DEAL WITH DIGITAL WBL

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The Emerging Digital Skills Model for VET trainers

Design, delivery, evaluation and certification of competences learned through Digital WBL

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FUTURE SKILLS FOR FUTURE TEACHERS

Guiding Learners at the Workplace

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Executive Summary

The report presents a **competence framework for teachers and trainers in VET** (vocational education and training) and other applied and practice-related educational contexts such as dual study programmes and learning on the job. It has been created within the DEAL with Digital Work-Based Learning initiative, an Erasmus+ project.

The **digitalization of work and learning environments** is transforming all domains of learning and work contexts. Their learning environments need to prepare learners to thrive in digital and hybrid environments and to become autonomous learners ready to take advantage of the potential of digital tools and environments. The Digital Work-Based Learning approach presented includes a vision where teachers and trainers not only replace their current teaching strategies, but rethink and reevaluate them under the light of new potentials and developments - and thus develop a future vision of learning together with learners. Thus, with this competence framework, we identify the competencies needed to provide learners with good, rich Digital Work-Based Learning experiences.

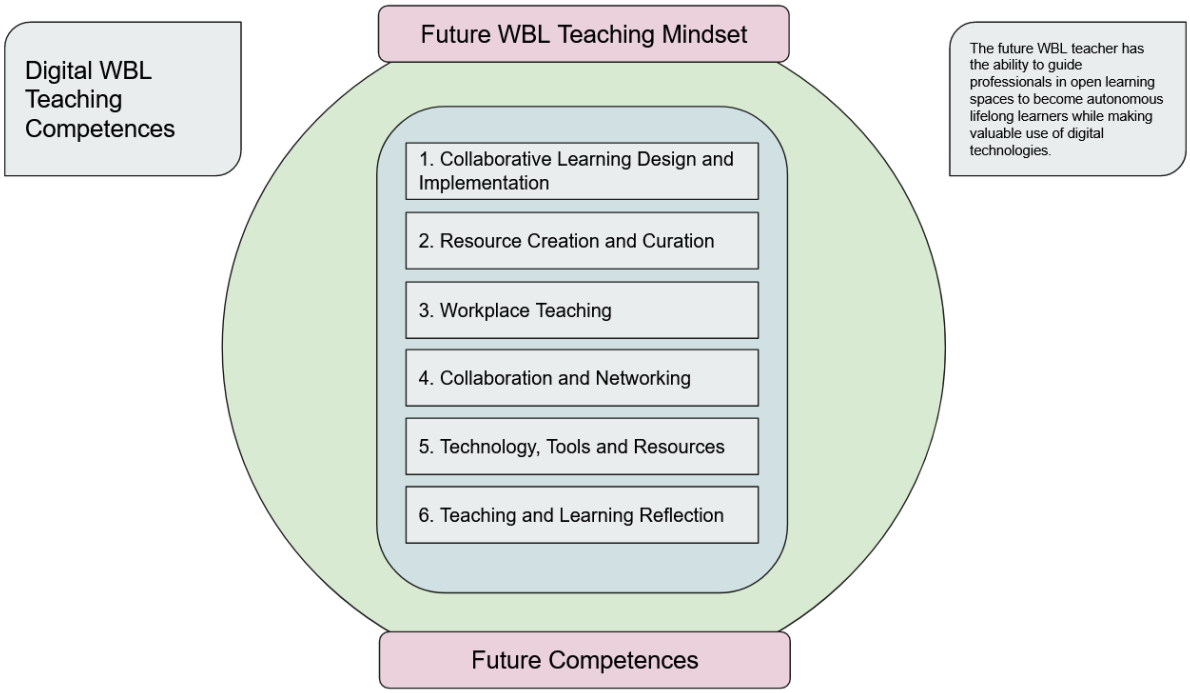
The main **target group** are VET teachers and trainers as well as in-company trainers. However, another important target group which has an important role in guiding and supporting learners can be identified: the learners themselves that can support other learners in peer-learning processes.

The competence framework presented in this report has been designed in a **multi-step research process**, including the analysis of resources and frameworks such as DigCompOrg and DigCompEdu. A bottom-up approach has been taken, i.e. starting from the specific needs and challenges of the teachers in order to organise, develop and manage virtual work-based learning spaces. It has been developed in a multi-step, qualitative approach, integrating diverse perspectives. For developing the framework, the Digital WBL Ambassador Programme was set up, serving as a training and research programme. It builds on three guiding principles relevant in the DEAL with Digital WBL initiative: Digital Transformation, new concepts of teaching and learning, and workplace learning.

Future Competences (or Future Skills) and a Future WBL Teaching mindset serve as the foundation and background for the six Core Competences of the Digital WBL Teaching Competences Framework.

The six Core Competences can be decribed as follows:

1. **Collaborative Learning Design and Implementation** - Design engaging, learner-centred and collaborative Digital WBL Learning and Assessment Settings and to guide learners in their learning process in Digital WBL spaces
2. **Resource Creation and Curation** - Design, adapt, edit, exchange and share learning materials and resources aligned with learners' needs in Digital WBL contexts and relevant to practice contexts
3. **Workplace Teaching** - Create learning experiences that reflect practice- or work-based contexts and to guide learners to create their open learning environment at the workplace
4. **Collaboration and Networking** - Collaborate with other stakeholders in education in order to realise successful Digital WBL experiences for learners
5. **Technology, Tools and Resources** - Learn about, choose, use, adapt and stay updated on appropriate tools for Digital WBL experiences while reflecting the technical conditions and security aspects
6. **Teaching and Learning Reflection** - Be reflective of societal developments, trends and challenges and other conditions when designing Digital WBL experiences and interacting with learners.


Digital WBL Teaching Competences
Future WBL Teaching Mindset
1. Collaborative Learning Design and Implementation
2. Resource Creation and Curation
3. Workplace Teaching
4. Collaboration and Networking
5. Technology, Tools and Resources
6. Teaching and Learning Reflection
Future Competences
The future WBL teacher has the ability to guide professionals in open learning spaces to become autonomous lifelong learners while making valuable use of digital technologies.

1. Introduction: Supporting the Future Teacher in Work-Based Learning

The following report presents a competence framework for teachers and trainers in VET (vocational education and training) and other applied and practice-related educational contexts such as dual study programmes and learning on the job. It has been created within the DEAL with Digital Work-Based Learning initiative, an Erasmus+ project.

While the Covid 19 pandemic has clearly accelerated developments and trends, the digitalization of work and learning environments has already been an ongoing process, influencing all domains of learning and work contexts. This means that learners will be working in contexts permeated by digital media and work processes - and they need the competences to do so. Their learning environments need to prepare them to thrive in digital and hybrid environments and to become autonomous learners ready to take advantage of the potential of digital tools and environments. On the other hand, digitalization changes learning environments and holds a lot of potential to transform learning experiences and even to overcome obstacles and barriers to participate in the learning process. However, for this to take place, we need a new approach to applied learning - which we call here Digital Work-Based Learning. It includes a vision where teachers and trainers not only replace their current teaching strategies, but rethink and reevaluate them under the light of new potentials and developments - and thus develop a future vision of learning together with learners. With this competence framework, we identify the competencies needed to provide learners with good, rich Digital Work-Based Learning experiences. Teachers and trainers willing to enhance their Work-Based Learning and Teaching experiences can use them as orientation to reflect on their own competences. This competence being part of the "DEAL with Digital WBL" initiative, an online training offer to promote these competences is currently being developed and will be freely available at www.digitalwbl.com.

