Sharing through digital technologies	2.2A Sharing files	Base
	2.2B Sharing folders	Base
	2.2C Sharing via social media	COM_general
	2.2D Uploading content	COM_general
2.3 Engaging in citizenship through digital technologies	2.3A Public online services	Base
	2.3B Private online services	Base
	2.3C Recognizing information and interactive online services	Base
	2.3D Filling an online form	Base
	2.3E Interacting with services	Base

2.4 Collaborating through digital technologies	2.4A Mails to multiple recipients	Base
	2.4B Managing a videocall	COM_general
	2.4C WhatsApp groups	COM_general
2.5 Netiquette	2.5A Basic email netiquette	Base
	2.5B Basic online writing netiquette	Base
	2.5C Social media netiquette	Communication&social media
	2.5D Inappropriate behaviour	Communication&social media
2.6 Managing digital identity	2.6A Safe personal account management	Communication&social media
	2.6B Managing reputation	Communication&social media
3.1 Developing digital content	3.1A Software overview	Base
	3.1B Basic word processing	Base
	3.1C Basic spreadsheet	Digital Content
	3.1D Basic presentation	Digital Content
	3.1E Taking videos and pictures	Digital Content
	3.1F Taking screenshots	Base
3.2 Integrating and re-elaborating digital content	3.2A Editable and uneditable files	Digital Content
	3.2B Text editing	Digital Content
	3.2C Spreadsheet editing	Digital Content
	3.2D Presentation editing	Digital Content
3.3 Copyright and licenses	3.3A Copyright and licenses	Digital Content/ Communication&social media
3.4 Programming	3.4A Programming	Explore ICT
4.1 Protecting devices	4.1A Hardware risk	Base
	4.1B Software risks and protection	Base
	4.1C Update and backup	Base
	4.1D Password	Base
4.2 Protecting personal data and privacy	4.2A Protecting personal data	Communication&social media
	4.2B Private navigation	Base

4.3 Protecting health and well-being	4.3A Preventing physical and psychological risk	Base
	4.3B Protecting children	COM-Social media
	4.3C Entertainment	Base
4.4 Protecting the environment	4.4A Protecting the environment	Explore ICT
5.1 Solving technical problems	5.1A Identifying technical problems	Explore ICT
	5.1B Downloading and installing Apps	Base
	5.1C Support	Base
5.2 Identifying needs and technological responses	5.2A Choosing digital tools	Base
	5.2B Customizing digital tools	Base
5.3 Creatively using digital technology	5.3A Opportunities for creative digital use	Explore ICT
5.4 Identifying digital competence gaps	5.4A Identifying competence gaps	Base
	5.4B Learning solutions	Base

Annex 3 – Didactic sequence of units in modules and learning paths

Table 12 - Sequence of LUs and modules in the Learning Path BASE

LOUT n°	LOUT description	Learning Unit	Module
3.1.1	I can identify (through their icons) and describe the purpose/basic functionality of commonly used software applications	3.1A Software overview	Managing files and folders
1.3.4	I can create, locate, open, copy, move, rename and delete files in my digital device	1.3A Managing data, information and digital content	
1.3.2	I can identify file types based on their extension		
1.3.1	I can organise (create, delete, copy, name) folders to store files on my digital device		
1.3.3	I can view and sort files inside a folder in different ways		
1.3.5	I can create, open, copy, move, delete files and folders on a) external/portable storage device (hard disk, USB memory, memory card, CD), b) cloud storage service		
1.3.6	I can compress or extract on my PC compressed files/folders (zip, rar …)	1.3B Compressed files/folders	
2.2.2	I can share folders on the cloud	2.2B Sharing folders	
1.1.1	I can locate the browser icon on my device, open the browser and use the toolbar buttons (e.g. back, forward, refresh, home, close)	1.1A Browsing	Safe browsing and aware info search
1.1.2	I can navigate web pages (inside a website or across websites) using hyperlinks and menus		
1.1.3	I can save web addresses in my browser favorites/bookmarks		
1.1.4	I can retrieve a previously visited web page from my browser's history or from the bookmarks		
4.2.5	I can view, modify and delete the cookies and navigation history in the browser	4.2B Private navigation	
4.2.6	I can use the "incognito" (anonymous) surfing function offered by most browsers		

