Teachers and teacher professional development for new learning (POL-TIEDA WP20)

European Training Foundation

# Literature Review

Draft

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**Acronyms**

AI: Artificial Intelligence
CBE: Competence-Based Education
CNL: Creating New Learning
CPD: Continuous Professional Development
CVET: Continuous Vocational Education and Training
EPD: Educators Professional Development
ETF: European Training Foundation
ESD: Education for Sustainable Development
ICT: Information and Communication Technologies
IoT: Internet of Things
IVET: Initial Vocational Education and Training
JRC: Joint Research Centre of the European Commission
VET: Vocational Education and Training

## Executive Summary

The present research report, framed within the "Create New Learning" (CNL) initiative of European Training Foundation (ETF), stems from the fact that the role of Vocational Education and Training (VET) educators is and should be changing in line with the rapid developments in the labour market, the introduction of new technologies, the new insights on how people learn and the growing emphasis on lifelong learning. The report is based on a systematic literature review that has screened a total of 222 scientific papers and reports produced from 2010 on, focussing both on teachers and instructors in formal VET as well as trainers and coaches in non-formal settings including the workplace.

In order to better understand this change processes, the report provides insight from literature on four connected aspects:

1. How the **roles and behaviours of educators** are changing and/or need to change, so to be able to support learners to acquire labour market-relevant learning outcomes in an efficient and engaging way;
2. To what extent these changes are reflected in **educators profiles** and qualifications and competences frameworks;
3. Whether and how these developments are leading to changes in **educators careers**;
4. How **educators professional development** can best support teachers and trainers in their transition to new behaviours and roles**.**

***Research question 1. How are, and how should, educators' roles and behaviours changing to meet the changing needs of lifelong 21st century learners and new modes of learning? What are the main reasons for this change?***

Global changes are putting VET systems under pressure, creating new labour market dynamics and new jobs, and they are changing the way people learn, work and interact. A new generation of students with new learning styles is emerging, that cannot be trained with traditional methods. By screening existing literature, we conclude that **six main trends that are having an impact on VET educators**: Digital transformation, including industry 4.0, New teaching paradigms and approaches, including Competence-Based Education, Migrations and new demography, Climate change, New forms of entrepreneurship and Increased networking and collaboration.

These trends are placing new demands on educators, to meet the new calls from both industry and society. Agreement exists within literature on four aspects related to this new idea of educators. First, **educators are encouraged to take up new roles**: there is a trend to avoid using the words *teacher* and *trainer* and to refer to educators as *facilitators*, *coaches*, *supervisors*, *mentors*, *counsellors*, *orchestrators*, *alchemists and welders*. Second, **educators are expected to expand their responsibilities**, becoming active in administration, management and quality assurance tasks, actively cooperating with colleagues and with companies and getting more involved in curriculum design. Third, **educators are increasingly considered as key agents of change within VET reform processes**, contributing to designing new classroom and workshop learning and providing feedback on training outside classrooms. Fourth, **educators are called to work through collaboration and networking** with colleagues,

experts and external stakeholders such as companies or social parties. Literature recognises that **these transitions are difficult**, because they imply a major cultural shift within educators' self-perception, related to the need of rethinking and reshaping the roles played within the teaching process and the underpinning knowledge production process. Because of this complexity, educators should be given sufficient time and resources to develop innovative teaching processes, and training programmes should ensure that staff have the capacity to deal with such initiatives.

By reviewing existing literature, we have condensed the characteristics of a 21st century educator through three areas, which should exist side by side with the traditional competencies.

- First, educators should be able to implement **new teaching approaches**, by being a) Learner-centred, b) e-educators and c) Collaborative and open.
- Second, educators should be fluent in four **new areas of competence**: a) Digital society competence, b) Intercultural competence, c) Green awareness and skills and d) Entrepreneurial competence.
- Third, educators should have a **new professional attitude**, by being a) Active and Lifelong professional and b) Networked professional.

***Research question 2. What are the emerging profiles of educators suited to bring about 21st Century lifelong learning?***

In order to understand the distance between the ideal profile of the 21st century educator and the approaches currently adopted around the world, we have mapped 19 national and supra-national educators competences frameworks (ECF) and professional standards. Most of the mapped competencies frameworks reflect a rather holistic competence model composed by a combination of professional knowledge and beliefs, motivation and self-regulation, and do assign importance to **innovative teaching approaches** and to **new professional development attitude**, setting standards for teachers to be (or become) active, lifelong and networked professional.

On the other hand, **the great majority of ECFs do not include the new areas of competence that emerged from literature:** digital, Intercultural, green and entrepreneurial competences are absent from most of the frameworks. The great majority of the mapped ECF, that differ widely in terms of approach and granularity, refer to the work of educators in VET institutions, while only in a very few cases they consider as well the competences needed within work-based learning or apprenticeship schemes.

***Research question 3. How are changes in the role and behaviour of educators leading to new career developments and structures of educators?***

Literature converges on the **low quality of recruitment pre-requisites and initial teacher training programmes** in many countries, connected with the difficulty to link VET teacher training programmes to practice in the workplace and to the disconnection, particularly where academic models prevail, between the educational part of VET teacher training programmes and the implementation of the acquired competences on the workplace.

**Many countries are working to upgrade the paths to become a VET educator** and some progress has been made, establishing for example TVET teacher training coordinating bodies with responsibility for pre-service training or introducing masters' programmes for teachers. The concept of **hybrid teacher/trainer** is emerging, indicating educators working part-time in a company and part-time as a teacher in a vocational school. This concept opens interesting **hybrid educators careers** perspectives, that call for closer collaboration between VET teachers and trainers and for a stronger role of mentors and career counsellors to support and guide learners. Also, efforts exist to **address the low motivation of educators to develop professionally**, a factor that is hindering successful career paths within the VET sector: an emerging model is the one of parallel pre-service training through institutional networks.

***Research question 4. What are the drivers and the barriers to implement new or revised systems and models of initial and continuing educators development?***

Even if literature shows **a positive correlation between Educators Professional Development (EPD), quality teaching practices and student outcomes** exists, international studies agree as well that only a small proportion of educators participate in high-quality professional development activities and that **professional development programmes are often ineffective**, typically relying on conventional teaching without having much impact on practice. Literature describes several **characteristics of effective EPD**: it needs to contribute to useful outcomes in the labour market, it has to be designed with social partners and employers, it has to include both subject-related knowledge and transversal skills, it has to include context-rich learning, be team-based, and possibly be blended with informal learning characteristics (Darling-Hammond et al. 2017, Namamba et Rao 2017).

Literature concurs that the increasing complexity of educators' professional practice calls for sophisticated and innovative professional learning, suggesting that educators' agency, collaboration, and active participation must be fostered to create enduring changes in practice. We have categorised **four typologies of innovative Educators Professional Development** emerging from literature: Digitally-enhanced and mobile EPD; Professional communities of practices; Personal Learning Networks; Innovative design based approaches, including new ways to engage stakeholders.

## 1. Background and methodology

The present research, framed in the "Create New Learning" (CNL) initiative of European Training Foundation (ETF), stems from the fact that the role of educators is and should be changing in line with the rapid developments in the labour market, the introduction of new technologies, the new insights on how people learn and the growing emphasis on lifelong learning. In order to fulfil these new roles, educators will have to change their behaviours, and Vocational Education and Training (VET) systems must accompany and support this change, by innovating educators careers schemes, profiles and educators development systems.

In order to better understand this change processes, **the research has four objectives**:

5. To understand how the roles and behaviours of educators are changing and/or need to change based on the current understanding of how people learn and in the perspective of lifelong learning, so to be able to support learners to acquire (labour market-relevant) learning outcomes in an efficient and engaging way;
6. To explore to what extent these changes are reflected in educators profiles and in frameworks of educators qualifications and competences;
7. To examine whether and how these changes are leading to changes in the career development and career structure of educators;
8. Examine how pre-service training and Continuing Professional Development can best support educators in their transition to new behaviours and roles**.**

The focus of the research is specifically on the context of VET, including initial VET and continuous VET, adult learning and formal and non-formal education.

In the context of the research, the term educators applies to teachers and instructors in formal VET as well as trainers and coaches in non-formal settings including the work-place. "When we refer to 'teachers and trainers' in ETF partner countries, we normally mean different categories of professionals working in VET. There are trainers for adults, training centres for unemployed workers, and people teaching vocational practice in schools, while others teach the theory of technical and vocational education, and still others teach general education content in VET schools" (European Training Foundation 2019). The infographic below shows this variety very well:

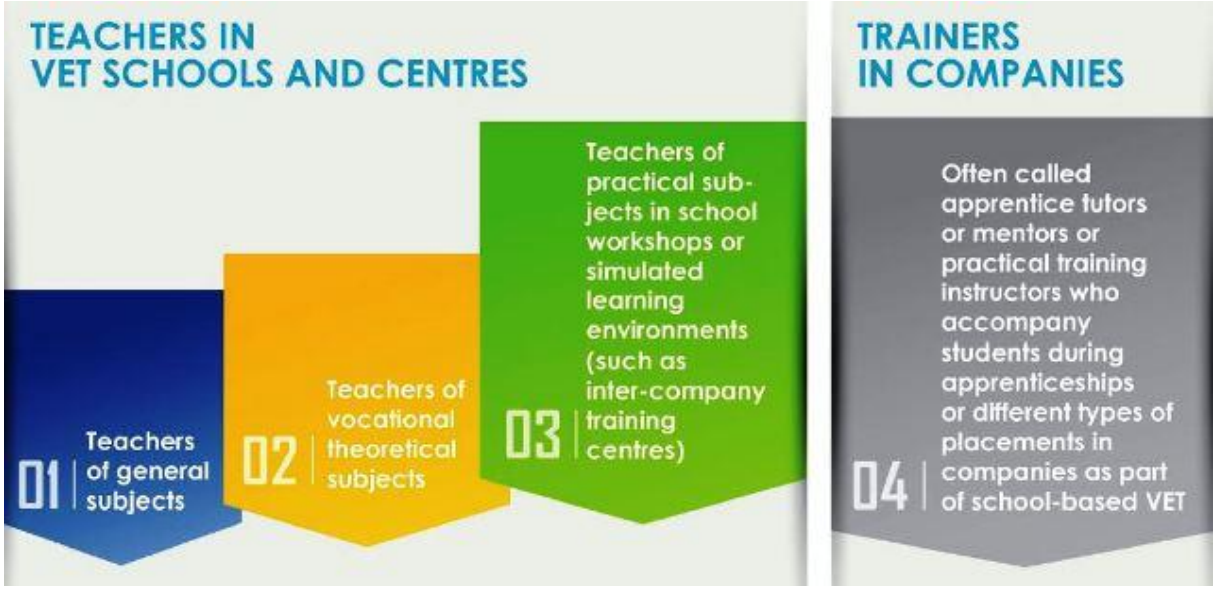


*Figure 1: Different kinds of VET educators (Cedefop 2016)*

The **research questions** cover four areas (the rows of Table 1) and have been structured along two levels of analysis: the first one refers to understanding how things are changing (based on evidence of new practices and initiatives) and the second one to how things should change (for example looking at evidence-based recommendations on how things should change). By keeping this double approach (how things are changing and how things should be changing), the study intends to combine evidence of innovation (typical of literature based on case studies for example) with recommended innovation (typical of reports of events by international organisations for instance), mixing actual present developments with future desired innovations.

