Development of a Digital Competence Model

A1_Digital Competence Model

Aim: A model of digital transformation competences that can serve as a foundation and point of reference for the subsequent processes of self-assessment, training, and certification. The project proposal states that this model should have three components: knowledge and understanding of digital technologies, interpersonal skills, and knowledge and understanding of the concept of e-leadership. The European Digital Competence Framework for Citizens (DigComp) was used as a starting point because of its universal and inclusive qualities.

Literature Review

We began by conducting a systematic review of the academic literature to locate academic papers about digital competence or digital skills, soft skills, and e-leadership skills. We used Google Scholar, Scopus, and Web of Science as databases. Our search was focused on frameworks for digital competence as well as papers on the integration of soft skills, e-leadership, and digital competency. 42 papers were located in total. 12 of them introduced new frameworks, and 22 of them discussed digital competence and digital skills. The other 22 papers offered insightful discussions on soft skills and e-leadership skills. Additionally, we incorporated reports about DigComp applications as well as all four versions of the DigComp Report in our literature review.

The following step was to analyze all 42 papers in order to create a new model of digital competence. We began by gathering all examples and definitions of digital competencies, soft skills, and e-leadership skills. Second, we attempted to identify various themes and their relationships. Each theme represented a component of digital competence. Each component was then assigned to one of the model's three dimensions: technological knowledge, soft skills, and e-leadership skills.

Initial Digital Competence Model

At the end of the analysis, we had developed a digital competence model with 19 areas or building blocks. The first dimension, Technological Knowledge, included four blocks:

- Knowledge about Hardware and Software
- Knowledge about Information Management
- Knowledge about Digital Content
- Advanced Technological Knowledge

The second dimension, Soft Skills, had the following seven blocks:

- Self-Assessment and Self-Development
- Open Mindset
- Ethics and Responsibility
- Creativity and Innovation
- Problem Solving
- Face-to-Face Communication

- Conflict Management

The third dimension, E-leadership Skills, consisted of eight blocks:

- Technological Skills
- Digital Communication
- Change Management
- Self-Leadership
- Helping and Motivating Others
- Team Working
- Trust-Building
- Time Management

To make the model more comprehensive and provide a better understanding of the building blocks, we formulated four to six examples for each building block.

Refinement of the Model during Meetings

We presented this model to the whole group during online meetings as well as on the transnational meetings in Zalec, Slovenia, and in Turku, Finland. During all meetings, we received valuable feedback for improvement, such as re-labelling and summarising of building blocks, as well as suggestions for further building blocks.

A2_Online Survey

Aim: online quantitative survey of representative samples of the three main target groups "managers", "students", and "trainers" to investigate the digital competence model.

Since a survey that included all 19 competence areas seemed to be too comprehensive, we discussed in the group what were the most important competence areas of this model. We finally selected 12 competence areas that we want to measure with our survey. To measure these areas, we used the examples from our model to formulate 1-2 statements for each area. The user should then decide on a scale from 1-5 whether he or she agreed or disagreed with the statement. Overall, 16 statements were included in the survey.

Technological Knowledge	
Hardware & Software	I can use basic softwares and I know the most used digital tools and applications in my job
Information Management	I can search digital information in databases and search engines and use simple criteria to select them
Information Management	I can analyse systemically and understand digital data and information and I know how to store them
Digital Content	I can use common tools to create and modify information/textual, numerical and audiovisual contents

Soft Skills	
Self-Assessment	I recognise the fields in which my digital skills need to be improved or updated
Self-Assessment	I constantly expand and improve my knownledge and ability to use digital technologies
Open Mindset	I am curious to learn new things about media and digital and experimental applications
Responsibility	In the relationship with the others I manage responsibility of personal and company data
Creativity & Innovation	I try to use innovative technologies when during my work activities
Conflict Management	Through digital technologies I examine problems together with others, examine different ideas and search for new solutions