The initiative has the ambition to develop teachers' and trainers' competences to design, deliver and validate practical learning experiences in virtual and hybrid environments. These competences allow to design, deliver, evaluate experiential learning experiences (i.e. WBL) through the use of innovative pedagogies, digital

tools and virtual learning environments. The project consortium consists of 8 partners from 5 European countries, centres of excellence in the areas of digitisation applied to Work-Based Learning and Vocational Education and Training (VET) systems:

- SFC, Sistemi Formativi Confindustria
- PANKO, Panevėžio kolegija/Panevėžys University of Applied Sciences
- IPOSZ, the Hungarian Association of Craft Cooperatives with Independent Legal Personality
- Dinamo 3d, an SME composed of three business units: Dinamo 3D, Dinamo Lab and Dinamo ADV
- CIS, Scuola per la Gestione d'impresa
- UOC, the Universitat Oberta de Catalunya
- DHBW, Baden-Wuerttemberg Cooperative State University
- Hanse-Parlament, Network for Small and Medium Enterprises

The DEAL with Digital Work-Based Learning (DEAL with WBL) initiative sets out to promote good practice in digitally enhanced applied and work-based learning settings. For this, the competence framework is embedded in a project logic to build upon the results and bring them into practice. In the first step of the initiative, "Guidelines for Designing Digital WBL & Remote Experiential Activity" have been developed that serve as a basis for the pedagogical approach underlying this competence framework. The question now is to bring this pedagogical approach into practice. For this, teachers and trainers need to acquire specific competences - as identified in this report - but they also need conditions and infrastructures allowing them to design rich Digital Work-Based Learning environments. This more strategic level will be taken into account in the next step. In order to support teachers and trainers on their journey to promote Digital Work-Based Learning in their teaching and training, an online training system is currently being developed and will be provided and piloted on an online platform in a next step, accompanied by a toolkit to promote Digital Work-Based Learning on the basis of the resources that have been developed.

The competence framework presented in this report has been designed in a multi-step research process, coordinated by the DHBW research team, in the following research steps:

- April 2022 - October 2022: state-of-the-art research on pedagogical foundations, competence frameworks and relevant reports
- October 2022 - March 2023: extensive stakeholder consultations in all partner institutions
- February 2023 - March 2023: qualitative content analysis of consultation documentations and synthesis into a preliminary framework
- March 2023 - May 2023: further discussion and adaptation of the competence framework

They will be described more thoroughly in the upcoming sections.

2. Potential of Digital WBL for VET

2.2 Defining Digital Work-Based Learning (WBL)

We define Digital Work-Based Learning as the digital support, provision and/or enhancement of practical experiences in a vocational context for knowledge and skills development as well as integration of theory and practice.

In this, two specific elements can be distinguished:

- "the use of a learning approach based on practical experience (including laboratory activities, work-based learning, experiential learning, etc.)
- the use of digital solutions to support the implementation of hands-on learning. The presence of digital can thus be of different types and intensity: from the communication platform, to computerised systems and tools to support the implementation of practical work, to virtual environments where experiential learning takes place through the use of simulators" (quoted from the "Guidelines for Designing Digital WBL & Remote Experiential Activity", p. 14)

Digital work-based learning is a rapidly growing area of education that offers a range of potential benefits for learners, employers, and society as a whole. With the rise of digital technologies and the increasing demand for highly skilled workers, digital work-based learning offers a flexible, accessible, and cost-effective way to develop and enhance skills and knowledge in a variety of fields. It is characterised by the use of digital technologies to support work-based activities, such as simulations, games, and virtual environments, which allow learners to gain practical experience in a safe and controlled setting. Digital work-based learning also enables learners to access a wide range of resources, including online courses, webinars, and other digital learning materials, which can be tailored to their specific needs and interests.

The potential benefits of digital work-based learning are numerous. For learners, it can provide a more engaging, personalised, and flexible learning experience that allows them to develop the skills and knowledge needed to succeed in today's rapidly changing workplace. For employers, digital work-based learning can help to increase productivity, reduce training costs, and improve employee retention

and satisfaction. Finally, for society as a whole, digital work-based learning can contribute to the development of a highly skilled and adaptable workforce that is better equipped to meet the challenges of the future.

From the workshops conducted and analysed, described more thoroughly in section 4, we could deduct many potentials of Digital Work-Based Learning:

- Advantages of Digital Work-Based Learning (such as: Easy access; More engaging; Rapid (re)training; Networking; Saving time and Money; Possibly less biases; Accessibility; Integrating more human senses; Practice/context-specific; Innovative, …)
- Collaboration and Social Learning (such as: Students learn how to collaborate; Share practice experiences; Social VR – allow for true interaction, …)
- Learning Outcomes and Analysis (such as: Tracking and analyzing activities; Documenting learning outcomes; Repetition of learning, …)
- Safety and Sustainability (such as: Practice/Learning in Safe Setting; Avoiding dangerous situations; Ecological aspects, …)
- Technology Advancements (such as: Digitalization for all; Independence; Open Educational Resources, …)

The potentials of Digital Work-Based Learning are numerous, and so are the challenges. However, they are also a necessity, as students need to learn how to work, live and thrive in digitally supported, digital and hybrid contexts - and this should be one focus of why to promote Digital Work-Based Learning.

2.2 Description of an Emerging Target Group: Creation of Personas of Future VET Teachers and Trainers

Our main target group are VET teachers and trainers as well as in-company trainers. However, another important target group which has an important role in guiding and supporting learners can be identified: the learners themselves that can support other learners in peer-learning processes.

A VET teacher or trainer is an individual who is responsible for delivering vocational education and training (VET) to students in a variety of settings. VET teachers and trainers may work in schools, colleges, or other training organisations, and are typically responsible for designing, developing, and delivering VET programs that meet the needs of their students. In-company trainers can be responsible for facilitating and observing the practical part of a training, and they can also work in further training departments. Peers are working or learning in schools, universities and on-site and be fellow colleagues or students in a multitude of roles.

They all play a vital role in helping students to acquire the skills and knowledge they need to succeed in their chosen career paths and especially to guide them in their learning pathways. In practice, however, their tasks, working and consulting contexts, and challenges may look different. This is why we suggest three personas to exemplify these roles:

[1]Vivien, the Vocational School Teacher

Vivien is 42 years old and works in a vocational school where learners receive theoretical training relevant for their practice. As she is a full-time teacher, she lacks the direct and up-to-date insights into everyday professional practice. However, as a motivated teacher, Vivien tries to make her classes relevant to learners - and to bring practice experiences into her classes. For this, she has already invited some professionals via Zoom to talk about their practice experiences and discuss them with the students, and she regularly uses videos to present information on places and processes in another way. She also asks students about the ways they would like to learn with each other. She is interested in using other technologies such as VR and AR but hasn't had the time and tools to try them out. She also thinks about how she can enhance her digital teaching competences - and her learners' digital literacy.