*Table 1. Research questions of the study.*

| **Area of work** | **Observing the change**<br>(State of the art, barriers) | **Recommending the change**<br>(Recommendations, incentives) |
|---|---|---|
| 1. Educators' roles and behaviours | How are educator roles and behaviours changing to meet the changing needs of lifelong 21st century learners and new modes of learning? What are the main reasons for this change, in terms of societal, technological, educational developments? What does the emphasis on/introduction of competences-based learning mean for educator roles and educator behaviours? | How should be changing educator roles and behaviours changing to meet the changing needs of lifelong 21st century learners and new modes of learning? |
| 2. Educators profiles and standards | What are the emerging profiles of educators (occupational standards, qualification, competences frameworks) suited to bring about 21st century lifelong learning? | To what extent do these profiles capture the behaviours and roles identified in research question 1? |
| 3. Educators careers | How are changes in the role and behaviour of educators leading to changes in the career development and career structure of educators? | How might the career of educators change to bring about 21st century lifelong learning? |
| 4. Educators development systems and models | What are drivers and what barriers implementing new or revised systems and models of initial and continuing educators development, e.g. mindsets, formal requirements? | What kind of systems and models of initial and continuing educator development support the implementation of changes described in the previous questions? |

In order to respond to these research questions, a systematic literature review was conducted, using the following databases:

- https://eric.ed.gov
- https://www.ebsco.com
- https://www.voced.edu.au
- Cedefop's Discovery Tool and VET-Bib database
- UNEVOC Online Library.

To complement these databases, further searches were conducted using SemanticScholar.org and Google Scholar. This generated additional sources including grey literature consisting of commissioned reports and theses. To map educators competences frameworks in Chapter 5, we also reviewed governmental websites and cross-referenced relevant international organisations such as UNESCO or OECD. Where the linguistic barrier made it impossible to directly consult the frameworks, we referred to secondary academic literature interrogating the documents.

The following keywords were used to limit the field: “VET/Vocational Education/Lifelong Learning/Adult Learning” and “teachers/educators/trainers/coaches/instructors”, while the following keywords were used to focus the searches:

- innovation/change/new learning (research question 1)
- innovation/change/standards/profiles/competences frameworks/qualifications (research question 2)
- innovation/change/career/career development (research question 3)
- innovation/change/initial/continuous/professional development (research question 4).

In terms of publication date, the search covered literature published after 2010, even if some sources from the years just before 2010 were included when extremely relevant. The title and abstract as depicted by the search engines were judged against the relevance for the research questions and fitting publications were selected.

Publications were judged against the following criteria, excluding articles that were:

- published before 2010;
- focusing on educational innovation in general, without a specific focus on educators;
- focused exclusively on school education or on higher education;
- focused on a very specific target group (ex. a specific indigenous group);
- focused solely on ICT-related change.

As a result, 222 publications, including journal articles, research reports and dissertations, were retrieved, along the different research questions of the project: RQ1: 93 publications, RQ2: 42 publications, RQ3: 27 publications, RQ4: 61 publications. When a publication was judged as relevant for more than one research question, it was connected with the research question of major relevance. Further to this, the most relevant publications for each research question were selected and are listed at the end of paragraphs 3, 4, 5 and 6.

## 2. The policy concern on the changing role of VET educators

Recent VET policies have focused their efforts on the development of new curricula, occupational standards and stakeholder consultations, with relatively little attention given to educators (Pavlova 2019). Still, in the last decade a number of conferences have in fact been organized focusing on VET educators. Example of these conferences are:

- Conference "Preparing TVET educators for the next generation", organized by UNESCO-UNEVOC in collaboration with other partners in 2011
- Online Conference "Strengthening TVET teacher Education", organized by UNESCO-UNEVOC in 2012
- Policy Learning Forum "Professional development of teachers and trainers – a guarantee of quality in VET", organised by Cedefop in 2016
- Global Forum "Advancing learning and innovation in TVET", organized by UNESCO-UNEVOC in in 2019.

Also, a number of reports by international organizations have been produced in the last years that focus, from different perspectives, on the changing role of educators within VET:

- "Teachers and trainers for the future – Technical and vocational education and training in a changing world" by ILO (ILO 2010)
- "The future of learning - Preparing for change" by the European Commission's Joint Research Centre (JRC) (Redecker et al. 2013)
- "Vocational teachers and trainers in a changing world: the imperative of high-quality teacher training systems" by the International Labour Organisation (Axmann 2015)
- "Unleashing the potential: Transforming technical and vocational education and training" by UNESCO (Marope et al. 2015)
- "Report of the Joint ILO–UNESCO Committee of Experts on the Application of the Recommendations concerning Teaching Personnel" by ILO and UNESCO (Rawkins 2018)
- "Reforms in Vocational Education and Training in ETF Partner Countries" by the ETF (European Training Foundation 2018)
- "Toolkit: Skills and qualifications: Benefits for people" by ETF (European Training Foundation 2019)
- "Aligning teacher competence frameworks to 21st century challenges" by the European Commission's Joint Research Centre (Caena and Redecker 2019)
- The Trends Mapping reports by UNESCO-UNEVOC, on issues such as "Innovation in TVET" (Ganter de Otero 2019) and "Future of TVET Teaching" (Subrahmanyam 2020)
- "Council Conclusions on European teachers and trainers for the future" by the European Council (European Council 2020).

These reports recognise the central role that educators play in the transition of VET systems and address the changing roles and behaviours of VET teachers and trainers, typically calling for policy action to ensure the development of a high-quality educators workforce. In other words, **the policy imperative of focussing on innovating the role and profiles of VET educators clearly stems from the literature review**, at least within international organisations. Already in 2012, the **European Commission** noted the importance for VET educators to be well prepared to work in highly demanding contexts and to respond to diverse

requirements, making sure they possess professional, pedagogical and transversal competences and are able to participate in professional networks (European Commission 2012). Three years later, **Cedefop** stated that trainers need to go beyond conveying knowledge and skills, and that this requires enriching their role with coaching and mentoring activities, so that they can provide guidance and stimulate learning culture in enterprises (Cedefop 2015). More recently, confirming the findings of a 2018 survey among educators in ETF partners countries[1], a report by the **European Training Foundation** recognises that the introduction of new pedagogies such as blended learning and experiential learning rises the imperative for educators to take a step back as teachers and to focus on coaching and supporting students, working more closely with colleagues, exchanging experiences and good practices (European Training Foundation 2019). Also in 2019, a report by the **JRC of the European Commission** states that educators should be activators of meaningful learning, able to choose from a spectrum of strategies for the appropriate contexts and learners (Caena and Redecker 2019). Finally, a 2020 Communication by the **European Council** reads: "In the context of constant social, demographic, cultural, economic, scientific, environmental and technological changes, the world of education and training is changing, and so is the occupation of teachers and trainers, with increasing demands, responsibilities and expectations put before them. Continuous innovations and challenges have an effect not only on the competences required, but also on teachers' and trainers' wellbeing and the attractiveness of the teaching profession" (European Council 2020).

Finally, is must be noted that educators are a key component of the structural reforms that many transition and developing countries are putting in place, and that innovating educators' roles and profile can contribute to structural change. A recent report by the ETF has identified educators-related projects for ETF partner countries, namely the quality of teachers and trainers (e.g. Tajikistan, Ukraine, Serbia, Lebanon, Tunisia), their retention (e.g. Azerbaijan, Moldova), the level educators' wages (e.g. Georgia, Albania, Kosovo, Lebanon) (European Training Foundation 2018).

[1] The country reports resulting from the 2018 ETF international survey of vocational teachers and trainers working in vocational schools and training centres can be found at https://openspace.etf.europa.eu/wikis/etf-international-survey-vocational-teachers-and-trainers-final-reports.

## 3. Emerging roles and behaviours of 21st century educators

### 3.1 Main drivers of change impacting on roles and behaviours of educators

Literature converges on the fact that global socioeconomic changes are putting VET systems under pressure, both because they are creating new labour market dynamics, including new jobs, and because they are changing the way people learn, work and interact. Given the central role of educators within education and training systems, these changes are having an impact on the teaching profession as well. Also, teaching and training *per se* are changing, influenced by both the changing habits and preferences of young people (European Council 2020, Misra 2011) and the application to education of recent developments in neurosciences (Guy and Byrne 2013) . The capacity of educators to renew their roles and behaviours in line with these changes, as well as the capacity of VET systems to support their development, is even more important since the global economic recession has damaged teachers' pay and working conditions in many countries, bringing to a decline in educators' job satisfaction, security and wages (Hargreaves and Kristen 2017).

Our literature review shows that **six main trends that are having an impact on VET systems and on VET educators**:
1. Digital transformation, including industry 4.0
2. New teaching paradigms and approaches, including Competence-Based Education (CBE)
3. Migrations
4. Climate change
5. New forms of entrepreneurship
6. Increased networking and collaboration.

Two considerations must be made. First, **these trends are strongly interrelated**. For example, emerging new teaching paradigms are to a large extent connected to the use of Information and Communication Technologies (ICTs) and to increased collaboration dynamics, and at the same time have to consider the diversifying students population connected to the phenomenon of migrations. Also, a higher attention to climate change calls for innovative teaching approaches and for a more intense use of ICT to limit the carbon footprints on society. Or, the introduction of CBE can help multilateral recognition agreements, facilitating the placement of migrants, as well as the development of more entrepreneurial mindsets among learners. Second, **current research tends to tackle these trends rather individually and not holistically**[2], as shown by the fact that most of the references of Table 2 are connected to one or maximum two trends. Also it must be noticed that some of these trends are more present in literature than others: for example, while literature on digitalisation or new teaching approaches in VET is rather abundant, the case is not the same for new forms of entrepreneurship.

[2] An exception is the BILT Project by UNESCO-UNEVOC, which considers the impact on VET of different societal trends. See https://unevoc.unesco.org//bilt/BILT. In other cases some of these trends are compared in a binary way, as in the analysis run by Bohne et al. (2017) on the relation between CBE and networked teaching.

