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VET Teachers' Digital Pedagogical Competences in Latvia, Lithuania, and Portugal. Needs Analysis, Review Report and Recommendations for Continuous Education and Training

13.6.2022 · Brauer Sanna, Mäenpää Kati (Eds.)

Digital Tools for Learning and Validation in VET and WBL: Training Program for VET Teachers, Trainers and Mentors (Dig4VET) is an Erasmus+ KA2 Strategic Partnerships for VET-project aimed to improve skills and competences of vocational teachers, trainers and mentors in using digital tools in education process. Main goal is to raise awareness of a variety of digital tools and technologies that can be used in vocational education and training (VET) and workbased learning (WBL) settings for both classroom and distance learning. Dig4VET proposes empowering VET teachers, trainers and mentors/WBL tutors with the support of a training program for VET teachers, trainers and mentors which can be implemented by VET institutions (local level), by national continuous professional development (CPD) systems and internationally as Erasmus+ courses.

In this publication we communicate a review of digital skills of VET teachers and trainers in partner organisations (VET schools) and partner countries, including a report on the use of SELFIE in Latvia, Lithuania and Portugal. We also suggest recommendations for future training programs in digital pedagogy for VET teachers, trainers and WBL tutors. The recommendations section is initialised with an overview of competence-based approaches in advanced CPD which may be specially designed for VET Teachers, Trainers and Potential Mentors to enhance the use of digital tools for teaching, learning, assessment and validation. The report is a multidimensional information resource regarding digital competences

of VET teachers, trainers, mentors, and it will be useful for VET policy and decision makers, VET school management, researchers, and particularly – for VET teacher trainers. It can also be of interest and use for other sectors of education (general education, higher education, adult education).

Dig4VET project staff and teachers at ETAP, Escola Profissional, Vila Praia de Âncora, Portugal (photo: Kati Mäenpää).

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List of Abbreviations

AMKE	Ammattiosaamisen kehittämisyhdistys [The Finnish Association for the Development of Vocational Education and Training]
CPD	continuous professional development
CVET	continuing vocational education and training
DigCompEdu	Digital Competence Framework for Educators https://joint-researchcentre ec.europa.eu/digcompedu_en
DL	Digital Literacy
DGERT	Direção-Geral do Emprego e das Relações de Trabalho [The Directorate-General for Employment and Labor Relations]
EC	European Commission
ECTS	European Credit Transfer and Accumulation System
EFT	European Training Foundation
EQF	European Qualifications Framework
EU	European Union
GDPR	EU General Data Protection Regulation
ICT	information and communications technology
ICT-CFT	Information and Communications Technology Competency Framework for Teachers
ISCED	International Standard Classification of Education
IVET	initial vocational education and training
OECD	The Organisation for Economic Co-operation and Development
OER	open education resource
PCK	pedagogical content knowledge
PLE	personal learning environment

SELFIE	Self-reflection on Effective Learning by Fostering the use of Innovative Educational technologies – tool https://education.ec.europa.eu/schools-go-digital/about-selfie
TVET	technical and vocational education and training
TPACK	Technological Pedagogical Content Knowledge
UNESCO	The United Nations Educational, Scientific and Cultural Organization
UNESCO-UNEVOC	The UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training
VET	vocational education and training
WBL	work-based learning

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The Members of the Report Team

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METATIEDOT

Introduction

Baranovska Inta, Brauer Sanna

Vocational education and training (VET) policy is among top priorities in all European Union (EU) countries as the quality of our life in future to the great extent depends on the skills and competences of the workforce. Changes brought about by technologies and digitalisation demands us to learn new things every day. Situations where the majority of students digitally outperform their teachers is reality in most education systems. To improve digital competences of VET teachers and trainers and make their teaching more attractive by making use of various digital tools the National Centre for Education of the Republic of Latvia with partners from Latvia, Lithuania, Finland, Portugal and the Czech Republic in September 2020 started EU Erasmus+ project "Dig4VET – Digital Tools for Learning and Validation in VET and WBL: Training Program for VET Teachers, Trainers and Mentors". Project consortium represented VET schools, training centres, public authority and a university of applied sciences. The variety of institutions gave an added value to the project as partners had diverse experience and expertise.

The Dig4VET project was developed in the context of the EU Strategic Framework for European Cooperation in Education and Training (European Union, EU, 2009), mainly Objective 2: Improving the quality and efficiency of education and training, which is about teachers' continuous professional development (CPD). The focus on digital competences development linked the Dig4VET project with the Objective 4: Enhance creativity and innovation, including entrepreneurship. Because digital tools allow higher levels of inclusion and more flexibility in designing learning pathways and recognizing learning outcomes the project also tackled Objective 3: Promote equity, social cohesion and active citizenship and Objective 1: Make lifelong learning and mobility a reality.

The project idea was also inspired by the Digital Education Action Plan 2018-2020 (European Education Area, 2022), which notes that "use of technology in education lags behind". The Plan has defined a priority of "making better use of digital

technology for teaching and learning", stating that "digital technology has huge, largely untapped potential for improving education".

The two main objectives of the Dig4VET project were to improve skills and competences of VET teachers and trainers to use digital tools in the education process both for classroom and remote learning, and to raise awareness of the variety of digital tools and technologies that can be used in VET school and work-based learning (WBL) settings. When the Dig4VET project was developed none of the project partners could imagine how the Covid-19 virus would change our lives. After all, the project implementation was just in time, as most schools were required to continue learning online or remotely. Project activities and outputs provided support to VET schools, VET teachers and mentors in partner countries. It could be said that the pandemic alongside the negative experiences has also brought about some good things, e.g., teachers have acquired new digital tools, have become more resilient and creative in looking for new solutions and have started thinking outside the box.

The project objectives were focused to raise the project partners awareness of EU self-evaluation tool SELFIE (Selfreflection on Effective Learning by Fostering the use of Innovative Educational technologies) and digital tools for teaching, learning, assessment and validation; and to increase the project participants digital competences level and ability to practically use a variety of digital tools as well as improve their understanding of learning outcomes approach.

To meet these ambitious goals, the project consortium worked on three main project outputs:

1. Needs Analysis and Review Report,
2. development and piloting of the EU training program for VET teachers, trainers and WBL tutors "Attractive, Interactive and Inclusive VET: Digital Tools for Teaching, Learning, Assessment and Validation" and
3. development of open education resources including video-lessons and examples of using digital tools in teaching/learning contexts.

Oulu University of Applied Sciences (Oamk) was the key partner in the development of the Needs Analysis and Review Report and, introducing the SELFIE tool to all project partners. Oamk also supported the development and piloting of digital validation tools. The partner department was the School of Professional Teacher Education, pioneer in competence-based education with flexible study paths for both practising teachers and teacher candidates who want to gain the official teacher's qualification diploma to work as a subject teacher at schools, at vocational institutions or at universities of applied sciences. The School of Professional Teacher Education also trains specialists in competence-based qualifications. Additionally, there are many on-going projects that aim to advance competence-based teaching, learning and pedagogical knowledge. The Dig4VET "Self-Assessment of Digital Pedagogical Competence" – digital open badge was one of the advanced applications introduced in terms of competence-based approach during this project (see chapter: Supplementary Qualitative Results). In general, the focus on the development emphasised hands-on experiences and the instructors' ability to apply newly learned competences; technologies and new pedagogical solutions; in their own work to the full potential.

In the following chapters we communicate a review of teachers' digital pedagogical competences in Latvia, Lithuania and Portugal based on the results of the SELFIE study and desk research. We also suggest recommendations for future training programs in digital pedagogy for VET teachers, trainers and WBL tutors. The overview of competence-based approaches in continuous professional development (CPD) is specially designed for VET instructors; Teachers, Trainers and Mentors, to enhance the use of digital tools for teaching, learning, assessment and validation. The report will be useful for VET policy and decision makers, VET school management, researchers, and particularly – for VET teacher trainers. It can also be of interest and use for other sectors of education (general education, higher education, adult education).

References

European Union. 2009. Council conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training (ET 2020). 2009/C

119/02. Retrieved April 1, 2022. https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A52009XG0528%2801%29

European Education Area. 2022. Digital Education Action Plan 2021–2027. Retrieved April 1, 2022. https://education.ec.europa.eu/focus-topics/digital/education-action-plan

Tiivistelmä: Vocational education and training (VET) policy is among top priorities in all European Union (EU) countries as the quality of our life in future to the great extent depends on the skills and competences of the workforce. Changes brought about by technologies and digitalisation demands us to learn new things every day. Situations where the majority of students digitally outperform their teachers is reality in most education systems. To improve digital competences of VET teachers and trainers and make their teaching more attractive by making use of various digital tools the National Centre for Education of the Republic of Latvia with partners from Latvia, Lithuania, Finland, Portugal and the Czech Republic in September 2020 started EU Erasmus+ project "Dig4VET – Digital Tools for Learning and Validation in VET and WBL: Training Program for VET Teachers, Trainers and Mentors". Project consortium represented VET schools, training centres, public authority and a university of applied sciences. The variety of institutions gave an added value to the project as partners had diverse experience and expertise.

Building a Shared Understanding in Digital Competences

Brauer Sanna, Mäenpää Kati, Juntunen Elina

Teacher's Competence in Europe

In this report we connect the concept of competence with competence frameworks that provide tools to enhance professional teachers digital pedagogical competence. The concept of competence is separated, by paradigmatic difference, from the concept of competency, as competency refers to the potential of an individual as a whole (Mäkinen & Annala, 2010). The current educational paradigm in VET suggests that the domains of knowledge, skills and abilities (Nichols et al., 2017) describe the composition of individual competence. Competence can be seen also as an achievement acquired through training and development (McClelland, 1998; 1973). The European Reference Framework of Key Competences for Lifelong Learning (EU, 2007) describes "competence" as not only the required knowledge but also skills, attitudes and the ability to apply learning outcomes as is appropriate to the context (e.g., working life) (European Centre for the Development of Vocational Training, Cedefop, 2014).

According to Eurydice's recent report, "Teaching Careers in Europe" (2018), most European countries have defined a national framework to monitor teachers' competences. These frameworks aim to identify the continuing training needs of teachers. More than one-third of nations with teacher competence frameworks use them for career guidance and CPD throughout teachers' careers (European Commission/EACEA/Eurydice, 2018). According to the European digital framework (Kampylis et al., 2015), educational organisations should describe, maintain and evaluate their staff's digital competence as well as that of their students.

Standardised Competence Frameworks for Educators

Digital pedagogy aims to foster creativity, play and problem solving in learning by coupling theory with practice and making with thinking (Spiro, 2013). This approach encourages participation, collaboration and public engagement and increases one's critical understanding of digital settings. Professional teachers' competence in digital pedagogy is seen as a combination of professional or substance specific, pedagogical and technological expertise (e.g., Guerrero, 2005; Koehler et al., 2013; Kullaslahti, 2011). Kullaslahti (2011) added teachers' personal attributes to the list, that is, the continuous use of digital pedagogy and the development of one's own work in cooperation with colleagues and the world of work. Context was also added to the description of competence based on the teacher's role and tasks in his or her own organisation (Krumsvik, 2011, 2014; Kullaslahti, 2011; Lund et al., 2014; Prendes et al., 2011). The capacity to use technology is addressed as a transversal topic both for individual professional development and the development of any educational programme (Romero-Martín el al., 2017). Various digital pedagogical competence frameworks (Cabero-Almenara et al., 2020; Kools & Stoll, 2016; Tomczyk & Fedeli, 2021) have been developed to support teachers, educational organisations and legislators in delivering the effective and meaningful criterion-based professional development of different competences.

Information and Communications Technology Competency Framework for Teachers

Different initiatives to promote teachers' professional development have been established based on evolving frameworks and guidelines. The United Nations Educational, Scientific and Cultural Organization's (UNESCO, 2011) Information and Communications Technology Competency Framework for Teachers (ICT-CFT) has provided the basis for current development work. Now, the emphasis has shifted from individual aspects and descriptions of technical know-how to the wider

view of learning work communities and the multifaceted view on teachers' competence in digital pedagogy. Brauer (2019, p. 21) explained that, "in addition to teachers, UNESCO's ICT-CFT is intended to guide teacher trainers and staff undertaking learning reforms and executing professional development programs". To put it simply, UNESCOs' ICT-CFT outlines the competences required to teach effectively with ICT. The competence framework focuses on "the ICT skills needed to generate knowledge that enables reflective and creative problem solving for resourceful citizens who are in charge of their own lives and are active members of society" (Brauer, 2019, p. 21). The development of expertise at the upper levels of construction makes it possible for teachers to operate in regional, national and international networks.

Table 1 outlines UNESCO's ICT-CFT as arranged to three successive stages of teachers' professional development. The competence framework advances from understanding technology towards the development of learning organisations.

TABLE 1. The UNESCO ICT Competency framework for teachers (UNESCO, 2011, p. 3)

	Technology literacy	Knowledge deepening	Knowledge creation
Understanding ICT in education	Policy awareness	Policy understanding	Policy innovation
Curriculum and Assessment	Basic knowledge	Knowledge application	Knowledge society skills
Pedagogy	Integrate technology	Complex problem solving	Self management
ICT	Basic Tools	Complex tools	Pervasive tools
Organization and administration	Standard classroom	Collaborative groups	Learning organizations
Teacher professional learning	Digital literacy	Manage and guide	Teacher as model learner

The three successive stages of development aim to support teachers using ICT in enhancing students' collaboration, creativity and problem solving. UNESCO (2011) described these three stages as follows:

The first is Technology Literacy, enabling students to use ICT in order to learn more efficiently. The second is Knowledge Deepening, enabling students to acquire in-depth knowledge of their school subjects and apply it to complex, real-world problems. The third is Knowledge Creation, enabling students, citizens and the workforce they become, to create the new knowledge required for more harmonious, fulfilling and prosperous societies. (p. 3.)

These successive stages of teachers' professional development have been augmented at the European level by the Digital Competence Framework for Educators (DigCompEdu) proposing educator-specific digital competence (Redecker, 2017).

Digital Competence Framework for Educators

The extensive set of DigCompOrg framework has seven key elements and 15 sub-elements that are common to all educational sectors from early childhood to higher and adult education, including vocational education and training (Redecker, 2017). The framework aims to describe what it means to be a digitally competent educator. The guidelines propose an extensive set of competence descriptions, and the focus is not on technical skills. Digital learning technologies, in the context of DigCompOrg, constitute a key enabler for educational organisations, which can support their efforts to achieve their mission and vision for quality education. The DigCompOrg framework is designed to align with institutional and contextual requirements in different countries and is generic enough to apply to different educational settings allowing adaptation as technological possibilities evolve (Caena & Redecker, 2019). DigCompOrg is designed to focus mainly on the teaching, learning, assessment, and related learning support activities taking place in educational institutions.

The European digital framework for teaching staff (DigCompEdu) is based on the competence descriptions of a digital citizen (DigComp), an educational organisation (DigCompOrg) and consumers (DigCompConsumers). The framework for DigCompOrg promotes effective learning in the digital era (Kampylis et al., 2015) for educational institutions and related organisations. The DigCompEdu framework

describes the general digital competence required by teachers at all levels of education in detail. The DigComp framework can be used to develop relevant aspects of students' digital competence. Figure 1 presents teachers' desirable digital competence, as determined by DigCompEdu, including 22 different competences organised into six categories.
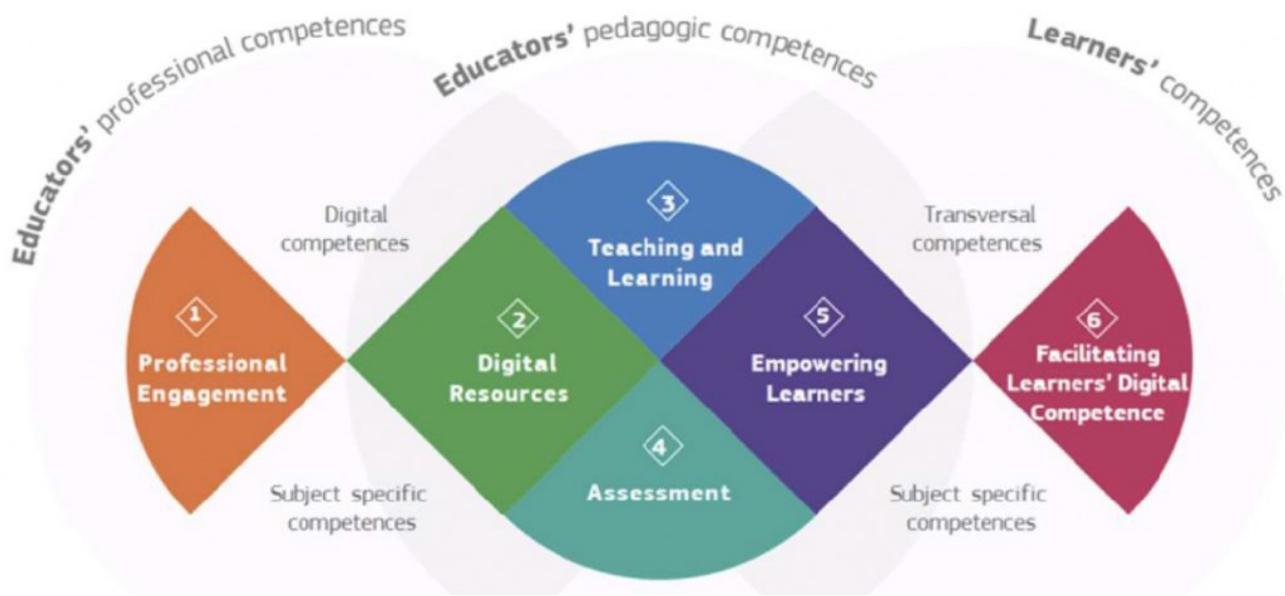

FIGURE 1. Digital competence framework for educators: areas and scope (Redecker, 2017, p. 15). Click to open in bigger size.

The six different areas focus on different aspects of educators' competence. Areas 2-5 form the core of the DigCompEdu framework. They explain educators' digital pedagogical competences describing competences educators need to foster efficient, inclusive and innovative teaching and learning strategies (Redecker, 2017). In Digital resources (area 2) focus is on planning teaching and learning: on sourcing, creating, and sharing digital resources. Teaching and learning (area 3) describes the implementation of teaching and learning process with the use of digital technologies. In Assessment (area 4) focus is on using digital technologies and strategies to enhance assessment; assessment strategies, analysing evidence, and feedback and planning. Empowering learners (area 5) contains a set of guiding principles relevant for competences specified in the areas 2, 3 and 4. Focus in that area is acknowledging the potential of digital technologies for learner-centred teaching and learning strategies, for example making learning materials accessible to all learners.

Professional engagement (area 1) is directed at the broader professional environment: using digital technologies for communication, collaboration, and professional development. Facilitating learners' digital competence (area 6) describes specific pedagogical competencies that are required to facilitate students' digital competence and enable them to use digital technologies creatively and responsibly. (Redecker, 2017.)
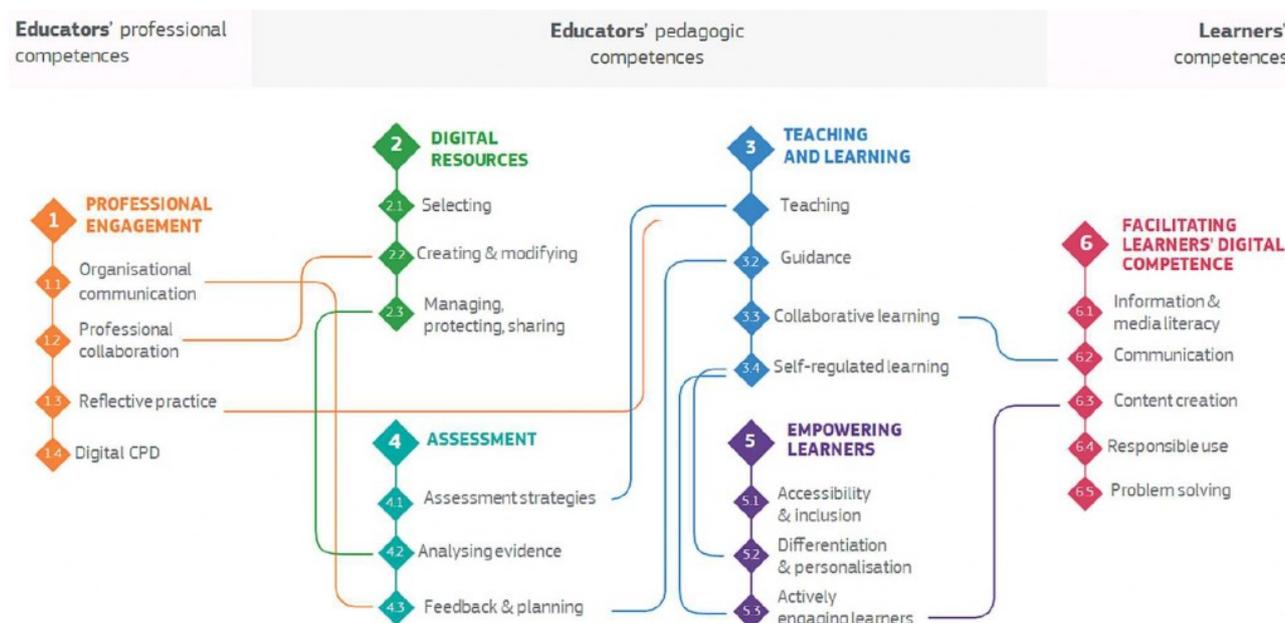

FIGURE 2. DigCompEdu framework overview (Redecker, 2017, p. 16). Click to open in bigger size.

The framework aims to inform how digital technologies can be used to enhance and innovate education and training. DigCompEdu responds to Europe's need to define digital competence specific to teachers and to harness the potential of digitalisation to improve several aspects of education. The scope is not entirely on educators' pedagogical competences; it also allows for the need for professional development to be noted as well as the different intended competences of a learner.

Technological Pedagogical Content Knowledge

The approach of DigCompEdu may be considered multifaceted compared to the abundantly applied Technological Pedagogical Content Knowledge (TPACK) model originating from the educational development that occurred in the U.S. in the '80s (Koehler & Mishra, 2009). Although the model is already ageing, it regularly

emerges in discussions related to digital pedagogy. TPACK-model provides a clear structure to comprehend main characteristics of digital pedagogical development (Figure 3), although it does not reflect the emergent complexity of digital pedagogical competence needs in the educational sector.
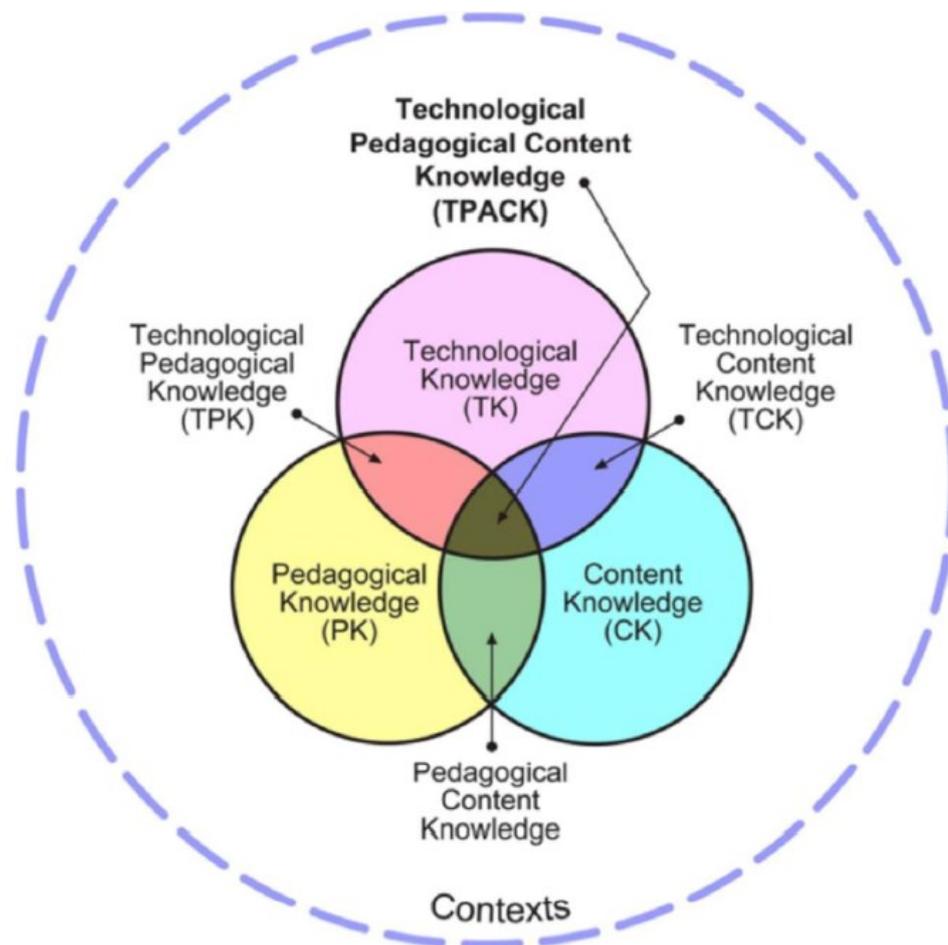
FIGURE 3. TPACK framework and its knowledge components (Koehler & Mishra, 2009).

In brief, the TPACK model is "a professional knowledge construct" (Koehler & Mishra, 2009, p. 66). As shown in Figure 2, "the content knowledge (CK) is teachers' knowledge about the subject matter" (p. 63). Pedagogical knowledge represents "teachers' deep knowledge about the processes and practices or methods of teaching and learning" (p. 64). The overlapping pedagogical content knowledge (PCK) determines a teacher's pedagogical understanding in applying different approaches to teaching particular content. Finally, technological knowledge involves "open-ended interaction with technology" (p. 64). Koehler and Mishra (2009) concluded that, for technology to impact the practices and knowledge of teachers, "an understanding of the manner in which technology and content

influence and constrain one another" (p. 65) is required. The technological pedagogical knowledge (TPK) provides a comprehension of "how teaching and learning can change when particular technologies are used in particular ways" (p. 65). The approach should always be considered in the context of a specific discipline, keeping in mind the constraints and affordances of different technologies.