Ella, the In-Company-Trainer

Ella is 35 years old and works in a large manufacturing company in a more rural area. She is responsible for initial and advanced training. As she is supervising a multitude of learners, she is thinking about ways to support them in their autonomous learning processes at the workplace and to make their learnings more sustainable. She is also thinking about how to attract talent from other areas by digitising work and learning processes and getting to know the company via digital ways. She also thinks that communication with the vocational school of her trainees might be enhanced - and that there must be more interesting opportunities for lifelong learners than non-interactive MOOCs. She also thinks about how more experienced professionals in her company can help others

[1] Images by pikisuperstar on Freepik

in their learning processes - and how she can align learning experiences with theoretical knowledge the learners bring into the schools.

Carl, the Peer Learner

Carl is 21 years old and following vocational training, alternating between school and company. As a “digital native”, he uses different tools to organise his learning pathway and to communicate with his teachers and trainers. He sometimes wonders about how he can learn better by bringing theory and practice together - but his teachers and trainers mostly know one side. His teacher sometimes promotes peer sessions where he can engage in conversations about practice experiences with his peers - and he has realised that this has helped him in reflecting on his practice experiences. He is curious to learn about ways how digital tools can support him in his learning pathway - and how he can profit from his peers to engage in meaningful learning experiences - and support them in the same thing.

3. State of Research

The Competence Framework is rooted in the project's pedagogical approach as described in the Guidelines for Designing Digital WBL & Remote Experiential Activity, based on literature reviews and focus group sessions. These guidelines and the present research on digital teaching competence frameworks and work-based learning represent the theoretical background to our research and will be shortly described.

3.1 A Pedagogical Foundation for the Competence Framework

The following framework can build on research conducted in an earlier stage of the project, resulting in a report on Guidelines for Designing Digital WBL & Remote Experiential Activity. The guidelines are based on a literature review, stakeholder consultations and key components for online teaching (Fig. 1) as established by previous research by the authoring team.

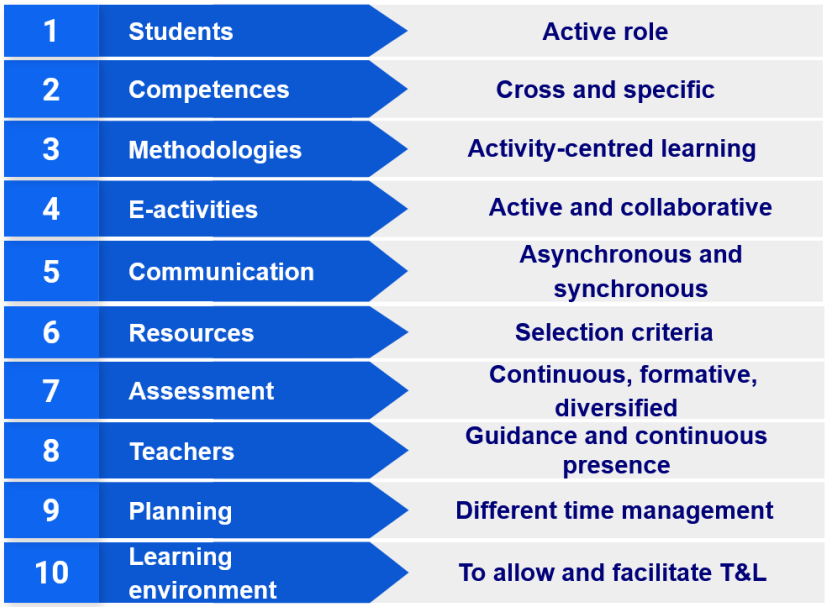


Fig. 1 - 10 key components of online teaching and learning

The report gives guidance and orientation to educational stakeholders to design and reflect on Digital Work-Based Learning practices by providing good practices, an assessment tool and a framework consisting of five components and 17 elements that a good Digital Work-Based Learning practice should incorporate (Table 1).

Table 1 - 5 components and 17 elements of a Digital WBL good practice

COMPETENCES IN D-WBL FOR VET	SOFT SKILLS
	HARD SKILLS
	BALANCE BETWEEN SOFT AND HARD
	DIGITAL COMPETENCE
	USEFUL SKILLS FOR ALL INVOLVED
TEACHING-LEARNING METHODOLOGIES	COLLABORATIVE / TEAMWORK
	BASED ON ACTIVE METHODOLOGIES
	MEANINGFUL CONNECTED TO REALITY ACTIVITIES
INTERACTION - NETWORKED COMMUNITY	SKILLS DETECTION AND INTEGRATION
	WORKPLACE DIGITALIZACION STATE
	MENTORING AND COMMUNICATION
CONTENT AND RESOURCES	VARIETY OF TOOLS AND FORMATS
	LEARNING OBJECTIVES AND CONTEXT
	AVAILABILITY AND REPLICABILITY
ASSESSMENT	COMPETENCE-BASED ASSESSMENT
	FORMATIVE ASSESSMENT: 360° FEEDBACK
	PLANIFICATION AND TRANSPARENCY

These components and elements constitute the pedagogical foundation for designing the Digital WBL competence framework. They give orientation as to how a good practice in Digital WBL should look like - and the Competence Framework takes the competences that teachers or trainers need in order to realise them into account. In the next step, the framework conditions for successful implementation will equally be taken into account.

3.2 Future Skills for Future Digital WBL Teachers & Trainers

The presented framework goes beyond these frameworks in its specificity to Work-Based Learning. It is also informed by the SELFIE WBL tool which itself is based on DigCompOrg and DigCompEdu. DigCompEdu, mostly based on DigCompOrg and DigComp, certainly serves as an orientation for more general teaching competences and conditions in digital environments, and the identified competencies and domains are also crucial for Work-Based Learning contexts. The existing frameworks have been analysed to identify aspects which are especially important to guide learners at the workplace to arrive at a vision of autonomous learners ready to navigate in digital environments for their own learning pathways.