*Table 2. Impact of drivers of change on VET systems and on VET educators, as emerging from literature review*

| Trend | Impact on VET systems | Impact on VET educators | Sources |
|---|---|---|---|
| **1. Digital transformation, including industry 4.0** | The developments in digital technology, including Industry 4.0, Internet of Things (IoT), Artificial Intelligence (AI), smart production and big data, not only affect the skills demands in labour market, but also change the profile of jobs: VET systems need to adapt to cater for these changes. | Educators need to acquire both the capacity to use ICT-enhanced pedagogy and the critical knowledge about digitalisation issues such as industry 4.0, AI and IoT. They can use ICT to monitor and coach learners across different contexts. | Tyler al. 2017, Avis 2017, Wagiran et al. 2019, Thurlings 2015, Brown et al. 2019, Fullan et al. 2014, Axmann et al. 2015, ETF 2019, Misra 2011, Marope et al. 2015, Downes 2012, Bates 2015, Subrahmanyam 2020, Spöttl et al. 2016 |
| **2. New teaching paradigms and approaches, including Competence-Based Education (CBE)** | New teaching approaches are increasingly being implemented within VET, and learning environments are consequently widening to include multiple learning venues such as classrooms, workshops and online settings. CBE approaches are having a radical impact on VET system in terms of curricula and teaching methods. | Educators need to be able to apply new teaching approaches, adapting them to their contexts. CBE and personalised learning call for higher integration of theory and practice and for more teamwork among educators. | Brundiers and Wiek 2013, Anane and Okwabi 2013, Gulikers et al. 2018, Zyrianova et al. 2018, ETF 2019, Fullan et al. 2014, Axmann et al. 2015 |
| **3. Migrations and changing demography** | Migration phenomena increase the diversity of VET students, adding up to aging and changing demography dynamics: VET systems need to be oriented not only to local skills supply, but also to migrating populations, including international workers. | Educators need to acquire intercultural communication and linguistics competences, as well as the capacity to support an increasingly aging VET learners population. | Teräs and Lasonen 2013, Finnish National Board of Education 2009, Nakar 2013, ETF 2019, Van Middlekoop et al. 2017, Axmann et al. 2015, Marope et al. 2015, Tran and Pasura 2018 |
| **4. Climate change** | The transition towards sustainable economies is placing pressure on VET systems to prepare the labour force for green jobs, and calls therefore for the development of green skills. Also, a green awareness is necessary for all jobs to ensure environmentally friendly workplace practices. | Educators need both to be knowledgeable about green economy developments and to have a sustainable and green attitude in their work. | Leicht et al. 2018, Pavlova 2019, Cotton and Winter 2010, Tilbury 2011, Sevilla and Dutra 2018, Brown et al. 2019, Wesselink and Wals 2011 |
| **5. New forms of entrepreneurship** | The need for entrepreneurial capacity development across sectors as well as the new forms of entrepreneurship (circular economy, crowdfunding, etc.) are having an impact in the world of work and need to be embedded in VET provision. | Educators need to be able to develop entrepreneurship capacities among learners and need to be aware about new form of entrepreneurship. | Avis 2017, Zhang et al. 2017, Roberts and Owen 2012, Bacigalupo et al. 2016, Van Dam et al. 2010, Neck et al. |
| **6. Increased networking and collaboration** | Collaborative ways of working can bring added value to both professional and personal life. Professionalism and expertise are no longer understood as personal properties, but closely tied to communities and networks. | Educators need to become "connected professionals", capable to work through professional networks and to leverage open communities. | Thurlings 2015, Roberts and Owen 2012, Finnish National Board of Education 2009, Lieberman and Mace 2009, Marope et al. 2015 |

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Digital transformation, including industry 4.0

The increasingly pervasive and seamless presence of ICTs in our societies, and especially the rise of Artificial Intelligence (AI), is having an impact on the world of work: although digital technologies have not yet created many new jobs, the spread of ICT throughout the economy is increasing the demand for workers who can manipulate and interpret data, solve problems, and interact with the world outside their immediate workplace (Subrahmanyam 2020, Susskind and Susskind 2017). Because of this, new combinations of skills must be fostered to ensure full complementarity between human and artificial intelligence, and at the same time workers need to be able to flexibly adjust to technological change (Misra 2011). As an example, research on the implications of the 4th industrial revolution for the initial and continuing VET in Bavaria shows an increased demand of the following skills: handling of hybrid data, handling of mechatronic equipment, manipulate software based control, abilities to optimize equipment, competencies in the process optimization and securing, reading, analysing and adjusting of the data of machines, controlling the faults of sensors and actuators, object oriented software design, repairing of the networked equipment, and thinking in the terms of process (Spöttl et al. 2016). In the COVID pandemic period, the role of ICT for learning has become even more important and has been mirrored by some important policy decisions such as the one by the Estonian Ministry of Education to make available to other countries all its digital learning resources (Estonian Ministry of Education 2020).

To respond to this pressure, VET systems around the world have been enriched with courses addressing occupational changes in the ICT job market, and VET providers have increased their distance and blended learning offer (Marope et al. 2015). In order for these approaches to work, educators should get familiar with emerging technologies, and e-VET should be pursued similarly to other instructional methods and curriculum innovations (Axmann et al. 2015). Literature shows that **the ICT revolution has multiple impacts on the work of VET educators**:

- They need to be able to integrate technology into teaching practices in a pedagogically sound way, including approaches such as mobile learning, flipped-classroom, learning analytics or blended learning (Bates 2015, Ganter de Otero 2019), facilitating the possibility for learners to experience learning in real-life simulations (Kyndt et al. 2014);
- They need to have a deep understanding of new digital society developments, including Industry 4.0, smart production and big data, as well as of their effects on individuals and societies, including the phenomenon of platform-based work (Pesole et al. 2018, Lehdonvirta et al. 2019);
- They need to be able to cross the boundaries between formal and informal learning (Hilliers and Figgies 2011), using technology to facilitate *hybrid VET experiences* (at an institution, on the workplace and online) and to becoming familiar with technology being used in different economic sectors (Ganter de Otero 2019).

New teaching paradigms and approaches, including Competence-Based Education

Starting from the assumption that traditional teaching methods often are not able to equip students with the competencies to make the transition from the classroom to work settings (Fullan et al. 2014), new teaching approaches are increasingly being implemented within VET, and learning environments are consequently widening to include multiple learning venues

such as classrooms, workshops and online settings (Oddone et al. 2019). Among these new approaches, the impact of **Competence-Based Education** (CBE) on educators' new roles is fundamental. Literature shown a relation between CBE and learning personalisation (Lahn and Nore 2019), adaptive capacity (Carbonell et al. 2016 and 2014) and 21st century skills development (Pellegrino and Hilton 2012). Also, it calls for a much more integrated approach between theory and practice within VET, where theory is at the service of practice with the aim of solving real world problems within authentic contexts. The emergence of **CBE has a strong impact on the role of educators**, who have to become adaptive coaches and role models (De Bruijn 2012), ultimately being able to cross boundaries between theory and practice. Along these lines, De Bruijn and Leeman (2011) have proposed the concept of **powerful vocational learning environments**, a model of competence-based education which pays attention to both authentic and self-directed learning, grounded in the idea of cognitive apprenticeship that is acquiring complex knowledge and skills within a social and functional context. Within this model, educators should have knowledge of both vocational practice and of vocational theory to support the learning processes of students adequately. Within this model, cooperation between practical trainers, teachers of general subjects and vocational-theory teachers is key. **Teamwork among educators** is also a key component of CBE. In the Netherlands, to facilitate educators collaboration around CBE, interdisciplinary teams are created to foster the dual role of teachers as coaches and experts (Sturing et al. 2011), even if working in teams does not always provide the desired impact (Veen and Meirink 2012). Literature also shows that teachers struggle to get their every-day teaching repertoire more in line with CBE, and that they have difficulties in being a role model for students (Van Dam et al. 2010). These problems can be overcome by applying a more holistic teacher competence model, which combines professional knowledge and beliefs, motivation and self-regulation (Wuttke and Seifried 2017) and by fostering new teaching methods to be used flexibly in response to the situation, the target and the needs of learners (De Brijn 2012).

Other learner-centred emerging approaches are problem- and project-based learning, that aim to formulate solutions through collaboration (Brundiers and Wiek 2013), as well as connectivism, that sees learning as an active process of exchanging knowledge among participants with the support of educators (Downes 2012). These new teaching methods seem to have a positive impact: research on the outcomes of pedagogical change in VET in fifteen EU Member States shows higher levels of student engagement, satisfaction, perceptions of achievement, motivation and a lower likelihood of dropout (Cedefop 2016). The popularisation of these new teaching approaches, which is in line with the emergence of lifelong and life-wide learning as the central learning paradigm of our times (Campbell 2011), is having an impact on VET systems by increasing their horizontal and vertical permeability, renewing the emphasis on work-based elements, connecting initial and continuing VET, and fostering the hybridisation of systems (Cedefop 2017).

Migrations and changing demography

A third significant driver of change lies in the increased migration flows, that are having an impact on the diversity in student populations in terms of learning motivation, skills, socio-economic background, age and previous education (ETF 2019). Migrations from developing to developed economies are having an important impact on the need for VET systems to

innovate: less developed economies must establish a strong VET offer to avoid brain drain dynamics and at the same time developed economies need quality VET mechanisms to facilitate migrants' swift entry into their labour markets. Migration dynamics are also impacting on VET qualifications, that are increasingly being considered as tools to facilitate international mobility of workers, calling for VET systems to enable efficient cross-border recognition of skills (Marope et al. 2015). This challenge is being taken by UNESCO, which is exploring the possibility of identifying a set of world reference levels to facilitate the international comparison and recognition of TVET qualifications[3]. It goes without saying that migrations, and the related growing diversity of student populations, are having an impact on the role of educators, who need to improve their intercultural communication skills to be able to address international cohorts of students overcoming linguistic and cultural barriers (Nakar 2013, Axmann et al. 2015, Teräs and Lasonen 2013). Migration dynamics are having an impact on an already diversifying student population, that is aging, especially in the world's more developed economies, and increasing in numbers, especially in developing ones (Ganter de Otero 2019). These diversifications require new skills for educators, who must be able to connect adult learning with formal education, facilitating opportunities for reskilling and lifelong learning (Marope et al. 2015).

Climate change

The transformations brought by climate change affect labour markets and therefore VET systems in three ways: by calling for a shift from carbon-intensive to greener industry practices, by creating new green occupations, with the consequent introduction of new regulations and standards and by changing skills profiles in existing occupations, as the result of greening production processes and workplaces. Against this background, the concept of Education for Sustainable Development (ESD) has raised interest in the last decade both in general education and within VET, as a way to enable all citizens to acquire the knowledge, skills, attitudes and values necessary to shape a common sustainable future (Pavlova 2019, ETF 2019). This approach calls for introducing sustainable development issues, such as climate change, disaster risk reduction, biodiversity and sustainable consumption into teaching practices, and to adopt experiential teaching strategies such as role plays, simulations, debates, case studies, fieldwork and outdoor learning (Cotton and Winter 2010; Tilbury 2011). In line with this approach, the German Federal Institute for Vocational Education and Training (BIBB) has developed manuals to support educators in both VET institutions and on the workplace to integrate sustainability concerns into their teaching practices, as well as a set of occupation-specific modules on how maintenance can assist in using products for a longer time and on the mitigation of the environmental hazards associated with maintenance (Fien et al. 2009).