1.1.5	I can find information on the web using well-known search engines (Google, Bing, Yahoo!...)	1.1B Searching	
1.1.8	I can download and save files from the internet	1.1D Download and save	
1.1.6	I can find images, videos, games and other multimedia content on the Internet	1.1B Searching	
4.3.4	I can find useful/entertaining games, music, concerts, museum-visiting, arts, films, interesting articles, news, travelling, cultures, languages, friends, colleagues etc. in the digital environment	4.3C Entertainment	
1.2.1	I can evaluate whether information or content that I find online is or is not reliable (including hoaxes and fake news), by looking at author and references, date of production/publishing and other evaluation criteria	1.2A Evaluating data, information and digital content	
1.2.2	I can differentiate the official website of a service or product provider from other non-official websites, by checking URL, website owner and other aspects		
1.2.3	I can differentiate promoted/advertised digital content and non-advertised content on the Internet		
1.1.7	I can use online maps and localization services (implications for privacy!)	1.1C Maps and localization services	
2.1.5	I can create an account to access and use online digital services (e-mail, social media, other interactive public and private services … beware privacy!)	2.1E Creating an account	Creating an account and using e-mail safely and correctly
2.1.2	I can create and save contacts in my digital devices	2.1B Creating and saving contacts	
2.1.6	I can send and receive e-mails (send, reply, forward)	2.1F Sending receiving email	
2.2.1	I can share files as attachments by email and other asynchronous communication services	2.2A Sharing files	
2.4.1	I can send and receive e-mails with multiple recipients (and "answer to all") to support group communication	2.4A Mails to multiple recipients	
2.5.1	I can apply the basics of email etiquette (e.g. use of BCC, forwarding etc.)	2.5A Basic email netiquette	
2.5.2	I can apply the basic online writing rules (not to use capital letters, to take care of spelling, to refer to others through their nicks or nicknames....) and I can use appropriately emoticons when communicating via the Internet	2.5B Basic online writing netiquette	
4.1.2	I can recognise suspicious emails, messages, pop ups that can cause data loss or misuse on my digital device (by clicking on them or downloading unfamiliar attachments)	4.1B Software risks and protection	

4.1.3	I can install/activate on my devices protection software and functions (antivirus, malware detectors, antispam, pop-up blockers on the web browser, protection from theft, locking the screen etc.) and I know how to scan a device (USB, hard disk, etc.)		
2.3.1	I can find the official websites and Apps of government bodies and other public organizations in my country at national and local level in areas of my interest (employment, health, education, taxes, etc.)	2.3A Public online services	Learning about public and private online service
2.3.2	I can find the official websites and Apps of private service providers of my interest (transport & travel, utilities, etc.)	2.3B Private online services	
2.3.3	I can get information from (public/private) services websites or Apps to carry out procedures in person (health, employment, social security, transport ...)	2.3C Recognizing information and interactive online services	
2.3.4	I can identify the interactive services offered by (public/private) services websites or Apps		
2.3.5	I can fill an online form also using a dropdown list, check box, radio button, calendar and other functions	2.3D Filling an online form	
2.3.6	I can respond to authentication requests, if that is needed to access (public/private) services websites	2.3E Interacting with services	
2.3.7	I can explain what "strong authentication" is, and why it is needed in order to use a range of online services		
2.3.8	I can upload documents and photographs when this is required to complete an online transaction		
4.1.1	I can describe risks and threats for my digital device (hardware breakdown, physical impacts, human error etc.) and their potential consequences	4.1A Hardware risk	Protecting my devices and data
4.1.4	I update regularly my computer's operating system, security software and other applications (when prompted or by setting up automatic updates), to prevent security issues	4.1C Update and backup	
4.1.5	I make frequent backups of information or content I care for, by making a copy and storing it separately either in the cloud or on an external storage device		
4.1.6	I can create and use strong passwords according to existing guidelines (e.g. using three random words or with at least 8 characters, using lower- and upper-case letters, numbers and symbols)	4.1D Password	