The following competence frameworks were considered when designing and revising the competence framework:

DigCompEdu (https://joint-research-centre.ec.europa.eu/digcompedu_en)

DigCompEdu is the European Digital Competence Framework for Educators. Targeted at educators, thus also teachers and trainers, it provides orientation towards digital competences related to education and teaching on different educational levels, including vocational education. It thus constitutes a valuable basis for a Teaching Competence Framework related to Work-Based Learning and is based on DigCompOrg (see next paragraph) and DigComp. It features six competence areas, containing overall 22 competences, and is organised into three domains: Educators' professional competences, Educators' pedagogic competences and Learners' competences. **In the framework presented in section 5, the competence clusters will be related to the competences and competence areas in DigCompEdu.**

DigCompOrg (https://joint-research-centre.ec.europa.eu/european-framework-digitally-competent-educational-organisations-digcomporg/digcomporg-framework_en)

DigCompOrg is the European Framework for Digitally Competent Educational Organisations. It features seven key elements and 15 sub-elements and mostly has educational organisations as a target group: it constitutes a systematic framework to describe aspects to integrate digital learning in educational organisations -

amongst them elements of "Teaching & learning practices" or "Professional development" that have been further developed in DigCompEdu. **This way, DigCompOrg is also reflected in the presented framework in section 5 and has been further included in a survey using the SELFIE WBL tool based mostly on DigCompOrg - and is a basis for designing a blueprint for framework conditions for Digital WBL in the following project output.**

Competence Meta-model for Digital education competences by EdDiCo initiative (https://eddico.eu/outputs/wp1/)

Within the EdDiCo (Supporting the Development and Certification of the Digital Competences of Educators) project, funded by Erasmus+, a Competence Meta-model for Digital education competences has been developed, based on an analysis of existing frameworks, resulting in a list of Digital Competences for Educators and a proposal for additional competences, closely linked to DigCompEdu.

The Digital Competence Wheel (https://digital-competence.eu/)

The Center for Digital Dannelse proposes an interactive online tool to map Digital Competences, called The Digital Competence Wheel. It is based on the European DigComp framework and focuses on four main competence domains: information, communication, production and safety. The framework is complemented by a self-assessment tool.

DiKoLAN Framework on Digital Competencies for Teaching in Science Education (https://dikolan.de/en/competencies-british-english)

The DiKoLAN framework was developed by a cross-university working group on Digital Basic Competencies. It features seven competencies, organised into more general competencies and more subject-specific competencies, providing sub-competencies relating to Teaching, Methods, Content-specific context and special tools.

After designing a preliminary competence framework version (as described in Section 3), the frameworks were revisited to identify possible missing competences or sub-competences in order to refine the framework. The analysis resulted in the following findings:

1. **Communication and collaboration:** These competences can be better highlighted in the framework, emphasising the ability to collaborate and participate in virtual teams

    1. Communication skills are also highlighted in DIGCOMP.

    2. The DigCompEdu framework focuses on the use of digital tools for communication and collaboration among educators and students. Includes competences such as using social media for professional development, using digital tools for collaborative project work, and providing feedback on digital work

    3. The DigComp framework also mentions a range of skills related to interacting, sharing, and collaborating through digital technologies

2. **Digital Content Creation and Use –** many of the frameworks have elements that focus on the creation and use of digital content for teaching and learning purposes, which can be better integrated into the resource-related categories, by emphasising the importance of designing and creating digital content, and being able to modify and improve it over time.

    1. The DIGCOMP framework also includes a Production category, which highlights the ability to create and edit digital content.

    2. The DigCompEdu framework includes competences such as designing digital learning resources, creating multimedia content, and using digital tools to collaborate with students

    3. The DigComp framework mentions skills related to developing, integrating, and re-elaborating digital content as well as understanding copyright and licences

3. **Digital safety and well-being:** The ability to understand and manage digital risks and protect sensitive data seems to be worthwhile enhancing in the framework.

    1. DIGCOMP highlights Safety and legal issues

2. DigCompEdu framework has an area focusing on promoting digital safety and well-being amongst educators and students with competences such as teaching about online safety, promoting responsible use of digital tools, and recognizing and responding to digital harassment

3. The DigComp framework also mentions skills related to protecting devices used, not just the privacy and well-being of the users

4. **Sustainability:** The framework could be expanded to include an emphasis on sustainability in digital work-based learning environments. This could include paying attention to energy consumption when using digital formats, and finding ways to reduce the ecological impact of digital work-based learning.

5. **Digital pedagogy**: The Learning Design category might be expanded to include the use of digital tools to enhance teaching and learning practices

    1. The DigCompEdu framework includes competences such as designing digital learning activities, using digital tools to facilitate student-centred learning, and integrating digital tools into assessment practices

3.3 Evidence from reports on (Digital) WBL

In order to draw on preliminary research on (Digital) Work-Based Learning and Teaching competences, several reports and publications on these topics were identified and analysed. The findings were used as a basis to design and adapt the competence framework and will be used in the next steps of the initiative.

vWBL Project Consortium (2021): Guide for VET teachers to virtual WBL (https://www.vwbl.eu/sites/vwbl/files/attachments/2021-08/vWBL_Guide_EN.pdf)

- The report features insights into teachers' self-evaluation concerning knowledge and skills in ICTs and also related to challenges

- Most common Digital WBL practices are video presentations, simulation tools are less common but raise interest

- Virtual WBL experiences in times of the pandemic feature as a starting point for the report

- Learners' motivation is a key challenge

- The report describes the importance and challenges of and in Digital WBL and that Digital WBL Implies a change in pedagogical approaches

- A vWBL framework is proposed, including key components (Teaching and Learning, Content and resources, Assessment, Teachers' professional development, Equipment and connection) and Enabling factors (Policy, Management, Collaboration/partnership)

Monteirto, DC4Work (2018): Work-Based Learning in a Digital Age. Study on training needs and trends of the Tourism and Trade sector (https://www.dc4work.eu/fileadmin/user_upload/dc4work/0_uebergreifend/Work-Based_Learning_in_a_digital_age-Final_Report.pdf)

- Recommended activities in companies: raising awareness to embrace digitalisation and the relevance of sharing information and responsibilities; raising awareness for the relevance of acquiring and developing digital competencies; promoting the acquisition of knowledge and skills of managers/tutors on how to promote workers' digital competencies assessment and development; creating the setting and conditions for the acquisition and development of workers' digital competencies

Development Asia (2018): Work-Based Learning for Skills Development (https://development.asia/explainer/work-based-learning-skills-development)

- Lists arguments for and challenges in Work-Based Learning and introduces scenarios with a focus on skills development

Bahl, Dietzen (2019): Work-based Learning as a Pathway to Competence-based Education (https://www.bibb.de/dienst/publikationen/de/9861)

- Different articles on WBL and competence development, e.g. also in the roles of teachers and trainers

- Part IV: The Role of Tutors, Fellow Workers and Instructors in Work-Based Learning - Enhancing Work-Based Learning: Different ‘Trainer’ Roles, Different Types of Guidance? (pp. 235-254)

    - Different roles of informal and formal workplace trainers

4. Methodology

In this framework, a bottom-up approach has been taken, i.e. starting from the specific needs and challenges of the teachers in order to organise, develop and manage virtual work-based learning spaces. It has been developed in a multi-step, qualitative approach, integrating diverse perspectives. It has been co-designed with the project consortium and teachers and trainers in VET education in order to make it useful and meaningful for them, the research process thus representing a co-design approach. Based on the research effectuated, it has involved stakeholders and experts in an exploration, validation and co-creation research process.