Applying technologies in teaching is complex, and new digital technologies face complicated challenges (Koehler & Mishra, 2009). Koehler and Mishra (2009) called for new ways to comprehend and accommodate this complexity as a precondition to succeed in educational technology integration, and TPACK, TPCK (technological pedagogical content knowledge) and the continuing value of Shulman's original PCK model have been re-examined and reevaluated (cf. Abell, 2008; Berry et al., 2015). Abell (2008) concluded that, even after decades, "many questions remain within the PCK paradigm" (p. 1413). The researchers have not been able to determine how teachers generate and use PCK. Further, the knowledge transformation process has yet to be explained. In practice, PCK offers to inform how teaching different disciplines and subjects differs and how teaching affects students' learning (Abell, 2008). Koehler and Mishra (2009) consider the cores of technology-enhanced teaching to be content, pedagogy and technology as well as the relations between these. Assessment itself is not mentioned as a core of technology-enhanced teaching. In DigCompEdu areas of focus assessment is seen as the core content of teacher's competence (Redecker, 2017).

Changing a Paradigm

In general, the effects of digitalisation on teaching and scaffolding are difficult to encapsulate. A recent article by Tomczyk and Fedeli (2021) synthesises and compares such concepts as TPACK (Koehler & Mishra, 2009), DigCompEdu (Redecker, 2017) and UNESCO's ICT-CFT (2011). Based on the review, Tomczyk and Fedeli (2021, n.p.) noted that:

1. There is no one-size-fits-all way to measure digital literacy (DL) among teachers;

2. The aforementioned theoretical frameworks mostly have clearly defined areas and levels of DL;

3. Most of the concepts assume measurement through self-declaration, abandoning measurement through practical activities;

4. All concepts clearly emphasise that DL cannot be separated from teaching processes;

5. DL among teachers differs from DL among other professional groups, this being due to the specifics of the field;

6. Differences in the formation of the most popular theoretical frameworks may be due to the richness of definitions of DL and the diversity of views on the process of the computerization of education;

7. A common feature of the analysed frameworks is the integration of DL with methodological elements (content, methods, forms), and teacher and learner development; and

8. The selected frameworks possess their own measurement tools.

Based on our studies, DigCompEdu can enable an understanding of how digitalisation transforms the perceptions of VET instructors' competences and offers to inform and improve competence frameworks in terms of digitisation. However, there is no one-size-fits-all competence-based model for pre- and in-service training (Brauer, 2021) that would suit every educational organisation (Davies, 2017; Ipperciel and ElAtia, 2014; Ushatikova et al., 2016); indeed, there are significant differences between disciplines (Jerez et al., 2016). We suggest exploring different concepts and frameworks of the implementation of ICT in education. Nevertheless, clear articulation of VET teachers', trainers' and mentors' competences is needed to reform educational practices to meet students' individual interests and recognized working life needs. All approaches to competence-based CPD should adopt the coordinated policies both in design and implementation. Moreover, a mutual understanding of achieved competences should be based on public evidence (Brauer, 2021; Rhodes, 2012). The concerns of teaching staff regarding their own

pedagogical competence must also be noted (de los Ríos-Carmenado et al., 2016; Jerez et al., 2016). A leap in competence development requires the expansion of educational provision of digital pedagogical in-service training (Brauer, 2021).

The current educational practices offer to inform teachers' expectations towards the change in the educational paradigm (Brauer et al., 2022). In this report, we sought to understand the concept and effects of digitalisation through competence frameworks that corresponded to the concepts of this project in the context of the professional development of vocational teachers' competences in the effective use of ICT in education. Keeping the different dimensions of digital pedagogy in mind, we will continue to look at the development of teachers' professional competences in the digital era from different perspectives.

References

Abell, S. K. 2008. Twenty years later: Does pedagogical content knowledge remain a useful idea? International Journal of Science Education 30 (10), 1405–1416. https://doi.org/10.1080/09500690802187041

Berry, A., Friedrichsen, P. & Loughran, J. (EdS.) 2015. Re-examining Pedagogical Content Knowledge in Science Education. New York: Routledge.

Brauer, S. 2019. Digital Open Badge-Driven Learning -Competence-based Professional Development for Vocational Teachers. Doctoral dissertation. University of Lapland, Finland.

Brauer, S. 2021. Towards competence-oriented higher education: a systematic literature review of the different perspectives on successful exit profiles. Education + Training 63 (9), 1376–1390. https://doi.org/10.1108/ET-07-2020-0216

Brauer, S., Kettunen, J., Levy, A., Merenmies, J. & Kulmala, P. 2022. The Educational Paradigm Shift—Medical Teachers' Experiences of Practices in Finland. Manuscript submitted for publication.

Cabero-Almenara, J., Romero-Tena, R. & Palacios-Rodríguez, A. 2020. Evaluation of Teacher Digital Competence Frameworks Through Expert Judgement: the Use of the

Expert Competence Coefficient. Journal of New Approaches in Educational Research 9 (2), 275–293. https://doi.org/10.7821/naer.2020.7.578

Cedefop. 2014. Terminology of European education and training policy: a selection of 130 terms. Luxembourg: Publications Office. https://www.cedefop.europa.eu/en/publications/4117

Davies, H. 2017. Competence-based curricula in the context of Bologna and EU higher education policy. Pharmacy: Journal of Pharmacy, Education and Practice 5 (2). https://doi.org/10.3390/pharmacy5020017

de los Ríos-Carmenado, I., Sastre-Merino, S., Fernández Jiménez, C., Núñez del Río, M., Reyes Pozo, E. & García Arjona, N. 2016. Proposals for improving assessment systems in higher education: an approach from the model working with people. Journal of Technology and Science Education 6 (2), 104–120. https://doi.org/10.3926/jotse.192

European Commission/EACEA/Eurydice. 2018. Teaching Careers in Europe: Access, Progression and Support. Eurydice Report. Luxembourg: Publications Office of the European Union.

European Union, EU. 2007. The key competences for lifelong learning – European reference framework. https://op.europa.eu/en/publication-detail/-/publication/5719a044-b659-46de-b58b-606bc5b084c1

Guerrero, S.M. 2005. Teacher knowledge and new domain of expertise: pedagogical, technology knowledge. Journal Educational Computing Research 33 (3), 249–267. https://doi.org/10.2190%2FBLQ7-AT6T-2X81-D3J9

Ipperciel, D. & ElAtia, S. 2014. Assessing graduate attributes: building a criteria-based competency model". International Journal of Higher Education 3 (3), 27–38. https://doi.org/10.5430/ijhe.v3n3p27

Jerez, O., Valenzuela, L., Pizarro, V., Hasbun, B., Valenzuela, G. & Cesar O. 2016. Evaluation criteria for competency-based syllabi: a Chilean case study applying mixed methods. Teachers and Teaching 22 (4), 519–534. https://doi.org/10.1080/13540602.2015.1082728

Kampylis, P., Punie, Y. & Devine, J. 2015. Promoting Effective Digital-Age Learning. A European Framework for Digitally-Competent Educational Organisations. EUR 27599EN. Publications Office of the European Union. https://doi.org/10.2791/54070

Koehler, M. J. & Mishra, P. 2009. What is technological pedagogical content knowledge? Contemporary Issues in Technology and Teacher Education 9 (1), 60–70.

Koehler, M.J., Mishra, P. & Cain W. 2013. What is Technological Pedagogical Content Knowledge (TPACK)? Journal of Education 193 (3), 13–19.

Kools, M. & Stoll, L. 2016. What Makes a School a Learning Organisation? OECD Education Working Papers, OECD Publishing. https://doi.org/10.1787/5jlwm62b3bvh-en

Kullaslahti, J. 2011. Ammattikorkeakoulun verkko-opettajan kompetenssi ja kehittyminen. [Online-teachers' competence and development in universities of applied sciences]. Academic dissertation. Tampere University.

Krumsvik, R. J. 2011. Digital competence in Norwegian teacher education and schools. Högre utbildning 1 (1), 39–51.

Krumsvik, R. J. 2014. Teacher educators' digital competence. Scandinavian Journal of Education Research 58 (3), 269–280.

Lund, A., Furberg, A., Bakken, J. & Engelien K.L. 2014. What does professional Digital Competence Mean in Teacher Education? Nordic Journal of Digital Literacy 9 (4), 281–299.

Prendes, P., Castañeda, L. & Gutiérrez, I. 2011. University teachers ICT competence: evaluation indicators based on a pedagogical model. Educação, Formação & Tecnologias, extra, Abril, 20–27. https://www.academia.edu/31000139/University_teachers_ICT_competence_evaluation_indicators_based_on_a_pedagogical_model

McClelland, D.C. 1973. Testing for competence rather than for 'intelligence'. American Psychologist 28, 423–447.

McClelland, D.C. 1998. Identifying competencies with behavioural-event interviews. Psychological Science 9 (5), 331–339.

Mäkinen, M. & Annala, J. 2010. Osaamisperustaisen opetussuunnitelman monet merkitykset korkeakoulutuksessa [Various aspects of the competence-based curriculum in higher education]. Kasvatus & Aika 4 (4), 41–61.

Nichols, P. D., Kobrin, J. L., Lai, E. & Koepfler, J. 2017. The role of theories of learning and cognition in assessment design and development. In A. A Rupp & J. P. Leighton (Eds.) The handbook of cognition and assessment: Frameworks, methodologies, and applications. Chichester, West Sussex, England: Wiley Blackwell.

Redecker, C. 2017. European Framework for the Digital Competence of Educators: DigCompEdu. In Y. Punie (ed.) EUR 28775 EN. JRC107466. Publications Office of the European Union, Luxembourg. https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/european-framework-digitalcompetence-educators-digcompedu

Rhodes, T. L. 2012. Show me the learning: Value, accreditation, and the quality of the degree. Planning for Higher Education 40 (3), 36–42.

Romero-Martín, R., Castejón-Oliva, F.-J., López-Pastor, V.-M. & Fraile-Aranda, A. 2017. Formative assessment, communication skills and ICT in Initial teacher education. Comunicar 25, 73–82. https://doi.org/10.3916/c52-2017-07

Spiro, L. 2013. Defining Digital Pedagogy. [PowerPoint slides] WordPress. https://digitalscholarship.files.wordpress.com/2013/03/gettysburgintrodigitalpedagogyfinal.pdf

Tomczyk, Ł. & Fedeli, L. 2021. Digital Literacy among Teachers – Mapping Theoretical Frameworks: TPACK, DigCompEdu, UNESCO, NETS-T, DigiLit Leicester. Proceedings of the 38th International Business Information Management Association (IBIMA), 23–24 November 2021, Seville, Spain.

https://www.researchgate.net/publication/356672873_Digital_Literacy_among_Teachers_-Mapping_Theoretical_Frameworks_TPACK_DigCompEdu_UNESCO_NETS-T_DigiLit_Leicester

UNESCO. 2011. UNESCO ICT Competency Framework for Teachers.
http://unesdoc.unesco.org/images/0021/002134/213475e.pdf

Ushatikova, I. Rakhmanova, A., Kireev, V., Chernykh, A. & Ivanov, M. 2016. Pedagogical bases of formation of key information technology competencies polytechnic institute graduates. International Journal of Economics and Financial Issues 6(2S), n.p.

METATIEDOT

Tiivistelmä: In this report we connect the concept of competence with competence frameworks that provide tools to enhance professional teachers digital pedagogical competence. The concept of competence is separated, by paradigmatic difference, from the concept of competency, as competency refers to the potential of an individual as a whole. The current educational paradigm in VET suggests that the domains of knowledge, skills and abilities describe the composition of individual competence. Competence can be seen also as an achievement acquired through training and development. The European Reference Framework of Key Competences for Lifelong Learning (EU, 2007) describes "competence" as not only the required knowledge but also skills, attitudes and the ability to apply learning outcomes as is appropriate to the context (e.g., working life).

Foundations of Collaborative Practices for Pedagogical Development

Kilja Päivi, Juntunen Elina

Vocational education and training in Europe has many similarities but also many differences. The countries participating in the Dig4VET project follow this pattern also. A basic aspect of vocational training is directly linked to the definition of VET as education and training which aims to equip people with knowledge, know-how, skills and competences required in particular occupations or more broadly on the labour market (Cedefop, 2014). European VET is changing in many ways and the pandemic has forced this process. Responding to rapidly changing demographics, technologies and labour market, European VET is diversifying its programmes and qualifications and becoming more digital (Kampylis et al., 2015). To gain a broader understanding of digital skills and recent development directions in VET especially in partnering countries, we conducted a brief desk research. Partnering countries also contributed to data collection and gathered previous findings of research or reports conducted at the national level.

Digital Competences and VET — National Characteristics in Partnering Countries

VET in Latvia

The Ministry of Education and Science steers and supervises vocational education and training in Latvia. VET programmes are mainly school-based, with practical learning periods at schools or workplaces (Cedefop 2018a). Vocational education curricula can be implemented also as an apprenticeship type system, nationally called workbased learning, with flexible implementations including close co-operation with working life. The Latvian Qualifications Framework has eight levels

corresponding to the European Qualifications Framework (EQF) (Cedefop 2018a). The VET system in Latvia has passed through substantial reforms since 2009. The reforms have led to vocational secondary education with equal shares of work-based and school-based learning (Cedefop, 2018a). In the concept of work-based learning, vocational programmes include workshops at schools and in-company training. Overall, all initial vocational education and training (IVET) students are reported to be enrolled in combined work- and school-based programmes. (Cedefop, 2017; Daija et al., 2019.)

VET institutions offer both initial and continuing vocational education and professional development programmes. IVET is offered at the second, third and fourth levels of the Latvia qualification's framework (and EQF). Continuing programmes lead to a certificate of professional qualification of EQF level 2–4. Professional development programmes do not lead to formal qualification. They enable people regardless of their previous education to master systematised professional competences corresponding to requirements of the labour market. Vocational education institutions provide mainly full-time studies. The qualification achieved in vocational secondary education gives access to higher education. Continuing VET is offered at EQF levels 4 and 5, requiring a VET qualification or relevant competences. Higher education programmes can be academic or professional (EQF levels 5 to 8). Higher education institutions, including colleges provide full time, part-time and distance studies at all levels. (Daija et al., 2019.)

National Development Plan is the highest national-level medium-term planning document in Latvia. One goal stated in the National Development Plan of Latvia for 2021-2027 is "quality education for the acquisition of knowledge and skills applicable in business and daily -life for every inhabitant of the country". Improving digital skills and introducing digital solutions in learning environment are mentioned as ways to measure actions (Cross-Sectoral Coordination Centre of the Republic of Latvia, 2020). In the Digital Transformation Guidelines for 2021-2027 it is stated that the national goal is to provide the opportunity to continuously and, on individual demand, acquire digital skills for everyday life, business, science, and research in order to move towards a society that bases its well-being on the effective use of digital technologies and creative development (Ministry of Environmental

Protection and Regional Development, 2020). The document sets long-term strategic guidelines for Latvian digital development and changes to be implemented in all areas of economy and life. This strategy refers to the EU Digital Competences Framework and investment in the development of digital competences throughout the education system in Latvia is recognized as one of the key directions in the strategy (The Organisation for Economic Co-operation and Development, OECD, 2020a).

According to Daija et al. (2020), VET initiatives concerning digitalization are rapidly developed and implemented in Latvia, at both national and school level. At national level, contents of vocational education are reformed for flexible learning options, including implementation of modular vocational education programmes consisting of components focusing on, e.g., information and communication technologies. Schools can respond quickly to the entry of new technologies required in the working environment, which is appreciated by employers. In order to enhance teachers' digital skills, digital literacy (DL) courses are organised for VET teachers both at national level and locally, offering new digital learning opportunities for teachers at the schools. These courses aim to help teachers in inspirational learning design by teaching the use of modern technologies and offering materials, for example, for digital pedagogy; tools to scaffold the learning process and digital assessment. One challenge in developing digital skills of VET instructors, is to engage teachers with lower lever digital skills in learning new technologies. It has been noted that teachers who already have experience with digital skills are also more eager to develop them (Daija et al., 2020). According to Rūdolfa's (2018) research, the emergent nature of technological development was difficult to reconcile in the Latvian educational system. One of the problems was that pedagogical actors are not able to fully use the opportunities of digital solutions.

At the end of March 2020, wide surveys were launched in Latvia to evaluate the implementation of remote learning during the nation-wide Covid-19 outbreak in education. The surveys by Edurio for the Ministry of Education and Science of Latvia collected responses from over 27 000 parents, 23 000 students in vocational and secondary education, 9 600 teachers and 790 school heads. According to the research (Jenavs & Strods, 2020), teachers', parents' and students' overall results

were positive on managing to continue studies remotely. Teachers raised concern mainly for vulnerable students' learning and those with less access to technology. 44 % of teachers also listed additional workload as one their top concerns during remote learning. Struggling with developing and adapting new materials, providing feedback, finding material, and planning remote learning might be factors contributing to the workload.

VET in Lithuania

The Ministry of Education is the main body responsible for developing and implementing national VET policy in Lithuania. The objectives of the National Education Strategy for 2013–2022 cover improving the quality of teaching, introducing a culture of education quality based on evidence, ensuring access to education and equal opportunities, and guaranteeing the efficiency of the education system and individuals' learning decisions (OECD, 2021b).

In Lithuania, the admission to the newly developed modular vocational training programs was launched in 2015 (Cedefop, 2018c). IVET programmes are provided from lower secondary to tertiary education levels: Lower secondary two- or three-programmes, Lower secondary two- or three-year school-based programmes, Upper secondary two- or three-year school-based programmes, Upper secondary three-year programmes and Postsecondary one- or two-year programmes. Vocational education and training can be organised in school or apprenticeship formats.

The Lithuanian VET system comprises IVET at lower, upper and post-secondary levels, continuing vocational education and training (CVET) and higher education. VET is offered from lower secondary to post-secondary education in International Standard Classification of Education (ISCED) levels 2–4, Lithuania qualification's framework and EQF levels 2–5. Higher education colleges offer VET-oriented programmes leading to a professional bachelor's degree at EQF level 6. EQF level 7 programmes are decided by universities. (Cedefop, 2018b; Cedefop, 2018).

Work-based learning plays a very small role in IVET. It can be school-based, including practical training, workshops simulating working conditions and training in enterprises (Cedefop, 2018c). Based on these facts there has been seeing a

growing political interest in promoting apprenticeship and work-based learning in VET. The popularity of apprenticeship VET programmes raised, and numbers of learners doubled in the period of 2014–2018, but still the account is only 3 % of all VET learners (Hogeforster & Wildt, 2020; Cedefop, 2018c). 40% of VET institutions already offer apprenticeship programmes and the new legislation's objective is to increase the share of apprenticeship students to 20 % of all VET graduates (Cedefop, 2020b).

Digital competence is listed as a key competence in VET in Lithuania and it is promoted at national and regional level (Cedefop, 2016). There are policy documents as well as regulations to support the development of this competence. For VET teachers' professional development purposes, teachers can participate in various continuing professional development courses. Digital transformation has a significant impact on all aspects of life in Lithuania and the COVID-19 has accelerated the digitalization of learning and work (OECD, 2020b).

According to the Survey of Adults Skills (OECD, 2016) results, Lithuanian adults showed below-average proficiency in problem-solving, in technology rich environments compared to other participating OECD countries. The Survey of Adult Skills focused on three key information-processing skills that were literacy, numeracy, and problem-solving in a technology-rich environment, that refers to the capacity to access, interpret and analyse information found, transformed, and communicated in digital environments (OECD, 2016). Every fifth (20.9 %) of Lithuanian adults had no prior experience with computers or lacked basic computer skills and over half (54.6 %) scored at level 1 or below in problem solving in technology-rich environments. This means the capability of using only widely available and familiar technological applications, such as e-mail or a web browser, to solve problems involving few steps, simple reasoning and little or no navigation across applications (OECD, 2016).

According to Kaminskienė and Chu's (2021) extensive study of Lithuanian school leaders', Covid-19 pandemic has required collective efforts from schools and teachers' strong autonomy to deal with the challenges of sudden transition to

distance education, during the school lockdown. Main challenges that occurred during distance education were (p. 130):

1. poor responsiveness of students,
2. evaluation and assessment of students' achievements,
3. ensuring equal opportunities for all students and,
4. maintaining regular communication with parents and caregivers.

Uncertainty about students' learning outcomes was an emergent concern upon schools' reopening. Another recognised challenge was keeping contact with students and maintaining their engagement during the learning process. To tackle these challenges there were three actions pointed out in the article: increasing the interactivity of work, making better use of the peer-to-peer network, and emphasising self-guided learning (Kaminskienė & Chu, 2021). The face-to-face instructions are mentioned as the central pillar in the back-to-school process also in UNICEF's (2020) recommendation to educators. Rapid transition is seen as a common challenge, but technology also supports the turbulent disruption for instance allowing teachers to notice struggling students when in remote teaching. However, teachers also need enough time and space to get used to applying these new digital platforms that offer easy-access-data on the immediate progress of students (Hegarty, 2020).

VET in Portugal

In Portugal, both vocational education and training, as well as adult education and training are the joint responsibility of the Ministry of Education and the Ministry of Labour, Solidarity and Social Security (EC, Eurydice, 2022). Higher education is the responsibility of the Ministry of Science, Technology and Higher Education. Portugal has been investing heavily on the role of VET in public education and training policies, either through its extension to the public-school network, or through the definition and creation of other training offers of a vocational nature (The Directorate-General for Employment and Labor Relations, DGERT, 2019). According to EC (2016) report, the main challenges of VET providers in Portugal are to increase youth employment and foster the ability to face social exclusion and disadvantages. Due to low level of qualifications and high levels of

underachievement at school and school dropout, there is an urgent need to target public policies especially to those who are not in employment, education, or training.

Since 2009, compulsory education has been extended to 12 years of schooling, comprising two major stages: basic education (1st–9th year) and secondary education (10th–12th year) (DGERT, 2019). VET in Portugal offers a wide range of programmes (EQF level 4): professional programmes, education and training programmes for young people, apprenticeship programmes and art education programmes. These programmes are flexible in type and duration and lead to a double certification: an education and professional certification. VET for adults is an integral part of the national qualification system, having education and training programmes and identification and validation of prior learning as key elements (DGERT, 2019). Tertiary education is offered in universities and polytechnic institutions. Higher education programmes can be general and VET programmes (EQF levels from 5 to 8). Responding to the challenges posed by the COVID-19 pandemic, Portugal has increased its focus on revitalising adult learning by supporting both the up- and reskilling of adults and the transition towards a digital economy (Cedefop, 2021).

Approximately 40 % of upper secondary education learners attend VET programmes which grant double certification: education and professional certification. They comprise four components: general, scientific, technological training and WBL. Depending on the type of VET programme, the amount of WBL in general varies between 14 % to 40 %. Share of WBL can also be determined individually. WBL is usually divided between workshops in VET institutions and learning at workplaces. In apprenticeship training, work-based learning is emphasised, and students spend 40 % of their time in workplace training. In contrast, in professional courses only about 19-27% of students' time is spent in workplace training. (DGERT, 2016; DGERT, 2019; Liebowitz et al., 2018.)

Key competences, or as in Portugal also called basic competences, have been included in national legislation on secondary general and vocational education and training since 2001 but more attention has been paid to them since 2009 (Ferreira, 2016). One of the key competences is digital competence and it is a compulsory

subject for all VET programmes at upper secondary education. Digital competence is also a subject of continuing training for VET teachers and trainers.

In several recent policy documents, promoting digital competence has been one key focus in Portugal (Cedefop, 2021). The Portugal INCoDe.2030 is the National digital competences initiative for 2030 and together with the Industry 4.0 (National strategy for the digitalization of the economy), they form an integrated public policy to enhance digital competences in Portugal. The INCoDe.2030 (2018) aims at providing the population with the right competences to use digital technologies effectively. The purpose of these is to strengthen the basic ICT skills of the Portuguese population and prepare them for digital based employment opportunities (Ferreira, 2020).

Teaching and Learning International Survey TALIS (OECD, 2018) provides information about the use of technologies in Portugal before the COVID-19 pandemic. On average in OECD countries, only a bit more than half of lower secondary teachers (53 %) reported letting students use ICT for projects or class work frequently or always. In Portugal, the number was a bit higher than that (57 %). 47 % of teachers reported that use of ICT for teaching was included in their formal education or training which is lower than average in TALIS. However, 88 % of teachers felt they could support student learning using digital technology quite a bit or a lot and that is higher than average in the survey.

It is important that teachers get access to in-service training to update their digital skills because learning technologies are changing rapidly (OECD, 2020c). Based on TALIS, 59 % of Portuguese teachers agreed or strongly agreed that most teachers in the school are open to change, which is lower than the average of OECD countries. Also, participation in collaborative professional learning at least once a month was very low (5 %) in Portugal, since the average in participating countries was 21 %. (OECD, 2018).

The Portuguese education system's initial response to COVID-19 pandemic included several actions (OECD, 2020d). As in most countries, the majority of educational institutions were closed during the spring 2020, when the pandemic hit. Securing the continued access to the learning possibilities and to the flexible educational

pathways, were the key factors that ensured the education system's successful responses to the challenges caused by the pandemic. In Portugal, the Support Schools website was established to share tools, resources, and guidance for online learning. Further, Training for Digital Teaching ·online course was launched with around 750 schools and school clusters registered already for the first session. Teachers were also sharing resources via online communities and uploading classes to YouTube. In higher education, learning and assessment continued through digital platforms. Targeted support was provided for vulnerable children and families. From the point of digital skills, these actions included providing technical support to teachers and schools and supporting families to transition to online learning (OECD, 2020d).