New forms of entrepreneurship

Transformative entrepreneurial competencies, including initiative, teamwork, creativity, emotional intelligence and other soft skills are important both for entrepreneurs and for

[3] See https://en.unesco.org/themes/skills-work-and-life/qualifications-frameworks.

employers in general, especially due to the emergence of new economic models such as the circular economy or platform-based companies. VET institutions are increasingly including these entrepreneurial competences in their offer, to prepare modern employees and potential future entrepreneurs (BILT project 2019), along the concept of entrepreneurship education, defined as a method whereby students work by creating, finding and acting on entrepreneurship-related opportunities (Neck et al. 2014). In turn, entrepreneurship education requires educators able to run activities covering issues such as generating innovative business ideas, business and strategic planning, finance, marketing, and the use of ICTs to achieve better business results Van Dam et al. 2010, Neck et al.). Entrepreneurship competences have been widely explored by the European Commission through the EntreComp framework, a tool that can help VET organisations to design interventions aimed at promoting entrepreneurial learning (Bacigalupo et al. 2016).

Increased networking and collaboration

Similarly to what is happening in all sectors of society (Jenkins et al. 2015), the requirement for more communication and cooperation with colleagues and communities, including companies and other actors is growing substantially across all educational sectors (Thurlings 2015, Roberts and Owen 2012). These increased collaboration dynamics call for renewed career schemes, professional development activities and teaching practices within VET, and bear the promise to have important benefits for both educators and learners. For example, as reported by Black and Yasukawa (2012), the collaboration between Australian VET educators and language, literacy and numeracy (LLN) teachers has improved students completions and employment rates as well as the pedagogical practices of educators.

### 3.2 A new idea of educator is emerging

The six drivers of change presented in the previous chapter are placing new demands on educators to ensure that they keep pace with what is happening in the industries for which they train workers and with the current societal developments, adding up to the societal expectations that have fallen on the shoulders of VET educators in the last couple of decades (Andersson and Köpsén 2015, Salamatov et al. 2017). Agreement exists within literature on four aspects related to this new idea of educators.

First, **educators are encouraged to work in new ways**. Literature shows that here is a trend to avoid using the words *teacher* and *trainer* and to refer to educators as *facilitators*, *coaches*, *supervisors*, *mentors*, *counsellors* (see among others Oddone et al. 2019, Rivoltella and Rossi 2012). *orchestrators* of individual and group learning, *alchemists* who compound strategies, techniques and resources, *welders* who connect bits and pieces of knowledge and activities into a meaningful whole (Caena and Redecker 2019 ). “Nowadays, vocational training teacher is not just a knowledge translator, but a teacher and researcher involved in active professional development and self-education through participation in scientific conferences, workshops, round tables of different levels, as well as in research, educational, and methodical activity” (Sokolova et al 2017, p. 83). Further to this, especially given the typical profile of VET students characterised by lower socio-economic background and lower cognitive abilities, the everyday

work of a VET educator has been defined as a mix of pedagogy, social and career development combined with socioemotional skills such as empathy, self-regulation and emotional intelligence (Marope et al. 2015, Subrahmanyam,2020, European Commission 2018). Existing studies show that **educators perceive this pressure to change**. For example, Estonian VET educators have realised that their work requires better professional, pedagogical, social and computer skills and, even if they tend to resist this new role, mentorship is perceived as a positive change (Sirk et al. 2016). This is confirmed by a recent JRC Report, where 71% of interviewed educators believe that, in 2025, their role will be different, moving towards guides, mentors, and partners in self-regulated, personalised and collaborative learning processes (Redecker et al. 2013). Other observers have noted that, despite this agreement on the needed transformation of the professional identity of educators, it is not clear what are the practical implications of this the redefinition of the concepts of professionalism and professionality (Rekkor et al. 2013). Indeed change must be gradual: as noted by De Bruijn and Leeman, the issue is not a choice between old and new ways of teaching, but rather the need to stimulate a combination of traditional and innovative teaching practices that can foster the acquisition of relevant competences. For the performance of this challenging task, in-company trainers need both a basic understanding of the theoretical key-concepts and the specific ways of thinking in the industry of action (De Bruijn and Leeman 2011).

Second, **educators are expected to expand their responsibilities**, becoming active in administration, management and quality assurance tasks, actively cooperating with colleagues and with companies and taking more responsibility in curriculum design (Misra 2011, Finnish National Board of Education 2009, European Training Foundation 2019). This expanded role appears from the way Cedefop defines educators responsibilities in one of its Briefing Note: "Teachers and trainers are responsible for strengthening the links between education and work, establishing new curricula, providing more, and high-quality, apprenticeships and other forms of work-based learning, and applying the European tools (Cedefop 2016)". These multiple responsibilities appear in the findings of Kemmis and Green (2013), who claim that educators should be responsible to equip individuals with broad-based skills and knowledge, prepare diverse learners for the labour market, develop close partnerships with industry, link formal, non-formal, and informal learning, improve levels of participation of those with low skill levels, and tailor provision to the distinctive needs of enterprises.

Third, **educators are increasingly considered as agents of change within VET reform processes**, instead of "targets" of these reforms. They are expected to be leading players, act proactively and contribute to designing and implementing new classroom and in-company learning (ETF 2019, ETF 2020). To play this active role, educators need to possess the competences needed not only to teach in new ways, but also to provide specific occupational guidance to their students (Nore 2015), and they are called to continuously engage in active professional development to continuously develop their innovative behaviours and roles (Messmann and Mulder 2011).

Fourth, **educators are called to work through collaboration and networking**, with colleagues, experts and external stakeholders such as companies or social parties. The idea is that sharing expertise in educators' day-to-day work can enables everyone to concentrate on their own strengths, promoting well-being and social capital development (Hilliers and Figgis 2013,

Tapani and Salonen 2019). Teaching through teams has shown to be effective, especially within Competence-Based Education, to integrate theory and practice within VET (Sturing et al. 2011). Literature puts emphasis as well on the increasing flexibility and individuality of learners as well as on their freedom to choose when and where to learn: these dynamics require new collaborative attitudes from the side of educators (Finnish National Board of Education 2009).

Literature recognises that **these transitions (new ways of working, expanded responsibilities, increased agency, greater networking) are difficult**, because it represents a major cultural shift within the self-perception of educators, who need to rethink and reshape the roles played within the teaching process and the underpinning knowledge production process (Rivoltella and Rossi 2012, Duch and Andreasen 2015). This change process refers not only to the way teachers design their courses, license their materials, support knowledge creation among students, but also to their professional identity, noting that educators' behaviour is shaped by both personal and professional attitudes and by the expectations of society of what an educator should be, know and do (De Bruijn 2012). This process is made more complex by the fact that in general terms educators do not feel competent in implementing innovative and collaborative approaches in their teaching (Ruys et al. 2013); as shown by the fact that, according to the OECD TALIS data, 57% of educators lack training in ICT skills for teaching; 48% in teaching for diversity; 41% in 'student counselling and behavioural (OECD 2019). Because of this complexity, educators should be given sufficient time and resources to develop innovative teaching processes, and training programmes should ensure that staff have the capacity to deal with such initiatives (Ganter de Otero 2019).

### 3.3 Profiling the 21st century educator

In table 3 we have condensed the characteristics that a 21st century teacher should have as emerging from literature. Notably, these new characteristics should exist side by side with the traditional competences of educators, that are a deep knowledge of the taught subject and a broad understanding of pedagogical strategies and approaches.

First, educators should be able to implement **new teaching approaches**, by being:
- Learner-centred
- e-educator
- Collaborative and open

Second, educators should be fluent in four **new areas of competence:**
- Digital society competence
- Intercultural competence
- Green competence
- Entrepreneurial competence

Third, educators should have a **new professional attitude**, by being:
- Active and Lifelong professional
- Networked professional.


*Figure 1: profile of the 21st century educator*

Interestingly, this structure that emerges from scientific literature produced within the last decade is quite aligned with the set of core competencies for learning professionals proposed by the European Commission already in 2012, which listed the following core competences: (a) being an expert in a field of study/practice; (b) being responsible for the further development of adult learning; (c) being a fully autonomous lifelong learner; (d) being a communicator, team player and networker; (e) didactical competence; (f) empowering adult learners; (g) coping with heterogeneity and diversity in groups (European Commission 2012).

*Table 3: The profile of the 21st century educator as emerging from literature.*

| | Characteristics | Activities | Sources |
|---|---|---|---|
| **New teaching approaches** | Learner-centred | Coaches and monitors learners across learning environments<br>Fosters relevant learning, based on learning outcomes<br>Fosters learners responsibility<br>Uses flexible time frames<br>Uses new assessment methods<br>Fosters soft skills development<br>Provides career guidance | Vuorikari 2018, Gulikers et al. 2018, Anane and Okwabi 2013, Brundiers and Wiek 2013, Achtenhagen and Winthers 2013, Zyrianova et al. 2018, De Bruijn 2012, Nore 2015, Nugumanova and Shaykhutdinova 2019, Ginsburg 2010, De Bruijn and Leeman 2011, Van der Vleuten el al. 2017, Nyamai et al. 2019, Bohne et al. 2017, Psifidou 2010, Axmann et al. 2015, Draaisma et al. 2016, Oudeweetering and Voogta 2018, Thurlings 2015, Gore et al. 2017 |
| | e-educator | Uses ICT, the internet and social media for teaching<br>Encourages learners to use the web for their learning<br>Respects copyright and online privacy | Redecker et al. 2013, Vuorikari 2018, Zeggelaar et al. 2018, Oudeweetering and Voogt 2018, Nore 2015, Bohne et al. 20017, Thurlings 2015, Roberts and Owen 2012, ETF 2019, Axmann et al. 2015, Subrahmanyam 2020 |
| | Collaborative and open | Facilitates peer and team learning<br>Works in team with other teachers<br>Encourages co-creation and sharing of knowledge<br>Opens the learning settings to external stakeholders | Redecker et al. 2013, Vuorikari 2018, Black and Yasukawa 2012, Zeggelaar et al. 2018, Oudeweetering and Voogta 2018, Heikkilä 2013, Bohne et al. 20017, Thurlings 2015, Roberts and Owen 2012, Oddone et al. 2019, Huitt and Monetti 2017 |
| **New knowledge areas** | Digital society competence | Understands digital issues (AI, big data, etc.)<br>Foster responsible digital citizenship (personal data management, media literacy, digital ethics, etc.) | Redecker et al. 2013, Zeggelaar et al. 2018, Oudeweetering and Voogta 2018, Thurlings 2015, Axmann et al. 2015, Subrahmanyam 2020, Pesole et al. 2018 |
| | Intercultural competence | Fosters intercultural communication with and among learners<br>Includes students from different backgrounds | Vuorikari 2018, Teräs and Lasonen 2013, BILT project 2019, Axmann et al. 2015 |
| | Green competence | Fosters environmentally sustainable behaviours<br>Reflects on sustainable dynamics with learners | Brundiers and Wiek 2013, Pavlova 2019, Cotton and Winter 2010, Wesselink and Wals 2011, ETF 2019 |
| | Entrepreneurial competence | Fosters entrepreneurship and risk-taking<br>Is aware of the needs of business and employers | Zhang et al. 2017, Valerio et al. 2014, ETF 2019, Subrahmanyam 2020, Khorrami et al. 2018 |
| **New professional development attitude** | Active and Lifelong professional | Searches proactively for PD opportunities<br>Develops autonomously through their career | Evers et al. 2017, Hardy 2013, Messmann and Mulder 2011, Borasi and Finnigan 2010, Nakata 2011, Thurling et al. 2015, Desimone and Garet 2015, Axmann et al. 2015, ETF 2019, Smith and Yasukawa 2017 |
| | Networked professional | Learns through peers and communities<br>Learns through ICT means and social networks | Redecker et al. 2013, Vuorikari 2018, Hardy 2013, Roberts and Owen 2012, Oddone et al. 2019, ETF 2019, Carpenter and Krutka 2014 |

### 3.4 Emerging teaching approaches and competence areas

Table 3 shows the profile of the 21st century educator as emerging from literature, clearly showing that the role of educators, traditionally considered as the *experts* tasked with communicating the necessary bodies of knowledge to students, is being questioned by educational researchers who claim that educators must be able to implement teaching approaches that are learner-centred, ICT-intensive, collaborative and open and that consider the learner personal trajectory in a lifewide fashion. We recognise that setting the objective that every educator should master all these competences is probably too ambitious, and this is because the table presents an ideal holistic profile of the 21st century educator, while most of the papers quoted there focus on one or two of these competences. Still, this set of competences sets an important target that could be approached not having in mind individual educators but rather teams of educators, that could work in a collaborative way.