It builds on three guiding principles relevant in the DEAL with Digital WBL initiative as represented in figure 2:

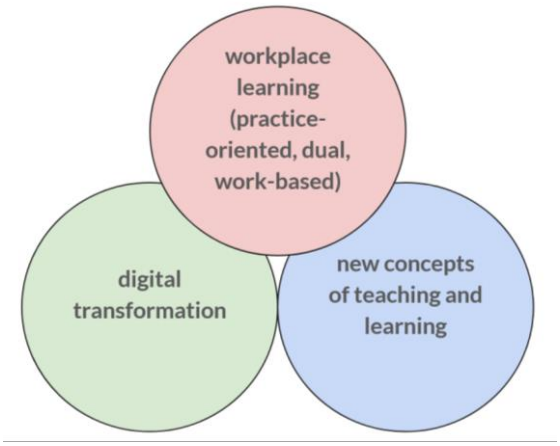


Fig. 2 Guiding principles of the framework

The three guiding principles can be described as follows:

- The **Digital Transformation** is affecting all domains of living, working and learning and thus asks to rethink our teaching approaches
- We thus must rethink our teaching and learning approaches and develop **new concepts of teaching and learning**
- The initiative sets out to identify the relevant contexts to design, deliver and evaluate teaching and learning practices in vocational educational contexts

related to **workplace learning, practice-oriented, dual and work-based learning**

4.1 Description of the Research Methodology

In our approach, competences comprise the components knowledge, skills and attitudes and can be acquired in a learning process. They allow individuals to successfully act and solve problems in various contexts.

The competences that we will describe as Core Competences go beyond basic digital and pedagogical competences - they are needed to successfully act in and design rich learning environments in emerging educational contexts related to Digital Work-Based Learning. Put in other words, these competences are needed to transform Work-Based Learning into Digital Work-Based Learning.

The results from the first research steps in the DEAL with Digital WBL initiative as described in the Guidelines for Designing Digital WBL & Remote Experiential Activity served as a basis for the underlying pedagogical approach for teachers and trainers to design Digital Work-Based Learning environments. These guidelines and the present research on digital teaching competence frameworks and work-based learning represent the theoretical background to our research.

The Digital WBL Ambassador Programme

It was decided from the beginning that it would be important to not only design a competence framework **for** VET teachers and trainers, but also **with** them in order for it to be meaningful for them. In order to involve them in our research initiative, a programme has been set up for this purpose: The Digital WBL Ambassador Programme. It was clear from the beginning that, in order to motivate teachers and trainers to co-design the competence framework with the project team, there needs to be another motivation and use for them in order to participate. The Digital WBL Ambassador Programme thus served as a training and research programme at the same time. The name “ambassador” was chosen in order to empower the participants to not only learn new practices and approaches, but also to motivate others to connect, to try and move forward and to do this in a professional peer network - and this is what the initiative sets out to do.

In these workshops, interested stakeholders, amongst them mostly teachers and trainers in schools, universities and companies (thus at the workplace) were invited to join monthly thematic workshops, mostly held online, presenting and discussing different practices, tools and scenarios of Digital Work-Based Learning - to inspire and motivate them to try these out in their own pedagogical scenario, but also to discuss in which ways they could be useful and enhance learning experiences, but also what would be needed in order to employ them - in terms of competences and framework conditions. Workshops were held by each partner in their national language in order to allow accessibility for teachers to join them. Each partner was asked to involve their own institutional network for this in order to allow for dissemination and networking of all stakeholders involved. Interested people could get acquainted with the programme in kick-off events at each partner institution and were then invited to the workshops.

Altogether, 19 workshops were held by seven partners in different countries and languages and featured, for example, the following topics:

- General discussion about Digital WBL tools, scenarios and good practices
- Digital WBL competence needs
- Discussion about Digital WBL in specific disciplines (such as Health Sciences, Business, …)
- AI, Chat GPT, Chatbots and WBL
- Augmented and Virtual Reality; Immersive Media
- 3D simulation
- Open Educational Resources and Practices
- Digital tools to support active learning
- Design the quality of the environment (physical and virtual)
- Create a remote digital fabrication laboratory with 3D Printing and Lasercut
- Digital consultation settings

- Digital portfolio tool for theory and practice integration
- Opportunities of videos in Digital WBL

There also was one international workshop in English offered to all partners' ambassadors. This served as an attempt to build an international ambassador community and to allow for an international and interdisciplinary engaging exchange among participants, but also to discuss the following topics:

- Relevance of Digital WBL (Why does Digital WBL matter?)
- Practices and Experiences in Digital WBL (What good practices of Digital WBL do you know? What have you tried out? What would you like to try?)
- Discussing the competence framework (Which competencies are most important for you? And the least important? Where do you see the biggest training needs? Which competences are missing?)

The workshops already served to promote Digital WBL in their own cause, but were also used to gather information on competence needs and framework conditions to promote good Digital WBL practice. For this, a documentation table was set up in which the workshop organisers and moderators were asked to document the workshop inputs and discussions according to the following categories:

- Focus Subject: Competences/Skills
    - Input on teachers'/trainers' competence needs
    - Input on students' competence development
- Challenges and Training needs
    - Input on challenges faced in Digital WBL
    - Input on support needs
    - Ideas for Learning Teaching Training
- Potentials
    - Potentials of Digital WBL named

    - Input on positive practice experiences
- (Good) Practices
    - Good Practices Named
    - Tools Named
- Any other business

'The Deal with Digital WBL project group sincerely thanks all the Ambassadors who participated in the numerous initiatives related to the project. Please refer to the "Ambassadors" page on the project website: https://digitalwbl.com/ambassador-programme/ for a clear overview of the participants.

From Workshop Outcomes to Competence Framework

In an inductive content analysis of workshop documentations according to Kuckartz (2018), the documentation table was analysed in order to identify categories related to a) relevant competences for VET teachers and trainers and b) framework conditions needed in order to promote Digital WBL. The findings were summarised in an analysis table for the competence framework and then clustered into categories of competences. In this stage, components of competences such as knowledge, skills and attitudes were not thoroughly described and differentiated yet. The categories were then amalgamated into a first provisional competence framework.

The approach taken at this stage was mostly inductive but was also informed by a deductive method in that this preliminary framework was compared to and analysed according to other relevant competence frameworks as described in section 3.2. These were used in order to refine identified categories, identify missing categories but also to identify specific competences which are not general digital teaching competences, but specific for the work-based learning context - this being at the heart of this process - because the aim was not to draft “just another teaching competence framework”. The deductive approach is also reflected in the choice to use the SELFIE WBL online assessment tool, based on the DigCompOrg framework and reflecting the DigCompEdu framework, to ask ambassadors and educational stakeholders from the institutions to reflect on competences and

framework conditions at their institutions for promoting Digital WBL. So far, 64 persons (3 School Leaders, 28 Teachers, 28 In-Company, and 5 Students) have participated. The results were used to enrich the findings of the other research in order to identify possible “weak” and “strong” points as assessed by participants and in order to identify relevant framework discussions to discuss in the next research steps. They also served to refine the provisional competence framework (see figure 3) and its further steps of development.