The Role of Leaders, Teachers, Students and WBL Tutors in VET

VET Leaders Manage and Lead Development

The Handbook and the Competence Framework for VET Professions (Volmari et al., 2009) hope to contribute to a wider understanding of the roles and responsibilities of VET professionals in the development of vocational education and training. The descriptions developed by Cedefop and the Finnish National Board of Education reflect the complex activities and competences required of those working within vocational education and training. The role of VET leaders is defined as "one or several persons in charge of VET institutions, such as vocational upper secondary institutions and further education colleges or training centres providing continuing vocational education and training" (p. 10). The main responsibilities of VET leaders are the overall responsibility for the running of an institution, and the implementation and development of a new curriculum, and student advisory services and students' social needs, as well as managing networks. Later, the increasing evidence of the importance of leadership in education was emphasised in Cedefop (2011a) working paper. VET institutions should widely acknowledge the role of those managing and leading. VET leaders are crucial in implementing reforms and policy initiatives.

In the recent OECD (2021a) report, VET leaders are referred to individuals who are appointed or employed in a recognised leadership position to oversee VET programmes and institutions and have responsibility for the goals set by VET institutions. The same report states the roles of VET leaders. They play a crucial role in the learning environment. Their task of developing and supporting teachers to engage multiple stakeholders and improving the quality of VET through the allocation of resources and provision of instructional guidance has given them a very special responsibility.

The world of work changes constantly, and VET must change accordingly. The skills the labour market needs are changing and increasing, reinforcing the need for VET teachers to keep up to date with the changes of the labour market. The unique role of VET leaders is to attract and retain VET teachers with the right skills and to provide them with new opportunities for professional development (OECD, 2021a). With this respect, the ability of managing networks is even more important in a changing labour market.

VET Teachers – Competent Dual-Professionals

VET teachers are generally recognised as being "dual professionals" – requiring knowledge and skills in the industry areas for which they teach, and the ability to convey those skills to students, as well as need to update their knowledge continuously in response to changes in technology and working practices (Greatbatch & Tate, 2018; OECD, 2021a). The UNESCO-UNEVOC´s (2020) Future of TVET teaching report states that employees in today's workplaces need not just occupation-specific and technical skills but also stronger basic, digital and soft skills.

The VET teacher identity can be seen as dual, an occupational identity and a teacher identity, being shaped through participation in and boundary crossings between different communities of practice: work in their initial occupational practice, teaching in the practice of VET, and learning through teacher training (Köpsen, 2014; Vähäsantanen & Hämäläinen, 2019). The dual VET teacher identity to be an ongoing balancing act and identity formation, mainly due to VET teachers' boundary processes and boundary crossings within a landscape of communities of

practice related to their teaching. Furthermore, there can be the harmonious and ensioned relationships between these elements of the work and teachers' identities (Köpsen, 2014; Vähäsantanen & Hämäläinen, 2019).

VET teachers prepare young people for work by teaching not only occupational skills but also transversal skills, such as basic and soft skills. They support the students for the labour market with diverse backgrounds, including those who are struggling with studies, and adults in need of updated or improved skills. They also have the main responsibility for the learner and their overall progress. Interplay between working life and school is essential within VET, and VET teachers have a central role as the link between school and working life. VET teachers' updating of their knowledge to retain industrial knowledge also requires interaction with and presence in working life where the occupational knowledge they teach is situated. Lehtonen et al. (2018) conducted the research on vocational teachers' professional identities. The findings showed how boundary crossings between school and working life can be of value for VET teachers' professional development, and for the development of teaching in alignment with working life.

By using the definition of OECD (2021a), the teaching workforce in VET programmes or institutions can be divided into two different types.

- VET teachers can be teachers of vocational subjects, regardless of programme orientation. These VET teachers teach vocational subjects in vocational and/or general programmes.
- VET teachers as teachers in VET programmes, regardless of the subjects they teach. These VET teachers teach any type of subject – including general subjects – in VET programmes, while general education teachers in this definition teach any type of subject in general programmes.

According to OECD (2021a) report the landscape of teaching and learning in VET is changing, as are the skills the labour market needs, reinforcing the need for VET teachers to keep abreast of new pedagogical approaches. For example, increasing demand for basic, digital and soft skills in the labour market means VET teachers need to have these competences, as well as foster the development of these skills in their students.

Vocational education teachers need opportunities to keep their skills and knowledge up to date. In particular, the close links between VET and working life practices bring new challenges to teachers' competences. Vocational teachers' views on their professional competence and cooperation with working life were examined by Lehtonen et al. (2018). The data was collected by interviews with vocational teachers who worked in the social and health service sector, construction work sector, and business sector. Vocational teachers' competence was constructed based on cognitive, operational, social, and meta competence. The findings showed some important challenges in teachers' working life cooperation. Cooperation was sometimes seen as balancing between the needs of students and workplaces. Teachers were even considered to have very limited opportunities to intervene when any problems occur. However, working life cooperation was described as favourable development of learning environments (Lehtonen et al., 2018).

Vocational Qualifications Relevant to the Labour Market Promote Employment and CPD

The participation in VET has many benefits for individuals. These benefits might include, for example, improved participation in society and active citizens. Some benefits, though, are not immediately realisable but may be thought of as being resources which students might draw on in future. These benefits include resilience and self-esteem. Learning may also enable personal development, increase social value and it may also enable individuals to sustain what they have achieved (Cedefop 2011b; 2020a). Citizens participate in different vocational programmes to acquire the knowledge, skills and competences specific to a particular occupation, trade, or class of occupations or trades (UNESCO, 2011). Successful completion of such programmes leads to vocational qualifications relevant to the labour market.

VET students have different pathways of educational progression, to achieve professional qualifications (Cedefop, 2020a; EC, 2018). IVET usually takes place during upper secondary education. It takes place in school and in workbased environments. This varies from country to country, depending on national systems. CVET is understood as job-related formal and non-formal education and training for adults following the completion of IVET, or this can take place after beginning

working life. On average, 50 % of young Europeans aged 15–19 participate in IVET programmes at the upper-secondary level. However, the participation ranges from 15 % to more than 70 % in different regions (Cedefop, 2020a; EC, 2018).

According to Cedefop (2020a) research, one of the trends within VET is that it has become more flexible by increasing modularisation, and by allowing students to make more individual pathways or to use individual learning approaches. Furthermore, from the point of view of students an "age neutral" approach would need to give priority to the development of individual learning plans, for example accreditation of the prior learning and validation, and guidance services.

Work-based learning provides students with opportunities to develop practical skills related to their training and to apply them in workplace settings. Practical and conceptual skills can be learned through the combination of the classroom and the workplaces, as well through socialisation in the workplace. According to the European Training Foundation (EFT, 2013) report, WBL has the potential to offer VET students a variety of benefits. These range from the development of an individual's expertise benefits (i.e. hard skills, technical expertise and tacit knowledge, and soft skills, other competences and behaviours), and to general benefits (i.e. socialisation and motivation). Apart from the benefits it clearly offers to students, WBL also has specific advantages for students. It has been shown to have a positive effect on self-confidence, self-efficacy and learner motivation, as well to develop career awareness and career management skills (Mäenpää, 2021). Mikkonen et al. (2017) also emphasise how the learners' self-regulative skills can be of value for the learners' prospects for developing expertise in workplaces. The learners' skills, such as responsibility and the ability to take the initiative and to actively seek guidance, affect how guidance is afforded to their in the work community.

Achieving a Successful WBL Process

Work-based learning is a fundamental aspect of VET by serving as a springboard for jobs and belonging to society. WBL tutors play an important role in achieving a successful WBL process. They improve a citizen's employability and opportunities in life by providing the skills and competences needed in the labour market and

support personal development (EC, 2013). According to Cedefop (2020a) research, in the preceding 20 years in and across Europe, WBL within companies has become standard practice in any of the educational programmes.

When WBL is discussed in the context of vocational training, it is usually understood as apprenticeship training. Although two concepts are indeed closely interlinked, a separation does need to be made between them (Maurer, 2018). Cedefop (2014) defines WBL as a combination of training in a workplace and complementary classroom teaching and practical learning processes in VET school environments. One of various ways to organise WBL is apprenticeship, including long-term training alternating periods at the workplace and in an educational institution or training centre (Cedefop, 2014).

Workplace tutors, who implement and organise WBL in companies, have an important role with hands-on approach to practical learning guidance at the workplaces. As Mikkonen et al. (2017) notes, that guidance provided by tutors opens up opportunities for learners to participate in collective practices by gradually assuming more responsibility and more demanding tasks as their skills develop. Typically, they are experienced supervisors or advisers, responsible for promoting work-based learning or experiential learning in enterprises (ETF, 2018).

To have the same understanding of WBL process, quality standards and responsibilities of each side, Baltic countries – Estonia, Latvia and Lithuania, have promoted and agreed on basic requirements for competences of WBL tutors, including core knowledge, skills and competences, and attitudes for working with WBL students (Krastiņa, 2020). The required competences are reflected in a common Baltic competence profile for WBL tutors. The Federal Institute for Vocational Education and Training and the UNEVOC network emphasised tutor profiles with two features, firstly the attitudes or experiences and personal background of the tutor and secondly tutor's competences and skills for guidance (Jacinto et al., 2019).

Within the tutors' role one can identify a number of challenges that can be due to the nature of the role. WBL mentor has an essential role to play in providing the necessary training to apprentices and other students in different workplace

environments. From the point of view of promoting learning, it raises questions on how learning and training at workplaces are pedagogically led and how the connection between these two learning environments is arranged. According to Mikkonen et al. (2017), the workplace guidance is quite often disrupted by weakly defined responsibilities and lack of resources or guidance awareness at workplaces. Airila et al. (2019) also brought up the concern of poor guidance skills, and lack of the pedagogical and guidance resources in workplaces.

According to Cedefop (2015) research, WBL tutors are entrusted with training tasks more likely based on their substantial experience than training-related certificates. There are also states that policy-making should take more recognition to support tutors' competence and professional development because those opportunities have been limited so far. Based on the research report (Kaikkonen et al. 2020), by training and coaching VET school tutors and workplace tutors together, can be generating closer and more diverse collaboration between educational institutions and enterprises or workplaces. Therefore, so-called tandem training can be considered useful overall, especially from the point of view of individuals' knowledge, skills and attitudes.

References

Airila, A., Mattila-Holappa, P., Kurki, A.-L. & Nykänen, M. 2019. Työelämässä oppiminen, ohjaus ja oppilaitosyhteistyö työpaikkojen näkökulmasta [Learning, guidance and co-operation in working life from a workplace perspective]. Ammattikasvatuksen Aikakauskirja 21 (2), 24–41. https://journal.fi/akakk/article/view/86932

Cedefop. 2011a. Exploring leadership in vocational education and training. Working Paper No 13. Publications Office of the European Union. http://www.cedefop.europa.eu/EN/Files/6113_en.pdf

Cedefop. 2011b. Vocational education and training is good for you. The social benefits of VET for individuals. Research Paper No 17. Publications Office of the

European Union, Luxembourg.
https://www.cedefop.europa.eu/en/publications/5517

Cedefop. 2014. Terminology of European education and training policy (2nd ed.) Publications Office of the European Union, Luxembourg.
https://www.cedefop.europa.eu/fi/publications/4117

Cedefop. 2015. Who trains in small and medium-sized enterprises: characteristics, needs and ways of support. Publications Office of the European Union, Luxembourg. Cedefop research paper No 50. http://dx.doi.org/10.2801/304533

Cedefop. 2016. Kvalifikacijų ir profesinio mokymo plėtros centras [Key competences in vocational education and training – Lithuania]. Cedefop ReferNet thematic perspectives series.
https://cumulus.cedefop.europa.eu/files/vetelib/2016/ReferNet_LT_KC.pdf

Cedefop. 2017. Statistical overviews on VET – Latvia.
http://www.cedefop.europa.eu/en/publications-and-resources/country-reports/statistical-overviews-vet-latvia

Cedefop. 2018a. Vocational education and training in Europe: Latvia 2018. https://www.cedefop.europa.eu/de/publicationsand-resources/country-reports/vocationaleducation-and-trainingeurope-latvia-2018

Cedefop. 2018b. National qualifications framework developments in Europe 2017. Publications Office. https://data.europa.eu/doi/10.2801/545730

Cedefop. 2018c. Vocational education and training in Europe – Lithuania. Cedefop ReferNet VET in Europe. Reports.
https://cumulus.cedefop.europa.eu/files/vetelib/2019/Vocational_Education_Training_Europe_Lithuania_2018_Cedefop_ReferNet.pdf

Cedefop. 2020a. Vocational education and training in Europe, 1995–2035: scenarios for European vocational education and training in the 21st century. Publications Office of the European Union, Luxembourg. Cedefop reference series No 114. http://data.europa.eu/doi/10.2801/79447

Cedefop. 2020b. Lithuania: New steps to implement apprenticeships in VET. https://www.cedefop.europa.eu/en/news-and-press/news/lithuania-new-steps-implement-apprenticeships-vet

Cedefop. 2021. Vocational education and training in Portugal: short description. Publications Office of the European Union, Luxembourg. http://data.europa.eu/doi/10.2801/251891

Cross-Sectoral Coordination Centre of the Republic of Latvia. 2020. National Development Plan of Latvia for 2021–2027. https://www.pkc.gov.lv/sites/default/files/inline-files/NAP2027__ENG.pdf

Daija, Z., Kinta, G. & Labunskis, E. 2019. Vocational education and training in Europe: Latvia. Cedefop ReferNet VET in Europe reports 2018. https://www.cedefop.europa.eu/en/country-reports/vocational-education-and-training-europe-latvia-2018

Daija, Z., Kinta, G. & Labunskis, E. 2020. Vocational education and training for the future of work: Latvia. Cedefop ReferNet thematic perspectives series. http://libserver.cedefop.europa.eu/vetelib/2020/vocational_education_training_future_work_Latvia_Cedefop_ReferNet.pdf

European Commission. 2013. Work-Based Learning in Europe. Practices and Policy Pointers. European Commission. https://dual-t.com/contenidos/common/work-based-learning-in-europe.pdf

European Commission. 2016. Executive Summary of the National Reform Programme. https://ec.europa.eu/info/sites/default/files/european-semester-national-plan_executive_summary-portugal_2016_en.pdf

European Commission. 2018. Opinion on the Future of Vocational Education and Training Post 2020. https://ec.europa.eu/social/BlobServlet?docId=20479&langId=en

European Commission, Eurydice. 2022. Portugal Overview. https://eacea.ec.europa.eu/national-policies/eurydice/content/portugal_en

European Training Foundation. 2013. Work-based learning: Benefits and obstacles. A literature review for Policy Makers and Social Partners in ETF partner countries. https://www.etf.europa.eu/sites/default/files/m/576199725ED683BBC1257BE8005DCF99_Work-based%20learning_Literature%20review.pdf

ETF. 2018. Work-based learning: How ready are we? A tool for ETF partner countries. European Training Foundation. https://www.etf.europa.eu/sites/default/files/2018-09/Work-based%20learning_Tool.pdf

Ferreira, F. 2016. Key competences in vocational education and training – Portugal. Cedefop ReferNet thematic perspectives series. http://libserver.cedefop.europa.eu/vetelib/2016/ReferNet_PT_KC.pdf

Ferreira, F. 2020. Vocational education and training for the future of work: Portugal. Cedefop ReferNet thematic perspectives series. http://libserver.cedefop.europa.eu/vetelib/2020/vocational_education_training_future_work_Portugal_Cedefop_ReferNet.pdf

Greatbatch, D., & Tate, S. 2018. Teaching, leadership and governance in Further Education. Research report. Social Science in Government. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/680306/Teaching__leadership_and_governance_in_Further_Education.pdf

Hegarty, C. 2020. Covid challenge: How to make blended learning engaging for students. https://www.headteacher-update.com/best-practice-article/covid-challenge-how-to-make-blended-learning-engagingfor-students-remote-education-coronavirus-lockdown/230812/

Hogeforster, M. & Christian Wildt, C. 2020. Recent developments and challenges of the introduction of dual training for SMEs in countries around the Baltic Sea Region with a special emphasis on Lithuania. 11th International Scientific Conference Business and Management 2020. http://bm.vgtu.lt/index.php/verslas/2020/paper/viewFile/652/169

Jacinto, C. & Pozzer, J. 2019. Work-based Learning as a Concept "under construction": Evidence from two Internship Schemes in Argentina. In A. Bahl & A. Dietzen (Eds.) Work-based Learning as a Pathway to Competence-based Education, pp. 187–202. A UNEVOC Network Contribution.
https://www.bibb.de/dokumente/pdf/BzbB_Bahl_Dietzen_Work-based_learning.pdf

Jenavs, E. & Strods, J. 2020. Managing a school system through shutdown: lessons for school leaders. Results of a system-wide study of remote learning in Latvia by Edurio and the Ministry of Education and Science of Latvia.
https://www.oecd.org/education/Latvia-managing-school-system-through-shutdown-lessons-for-school-leaders.pdf

Kaikkonen, L. & Maunonen-Eskelinen, I. (Eds.) 2020. Does the tandem approach work? Research on the experimentation testing the professional development model for tutors in work-based learning in the Baltic Countries. Publications of Jamk University of Applied Sciences 277. Jyväksylä University of Applied Sciences.
https://urn.fi/URN:ISBN:978-951-830-558-6

Kaminskienė, L. & Chu, L.Y. 2021. Challenges of Distance Education During the School Lockdown: the Lithuanian School Leaders' Perspective. SOCIETY. INTEGRATION. EDUCATION. Proceedings of the International Scientific Conference. Volume V (May 28th–29th, 2021), 127–134.
https://portalcris.vdu.lt/server/api/core/bitstreams/cf6a6958-76e5-4ebb-bd23-16f39b1471b5/content

Kampylis, P., Punie, Y. & Devine, J. 2015. Promoting Effective Digital-Age Learning – A European Framework for Digitally-Competent Educational Organisations. Publications Office of the European Union, Luxembourg.
https://publications.jrc.ec.europa.eu/repository/handle/JRC98209

Krastiņa L. & Tiihonen, A-K. (Eds.) 2020. Testing New Approaches to Training VET and Workplace Tutors for Work Based Learning. TTT4WBL Baltic Practice in WBL Tutor Training Project Highlights and Achievements. Jyväskylä University of Applied Sciences. https://ttt4wbl-project.eu/wp-content/uploads/2020/02/TTT4WBL-project-summary-publication.pdf

Köpsén, S. 2014. How vocational teachers describe their vocational teacher identity. Journal of Vocational Education and Training 66 (2), 194–211.

Lehtonen, E., Rintala, H., Pylväs, L. & Nokelainen, P. 2018. Ammatillisten opettajien näkemyksiä opettajan työssä tarvittavasta kompetenssista ja työelämäyhteistyöstä [Vocational teachers' views on the competence and cooperation in working life]. Ammattikasvatuksen aikakauskirja 20 (4), 10–26.

Liebowitz, D., González, P., Hoogei, E. & Lima, G. 2018. OECD Reviews of School Resources: Portugal 2018. OECD Reviews of School Resources. OECD Publishing. https://doi.org/10.1787/9789264308411-en

Maurer, M. 2018. Integrating work-based learning into formal VET: Towards a global diffusion of apprenticeship training and the dual model? In S. McGrath, M. Mulder, J. Papier & R. Suart (Eds.) Handbook of vocational education and training: Developments in the changing world of work, pp. 551–567). Springer.

Mikkonen, S., Pylväs, L., Rintala, H., Nokelainen, P. & Postareff, L. 2017. Guiding workplace learning in vocational education and training: a literature review. Empirical Research in Vocational Education and Training (9), 9. https://dx.doi.org/10.1186/s40461-017-0053-4

Ministry of Environmental Protection and Regional Development. 2020. Digital Transformation Latvian Digital Transformation Guidelines for 2021–2027 – Accellation of Digital Capacities for Future Society and Economy. https://www.varam.gov.lv/lv/digitalas-transformacijas-pamatnostadnes-2021-2027gadam

Mäenpää, K. 2021. Motivation regulation and study well-being during nurse education studies [Doctoral dissertation]. University of Oulu. http://urn.fi/urn:isbn:9789526231532

Organisation for Economic Co-operation and Development. 2016. Lithuania – Country Note – Skills Matter: Further Results from the Survey of Adult Skills. https://www.oecd.org/skills/piaac/Skills-Matter-Lithuania.pdf

Organisation for Economic Co-operation and Development. 2018. Teaching and Learning International Survey. TALIS Database. https://www.oecd.org/education/talis/talis-2018-data.htm

Organisation for Economic Co-operation and Development. 2020a. OECD Skills Strategy Implementation Guidance for Latvia: Developing Latvia's Education Development Guidelines 2021-2027. OECD Skills Studies. https://doi.org/10.1787/ebc98a53-en

Organisation for Economic Co-operation and Development. 2020b. OECD Skills Strategy Lithuania: Assessment and Recommendations. OECD Skills Studies, OECD Publishing. https://doi.org/10.1787/14deb088-en

Organisation for Economic Co-operation and Development. 2020c. School Education during COVID-19: Were Teachers and Students Ready? Country Note Portugal. https://www.oecd.org/education/Portugal-coronavirus-education-country-note.pdf

Organisation for Economic Co-operation and Development. 2020d. Education Policy Outlook Portugal. https://www.oecd.org/education/policy-outlook/country-profile-Portugal-2020.pdf

Organisation for Economic Co-operation and Development. 2021a. Teachers and Leaders in Vocational Education and Training. OECD Reviews of Vocational Education and Training. https://doi.org/10.1787/59d4fbb1-en

Organisation for Economic Co-operation and Development. 2021b. OECD Skills Strategy Lithuania Assessment and Recommendations, OECD Skills Studies. https://www.oecd.org/skills/oecd-skills-strategy-lithuania-14deb088-en.htm

Portugal INCoDe.2030. 2018. Portugal INCoDe.2030, Summary of the on Going and Planned Activities Under the INCoDe.2030 initiative. https://www.incode2030.gov.pt/en/documents-publications

Rūdolfa, A. 2018. Mācību platformas izglītības digitalizācijas kontekstā Latvijā [Learning platforms in the context of digitalisation of education in Latvia]. Latvijas Universitāte. https://dspace.lu.lv/dspace/handle/7/39467

The General Directorate for Employment and Industrial Relations. 2016. Vocational education and training in Europe – Portugal. Cedefop ReferNet VET in Europe reports 2016. http://libserver.cedefop.europa.eu/vetelib/2016/2016_CR_PT.pdf

The General Directorate for Employment and Industrial Relations. 2019. Vocational education and training in Europe – Portugal. Cedefop ReferNet VET in Europe reports 2018. http://libserver.cedefop.europa.eu/vetelib/2019/Vocational_Education_Training_Europe_Portugal_2018_Cedefop_ReferNet.pdf

UNESCO. 2011. International Standard Classification of Education. UNESCO Institute for Statistics. http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf

UNICEF. 2020. Ready to Come Back: Teacher Preparedness Training Package. https://www.unicef.org/mena/media/9601/file/UNICEF_MENA_TTP_total_0.pdf%20.pdf

Volmari, K., Helakorpi, S. & Frimodt, R. (Eds.) 2009. Competence framework for VET Professions. Handbook for practitioners. Finnish National Board of Education. Cedefop publication. https://www.cedefop.europa.eu/en/news/competence-framework-vet-professions-handbook-practitioners#grouplinks

Vähäsantanen, K. & Hämäläinen, R. 2019. Professional identity in relation to vocational teachers' work : an identity-centred approach to professional development. Learning: Research and Practice 5 (1), 48–66.

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Kieli: suomi

Pysyvä osoite: http://urn.fi/urn:nbn:fi-fe2022060342894

Tiivistelmä: Vocational education and training in Europe has many similarities but also many differences. The countries participating in the Dig4VET project follow this pattern also. A basic aspect of vocational training is directly linked to the definition of VET as education and training which aims to equip people with knowledge, know-how, skills and competences required in particular occupations or more broadly on the labour market. European VET is changing in many ways and the pandemic has forced this process. Responding to rapidly changing demographics, technologies and labour market, European VET is diversifying its programmes and qualifications and becoming more digital. To gain a broader understanding of digital skills and recent development directions in VET especially in partnering countries, we conducted a brief desk research. Partnering countries also contributed to data collection and gathered previous findings of research or reports conducted at the national level.

The New Digital Era

Juntunen Elina, Kilja Päivi, Brauer Sanna

In general, the current epoch suggests us to consider novel and more complex approaches to learning and implementing the student-centred and digitally supported learning practices. This has also been incentivized by the Declarations issued in Bologna and Berlin (Brauer, 2020). For instance, several studies have concluded that effective integration of advanced digital technologies push teaching and learning towards the constructivist pedagogical paradigm and student-centred practices (Becker, 2000; Becker, 2001; Becker & Ravitz, 1999; Dexter, Anderson, & Becker, 1999; Matzen & Edmunds, 2007; Palak & Walls, 2009; Ravitz, Becker, & Wong, 2000). Moreover, educational provisions in VET are often already based on student-centred practices by nature. Still, these interactive, student-centred teaching strategies for learning require critical and constructive evaluation in order to move towards better implementations. The provided projects and experiments can help us with the review.

DigCompEdu — Examples of Applications from Europe

DigCompEdu has already been or will be integrated in training courses and guidelines for teachers in many European countries, for example in Germany, Portugal, Croatia and Spain (Caena & Redecker, 2019). It is expected that in the upcoming years, more guidance documents will refer to this extensive set of pan-European recommendations. Competence frameworks are often primarily targeted in national, regional, local authorities and stakeholders who are responsible for designing and implementation of guidelines, practices, and curricula (Caena & Redecker, 2019). DigCompEdu has already proved its worth in practice as a valuable tool. It serves teachers in daily work, empowering them as developers of their own work. In the following chapter we aim to discuss some examples of previous development initiatives and already established practices.

