

D3.3 - Validated mapping of Digital Competence

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**Online Consultation on experts' views on
Digital Competence**

Deliverable 3.3

Validated Mapping of Digital Competence

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Version	Date	Description	Editor(s)
1.0	13-05-2012	Mapping of Digital Competence following validation among experts.	José Janssen (OU), Slavi Stoyanov (OU)
1.1	23-05-2012	More detailed introduction and method sections. Further fine-tuning of Digital Competence areas and statements	

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Validated mapping of Digital Competence

Introduction

Digital competence – the confident and critical use of information society technology for work, leisure, and communication – is of key importance in warranting participation in society. However, research and practice in the field of digital competence present a scattered image of digital competence and the knowledge, skills, and/or attitudes it is considered to entail.

In order to inform employers, policy makers, and citizens on what it means to be digitally competent, a common understanding of the concept and its constituent parts needs to be developed - a mission taken on by the European Commission, more particularly its Institute for Prospective Technological Studies (IPTS). One step in this process of developing a common understanding involves the investigation of experts' views on digital competence. To this end IPT has commissioned an online consultation of experts and practitioners in fields relating to digital competence and digital inclusion.

The online consultation was carried out in two rounds. In the first round experts in the field were asked to generate as many ideas as possible on what it means to be digitally competent. A total of 204 experts were invited to take part in the online brainstorm - 79 (38%) of them completed the questionnaire. The input provided by these experts resulted in an initial description of digital competence distinguishing 14 digital competence areas. This result was then presented back to the experts in a second consultation round directed at validating the result as a 'collective understanding' of digital competence. This deliverable describes the outcome of the second round of the consultation.

Method

The 14 digital competence areas identified in the first round emerged following a particular method. First two researchers went through all the statements generated by the experts to select unique single statements and remove double items. This resulted in a set of 134 statements. These statements were presented to a smaller number of experts ($n=17$) attending a workshop, asking them to individually sort and categorise the statements according to similarity of meaning. Based on these categorisations a hierarchical cluster analysis was carried out resulting in an initial solution of 15 clusters, i.e. digital competence areas. This result was then presented back to the experts attending the workshop asking them to comment on these digital competence areas and the statements describing them, and to provide a label and description for each area. This follow up activity was carried out in four small groups. Based on the results from the cluster analysis, as well as the feedback and suggestions from the groups, the initial solution was adapted, e.g. some clusters were combined, another split up, some statements were moved and others removed¹. This resulted in a mapping of digital competence consisting of 14 areas of digital competence, described by 125 statements.

1. General technical knowledge and functional skills
2. Basic use in everyday life
3. Specialized and advanced skills for work and creative expression

¹ A detailed account of the removed statements and the criteria used will be provided in the final report of the project

4. Technology mediated communication and collaboration
5. Privacy and security
6. Legal and ethical aspects
7. Information processing and management
8. Informed and flexible decision-making
9. Exploration of digital opportunities and adaptation to own needs
10. Self-directed learning with digital technologies
11. Understanding and awareness of role of ICT in society
12. Effective and efficient use
13. Seamless use and appropriation of technology
14. Balanced attitude towards technology

Finally, all experts invited to the first consultation round, were addressed to take part in a second consultation round aimed at validating the collective view that emerged from the first round. They were asked to go through the above digital competence areas, which were presented to them including a brief description and statements 'belonging' to each area, and to indicate whether they think the 14 areas present a complete picture of digital competence. Do they find there are things missing still, or perhaps things are included which they do not consider to constitute part of digital competence?

In the second round 57 experts examined the aggregated result from the first round, 41 of whom had also provided input for the first round. The other 16 experts had been invited for the first round as well, but had not taken part at that stage.