A central concept in this respect is **learner-centred pedagogy**, intended as a set of alternative teaching approaches that at the same time are responsive to the interests and needs of contemporary learners and that can foster the initiative and autonomy of learners. Literature agrees in fact that these approaches can foster learners' motivation, increase their control over the processes of learning, give greater attention to learning outcomes and to those individual factors associated with risks of dropout (Cedefop 2015, Redecker et al. 2013). Within Europe, learner-centred pedagogies such as group work, project work and enquiry-based learning were found to be more common in countries such as Denmark, Italy, Malta, the Netherlands and Finland, than in others, where they are regarded in literature and policy debate as useful methods but there is no strong evidence of their use (Cedefop 2015). This is due, among other things, to the fact that in many countries competences related to these pedagogies are not developed in initial teacher training or in professional development of teachers and that qualifications standards do not provide pedagogical guidance connected to these competences (Cedefop 2016). Learner-centred assessment is also part of the picture, even if Achtenhagen and Winther (2014) claim that VET research largely ignores the importance of implementing innovative assessment practices, noting that a long-term innovation cannot succeed if assessment is not seriously considered.

Connected to learner-centred pedagogy, another concept that is rather common, especially in some EU countries such as Denmark, Finland, the UK and the Netherlands (de Bruijn and Leeman 2011) is **vocational pedagogy**, that entails the capacity of educators to make decisions in relation to particular students or trainees and in relation to the vocational skills and knowledge they wish them to develop (Nore 2015). This stresses the **individual agency and the independence of educators**, and pushes forward a rather mature conception of educators' professionalism (Hanley and Orr 2019). Finland is quite advanced in this respect, having transformed the work of educators from teaching alone to teaching interactively in teams: through this approach Finnish teachers are able to take care of the students' individual needs, so to enable individual skills to meet the needs of the workplace in a flexible manner (Tapani and Salonen 2019). Similarly, as shown from the experience of the Netherlands, the organisation of the curriculum and educational pathways according to the needs of the individual learner is also a way to better design learners' careers, the identification of learning needs at the start of vocational study programmes being one of the key principles (Sturing et

al. 2011). Connected to vocational pedagogy, the concept of **authentic learning**, intended as a pedagogical approach able to situate learning activities in the context of future use enabling learners to develop real-world practical knowledge, is also increasingly being applied within VET settings. Authentic learning, which connects very well with CBE methodologies such as Project-Based learning (Richard 2015), can flourish within ICT-enabled learning environments both in blended and fully online courses (Herrington et al. 2013), as in the case of teacher education in Finland (Sirkku and Päivi 2018) or of nursing education in Taiwan (Pu et al. 2016).

A third concept emerging from literature, that combines the characteristics of *e-educator* and of *collaborative and open* is **ICT-enhanced open collaboration**. This is supported by theories such as connectivism, that considers that the spread of ICT and the deriving open and networked pedagogic approaches are challenging traditional schemes within education systems, starting from the idea that educators are the only ones entitled to produce and deliver knowledge (Vuorikari 2018, Downes 2012, Ozturk 2015). Apart from the functional skills on how to use ICT and from the pedagogical skills that are needed to make an appropriate use of technology for learning reasons, VET educators need to be equipped with a set of competences to actively manage the knowledge they produce and to make use of the knowledge produced by their students, in a collaborative, engaging and transparent way (Caena and Redecker 2019). Nascimbeni (2018) proposes five kinds of competences in this respect. First, **personal data management**, intended as the capacity to understand the explicit and implicit terms of use of online platforms and the business models of services that we pay for with our data, as well as to adjust one's behaviour based on legal and technological developments. Second, the **capacity to work in open settings**: in an increasingly participatory society where openly sharing knowledge is becoming in many cases the norm, the capacity to both share the knowledge we produce and to make use of knowledge produced by others is key. Third, the **capacity to engage through ICT**: educators must be able to prepare students to be active and participative stakeholders in the knowledge-sharing society, managing their emerging collective intelligence dynamics in an open and transparent way. Fourth, **critical media literacy**, that means being able to deconstruct, question and challenge media content, guiding learners on how to consume, understand, and create media that corresponds to factchecking standards. Fifth, the **capacity to deal with digital ethical issues**: questions such when and at what condition can data be shared or whether it is right to use openly available data are at the core of the debate on digital society, and should be mastered by contemporary educators. Two considerations must be made about these competences. First, this is not an exhaustive list, since new competences are continuously being codified (Nascimbeni 2018). To make an example, *computational thinking* might soon be added to the list, given its role in facilitating the understanding of how and why certain elements of our digital world are framed in specific ways, including the way big data and related algorithms work. Second, these competences, some of which were not even arrayed as such just a few years ago, dynamically evolve over time, influencing and being influenced by ICT developments themselves, and are deeply connected with each person attitudes and behaviours (Cronin 2017).

The concept of **lifewide learning** is also emerging, intended as the capacity of educators to inspire, guide and challenge learners to look beyond the present: reflecting and understanding, encouraging metacognition, critical thinking and competence development, engendering self-confidence, self-esteem and respect for others (Oudeweetering a and Voogta 2018). Researchers from the Netherlands suggest that *career learning environments*

can be helpful to enable students to develop future-oriented career competencies, and that for this to be done VET institutions should take a more long-term approach with respect to their learners' careers (Draaisma et al. 2016). Connected to lifewide learning is the concept of **careers education**, which refers to those services, programmes and activities aiming to link students' learning to lifelong career management and employability skills (European Training Foundation 2019). Given the importance of guiding learners through possible careers development, educators need to develop specific counselling skills to fulfil this role by working both across the curriculum and via extra-curricular activities such as careers, fairs, and workplace visits (European Training Foundation 2019).

The 21st century educator, apart from being able to teach in line with the new characteristics and needs of both labour markets and learners, should master contemporary competencies in those areas of changes identified in Table 2, in order to act as a positive role-model for learners, going beyond their specific teaching subject (Subrahmanyam 2020). **Contemporary educators must be digital, intercultural, green, entrepreneurial**. For each of these areas of competence, then need both to fully understand the implications of these developments for their learners and their future careers and must embed these competences in their knowledge, beliefs and behaviours (Baumert and Kunter 2013). Also, they need to inspire learners by being lifelong learners themselves in these areas, by keeping updated on these knowledge fields that are continuously and rapidly changing. **Digital society competence** is key for educators not only to prepare learners for future digital jobs and to act as an example of a critical digital citizen, but also because an appropriate us of ICT is fundamental across all the activities included in the profile presented in Table 3. Moreover, emphasis should be placed on the acquisition of transferable skills and the attainment of a general familiarity with new technologies such that teachers and trainers can adapt as new technology requirements and approaches evolve (Axmann et al. 2015). While VET systems are increasingly embedding virtual and distance learning in their offer, especially in the context of the current COVID-19 pandemic (Ganter de Otero 2020), a good example on how to develop digital competence comes from Germany, where VET centres are recommended to use ICT in their courses in order to increase accessibility, effectiveness and quality of their teaching, recognising that trainers and teachers with professional digital competences are crucial for high quality VET (Ganter de Otero 2019). **Intercultural competence** means that educators need to be able to offer inclusive education in an increasingly interconnected world. They also need foreign, especially English, language skills to communicate with and learn from other countries (Axmann et al. 2015). In their study on multicultural VET education in Finland, Teräs and Lasonen (2013) note that intercultural competence is constructed contextually and is intertwined with activities such as of boundary crossing processes and of innovative pedagogies. **Green competence** is often connected with the concept of Education for Sustainable Development (ESD), that has the objective to enable all human beings to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future (Leicht et al. 2018). This includes both introducing sustainable development issues, such as climate change, biodiversity and sustainable consumption into teaching activities and to motivate learners to consider sustainability issues. Even if a full understanding of the knowledge and skills needed to live and work in greener societies is not yet fully developed (European Training Foundation 2019), Cedefop notes that green skills can have different levels of complexity: generic green skills are the ones which help developing resource-efficient and eco-friendly behaviours, specific green skills are the ones which protect ecosystems through specific

standards, while highly-specialised green skills are the ones needed to work in sectors such as renewable energies or recycling (Cedefop 2019). Notably, the 2013 Scottish teaching professional standard embeds Learning for Sustainability as a criteria that all registered education professionals are expected to comply with throughout their careers (Qablan 2018). As recognised by the BILT project, VET educators need to develop **entrepreneurship competences** (BILT project 2019), in a moment when, due to emerging grassroots economic models as well as to the increasing flexibility of labour markets, including the drive towards the platform economy, their role is fundamental to both transfer entrepreneurial technical skills and to promote and encourage an open and entrepreneurial mindset among learners. 21st century educators should therefore both understand the relevance of entrepreneurial thinking and be aware of the needs of business and employers in their sector of action (Valerio et al. 2014). Notably, these competences can be better achieved through collaboration in peer networks and with companies (BILT project 2019).

**New Professional Development attitudes**. VET educators should develop a lifelong learning mindset, including a willingness to learn about the emerging concepts presented above and new pedagogical methods such as MOOC, mobile learning and simulation, to ultimately integrate those concepts and methods into their teaching. As noted in a study on Ireland, autonomy is important since it connects personal and professional accountability in a long term professional perspective (Conway and Murphy 2013). Looking at Japanese educators, Nakata (2011) revealed that the lack of collaboration prevents teachers from innovating, and that collegiality positively influences educators innovative behaviour. According to Hillier and Figgis (2013), professional networks are key to facilitate the transfer of tacit knowledge and therefore to develop socially-constructed practice. The authors propose the concept of *innovation ecology*, intended as way to encourage at the same time innovative thinking and innovative action, as a safe experimentation environment where practitioners and managers can address the challenges of implementing change so that innovation can be sustained.