E-Leadership	
Digital Communication	I share and exchange in a regular way knownledge and experiences with collegues through digital tools
Digital Communication	I make use of digital tools and social media platforms for networking and cooperation within and outside the school/company
Change Management	I persuade learners/collegues to embrace change and encourage innovation
Helping & Motivating Others	I understand the fields in which learners digital competences require improvement and how to support them to develop them
Time Management	I use technologies to give a priority order to activities and to identify those that need more attention
Time Management	I clearly establish boundaries that assure a balance between private life and working life and I dedicate time to myself

The survey was answered by nearly 600 people, which represented managers, students, and trainers. The main outcome of the survey was that the age as well as the working position of the participants among the VET schools in all project partner countries had an impact on technological knowledge, soft skills, and e-leadership skills. Furthermore, the age and working position of the participants impacted the use of technology by the managers, trainers and students.
However, these results reflected only statistical correlations/relationships among the selected variables; they must be validated through focus group activities conducted by the project partners.

A3_Focus Groups
Aim: qualitative focus groups with the involvement of experts and operators from VET ecosystem, businesses and the labour market to enrich and validate the results of the previous activities. 12 Focus Groups (2 in each partner country) should be conducted.

In order to deepen and collect qualitative contributions that can enrich and validate the Digital Competence Model, each partner organised locally at least 2 focus groups, involving managers, training experts and labour market intermediaries of its territorial networks, for a minimum number of 5 participants per meeting. In the focus groups, the following questions were discussed:

1. Show the model framework: do you find yourself in the three competence areas?
2. Do you observe missing competences? (*send the slide with all competences before the focus group; try to deepen the competencies related to AI if not emerging*)
3. Do you think that age or position/role may affect the applicability of the model?
4. From your observatory, what is the situation on the labour market (skills shortage)? Can the acquisition of these skills can give a competitive advantage (both for people who need to enter the labour market and for those who are already employed)?
5. What balance do you see between strictly technical and human/soft skills?

6. Having to carry out a self-assessment and then training programmes based on this skills model, what suggestions can you give us?
7. Highlight five key messages emerging from the focus group

Summary of answers:

1. Overall, while the model's foundation was appreciated, participants indicated the need for more specificity and clarity, especially in terms of distinguishing between certain competences and clarifying terms used.
2. Across the board, there's an urge for more holistic thinking about technology's role in modern life, not just its functional application but also its ethical, emotional, and health implications.
3. Overall, while the age factor seemed to consistently influence digital proficiency across different groups, the role or position was perceived differently by each group. Some felt roles dictated specific competencies, while others felt it was more about individual needs within those roles. The feedback also touched upon the importance of evolving education and training to address these disparities.
4. There's a notable deficiency of specific skills in various job sectors. Digital proficiency is paramount in the VET-sector because:
Technological innovations in VET education require individuals to keep pace.
An escalating shift to online tasks necessitates digital adeptness.
Employers prioritize candidates who demonstrate proficiency in relevant digital tools.
5. In conclusion, while the balance between technical and human/soft skills might vary based on professional roles, sectors, and contexts, there's a consensus that both skill sets are integral and often complementary in the modern professional landscape.
6. In essence, the feedback emphasizes a blend of practical application, tailored feedback, official recognition, learning from previous projects, and providing clear, tangible insights through self-assessment tools for effective skills development.
7. The overarching themes indicate a need for an integrated approach to soft and technical skills, the importance of relevancy and up-to-date content, and the value of clear, personalized feedback and training.

<u>Refinement of the Digital Competence Model</u>
The feedback from the discussions in the group as well as insights from the survey and focus groups were used to refine the digital competence model. The final model encompasses the following 19 competence areas.