Results

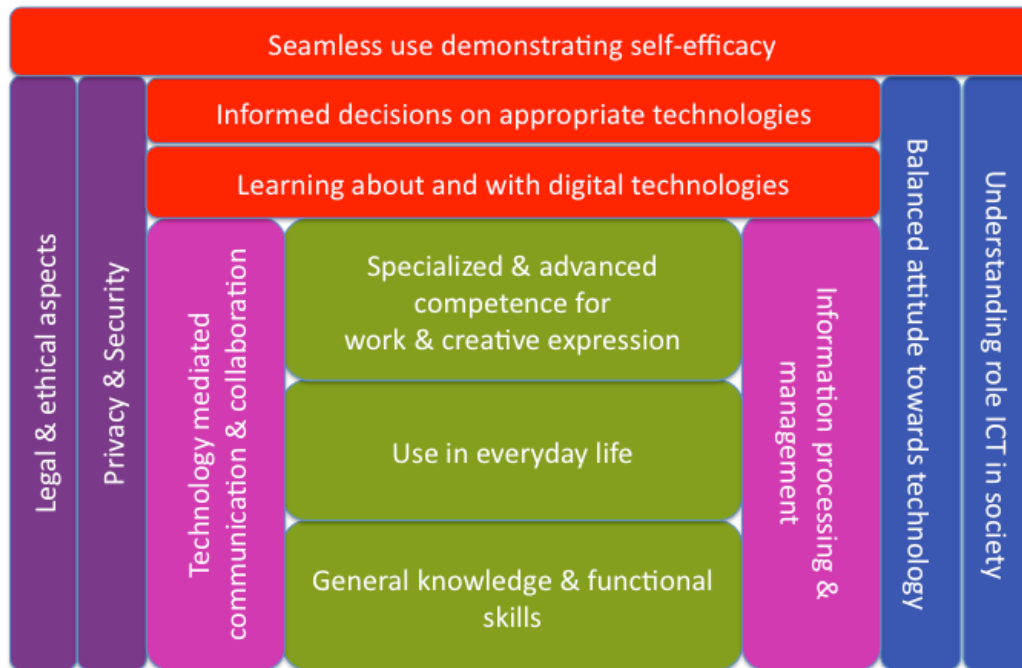
Based on the feedback of the 57 experts taking part in the second consultation round the initial description of digital competence areas has been adapted in various respects:

- Some labels of digital competence areas were changed
- A few descriptions of digital competence areas were adapted
- A number of statements were rephrased, (re)moved, or added
- Twice two competence areas have been merged, reducing the number of digital competence areas to twelve

This deliverable describes in detail the validated collective view of experts as summarized in the figure below. The figure provides a schematic representation of the results and as such can not completely reflect the richness of the results, but it serves to illustrate how the various digital competence areas identified through the online consultation can be considered as 'building blocks'. Proficiency levels vary both within and between blocks. Most notably proficiency levels increase as we move up through the green blocks. Eventually high proficiency levels are reflected in (self-directed) learning about and with technologies, informed decisions on appropriate technologies, and ultimately, smooth, seamless use of these technologies.

'Core' competences related to digital technology usage in every day life and at more advanced levels connected to creative expression and/or work (green areas) are bolstered on one side by technology mediated communication and collaboration competences and competences relating to information processing and management on the other.

Digital Competence Building Blocks



The green and pink digital competence areas involve direct, 'primary', use of digital technology. These competences must be embedded in or supported by other competences involving awareness and skills relating to the wider implications and impact of using digital technologies. These 'supportive' (but by no means less important) competences are: awareness of legal and ethical aspects, as well as privacy and security issues and the ability to act prudently in these matters on the one hand, and an understanding of the role of ICT in society together with a balanced attitude towards technology on the other hand.

Finally, at an even higher level of reflection and integration, digital competence involves a number of competences which enable the digitally competent person to evaluate both his/her own digital competences and the surrounding digital environment in order to take appropriate decisions for self-development and enhancement of one's personal digital environment, ultimately resulting in a level of proficiency where the digitally competent person demonstrates self-efficacy and seamless use of digital technologies.

The following section describes the digital competence areas in more detail, including the validated statements which serve to illustrate the variety of skills, knowledge, attitudes, and behaviours pertaining to each particular area.

A note of caution to make here is that although these results can be considered a validated mapping of the collective views of experts in the field of digital competence, it should not be considered as representing consensus among the experts. Though many of the experts taking part in the second round indicated they agreed with the final mapping, and many of the comments and further suggestions made by them have been followed up, there were some more substantial differences between experts which could not be solved, e.g. some experts would like to restrict the description of digital competence to knowledge and skills, as they consider attitudes related to digital competence not to be part of digital competence. Likewise, there were experts who advocated

limiting the description to 'pure' digital competence and leaving out related but at the same time more general competences like information processing skills.

In this respect, the online consultation can be considered a balancing act between the academic (as well as common sense) values of parsimony and conciseness on the one hand and doing justice to the rich variety of ideas and nuances suggested by so many experts. Though this in itself does not constitute a problem, it is good to be aware that validating the results of the first round by means of a second consultation round does not mean that the final result reflects consensus.

Digital Competence areas

A. General knowledge and functional skills

The digitally competent person knows the basics (terminology, navigation, functionality) of digital devices and can use them for elementary purposes.

Possesses general computer skills (typing, using computers, getting into a new programme).