### 3.5 Key literature


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# 4. Emerging educators' profiles and standards

## 4.1 Mapping innovation within educators' competences frameworks

In order to understand the distance between the ideal profile of the 21st century educator presented in the previous paragraph and the approaches currently adopted around the world, as well as to indicate areas of improvement for future work, we have been mapping a number of national and supra-national competence frameworks educators competences frameworks (ECF) and professional standards. Our aim was to check the relevance of the competences identified in Table 3 as specifically embedded in ECFs or other documents outlining standards for the teaching profession, since these are normally the ones that guide national teachers capacity building interventions.

It must be noted that a fully comprehensive review is beyond the scope of this study, and the collection of documents surveyed is both heterogeneous and has substantial geo-political gaps (due to either lack of documentation or access to it). Still, Table 4 constitutes a useful exercise to showcase high-level trends and (mis)alignments between educators ideal competences sets and existing expectations and standards.

*Table 4. Mapping of the 21st century educator characteristics across existing competences frameworks[4].*

| **Educators profile, geographical scope, year** | **New teaching approaches** | | | **New knowledge areas** | | | | **New professional development attitude** | |
|---|---|---|---|---|---|---|---|---|---|
| | **Learner-centered** | **e-educators** | **Collaborative and open** | **Digital competence** | **Intercultural competence** | **Green competence** | **Entrepreneurial competence** | **Active and Lifelong professional** | **Networked professional** |
| European teachers and trainers for the future", EU, 2020, link | | | | | | | | | |
| Performance Management System, Singapore, 2006, link | | | | | | | | | |
| Training Regulations, Philippines, 2015 link | | | | | | | | | |
| Competence Framework for VET professions, EU, 2009, link | | | | | | | | | |
| Teachers' standards, UK, 2011, link | | | | | | | | | |
| Estonian standards for teachers, Estonia, 2013, link | | | | | | | | | |
| Las Competencias Profesionales, Galicia, 2017 link | | | | | | | | | |
| Professional Teaching Standards, USA, 2016, link | | | | | | | | | |
| Teaching Quality Standards, Alberta, Canada, 2007, link | | | | | | | | | |

[4] Dark blue means that the issue is tackled as one of the main areas of competence or as one of the most important competences within one area. Light blue means that the issue is mentioned in the framework description but it is not a competence area nor a key competence within any area.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Teacher Competency Standards Framework, Myanmar, 2017, link | | | | | | | | | |
| Malaysian Teaching Standards, Malaysia, 2009, link | | | | | | | | | |
| Teaching Competency Standards, South-East Asia, 2010, link | | | | | | | | | |
| Pan-Commonwealth Standard Framework for Teachers and School Leaders, 2016, link | | | | | | | | | |
| Practising Teacher Criteria, New Zealand, 2006, link | | | | | | | | | |
| VET Practitioner Capability Framework, Australia, 2013, link | | | | | | | | | |
| Towards a Learning Profession, Hong Kong, 2003, link | | | | | | | | | |
| Teachers Competencies, Council of Education, India, 2014 link | | | | | | | | | |
| Marco para la Buena Enseñanza, Chile, 2008, link | | | | | | | | | |
| Competence of a Future Teacher, Russia, 2012, link | | | | | | | | | |
| Teacher Standards and Competencies, Southern African Community, 2017, link | | | | | | | | | |

### 4.2 Emerging considerations

As it appears from Table 4, most of the mapped competencies framework do assign importance to **innovative teaching approaches** (calling to different extent for teachers that are learner-centred, e-educators, collaborative and open, to use our categories) and to **new professional development attitude**, setting standards for teachers to be (or become) active, lifelong and networked professional. On the other hand, **the great majority of ECFs do not include the new areas of competence that emerged from literature:** digital, Intercultural, green and entrepreneurial competences are absent from most of the frameworks. Positive exceptions in this respect are the 2020 EU Council conclusions on European teachers and trainers for the future and the ECF from the Philippines, even if it must be noted that some of those frameworks have been produced more recently than others, and this is most probably having an impact on their innovation permeability.

It must be reminded that with Digital Competence here we do not intent the capacity to use ICT-intensive teaching approaches, which is actually present in the great majority of the ECF, but the critical understanding of issues connected to the digital revolution such as Artificial Intelligence and Big Data, and the capacity to foster digital citizenship among learners. **Digital competence typically defines the instrumental use of ICT, and very rarely argues for a critical and risk-aware use of technology**, nor provides a specific framing of criticality in digital contexts (Nascimbeni 2018). On the other hand, it would be very important to include these competences in existing educators' profiles so to stimulate their role as active digital citizens and as role models for their students. Furthermore, when digital competences are discussed, they are often reduced to a passing mention, or is otherwise minimal, often limited to highlighting a generic need for "appropriateness" in the materials and approaches[5].

Another finding from the mapping is that **Educators Competences Frameworks (ECF) are rather different in terms of approaches**. As noted also by Torrance and Forde (2017), some ECF provide a career-long development framework, such as the Scottish professional standards for teaching, which has been deeply analysed by Forde et al. (2015), while others do not consider the teachers progress in their careers, such as the English *Teachers' Standards*, and are not able to grasp the complexities of practice realities (Forde et al. 2015). Also, some frameworks are general to all educational levels and therefore do not include competences typical of VET such as entrepreneurship nor skills connected to practices such as work-based training.

**The great majority of the mapped CF refer to the work of educators in VET institutions, while only in in a cases of the Philippine and CEDEFOP's frameworks they consider as well the competences needed within work-based learning or apprenticeship schemes** (Tūtlys et al. 2019, Broeke et al. 2017). Confirming this, Cedefop noted that, even if many EU countries are developing competence requirements for trainers in continuing VET and adult learning, mandatory qualification requirements to work as a trainer in company existed only in Poland and Portugal, and that EU countries with established apprenticeship systems, such as the

[5] This is not the case for Digital Teachers Competences Frameworks, such as for example the DIGCOMPEDU framework proposed in 2017 by the European Commission (Caena and Redecker 2019), which is based on a rather holistic understanding of digital literacy, that considers the needed digital competences of 21st century educators together with their professional engagement activities and with the impact that teachers can have on their learner's digital literacy (Nascimbeni 2018).

Czech Republic, Germany, France, Croatia, Italy, Hungary, Austria, Poland, Slovenia and Slovakia, are devoting attention to the competences of in-company trainers (Cedefop 2016). These competence requirements, which are not yet formalised within national frameworks, can take the form of qualifications combined with professional record, or of qualification combined with years of experience in the profession and pedagogical training (Cedefop 2016)

In line with the finding of Wuttke and Seifried (2017), **the majority of the mapped ECF design a rather holistic competence model composed by a combination of professional knowledge and beliefs, motivation and self-regulation**. In addition to technical skills related to teaching topics, ECF often include new areas of competence such as greening or digitalization, professional and personal development of teachers is also included in these frameworks. Also, we notice the **growing importance of soft skills**, such as creativity and critical reflection of the own work, within existing teachers competences: these skills are sometimes integrated transversally or considered under areas such as the one of entrepreneurial skills (BILT project 2019).

**Supra-national exercises are relevant**, both because they set international benchmark that are adaptable to national contexts ad because they are developed through dialogue activities such as workshops and consultations. Apart from the longstanding work in the European Union led by Cedefop, both South East Asian and Commonwealth countries have been recently running such exercises, which have represented the basis for the development of regional ECFs. Connected to this, we note that **intense benchlearning** exists among countries when it comes to designing professional teaching standards. For example, the South African government has run a study in 2017 to inform the development of its professional teaching standards examining the use of standards in six countries: USA, England, Australia, Jamaica, Namibia and Chile (CDE, 2017). Other examples are a recent paper by OECD compares the impact of ECFs in Australia, Estonia and Singapore (Révai 2018), the comparative research on VET teaching competences in Germany, Italy and Lithuania by the VETNET network (Tūtlys et al. 2019) and the work of the BILT project by UNESCO-UNEVOC which has recently organised a Virtual conference on New qualifications and competencies in TVET.

As noted above, the three ECF which consider the new areas of competence emerging from literature are the ones by the **European Council**, **Singapore** and the **Philippines**. Even if they have been developed within quite different contexts, these frameworks deserve attention because they include, to different extent and with different wording, the capabilities connected to new teaching approaches, new competence areas and new professional development approaches, representing examples of advanced profiles of 21st century educators. Nevertheless, it must be remembered that the context of origin of these standards and their state of development play a fundamental role. To make an example, when confronting the standards emerging from the work of the European Commission with the ones from Singapore, it should be remembered that Singapore is a very special case since teacher training is run by a single centralised institution, which develops and monitors the national standards as well (Révai 2018). Also because some of these frameworks are very recent, evidence on their level of implementation and on their impact on VET systems and educators is quite scarce; it would be important to close this gap, possibly through some field research, in order to understand how the implementation of these framework is being supported and to allow benchmarking best practices transfer.

Another rather holistic approach is the one of **Finland**, which has been analysed by Tapani and Salonen (2019). In a context where learner-centred pedagogy is explicitly required within all vocational teacher education programmes, the curriculum for vocational teacher education specifies that teachers should have:

- knowledge and understanding about learning, which refers to the teacher's awareness of learning from the theoretical and philosophical perspective;
- knowledge and understanding about learners, meaning the teacher's awareness of the diversity of learners;
- personalised teaching/facilitating and assessment skills, which means the teacher's ability and willingness to account for the individual characteristics of the students in the planning and implementation of teaching and in the guidance and assessment of learning;
- new technology skills, which means the skills and motivation of the teacher to use new technologies in developing learning environments and in learning.

Interestingly, a rather innovative and well-structured educators' competences framework for Finland has been developed by Microsoft under the name of "Road to 21st Century Competences". Presented as an assessment tool to supports teachers in evaluating how well they plan their lessons for teaching 21st Century competences, this framework deserves attention – even if it does not focus specifically on VET educators but on general educators – since it represents an example of a framework produced by a commercial provider to be used within a specifi country.

The Malaysian ECF deserves attention for its structure. Starting from the understanding that a new paradigm for VET is needed and that teachers are the key for this to be developed, following a thorough literature review, Arifin et al. (2017) developed a rather holistic ECF for **Malaysia**, which identifies four competencies areas.

- **Teaching competency:** the ability to integrate the theory and practice in classrooms activities, considering vocational learner background and using different teaching techniques and practical approaches to reflect the teaching objectives.
- **Professional Competency:** the mastery of the contents of knowledge with the latest information required by vocational learners, considering current industry needs.
- **Communication competence:** the ability to perform effective communication not only with leaners, but with parents of learners, colleague and the industry.
- **Personal competency**: self – images, ethics and personal goals are the personal traits that can enhance educators' job performance, keeping abreast on new relevant theory and new technologies to use in classrooms.