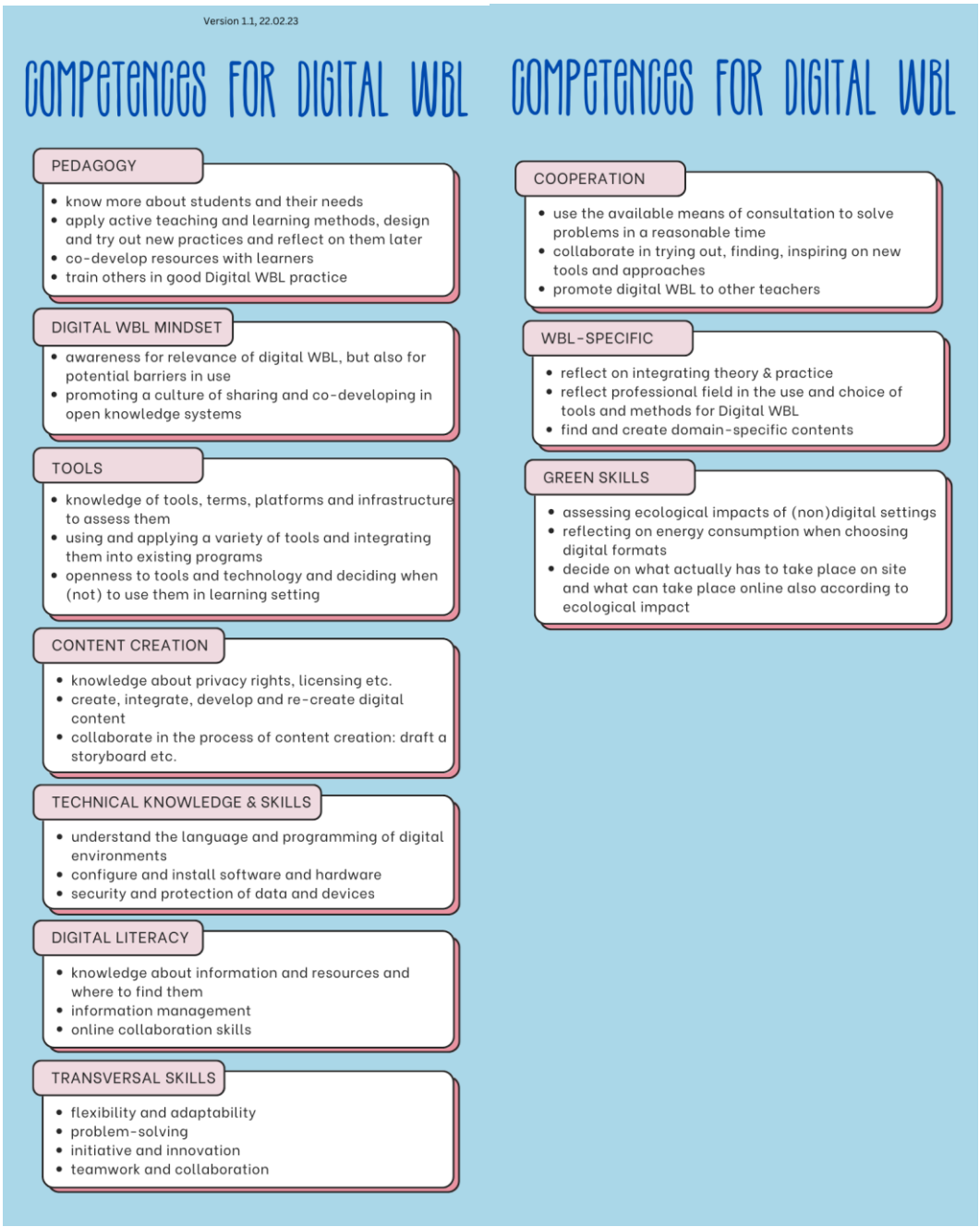


Fig. 3 provisional competence framework

This competences framework was used as a discussion basis for further refinement. It was discussed at several opportunities, these also being documented and included in the further qualitative content analysis.

It has been presented at the following events and to the following target groups:

- An international online workshop (22 February 2023) with participants from the Digital WBL Ambassador programme
- An international Learning and Teaching training held on site in Karlsruhe, Germany (13 and 14 March 2023) with selected participants of the ambassador programme, after exchanging on practices, scenarios, experiences and challenges in Digital WBL
- An international and interdisciplinary Multiplier event held in Karlsruhe, Germany, (15 March 2023) bringing together consortium members, Digital WBL ambassadors and information and library professionals, discussing competence needs of future teachers in a broader way.

Based on these results, a second, more focused version of the competence framework was designed, taking into account the feedback received, and revising it according to the three relevant components as identified above. It was aimed at to satisfy the following criteria:

- Categories specific to Digital WBL
- Distinct categories
- Compactness of the framework

This way, the first competence framework was reduced to six core competencies that are specific to Digital Work-Based Learning and distinct from each other. This is also a number that allows for a certain compactness. More transversal elements are still very important for the framework, but are conceived as encompassing elements: the Future WBL Teaching Mindset and Future Competences. The following changes were also made:

- Renaming and harmonising competence titles (e.g. collaboration instead of cooperation)

- Synthesising competences into one competence (e.g. “tools” and “technical knowledge & skills” into “Technology, Tools & Resources”)

- Deducting the “Teaching and Learning Reflection” competence from the adaptations made, integrating e.g. the Green Skills category

It was further discussed at a learning festival within DHBW (EdCon Learning festival held in Heilbronn, Germany on 19 April 2023) and in an internal consortium consulting meeting (14 April) and then presented for final feedback to the consortium partners. The framework was then refined some more and the competences were defined according to knowledge, skills and attitudes. The framework will be presented in the following. It shall be understood as a living document, to be discussed and used and put into practice, and is likely to grow and evolve in the next steps of the DEAL with Digital WBL initiative.