Digital Competence		
Technological Knowledge	**Soft Skills**	**E-Leadership Skills**
• Knowledge about Hardware and Software	• Self-Assessment & Self-Development	• Technical and Data Management Skills
• Knowledge about Information Management	• Open Mindset	• Digital Communication
• Knowledge about Digital Content	• Ethics and Responsibility	• Change Management
• Advanced Technological Knowledge	• Creativity and Innovation	• Self-Leadership
	• Problem Solving	• Helping and Motivating Others
	• Face-to-Face Communication	• Team Working
	• Emotional Intelligence	• Trust-Building
		• Time Managmenent

Changes affected the names of the competence areas as well as the examples. The section “conflict management” in the Soft Skills dimension was renamed into “emotional intelligence”, and the section “technical skills” under E-Leadership Skills into “technical and data management skills”. Some major changes were done in the examples. In the dimension of Technological Knowledge, we integrated more examples regarding artificial intelligence and cyber security. Similarly, since we included new sections “emotional intelligence”, and “data management skills” we related the examples closer to these concepts. For instance, we considered data analysis, data integrity, and business intelligence as important data management skills to be included in the model. Finally, we also reduced examples in the sections “self-leadership” and “time management”. On the next pages, the detailed version of the digital competence model with all the examples is presented.

Technological Knowledge

Knowledge about Hardware and Software

1. To understand the basic ICT concepts of hardware and software
2. To use the basic software that is relevant for VET/for work/at school and at work
3. To be aware of the most commonly used digital devices and applications in VET/at work/at school
4. To select suitable digital resources for teaching and learning/for working/for studying and learning
5. To protect devices and digital systems against external threats

Knowledge about Information Management

1. To search for digital information in databases and search engines and be aware they use AI algorithms
2. To use simple criteria to select from information found
3. To systematically analyse and interpret digital data and information
4. To scrutinise digital information critically and be aware that data based on AI may include biases
5. To store, organise and retrieve digital data in a useful and structured manner

Knowledge about Digital Content

1. To use the most common tools to create textual, numerical, and/or audiovisual information/content
2. To edit digital content
3. To be aware of author rights and different forms of digital content diffusion
4. To be able to protect one's own digital identity
5. To know strategies of cyber security to protect personal data and systems from attacks and loss

Advanced Technological Knowledge

1. To use digital technologies to create knowledge and to innovate processes and products
2. To know how to set up online teaching/work platforms to allow teaching/working from remote
3. To identify and solve technical problems when operating digital technologies
4. To adjust and customise digital environments to personal needs
5. To understand at least one programming language to programme and customise VET-/work-relevant programmes
6. To develop specific knowledge about emerging technologies (e.g. artificial intelligence, augmented reality)

Soft Skills

Self-Assessment & Self-Development

1. To recognise where one's own teaching and digital practice/digital competences needs to be improved or updated
2. To use online resources or social media to learn about new teaching methods and strategies/ digital technologies
3. To use online resources or social media to identify opportunities for training and development
4. To continuously expand and enhance one's repertoire of digital teaching practices/digital knowledge

Open Mindset

1. To develop self-efficacy using digital technologies for taking an active part in social interactions
2. To maintain a positive and constructive approach even in the face of critical issues related to the use of dt
3. To have the patience to try new digital applications, pursue goals perseveringly and be ready to make an effort
4. To experiment with new formats and teaching methods/digital tools

Ethics and Responsibility

1. To consider the consequences of one's actions in a digital context
2. To act responsibly in dealing with others and with private and corporate data
3. To have due regard to reliability and privacy
4. To understand the role of digital technologies for social well-being and social inclusion

Creativity and Innovation

1. To use digital technologies to create new digital educational resources/knowledge
2. To transform ideas or solutions into entirely new forms
3. To incorporate innovative pedagogies into one's teaching/technologies when completing tasks at work/ technologies when completing at school and at work
4. To employ strategies to deal with the constantly changing digital landscape
5. To respond creatively to problems and opportunities

Problem Solving

1. To identify and analyse problems in difficult situations and make a justifiable evaluation
2. To exploit technological potentials in order to represent and solve problems
3. To know how to explore the web and your online network when searching for solutions
4. To look for causes of the problem to understand what is really going on
5. To be able to build meaningful knowledge through interaction with digitally available resources