**The way governments publish their ECF is also interesting**. The U.S. ECF is a good example in communication terms since it is presented through a rather complete website (http://accomplishedteacher.org/) where recent articles on teachers innovation are also presented. The ECF from Singapore is thoroughly presented in a report that contains a description of the achieved milestones in teachers education as well as a set of recommendations on how to implement the ECF, making it very friendly and usable. Another good example is the website of the ECF of New Zealand, that clearly presents the framework as one of the component of educators career and CPD, along other dimensions such as "Becoming a Teacher", "Getting Certificated" and "Practising as a Teacher".

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## 5. Change in educators career developments and structures

### 5.1 Innovative careers structures for contemporary educators

Literature converges on the fact that one of the causes of the global shortage of quality TVET personnel (Rawkins 2018) is the **low quality of recruitment pre-requisites and initial teacher training programmes** in many countries (Axmann et al. 2015, Hanley and Orr 2019). VET educators are often recruited through school or university systems rather than from industry, so they lack the specific skills of the work they prepare students for (Euler 2015). Additionally, they are often hired to fill urgent needs with not enough time for initial training (Chatigny et al. 2012). Researchers often call for a complete restructuring of the existing pre-service model, which in many cases is grounded in theoretical content rather than practical application and skills (see for example Stoddart et al. 2013). Among the factors that hamper career development of educators, Marope et al. (2015) underline the difficulty to link VET teacher training programmes to practice in the workplace, and the disconnection, particularly where academic models prevail, between the educational part of VET teacher training programmes and the implementation of the acquired competences on the workplace. In line with this, international organisation agree in advocating for a higher integration of theoretical education and practical training, overcoming the traditional separation of roles between VET teachers and trainers (Cedefop 2013, Marope at al. 2013, Ganter de Otero 2019, ETF 2019).

The UNESCO report *Unleashing the potential* notes that **many countries are working to upgrade the paths to become a VET educator** and some progress has been made, establishing for example TVET teacher training coordinating bodies with responsibility for pre-service training or introducing masters' programmes for teachers (Marope at al. 2015). Some European countries have started to develop specific teacher training programmes to support the transition of workers with industry experience into the teaching profession, often through modularization and part-time training, such as the lateral entrance approach in the Netherlands (Cedefop 2010). Also, numerous developing countries have introduced requirements for masters' level qualifications for TVET teachers (Axmann et al. 2015).

Policy-makers have introduced forms of VET hybridization, blurring some of the traditional distinctions between VET and 'academic' education streams, with the aim to improve pathways to adulthood, deliver labour market benefits, improve pedagogy, and reduce costs within VET systems (Andersson et al. 2013, Marope et al. 2015). The concept of **hybrid teacher/trainer** is emerging, indicating educators working part-time working in a company and part-time as a teacher in a vocational school, with its potential to contribute to more innovative school-based environments and to foster cooperation between VET organizations and companies (European Commission 2020). This concept opens interesting **hybrid educators careers** perspectives, such as the *Middelbaar beroepsonderwijs* (MBO) program in the Netherlands, where up to one-half of the course is based on traditional teaching while, at the same time, learners get an extensive amount of work-based training in their area of specialisation. Another example is the Danish *Practicum*, a model that aims to develop new types for partnerships between schools and companies by developing a kind of 'third learning environment' situated between the vocational school and the training company: here VET

teachers work in full collaboration with the apprentices and companies involved (Nord-VET 2016). For these approaches to be successful, **hybridisation of VET teaching** is required: this can be achieved through teachers and trainers who work in both VET institutions and companies, through closer collaboration between VET teachers and trainers, and by fostering the role of mentors and career counsellors to support and guide learners (Cedefop 2016). Along these lines, the ILO recommends a scheme for training system for VET educators that can be applicable globally, composed of the following four phases: a) providing initial training, either at university level or at the workplace), b) requiring non-academic work experience, c) supporting pre-service teacher training and d) emphasizing CPD or in-service teacher training (Axmann et al. 2015).

Also, efforts have been made to **address the low motivation of educators to develop professionally**, a factor that is hindering successful career paths within the VET sector. The idea is that by adding a more diverse range of career opportunities will provide incentives to individuals to pursue professional development opportunities (Andersson and Köpsen 2019, Berger and Girardet 2016, Stenfors-Hayes et al. 2012). Another strategy to increase motivation is to increase the external visibility of educators; for example, Croatia and Serbia have started to establish positions within VET institutions for coordinating external affairs with employers, industrial associations and unions (Rawkins 2018).

An interesting model, somehow inspired by the German Berufsakademie, is the one of **parallel pre-service training through institutional networks**. Through this model, a number of institutions work together for the development of educator competences: typically, universities teach the theory and model research approaches, VET colleges teach practical or functional aspects of the job, companies provide knowledge about the competences needed within the occupation (Van Waes et al. 2016). This model, that has been piloted for example by the Vet-Net project in Ethiopia, Germany, Mozambique and South Africa, can make sure that each area of the educator profile is developed and that working relationships with key stakeholders are established from the start of the career (Rawkins 2018).

The Centre for International Education Benchmarking has analysed the **common characteristics of the career systems of the best educational systems** according to the 2018 PISA results, namely Canada, China, Estonia, Finland, Hong Kong, Japan, Poland, Singapore, South Korea, and Taiwan, and has concluded that all top-performing systems all have policies in place to make sure that the best possible educators are recruited and are offered an inviting career perspective (NCEE 2020). This principle, even if emerging from an analysis of teachers in general, should be kept in mind also when designing careers for VET educators. The following characteristics are common to these systems:

- They have a very limited number of educators training programs, just one in the case of Singapore, and all of these are run by top research universities.
- Entry into the educator profession is very competitive (with a 1 to 10 ratio in Finland) so that only the most qualified candidates are admitted, and some countries allow only the best high school graduates to apply.
- Selection requirements are multiple and include interviews, exams and demonstrative lessons.
- Educators' initial training tend to emphasize the content that teachers will be expected to teach, the capacity to apply teaching techniques to help students with problems, and the

capacity to improve one's teaching, including piloting new approaches, evaluating the impact on students and making corrections.

- At least a year of is provided for practical on-the-job experience, under the guidance of trained mentor educators, sometimes in specific schools that collaborate with the preparation programs.

A number of **countries have been restructuring their educators' career schemes**, both in general and specifically for the VET sector, with the aim to to recruit and retain motivated educators with the right competences. These countries include Australia, Canada, Estonia, Finland, Germany, Hong Kong, Korea, Poland, Singapore, Scotland and the Netherlands. Among these countries, some interesting innovative approaches deserve attention and could be further researched. In the **Netherlands**, competence-based education (CBE) is having an impact on educators' career development, implying the organisation of the curriculum and educational pathways according to the needs of the individual educator; the identification of learning needs at the start of vocational study programmes is one of the key principles (Sturing et al. 2011). In **Finland,** individualized learning programmes are offered to perspective educators that allow changes in the length of studies combined with the use of modern digital technologies, based on the concept of continuous competence development. In this system, where VET students can choose the most suitable study path according to their needs and goals, the new role of educator is made explicit with careers such as 'qualification coordinator', 'digital tutor teacher' or 'work-life cooperation coordinator'. Also, these educators work as 'pedagogical peer coach' by helping, advising and encouraging peer-educators to face everyday challenges and changing situations (Lavonen 2020). Notably, in Finland a career as a VET educator is considered attractive, as shown by the reflected in the high number of applications to enrol in vocational teacher training programmes.

As noted in a recent report by the European Training Foundation, **ETF countries** are also experimenting innovation in this respect. Albania is piloting a basic didactic programme for VET teachers and trainers.; Georgia is piloting guidelines for teaching oriented towards individual student needs; Kazakhstan has trained a number of teachers and trainers within the framework of its pilot project on introducing CBE and dual VET (also noted by Nabi et al. 2016), and Kosovo has developed and piloted a teacher-performance assessment system. In Turkey, entrepreneurship training has been provided to part of the teaching workforce in VET, and a school-based vocational development guide in support of teachers' professional development has been piloted in six provinces of the country (European Training Foundation 2018).

### 5.2 Key literature

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# 6. Change in educators professional development systems

## 6.1 The relevance and complexity of Educators Professional Development

Education systems are increasingly recognising the importance to consider educators as lifelong learners, as shown by the many high-profile commitments to promoting quality professional development for VET educators (Euler 2015). Also, **a positive correlation between Educators Professional Development (EPD), quality teaching practices and student outcomes** exists, as shown by two recent meta-reviews (Darling-Hammond et al. 2017, Teacher Development Trust 2015). On the other hand, international studies agree as well that only a small proportion of educators participate in high-quality professional development activities (OECD 2017) and that **professional development programmes are often ineffective**, typically relying on conventional and top-down teaching without having much impact on practice (Cedefop 2014, Rasmussen 2015). EPD systems are inhibited by a number of barriers: low planning coordination, insufficient funding, lack of quality assurance culture, absence of systematic formal certification of professional development, low professional ethos in support of professional development and weak responsiveness to the needs of both VET systems and educators (Rawkins 2018). A literature review by Vermunt and Endedijk note that existing models of EPD, both in institutional VET and in workplace settings, rarely incorporate the problematic aspects of learning, such as frictions between expectations and actual events or struggling not to revert to old ways of teaching, even if these problematic aspects play an important role, both in novice and in experienced teacher learning (Vermunt and Endedijk 2011).This is true especially for EPD in work-based-learning settings, that is not able to offer trainers the chance to deliver the desired quality in WBL and do not stimulate mutual cooperation and communication (Broex et al. 2017).

Literature describes several **characteristics of effective EPD**: it needs to contribute to useful outcomes in the labour market, it has to be designed with social partners and employers, it has to include both subject-related knowledge and transversal skills, it has to include context-rich learning, be team-based, and possibly be blended with informal learning characteristics (Darling-Hammond et al. 2017, Namamba et Rao 2017). Also, an important characteristric of successful EPD is its capacity to focus on learners' personal development; this is becoming very relevant given, among other developments, the emergence of new categories of workers and learners such as platform workers, that are fundamentally responsible for their own skills development (Lehdonvirta et al. 2020). Finally, in terms of pedagogy research has shown that, as it happens for learning in general, EPD provision should be "experiential, grounded in enquiry, collaborative, sustained and derived from teachers' work with their students" (De Paor 2018, p. 4) and should be based a collaborative culture within VET organizations (Andersson et al. 2018). As stated in the Finnish Curriculum for VET Educators: "The cornerstone of teacher education is a conception of man, knowledge and learning, which emphasises teacher students' own participation, collaborative knowledge building and assessment as well as developing new ways of working. This type of reflective, exploratory, developing and entrepreneurial way of working is called participatory" (Teacher Education 2018).