Is able to use a digital device, which may be one of many types (e.g. Desktop PC, Laptop, Tablet, Smart phone).

Understands the difference between hardware and software.

Is familiar with the meaning of terms commonly used in user manuals for the operation of hardware and the installation and configuration of software.

Knows about the existence of various operating systems.

Understands the differences between operating systems.

Understands the different parts and components of a computer and/or other digital devices.

B. Use in everyday life

The digitally competent person is able to integrate technologies into the activities of everyday life.

Is able to use at least office applications (or other work related applications) to edit and create content (text, numeric, images).

Is able to search, collect, process, evaluate, share, store data and information using various devices, applications, cloud services.

Is able to download and access different information types from the Internet.

Consults digital resources as a matter of routine across various aspects of life (news, health, sports, travel, entertainment, etc.).

Can conduct transactions online (e.g. pay bills, apply for a job, submit tax declaration, complete online forms, book a hotel, interact with government or local services, shop online, etc.).

Is able to participate in society through online engagement in democratic actions (e.g. lobbying, petitions, parliament).

C. Specialized and advanced competence for work and creative expression

The digitally competent person is able to use ICT to express his/her creativity and to improve his/her professional performance.

Uses technology to improve the quality of his/her work.

Masters specialized digital skills needed by his/her area of work.

Is able to create knowledge representations (e.g. mind maps, diagrams) using digital media.

Is able to use a variety of media to express him/herself creatively (text, images, audio, and movie).

Is able to remix different existing content into something new.

Is able to build meaningful knowledge through interaction with digitally available resources

Understands how meaning is produced through multimedia (text, images, audio, video) and how culture is produced through the Internet and social media in particular.

Is able to broaden/update digital competences according to personal/professional needs (e.g. database use, editing websites, editing digital images).

Is able to create complex models and simulations of the real world using digital information.

Is able to program ranging from using block building code tools to a high-level programming language.

D. Technology mediated communication and collaboration

The digitally competent person is able to connect, share, communicate, and collaborate with others effectively in digital environments.

Is able to communicate through ICT (e.g. email, instant messaging, video conferencing.).

Is able to use social media and participative technology.

Is able to use digital media to be part of a community.

Can use ICT for team work (collaboration, co-construction of content); to work at a distance.

Is able to take advantage of digital technology to cooperate and take part in networks and networked learning for personal or professional purposes.

Is able to manage several virtual identities in different contexts.

Knows how to use social media and social networks to promote results of their work.

Is able to contribute to the public knowledge domain (e.g. wikis, public forums, reviews).

E. Information processing and management

The digitally competent person uses technology to improve his/her ability to gather, organise, analyse and judge the relevance and purpose of digital information.

Is able to gather relevant digital information, e.g. other users' experiences, and to assess the quality of goods based on that information.

Is able to judge the validity of content found on the Internet, how to find appropriate material, and what sources can be trusted.

Is able to compare and contrast information from diverse sources (triangulate information) before it is used in a knowledge-making process.

Can integrate, compare and put together different types of information related to multimodal content.

Is able to structure, classify, and organize digital information/content according to a certain classification scheme or genre.

F. Privacy and security

The digitally competent person has the capacity to protect personal data and take appropriate security measures.

Is able to protect and monitor his/her digital identity and footprints.

Understands the terms of use of online services (i.e. the fact that service providers may use personal data that they collect about users) and can act prudently in this knowledge.

Knows that many interactive services use information about him or her to filter in commercial messages in more or less explicit manners.

Understands the risks associated with online use and encounters with unknown persons.

Is able to protect him/herself from threats of the digital world (fraud, malware, viruses etc.).

Understands the risk of identity theft and other credentials' thefts and is able to take steps to mitigate risk.

Is aware of privacy issues when using Internet/mobile Internet and is able to act prudently.

Is aware of the impact and longevity of digital information that s/he considers for publishing.

G. Legal and ethical aspects

The digitally competent person behaves appropriately and in a socially responsible way in digital environments, demonstrating awareness and knowledge of legal and ethical aspects on the use of ICT and digital content.

Is able to communicate and collaborate with others in line with codes of conduct appropriate to the context.

Considers legal and ethical principles of use and publication of information.

Understands copyright and licence rules.

Knows there are different ways of licensing intellectual property production, understands differences between using copyright, public domain, copyleft and/or creative commons licenses.

Has an advanced sense of suitable behaviour, finely tuned to media context, audience and legal provisions.

H. Balanced attitude towards technology

The digitally competent person demonstrates an informed, open-minded, and balanced attitude towards Information Society and the use of digital technology. The digitally competent person is curious, aware of opportunities and new developments, and is comfortable to explore and exploit them.