The Importance of Digital Skills in the Lives of Young People

Related to the digital skills of youth (12-17-year-olds), the ySKILLS project reported on a research on experts in the educational sector and the labour market conducted in six European countries: Estonia, Finland, Germany, Italy, Poland and Portugal (Donoso et al. 2020). The report discussed the skills that youth need in the 21st century and the role of digital skills education in formal, informal and non-formal learning settings. The interviews (n=34) were carried out in April and May 2020. The key findings showed that the provision of programmes, tools and resources to support the development of digital skills varies greatly across and within countries.

Indiduals' access to skills development differs greatly depending on a wide range of factors including individual (e.g., age or gender), socio-economic (e.g., having or lacking access to internet at home or to high quality education), political (e.g., local, or national policies to promote the development of digital skills) and even geographical factors (e.g., poor connectivity due to one's location). In addition, educational and labour market experts had the common idea that the development of digital skills and the promotion of digital literacy is not a task that only concerns the formal educational system, e.g., the importance of working collaboratively across different sectors should be recognised. Another interesting finding from this research was that different experts seemed to share a similar understanding and considered the same set of basic skills as particularly important for young people to acquire. That comprised aspects as varied as operational skills, critical literacy and even an ethical dimension.

Furthermore, based on the DigComp 2.0 aspects the great majority of experts considered the top-5 digital skills for children to possess: the Capacity to Evaluate data, Information and Digital content, Browsing, Searching and Filtering data, Information and Digital content, Collaborating and Interacting through digital technologies, Managing digital identity, and Engaging in citizenship through digital technologies (Donoso et al., 2020). In general, the experts from different countries and across different sectors agreed that digital skills and digital literacy will continue to occupy an increasingly important role in people's lives and especially in working life. In the near future, digital technologies will be used for work, but also to

perform a wider range of everyday activities (e.g., communication, online shopping, e-government, e-health, leisure, etc.). In addition, the experts agreed that the workforce in their country was not sufficiently digitally skilled, and there also can be strong differences within countries and across different (economic) sectors. This concerns not only young people but also adults, especially the elderly (Donoso et al., 2020).

The Check-In questionnaire as a Tool to Measure Digital Competence

Lucas, Dorotea & Piedades' study (2021) analyzes the contribution of in-service training to the development of the digital competence level of a group of teachers in Portugal. The study used DigCompEdu as a guiding document and the self-assessment tool developed from this framework, the Check-In questionnaire, to measure improvement pre- and post-training. The Check-In tool provides a statement for each of the 22 competences proposed in DigCompEdu (Lucas et al., 2021). Each of these statements present five response options and teachers select the one that best reflects their practice. The total score is mapped according to the six proficiency levels in DigCompEdu.

Three in-service training actions were offered to the development of the digital competence for a selected group of teachers. Teachers with low digital competence level were selected to the study and the areas most in need of training were identified. Those areas from DigCompEdu were Digital Resources, Teaching and Learning, and Evaluation. Training sessions included face-to-face teaching and guidance, and a Facebook group was also created to enable exchange of information, experiences and to ask questions. Each session was led by two trainers, with experience in in-service training for pedagogical use of digital technologies assisted by a teacher from the school cluster where the training was held. The sessions focused on practice and had a strong emphasis on applicability in the classroom context. After training sessions and new assessment, the results showed that competence level increased in all areas and competences worked (Lucas, Dorotea & Piedade, 2021).

Previous SELFIE Studies

The European Commission gathered information about the use of digital technologies in upper secondary VET institutions in countries that have signed the Convention on the Organisation for Economic Co-operation and Development (OECD, 2021). According to aggregated data from SELFIE users, VET teachers in upper secondary education use digital technologies slightly more than general education teachers (see SELFIE explained in more details in Chapter 5). However, not all VET teachers use digital technologies in their teaching (estimated at 34%), and a large proportion of them do not use them as a tool to improve the quality of their teaching. For instance, 66 % of VET teachers incorporate digital technologies in their daily practice to engage students during their lessons, and an almost similar share use it to assist student in developing their soft skills, by fostering creativity (64 %) or by facilitating collaboration (58 %), or to tailor their teaching to students' needs (62 %). Moreover, only 56 % of VET teachers use digital technologies for assessment purposes, or as part of cross-curricular projects (52 %). The results also showed significant age-related differences, with younger VET teachers more active to use digital tools and resources in their teaching than older peers.

Based on the evidence collected by OECD (2021), the reason why many VET teachers don't apply and build upon the digital skills and competences is that they gained included lack of confidence and negative attitudes to change, or they do not feel confident enough to use digital technologies. Furthermore, according to SELFIE data, around 25 % of upper secondary VET teachers reported lacking confidence in their abilities to use digital technologies for classroom teaching or for providing feedback to students. This percentage varied across countries (e.g. 45 % of Slovenian VET teachers) and VET teacher age profiles (e.g. 47 % of those aged 60+ compared to 24 % of those aged 30 to 39). For example, around 82 % of VET teachers aged 30 to 39 feel confident preparing lessons using digital technologies, and 76 % of them feel confident using technology in class teaching, whereas those figures reduce to 59 % and 53 % of VET respectively for VET teachers over 60 (OECD, 2021).

In summary, data from the SELFIE tool suggested that upper secondary VET teachers should get the support they need to integrate new technology into VET (OECD, 2021). Pedagogical innovations usually need systematic efforts from employers, and particularly VET leaders. For example, only 52 % of VET teachers reported having received support from school leaders for trying out new ways of teaching with digital technologies, and 45 % of teachers said that school leaders had discussed with them their professional development needs for teaching with digital technologies. Moreover, 51 % of teachers agreed that school leaders had supported them in sharing experiences within their school about teaching with digital technologies, and only 31 % of teachers reported having had time to explore how to improve their teaching with digital technologies. (OECD, 2021.)

Castaño-Muñoz, Weikert Garcia et al. (2021) examined the digital capacity of Spanish primary and secondary schools using the SELFIE tool. The data was collected in early 2020, just before the school closures in Spain due to the COVID-19 pandemic. SELFIE questionnaires collected views of school leaders, teachers and students on eight different key areas of digital capacity: leadership, collaboration and networking, infrastructure and equipment, continuing professional development, supports and resources, implementation in the classroom, assessment practices, and student digital competence. The data was collected by SELFIE questionnaires in 492 schools in three educational levels, from altogether 26303 responses, consisting of school leaders (n=1721), teachers (n=7934), and students (n=16 648).

Castaño-Muñoz, Weikert Garcia et al. (2021) found out, in general, that the first steps of the digitalisation process have already been completed, therefore areas such as supportive uses of the internet for preparation of lessons and existence of basic infrastructure obtain high scores. The best-valued areas by school leaders and teachers were Supports and Resources and Infrastructure and Equipment. The areas related to leadership of the schools to promote digitalization and opportunities for continuous professional development in the use of digital technologies by teachers, also showed good results. For example, the existence of adequate infrastructure to be used for innovative teaching and learning in the school and the existence of internet connection were the items with higher scores. Although

internet access was valued high in general, it was more valued by teachers and school leaders than by students. Moreover, regarding students' digital competence, the study also revealed positive aspects: the development of responsible and safe use of technology was present at all education levels. On the other hand, there were two aspects that were less developed: the recognition of sources, and the ability to judge the quality of information found online.

The findings also showed that teachers can apply digital technologies by adapting the teaching process to students. However, it is interesting that the use of virtual learning environments has not been fully widespread. The findings brought up the concern of collaborative uses of digital technologies, or its application in innovative assessment procedures. The areas with lower averages, and therefore with more room for improvement by school leaders and teachers, were Assessment Practices and Collaboration and Networking. The data showed that Assessment Practices was the area with the lowest scores. This indicates that it is necessary to deepen the usefulness of digital technologies to facilitate a personalised and formative assessment that includes relevant and timely feedback. The most common practice was to use digital technologies to assess students' skills. Similarly, the use of technology for peer assessment, that implies interaction between students, was shown as a particularly weak level.

Collaboration and Networking was one of the areas with lower scores and therefore with highest room for improvement. The use of digital technology for students' collaboration obtained a low average score by teachers and school leaders. According to Castaño-Muñoz and Weikert Garcia et al. (2021), the low experience of digital technology can have a direct effect on remote learning situations when the use of technologies is very relevant for collaboration and the promotion of this type of activity can develop teamwork and self-regulation, skills that are very important in distance education. In addition, an exchange of experiences of schools with their community and environment would allow them to obtain more and better information on how to be up to date with the use of technology in education.

Castaño-Muñoz, Weikert Garcia et al. (2021) brought up the concern of continuous professional development (CPD) of teachers. The teachers had a worse perception than school leaders about the support received from the school to participate in

CPD. The items referred to the perceived support to internal discussion about CPD needs and activities to exchange experiences with other teachers had lower scores. The sharing experiences has been detected as a key approach for effective integration of digital technologies and students' digital competence development. According to teachers' answers, the most useful CPD activities were, learning from the other teachers and in-house training sessions organised by the school.

The survey also included some additional questions. One of them was about the barriers that inhibit the use of digital technologies in the school. There was consensus with school leaders and teachers in all education levels that teachers' lack of time was the most important barrier. It was followed by the lack of funding and the bad adequacy of the equipment in the school. In addition, school leaders identified teachers' lack of digital competence was one of the biggest barriers. The lack of digital competence of students was not seen as a remarkable barrier in any education level.

The relationship between students' digital competence acquisition, teaching practices, and teacher professional learning activities were relevant to both teachers and students. Castaño Muñoz, Vuorikari et al. (2021) found out in their study that the use of digital technologies for teacher collaboration can have great potential and importance, both for teachers and learners. They used data collected from SELFIE tool during the first year of its use (October 2018–July 2019) throughout Europe. In their study focus was on the responses of teachers (n=59452), as they constituted information about participation in professional learning and what happens in the classrooms in terms of teaching practices and students' digital competence acquisition.

When examining the data, Castaño Muñoz, Vuorikari et al. (2021) noticed that all the proposed teaching practices using digital technologies, as well as ´tailoring teaching to the needs of students´ had a positive effect on students' digital competence acquisition as perceived by teachers. The results also showed that the most related teaching practice to the acquisition of students' digital competence was the use of digital technologies in implementing cross-curricular projects. Moreover, in order to obtain quality cross-curricular projects, there should be more teachers´ participation in professional networks. These findings suggested that the

importance of teachers' participating in professional learning activities that focus on the pedagogical use of digital technologies, as well as teacher networks that promote teacher collaboration, had proven useful.

The digital capacity of educational institutions through SELFIE has also been surveyed in Italy. Bocconi et al. (2020) conducted the research on the Italian general and vocational school leaders', teachers' and students' perception of their school's digital competence and different levels of use of digital technology. The data was collected between September and October 2017, from altogether 31 912 participants, consisting of school leaders (n=1 507), teachers (n=5690) and students (n=24 715) from 201 Italian schools.

The findings showed variance in the school leaders', teachers', and students' perception of concerning the SELFIE areas (Leadership and Governance practices, Teaching and Learning practices, Professional Development, Assessment practices, Content and Curricula, Collaboration and Networking, and Infrastructure). Concerning the area of Teaching and Learning Practices, all the three actors felt very positive about it. For example, as many as 59 % of the school leaders and students perceived positively the use of digital technologies, respectively to actively involve students. In comparison, teachers´ perception of this aspect was more cautious (45%) than those of school leaders and students. Moreover, quite few teachers had positive perception involvement in the development of the school's digital strategy (27 %). The school leaders had a positive impression about Professional Development. Most of them stated that their school provided strategies to promote in-house professional development opportunities (64 %) and external professional development opportunities (74 %) consistently.

All the three actors were critical about the Assessment Practices area (only 30 % of the school leaders, 32 % of the teachers, and 32 % of the students had positive responses). In particular, the existing differences emerged concerning using digital technologies for self- and peer-assessment (19 % School Leaders, 25 % Teachers, 32 % Students). However, even when the school leaders (29 %) and the teachers (36 %) were quite critical about the item Students use digital technologies to document their learning, 47 % of the students expressed that they use digital technologies to document their learning. Overall, 64 % of school leaders, teachers

and students agreed that their school reached positive levels in fostering students' learning to use information critically.

Bocconi et al. (2020) also found out in their research the differences among the three actors´ perceptions emerged concerning Infrastructure, Leadership and Governance, and Collaboration and Networking areas. For example, both school leaders and students agreed that their school reached positive levels in fostering students' learning to behave safely and responsible (67 % School leaders, 65 % Students). Furthermore, there was variation in opinions regarding the use of virtual learning environments. 45 % of students and 32 % of school leaders expressed positive perspectives, but only 18 % of teachers considered the use of virtual learning environments consistently.

Concerning Leadership and Governance, it was especially the students, of whom 52 % expressed a positive perspective that teachers choose the technologies they need consistently (52 %), and digital technologies are used to make learning more effective (59 %). Regarding the participants' responses, there were clear differences within the three actors concerning the area Collaboration and Networking. For example, regarding the item Teachers participate in professional online networks, teachers provided the 20 % of positive responses and school leaders provided the 36 % of positive responses. Concerning the other item Use of different communication tools within and beyond the school community, teachers provided the 54 % of positive responses, school leaders provided the 66 % of positive responses and students provided the 47 % of positive responses. (Bocconi et al. 2020.)

COVID-19 pandemic — The Challenging Catalyst for the Digitalisation in VET

COVID-19 pandemic has presented challenges to learning in VET as well as in other levels of learning. One group that was facing challenges even before lock downs were VET students at risk, for example students from disadvantaged socioeconomic backgrounds, migrants, and learners with disabilities and special education needs (Cedefop, 2020). Many vulnerable learners do not even have access to digital

devices and/or web access at home. The crisis has shown that vulnerable learners are less likely to be involved in distance learning procedures which may eventually lead them to drop out from their VET programmes (Cedefop, 2020). According to Cedefop's report (2020), ambassadors in seven European countries (Germany, Greece, Portugal, Romania, Spain, Turkey, and the UK) were determined that countries are aiming to ensure learning continuity for all VET learners and apprentices during COVID-19 pandemic.

The actions (Cedefop, 2020, p. 4) for that were:

- facilitating access to digital devices; internet connection; translating guidelines into different languages spoken by ethnic minorities and refugees, as well as hearing impaired students;
- providing individualised support and distance tutoring; developing learners' digital skills;
- supporting VET teachers and trainers through online training modules on digital skills and e-learning pedagogies and by providing them with free digital devices.

These initiatives have been taken at different policy levels, some of them at national level and others at regional, local or institutional level.

Practical and work-based learning are crucial for the success of vocational education because they play a central role in the alignment between education (OECD, 2021) and VET institutions train many of those professions that formed the backbone of economic and social life during COVID-19 pandemic from the health sector to the retail sector (OECD, 2020). One big challenge that was brought up in the report was the continuation of the work-based component of VET programmes (Cedefop, 2020).

Practical aspects are harder to deliver effectively due to lack of access to tools, materials and/or equipment. During COVID-19 pandemic many companies were temporarily shut down, which made internships harder to continue for VET students. In all these seven countries, VET and apprenticeships were incorporating online platforms to facilitate learning and assessment. Some of them were also

exploring options for innovative, digital pedagogical approaches such as simulators or augmented/virtual reality to train practical skills (Cedefop, 2020). These new innovative technologies can be used to facilitate school-based delivery of practical learning but in the longer term, also improve the effectiveness of face-to-face and online learning in VET (OECD, 2021).

For distance learning, VET teachers and trainers were facing challenges with access to equipment and internet connection but also lack of digital skills and competences to make use of platforms, lack of experience in creating digital teaching content as well as on e-learning and effective pedagogies on distance learning in VET (Cedefop, 2020). Teachers and trainers also brought up concerns over privacy issues, copyright, and data protection. While it is important to support teachers and trainers on developing digital pedagogical skills, their wellbeing should not be forgotten. Teachers and trainers have been struggling to meet the new demands to move into virtual classrooms and workplaces and come up with effective teaching methods online in such a short notice. Autonomy-supportive leadership in VET schools might have an important role in teacher and trainers' wellbeing. When teachers perceive their leaders to be autonomy-supportive, they have reported greater capacity to navigate through common challenges at work (Collie, Bostwick & Martin, 2019). That is important also with navigating the challenges caused by COVID-19 pandemic. Autonomy-supportive leadership may include taking teachers and trainers' input in the decision-making processes, understanding their needs and addressing the challenges in distance learning provision and retaining open dialogue (Cedefop, 2020).

ILO-UNESCO-World Bank Survey, for providers of initial and continuing technical and vocational education and training (TVET) policymakers and social partners from around the world, was conducted in spring 2020 during the COVID-19 pandemic. The survey (ILO, 2021) collected data from 1353 respondents in 126 countries. As it has become clear, national lockdowns and TVET centres' closures affected the continuity of TVET. Distance learning alternatives were exploited but, according to the survey, at that point they could not replace the quality of face-to-face classes and were especially affected in work-based learning and acquisition of practical skills. According to the survey results, leaders, trainers, and learners were not

sufficiently prepared for a sudden transition to remote learning and were lacking the necessary skills and infrastructure needed in distance teaching and learning. In many countries, trainers and especially learners were facing challenges such as lack of access to the internet or the number of digital devices available. The lack of effective distance learning platforms and the quality of pedagogical resources to support remote instructions especially on a national scale were also hindering the transition to remote learning. Lack of staff capacity to support distance learning through quality pedagogical resources also came up in the survey: the ability to operate in online learning platforms efficiently and to develop pedagogical resources for remote teaching and learning purposes. Many countries reported difficulties in student engagement during remote learning but also lack of motivation of teachers and managers due to the heavier workload caused by sudden transition to distance learning. Most respondents also indicated that certifying exams and assessment were postponed or in some cases even cancelled. However, in some cases assessments were carried out virtually.

As well as Cedefop's (2020) report from European countries, ILO-UNESCO-World Bank survey (2021) results show that the delivery of work-based learning, including apprenticeships, faced serious disruption during COVID-19 pandemic and the lockdowns. Even though these challenges and negative impacts are often highlighted, the crisis has also accelerated the transition towards the digitalization that was already underway. The importance of developing digital skills has become clear and efforts have been made to strengthen them. (ILO, 2021.) COVID-19 has brought some key challenges to light in VET but also underlined the benefits of the use of digital technologies in education (OECD, 2021). All in all, it seems that COVID-19 pandemic and school closures have worked as catalysts for the digitalisation process of schools (Cedefop, 2020). VET teachers and leaders had to be creative to ensure continuity of teaching during closures and they found alternative ways of teaching and learning using technology and provided alternative opportunities for practical learning at schools (OECD, 2020). For VET teachers it is important to have opportunities to keep their skills up to date with workplace activities and apply new technologies for teaching and learning (OECD, 2021).

Key Elements that Helped to Adapt in Challenges in Finland

A recent report by the International Centre for Technical and Vocational Education and Training (UNESCOUNEVOC, 2021) examined how TVET was organised in Finland during COVID-19 pandemic. During spring 2020 TVET institutions were closed, and face-to-face learning was disrupted. Overall TVET providers reported that transition to distance learning was successful even though it happened in a very tight schedule. According to The Finnish Association for the Development of Vocational Education and Training (AMKE, 2020) the staff and students adopted the increased use of digital and online solutions quickly and teachers supported each other by sharing advice and materials on online learning. The transition was easier for those TVET providers that had used more digital solutions also prior to COVID-19 pandemic. In Finland, digital skills have been emphasised by the Finnish National Agency for Education and TVET providers have been encouraged to develop digitalization strategies since 2010. That has facilitated the development of distance and online learning solutions in recent years (UNESCOUNEVOC, 2021).

In general, TVET providers were able to maintain regular contact with students and they estimated that the majority of students coped well with distance learning (AMKE, 2020). However, based on The Finnish Evaluation Centre (2020) survey, teaching and guiding staff thought that supporting students' sense of community, supporting students' wellbeing and interaction with students were shown to be especially difficult during COVID-19 pandemic. Finnish teachers also felt an increase in their workload with more time spent on planning, adapting new digital tools, and increased amount of individual, written feedback. Also based on students' responses there were some challenges with the lack of feedback and adequate support. Distance learning was also more challenging for students who needed special support. Graduation has been mostly ensured timely for most students.

In Finnish TVET, students' skills and competences are usually demonstrated and assessed in practical tasks in authentic work situations by a teacher with a working life representative. During COVID-19 pandemic, students were also allowed to demonstrate their competence by practical tasks similar to authentic work situations if authentic work situations were not possible to arrange (UNESCO-

UNEVOC, 2021). Whether students were able to continue work-based learning varied on different learning sectors: technology and service industry were the ones that suffered most from the crisis (AMKE, 2020). About one third of the students in the Finnish Evaluation Centre (2020) survey reported being in work-based learning during COVID-19 pandemic in spring 2020 and for 80 % of them work-based learning was still possible to continue during lockdowns.

Based on experiences from school closures during COVID-19 pandemic in spring 2020, Finnish TVET system stands with UN Secretary-General' Policy Brief (United Nations, 2020) message that it is necessary to ensure education systems are more flexible, equitable and inclusive in the future. There were valuable lessons learnt during school closures and to identify best practices of countries to improve the resilience of education systems worldwide is important. Key elements that helped to adapt in challenges of COVID-19 pandemic in Finland were: high degree of flexibility and autonomy in educational system, personal competency development plans for each student, TVET as a mixture of school-based, work-based and online-based learning and modular structure of studies for reskilling and upskilling. Also competency-based approach is an important factor: it is learning and acquired knowledge, skills and competences that count, not a study credit per se, and assessment is continuous with no standardised national examinations. In Finland, teaching is also a highly respected profession and teachers have a long educational background. They take active part in in-service training and, as mentioned before, digital skills have been one of the focus areas in professional development (UNESCO-UNEVOC, 2021).

References

Ammattiosaamisen kehittämisyhdistys [The Finnish Association for the Development of Vocational Education and Training]. 2020. Koronan vaikutukset ammatillisen koulutuksen toimintaan [Survey on the impact of COVID-19 on TVET]. https://www.amke.fi/media/julkaisuja/2020/jatkokyselyn-tuloksien-esittely_pitka-versio2.pdf

Becker, H. J. 2000. Findings from the teaching, learning, and computing survey. Education policy analysis archives (8) 51.

Becker, H. J. 2001. How are teachers using computers in instruction? Paper presented at the Meeting of the American Educational Research Association, Seattle, WA. https://pdfs.semanticscholar.org/5193/20f10755eb04c82c6cb778bcad045bf3c8a7.pdf

Becker, H. J. & Ravitz, J. L. 1999. The influence of computer and Internet use on teachers' pedagogical practices and perceptions. Journal of Research on Computing in Education 31 (4), 356–384.

Bocconi, S., Panesi, S. & Kampylis, P. 2020. Fostering the Digital Competence of Schools: Piloting SELFIE in the Italian Education Context. IEEE Revista Iberoamericana de Tecnologias del Aprendizaje 15 (4), 417–425. http://dx.doi.org/10.1109/RITA.2020.3033228

Brauer, S. 2020. Digital Open Badge-Driven Learning – Practical Applications to Support Validation of Prior Learning. In R. Duvekot, R., Karttunen, A., Noack, & L. Van den Brande, L. (Eds.) Making Policy Work – Validation of Prior Learning for Education and the Labour Market. Series VPL-Biennale nr. 7, 147–158. European Centre Valuation of Prior Learning & Bertelsmann Stiftung. Houten/ Berlin. https://pdfs.semanticscholar.org/5193/20f10755eb04c82c6cb778bcad045bf3c8a7.pdf

Caena, F. & Redecker, C. 2019. Aligning teacher competence frameworks to 21st century challenges: The case for the European Digital Competence Framework for Educators (DigCompEdu). European Journal of Education (54), 356–369.

Castaño Muñoz, J., Vuorikari, R., Costa, P., Hippe, R. & Kampylis, P. 2021. Teacher collaboration and students' digital competence – evidence from the SELFIE tool, European Journal of Teacher Education. https://www.tandfonline.com/doi/pdf/10.1080/02619768.2021.1938535

Castaño Muñoz, J., Weikert Garcia, L. & Herrero Rámila, C. 2021. Analysing the digital capacity of Spanish schools using SELFIE : an early diagnosis for a better response to COVID and beyond. Publications Office of the European Union, Luxembourg. https://data.europa.eu/doi/10.2760/947402

Cedefop. 2020. Digital gap during COVID-19 for VET learners at risk in Europe. Synthesis report on seven countries based on preliminary information provided by Cedefop's Network of Ambassadors tackling early leaving from VET. https://www.cedefop.europa.eu/files/digital_gap_during_covid-19.pdf

Collie, R., Bostwick, K. & Martin, A. 2019. Perceived autonomy support, relatedness with students, and workplace outcomes: an investigation of differences by teacher gender. Educational Psychology. An International Journal of Experimental Educational Psychology 40 (3), 253–272.

Dexter, S. L., Anderson, R. E. & Becker, H. J. 1999. Teachers' views of computers as catalysts for changes in their teaching practice. Journal of Research on Computing in Education 31 (3), 221–239.