5. The DEAL with Digital WBL Competence Framework

5.1 Overview of the Digital WBL Teaching Competences Framework

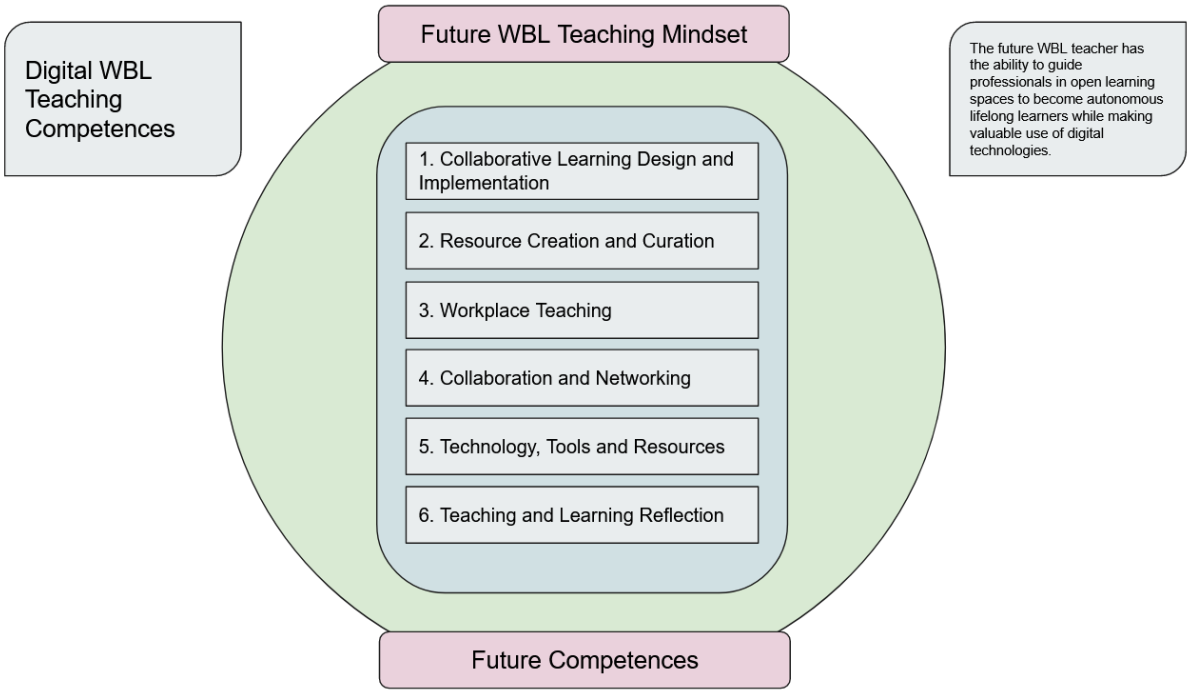


Fig. 4 DEAL with Digital WBL Competence Framework

The Digital WBL Teaching Competences Framework (figure 4) is composed of three main elements: the element of Future Competences (or Future Skills) and the element of a Future WBL Teaching mindset, both a foundation for creating a rich Digital Work-Based Learning Experience. Both elements are of a more transversal nature and not exclusive for Digital Work-Based Learning. In this way, they are necessary, but not sufficient. They are the foundation and background for the third element, the six Core Competences of the framework.

Attitudes and Mindset are one of the main important success factors when implementing and realising a new culture of learning and teaching. This is especially true for the area of digitally enhanced learning contexts. Therefore we have defined two main aspects of attitude with general importance. They both can be viewed as a foundational aspect for future teaching competences.

Future WBL Teaching Mindset	The Future WBL Teaching Mindset is an overarching cluster of values, attitudes and mindsets necessary to promote future-oriented Digital WBL. It features as the "attitudes" component of all core competences of the framework. **It comprises:** ● awareness for relevance of Digital WBL and potentials of Digital WBL settings ● curiosity, open-mindedness & willingness to experiment ● courage & openness to make mistakes ● passion ● transparency ● sharing mindset ● willingness to learn and unlearn
Future Competences	Future Competences are related to promoting good Digital WBL experiences, but are not exclusive to Digital WBL. Together with a Future WBL Teaching Mindset, a Future WBL teacher should also be able to support learners to become autonomous learners and to develop their Future Skills. **They comprise:** - digital literacy - self-organisation - flexibility and adaptability - resilience - leadership - initiative competence - problem-solving - communication - learning competence and professional development - design-thinking and imagination

In the KSA competence approach, the "Future WBL Teaching Mindset" represents the A/Attitude component for all core competences. The knowledge and skills components will be described in the following. For a more precise description and adaptability of the framework, two levels of proficiency have been defined: "basic" and "advanced".

5.2 Description of the Digital WBL Teaching Competences Framework

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
1. Collaborative Learning Design and Implementation	Design engaging, learner-centred and collaborative Digital WBL Learning and Assessment Settings and to guide learners in their learning process in Digital WBL spaces It relates to the following Competences in the DigCompEdu Framework: - Competence 1: Professional Engagement, including the Sub-Competence - Competence 3: Teaching and Learning, including the Sub-Competences 3.1 Teaching, 3.2 Guidance, 3.3 Collaborative learning and 3.4 self-regulated learning - Competence 4: Assessment with the Sub-Competence 4.1 Assessment strategies and 4.3 Feedback & planning - Competence 5: Empowering Learners with the Sub-Competence 5.3 Actively engaging learners - Competence 6: Facilitating Learners' Digital Competence with the Sub-Competence 6.3 Content creation			x		
1.1 Student Guidance and Support	Guide and support learners in their individual learning process while using feedback to know about their needs and well-being					

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
1.1.1	Awareness of and sensitivity to student needs and well-being	x			x	
1.1.2	Use on-site and virtual feedback possibilities and tools to learn more about students and their needs and to adapt practices		x		x	
1.1.3	Provide support to students in their learning process as a guide, facilitator or mentor		x			x
1.2 Design collaborative learning spaces and experiences	Dispose of and use a variety of (digital) teaching scenarios and tools in order to design engaging, active and collaborative learning experiences					
1.2.1	Be able to decide when (not) to use digital technology in teaching and learning	x	x		x	

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
1.2.2	Knowledge how to apply active and motivating teaching, learning and assessment methods		x		x	
1.2.3	Integrate digital tools holistically to facilitate student-centred learning and problem-solving		x			x
1.2.4	Create engaging social learning experiences on site and virtually		x		x	
1.3 Facilitate co-responsibility in the learning process	Apply Open Educational Practices to involve students in the whole learning process and thus promote co-responsibility					
1.3.1	Involve students in the process of designing Digital WBL learning experiences		x		x	

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
1.3.2	Design meaningful assessment methods aligned with learning spaces		x		x	
1.3.3	Co-develop resources with learners		x			x
2. Resource Creation and Curation	Design, adapt, edit, exchange and share learning materials and resources aligned with learners' needs in Digital WBL contexts and relevant to practice contexts It relates to the following Competences in the DigCompEdu Framework: - Competence 1: Professional Engagement, including the Sub-Competences 1.2 Professional collaboration, 1.4 Digital CPD - Competence 2: Digital Resources, including the Sub-Competences 2.1 Selecting, 2.2 Creating & modifying and 2.3 Managing, protecting, sharing - Competence 4: Assessment - Competence 5: Empowering Learners, including the Sub-Competence 5.2 Differentiation & personalisation - Competence 6: Facilitating Learners' Digital Competence with the Sub-Competence 6.3 Content creation					

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
2.1 Resource Creation	Create and recreate appreciate digital resources in a collaborative process					
2.1.1	Create, integrate, develop and re-create digital resources		x		x	
2.1.2	Knowledge about support staff and infrastructure in creating digital resources	x			x	
2.1.3	Collaborate in the process of resource creation		x			x
2.1.4	Co-develop OER with students		x			x
2.2 Resource Curation	Search, use and remix existing digital resources and adapt them to the respective learning context					
2.2.1	Knowledge about privacy rights, licensing etc.	x			x	
2.2.2	Knowledge about Digital WBL resources and where to find them	x			x	