F2F Communication

1. To strive for stringent communication transparency and clarity
2. To listen effectively without visual cues and focus on the content of the message
3. To send messages that avoid the risk of misunderstanding
4. To provide timely and substantive feedback and actively involve learners/followers
5. To be aware of behavioural norms and cultural and generational diversity when comunicating
6. To distinguish between important and unimportant information and to present the information in a summarised way

Emotional Intelligence

1. To be aware that (your) online interactions might affect other people's feelings
2. To explore issues with others in online communities so as to find solutions that meet everyone's needs
3. To evaluate and apply diverse perspectives in front of multiple and conflicting positions
4. To be usually willing to adjust priorities to reach a resolution in online settings
5. To manage emotions and competencies when communicating online
6. To gather as much information and keep the lines of communication open in online interactions

E-Leadership Skills

Technical and Data Management Skills

1. To combine a variety of digital tools to overcome communication barriers
2. To be able to find patterns in large sets of data so as to see what data is important and what data can be ignored (= data analysis)
3. To gather data from various sources, transform it into meaningful insights, and deliver those insights to key stakeholders within an organization (= business intelligence)
4. To ensure accuracy, consistency, and reliability of data, so that it can be used for decision-making, analysis, and reporting (= data integrity)
5. To optimize the use of digital technologies from a cost-benefit perspective

Digital Communication

1. To use the most common communication tools to interact with learners/superiors, colleagues and peers/teachers, colleagues and peers
2. To apply the appropriate language and basic strategies for communicating using digital media
3. To monitor and guide learners' interactions in a digital environment and enable peer feedback on individual assignments
4. To share contents & information using social networks and collaborative platforms to collect feedbacks
5. To share and exchange knowledge and experiences with colleagues and peers via digital tools
6. To use digital tools and social media platforms for networking and collaboration within and beyond the organization/school

Change Management

1. To plan, monitor, and continuously refine the adoption of digital technologies for VET/ for work/for school
2. To consider generational differences of learners/subordinates and colleagues/peers and colleagues regarding technology adoption and offer innovative approaches
3. To convince learners/subordinates and colleagues/peers and colleagues to embrace change and encourage innovation
4. To balance old and new technologies and to foresee interrelations and possible conflicts
5. To adopt a systemic perspective taking into consideration the complexity related to change

Self-Leadership

1. To understand who one is, one's emotions, motivations, strengths and weaknesses
2. To control own emotions, thoughts and behaviours to accomplish personal goals
3. To anticipate needs and challenges and then respond to them effectively
4. To stay motivated to complete tasks and pursue difficult tasks to the end

Helping and Motivating Others

1. To use digital resources to visualise and explain new concepts in a motivating and engaging way
2. To understand where a learner's/subordinate's or colleague's/peer's digital competence needs to be improved and to support others with their digital competence development
3. To appreciate and recognize individual performance
4. To create a positive relational climate and nurture a shared identity
5. To facilitate interactions and the exchange of ideas and opportunities across boundaries
6. To align virtual teams around a common goal and allow them autonomy

Team Working

1. To know several relevant people inside and outside one's organization/school whom one can contact through digital networks to discuss topics and get help
2. To be aware of different tools used to collaborate using virtual environments
3. To use the most common tools to collaborate in social and professional networks
4. To share digital information and content by selecting the most appropriate digital technologies
5. To welcome suggestions for improvements from the team
6. To understand that teamwork requires effectively managing and negotiating group dynamics inherent in teamwork

Trust-Building

1. To grant autonomy to followers and care about them as individuals
2. To communicate clear expectations and be accountable for their promises
3. To maintain work-life balance despite ubiquitous accessibility via digital media
4. To create a relevant, rich and effective digital learning environment
5. To appreciate and accept the perspectives of different people from different backgrounds and cultures

Time Managmenent

1. To set specific, measurable, achievable, and relevant goals
2. To schedule and organize all activities and choose a time to get certain tasks accomplished
3. To prioritize tasks for identifying those that deserve more attention than others intention
4. To delegate specific tasks in order to free up time to focus on higher value activities
5. To set clear boundaries that ensure work-life balance and consciously take time for oneself