4.1.7	I keep the information I use to access my devices and online accounts secure (including passwords), using different and secure passwords for websites and accounts (e.g. to prevent identity theft and its consequences)		
4.3.1	I can identify ergonomic and physical risks resulting from prolonged and inappropriate use of digital devices (backache, visual impairment, traffic hazards when using mobile phones, risks of using headphones while walking, bicycling, driving etc.) and take measures to minimize / alleviate these negative effects	4.3A Preventing physical and psychological risk	Protecting health and well-being
4.3.2	I can identify the main symptoms of Internet/digital addiction (tiredness, being unable to stop an activity, less sleep, decline of social connections, losing the sense of reality etc.) and take measures to protect myself and/or my children.		
5.2.1	I can list the most common digital devices (computer, printer, scanner, tablet, smartphone, ebook reader). I can differentiate them by their function (what they can be used for)	5.2A Choosing digital tools	Basic ICT operations
5.2.2	I can choose the most appropriate digital devices and Apps for my activities, personal needs and habits		
5.1.2	I can find, install, update and remove software and applications (apps), downloaded from safe sources	5.1B Downloading and installing Apps	
5.2.3	I can customize some basic display and other features of my device (font size, screen background, power management etc.)	5.2B Customizing digital tools	
3.1.6	I can take a screenshot on my devices (computer, mobile phone …)	3.1F Taking screenshots	
3.1.2	I can use basic features of word processing software (using desktop or cloud computing software) to write simple text and apply formats	3.1B Basic word processing	
5.1.3	I can use common problem-solving support tools which are available in my device and applications (e.g. configuration guide, help function, set-up commands, etc.)	5.1C Support	
5.1.4	I can search for support online using community forums, blogs, video other types of tutorials		
5.4.1	I can find and use tools to identify my digital competence gaps	5.4A Identifying competence gaps	Digital self-awareness and learning
5.4.2	I can identify available solutions for learning online: video tutorials, e-learning courses, online guides and other educational materials	5.4B Learning solutions	

Table 13 - Sequence of LUs and modules in the Learning Path Communication and social media

LOUT n°	LOUT description	Learning Unit	Module
2.1.1	I can distinguish between synchronous and asynchronous communication media and choose between them the most appropriate to the communication I want to make	2.1A Synchronous and asynchronous	Communication services
2.1.3	I can make video calls over the Internet	2.1C Video calls	
2.4.2	I can add a participant to or join a videocall	2.4B Managing a videocall	
2.1.4	I can find and view the latest calls and messages made and received	2.1D Checking calls and messages	
2.1.7	I can send and receive SMS through my phone	2.1G Sending receiving SMS	
2.1.8	I can send text messages via instant messaging applications (WhatsApp, Messenger, Skype ...).	2.1H Instant messaging	
2.4.3	I can create a WhatsApp group and add members to it	2.4C WhatsApp groups	
2.1.9	I can post messages on a forum and/or a blog	2.1I Forum and blog	
2.6.1	I can create an online account and related personal profile and log in and out of it safely (including changing and protecting passwords to prevent identity theft). I can delete my account if I want to quit.	2.6A Safe personal account management	Social media
2.6.2	I can give examples of footprints that I willingly leave online using different communication applications (e.g. posts in forums, blogs, "likes", published/shared photos and video etc.) and identify those that may damage my reputation	2.6B Managing reputation	
2.6.3	I can look up and view information about myself and others online	2.6B Managing reputation	
2.6.4	I can adjust my online profile depending on the potential audience (formal-informal, professional, official, thematic etc.)	2.6B Managing reputation	
4.2.1	I can provide a list of personal data, indicating those that should not be shared/ made visible on the Internet	4.2A Protecting personal data	
2.2.3	I can share files, videos, audio, photos, locations, and contacts via social media and instant messaging software (WhatsApp, Messenger, Skype and others), also by using the "share" function	2.2C Sharing via social media	

2.2.4	I can upload self-created content (e.g. a photo) to be shared on websites that request it and/or that give this possibility (social media)	2.2D Uploading content	
2.5.3	I can recognize appropriate behaviours to adopt on social media ... such as asking permission before publishing/sharing photos of other people (especially when children are concerned); avoiding spamming (e.g. by sending invitations or other messages to everyone); using carefully sarcasm, irony or words that may be misunderstood by others	2.5C Social media netiquette	
2.5.4	I can recognise socially/ethically inappropriate online behaviour and communication such as hate speech, flaming, trolling, cyber-bullying, online stalking etc.	2.5D Inappropriate behaviour	
2.5.5	I use basic ways to contrast negative interactions online (signalling posts to service owners, postal police etc.)	2.5D Inappropriate behaviour	
4.2.3	I can adapt the personal information that I provide depending on the context and its security features (social networks, forums...)	4.2A Protecting personal data	
4.2.4	I can set privacy settings on my devices and on the applications I use (social media and others) -> e.g apply privacy settings to Facebook to ensure only friends can see posts and shared content	4.2A Protecting personal data	
4.3.3	I can take measures to protect myself and my children against cyberbullying, grooming and sexting	4.3B Protecting children	
3.3.1	I can recognise the kind of copyright protection associated with online digital content	3.3A Copyright and licenses	Copyright and licences
3.3.2	I can adapt my use of online digital content depending on its copyright status and licences	3.3A Copyright and licenses	
3.3.3	I can find and quote the source and/or author of online digital content before sharing it online	3.3A Copyright and licenses	