## 6.2 Emerging EPD approaches

The importance of Educators Professional Development is growing in the present times of change, given the importance of updating the competences of educators in line with the new emerging roles and profiles that have been detailed along this study. In other words, EPD is key to continuously prepare educators for their hybrid role as teachers/trainers, mentors and counsellors and for supporting active and open teaching (Cedefop 2020). Literature concurs that the increasing complexity of educators' professional practice calls for sophisticated and innovative professional learning, suggesting that educators' agency, collaboration, and active participation must be fostered to create enduring changes in practice (Desimone and Garet 2015, Csíkos et al. 2018). Recognising that traditional models of EPD are often disconnected from practice and have limited impact (Czerniawski 2013) and that a gap exists between what is known to be effective and what educators experience (Fletcher-Wood and Zuccollo 2020), traditional EPD formats such as courses and seminars are increasingly complemented with other innovative activities. The Joint Research Centre of the European Commission has analysed 30 educators' EPD practices, concluding that digital platforms, interactive content, new teaching processes and stakeholders networking can take the professional development of educators to a higher level and create direct impact on student learning (Vourikari 2019). In general terms, even if traditional approaches are still the norm in most countries and innovative EPD approaches are often in pilot phases (Cedefop 2014), literature is witnessing a trend going from traditional EPD approaches, typically centred around standards, accountability and efficiency, to initiatives that strongly rely on ICT and on peer-collaboration to develop the sorts of skills and characteristics required 21st century educators (Cedefop 2014, Marynchenko 2017).

We have categorised **four typologies of innovative Educators Professional Development** emerging from literature:

1. Digitally-enhanced and mobile EPD (Vourikari 2019, Axmann et al. 2015, Pegrum et al. 2013, Dann and Allen 2015)
2. Professional communities of practices (Macià and García 2016, Lieberman and Mace 2009, Heikkilä 2013, Trust et al. 2016, Burke et al. 2015, Tseng and Kuo 2014)
3. Personal Learning Networks (Beauchamp et al. 2015, Trust et al. 2016, Visser et al. 2014, Vourikari 2019, Oddone et al. 2019, Tour 2017)
4. Innovative design based approaches, including new ways to engage stakeholders (Aubusson et al. 2009, Swanson 2013, De Paor 2018).

<u>Digitally-enhanced and mobile EPD</u>

Digitally-intensive strategies of EPD are gaining ground, both because they are more effective that traditional modalities and because they are able to support and motivate teachers to develop their digital competences (Prestridge 2017). Among the many practices collected in literature, two example from Germany are particularly interesting, focusing on the acquisition of vocaltional skill. The *Competence Workshop Toolbox* is a method focused on providing conceptual and digital support to training in companies, vocational schools and in-company training centres, that offers a cross-media set of instruments to train staff and trainers, as well as an online tutorial course in social media addressing educators and consultants working in the field of job application and career entry. The Baden-Württemberg initiative *Learning*

*Factories 4.0* supports ICT-rich laboratories that are similar to in-company facilities, featuring automated solutions and professional equipment, where educators can learn how to use technologies and processes (Hippach-Schneider and Huismann 2019). Also, a recent UNESCO-UNEVOC report presents the case of the University of Management TISBI in the Russian Federation, which offers a training module *Digital technologies and ICT in teacher training activity*, developed in cooperation with the CISCO Networking Academy and delivered via face-to-face seminars using a multimedia complex with 3D visualization (Subrahmanyam 2020). A promising area of development within educators EPD is connected to the **use of mobile-devices,** that can support learning anywhere, facilitating the breaking of walls between the classroom and the workplace. Mobiles devices have been used for example to video-record educators' observations on their first days of training, enhancing observation, connections with peers and reflection on both their own and their peers' experiences (Maxfield and Romano 2013). Other authors have researched the benefits of mobile EPD for educators to receive timely feedback, to stay connected with peers, and to develop a broader understanding of learning spaces and learning networks (Dann and Allen 2015, Pegrum et al. 2013). Digitally-enhanced EPD is high in the agenda of various ETF countries: Uzbekistan, Turkey and Armenia are working to build a distance learning system to improve the professional level of VET educators, Belarus has invested in the creation of 48 Resource Centres with state of the art equipment to foster ICT-rich work of VET students, adult learners and educators (European Training Foundation 220).

Professional communities of practice

Educators' communities of practices (CoP) work through the interplay of individuals and groups of teachers and trainers within specific online and offline contexts, including peer-observation, observation visits, mentoring and coaching (Burke et al. 2015, Kuh 2016, Tseng and Kuo 2014), with the ultimate objective to improve educators' teaching practices. When a CoP emerges, participating educators use it to discuss problems, strategies, and solutions, and **teaching behavioural change becomes an ongoing, collective responsibility rather than an individual one** (Opfer and Pedder 2011). As noted by Parsons et al. already in 2009, peer learning and CoP approaches are key for the *reprofessionalisation* of VET educators. Research on the Finnish VET system concluded that network-based teacher education seems to work better, allowing educators to select different learning environments together with their students, depending on their needs (Tapani and Kukkonen, 2018). Also, **CoP are key to support mentoring**: in Finnish vocational education, future educators are asked to discuss their practice with their mentors within existing CoP (Teacher Education 2018). Among existing "institutionalised" CoPs, the Italian Association of Trainers (Associazione Italiana Formatori, AIF) aggregates around 2.500 VET educators including in-company, adult learning trainers, and freelance trainers and supports peer collaboration on issues such as skills development, competence certification and validation of prior learning. In Flanders, the *Lights on Learning* project supports a learner network of training professionals and practitioners consisting of 880 members, which uses 'network learning' to improve the continuous professional development of in-company trainers (Cedefop 2010). Also, participation in a teacher training community develops special knowledge and skills for teaching, influencing the way educators develop their professional identities (Fejes and Köpsén 2014).

Personal Learning Networks

**The use of Personal Learning Networks (PLN) is emerging as an important EPD strategy**, also as a response to the growing evidence of ineffectiveness of traditional top-down approaches such as expert-led workshops (Beauchamp et al. 2015, Oddone et al. 2019, Visser et al. 2014). In the context of EPD, PLNs can be defined as "complex systems of interactions consisting of people, resources and digital tools that support ongoing learning and professional growth" (Trust et al. 2016, p. 28). Differently from what happens in CoPs where the focus is on the community and on the learning relations that it can forster, **within PLN the focus is on the educator who is at the centre of a network of colleagues and experts**, and uses the knowledge produced by these connections as a way to develop professionally, through ICT-supported activities such as microblogging and social networking (Wright 2011). Research shows that **PLNs are increasingly becoming legitimate and effective approaches for educators' professional growth** (Trust et al. 2016) and that they actually support self-regulated and professional learning (Visser et al. 2014) by strengthening educators independence (Tour 2017), agency, accessibility, and reciprocity (Biddolph and Curwood 2016). Also, Carpenter and Kruta (2014) suggest that PLNs can facilitate beneficial interactions between pre-service and in-service teachers. On the negative side, some researchers note that educators tend to use their PLNs to retrieve knowledge without giving it back to the community (Prestridge 2017).

Innovative design based approaches

New practices are emerging not only in the way EPD actions are delivered, but also in the way they are designed. Educators themselves are increasingly part of the EPD design process, as in the case of the Veneto Region in Italy where their preferences and requirements represented the basis to design a major regional EPD programme specifically dedicated to VET teachers and trainers aiming to allow them to develop the competencies they felt they needed. (Sartori et al. 2015, Seeznik and Poell 2010). Also, social parties and employers are increasingly involved in the process of designing EPD activities, by bringing in their needs and concerns. This engagement, which is happening naturally wthin dual VET systems, is starting to become the morm also elsewhere. In th EU, such partnerships are starting to emerge both as nstitutionalised system practices (Ireland, France, Finland, the UK) and at the leve of individual cooperation arrangements between VET institutions and companies (Bulgaria, the Czech Republic, Lithuania, Malta, Romania) (Cedefop 2018). Working on the Australian context, Saunders (2012) has proposed a **Concerns Based Adoption Model** to guide the design and implementation of EPD programs, stressing that change should be considered as a process and not as an event, made by individuals first then by organizations: all of this should be considered when designing a PD intervention for educators. Stakeholders involvement is present as well in some of the existing **guidelines for EPD design** (Cedefop 2014, Dymock and Tyler 2018, McFadden and Williams 2020). As an example, evidence from research in the U.S. suggests that effective EPD should be designed by considering five features: content focus, active learning, coherence between content, goals, and activities of all stakeholders, sustained duration, and collective participation, connecting to the concept of interactive learning community (Desimone ad Garet 20152009).

The four **typologies of innovative EPD presented above** show a lot of overlapping, mainly connected to the use of ICT and of collaborative approaches, and seem to converge towards

a model of **educators as connected professionals** (Oddone et al. 2019), presented in Figure 2. This model incorporates the learning context, which comprises the pedagogical, personal, and public arenas of learning, the concept of *teacher as learner*, and the PLN approach, mediated through social technologies. By stressing the influence of connections, interactivity and autonomy, the model bears the potential to inspire different CPD innovative activities, and could serve as inspiration to design contemporary CPD initiatives.

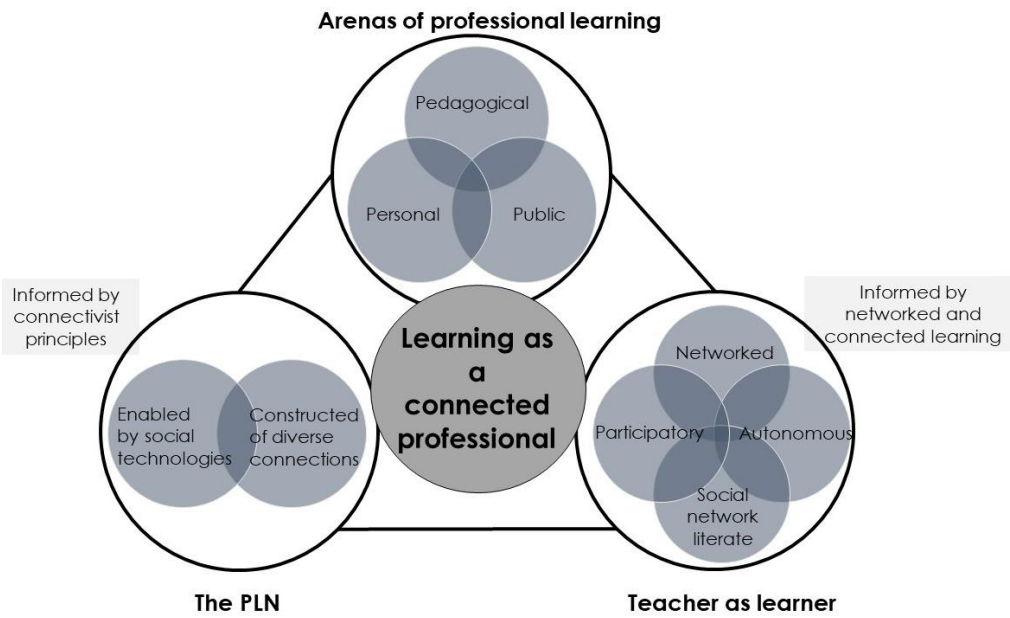


*Figure 3. Educators as connected professionals (Oddone et al. 2019)*

### 6.2 Key literature


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