Has a positive but realistic attitude towards the benefits and risks associated with information technologies.

Sees digital media as enablers rather than inhibitors of choice and action.

Uses digital media and tools without fear, always aware that digital enablers should serve the human being to have a better life (and not the opposite).

Is self-motivated to seek and share information, to learn new skills, and – at least initially – experience new information with an open and critical mind.

Holds a positive attitude to learn about emerging digital technologies.

Has a general level of confidence, meaning that s/he is willing to experiment with new technologies, but also to reject inappropriate technologies.

Feels part of the current discourse on the opportunities afforded by new media.

Is able to assess and reduce/avoid technology related threats to one's health.

Is able to manage the potentially distracting aspects of working digitally.

Has understood that the digital environment we are facing can make things better or worse - it all depends on how we are using it and what rules we find for it.

I. Understanding and awareness of role of ICT in society

The digitally competent person understands the broader context of use and development of information and communication technology.

Understands the wider context of digital tools in a 'digital age' characterised by globalisation and networks.

Understands where ICT comes from, who develops it and for what purposes.

Knows about the historical evolution of internet, the web and its basic architectural principles.

Is aware of the general trends within new media even if s/he does not use them.

Understands the role of ICT in everyday life, in social life and at work.

Has a deep and transversal competency in how digital devices, media and networks play together.

Is aware of environmental issues related to the use of digital technologies.

J. Learning about and with digital technologies

The digitally competent person actively and constantly explores emerging technologies, integrates them in his/her environment and uses them for lifelong learning.

Is able to adapt smoothly to new technology and to integrate technology into his/her environment.

Is able to learn how to work with any new digital technology by trying it out, and using its internal guidance and help.

Possesses the skills to update knowledge about the availability of digital tools.

Is able to learn and integrate the new technologies that emerge.

Is able to use digital media to learn (develop oneself).

Is able to use a digital environment for lifelong learning (formal or informal).

Can self monitor personal goals and can diagnose deficiencies of digital competence required for reaching these goals.

Knows how to self-regulate his/her learning about digital technologies.

Can use ICT resources to safely expand own knowledge and connect to the world around.

Is able to use learning management systems, information management systems, etc.

Is capable of exploiting technological potentials in order to represent and solve problems.

Is able to solve a technical problem or to decide what to do when technology does not function.

K. Informed decisions on appropriate digital technologies

The digitally competent person is aware of most relevant or common technologies and is able to decide upon the most appropriate technology according to the purpose or need at hand.

Has first-hand knowledge and expertise of the major digital technologies used in his/her field.

Understands the potential of digital devices and resources for her/his work.

Knows the range of things that can be done using ICT/Internet.

Is aware of the most relevant or popular digital technologies used by others (e.g. peers, reputed experts).

Has reasonable knowledge of available technologies, their strengths and weaknesses and whether and how they might support the achievement of personal goals.

Chooses the most appropriate technologies according to the task.

Does not opt for a particular technology because it is the latest or most trendy/sexy one, but instead seeks to find the best solution for the problem at hand.

Uses a widely diverse and well-balanced mix of digital and non-digital technologies for different problems and will dynamically change options over time.

Is able to use digital services without being completely dependent on them (or: helpless without).

Can determine if appropriate and safe digital means are available, that are efficient and cost-effective in comparison with other means.

Understands the technologies s/he is using at a level that is sufficient to underpin good purchasing decisions, e.g., about devices or Internet Service Providers.

Has a comprehensive mental map of how the online world works.

Understands the environmental impact of computers and electronic devices and how s/he can make them last longer by recycling parts of it (such as changing hard disks).

Is able to make informed decisions (with human or technological assistance where appropriate) about whether and how to use technologies to pursue personally relevant goals.

L. Seamless use demonstrating self-efficacy

The digitally competent person confidently and creatively applies digital technologies to increase personal and professional effectiveness and efficiency.

Is able to arrange and develop his/her personal working environment as an effective and reliable system.

Includes more and more digital instruments in every day life to increase the quality of life.

Can use different ICT in a way that helps to achieve certain results more quickly, or more easily, or to achieve better results.

Knows how to use digital equipment cost-efficiently and also time-efficiently.

Can solve a theoretical or practical problem, of individual or collective interest, through or with the support of digital tools.

Is able to stay informed using a combination of active search and personalised, automated delivery of information.

Can access technology and uses it without realising that s/he is actually using it.

Is familiar with the language of new media comparable to the way proficiency in one or more human languages makes our life easier.

Digital competence map