Donoso, V., Pyżalski, J., Walter, N., Retzmann, N., Iwanicka, A., d'Haenens, L. & Bartkowiak, K. 2020. Report on Interviews with Experts on Digital Skills in Schools and on the Labour Market. KU Leuven, Leuven: ySKILLS. https://zenodo.org/record/5226910#.YidK4xNBxm9

Finnish Education Evaluation Centre. 2020. Poikkeuksellisten opetusjärjestelyjen vaikutukset tasa-arvon ja yhdenvertaisuuden toteutumiseen [Impact of exceptional teaching arrangements on equality and equal opportunities]. https://karvi.fi/app/uploads/2020/07/Poikkeuksellisten_opetusjarjestelyjen_vaikutukset_ensimmaiset_tulokset_korjattu-10.7.pdf

ILO. 2021. Skills development in the time of COVID-19: Taking stock of the initial responses in technical and vocational education and training. International Labour Office, Geneva: ILO. https://www.ilo.org/wcmsp5/groups/public/—ed_emp/—ifp_skills/documents/publication/wcms_766557.pdf

Lucas, M., Dorotea, N. & Piedade, J. 2021. Developing Teachers' Digital Competence: Results from a Pilot in Portugal. Ieee Revista Iberoamericana De Tecnologias Del Aprendizaje 16 (1), 84–92. https://doi.org/10.1109/RITA.2021.3052654

Matzen, J. N. & Edmunds, J. A. 2007. Technology as a catalyst for change: The role of professional development. Journal of Research on Technology in Education 39 (4), 417–430.

OECD. 2020. Education at a Glance 2020: OECD Indicators, OECD Publishing, Paris. https://doi.org/10.1787/69096873-en

OECD. 2021. Teachers and Leaders in Vocational Education and Training. OECD Reviews of Vocational Education and Training, OECD Publishing. https://doi.org/10.1787/59d4fbb1-en

Palak, D. & Walls, R. T. 2009. Teachers' Beliefs and Technology Practices. Journal of Research on Technology in Education 41 (4), 417–441. https://doi.org/10.1080/15391523.2009.10782537

UNESCO. 2021. Case Study on Finnish TVET. A Resilient Model of Training During COVID-19. By Omnia Education Partnerships. Education 2030. https://unesdoc.unesco.org/ark:/48223/pf0000375471

UNESCO-UNEVOC. 2020. Future of TVET teaching, UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training. https://unevoc.unesco.org/pub/trendsmapping_futureoftvetteaching.pdf

United Nations. 2020. Secretary-General's Policy Brief on Education and COVID-19. https://www.un.org/sites/un2.un.org/files/sg_policy_brief_covid-19_and_education_august_2020.pdf

METATIEDOT

Tiivistelmä: In general, the current epoch suggests us to consider novel and more complex approaches to learning and implementing the student-centred and digitally supported learning practices. This has also been incentivized by the Declarations issued in Bologna and Berlin. For instance, several studies have concluded that effective integration of advanced digital technologies push teaching and learning towards the constructivist pedagogical paradigm and student-centred practices. Moreover, educational provisions in VET are often already based on student-centred practices by nature. Still, these interactive, student-centred teaching strategies for learning require critical and constructive evaluation in order to move towards better implementations. The provided projects and experiments can help us with the review.

Training Needs Analysis of Digital Skills of VET Teachers, Trainers and Tutors in Latvia, Lithuania and Portugal

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This training needs analysis presents the survey results of use of digital technologies in VET, in Dig4VET partner countries Latvia, Lithuania and Portugal. The particular focus is on digital competences of VET teachers, trainers, WBL tutors/mentors in the field of education technologies. The need analysis includes their perceptions about their digital competences. It comprises their understanding of the potential of digital tools in learning, teaching, assessment, validation, awareness of digital policies and their perception of training needs. Consistently, it includes the perceptions of VET students and VET school managers. The need analysis also covers an overview of digital tools, education technologies and apps relevant and useful for VET and WBL settings. As well, it offers an overview of how VET schools, VET teachers and school leaders in partner countries were prepared and how they succeeded during the time of Covid-19 pandemic outbreak.

Implementation of the Needs Analysis

To explore the digital competences of VET teachers, trainers, tutors, mentors, and students in three the Dig4VET projects' European countries, this analysis used principally data gathered by the SELFIE (see Self-reflection on Effective Learning by Fostering Innovation through Educational technology). SELFIE is a self-reflection tool that is launched, developed, and administered by the European Commission. This methodological choice was made with the intent to reach equal data with trustworthy and earlier standardised instruments. Additionally, we used a tailored Survey of tools questionnaire and collected qualitative data from the project participants.

This chapter describes the implementation of the need analysis in more detail. It explains the aims of the needs analysis, study context, participants and methods of data collection and analysis. Finally, the main results and conclusion of the results are presented.

Aims

The main aim of the need analysis was to gain overview of VET teachers', tutors, mentors', school leaders' and students' perceptions of their digital competency and use of digital technology in Dig4VET partner countries' organisations (VET schools). As well, it intented to report about the use of SELFIE tool for a need analysis purpose. As the SELFIE tool survey was conducted during the Covid-19 pandemic time (2020-2021), at the same time it covers an overview on VET distance and digital learning during the virus outbreak. This report also gives an overview of digital tools and technologies available for use in VET and WBL teaching and learning.

On the grounds of the conducted surveys, one important practical aim was to get a quick and up-to-date overview of the participating organisations' staff's digital competences, to develop a joint training programme for a group of VET school teachers during this project. The teachers were intended to be trained during the project in two joint staff training periods. After the training teachers were expected to implement the skills learned to the national level in their own organisations. For example, after the training VET schools' teachers were asked to provide examples of using digital tools in their different vocational fields and organised master classes at their schools.

Study Context

The needs analysis includes results of SELFIE survey reviews in three partner countries: Latvia, Lithuania and Portugal. The partner VET school organisations from these countries formed the main piloting ground and presented the focus groups in Dig4VET training. The VET schools from Latvia (Rīgas Mākslas un Mediju tehnikums), Lithuania (Vilnius Car Mechanics and Business School) and Portugal

(ETAP – Escola Profissional) represented different VET programs and carried out their self-evaluation with SELFIE tool. According to the focus groups categorised in SELFIE tool, they conducted the SELFIE based needs analysis from the perspective of three profiles: VET teachers, school leaders and students. In the VET teachers profile the participants are comprehended to represent also VET tutors, trainers or mentors. All the profiles shared their existing experience in use of digital tools, as well as their experience and results of the period of distance/digital learning during the COVID-19 pandemic in spring 2020.

Methods and Data Collection

The needs analysis survey was conducted between the end of December 2020 – February 2021. The data were collected mainly via SELFIE tool and additionally by a tailored Survey of tools questionnaire. During the project there were also collected some qualitative data, such as free feedback from the use of the surveys and training. The Finnish partners led all the need analysis and SELFIE surveys and the Dig4VET project staff from Latvia, Lithuania and Portugal provided the practical survey procedures in their own countries. The project staff prepared the local SELFIE questionnaire to include the same question patterns and additional questions as jointly decided in the Dig4VET-project with the aid of Finnish partners. The project staff in each three countries conducted the surveys and collected the SELFIE reports in their participating vocational school organisations and sent the SELFIE school reports in pdf-format to the Finnish partners for the further need analysis.

SELFIE – Self-Reflection Tool on Effective Learning

The need analysis was primarily based on the SELFIE questionnaire. SELFIE, a self-reflection tool for schools' digital capacity, is based on the European commissions' DigCompOrg framework (see https://education.ec.europa.eu/selfie). SELFIE helps schools systematically exploit and reflect the opportunities that digital technologies can offer for them. SELFIE enables the school community to reflect their current digital capacity collectively. It focuses on improving students, professionals and organisational learning. It also provides a common and consistent language for

discussion, development and implementation of policies and practices at the European level (Bocconi, Panesi & Panagiotis, 2020).

SELFIE is easy to conduct online and available on the European Comissions' website for free in all EU official languages (see https://education.ec.europa.eu/selfie). The views of teachers school leaders and students are gathered by using short statements and questions with a simple 1-5 answer scale. It takes approximately 20 minutes to complete the survey. Every school can also customise the tool to suit their unique needs. Schools can select and add questions and statements that match the needs and context of their school. Each school that provides the SELFIE-questionnaire receives a detailed, tailor-made and visualised report (called the SELFIE School Report). The SELFIE assessment could also be provided periodically to help the school to gauge their progress.

SELFIE gathers the answers anonymously and data is secure. The data is for the school only, no personal data is collected. It is not possible for other organisations to track the answers for an individual school or participant. Each school owns its' SELFIE report, which is not shared with others unless the school chooses to do so. SELFIE is hosted on a server owned and managed by the European Commission. All the data is gathered according to the Commission's data processing rules and rules for SELFIES's data and privacy (see https://education.ec.europa.eu/selfie/data-and-privacy).

SELFIE has a strong basis in research on promoting effective digital-age learning (Kampylis, Punie & Devine, 2015). School leaders, teachers, students, policy makers from across Europe have been developing and researchers have also validated it (Castaño-Munoz, Costa, Hippe, & Kampylis, 2018; Costa, Castaño-Munoz, & Kampylis, 2020). 5 000 staff and students have given input to the early design of the tool, 67 000 people from 650 schools across Europe (Belgium, Cyprus, Denmark, Estonia, Finland, Greece, Ireland, Italy, Malta, Spain, UK, and Georgia, Russia and Serbia) took part in the pilot test in 2017. Today it has been used by over 22 000 schools in 87 countries (see the continuously updated information on https://schools-go-digital.jrc.ec.europa.eu/).

Tailored SELFIE Questionnaire for Dig4VET

Overall, the SELFIE tool used in this need analysis survey included 57 existing items, and 10 tailored additional items. The existing SELFIE tool items focus on digital competences in eight theme areas that are presented in more details next.

A) Leadership

Items in leadership area concern: digital strategy, strategy development with teachers, new ways of teaching, time to explore digital teaching, copyright and licensing rules, involving companies in strategy. (e.g. "In our school, I have time to explore how to improve teaching with digital technologies.")

B) Collaboration and networking

Items in collaboration and networking area include: progress review, discussion on the use of technology, partnership, synergies for remote teaching and learning. (e.g. "In our school, we collaborate with other schools or organisations to support the use of digital technologies.")

C) Infrastructure and equipment

Items in the infrastructure and equipment area include: infrastructure supports, digital devices to use for teaching, internet access, technical support, data protection, digital devices for learning, devices for students. It also includes items about measures to identify challenges and support to address challenges, and items about bring your own device use, physical spaces, assistive technologies, online libraries/repositories and database of training opportunities. (e.g. "In our school, there are school owned and managed portable devices that students can take home when needed." or " In our school, students have access to a database of in-company training opportunities.")

D) Continuing professional development

Continuing professional development (CPD) area comprises items in: CPD needs, participation in CPD, sharing experiences, CPD opportunities (e.g. "Our teachers have opportunities to participate in CPD for teaching and learning with digital technologies.")

E) Pedagogy: supports and resources

This pedagogy area focus on supports and resources, and includes items in: online educational resources, creating digital resources, using virtual learning environments, communicating with the school community, open educational resources (e.g. "Our teachers use virtual learning environments with students." or "Our teachers create digital resources to support their teaching.")

F) Pedagogy: implementation in the classroom

The pedagogy area called implementation in the classroom area has items of concern: tailoring to students' needs in school, fostering creativity, engaging students, student collaboration, cross-curricular projects and career guidance. (e.g. "Our teachers use digital technologies to tailor their teaching to students' individual needs." or "Our teachers engage students in using digital technologies for cross-curricular projects.")

G) Assessment practices and assessing skills

Assessment practices and assessing skills area concludes items in: timely feedback, self-reflection on learning, feedback to other students, digital assessment, documenting learning, using data to improve learning and valuing skills developed outside school. (e.g. "Our teachers use digital technologies to enable students to reflect on their own learning in our school." or "Our teachers use digital technologies to enable students to provide feedback on other students' work.")

H) Student digital competences

Student digital competences area items comprise: safe behaviour, responsible behaviour, checking quality of information, giving credit to others' work, creating digital content, creating digital content, digital skills across subjects, learning coding or programming and learning to solve technical problems. (e.g. "In our school, students learn coding or programming.")

Additional Custom Questions

In Dig4VET-project, the tailored 10 additional questions focus on work-based settings. The items included questions about: 1) computers or mobile devices to

use, 2) WBL tutors use digital technologies for teaching/supervision, 3) WBL tutors use digital technologies for guidance and to interact with learners, 4) WBL tutors use digital technologies to teach skills, 5) WBL tutors instruct students to use digital technologies to document their expertise and competences achieved, 6) WBL tutors use digital technologies for assessment and to provide feedback, 7) Teachers enable students to use digital technologies used in working life, 8) Digital technologies have helped to develop guidance partnership with working life, 9) Students use of digital technologies to plan and monitor their own learning, 10) Digital technologies have supported students in achieving learning objectives during the pandemic.

Survey of Tools Questionnaire

To gain more detailed information about the digital technology tools that school personnel in DIG4VET partner countries' (in VET organisations) use, we tailored a Survey of tools questionnaire. It included questions about tools and applications the VET schools use. For example the participants were asked to choose the tools they use in their workplace from the list of technological equipments (e.g. portable laptop, tablet, smartphone, 360 camera, 3Dprinter, virtual reality technology, simulation technology), Cloud services (e.g. Google Drive, DropBox, OneDrive), social media applications (e.g. Facebook, LinkedIn, Instagram, Youtube, Google Drive, One Drive, WhatsApp) or Online platform for teaching/counselling (e.g. Zoom, Teams, Skype, Google Hangout, Meet, Adobe Connect). There were altogether 29 items about technologies, applications or other digital learning tools in this survey.

Data Analysis

The main analysis is based on SELFIE School Reports that the SELFIE tool provides. The average numbers were found the most appropriate way to collect results together from the returned SELFIE reports. There was no access to the original SELFIE School Reports database due to make further and more detailed quantitative analysis (without bias). Respondents in SELFIE used five-point scale averages, ranging from low (1) to high (5). The emphasis in analysis was in high ratings (strengths), low ratings (weaknesses) and notable ranges between values. As instructed by the EC's Selfie team, SELFIE is not meant to compare schools

(see https://education.ec.europa.eu/selfie/resources). To honour this guideline, the data is not presented by schools or countries and there are no comparisons made between schools and countries in this analysis. Yet, some single figures are chosen to demonstrate the analysis process and present examples of how averages were gathered together by the countries.

Due to help to interpret and discuss average values in a more detailed manner, a modified DigCompEdu frameworks' proficiency level scale was implemented to assist the analysis of the SELFIE results for this need analysis purpose. (see Figure 4) (see https://ec.europa.eu/jrc/en/digcompedu/framework/proficiency-levels).

FIGURE 4. Designed codes combined with DigCompEdu proficiency level ·scale to assist the interpretation of results. Click to open in bigger size.

Results

Participants

Altogether 219 respondents participated in the SELFIE study (Latvia n = 124, Lithuania n = 63, Portugal n = 32). There were 13 leaders, 47 teachers and 159 students who took part in the SELFIE survey (see Figure 5). The response rates were Latvia 57.7 % (N= 215), Lithuania 78.8 % (N=80), Portugal 20.4 %, N=157).

Additionally 83 participants took part in Survey of tools ·survey (Latvia n = 27, Lithuania n = 44, Portugal n = 12).
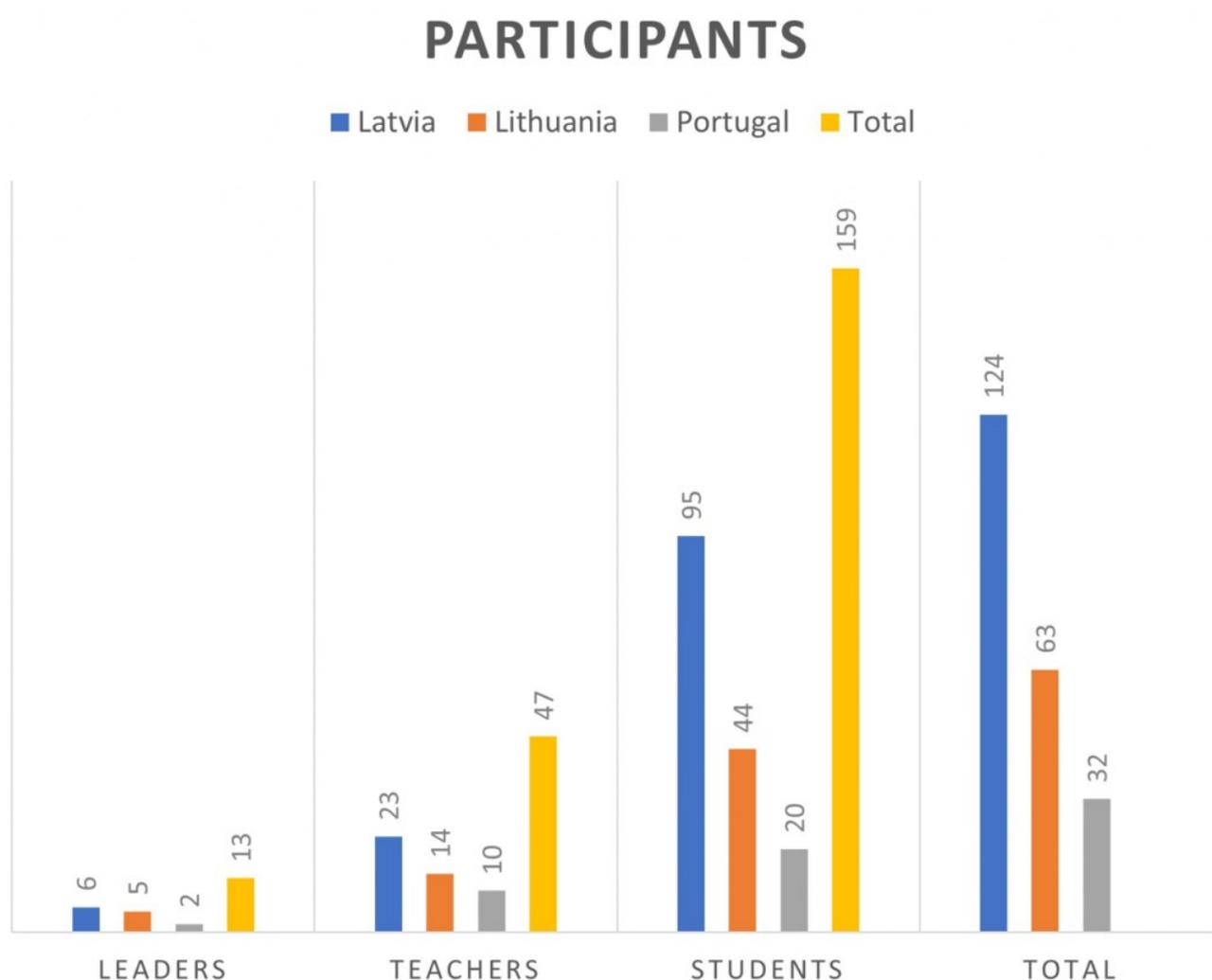
PARTICIPANTS

FIGURE 5. Participants by profiles and countries in SELFIE survey.

Overall the results indicated that on average all profiles showed at least good or moderate (3.1–4.6) competence levels in all digital competency areas (see Figure 6). In general results showed that the high competence levels were gained especially in pedagogy: supports and resources ·area (3.5–4.6). Overall the lowest competences showed up in leadership (3.1–3.6). It is important to bear in mind that all in all there did not emerge any remarkably low competence levels in any assessed area of the competence. However, the more detailed analysis revealed some fine·grained differences and also similarities between profiles and competence areas.

	TEACHERS	range	SCHOOL LEADERS	range	STUDENTS	range	Range all
Leadership	**3,4-3,5**	0,1	**3,1** - 3,6	0,5			0,5
Collaboration and Networking	3,7	0	3,6-4,1	0,5	**3,2**-4,0	**0,8**	0,9
Infrastructure and Equipment	3,6-3,8	0,2	3,5-4,0	0,5	**3,2**-3,9	**0,7**	0,8
Continuing Professional Development	**3,4**-4,0	**0,6**	**3,3**- 4,3	1			1
Pedagogy: Supports and Resources	4,1 - **4,3**	0,2	4,2-**4,6**	0,4	3,5-**4,3**	**0,8**	0,8
Pedagogy: Implementation in the classroom	3,9 - **4,2**	0,3	3,7-4,1	0,4	3,5- **4,2**	**0,7**	0,7
Assessment Practices	3,7-4	0,3	3,5-4,1	**0,6**	**3,1**-4,1	1	1
Student Digital Competence	3,7-3,8	0,1	3,8-4,0	0,2	**3,2**-4,0	**0,8**	0,8

FIGURE 6. Averages and ranges in all competence areas, by all countries.

School Leaders

In general school leaders reported the most skillful competences in pedagogy: supports and resources (4.2–4.6) and lowest levels in leadership (3.1–3.6) (See Figures 6 and 7). They assessed the strengths in their organisation were in implementing new ways of teaching, discussion on the use of technology and organising devices and tailoring education to students' needs in school. They reported rather high levels in using virtual learning environments and open online educational resources.

As weaknesses they experienced at first that they do not have enough time to explore digital teaching methods and technologies. They experienced needing more digital skills in planning their digital strategy and involving companies in strategy planning and also using more synergies for remote teaching and learning. They were looking for more databases of training opportunities and participation in continuing professional education. However, the range between school leaders' assessment of their CPD was rather high (3.3–4.3) (see Figures 6 and 9). School leaders also

experienced somewhat lower levels in how they utilise self-reflection in learning, feedback to other students and cross-curricular projects.
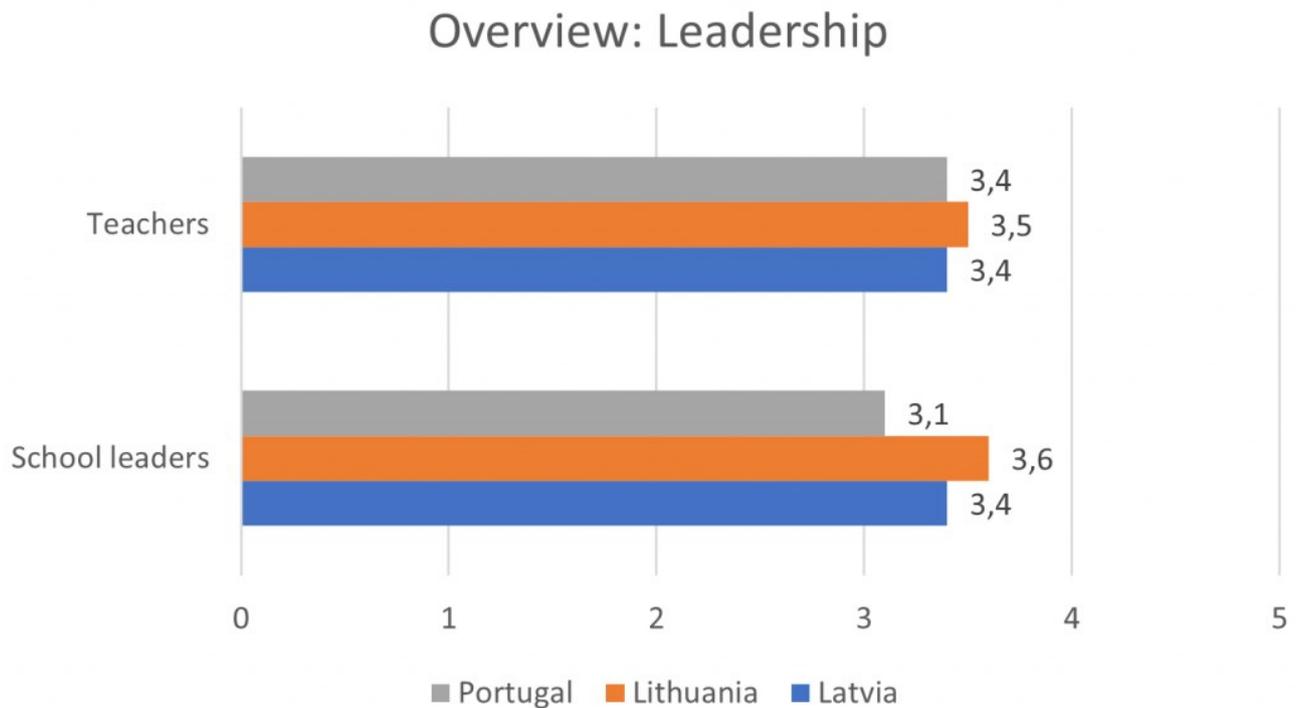
Overview: Leadership

FIGURE 7. Overview of the averages in the leadership area.

Teachers

Similarly as school leaders, teachers showed the highest competences in pedagogy: supports and resources area (4.1–4.3) (Figures 6 and 8). They were most competent in utilising online and open educational resources and communicating digitally with the school community. They experienced that they were capable in using virtual learning environments and utilising internet access. Teachers assessed also as strengths how they know copyright and licensing rules. They reported their competence levels high in discussion on the use of technology and valuing students skills that they have developed outside the school.