Table 14 - Sequence of LUs and modules in the Learning Path Digital content creation

LOUT n°	LOUT description	Learning Unit	Module
3.1.2	I can use basic features of **word processing** software (using desktop or cloud computing software) to write simple text and apply formats	3.1B Basic word processing DONE IN LP BASE	Documents
3.2.1	I can distinguish between editable documents and uneditable ones due to PDF format and file protection	3.2A Editable and uneditable files	Documents
3.2.2	I can make simple changes (add text, make spelling corrections, change formats) to a document produced by another person using desktop or cloud computing software	3.2B Text editing	
3.1.3	I can use basic features of **spreadsheet** software (using desktop or cloud computing software) to organize data and use simple formulas	3.1C Basic spreadsheet	Spreadsheets
3.2.3	I can make simple changes (change/add numbers, change rows sequence by a new ordering criterium) to a spreadsheet created by another person using desktop or cloud computing software	3.2C Spreadsheet editing	
3.1.4	I can use basic features of **presentation** software (using desktop or cloud computing software) to prepare a simple presentation	3.1D Basic presentation	Presentations
3.2.4	I can make simple changes to a presentation created by another person using desktop or cloud computing software	3.2D Presentation editing	
3.1.5	I can take pictures and videos with mobile devices	3.1E Taking videos and pictures	Photos and videos
3.3.1	I can recognise the kind of copyright protection associated with online digital content	3.3A Copyright and licenses	Copyright and licences
3.3.2	I can adapt my use of online digital content depending on its copyright status and licences	3.3A Copyright and licenses	
3.3.3	I can find and quote the source and/or author of online digital content before sharing it online	3.3A Copyright and licenses	

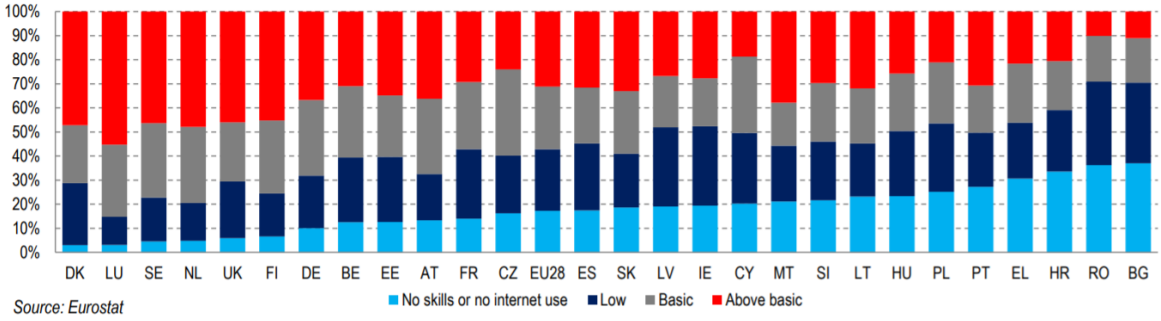
Table 15 - Sequence of LUs and modules in the Learning Path Explore ICT

LOUT n°	LOUT description	Learning Unit	Module
3.4.1	I can read a flow chart identifying the operations and the order of their execution	3.4A Programming	Programming
3.4.2	I can create a basic program based on a simple flowchart or algorithm	3.4A Programming	
4.4.1	I can identify the basic measures to save energy and environmental resources (e.g. avoid unnecessary printing on paper, turn off equipment/devices after use, do not leave chargers connected without a mobile phone, etc.)	4.4A Protecting the environment	Environment
4.4.2	I can identify where to deposit obsolete and/or worn out ICT elements (electronic or computer components, batteries, toners, etc.) to minimise their wasting impact	4.4A Protecting the environment	
5.1.1	I can identify simple technical problems when operating devices and using digital environments	5.1A Identifying technical problems	Technical problems
5.3.1	I can explain what are simple tools such as: calendars, maps & navigators and Wikipedia	5.3A Opportunities for creative digital use	ICT tools
5.3.2	I can simply explain what are new tools and services such as: online collaboration environments, augmented/virtual reality, robots, voice commands, intelligent assistants, drones, 3D printing, internet of things	5.3A Opportunities for creative digital use	

Annex 4 - Digital skills of the EU population based on DESI 2018

According to the DESI 2018 Human capital report,[22] **43% of the EU population in 2017** could be considered as lacking sufficient digital skills insofar, as they had either **low** (26% of respondents) **or no digital skills** (17% did not use the internet or did so only seldom).