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
2.2.3	Assess quality and practice relevance of curated materials		x		x	
2.3 Resource Sharing	Share created and curated resources with other stakeholders					
2.3.1	Engage in OER practices and provide resources as OER		x			x
3. Workplace Teaching	Create learning experiences that reflect practice- or work-based contexts and to guide learners to create their open learning environment at the workplace It relates to the following Competences in the DigCompEdu Framework: - Competence 3: Teaching and Learning, including the Sub-Competence 3.1 Collaborative Learning - Competence 5: Empowering Learners, including the Sub-Competences 5.1 Accessibility & Inclusion, 5.2 Differentiation & personalisation, 5.3 Actively engaging learners					

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
3.1 Practice Relevance Reflection	Reflect on the practice relevance for a specific professional field in all steps of the teaching and learning process					
3.1.1	Know about a variety of (non-)Digital WBL scenarios	x			x	
3.1.2	Reflect professional field in the use, creation and choice of tools, resources and methods for Digital WBL		x		x	
3.1.3	Integrate theory and practice in learning experiences		x			x
3.1.4	Understand learners' career and workplace competence requirements	x	x		x	
3.2 Promote Professional Peer Networks	Support learners to form self-supporting peer networks to support their learning processes					

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
3.2.1	Support networking between professionals in order to promote professional peer learning		x		x	
3.2.2	Create opportunities for learners to share their professional expertise		x		x	
3.2.3	Create community-oriented peer networks		x			x
4. Collaboration and Networking	Collaborate with other stakeholders in education in order to realise successful Digital WBL experiences for learners It relates to the following Competences in the DigCompEdu Framework: - Competence 1: Professional Engagement, including the Sub-Competences 1.1 Organizational communication, 1.2 Professional collaboration - Competence 3: Teaching and Learning, including the Sub-Competence 3.1 Collaborative Learning - Competence 5: Empowering Learners, including the Sub-Competence 5.3 Actively engaging learners					

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
4.1 Digital Collaboration	Successfully collaborate in hybrid and digital settings with educational stakeholders					
4.1.1	Successfully collaborate in hybrid and digital environments with students and educational stakeholders		x		x	
4.1.2	Promote a culture of sharing and co-developing in open knowledge systems		x			x
4.2 Professional Collaboration	Collaborate with other teaching stakeholders for realising Digital WBL practices					
4.2.1	Know about institutional infrastructure and support stakeholders in the Digital WBL process	x			x	
4.2.2	Collaborate in trying out, finding, inspiring on new tools and approaches and create networks		x		x	

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
4.2.3	Promote digital WBL to other teachers and train others in good Digital WBL practice		x			x
4.2.4	Cooperate with companies and external partners to design Digital WBL environments		x			x
5. Technology, Tools and Resources	Learn about, choose, use, adapt and stay updated on appropriate tools for Digital WBL experiences while reflecting the technical conditions and security aspects It relates to the following Competences in the DigCompEdu Framework: - Competence 1: Professional Engagement, including the Sub-Competence 1.4 Digital CPD - Competence 2: Digital Resources, including the Sub-Competences: 2.1 Selecting, 2.3 Managing, protecting, sharing - Competence 6: Facilitating Learners' Digital Competence with the Sub-Competence 6.4 Responsible use					
5.1 Know and Use	Dispose of and apply a range of tools and technologies to create Digital WBL experiences					

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
Tools and Technology						
5.1.1	Knowledge of tools, terms, platforms, technology and infrastructure relevant to teaching context	x			x	
5.1.2	Be able to find, choose, use and apply a variety of appropriate tools and integrate them into existing programs		x		x	
5.1.3	Know about tools and technology used in companies and educational network relevant to learners	x				x
5.2 Security and reflection of technical environment	Know about and reflect on aspects of data security and technical foundations when creating Digital WBL experiences					

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
5.2.1	Configure and install software and hardware		x			x
5.2.2	Understand the language and programming of digital environments	x	x			x
5.2.3	Know about and reflect on security and protection of data and devices	x	x		x	x
5.2.4	Reflect on the accessibility of technical infrastructure		x		x	x
6. Teaching and Learning Reflection	Be reflective of societal developments, trends and challenges and other conditions when designing Digital WBL experiences and interacting with learners It relates to the following Competences in the DigCompEdu Framework: - Competence 1: Professional Engagement, including the Sub-Competences 1.3 Reflective practice - Competence 5: Empowering Learners, including the Sub-Competences 5.1 Accessibility & inclusion, 5.2 Differentiation & personalisation					

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
6.1 General Reflection	Apply a culture of reflection and improvement on all aspects of Digital WBL teaching experiences					
6.1.1	Reflect on implemented Digital WBL teaching and learning settings and modify them accordingly		x		x	
6.1.2	Know about and reflect on the role of artificial intelligence and other developments influencing (non-)Digital WBL experiences	x	x			x
6.2 Social Reflection	Reflect on social aspects within the Digital WBL experience and design adapt it accordingly					
6.2.1	Know about and reflect on the inclusiveness of (non-)digital WBL experiences	x	x		x	
6.2.2	Reflect on learners' well-being in (non-)digital WBL experiences		x		x	
6.2.3	Reflect on one's own role in (non-)digital WBL experiences		x		x	

Component/ Competence	Description	Knowledge	Skills	Attitudes	Basic	Adv
6.3 Sustainability Reflection	Consider and reflect on different aspects of sustainability in all stages of the Digital WBL teaching process					
6.3.1	Know about and reflect on the sustainability of (non-)digital WBL experiences	x	x			x

6. Conclusion and Outlook

This report proposes a framework of competences that teachers and trainers in VET and practice-oriented education settings need in order to design and implement good practice in Digital Work-Based Learning.

How to use this framework?

This framework is intended as a living document, providing orientation and inspiration to teachers, trainers and peers in practice-relevant educational settings. In this way, it can not only serve as an orientation, but also support individual self-evaluation or assessment and reflection of one's competence development. A first step of further development of one's own teaching competences is always reflecting one's own experiences as a teacher or trainer, but also as a learner - and the framework can assist teachers in this complex and valuable process. This can also support or incite discussion on Digital Work-Based Learning in professional networks and thus serve peer learning; it can also serve for designing training opportunities for teachers and trainers.

The message of the framework shall not be that all competences are needed on an expert level in order to design Digital Work-Based Learning opportunities - rather, it shall serve as a basis to start in order to identify which competences are relevant for one's teaching and learning contexts in order to enhance them.

And what is next?

In order to support learners in this process, an online training course is being developed within the initiative which shall be freely available and piloted from 2024. In order to make this training course relevant to teachers and trainers, feedback and participants for the piloting phase are very welcome. The framework also constitutes a living document which might be adapted at a later stage. It will shortly be complemented by a strategic blueprint document, focussing on the framework conditions for successful Digital Work-Based Learning needed in addition to teachers' and trainers' competences.

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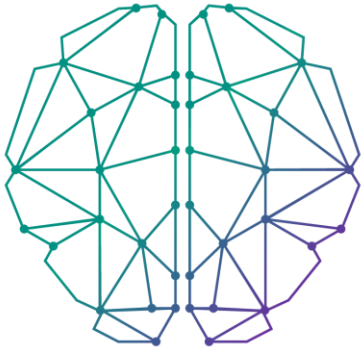

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