Overview: Pedagogy: Supports and Resources

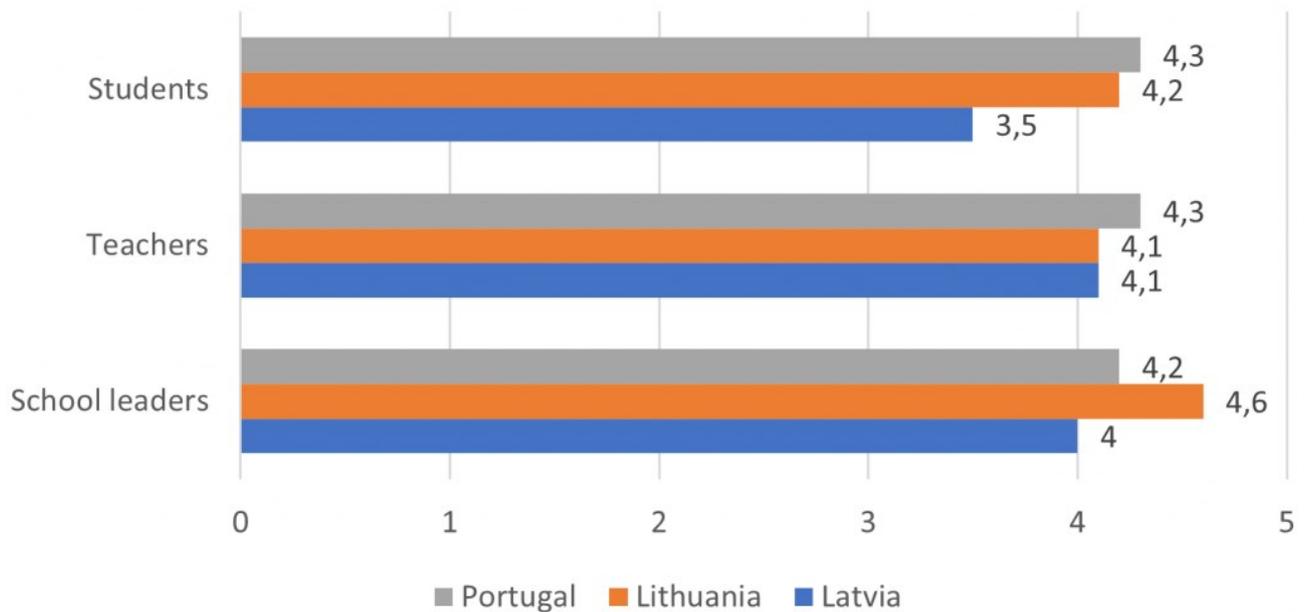|	Portugal	Lithuania	Latvia
Students	4,3	4,2	3,5
Teachers	4,3	4,1	4,1
School leaders	4,2	4,6	4

FIGURE 8. Overview of the averages in the pedagogy: supports and resources area.

Teachers estimated the lowest competence in continuing professional development (CPD) (3.4–4) and leadership (3.4–3.5) (see Figures 6, 7 and 9). For example, they found it more difficult or had a lack of opportunities to participate in CPD concerning teaching and learning with digital technologies. Teachers showed willingness in sharing their teaching experiences in continuing professional development training, but teachers looked for more possibilities to discuss their needs for teaching with digital technologies. As weaknesses teachers reported also how they do not optimally use synergies for remote teaching and learning and how their school is lacking for devices for students. They also found that they don't have enough time to explore digital teaching or create digital resources.

In implementing pedagogy in the classroom teachers (also school leaders) assessed that implementing crosscurricular projects was more difficult than for example fostering students creativity, engaging students, utilising student collaboration or tailoring pedagogy and career guidance to students' needs.
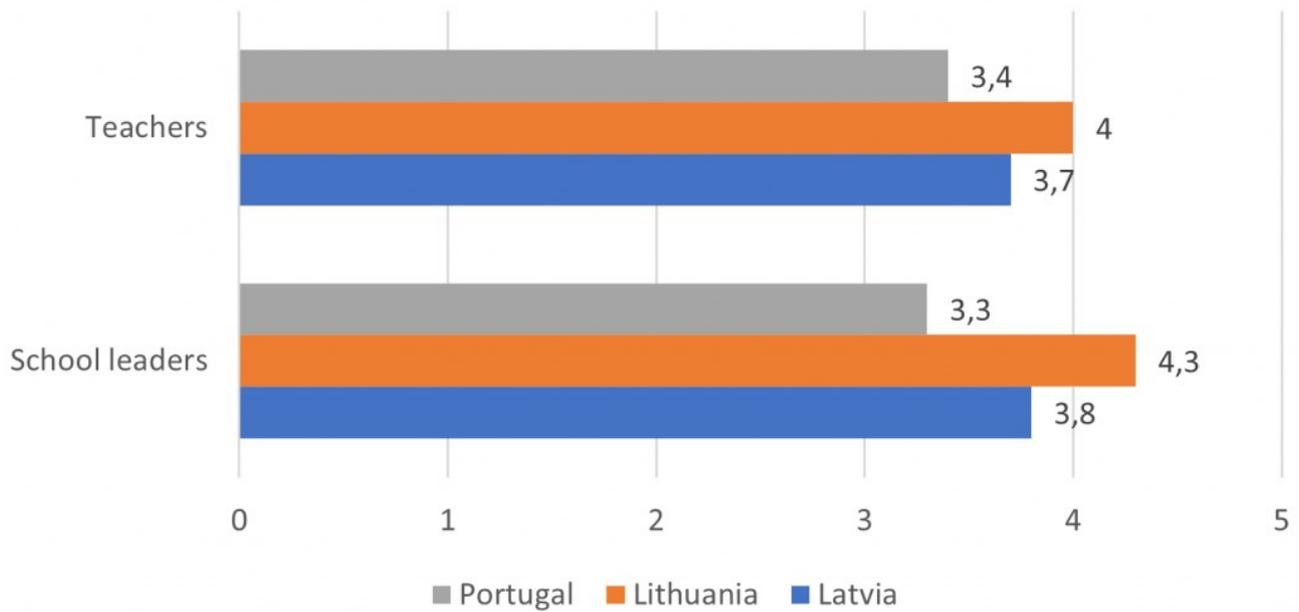
FIGURE 9. Overview of the averages in Continuing Professional Development area.

Students

In general students reported also the highest competences in pedagogy: supports and resources area (3.5–4.3) (e.g. using virtual learning environments with students) (see Figures 6 and 8). Students experienced as their strengths how they can use digital skills across subjects and in cross-curricular projects. They also experienced good competence in using virtual learning environments and having digital devices. They reported high levels in using technology in student collaboration and having discussions about the use of technology.

Students experienced the lowest scores in assessment practices (3.1–4.1), however the range was rather big (see Figures 6 and 10). The assessment practices area relates to measures that schools may consider in order to gradually shift the balance from traditional assessment towards a more comprehensive repertoire of practices. This repertoire could include technology-enabled assessment practices that are student-centred, personalised and authentic. In assessment practices (all profiles) experienced weaker skills especially in how digital technologies were utilised to enable giving feedback to other students.

All profiles, students, school leaders and teachers reported that there weren't always appropriate facilities or devices (e.g. portable) for students to use. Students' and school leaders reported also that the databases of digital training opportunities were sometimes rather poor. The internet access was not a problem for any profiles.

Overview: Assessment Practices

Students: Portugal 3,8; Lithuania 4,1; Latvia 3,1
Teachers: Portugal 4; Lithuania 3,7; Latvia 3,7
School leaders: Portugal 4,1; Lithuania 3,9; Latvia 3,5

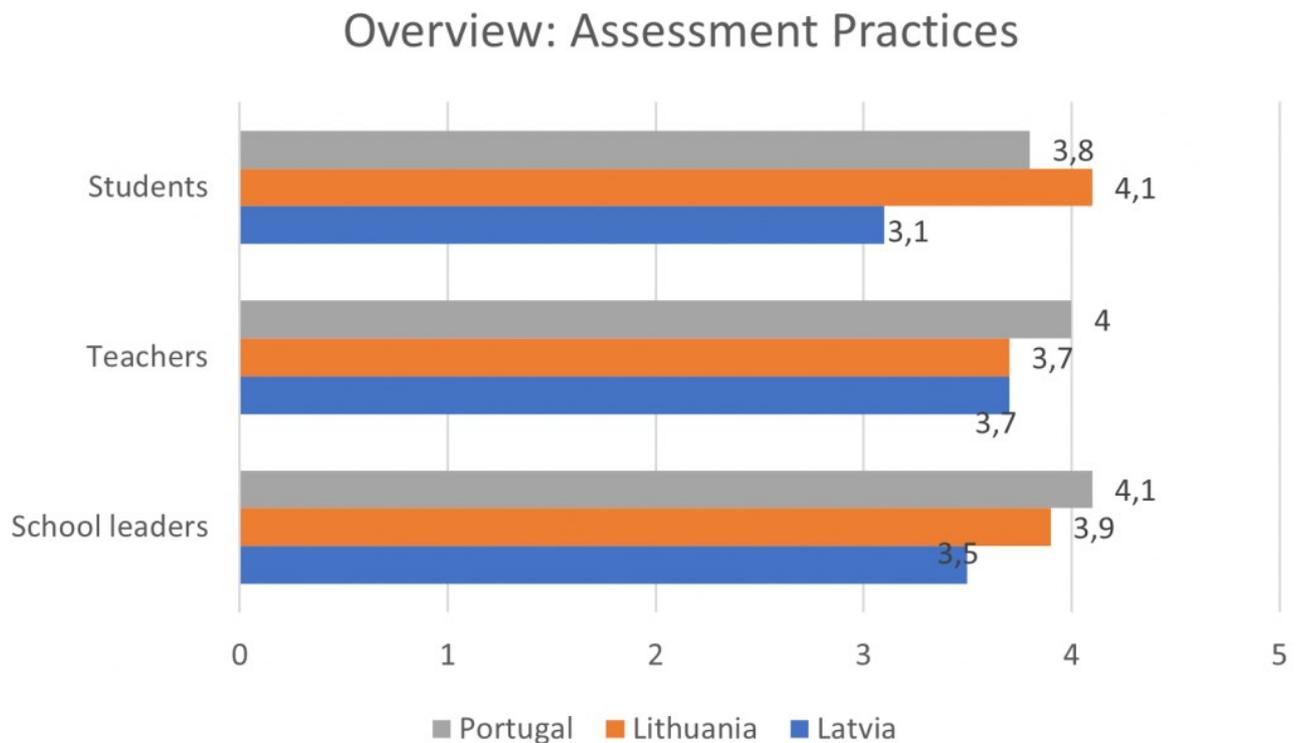Legend: Portugal, Lithuania, Latvia

FIGURE 10. Overview of the averages in the assessment practices area.

By all profiles, students' digital competences (see Figure 11) were found to be good in responsible behaviour, creating digital content, and showing skills for vocational qualification. Students were found skillful in using digital skills across different subjects and in communicating. In all profiles, lower skill levels were reported in students' possibilities to learn coding or programming and learn to solve technical problems.
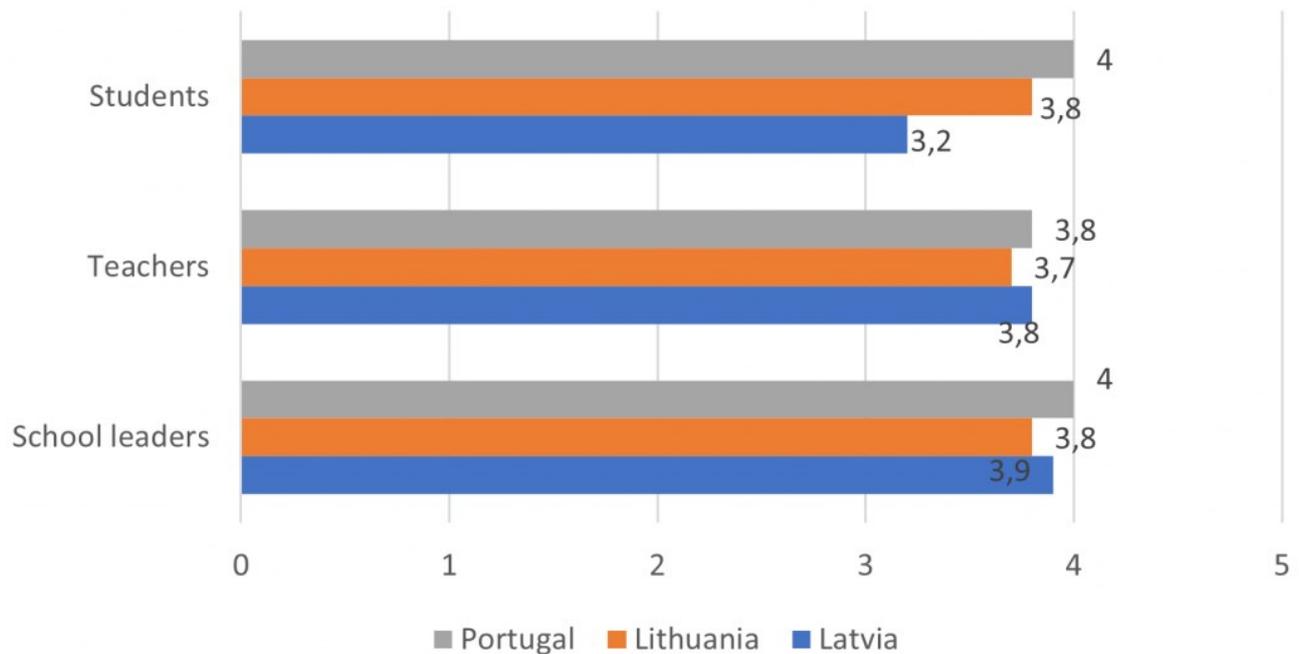
FIGURE 11. Overview of the averages in student digital competence area.

Work-Based Settings

In work-based settings teachers and school leaders reported best abilities in how WBL tutors use digital technologies for guidance and to interact with learners. It was also highly skilled how WBL tutors use digital technologies to teach skills, instruct students to use digital technologies to document their expertise and competences achieved. In-line, teachers enabled students to practise technologies that are used in working life. What was an obvious result is that all profiles agreed that digital technologies have supported students a lot in achieving learning objectives during the pandemic (Figure 12). Also, both teachers and school leaders reported to find more synergies for remote teaching and learning with other schools and organisations.

Digital technologies have supported students in achieving learning objectives during the pandemic

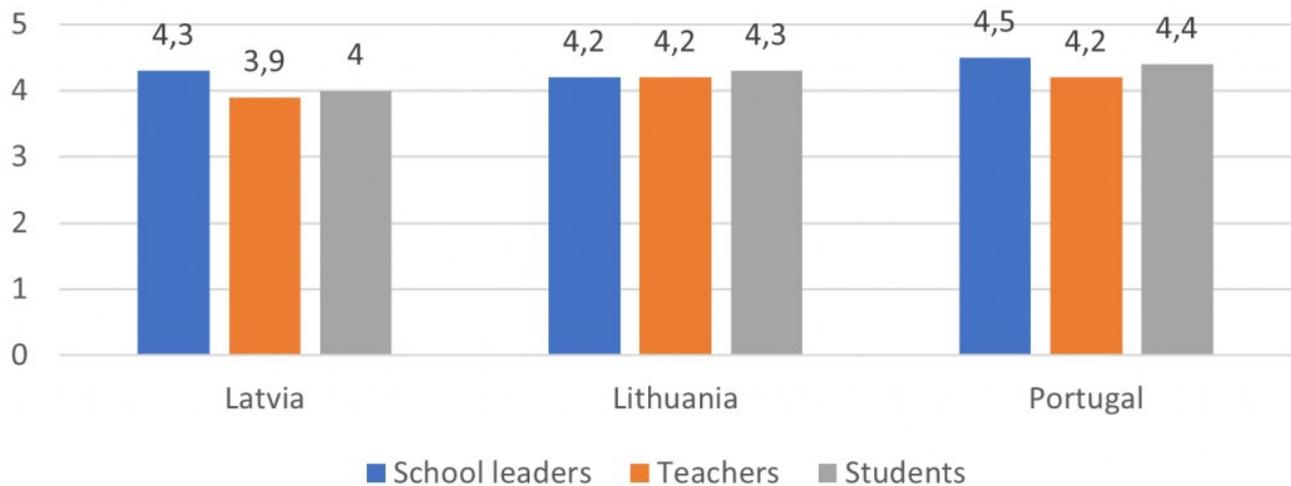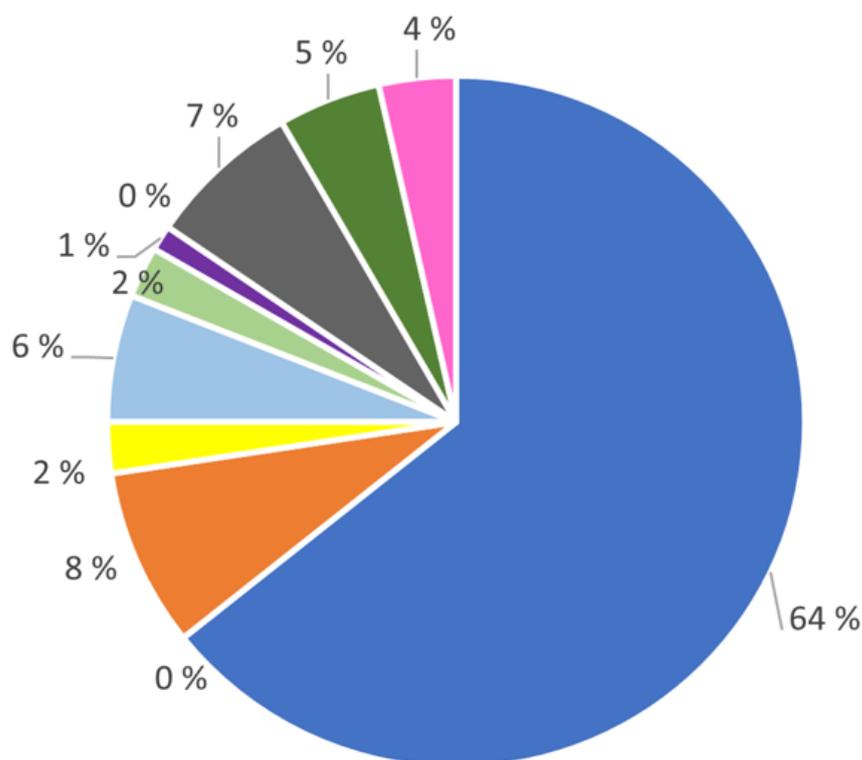|	Latvia	Lithuania	Portugal
School leaders	4,3	4,2	4,5
Teachers	3,9	4,2	4,2
Students	4	4,3	4,4

FIGURE 12. Overview of the averages in how digital technologies have supported students in achieving the learning objectives during the pandemic.

Only slightly weaker skills were reported in the experiences of how digital technologies have helped to develop guidance partnership with working life, and how students use digital technologies to plan and monitor their own learning. As well, the students' possibility to have computers or mobile devices to use in WBL settings was somehow weaker. In addition, students stated that WBL tutors do not often instruct students to use digital technologies (e.g. ePortfolios, learners' blogs) to document their expertise and competences achieved.

Study of Tools Results

Altogether 83 participants took part in Survey of tools -survey (Latvia n = 27, Lithuania n = 44, Portugal n = 12). 64 % of them represented technology sectors, 8 % clothing industry and 7 % hand and art industry (see Figure 13).

The educational field I represent (n=83)

- Technology sectors — 64 %
- Clothing industry — 8 %
- Business administration — 2 %
- Hotel, restaurant and tourism — 6 %
- Social services — 2 %
- Health, sports and wellness — 1 %
- Natural resources — 0 %
- Hand and art Industry — 7 %
- Culture — 5 %
- Visual design and interior design* — 4 %
- Food — 0 %

Legend:
- Technology sectors
- Clothing industry
- Hotel, restaurant and tourism
- Health, sports and wellness
- Hand and art Industry
- Visual design and interior design*
- Food
- Business administration
- Social services
- Natural resources
- Culture

FIGURE 13. Participants' educational field in the Survey of tools -survey.

The results of this study revealed that the most used tools and apps they had and used were online platforms for teaching/counselling (89 %) (e.g. Teams, Zoom), own smartphones (81 %), digital learning environments (80 %), YouTube (80 %), desktop computers from workplace (75 %) and cloud services (7 %) (e.g. Google Drive) and Facebook (74 %) (see Table 2).

TABLE 2. The most typical tools and apps reported to have in use, or lack of in work-based settings.

Yes when ever I need	No, but I would need
Online platform for teaching/counselling (89 %)	Tablet from workplace (45 %)
Own smartphone (81 %)	Simulation technology (38 %)
Digital learning environment (80 %)	Photo editor facility (33 %)
YouTube (80 %)	3D-printer (32 %)
Desktop computer from workplace (75 %)	Virtual reality technology (30 %)
Cloud services (74 %)	A portable laptop from workplace (28 %)
Facebook (74 %)	Other 3D-technology (28 %)
Own desktop or laptop (72 %)	360 camera (23 %)
Intranet (70 %)	Smartphone from workplace (27 %)
Student register database (57 %)	Simulator (27 %)
Mobile apps for teaching/counselling (54 %)	Videocamera (23 %)
A portable laptop from workplace (51 %)	Camera (23 %)
	Own tabler (22 %)
	Wearable technology (21 %)

What participants needed most, but didn't have were tablets from the workplace (45 %), simulation technology (38 %), photo editor facilities (33 %), 3D-printers (32 %) and virtual reality technology (30 %). A synopsis of all the most important tools and applications that participants had proficiently in their use (Yes, when ever I need), or on the other hand, what they would need more (No, but I would need), is presented in table 2.

Supplementary Qualitative Results

During the joint Dig4VET project meetings and training periods the project staff and participating teachers were asked to write free feedback (Padlet) about the

conducted SELFIE survey (N=8) and their professional development during digital pedagogical training (N=24). In qualitative feedback the SELFIE was considered good in layout and structure. Most of the participants would recommend the use of SELFIE to a colleague very likely or somewhat likely. On a scale from 4 to 10 they would on average give a grade of 8.5. SELFIE was regarded as well understandable. However, participants would add more flexibility in how to make changes when tailoring the questionnaire's additional questions and amendments. What else they would improve in SELFIE, were propositions about updating the SELFIE with new approaches, methods and solutions (e.g. specify pandemic time). Participants also found that there should be a shortened version of the SELFIE and the filling instructions should be simplified. (Participant: "Instructions were complicated and too long.")

Typically the Dig4VET professional digital pedagogical training was found to improve understanding about the framework of digital competences. In general participants experienced that it helped to improve their professional development, practical skills of using digital tools for teaching, learning, management and collaboration. For instance they had learnt about different kinds of interactive quiz tools and co-working platforms (e.g. Kahoot, Lucid charts, Quizizz, Socrative, Menti, Miro, Canva, Slido). The training was found partly interactive, however the participants were suggesting more collaboration and teamwork with others during the training. They wished for deep pedagogical reasoning and teamwork on the topics each participant was interested in. Participants also wanted to have more indepth demonstrations of digital teaching methods and platforms to use in tutoring the learning processes.

In particular, participants found it interesting and useful to learn about how to build and develop assessing and validation in VET schools with Digital Open Badges. From a side of the finnish educators, the Dig4VET digital pedagogical training included also a tailored Open Badge, called "Self-Assessment of Digital Pedagogical Competence" (see Figure 14).

SELF-ASSESSMENT OF DIGITAL PEDAGOGICAL COMPETENCE

OAMK Oamk, Ammatillinen opettajakorkeakoulu
amok@oamk.fi

Oulun Ammattikorkeakoulu Oy

Tags: Assessment, Self-reflection

The receiver of this badge has participated in digital pedagogical training, set personal goals and assessed their gained competence in relation to the training.

This badge was created in Erasmus KA2 -project Dig4VET - Digital Tools for Learning and Validation in VET and WBL: Training Program for VET Teachers, Trainers and Mentors.

LEARNING OBJECTIVES

- You make self-assessment of your level of digital pedagogical competence and set personal learning goals for the training.
- After the training you reflect your development in relation to set personal goals.

CRITERIA

- You are able identify your strengths and needs for development in digital pedagogical competence. You set realistic personal goals in relation to the training content.
- You are able to explain how your digital pedagogical competence has improved in relation to set goals for the training. You give at least one example of your learning, gained skill or knowledge.

COMPETENCE DEMONSTRATION

1. Describe your learning goals for the training.
2. Compare your level of digital pedagogical competence before and after the training. Give one example of a gained skill or knowledge.

FIGURE 14. Open Badge "Self-Assessment of Digital Pedagogical Competence" tailored for Dig4VET digital pedagogical training. Click to open in bigger size.

It was voluntary for participants to exhibit their gained digital pedagogical competence during the training, apply and gain a digital Open Badge for it. According to the evaluated digital Badges participants perceived that they had improved their digital skills and confidence in using digital tools. They described they have had time to explore digital pedagogy during the training. They were especially pleased with how they had learnt to engage students in learning and make lessons pedagogically more interesting and motivating with the aid of technology.

Summary of the Needs Analysis

The need analysis was conducted in the beginning of the year 2021, during the Covid -19 pandemic outbreak. The aim of the need analysis was to gain overview of school leaders', teachers' and students' perceptions of their digital competence and use of digital technology in participating organisations, in three countries: Latvia, Lithuania and Portugal. The SELFIE provided essential data for need analysis and the data were collected mainly via SELFIE tool that is run by the European commission. In general, the findings showed positive signals about VET teachers', trainers', tutors and mentors' digital pedagogical skills, use of the technology and online learning environments for teaching and existence of basic digital infrastructure in schools. They all obtained rather high scores, but some slightly weaker areas and things to develop were also revealed.

Overall school leaders reported the most skillful competences in pedagogy (supports and resources) and lowest levels in leadership area. They needed more digital skills especially in planning their digital strategy. In addition, they experienced that they do not have enough time to explore digital teaching methods and technologies. Similarly, teachers and students showed the highest competences in pedagogy area concerning supports and resources. They were most competent in utilising online and open educational resources, virtual learning environments and communicating digitally with the school community. Only the ability to create digital resources was found somehow more difficult. In implementing pedagogy in the classroom especially teachers and school leaders assessed that implementing cross-curricular projects was more difficult than for example implementing pedagogy to meet students' needs. Teachers estimated the weakest competence in continuing professional education and leadership. For example, they found it difficult or had a lack of opportunities to participate in CPD about teaching and learning with digital technologies. They looked for more possibilities to discuss their particular needs for teaching with digital technologies. This confirms the similar findings that having possibilities (training, time, professional networks) to share experiences is seen as a key aspect for effective integration of digital technologies in

teaching practices and to gain professional development (Castaño-Muñoz, Weikert Garcia et al., 2021).