Figure 8 - Digital skills of the EU population, 2017 (% of individuals by skills level)



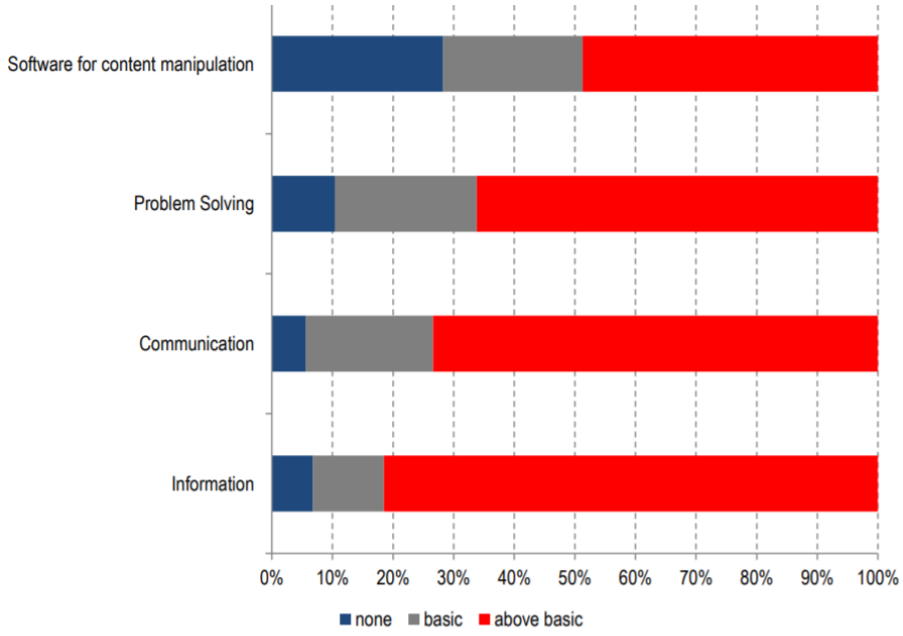
The share of no skills/no users in the EU **labour force** is lower (10%) than in the overall population (17%), but that of low skilled users is roughly similar (below 30%).

Figure 9 next page illustrates the level of digital skills of Internet users (not the whole population), by referring to the four competence dimensions identified from DigComp.

According to the DESI 2018 report: “Across competence dimensions, the largest skills deficit, both among the active labour force and the population at large, relates to the use of software for content manipulation. Almost one in three internet users in the EU has no skills in this area (i.e. they declared to not to have carried out any of the activities considered under this dimension, which range from relatively basic text treatment and spreadsheet-based work to video editing and coding). By type of activity, only about 7% and 30% of EU internet users had, respectively, written code and used spreadsheet advanced functions. In contrast, 82% and 73% can be considered to have above basic skills in, respectively the information and communication dimensions”.

[22] See http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=52247

Figure 9 - Digital skills, by competence dimension and level, 2017 (% of internet users)



Source: Eurostat

Annex 5 - Sources analysed to identify DCDS learning outcomes

Besides the DESI human capital indicator, we explored several sources that could be useful for the identification of the LOUTs to be included in the DCDM:

- DigComp v.1 provides examples of knowledge, skills and attitudes (dimension 4 of the framework) for all 21 competences, but without referring to proficiency levels. On the other hand, DigComp 2.1 provides examples of competence use, referring to the work and learning domains, at foundation level, for competences 1.1, 1.2, 1.3, 3.1, 3.2, 5.1 and 5.2. These examples inspired several DCDS LOUTs.
- the curricula of the Pane e Internet courses level 1 and 2, which mostly address foundation level digital competences in Italy;
- the online platform of the Flanders Adult Education system devoted to ICT courses, in particular the competence items and interpretations in the 2 modules of the “Start with ICT” course;
- the digital competence framework behind the PIX platform developed by the French Ministry of education;
- the descriptions in the teacher digital competence framework at foundation level 1 and 2, developed by INTEF in Spain;
- the digital competence descriptions at foundation level used in the certification system developed by the Castilla Y Leon government in Spain

Other resources analysed although not explicitly referred to DigComp are:

- the UK Essential Digital Skills framework articulated by life and work domains, but without proficiency levels;
- the online training platforms Les Bons Clics in France and Learn My Way in the UK;
- the “The Importance of Digital Literacy” chapter of the Canadian Language Benchmarks: ESL for Adult Literacy Learners (ALL)

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