In all profiles, students' digital competences were found good in their responsible behaviour, creating digital content, showing skills for vocational qualification, using digital skills across different subjects and in communicating. Students' and school leaders reported that the databases about digital training opportunities was their weakness area. All profiles also reported that there weren't always appropriate facilities (e.g., devices) at school for students to use. Challenges were also reported in students' possibilities to learn coding or programming and to learn to solve technical problems.

Noteworthy, by students, the lowest levels were reported in assessment practices. This related to technology enabled assessment practices that should be student-centred, personalised, and authentic and how digital technologies could be utilised to give feedback to other students. In line with earlier SELFIE studies (Castaño-Muñoz & Weikert Garcia et al. 2021), this finding highlights the still existing concern or lack of collaborative and student-centred uses of digital technologies and their application in innovative assessment procedures. To promote this, teachers, tutors and mentors should consciously enhance students' self-regulated learning skills (e.g., motivation regulation) which are regarded as integral, particularly in digital learning environments (Mäenpää, 2021).

In work-based learning settings, WBL tutors appeared to use digital technologies for guidance smoothly and to interact with learners well. WBL tutors use digital technologies to teach skills and enable students to practise digital technologies used in working life. Some challenges were reported in how digital technologies were utilised to create partnership with working life, to plan, monitor and assess students' own learning or to document their expertise and competences achieved (e.g., portfolios, learners' blogs). All profiles agreed that digital technologies have massively supported students in achieving learning objectives during the pandemic.

SELFIE based need analysis provides a possibility to share ideas and discuss with different countries about their VET school's digital capacity. However, it has some limitations too. On the grounds of the SELFIE reports it was difficult to display the

data together with other organisations. Even if the SELFIE results are not meant to be compared it would be beneficial if the tool was able to collect the data together from several schools to a one anonymous report in joint projects like Dig4VET. A major limitation of the current study derives from the limited sample size of participants in all participating countries and a very restricted sample number of educational organisations. Despite the limitations, the need analysis sheds light on issues that should be addressed in developing the digital capacity and recommendations for vocational schools. It should be also noted that the report will cover only partner countries, but information gathering approaches can be continued regarding other EU countries.

References

Bocconi, S., Panesi, S. & Kampylis, P. 2020. Fostering the Digital Competence of Schools: Piloting SELFIE in the Italian Education Context. IEEE Revista Iberoamericana de Tecnologias del Aprendizaje 15 (4), 417–425. https://doi.org/10.1109/RITA.2020.3033228

Castaño-Muñoz, J., Costa, P., Hippe, R. & Kampylis, P. 2018. Within-school differences in the views on the use of digital technologies in Europe: evidence from the SELFIE tool. Edulearn18 Proceedings. https://doi.org/10.21125/edulearn.2018.2528

Castaño Muñoz, J., Weikert Garcia, L. & Herrero Rámila, C. 2021. Analysing the digital capacity of Spanish schools using SELFIE: an early diagnosis for a better response to COVID and beyond. Publications Office of the European Union, Luxembourg. https://data.europa.eu/doi/10.2760/947402

Costa, P., Castaño-Munoz, J. & Kampylis, P. 2020. Capturing schools' digital capacity: Psychometric analyses of the selfie self-reflection tool. Computers & Education 162, 104080. https://doi.org/10.1016/j.compedu.2020.104080

Mäenpää, K. 2021. Motivation regulation and study well-being during nurse education studies. Doctoral dissertation. University of Oulu. http://urn.fi/urn:isbn:9789526231532

METATIEDOT

Tiivistelmä: This training needs analysis presents the survey results of use of digital technologies in VET, in Dig4VET partner countries Latvia, Lithuania and Portugal. The particular focus is on digital competences of VET teachers, trainers, WBL tutors/mentors in the field of education technologies. The need analysis includes their perceptions about their digital competences. It comprises their understanding of the potential of digital tools in learning, teaching, assessment, validation, awareness of digital policies and their perception of training needs. Consistently, it includes the perceptions of VET students and VET school managers. The need analysis also covers an overview of digital tools, education technologies and apps relevant and useful for VET and WBL settings. As well, it offers an overview of how VET schools, VET teachers and school leaders in partner countries were prepared and how they succeeded during the time of Covid-19 pandemic outbreak.

Advanced Continuous Professional Development – Lessons Learned in Finland

Brauer Sanna, Kotimäki Erja, Korkala Hannu

This report is an information resource regarding digital competences of VET teachers, trainers, mentors, and it will be useful for VET policy and decision makers, VET school management, researchers, and particularly for VET teacher trainers. The long-term experience of Finns as developers of digital pedagogical education opens up a point of reference at which this network can continue to work on higher quality content and development of the training program. In the Dig4VET project, Oulu University of Applied Sciences, School of Professional Teacher Education had an excellent viewpoint to look at the recognised training needs and the training packages planned and implemented during the initiative. In the following chapter we will discuss our review results in relation to recent recommendations, research findings and teacher trainees' experiences. At the same time, we aim to provide guidelines for the development of future training programs and open education resources, too.

Vocational Teacher Training and CPD Practices in Finland

Northernmost in Europe, the focus has been already over a decade on the nationwide development of VET teachers' competences in digital operating environments using a variety of tools, producing and selecting digital material and becoming familiar with the operating practices of the digital settings (Kullaslahti et al., 2019). The Finnish government embarked on a reform of the entire VET in 2015, and the notable change in legislation came into force in January 2018. The main aims of the change were to adopt a new customer-oriented and demand-driven approach to educational provision and to meet the needs of the world of work

(Kukkonen & Raudasoja, 2018; Ministry of Education and Culture, MINEDU, 2018; Rintala et al., 2018; Räisänen & Goman, 2017). The new model emphasising individual learning paths has transformed teachership, use of learning environments and resulted in more selfdirected learning (Rintala et al., 2018). In Finland, the reform in VET has led the way towards the evident change in all educational sectors (Korhonen et al., 2020).

Finnish VET teachers are required to hold an appropriate degree from a university or university of applied sciences with at least three years of work experience in a field that is relevant to the position and the teachers' pedagogical studies. Vocational teacher training is organised by five Schools of Professional Teacher Education located in different parts of the country. Additionally, training is provided in Swedish. Vocational teacher training is intended for applicants who work or intend to work as a teacher at Universities of Applied Sciences and institutions of vocational education. The education offers a general pedagogical qualification for teaching at all educational levels (see Studyinfo.fi).

The aim of vocational teacher programmes is to provide the students with

- the knowledge and skills needed in the guidance of the learning process of individual students
- the competences to advance in their own teaching area, taking into account the development of working life and professions.

The studies include the basics of educational sciences, vocational pedagogy, and a teaching practice, among other optional course offerings. The 60 ECTS credits for a teacher's qualification provide a strong foundation for working in competence-based vocational education and emphasise the importance of up-to-date digital pedagogical competence. However, the skills and knowledge acquired during the professional teacher training are insufficient for a vocational teacher's entire career (Brauer et al., 2018). Participation in in-service training is recommended but not mandatory and, for example, a national register of individual competence is not kept. The great autonomy of Finnish teachers reflects a belief in their responsibility to enhance their own competences, yet teachers rarely have a personal development plan (Minedu, 2016).

In vocational teacher education, identification and recognition of competences is of primary importance, a reflective process that supports the emergence of professional identity while helping to deepen already-acquired competences (Kolkka & Karjalainen, 2013). The competence-based approach relates to vocational teacher training and CPD not only through validation of competences, but also through evolving pedagogical choices, digital learning solutions and evaluation processes. These features help students to perceive the competence-based approach as a concept and practice grounded in personal experience (Brauer, 2019). Today, VET teacher's knowledge and experience of competence-based approach is one of the key competences in training future professionals (Saari et al., 2021).

Competence-Based Approach as the Development Principle

After the reform of Finland's vocational education and training sector, there arose an urgent need to focus on vocational teachers' new competences. Two Finnish Schools of Professional Teacher Education sought to restructure the CPD to design competence-based professional development programmes that would support VET teachers in building digital pedagogical skills and knowledge. As a result, novel approaches such as digital open badges and badge-driven learning were introduced (Brauer, 2019; Korhonen et al., 2020).

Digital open badges offer novel possibilities in identifying and recognising digital pedagogical competences independent of how they were acquired (Brauer, 2019). Open badges represent a type of microcredentials that offers to inform and improve learning outcomes, but also to scaffold and assess learning. Further, badges permit efficient use of learning analytics and inspiring gamification that supports consistent competence development as a continuum (Brauer, 2020). Moreover, the pedagogical design encourages participants to apply acquired skills and knowledge immediately in practice (Brauer et al., 2018). In teacher training, this means that for every badge earned, a VET teacher has developed and implemented one new learning solution in their work in practice. The numbers speak for themselves. More than 30,000 competence-based badges have been awarded to Finnish VET teachers

in the "Learning Online" program. This means that more than 30,000 times a teacher has developed their learning material, teaching, guidance or even group interactions in practice. The original goal of the "Learning Online" project was to establish a competence-based professional development programme to inform and improve VET teachers' digital pedagogical skills with some inspiring tools of gamification. The Learning Online concept was built during an OsaOppi-project funded by the Finnish National Agency for Education in 2014 and has been in development ever since. The Learning Online aims to support VET teachers in applying new technologies and strategies to teaching and learning in online, hybrid and face-to-face learning environments (Brauer et al., 2017). The program exceeded all intended learning outcomes already in the first year of implementation both in terms of quantity and quality. In 2022, the educational setting is updated to compliment all aspects of DigCompEdu and nationally recognised digital pedagogical professional needs.

All key success factors of Learning Online revolve around the concept of competence and competence-based approach in VET practices. In practice, digital open badges offer to inform the following (Brauer, 2019, p. 71–72):

1. identification of individual competences needed in working life,
2. independent self-evaluation of existing competences,
3. choice to customise studies, alternative, flexible study options to follow.

The criteria-based badge constellation provides a visual representation of layered badges, metabadges and the final badges of mastery (Brauer et al., 2017). The design of the constellation and families of connected badges relates to the intended learning outcomes defined in the curricula or course plan, aiming to encourage desirable behaviours by prompting and rewarding the learner for work towards required competences (Brauer et al., 2018; Brauer et al., 2017; Gamrat et al., 2016; Reid et al., 2015). Stacked and layered badges provide practical visual aids to learners (Brauer, Korhonen, & Siklander, 2019; Smith, 2015) seeking to self-evaluate existing competences and plan studies ahead; the clear and consistent badge criteria tie the learner's guidebook together, suggesting how to proceed towards intended learning outcomes (Brauer, Korhonen, & Siklander, 2019). This pragmatic approach has scientifically proven to motivate VET teachers in their CPD.

However, seamless badge design is not enough to achieve excellent learning outcomes, also flexible study options and just-in time scaffolding is on demand. In general, digital open badge-driven learning seems to enhance vocational teachers' perceptions of the competence-based approach in practice (Brauer, 2019).

Easy Access Digital Tools for Learning and Open Recognition

During the current virus outbreak (2020–2021), most schools were required to transform learning in an online or distance regime. Some of the settings were implemented partially online, others to full extent. For example, theoretical subjects were provided online, and practical tasks were organised at the school face to face. Another option was to schedule schoolwork periodically eg., classes worked at school premises on rotation to reduce the number of people in contact. Pre-COVID-19 pandemic studies (e.g., Waheed et al., 2015) already found that autonomous and easy accessibility in online learning environments intrinsically motivates CPD on an individual level. How VET schools, VET teachers and mentors could and should prepare to meet changing situations?

The Dig4VET project sought to broaden understanding of the potential of digital tools in learning, teaching, assessment, validation. The experiences of those who participated in the piloting of the training program and international joint staff training event, reflect a variety of perceptions of training needs in the field of VET. Next, we intend to summarise these experiences to provide an overview of digital tools, education technologies and apps relevant and useful for VET and WBL settings. However, we do not propose individual applications or tools to promote digitalisation in teaching and learning but seek to describe pedagogically sustainable guidelines for future development work.

Given the diversity of VET, the different skills to achieve, the pedagogical models to be applied and, of course, the different teachers and learners, it is obvious that there is a wide range of digital tools to benefit from. The digital pedagogical training should therefore provide a wide range of different digital tools that could be used in both teachers' pre-service and in-service training. The challenge is that learning how

to use digital tools takes a lot of time, and even more so, to understand which pedagogical model is the most appropriate to apply. The teacher training offered must therefore provide clear pedagogical models that allow even beginners to apply these tools in his or her own teaching in the appropriate way. If the tools are used; for instance, only to test the studied data, the results do not describe a student's competence to full extent. A limited number of digital tools, for example, allow reflection and reasoning, which are emphasised by the majority of competence-based pedagogical approaches. Moreover, the concepts related to advancement in digital technologies might seem difficult for "non-digital natives", and the language itself might build a barrier as the tools are usually in English, which requires the user to have good language skills. Easy access digital tools should be prioritised (e.g., sign in by using Google-account), however attention must be paid to issues related to data security and, for example, The EU General Data Protection Regulation (GDPR). It is also noteworthy to consider options for the Open Educational Resources (OER), and licensing that allows educational access (e.g., Creative Commons). Moreover, it is crucial to respect the accessibility regulation (European accessibility act).

International joint staff training events of Erasmus+ projects offer an interesting opportunity to see what kind of digital tools are used in VET in different countries and how different teachers' experiences on digital pedagogical practices are. Given the national characteristics of pre-service teacher education, country-by -country comparisons are challenging to make. However, the need for systematic in-service training is evident. The discussions during the joint staff training emphasised that the manner and formats of in-service training should be based on up-to-date pedagogy that is also applicable in VET. Also, in-service teachers found it satisfactory to achieve something concrete by doing it by themselves and found it helpful to experiment new tools between meetings and then present that experience, the lessons learned, next time. Teachers also appreciate optimal, just-in-time guidance that can be adjusted according to entry level and language skills. In international training, it can sometimes be challenging to follow the performances of others due to the different levels of English language skills of the participants. For that reason too, experimenting and doing it yourself is especially important. The Dig4VET staff training events revealed that the competence-based approach was not

yet familiar to all participants. Competence-based approach as a development principle for pedagogical activities realised in the training as the Dig4VET digital open badge was introduced. In other countries, this emergent concept of open recognition and micro-credentialing was still relatively unknown. However, the model could benefit digital pedagogical training as it guides the demonstration of competence in practice. In addition, clear structures and processes lead to clear and unambiguous linguistic expression when talking about competence objectives, assessment, and evidence of competence.

In digital open badge-driven learning, essential preconditions for learning include also summarising the process, facilitating tasks and supporting the use of learning materials (Salmon, 2011). This kind of home base with easy access learning materials and instructions for the badge application process 24/7 online (Waheed et al., 2015) could support in-service instructors to a great extent. Educational settings should organise learning materials themed according to digital badge management in order to supplement instructional badge criterion (Brauer, 2019). It should be noted that the need for learning materials grows as the studies progress towards more challenging themes and applications. Learning materials are expected to be thorough and provide all required information to apply the pedagogical model and technology related to the topic (Brauer et al., 2017). Advanced search options are appreciated because individual study paths are unlikely to proceed gradually or follow the planned pattern (Brauer, Korhonen & Siklander, 2019). In-service teachers should feel capable, comfortable, and confident using resources independently (Salmon, 2011).

Digital Open Badges as Evidence of Development Actions

VET teachers and WBL tutors should perceive the competence-based approach as a concept and practice grounded in personal experience (Brauer, 2019). The process of competence-based assessment involves ongoing procedures for identifying and recognising skills and knowledge based on standardised criteria for demonstrating required evidence (Brauer, 2019). Here, criteria should be understood as a distinct

tool, with attributes and rules for judgement (Sadler, 2005). From the practical point of view, Kilja (2018) emphasises the necessity for learners to demonstrate the required competences in their working lives. The detailed competence descriptions are needed at different stages of competence demonstration to inform and improve individual performance.

The following questions offer to guide planning the demonstration of competence in digital open badge-driven learning (Brauer, 2019):

1. How to demonstrate competence in practice?
2. How to document the assessment process?
3. How to document the achievement, how to formulate the evidence of competence?

In badge-driven learning (Brauer, 2019) scaffolding is not seen as a stage but an ongoing process that includes peer related activities, such as socialisation within a study group on social media. The badge constellation of competences and recognised stages of the learning process provide different viewpoints and tools for scaffolding. For example, they assure easy access to learning materials, allow self-evaluation of achieved and desirable competences based on the criterion, and promote relevant remediation in accordance with instructional badging. These features allow learners to update their development plan and affect study progress throughout the process. Easy access online environments enhance students' confidence and sense of personal control of studies (Salmon et al., 2010) and this situation motivates them to return for additional badge applications (Brauer, 2019). Meanwhile, digital open badges advocate competence-based assessment and shared expertise in digital environments (Brauer et al., 2018).

Digital open badges offer to advance transparent learning processes, equal and egalitarian assessment, and relevant learning (Brauer, Korhonen, & Siklander, 2019). Public recognition of different competences encourages people to use their knowledge and skills, to see new opportunities and to grow as experts (Halttunen et al., 2014). Also, employers insist on having a clearer understanding of an applicant's abilities before extending an offer of employment (Gauthier, 2020). The option to promote personal expertise within the work community is the most

significant reason for publishing a badge. The value of publicly-shared badges resides in the fact that both the badge earners and their peers can see each other's skill levels in regard to requisite skills set (Abramovich, 2016). Public badges allow peers to recognise others' reputations (Deterding et al., 2011); through badges for instance, people can see who in the community would be able to help with a difficult challenge. The badges seem to promote a sense of community and enhance the experience of inclusion, equality and meaning (Mäki et al., 2015).

Digital Pedagogical Competence — Resilience for the Entire Learning Community

A recent report by the UNESCO-UNEVOC (2022) emphasises that "TVET teaching staff have experienced heavier workloads and higher teaching/training costs, often with little employer support, reducing their motivation to develop their knowledge, skills and competencies to deliver high-quality technology-enhanced distance learning" (p. 31). This transformation emphasises the significance of digital pedagogical competence strengthening the resilience and pedagogical well-being of the entire work community.

UNESCO-UNEVOC trends mapping study points out how rushed transitions to remote working arrangements have led to heavier workloads for VET teachers/trainers. During school closures, teaching staff have been expected to "learn about and apply new tools and technologies to deliver VET, prepare lessons and learning materials in new formats, adapt new teaching methodologies, learn how to manage virtual workspaces and classes, and field student enquiries at all hours, while executing their regular teaching and assessment tasks" (International Labour Organization, ILO, 2020, p. 2; ILO et al., 2021).

In order to increase digital literacy of all citizens, there is a need for long-term development of teachers' digital pedagogical competence that requires strong cooperation between different stakeholders, and strong guidelines for a common European, sustainable VET. The advancement of intelligent technologies should be taken into account in the continuing professional development of competences (Ruhalahti & Kenttä, 2017). Solid research-based foundation is required for high-

level pedagogical development, but the challenges on teacher's daily practices still might occur – as said – practical issues. UNESCO-World Bank survey, for instance, suggests that in some instances the extra costs of work-from-home arrangements amid school have reduced teachers'/trainers' motivation to undergo training and to deliver high-quality distance learning (ILO et al., 2021). Such costs have been borne mainly by teachers/trainers, rather than by educational providers (ILO et al., 2021).

The COVID-19 crisis forced VET providers to close their premises and shift to distance learning in an extremely tight schedule. In Finland, VET providers were successful in implementing this transition and reported that staff and students adopted the increased use of digital and online learning solutions very quickly (Finnish Association for the Development of Vocational Education and Training, AMKE, 2020). In general, the transition to distance learning was easier for some VET providers than others depending on how much they used digital solutions prior to COVID-19 pandemic. A recent report of Finnish practices by the United Nations Educational, Scientific and Cultural Organization, UNESCO (2021) describes the VET providers actions to help teachers and staff in this difficult situation.

The following activities were carried out:

- Setting up additional remote teaching and IT support services for teachers and staff.
- Providing training for staff and students in using digital communication and learning tools (such as Teams).
- Efficient and constant communication about the crisis and new learning arrangements with staff and students.

Now that more than two years have passed since the COVID-19 crisis, VET providers have shown their resilience. Finnish teachers have been able to adapt to the situation and perform extremely well considering the circumstances. However, the successful implementation of distance learning seems to have taken a toll on teachers. More time spent on planning, adopting new digital tools, increased amount of written individual feedback for each student, and continuous communication have all increased the teachers' workload: 54 % of TVET teachers have reported a significant increase, and 33 % a slight increase in their workload

(Finnish Education Evaluation Centre, 2020). These results of Finnish VET teachers are inline with the latest findings of UNESCO-UNEVOC (2022). Still, more complex skills and knowledge are required for the sustainable development of vocational education and training. In the next, final chapter, we seek to build recommendations about awareness-raising needs and potential in digital pedagogical development for VET based on our experiments in the Dig4VET project and in general.

References

Abramovich, S. 2016. Understanding digital badges in higher education through assessment. On the Horizon 24 (1), 126–131.

Brauer, S. 2019. Digital Open Badge-Driven Learning –Competence-based Professional Development for Vocational Teachers. Doctoral dissertation. Lapland University. http://urn.fi/URN:ISBN:978-952-337-110-1

Brauer, S. 2020. Digital Open Badge-Driven Learning – Practical Applications to Support Validation of Prior Learning. In R. Duvekot, A. Karttunen, M. Noack & L. Van den Brande (Eds.) Making Policy Work – Validation of Prior Learning for Education and the Labour Market. Series VPL-Biennale 7, pp. 147–158. European Centre Valuation of Prior Learning & Bertelsmann Stiftung. Houten/Berlin. https://ec-vpl.nl/download/entry/162/

Brauer, S., Kettunen, J. & Hallikainen, V. 2018. "Learning Online" for vocational teachers – visualisation of competence-based-approach in digital open badge-driven learning. The Journal of Professional and Vocational Education: Vocational education and training in the Nordic countries 20 (2), 13–29.

Brauer, S., Korhonen, A-M. & Siklander, P. 2019. Online scaffolding in digital open badge-driven learning. Educational Research 61 (1), 53–69. https://doi.org/10.1080/00131881.2018.1562953

Brauer, S., Ruhalahti, S. & Hallikainen, V. 2018. Digital professional learning triggers: in an online badge driven process. Education in the North 25 (1–2), 64–86. https://doi.org/10.26203/2QHH-5K39

Brauer, S., Siklander, P. & Ruhalahti, S. 2017. Motivation in Digital Open Badge-Driven Learning in Vocational Teacher Education. Ammattikasvatuksen aikakauskirja 19 (3), 17–23.

Deterding, S., Khaled, R., Nacke, L. & Dixon, D. 2011. Gamification: Toward a Definition, CHI 2011 Gamification Workshop Proceedings. Vancouver, Canada.

Finnish Association for the Development of Vocational Education and Training, AMKE. 2020. Survey on the impact of COVID-19 on TVET. https://www.amke.fi/media/julkaisuja/2020/jatkokyselyn-tuloksien-esittely_pitka-versio2.pdf

Finnish Education Evaluation Centre. 2020. Impact of exceptional teaching arrangements on equality and equal opportunities. https://karvi.fi/app/uploads/2020/07/Poikkeuksellisten_opetusjarjestelyjen_vaikutukset_ensimmaiset_tulokset_korjattu-10.7.pdf

Gamrat, C., Bixler, B., & Raish, V. 2016. Instructional design considerations for digital badges. Digital Badges in Education: Trends, Issues, and Cases, 71–81.

Gauthier, T. 2020. The value of microcredentials: The employer's perspective. The Journal of Competency-Based Education 5. https://doi.org/10.1002/cbe2.1209

Halttunen T., Koivisto M. & Billett S. 2014. Promoting and recognising lifelong learning: Introduction. In T. Halttunen, M. Koivisto & S. Billett (Eds.) Promoting, assessing, recognizing and certifying lifelong learning. Lifelong Learning Book Series 20. Springer, Dordrecht.

ILO. 2020. COVID-19 and the education sector. ILO Sectoral Brief, June 2020, Geneva. Switzerland, International Labour Organization.

ILO, UNESCO and World Bank. 2021. Skills Development in the Time of COVID-19: Taking Stock of the Initial Responses in Technical and Vocational Education and Training. Geneva, Switzerland, International Labour Organization.

Kilja, P. 2018. Opintojen henkilökohtaistaminen aikuisoppijoiden kokemana. Eksistentiaalis-fenomenologinen tutkimus näyttötutkintomestarikoulutuksen

kontekstissa [Personalisation of Studies as Experienced by Adult Learners – An Existential Phenomenology Study at the Context of a Training Programme for Specialists in Competence-based Qualifications]. Doctoral dissertation. University of Jyväskylä. http://urn.fi/URN:ISBN:978-951-39-7406-0

Kolkka, M. & Karjalainen, A. L. 2013. Maailman osaavin kansa. Koulutuksellinen tasa-arvo on poliittinen ja pedagoginen kysymys. [The most knowledgeable people in the world – Educational equality is a political and pedagogical issue]. In Maailman osaavin kansa 2020 – Koulutuspolitiikan keinot, mahdollisuudet ja päämäärät. Koulutustutkimusfoorumin julkaisu. Raportit ja selvitykset 2013:8, 50–67. http://www.oph.fi/download/151447_maailman_osaavin_kansa_2020.pdf

Koramo, M., Brauer, S. & Jauhola, L. 2018. DIGAM – Digitalisaatio ammatillisessa koulutuksessa. [Digitalisation in vocational education]. https://www.oph.fi/julkaisut/2018/digitalisaatio_ammatillisessa_koulutuksessa

Korhonen, A-M., Ruhalahti, S. & Niinimäki, J. 2020. Finnish vocational teachers' competences made visible by open badges. Higher Education Theory and Practice. https://doi.org/10.33423/jhetp.v20i6.3138

Kukkonen, H. & Raudasoja, A. 2018. Osaaminen esiin: Ammatillisen koulutuksen reformi ja osaamisperusteisuus. [Competence highlighted: Vocational education reform and competence-based approach]. Tampere University of Applied Sciences. https://julkaisut.tamk.fi/PDF-tiedostot-web/A/23-Osaaminen-esiin.pdf

Kullaslahti, J., Ruhalahti, S. & Brauer, S. 2019. Professional development of digital competences: Standardised frameworks supporting evolving digital badging practices. Journal of Siberian Federal University. Humanities and Social Sciences 12 (2), 175–186. https://doi.org/10.17516/1997-1370-0387

MINEDU. 2018. Reform of vocational upper secondary education. Ministry of Education and Culture. http://minedu.fi/en/reform-of-vocational-upper-secondary-education

MINEDU. 2016. Opettajankoulutuksen kehittämisen suuntaviivoja. Opettajankoulutusfoorumin ideoita ja ehdotuksia. [Guidelines for Developing

Teacher Education. Teacher Education Forum Ideas and Suggestions], Teacher Education Forum. Opetus- ja kulttuuriministeriön julkaisuja 2016:34. http://urn.fi/URN:ISBN:978-952-263-426-9

Mäki, K., Vanhanen-Nuutinen, L., Guttorm, T., Mäntylä, R., Stenlund, A. & Weissmann, K. 2015. Opettajankouluttajan osaaminen – Ammatillisen opettajankouluttajan työn tulevaisuus 2025 [Teacher Trainer's Competences – The Future of Professional Teacher Education 2025]. Report 12.1.2015. OKO-project.

Reid, A. J., Paster, D. & Abramovich, S. 2015. Digital badges in undergraduate composition courses: effects on intrinsic motivation. Journal of Computers in Education 2 (4), 377–398.

Rintala, H., Jussila, J. & Nokelainen, P. 2018. The Reform of Vocational Education and Training in Finland: Insights from Twitter. In C. Nägele & B. E. Stalder (Eds.) Trends in vocational education and training research. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET), pp. 312–321. https://doi.org/10.5281/zenodo.131970

Ruhalahti, S. & Kenttä, V. 2017. Ammatillisen koulutuksen digitalisaatio ja työelämäyhteistyö [Digitalisation and collaboration with a world of work in vocational education]. Raportit ja selvitykset 2017:18. http://www.oph.fi/julkaisut/2017/ammatillisen_koulutuksen_digitalisaatio_ja_tyoelamayhteistyo

Räisänen, A. & Goman, J. 2017. Competence-based, customer-oriented and efficient vocational education and training – Evaluating the impacts of policy measures (ex ante). Publications of the Government's analysis, assessment and research activities 86/2017. http://urn.fi/URN:ISBN:978-952-287-496-2

Saari, J., Halttunen, T., Brauer, S. & Mäkelä, M. 2021. Validation in Art Teacher and Professional Teacher Education Curricula in Finland. European Journal of Education Studies 8 (11), 1–27. http://dx.doi.org/10.46827/ejes.v8i11.3961

Sadler, D. R. 2005. Interpretations of criteria-based assessment and grading in higher education. Assessment & evaluation in higher education 30 (2), 175–194.

Salmon, G. 2011. E-moderating: the key to teaching and learning online (3rd ed.) Routledge: London and New York.

Smith, S. 2015. Lessons learned in launching an award-winning digital badging program. In S. Carliner, C. Fulford & N. Ostashewski (Eds.) Proceedings of EdMedia 2015 – World Conference on Educational Media and Technology, 200–207. Montreal, Quebec, Canada: Association for the Advancement of Computing in Education (AACE). https://www.learntechlib.org/p/151287/

UNESCO. 2021. Case Study on Finnish TVET. A Resilient Model of Training During COVID-19. By Omnia Education Partnerships. Education 2030. https://unesdoc.unesco.org/ark:/48223/pf0000375471

UNESCO-UNEVOC. 2020. Future of TVET teaching, UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training. https://unevoc.unesco.org/pub/trendsmapping_futureoftvetteaching.pdf

UNESCO-UNEVOC. 2020. Digital skills development in TVET teacher training. Trends mapping study. https://unevoc.unesco.org/pub/trends_mapping_study_digital_skills_development_in_tvet_teacher_training.pdf

Waheed, M., Kaur, K., Ain, N. & Hussain, N. 2015. Perceived learning outcomes from Moodle: An empirical study of intrinsic and extrinsic motivating factors. Information Development 32 (4), 1001–1013.

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teachers, trainers, mentors, and it will be useful for VET policy and decision makers, VET school management, researchers, and particularly for VET teacher trainers. The long-term experience of Finns as developers of digital pedagogical education opens up a point of reference at which this network can continue to work on higher quality content and development of the training program. In the Dig4VET project, Oulu University of Applied Sciences, School of Professional Teacher Education had an excellent viewpoint to look at the recognised training needs and the training packages planned and implemented during the initiative. In the following chapter we will discuss our review results in relation to recent recommendations, research findings and teacher trainees' experiences. At the same time, we aim to provide guidelines for the development of future training programs and open education resources, too.

Recommendations for Future Trainings

Brauer Sanna, Mäenpää Kati, Kilja Päivi, Juntunen Elina

Vocational education, VET teachers and teacher trainers are experiencing constant societal change, resulting in increased individual competence needs in the future. In demanding dual positions of VET teachers, both substance specific and pedagogical competence is challenged by turbulent digital disruption in different sectors. The studies presented in this report, suggest a variety of options, technologies, and digital pedagogical approaches to be applied in vocational teacher programmes. We hope that these models, studies, and the results reported are useful for many involved in the development of VET and vocational teacher education.

A Common Professional Development Plan for VET Instructors

Vocational education, VET teachers and teacher trainers are experiencing constant societal change, resulting in increased individual competence needs in the future. In demanding dual positions of VET teachers, both substance specific and pedagogical competence is challenged by turbulent digital disruption in different sectors. The studies presented in this report, suggest a variety of options, technologies, and digital pedagogical approaches to be applied in vocational teacher programmes. We hope that these models, studies, and the results reported are useful for many involved in the development of VET and vocational teacher education.

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hope that these models, studies, and the results reported are useful for many involved in the development of VET and vocational teacher education.

Most important of all, continuing professional development should reflect the up-to-date sum of competences required from teachers (Day, 2017). The foundation of the VET teachers', trainers' and mentors' professional development should rest on competence criteria following the transparent, commonly agreed guidelines to build consensus on common goals and objectives. Based on previous findings and Dig4VET studies with respect to pan- European guidelines such as DigCompEdu, we propose the following multi-professional recommendations (Table 3). The excellent outcomes in Finnish VET allow us to propose an application of digital open badges, and competence demonstrations in practice. We seek to emphasise the possibility of applying new competences in the teaching profession of significant value for the competence-based approach. The models developed in the context of vocational teacher education and in-service training are also more widely applicable to different operating environments in the teaching and development activities of VET and WBL settings. These recommendations (Table 3) can be applied to lifelong learning, both pre-service teacher training and continuous professional development in VET.

TABLE 3. Recommendations to consider in future CPD for VET teachers, trainers and mentors.

	DigCompEdu	SELFIE Results	Supplementary Findings	Recommendations
Digital Pedagogy	Teaching and learning: Managing and orchestrating the use of digital technologies in teaching and learning.	More digital skills and advancement in school's digital pedagogy strategy planning. Appropriate facilities and devices at school premises. More	Clear pedagogical models that allow even beginners to apply new tools in their own teaching in an appropriate way. More collaboration and teamwork during the trainings.	Daily VET practices employ a variety of digital tools and CPD ensures digital skills and digital pedagogical competence. Teaching agents like digital technologies, PLEs and peer-related cooperation

		synergies for remote teaching and learning with other schools and organisations. Cross-curricular training and collaboration based on common digital strategies.		scaffold learning processes.
Competence-Based Approach	Assessment: Using digital technologies and strategies to enhance assessment.	More comprehensive repertoire of assessment practices. Self-reflection and feedback in learning should be emphasised.	In-service training should provide tangible skills by doing things by themselves, and experiment new tools between meetings and then present that experience, the lessons learned, next time.	VET teachers, trainers and mentors perceive the competence-based approach as a concept and practice grounded in personal experience. Digital open badges inform and facilitate competencebased approach as a development principle for pedagogical activities.
Advanced Technologies	Digital Resources: Sourcing, creating and sharing digital resources.	It is noteworthy to consider options for the Open Educational Resources (OER), open databases and licensing that allows educational access (e.g. Creative Commons).	An overview of digital tools, education technologies and apps relevant and useful for VET and WBL settings is required. Easy access digital tools should be prioritised (e.g., sign in by using Google account).	Easy Access Online Materials available 24/7. Attention must be paid to data security and GDPR. All learning solutions should respect the accessibility regulation (European accessibility act).

Pedagogical Design Competence	Empowering Learners: Using digital technologies to enhance inclusion, personalisation and learners' active engagement.	Opportunities to explore digital teaching and learning methods. Understanding of how to support engaging, reflective and collaborative learning processes. Opening new procedures to create digital resources.	In-depth demonstrations of digital teaching methods and platforms to use in tutoring the learning process.	VET teachers, trainers and mentors should feel capable, comfortable and confident using resources independently; in summarising the process, facilitating tasks and supporting the use of learning materials. Scaffolding and digital scaffolds for the selfregulated learning process.
Future CPD	Professional Engagement: Using digital technologies for communication, collaboration and professional development.	Flexible study options that allow CPD regardless of time and place. CPD should allow wider opportunities to participate and collaborate with colleagues.	Training should be based on up-to-date pedagogy that is also applicable in VET. Deep pedagogical reasoning and teamwork on topics each participant is interested in.	The CPD process allows active and collaborative learning with scaffolding that supports a comprehensive system of assessment and triggers engagement. Competence-based digital badges help to plan competence development as a continuum.
Practical Implications	Facilitating Learners' Digital Competence: Enabling learners to creatively and responsibly use digital technologies for information, communication, content creation, wellbeing and	Development and promotion of guidance partnership models. Possibilities to communicate and reflect the present use of digital technologies. WBL tutors should be enhanced to instruct	Scaffolding should be optimised, just-in-time guidance that can be adjusted according to entry level.	Detailed competence descriptions inform and improve professional performance. Individual development plans and achieved digital pedagogical competence are described in ePortfolios validated by

problem-solving.	students to use digital technologies to document their expertise and competences achieved.	digital open badges. The digital pedagogical competences and experiences can be professionally shared.

These recommendations reflect VET teachers', trainers', mentors, managers and students' perceptions about their digital competences and their awareness about EU digital policies, tools (e.g., SELFIE) and EU frameworks, suggesting awareness-raising needs and potential advancement of CPD practices. As a focus group piloting new learning solution, Dig4VET staff training participants' experiences, views and ideas are more than noteworthy. In practice, high-quality pedagogical innovations such as digital open badges offer to inform and improve both professional development and professional knowledge constructions to develop different competences (Brauer, 2019). The supplementary results summarise our desk research findings and the varying experiences of those who participated in the piloting of the training program and international joint staff training event of Dig4VET project. These results reflect a variety of perceptions of training needs in the field of VET and WBL.

The recommendations thoroughly also highlight the importance of promoting self-regulated learning processes, such as learners' engagement, self-reflection, collaboration and motivation in digital learning environments (Mäenpää, 2021). From the point of view of teachers, mentors, school leaders, and also in choosing the learning environment, we should always bear in mind the crucial role of student's learning. After all, pedagogy is aimed to enhance learning and therefore the recommendations that concern pedagogical practices should be covered by the approach of learning.

Digital Pedagogy and Advanced Technologies

Teaching and learning, and digital resources represent the core areas of the DigCompEdu framework (Redecker, 2017). Together with digital assessment

strategies and practices that enhance inclusion, personalisation and learners' active engagement these areas explain educators' digital pedagogic competence, i.e., the digital competences educators need to foster efficient, inclusive and innovative teaching and learning strategies. The widely applied framework emphasises that educators' digital competence must reach beyond the concrete use of digital technologies within teaching and learning. Redecker (2017) explains that "digitally competent educators must also consider the overall environment, in which teaching and learning encounters are embedded. Hence, it is part of educators' digital competence to enable learners to actively participate in life and work in a digital age" (p. 17). These sentiments are quite natural to adopt in the field of VET and WBL to full extent. Regardless of the tool or the platform, the up-to-date learning design should always consider several aspects of modern cultures in the 21st century, including digitalisation, the meaningful use of incentives such as gamification in learning and allow public sharing of expertise in order to support shared learning within work communities.

The SELFIE results pointed out that despite years of development, appropriate facilities and devices are not always available for teachers and students at school premises. Further, clear digital pedagogical models are on demand. These practical examples should guide new teachers and other novice instructors to apply new tools in their own teaching in an appropriate way. Moreover, in-depth demonstrations of digital teaching methods and platforms could benefit instructors to use new tools to advance teaching and learning.

Our findings also suggest enhancing co-operation and collaboration at different levels and stages of the development activities regarding VET and WBL. To put it simple, training should include more collaboration and teamwork. The extended concept of scaffolding may be understood to include teaching agents like digital technologies, peer-related cooperation and even the learning environment as potential scaffolds (Brauer, 2019). On one hand, more synergies could be found for remote teaching and learning with other schools and organisations – on the other hand, cross-curricular trainings based on common digital strategies could be emphasised in future development actions. Moreover, we suggest that daily VET practices should employ a variety of digital tools to support VET teachers, trainers

and mentors feeling capable, comfortable, and confident using digital learning resources independently. However, different flexible options for CPD are required to ensure digital skills and digital pedagogical competence on both institutional and individual level.

Competence-Based Approach

VET teachers, trainers and mentors find it helpful to perceive the competence-based approach as a concept and practice grounded in personal experience. The study findings suggest that in-service training should provide tangible skills by doing things by themselves, and participants should be able to experiment new tools between study group meetings and then present that experience, the lessons learned, next time. Different Finnish educational institutions and training providers have been applying competence-based approach, digital pedagogy and open badges in learning processes (Brauer & Korhonen, 2022). Digital open badges allow facilitation of learning processes in diverse manner suggesting applications of gamification and massive open online courses. Similar to the visible achievements of gamers, gamification of the digital open badge-driven learning process has the potential to motivate students (Abramovich et al., 2013; Brauer et al., 2017; Reid et al., 2015).

Competence-based approach is often focused on the development of assessment practices. DigCompEdu Framework (Redecker, 2017) suggests using digital technologies and strategies to enhance assessment. This is in line with our SELFIE study findings that a more comprehensive repertoire of practices is required. Further, selfreflection and feedback in learning should be emphasised. Instructors as students appreciate professional evaluation, and peer reviewing, and automatic solutions remain elusive (Brauer, 2019). The metadata included in badges describe the principles of judgement (e.g., defined in accordance with DigCompEdu) and explain how the competence in question should be demonstrated in the form of a tangible task. Requirements within the badges may vary from practical skills demonstrating rather technical knowledge to demanding strategic planning (Brauer, 2019).

In general, digital open badge-driven learning seems to enhance VET teachers' perceptions of the competencebased approach in practice (Brauer, 2019). However, teachers' assessment competence is so important that developed badges should correspond to the areas of assessment to a greater extent (Kullaslahti et al., 2019). Kullaslahti et al. (2019) also note that learner empowerment and the facilitation of digital competence should be emphasised in future development efforts. Digital open badges offer to promote professional development within working communities as the competence-based approach supports identification and recognition of the different competences achieved (Casilli & Hickey, 2016). In addition, statistics (Brauer et al., 2018) indicate that competencebased digital badges help teachers to plan competence development as a continuum. Public sharing of achievements (McDaniel et al., 2016) may be one reason also for the positive outcomes of the Finnish success story of "Learning Online". In "Learning online" in-service teachers did consider publicising badges to be significant in their professional development (Brauer, 2019).

Digital open badges have become an effective criterion-based learning solution that couples different learning communities and alternative ways of acquiring competences (Knight & Casilli, 2012). However, it is essential that the standards and guidelines are developed on a national and European level (Kullaslahti et al., 2019). To serve the students, trainers need to learn how to apply the competence-based approach in practice and further develop their digital pedagogical competences and practical applications. Moreover, digital open badges offer to inform and improve competence-based approach as a development principle for pedagogical activities.

Future CPD and Practical Implications

The on-going changes in the paradigm of continuing professional development (Kools & Stoll, 2016) necessitate supportive technological and digital pedagogical models. The current development and research related to digital open badge-driven learning (e.g., Brauer, 2019; Korhonen et al., 2020) contributes to the educational discourse on competence-based approaches, assessment and professional

development. Moreover, recent initiatives suggest viewing micro-credentials as the means to explore new forms of short-cycle educational provision.

The transformative practices of digitalisation is both collegial and collective challenge for VET and WBL. This is the focus of Area 1 on the DigCompEdu Framework too, expressing educators' digital competence "in their ability to use digital technologies not only to enhance teaching, but also for their professional interactions with colleagues, learners, parents and other interested parties, for their individual professional development and for the collective good and continuous innovation in the organisation and the teaching profession" (Redecker, 2017, p. 19). It is an important task for an instructor to facilitate learners to use digital technologies creatively and responsibly for information, communication, content creation, wellbeing and problem-solving. Our SELFIE study findings promote the development of guidance partnership models. Moreover, WBL tutors should be enhanced to instruct students to use digital technologies to document their expertise and competences achieved.

Future CPD for VET teachers, trainers and mentors should be based on up-to-date pedagogy that is also applicable in VET. According to recent studies (e.g., Brauer, 2019; Kilja 2018), this requires diverse practices, such as flexible study options that allow CPD regardless of time and place, and different possibilities for learning, as well as understanding of the individuality of the learning process. As a practical implication we also suggest that in CPD, scaffolding should be optimised, just-in-time guidance that can be adjusted according to entry level. CPD should allow wider opportunities to participate and collaborate with colleagues. Deep pedagogical reasoning and teamwork should be emphasised on implementations. The CPD process is required to allow active learning with scaffolding that supports a comprehensive system of assessment and triggers engagement. Detailed competence descriptions offer to inform and improve professional performance. Thus, competence-based digital badges could help to plan competence development as a continuum. As the actual outcome, individual development plans and achieved digital pedagogical competence could be described in ePortfolios and validated by digital open badges.

To conclude, we suggest focusing digital strategies on CPDs that allow managing and orchestrating the use of digital technologies in teaching and learning in synergy with other educational institutions and in solid partnership with working life. The role of WBL tutors should be emphasised when planning CPD. The implementations must allow wider opportunities to participate and support flexible options for participation to meet unique professional needs of VET teachers, trainers, and mentors.

References

Abramovich, S., Schunn, C. & Higashi, R. M. 2013. Are badges useful in education? It depends upon the type of badge and expertise of learner. Educational Technology Research and Development 61 (2), 217–232. http://doi.org/10.1007/s11423-013-9289-2

Brauer, S. 2019. Digital Open Badge-Driven Learning – Competence-based Professional Development for Vocational Teachers. Doctoral dissertation. Lapland University. http://urn.fi/URN:ISBN:978-952-337-110-1

Brauer, S., Kettunen, J. & Hallikainen, V. 2018. "Learning Online" for vocational teachers – visualisation of competence-based-approach in digital open badge-driven learning. The Journal of Professional and Vocational Education: Vocational education and training in the Nordic countries 20 (2), 13–29.

Brauer, S. & Korhonen, A. 2022. 360-Degree View of Digital Open Badge-Driven Learning. In D. Piedra (Ed.) Innovations in the Design and Application of Alternative Digital Credentials, pp. 95–130. IGI Global. https://doi.org/10.4018/978-1-7998-7697-7.ch005

Brauer, S., Siklander, P. & Ruhalahti, S. 2017. Motivation in Digital Open Badge-Driven Learning in Vocational Teacher Education. Ammattikasvatuksen aikakauskirja 19 (3), 17–23.

Casilli, C. & Hickey, H. 2016. Transcending conventional credentialing and assessment paradigms with information-rich digital badges. The Information Society 32 (2), 117–129.

Day, C. 2017. Competence-based Education and Teacher Professional Development. In M. Mulder (Ed.) Competence-based Vocational and Professional Education. Technical and Vocational Education and Training: Issues, Concerns and Prospects 23, 165–182. http://doi.org/10.1007/978-3-319-41713-4_8

European Union. 2009. Council conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training (ET 2020). 2009/C 119/02. https://eur-lex.europa.eu/legalcontent/EN/ALL/?uri=celex%3A52009XG0528%2801%29

European Education Area. 2022. Digital Education Action Plan 2021–2027. https://education.ec.europa.eu/focus-topics/digital/education-action-plan

Kilja, P. 2018. Opintojen henkilökohtaistaminen aikuisoppijoiden kokemana. Eksistentiaalis-fenomenologinen tutkimus näyttötutkintomestarikoulutuksen kontekstissa [Personalisation of Studies as Experienced by Adult Learners – An Existential Phenomenology Study at the Context of a Training Programme for Specialists in Competence-based Qualifications]. Doctoral dissertation. University of Jyväskylä. http://urn.fi/URN:ISBN:978-951-39-7406-0

Knight, E. & Casilli, C. 2012. Mozilla Open Badges. In Game Changers. Education and information technologies, pp. 279–284. EDUCAUSE. https://net.educause.edu/ir/library/pdf/pub7203cs6.pdf

Kools, M. & Stoll, L. 2016. What Makes a School a Learning Organisation? OECD Education Working Papers, 137. OECD Publishing. https://doi.org/10.1787/5jlwm62b3bvh-en

Korhonen, A-M., Ruhalahti, S. & Niinimäki, J. 2020. Finnish vocational teachers' competences made visible by open badges. Higher Education Theory and Practice. https://doi.org/10.33423/jhetp.v20i6.3138

Kullaslahti, J., Ruhalahti, S. & Brauer, S. 2019. Professional development of digital competences: Standardised frameworks supporting evolving digital badging practices. Journal of Siberian Federal University. Humanities and Social Sciences 12 (2), 175–186. https://doi.org/10.17516/1997-1370-0387

Mäenpää, K. 2021. Motivation regulation and study well-being during nurse education studies. Doctoral dissertation. University of Oulu. http://urn.fi/urn:isbn:9789526231532

McDaniel, R., Lindgren, R. & Friskics, J. 2012. Using badges for shaping interactions in online learning environments. Proceedings from the 2012 IEEE International Professional Communication Conference. 1–4. Orlando, FL; IEEE.

Redecker, C. 2017. European Framework for the Digital Competence of Educators: DigCompEdu. In Y. Punie (Ed.) EUR 28775 EN. Publications Office of the European Union, Luxembourg. https://doi.org/10.2760/159770

Reid, A. J., Paster, D. & Abramovich, S. 2015. Digital badges in undergraduate composition courses: effects on intrinsic motivation. Journal of Computers in Education 2 (4), 377–398.

METATIEDOT

Tiivistelmä: Vocational education, VET teachers and teacher trainers are experiencing constant societal change, resulting in increased individual competence needs in the future. In demanding dual positions of VET teachers, both substance specific and pedagogical competence is challenged by turbulent digital disruption in different sectors. The studies presented in this report, suggest a variety of options, technologies, and digital pedagogical approaches to be applied in vocational teacher programmes. We hope that these models,

studies, and the results reported are useful for many involved in the development of VET and vocational teacher education.

The Consortiums of the Project

Dig4VET Digital Tools for Learning and Validation in VET and WBL: Training Program for VET Teachers, Trainers and Mentors. Erasmus+ KA2 Strategic Partnerships for VET Project No. 2020-1-LV01-KA202-077486.

Partners:

[National Centre for Education of the Republic of Latvia](#) (LV) – lead partner

[Riga Art and Media School](#) (LV)

[COOPETAPE – Cooperative of Education](#) (PT)

[Oulu University of Applied Sciences](#) (FI)

[Vilnius Car Mechanics and Business school](#) (LT)

[ITC International](#) (CZ)

[Baltic Bright](#) (LV)

The objective of the Project was to improve skills and competences of VET teachers, trainers, mentors for use of digital tools in education process, for both: classroom and distance learning; and to raise awareness of a variety of digital tools and technologies that can be used in VET school and WBL settings.

Dig4VET project outcomes propose empowering VET teachers, trainers and mentors/WBL tutors with the support of a training program for VET teachers, trainers and mentors which can be implemented by VET institutions (local level), by national CPD systems and internationally as Erasmus+ courses.

METATIEDOT

Tiivistelmä: Digital Tools for Learning and Validation in VET and WBL: Training Program for VET Teachers, Trainers and Mentors (Dig4VET) is an Erasmus+ KA2 Strategic Partnerships for VET-project aimed to improve skills and competences of vocational teachers, trainers and mentors in using digital tools in education process. Main goal is to raise awareness of a variety of digital tools and technologies that can be used in vocational education and training (VET) and workbased learning (WBL) settings for both classroom and distance learning. Dig4VET proposes empowering VET teachers, trainers and mentors/WBL tutors with the support of a training program for VET teachers, trainers and mentors which can be implemented by VET institutions (local level), by national continuous professional development (CPD) systems and internationally as Erasmus+ courses. In this publication we communicate a review of digital skills of VET teachers and trainers in partner organisations (VET schools) and partner countries, including a report on the use of SELFIE in Latvia, Lithuania and Portugal. We also suggest recommendations for future training programs in digital pedagogy for VET teachers, trainers and WBL tutors. The recommendations section is initialised with an overview of competence-based approaches in advanced CPD which may be specially designed for VET Teachers, Trainers and Potential Mentors to enhance the use of digital tools for teaching, learning, assessment and validation. The report is a multidimensional information resource regarding digital competences of VET teachers, trainers, mentors, and it will be useful for VET policy and

decision makers, VET school management, researchers, and particularly · for VET teacher trainers. It can also be of interest and use for other sectors of education (general education, higher education, adult education).